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## The Long Persistence of Regional Entrepreneurship Culture: Germany 1925-2007

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# The Long Persistence of Regional Entrepreneurship Culture: Germany 1925–2005

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## Abstract

We investigate the persistence of levels of self-employment and new business formation in different time periods and under different framework conditions. The analysis shows that high levels of regional self-employment and new business formation tend to be persistent for periods as long as 80 years and that such an entrepreneurial culture can even survive abrupt and drastic changes in the politic-economic environment. We thus conclude that regional entrepreneurship cultures do exist and that they have long-lasting effects.

Keywords: Entrepreneurship, self-employment, new business formation, persistence, culture

JEL classification: L26, R11, O11

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## 1. Introduction

Studies of established market economies such as West Germany (Fritsch and Mueller, 2007), the Netherlands (van Stel and Suddle, 2008), Sweden (Andersson and Koster, 2011), the United Kingdom (Mueller, van Stel, and Storey, 2008), and the United States (Acs and Mueller, 2008) show that regional start-up rates tend to be relatively persistent and path dependent over periods of one or two decades. Hence, regions that have a relatively high level of entrepreneurship and start-up activity today can be expected to also experience high levels in the future. One main reason for this strong persistence could be that region-specific determinants of entrepreneurship also remain relatively constant over time, or, as stated by Marshall (1920), *natura non facit saltum* (nature does not make jumps). Another explanation could be the existence of a regional entrepreneurship culture, a phenomenon also known as “entrepreneurship capital” (Audretsch and Keilbach, 2004). An entrepreneurial culture should, at least to some degree, be independent of socio-economic conditions and may, therefore, even survive considerable shocks to the socio-economic environment, such as serious economic crises, devastating wars, and drastic changes of political regime.

We analyze the persistence of regional entrepreneurship in three different scenarios, each with a different degree of change in economic conditions. In contrast to extant work that studies time periods of up to 10–20 years (e.g., Andersson and Koster, 2011), we investigate persistence of regional entrepreneurship for periods as long as 80 years. Moreover, while work to date studies the persistence of entrepreneurship under stable socio-economic conditions, our examples include different kinds of disruptive changes or “jumps” in the conditions for entrepreneurship. Hence, the persistence of regional entrepreneurship that we find under such dramatically changing conditions cannot be caused by persistence of the determinants of entrepreneurial activity, but must be due to other reasons, such as a regional culture of entrepreneurship.

The *first scenario* we present is regional entrepreneurship in West Germany from 1984 to 2005, a period characterized by relatively stable

conditions without any major shocks to the socio-economic environment. For the *second scenario*, we extend our period of analysis to cover 80 years and compare regional entrepreneurship in West German regions in 1925 with the level of entrepreneurial activity in the 1984–2005 period. A number of considerable disruptions occurred during this period, including the world economic crisis of the late 1920s, World War II, occupation by the allied powers, massive in-migration, and a new constitutional base and political system, as well as reconstruction of the economy. If we find persistence of regional entrepreneurship in the second scenario, it can be viewed as an indication of an entrepreneurial culture that persists even in the face of severe ruptures with the past. The *third scenario*, East Germany between 1925 and 2005, is characterized by change even more drastic than that experienced in West Germany. While both parts of the country had very similar macroeconomic conditions until the end of World War II in 1945, East Germany then had 40 years under a socialist regime that more or less tried to completely extinguish private firms and entrepreneurship. German Unification in 1990 was another abrupt shock for East Germany, initiating, as it did, a dramatic transformation process to a market economy.

We find long-term persistence in all three scenarios, something that particularly remarkable in the third one involving East Germany. A high level of self-employment in 1925 has a significant positive effect on start-up activity 80 years later in 2005. Our findings can be regarded as a strong indication for the existence of a regional entrepreneurial culture that can survive even drastic and long-lasting changes to the socio-economic environment.

In the next section we review previous research on the persistence of regional entrepreneurship and discuss the concept of an entrepreneurial culture or entrepreneurship capital. The following sections analyze the persistence of entrepreneurship in the three scenarios described above. The final section (Section 6) discusses the results, draws policy conclusions, and proposes avenues for further research.

## 2. Persistence in Regional Entrepreneurship: Beyond Stability in Context

Studies of a number of established market economies have found that the regional level of new business formation tends to be rather constant over periods of 10–20 years.<sup>1</sup> One obvious explanation for this phenomenon could be that regional determinants of new business formation and their effects are relatively stable over time. Indeed, variables shown to be conducive to the emergence of new firms, such as qualification of the regional workforce or employment share in small firms (Fritsch and Falck, 2007), do tend to remain fairly constant over successive years. Some authors claim that the persistence of start-up rates may indicate the presence of an entrepreneurial culture (Andersson and Koster, 2011), sometimes referred to as “entrepreneurship capital” (Audretsch and Keilbach, 2004).

An entrepreneurial culture is typically understood “as a positive collective programming of the mind” (Beugelsdijk, 2007, 190) oriented toward entrepreneurial values such as individualism, independence, and achievement.<sup>2</sup> Etzioni (1987) argues that one important aspect of entrepreneurial culture is spatial variation in social acceptance of entrepreneurs and their activities. According to him, the degree of societal legitimacy when it comes to entrepreneurship may be higher in some regions than in others. As a consequence, the more entrepreneurship is regarded as legitimate, the higher the demand for it and the more resources dedicated to such activity. This social acceptance of entrepreneurship can be regarded as an informal institution that typically changes only gradually over time (North, 1994). In an approach inspired by social psychology, Fornahl (2003) conceptualizes how a specific regional attitude toward entrepreneurship may emerge via the presence of positive local examples or role models. The main idea of this approach is that an individual’s perception of entrepreneurship—the cognitive representation—is shaped by observing entrepreneurial role

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<sup>1</sup> Acs and Mueller (2008), Andersson and Koster (2011), Fritsch and Mueller (2007), Mueller, van Stel, and Storey (2008), and van Stel and Suddle (2008).

<sup>2</sup> See also Aoyama (2009), Davidsson and Wiklund (1997), Fornahl (2003), Minitti (2005), Andersson and Koster (2011), and Lafuente, Vaillant, and Rialp (2007).

models in the social environment. This leads to learning from the role models, increases the social acceptance of entrepreneurial lifestyles, and raises the likelihood of adopting entrepreneurial behavior. With respect to learning, Sorenson and Audia (2000) argue that observing successful entrepreneurs enables potential entrepreneurs to organize the resources and activities required for starting and running one's own venture and increases individual self-confidence, in the sense of "if they can do it, I can, too" (Sorenson and Audia, 2000, 443). Accordingly, having a relatively high number of entrepreneurs in a region is conducive to new business formation probably because it provides opportunities to learn about entrepreneurial tasks and capabilities.<sup>3</sup>

These findings suggest that regional entrepreneurship might become self-reinforcing, as Minniti (2005) puts it. She provides a theoretical model that, based on the above-mentioned regional role model effects, can explain why regions with initially similar characteristics may end up with different levels of entrepreneurial activity. Chance events at the outset of such a process may induce entrepreneurial choice among individuals that leads to different levels of regional entrepreneurship, which may, in turn, attract other actors to the region. The presence of entrepreneurial role models in the social environment reduces ambiguity for potential entrepreneurs and may help them acquire necessary information and entrepreneurial skills. In this way, entrepreneurship creates a sort of perceptual non-pecuniary externality that spurs additional start-up activity and makes entrepreneurship self-reinforcing.<sup>4</sup> In Minniti's model, this self-reinforcing effect of entrepreneurship depends critically on the ability of individuals "to observe someone else's behavior and the consequences of it" (Minniti, 2005, 5). Thus, regional social capital, the properties of regional networks, and, particularly, regional entrepreneurial history play a role in the region's level of entrepreneurship. In

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<sup>3</sup> This is an implication of the highly significantly positive effect of the small business employment share on the regional level of start-ups (see, e.g., Fritsch and Falck, 2007) because such a high share of employment in small businesses indicates the presence of relatively many firms and entrepreneurs.

<sup>4</sup> "[I]n addition to economic circumstances, the local amount of entrepreneurial activity is itself an important variable in determining individual decisions whether to act upon a recognized opportunity. In other words, I argue that entrepreneurship creates a 'culture' of itself that influences individual behavior in its favor" (Minniti, 2005, 3).

the same sense, Fornahl (2003) argues that self-augmenting processes lead to the emergence of cognitive representation in favor of entrepreneurship, which translates into an increasing number of entrepreneurs in the region and a specific regional entrepreneurial attitude. Indeed, Andersson and Koster (2011), in an empirical analysis of Swedish regions, find that the positive effect of past start-up activities on the present level of new business formation is particularly pronounced in regions with relatively high start-up rates in previous years.

A regional culture of entrepreneurship, however, may need more than societal legitimacy of entrepreneurship, individuals able and willing to start firms, role models, networks, and peer effects. An infrastructure of supporting services, particularly the availability of competent consulting as well as financial institutions able and willing to invest (Audretsch and Keilbach, 2004), may also be necessary. In short, there are many aspects of the regional environment that may be, to different degrees, conducive to new business formation (Dubini, 1989).<sup>5</sup>

Thus, to summarize the literature, a regional entrepreneurial culture may exist and persist for mainly three reasons:

- the presence of role models and peer effects,
- social acceptance of entrepreneurship, and
- the existence of entrepreneurial supporting services and institutions (e.g., financing and advice).

Because these factors change only gradually over time as well as due to the self-reinforcing effects mentioned above, a regional culture of entrepreneurship should not only take a considerable time to develop, but

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<sup>5</sup> Dubini (1989) distinguishes between munificent and sparse entrepreneurial environments. A munificent entrepreneurial environment is characterized by a large number of entrepreneurial role models, an efficient infrastructure, well-established capital markets, and the availability of opportunities and incentives for starting entrepreneurial ventures. A sparse entrepreneurial environment lacks not only the values, culture, and tradition of entrepreneurship, but also the necessary infrastructure, well-functioning capital markets, and current innovation activities that may generate entrepreneurial opportunities, as well as government incentives. Hence, incentives for starting firms in such an environment are rather low.

should also be long-lasting, so that it may be regarded as a certain kind of “capital.” Moreover, even if supportive institutional infrastructure for entrepreneurship is destroyed, as was the case in East Germany under its socialist regime, the regional population’s positive attitude toward entrepreneurship might continue to prevail for some time.

There is considerable evidence for the long-term persistence of informal institutions in general. Becker et al. (2010), for instance, compare Eastern European regions that had been affiliated with the Habsburg Empire with regions that had not. They show that having been part of the Habsburg Empire in the past increases current trust and reduces corruption of police and courts compared to other regions with the same formal institutions but no past association with the Habsburg Empire. Alesina and Fuchs-Schuendeln (2007) arrive at a similar result for East Germany. They find that East German citizens who were exposed to the socialist regime until German Reunification in 1990 are much more in favor of redistribution and state intervention than their West German counterparts. That study, however, does not distinguish between regions within East Germany. A very long persistence of regional informal institutions is vividly illustrated by Voigtlaender and Voth (2011). The authors show that German regions that experienced anti-Semitic violence in the 14<sup>th</sup> century also had higher levels of violence against Jews in the 1920s and 1930s. If such attitudes can survive for centuries, it seems possible that other attitudes, such as those toward entrepreneurship, might also be long-term characteristics of a region, surviving even such disruptive events like world wars or institutional upheavals such as the transition from communism to a market economy in East Germany, which involved a rapid change of the norms and values that underlie economic activity (Newman, 2000).

### **3. Scenario I: Persistence of Regional Entrepreneurship in a Stable Environment—West Germany 1984–2005**

We begin our analysis of the persistence of regional entrepreneurship by looking at the rather stable environment of West Germany, which has already been investigated by Fritsch and Mueller (2007). We use the same



data source as that paper, but slightly extend the period of analysis (1984-2005) to more than 20 years. The analysis is at the level of 71 Planning Regions,<sup>6</sup> which represent functional spatial units. The data on start-up activity are obtained from the German Social Insurance Statistics. This dataset contains every German establishment that employs at least one person obliged to pay social insurance contributions (Fritsch and Brixy, 2004). The start-up rate is measured in accordance with the labor market approach (Audretsch and Fritsch, 1994), whereby the number of annual start-ups in the private sector is divided by the sum of employees in the private sector plus registered unemployed persons.<sup>7</sup> The regional self-employment rate is the number of establishments in a region's non-agricultural private-sector industries divided by the regional workforce (including registered unemployed persons). Figure 1 shows the regional start-up rates in Germany today.

There are considerable regional differences in the levels of new business formation in Germany at the end of the observation period, 2005 (Figure 1). The figure reveals that start-up rates tend to be higher in West Germany compared to East Germany. The on average lower level of new business formation in East Germany probably has to do with problems of transitioning to a market economy after having been under a socialist regime for 40 years. Due to this legacy, East Germany can be regarded a distinct regional growth regime (Fritsch, 2004).

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<sup>6</sup> There are actually 74 West German Planning Regions. For administrative reasons, the cities of Hamburg and Bremen are defined as planning regions even though they are not functional economic units. To avoid distortions, we merged these cities with adjacent planning regions. Hamburg has been merged with the region of Schleswig-Holstein South and Hamburg-Umland-South. Bremen has been merged with Bremen-Umland. Thus, the number of regions in our sample is 71.

<sup>7</sup> Start-ups in agriculture are not considered in the analysis.

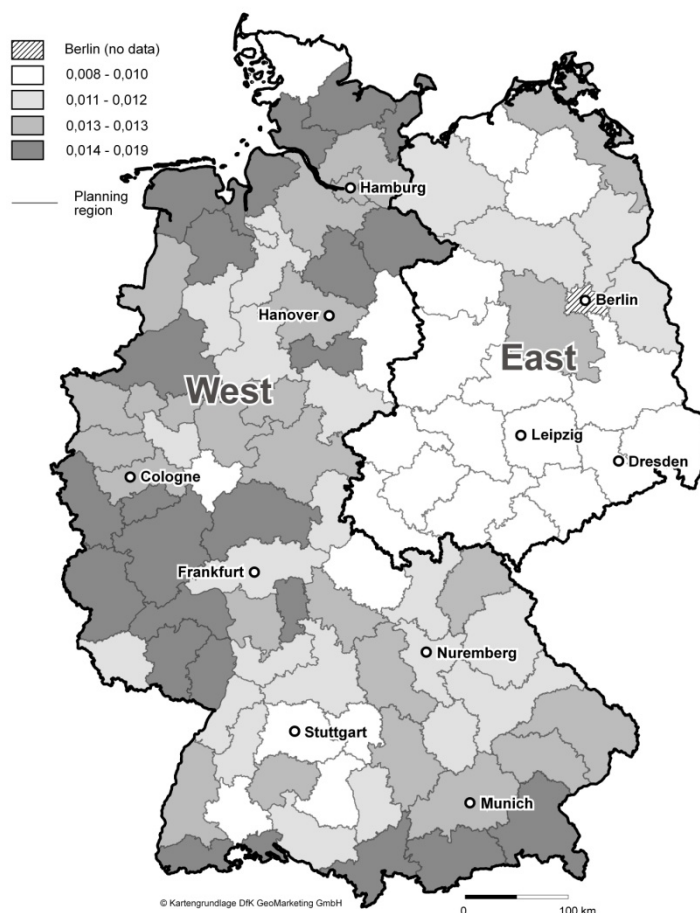


Figure 1: Start-up rates in German planning regions 2005

Regional start-up rates and self-employment rates are highly correlated over time (Table 1; see Table A1 and A2 in the Appendix for descriptive statistics). The relationship is not as close for years that are farther apart, but even over a 20-year period, the value of the correlation coefficient always remains above 0.85 for the self-employment rate and 0.7 for the start-up rate. That this correlation is stronger for the self-employment rate presumably is due to the stock character of this variable. Figures 2 and 3 illustrate the high degrees of variation across regions, as well as the high persistence of regional levels of new business formation and self-employment over time.

Table 1: Correlation of self-employment rates and start-up rates over time—  
West Germany, 1984–2005

	t-1	t-5	t-10	t-15	t-20
Self-employment rate t=0	0.995***	0.97***	0.93***	0.86***	0.87***
Start-up rate t=0	0.95***	0.90***	0.85***	0.76***	0.72***

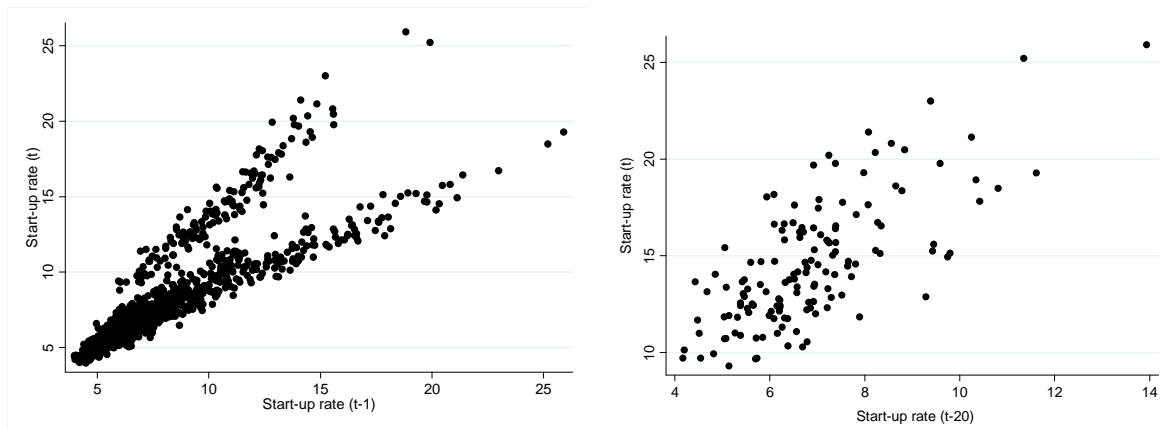


Figure 2: Relationship between start-up rate (per 1,000 individuals) in t and t-1 (left) and t and t-20 (right)

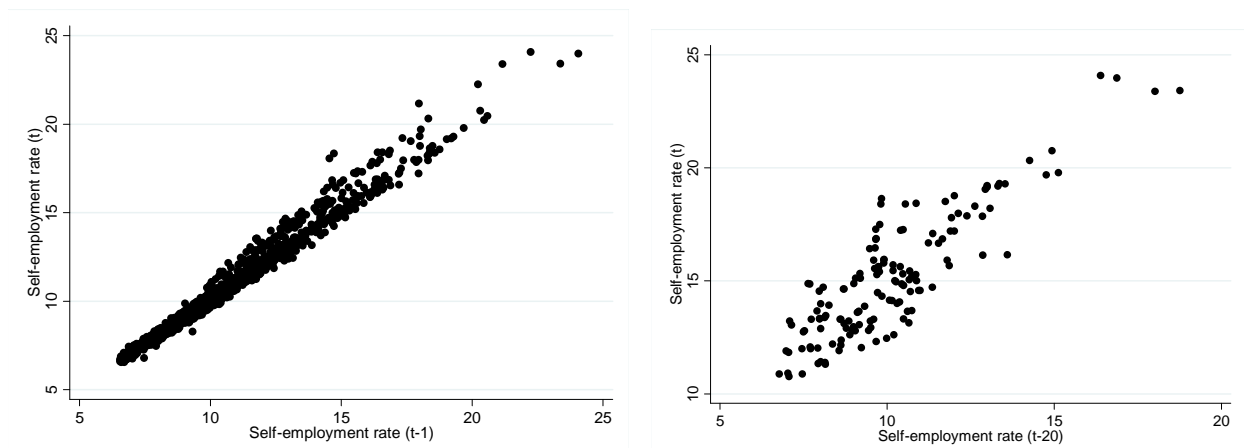


Figure 3: Relationship between self-employment rate (in %) in t and in t-1 (left) and t and in t-20 (right)

Table 2: The effect of past start-up rates on the current start-up rate in West Germany, 1984–2005

	I	II	III
	1984–2005		2000–2005
Start-up rate (t-1)	0.438*** (0.0238)	0.503*** (0.0258)	0.665*** (0.0501)
Start-up rate (t-2)	0.108*** (0.0143)	-	-
Start-up rate (t-3)	0.130*** (0.0169)	-	-
Population density (log) (t-1)	-0.0003* (0.0001)	-0.0004** (0.0002)	-0.0011*** (0.0004)
Share of R&D personnel (t-1)	0.0157** (0.0072)	0.0229*** (0.0074)	0.0472*** (0.0137)
Unemployment rate (t-1)	0.0045* (0.0024)	0.0001 (0.0026)	0.0278*** (0.0094)
Federal State dummies	***	***	***
Constant	0.0029*** (0.0008)	0.0051*** (0.0008)	0.0051*** (0.0019)
Number of observations	1,349	1,349	355
F-value	252.16***	191.90***	22.72***
R <sup>2</sup> <sub>adj.</sub>	0.793	0.770	0.459

*Notes:* Dependent variable: Regional start-up rate in t0. Pooled OLS regressions. Robust standard errors in parentheses. \*\*\*: statistically significant at the 1 percent level; \*\* statistically significant at the 5 percent level. There is a jump in the number of start-ups in 1999, which is controlled for by employing a dummy.

For a more in-depth analysis, we regress the current regional start-up rate on lagged values of some other variables intended to control for relevant characteristics of the regional environment. These control variables include regional population density, which represents a “catch-all” variable of regional characteristics, the employment share of R&D personnel, which may indicate the level of innovative entrepreneurial opportunities available in a region, and the local unemployment rate (for a discussion of these variables, see Fritsch and Mueller, 2007). Federal State dummies were included to capture effects of different political conditions and spatial autocorrelation. Robust standard errors are employed to account for heteroskedasticity (White, 1980). We run the model for the 1984–2005 period but also show the results of a model restricted to the years 2000 to 2005 for reasons of comparability with the

analysis that we perform for East Germany in Section 5. The results indicate a highly significant positive effect of new business formation during previous periods on current start-up rates (see Table 2). In line with the previous analysis by Fritsch and Mueller (2007), we find that the share of R&D personnel has a significant positive effect on the level of regional new business formation, whereas the effect of population density is significantly negative in two of the three models.<sup>8</sup> The local unemployment rate has a significant positive effect on start-up activity only when the analysis is restricted to the 2000-2005 period.<sup>9</sup> Looking at the over-time variation in the determinants of new business formation we also find a high degree of stability (see Table A3 in the Appendix). This indicates that the persistence of regional start-up rates in West Germany in the 1984–2005 period may be well explained by rather stable framework conditions.

In a further step, we follow Andersson and Koster (2011) and run quantile regressions. The idea behind this analysis is that the effect of a persistent culture of entrepreneurship that leads to persistence of start-up rates should be particularly strong in regions with relatively high levels of new business formation. Due to the extremely high correlation between start-up rates in successive years, we restrict the model to the start-up rate in  $t-3$  and the control variables as shown Table 2.<sup>10</sup> We do indeed find that the estimated marginal effect of previous levels of new business formation tends to be stronger the higher the level of new business formation. This indicates that persistence of start-up activity is especially reinforced in those regions that have experienced high levels of new business formation in the past.

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<sup>8</sup> Population density and the share of R&D personnel are highly correlated. Excluding the latter variable makes the effect of population density insignificant. This suggests that density does not have a negative effect per se.

<sup>9</sup> Fritsch and Mueller (2007) find a negative effect of the local unemployment rate. Restricting the period to the years analyzed by Fritsch and Mueller (2007) makes the unemployment rate significantly negative. The pronounced positive effect of the unemployment rate on start-up activity in the 2000–2005 period may be due to the introduction in 2002 of programs aimed at promoting start-ups by unemployed persons.

<sup>10</sup> Running the model with the start-up rate in  $t-1$ ,  $t-2$ , or  $t-4$  does not much change the results.

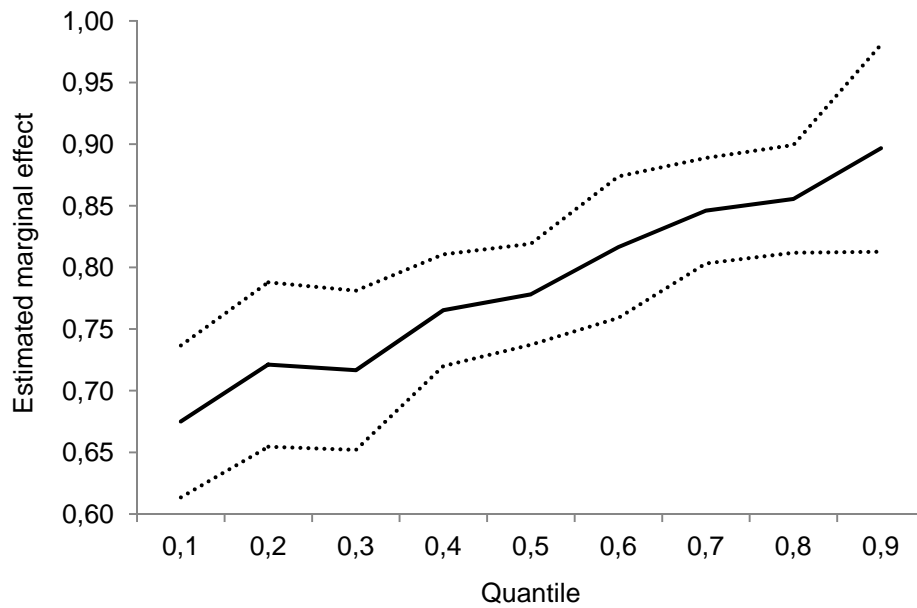


Figure 4: Estimated marginal effect of the start-up rate in t-3 on the start-up rates in t0 in West Germany (dotted lines indicate upper and lower confidence intervals; bootstrapped standard errors with 1,000 replications)<sup>11</sup>

Altogether, the results show the same persistency pattern of start-up activity as found by Fritsch and Mueller (2007) for a slightly extended period of analysis. Whether this pattern of persistency of regional entrepreneurship is mainly caused by the relatively stable framework conditions during this period or whether persistence can be found over a longer period that includes some drastic changes in the economic and political environment is investigated in the following scenarios.

#### 4. Scenario II: Persistence of Regional Entrepreneurship in the Face of a World War Followed by Massive In-Migration—West Germany 1925–2005

The second scenario is characterized by considerable disruption: the world economic crisis of 1929, World War II, occupation by the allied powers,

<sup>11</sup> Due to a jump in the recorded level of start-up activity that is probably caused by some post-1998 changes in the reporting system of the Social Insurance Statistics, including the years 1999–2005 leads to fuzzy results. Therefore, the quantile regressions for West Germany are restricted to the period 1984–1998.

massive in-migration of refugees from former territories, separation into East and West Germany, reconstruction of the country, and German Reunification. The indicator for the presence of regional entrepreneurship prior to the shock events is the self-employment rate in 1925. This is the number of self-employed persons in non-agricultural private sectors divided by all employees. The historical data are based on a comprehensive survey conducted in 1925 (Statistik des Deutschen Reichs, 1927). The self-employment rate in 1925 measures the share of role models within the total regional employment, thereby reflecting how widespread self-employment was across regions prior to the disruptive shock events.

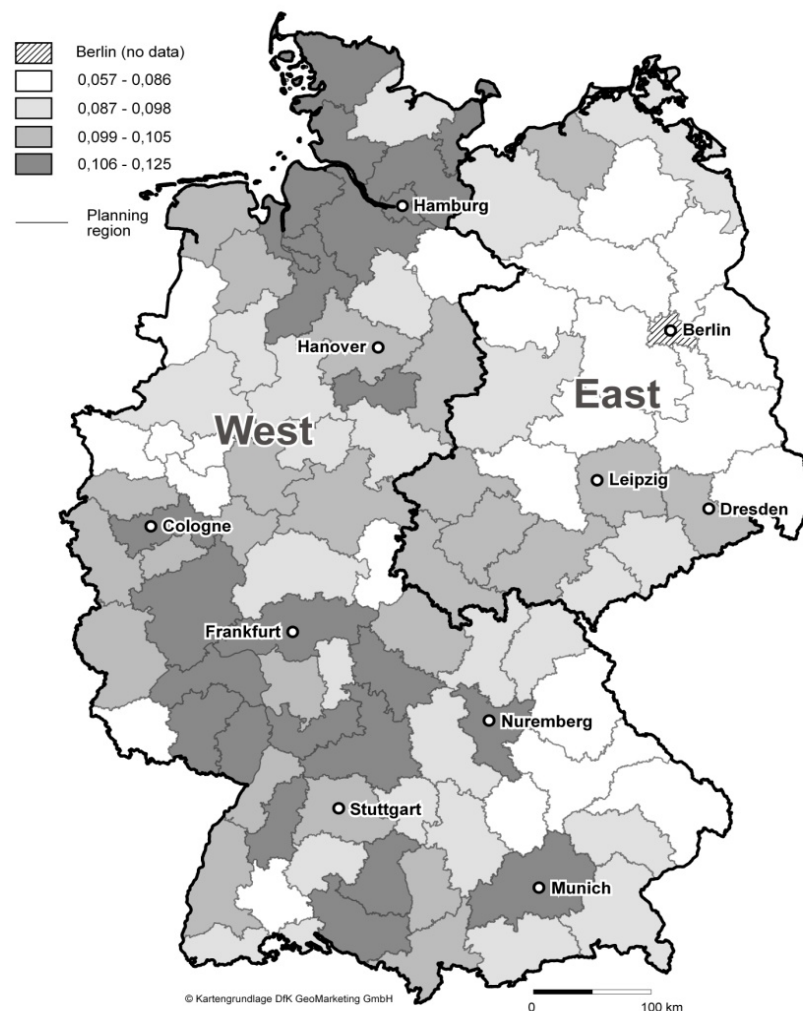


Figure 5: Share of self-employed persons in non-agricultural sectors in total employment in German regions 1925

Figure 5 shows the distribution of 1925 self-employment rates across the regions of Germany. A first observation is that these self-employment rates were, on average, higher in regions that became West Germany after World War II. Regions with relatively high self-employment rates are especially to be found around the urban centers of Hamburg, Frankfurt, Cologne, Munich, and Nuremberg. Also, the southwestern part of Germany, which is known for its innovative spirit and entrepreneurial culture (e.g., Baten et al., 2007), had high levels of self-employment in 1925. Regions with relatively low self-employment rates in West Germany include the Ruhr area north of Cologne, which is characterized by a high concentration of large-scale industries such as mining and steel processing, and a number of rural regions in the east and the southeast

Table 3: Correlation of self-employment rate in 1925 with self-employment rates and start-up rates over time—West Germany, 1984–2005

	I	II	III
I Self-employment rate 1984–2005	1		
II Start-up rate 1984–2005	0.853***	1	
III Self-employment rate 1925	0.153***	0.085***	1

\*\*\*: statistically significant at the 1 percent level.

Correlation coefficients between the self-employment rate in 1925 and self-employment as well as start-up rates for the 1984–2005 period show a highly significant positive relationship (Table 3; see Tables A4 and A5 in the Appendix for descriptive statistics). Regressing the start-up rates for the years 1984–2005 on the self-employment rate in 1925 reveals a significant positive effect (Table 4). Controlling for the industry structure in 1925 does not change this pattern.<sup>12</sup> The effect of the employment share of R&D personnel is significantly positive, like in the analysis of Scenario I, whereas population density is now insignificant (Table 2). One contrasting result is the

<sup>12</sup> The employment shares of three large economic sectors—construction, manufacturing, and other industries—in 1925 have been used to control for the economic structure of the regional economy. Employing a more detailed industry classification would not considerably change the results.



significantly negative effect of the unemployment rate. This result is in line with the analysis of Fritsch and Mueller (2007) for 1984–2002. The significant effect of the self-employment rate strongly indicates persistence of regional differences in start-up activity over longer time periods that include several disruptive shocks to environmental conditions.

Table 4: The effect of the self-employment rate 1925 on regional start-up rates in West Germany 1984–2005

	I	II	III
	Start-up rate		
Self-employment rate 1925	0.0106** (0.00524)	0.0229*** (0.00547)	0.0133** (0.00565)
Population density (log) (t-1)	-	-	0.00004 (0.00015)
Share R&D personnel (t-1)	-	-	0.0225*** (0.0069)
Unemployment rate (t-1)	-	-	-0.0092*** (0.0028)
Industry structure 1925	-	***	***
State dummies	***	***	***
Constant	0.0061*** (0.00065)	0.0036*** (0.0009)	0.0050*** (0.0011)
Number of observations	1,349	1,349	1,349
F-value	209.35***	210.89***	186.20***
R <sup>2</sup> <sub>adj.</sub>	0.782	0.802	0.806

*Notes:* Dependent variable: Regional start-up rate in t0. Pooled OLS regressions. Robust standard errors in parentheses. \*\*\*: statistically significant at the 1 percent level; \*\* statistically significant at the 5 percent level; \*: statistically significant at the 10 percent level. There are jumps in the number of start-ups for years after 1998, which are controlled for by employing respective year dummies.

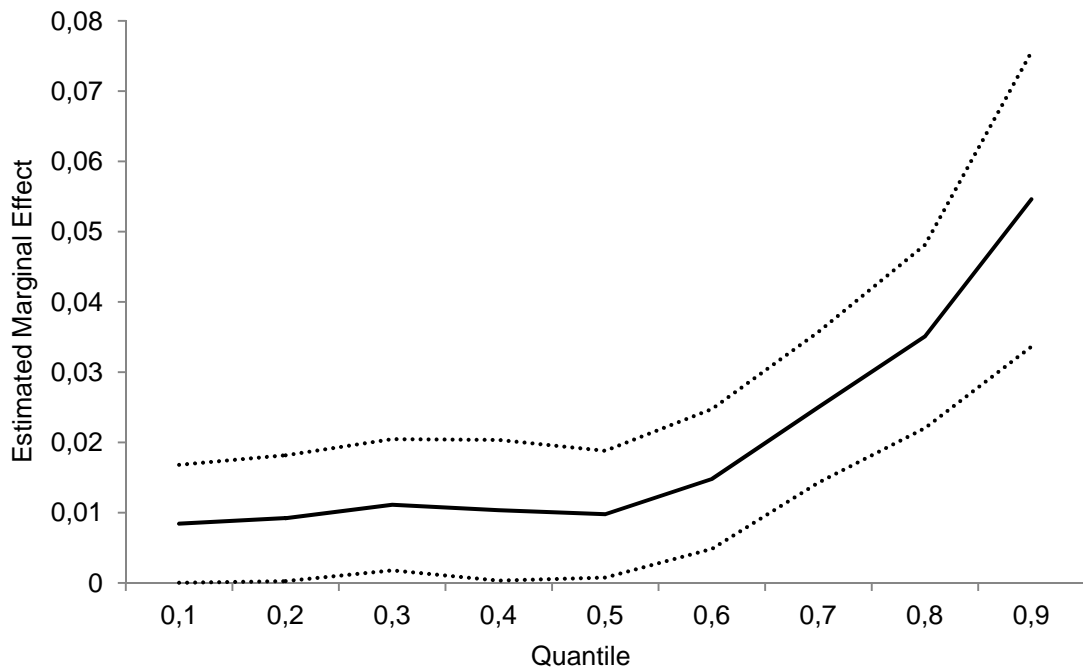


Figure 6: Estimated marginal effect of the self-employment rate in 1925 on the start-up rates in West Germany (dotted lines indicate upper and lower confidence intervals; bootstrapped standard errors with 1,000 replications)

For Scenario II, we again applied quantile regressions. We want to discover how the effect of historical self-employment rates differs across quantiles (Figure 6). The highest marginal effect can be found for the upper quantiles of the distribution. Thus, persistence is particularly pronounced in those regions that had high levels of self-employment prior to the disruptive historical shocks that characterized Scenario II.

##### **5. Scenario III: Persistence of Regional Entrepreneurship in the Face of a World War, 40 Years of Socialist Regime, a Shocking Transformation Process, and Massive Out-Migration—East Germany 1925–2005**

In the final scenario, we investigate persistence of regional entrepreneurship in East Germany from 1925 to 2005. During this time, East Germany experienced considerably more severe shocks than did West Germany. In addition, to the world economic crisis of 1929 and World War II, this part of the country was part of the Soviet bloc and under a socialist regime for 40 years, followed by a shock-treatment-like transformation process that caused

severe economic problems as well as considerable out-migration. East Germany's 40 years of socialist regime after World War II are of particular interest for our analysis because, during this period, the region was host to a great deal of policy intended to eradicate entrepreneurship. During the socialist regime, collectivist values were strongly favored and entrepreneurship was perceived as a bourgeois anachronism (e.g., Pickel, 1992; Thomas, 1996). Hence, an anti-entrepreneurship policy strategy was adopted that included massive socialization of private enterprises and the suppression of any remaining private-sector activity (for details, see Brezinski, 1987; Pickel, 1992). As a result, the self-employment rate at the end of the GDR regime in 1989 was only about 1.8 percent compared to 10.5 percent in West Germany. The few private firms in existence were primarily found in those small trades ill-served by inflexible centrally planned state firms.

The introduction of a market economy into East Germany in 1990 can be regarded as a "shock transition"; the ready-made formal institutional framework of West Germany was adopted practically overnight (e.g., Brezinski and Fritsch, 1995; Hall and Ludwig, 1995). Between 1989 and 1991, the share of manufacturing employment dropped from 48.7 percent to 16.0 percent (Hall and Ludwig, 1995) and unemployment rose from virtually zero in 1989 to more than 15 percent in 1992 (Burda and Hunt, 2001). These developments induced massive out-migration, especially of young and qualified workers (Hunt, 2006). Even now, more than 20 years after this transformation process began, nearly all East German regions lag considerably behind their West German counterparts.

With the transformation to a market economy system, new business formation in East Germany started to boom, particularly in the services and construction sectors. However, it took until 2005—15 years—before the self-employment rate in East Germany matched that of West Germany. Despite the now similar levels of self-employment, however, characteristics of the new businesses in terms of industry affiliation, survival, and number of employees are quite different between the two regions. Start-ups in East Germany since 1990 have been much more concentrated in sectors

characterized by a small minimum efficient size, particularly construction, tourism, and consumer services. They have lower survival rates (Fritsch, Noseleit, and Schindele, 2012) and, on average, fewer employees than new businesses set up in West Germany during the same period. In short, East Germany did not become a carbon copy of West Germany but is instead, due to its socialist legacy, a distinct regional growth regime (Fritsch, 2004).

Analyzing the persistence of East German start-up rates in successive years is limited by the relatively short time series of available data and by the turbulence of the transformation process, which was particularly pronounced during the 1990s. Therefore, we restrict this analysis to start-up rates for 2000–2005 and include only the start-up rate of the previous period ( $t-1$ ) so as not to lose too many observations. The spatial framework consists of the 22 East German Planning Regions. The region of Berlin is excluded since it is not possible to distinguish between the eastern and western part of the city, the latter of which was not under socialist regime. We use information on the self-employment rate in 1925, the self-employment rate at the end of the socialist period in 1989,<sup>13</sup> and the start-up rates during the 2000-2005 period.<sup>14</sup>

A first result is that there is a significant positive relationship between the regional self-employment rates for 1925, 1989, and 2000–2005, indicating high levels of persistence of entrepreneurship despite a number of severe shocks (Table 5). The significantly positive correlation of self-employment in 1925 with that in 1989, which marks the demise of the GDR regime, is particularly remarkable. This statistical relationship indicates that the policy of crowding out private initiative during the socialist regime had weaker effects in areas with high levels of self-employment before World War II. This may be regarded as an indication of regional differences in resistance to anti-entrepreneurship policies that are reflective of strong entrepreneurial intentions and the strength of the regional entrepreneurship culture.

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<sup>13</sup> The information on self-employment in 1989 was obtained from the GDR statistical Office and has been adjusted to the actual definition of spatial units (for details, see Kawka, 2007).

<sup>14</sup> The self-employment rate in 1989 is the number of self-employed divided by the number of all employees. Unfortunately, it is not possible to tell from the available data to which sectors the self-employed belonged.

Relatively high levels of continuing self-employment are found in regions that had a relatively strong tradition in the manufacturing sector prior to World War II, such as Chemnitz and Dresden (Figure 7) (for a more detailed description, see Wyrwich, 2012).

Table 5: Correlation between self-employment rates in 1925, 1989, and 2000–2005 and start-up rates in 2000–2005 in East German regions

	I	II	III
I Self-employment rates 2000–2005	1		
II Start-up rates 2000–2005	0.486***	1	
III Self-employment rate 1925	0.290***	-0.105	1
IV Self-employment rate 1989	0.391***	-0.235***	0.308***

\*\*\*: statistically significant at the 1 percent level.

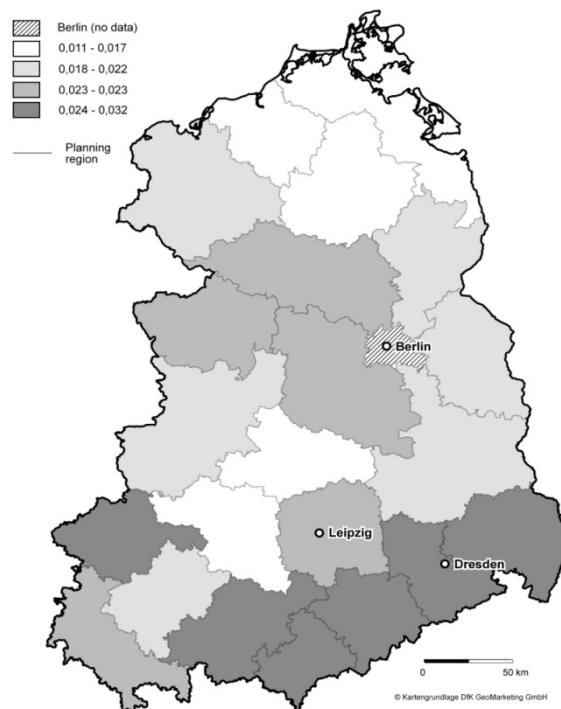


Figure 7: Self-employment rates in East German regions 1989

During the 2000–2005 period, the correlation coefficient between the start-up rate in year  $t$  and in  $t-1$  in East German regions is 0.846, indicating a high level of persistence. However, the relationship between the self-employment rate of 1989 and the start-up rates of the 2000–2005 period is significantly negative (Table 5). This result is most certainly related to transition-specific effects, such as the boom in construction company start-ups and the rather high share of new businesses in the service sector, especially in small-scale consumer services, a sector underdeveloped in the GDR economy. Many of these service-sector start-ups occurred out of necessity, for example, because there were no other jobs available. Accordingly, the correlation coefficient between the start-up rate and the unemployment rate has a positive value, albeit not a statistically significant one (see Table A5 in the Appendix). Thus, the level of local unemployment that was mainly caused by the transition to a market economy might confound a positive effect of the historical self-employment rate on start-up activity. Thus, if persistence is at play, there should be a positive significant effect of the historical self-employment rates when controlling for local unemployment in a multivariate framework (Table 6).

The regression analysis for East Germany shows a considerable persistence of regional start-up rates in the 2000–2005 period (Model I in Table 6). Also, the share of R&D personnel, population density, and the unemployment rate are statistically significant with the expected signs. Models II, III, and IV also show a significant positive effect of the self-employment rate of 1925 and the self-employment rate of 1989 also proves to have a highly significant positive effect (Model V). The results strongly indicate persistence of regional entrepreneurship. Quantile regressions using Model IV show that the effect of the self-employment rate in 1925 on current start-up activity is strongest for those regions with the highest levels of self-employment 80 years earlier (Figure 8).

Table 6: The effect of self-employment rates in 1925 and 1989 on current levels of new business formation in East Germany in the period 2000 to 2005 (Scenario III)

	I	II	III	IV	V
	Start-up rate				
Start-up rate (t-1)	0.365*** (0.0789)	-	-	-	-
Self-employment rate 1925	-	0.0495** (0.0205)	0.0502** (0.0213)	0.0888*** (0.0292)	-
Self-employment rate 1989	-	-	-	-	0.148** (0.0570)
Population density (log) (t-1)	-0.0009** (0.0004)	-	-	-0.0006 (0.0006)	0.0008 (0.0006)
Share R&D personnel (t-1)	0.0540*** (0.0173)	-	-	0.0239 (0.0220)	0.0128 (0.0205)
Unemployment rate (t-1)	0.0096* (0.0054)	-	-	0.0158** (0.0069)	0.0125** (0.0063)
Industry structure 1925	-	-	***	***	***
State dummies	***	***	***	***	***
Constant	0.0074*** (0.0022)	0.0049** (0.0021)	0.0021 (0.0034)	-0.0024 (0.0042)	-0.0034 (0.0051)
F-value	9.16***	9.44***	9.00***	7.47***	6.67***
Number of observations	110	110	110	110	110
R <sup>2</sup> <sub>adj.</sub>	0.433	0.341	0.404	0.444	0.420

*Notes:* Dependent variable: Regional start-up rate in t0. Pooled OLS regressions. Robust standard errors in parentheses. \*\*\*: statistically significant at the 1 percent level; \*\* statistically significant at the 5 percent level; \*: statistically significant at the 10 percent level.

The findings for Scenario III demonstrate that there is significant persistence of a regional entrepreneurship culture over long periods of time, one that has even survived four decades of socialism characterized by anti-entrepreneurship policy. That regional entrepreneurship has persisted in light of this background strongly suggests the survival of a positive perception of entrepreneurship in some regions.

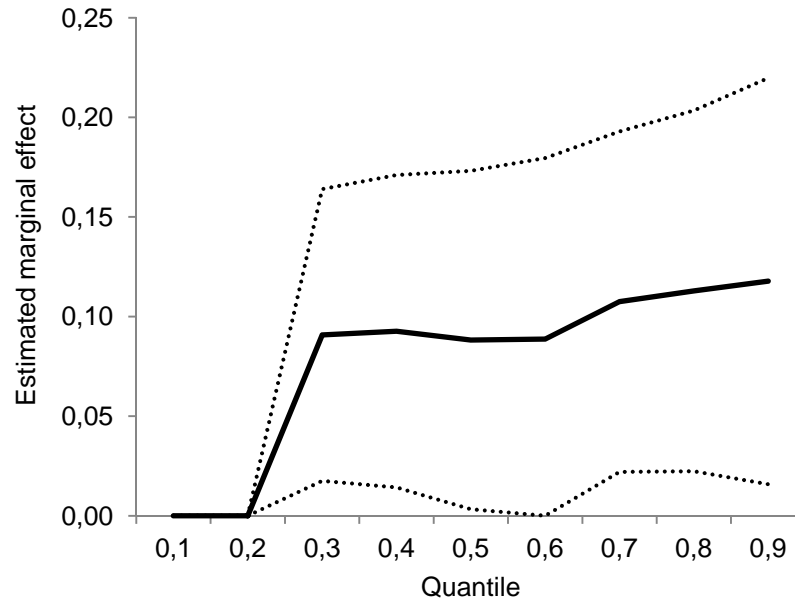


Figure 8: Estimated marginal effect of the self-employment rate in 1925 on the start-up rates in East Germany (dotted lines indicate upper and lower confidence intervals; bootstrapped standard errors with 1,000 replications)

## 6. Discussion and Conclusions

Our empirical investigation revealed pronounced persistence of self-employment and start-up rates in German regions over long periods of time, which is a strong indication for the presence of a regional entrepreneurship culture that has long-lasting effects. The fact that such a regional culture of entrepreneurship can survive even abrupt and harsh changes in environmental conditions such as, in the case of East Germany, World War II and 40 years of socialist regime (Scenario III) shows that persistence of a regional culture of entrepreneurship is only partially due to stability in the regional determinants of entrepreneurship. It turns out that a regional culture of entrepreneurship can survive the destruction of supportive infrastructure, as was the case in East Germany during 40 years of a socialist regime. The findings for East Germany are particularly strong evidence that peer effects and regional norms and values can create a positive “mental software” in the regional population that is not forgotten in times of hostile environmental conditions. This finding is even more remarkable given the massive migration



into West German regions and out of East German regions after World War II. Obviously, a regional culture of entrepreneurship is a strong force that, once developed, can survive and influence regional development for long periods of time. History matters!

The high level of persistence of regional entrepreneurship that we found implies not only long-term benefits once an entrepreneurial culture has developed; the stability of regional levels of self-employment and new business formation also strongly suggests that the establishment of an entrepreneurial culture may require long periods of time and considerable political effort. Hence, trying to build a regional entrepreneurial culture can be regarded as an investment in a kind of capital stock that may have a main effect only in the long run, but which will be a long-lasting one.

These results give rise to at least two important questions. First, what are the sources of a regional entrepreneurship culture? Analyses of historical examples of the emergence of an entrepreneurship culture may be particularly helpful for answering the second question, which is: "What can policy do to stimulate the development of a regional entrepreneurship culture"? Our knowledge about the emergence of high levels of regional entrepreneurship is currently rather limited, leaving much room for speculation. In many regions, the sources of an entrepreneurship culture may be deeply rooted in economic history. Maybe the type of agriculture that prevailed in a region, e.g., large-scale farming with many employees (like in northeast Germany) versus small family-run farms (such as are found in the German region Baden-Wuerttemberg), plays a role. Differences in the structure of agriculture may be based in socio-political reasons, but they may also have to do with the quality of the soil or with certain social practices, such as the mode of inheritance. If, for example, it has been common practice in a region to divide the land among the beneficiaries in real terms (*Realteilung*), the resulting small lots created an incentive to shift economic activity toward some type of craft business, maybe first as a secondary occupation that later became the main source of income. This is an often-heard explanation for the emergence of an economic structure characterized by relatively many small firms in some regions in the south of Germany. This

type of economic shift would not have been so likely to occur, however, if land was cohesively transferred to one beneficiary only (*Anerberecht*), as was the case in other regions of Germany. Such examples suggest that attempts to explain the emergence of a regional entrepreneurship culture will need to reach far back into the economic history of regions.

Another question we have not touched on here but leave for further analysis is the effect of a regional culture of entrepreneurship on regional development. Analyzing long-term growth trajectories should be particularly helpful in discovering whether new business formation is the source of growth or, instead, one of its symptoms (see Anyadike-Danes, Hart, and Lenihan, 2011).

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## Appendix

Table A1: Descriptive statistics West Germany

	Mean	Median	Minimum	Maximum	Standard deviation
Self-employment rate (1984–2005)	0.091	0.086	0.055	0.205	0.021
Start-up rate (per 1,000 individuals) 1984–2005	7.932	6.838	3.981	25.901	3.096
Self-employment rate 1925	0.097	0.098	0.057	0.124	0.012
Population density (log) 1987–2005	5.426	5.288	4.279	7.125	0.662
Share R&D personnel 1987–2005	0.027	0.024	0.007	0.078	0.012
Unemployment rate 1987–2005	0.087	0.083	0.030	0.177	0.028

Table A2: Correlation matrix West Germany

	I	II	III	IV	V
I Self-employment rate 1987–2005	1				
II Start-up rate 1984–2005	0.838***	1			
III Self-employment rate 1925	0.150***	0.081***	1		
IV Population density (log) 1987–2005	-0.359***	-0.056*	-0.097***	1	
V Share R&D personnel 1987–2005	-0.202***	-0.022	0.214***	0.539***	1
VI Unemployment rate 1987–2005	-0.048*	0.157***	-0.151***	0.183***	-0.107***

\*\*\*: statistically significant at the 1 percent level; \*\*: statistically significant at the 5 percent level; \*: statistically significant at the 10 percent level.

Table A3: Persistence of determinants of new business formation in East and West Germany

	t-1	t-5	t-10	t-15	t-20
West Germany (1984–2005)					
Population density					
t=0	1.000***	0.9995***	0.999***	0.998***	0.996***
Share of R&D personnel					
t=0	0.998***	0.980***	0.955***	0.941***	0.907***
Unemployment rate					
t=0	0.985***	0.924***	0.866***	0.842***	0.745***
East Germany (2001–2005)					
Population density					
t=0	1.000***	0.999***	-	-	-
Share of R&D personnel					
t=0	0.893***	0.955***	-	-	-
Unemployment rate					
t=0	0.949***	0.889***	-	-	-

Table A4: Descriptive statistics East Germany

	Mean	Median	Minimum	Maximum	Standard deviation
Self-employment rate 2000–2005	0.092	0.092	0.077	0.105	0.006
Start-up rate (per 1,000 individuals) 2000–2005	10.516	10.382	7.918	14.525	1.397
Self-employment rate 1925	0.090	0.089	0.078	0.102	0.008
Self-employment rate 1989	0.021	0.022	0.012	0.031	0.005
Population density (log) 2001–2005	4.795	4.776	3.876	5.704	0.517
Share R&D personnel 2001–2005	0.025	0.024	0.010	0.051	0.008
Unemployment rate 2001–2005	0.197	0.197	0.128	0.260	0.026

Table A5: Correlation matrix East Germany

	I	II	III	IV	V	VI
I Self-employment rate 2000–2005	1					
II Start-up rate 2000–2005	0.489***	1				
III Self-employment rate 1925	0.293***	-0.150	1			
IV Self-employment rate 1989	0.391***	-0.268***	0.308***	1		
V Population density (log) 2001–2005	0.087	-0.330***	0.536***	0.569***	1	
VI Share R&D personnel 2001–2005	-0.148	-0.209**	0.233**	0.247***	0.589***	1
VII Unemployment rate 2001–2005	-0.375***	0.123	-0.491***	-0.454***	-0.366***	-0.339***

\*\*\*: statistically significant at the 1 percent level; \*\*: statistically significant at the 5 percent level.