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# *The Entrepreneurial League Table of German Regions 1895 and 2019*

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## The Entrepreneurial League Table of German Regions 1895 and 2019

Michael Fritsch, Maria Greve and Michael Wyrwich

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Contribution to a book honoring the work of David Storey on Entrepreneurship and Small Firms edited by Jay Mitra and George Saridakis

### Abstract

We describe and analyze the long-term development of self-employment in German regions between 1895 and 2019. Based on rankings (“league tables”) for the two years we identify those regions where the relative level of self-employment significantly increased (‘leapfroggers’), and those where the level of self-employment as compared to other regions deteriorated (‘plungers’). Germany is a particularly interesting case due to the turbulent history of the country over the 20th century that includes two lost World Wars, occupation by foreign armies, forty years of division into a capitalist and a socialist state, as well as re-unification and shock transformation of the eastern part to a market economy. While there is some persistence of regional self-employment despite all the disruptive changes, we also find and discuss considerable changes of regional levels of entrepreneurial activity.

Keywords: Entrepreneurship, self-employment, regional dynamics

JEL-classification: L26, R11, O52

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## 1. Long term regional trajectories of entrepreneurship

David Storey was fascinated by the long-term dynamics of regional entrepreneurship. For measuring such long-term dynamics, he favored rankings of regions according to their levels of entrepreneurial activity, which he called ‘entrepreneurial league tables’.<sup>1</sup> One main advantage of comparing rank positions of regions over time is that this measure can be expected to be rather robust with regard to influences at the national level that affect all regions in more or less the same way. Therefore, changes in the regional entrepreneurship league table should reflect primarily regional rather than national influences.<sup>2</sup> Another advantage of rankings is that due to their ordinal character, they are robust with regard to the effect of extreme cases (‘outliers’) that could distort the results if continuous metrics are used. Finally, rankings help mitigate biases in metrics arising from different measurement concepts.

League tables of regional self-employment were constructed and analyzed for England and Wales (Fotopoulos and Storey 2017, 2019) and for the US (Potter et al. 2023). Rankings based on start-up rates were investigated by Fotopoulos (2022) for England and Wales, Fritsch and Kublina (2019) for Germany, and by Potter et al. (2023) for the US. This contribution constructs and analyzes the entrepreneurial league table of self-employment in Germany over a period of more than 120 years, from 1895 to 2019. In particular, we investigate the persistence and change of the league table positions between these two years. Do we find about the same regions at the top and bottom of the rank at the beginning and at the end of the period of analysis? What are the characteristics of those regions at the top of the ranking and at the bottom? How pronounced are changes in the rankings? And finally, what characterizes those regions where the level of self-employment increased significantly so that they moved up in the league table, the ‘leapfroggers’, and who are those regions where the level of self-employment deteriorated and whose position in the league table decreased (‘plungers’)?

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<sup>1</sup> Fotopoulos and Storey (2017, 2019), Fritsch and Storey (2014), Potter et al. (2023).

<sup>2</sup> “... regions reflect relative positions in a league table, whereas the national data reflect overall change. So, in a sports league, if the standards of all the clubs participating go up (or down) this does not automatically imply a change in the league position of the clubs that participate.” Fritsch and Storey (2014, 950).

Investigating the development of regional entrepreneurship in Germany is particularly interesting due to the turbulent history of the country over the 20th century that includes two World Wars, occupation by foreign armies, forty years of division into a capitalist and a socialist state after World War II, as well as reunification and shock transformation of the socialist eastern part of the country to a market economy (for a more detailed description, see Fritsch, Greve, and Wyrwich 2023). Given that these disruptive changes induced considerable geographic reorganization of economic activities one can expect some turbulence in the entrepreneurship league table. If we find stable league tables in such a scenario, this can be regarded as a litmus test for the stability of regional differences in entrepreneurship documented in the literature (Fritsch and Wyrwich 2023).

The remainder of the paper is organized as follows. Section 2 introduces the league table approach in more detail and explains the measurement of changing rank positions. Section 3 presents the geographic structure of self-employment levels in the years 1895 and 2019 and characterizes those regions with relatively high and relatively low levels of self-employment. Section 4 then analyzes changes in the positions of the league table, identifying the characteristics of the leapfrogging and plunging regions. The final section (Section 5) concludes and provides an outlook on avenues of further research.

## **2. Measuring long term regional trends in entrepreneurship: the league table approach**

Comparisons of entrepreneurship levels over long periods of time may be considerably impaired by national trends or by changes in the statistical reporting system (e.g., the definition of self-employment). These influences include macroeconomic policies, demographic trends, and technological developments, as well as changes in the business regulatory framework or the development of interest rates and taxation. Comparing regional positions in a national ranking, the national league table, is an easy way to account for such changes in national trends that affect all regions in more or less the same way (Fotopoulos and Storey 2017, 2019; Fritsch and Kublina 2019; Potter et al. 2023).

Another advantage of rankings is that due to their ordinal character, they are robust to the effect of extreme cases ('outliers') that could bias the results if continuous metrics are used. Moreover, rank positions indicate the attractiveness of regions for entrepreneurial talent, investments, and relocation of firms in comparison to other regions and, therefore, tend to have particular appeal to policy makers. Rankings correspond to the propensity of the regional population, and, in particular, of policy makers, to evaluate the performance of 'their' region compared to other regions.

### 3. Regional self-employment in Germany 1895 and 2019

Data for self-employment in 1895 are from an establishment census (Statistik des Deutschen Reichs, 1898). Information on self-employment in 2019 is obtained from the Federal German Statistical Office (Statistisches Amt des Bundes und der Laender 2022). We chose 2019 as the final year of our analysis to avoid distortions caused by the Covid-19 pandemic that broke out in early 2020. The metric of entrepreneurial activity that we use is the self-employment rate defined as the share of self-employed persons in the regional workforce or the regional population at working age in percent.<sup>3</sup> The reason for using this type of self-employment rate is to account for the size and potential of the respective region. We use the geographic definition of Germany today that distinguishes 257 labor market regions that represent functionally integrated spatial units with interwoven commuting patterns defined by NUTS3 codes (BBSR 2012).

Figure 1 shows the distribution of self-employment rates (excluding agriculture) in the year 1895; the distribution of rates in the year 2019 is shown in Figure 2. In both years, high self-employment rates can be found in regions of all levels of population density. Although the rank correlation of the self-employment rate with population density is positive in 1895 ( $r = 0.333$ ), it is slightly negative in 2019 ( $r = -0.123$ ). In 1895, regions with relatively high self-employment rates

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<sup>3</sup> For the year 1895 we only have information on the number of establishments and assume that each establishment reflects one self-employed person. Since we do not have information on the regional workforce in this year, we relate the number of self-employed to the regional population. For 2019, we can divide by the regional workforce, which is more appropriate.

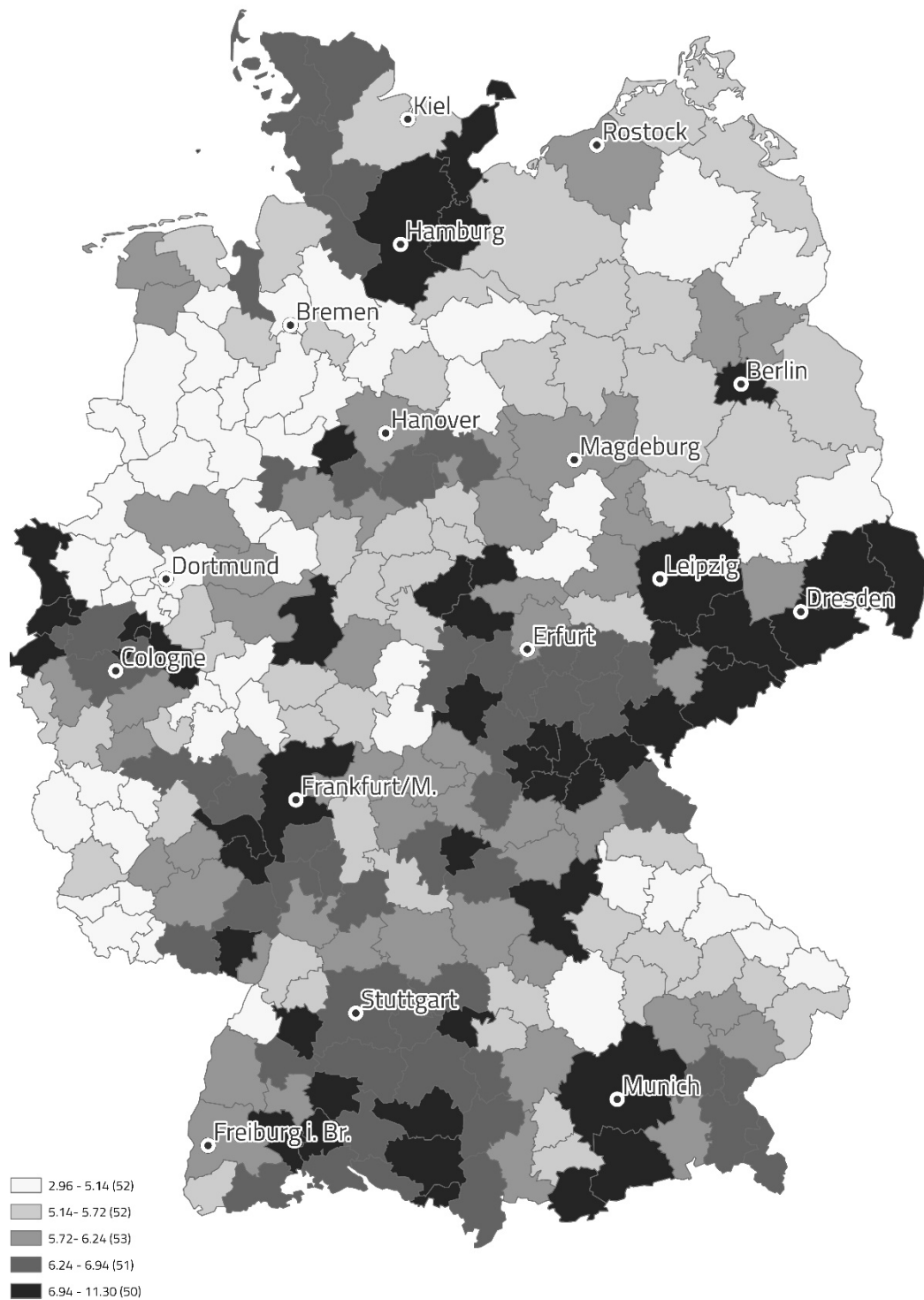


Figure 1: Geographic distribution of self-employment rates in Germany 1895

clustered in the southern part of East Germany and Berlin, in Baden Wuerttemberg south east of Stuttgart, as well as around the cities of Frankfurt, Hamburg, and Munich. Low levels of self-employment were particularly found in rural areas of the north-west, in the south-east close the border (the Bavarian

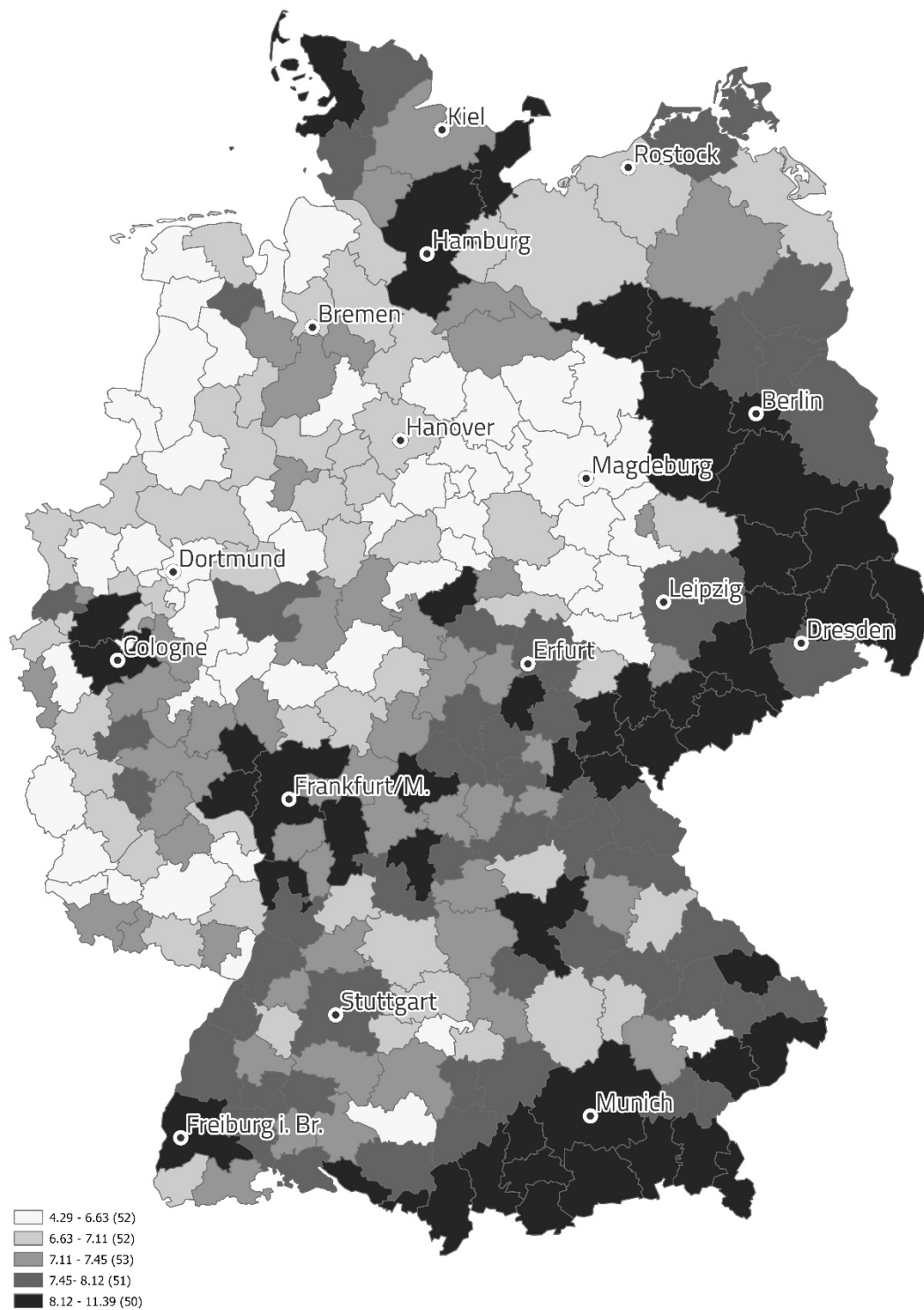


Figure 2: Geographic distribution of self-employment rates in Germany 2019

Woods), and in the northern part of East Germany. The largest clusters of regions with relatively high self-employment rates in 2019 are again located in the south of East Germany and west of Berlin (including Berlin), Hamburg and surrounding areas, as well as Munich and the regions more south. Low levels of self-



employment are frequent in regions north of the Ruhr area, as marked by the city of Dortmund and the areas around the cities of Hannover and Magdeburg.

Those regions at the top of the 1895 league table had a relatively large share of manufacturing employment, slightly higher population density, and had higher shares of natural scientists and engineers according to the 1925 census (Statistik des Deutschen Reichs 1927). Regions that were at the top of the ranking in the year 2019 exhibited a slightly higher share of manufacturing employment compared to the bottom performers. Interestingly, the shares of natural scientists and engineers in 2019 in the regions at the top and bottom of the league table are about equal. In the top position of the 1895 ranking is Erzgebirgskreis, which is located in the center of the area of South Saxony that was at this time among the most innovative regions in Europe (Fritsch, Greve and Wyrwich 2024). Quite remarkably, the region is found to be at rank #8 in the 2019 league table.

Among the regions at the bottom of the league table in 1895 are some regions in the Ruhr area, such as Bochum, Gelsenkirchen, Essen, and Dortmund. The relatively low levels of self-employment in these regions is not surprising as they were dominated by large-scale firms of the steel and coal mining industries and were at the heart of the German industrial complex. Some of the regions in the Ruhr area such as Duisburg or Gelsenkirchen are still at the bottom of the 2019 ranking. The two regions with the lowest level of self-employment in 2019, Salzgitter and Wolfsburg, are also dominated by large-scale industries (Table A1 in the Appendix). Quite notable, the magnitudes of the differences between those regions at the top and at the bottom of the league table are relatively small.

#### **4. Leapfroggers and plungers**

Comparing regional self-employment rates and rank positions in 1895 and 2019 shows substantial change. However, the Spearman rank correlation coefficient of regional self-employment rates in the two years is 0.358 and indicates a considerable degree of persistence.

Given that each rise of position in the regional league table must be related to a corresponding decline, the distribution of rank changes is bell-shaped (Figure 3). While 20.6 percent of all regions (53 regions) do not change their rank by more than 20 positions in either direction, only 7.4 percent of regions (19 regions)

change their rank by more than 150 positions. There are also rare cases where regions moved from the top to the bottom or vice versa. For instance, the region of Leverkusen was ranked #2 in the 1895 league table and takes rank #246 in the year 2019, that is, 244 positions below. The Cottbus region, located not far from Berlin, experienced the greatest positive change by moving 206 positions up in the league table.

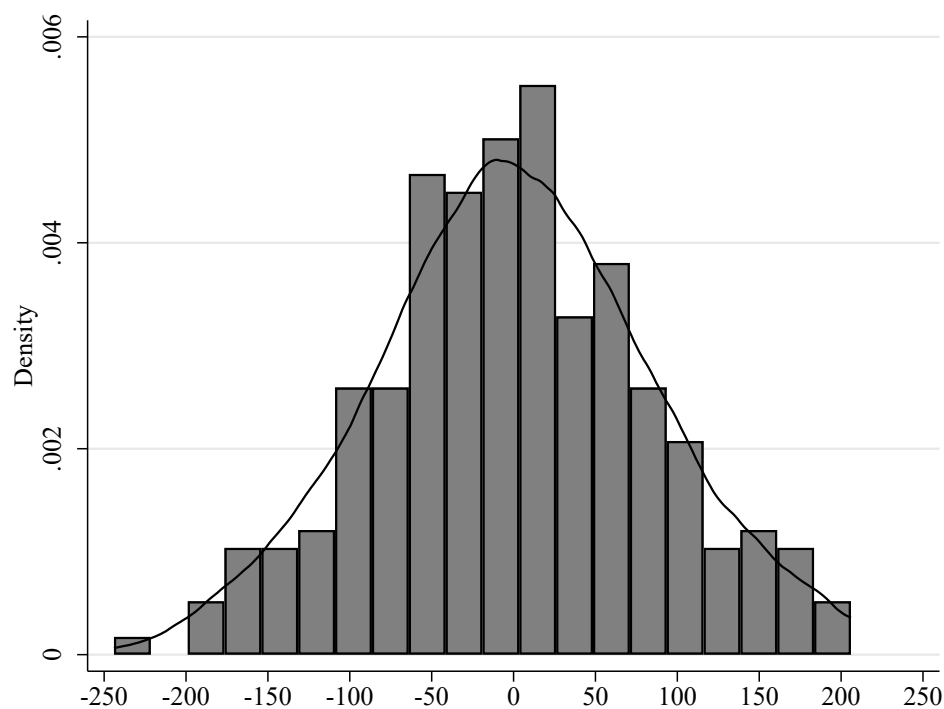


Figure 3: Distribution of changes in rank positions in the German entrepreneurial league tables between 1895 and 2019

David Storey suggested that the most interesting type of region when comparing league table positions are those who moved up in the ranking, the leapfroggers (Potter et al. 2023). He argued that a policy that wants to induce change processes may learn more from analyzing changes than from investigating persistence. Hence, investigating the development of leapfroggers may indicate levers for policy to initialize a rise of regional entrepreneurship. The analysis of regions with declining levels of entrepreneurial activity, the plungers, could help identify the forces that cause the deterioration of entrepreneurial activity in a region. In contrast, regions that remain permanently at the top or bottom of the

league table offer only relatively limited opportunities to learn how to initiate change.

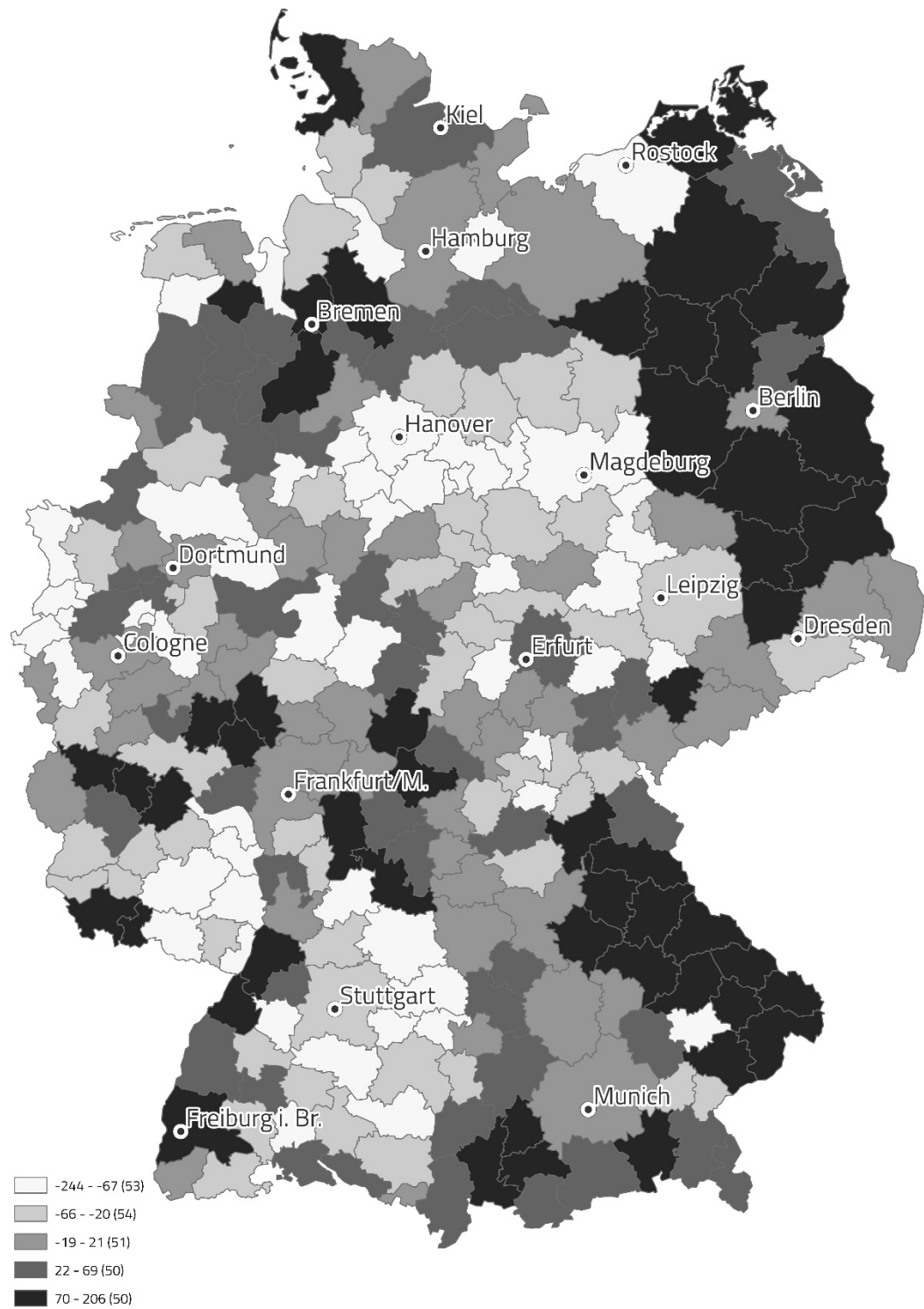


Figure 4: Changes of rank positions between 1895 and 2019

Figure 4 shows the regional distribution of the rank changes in the German entrepreneurial league tables between 1895 and 2019. Many of the leapfrogger

regions in this period were and still are rather rural, many of them located in the south of the country. A considerable part of the leapfroggers, particularly those located close to the cities of Berlin, Hamburg, Munich, Cologne, and Duesseldorf, obviously benefitted considerably from development spillovers that were generated by the growth of these centers. However, the performance of other leapfrogging regions like those in northern Bavaria, in the south and the west of Baden Wuerttemberg, as the well as south-east of Bremen, can hardly be explained by such growth spillovers among neighboring regions. Regions that declined in the league table are clustered east of Hannover, in the southern part of East Germany, as well as around Stuttgart and south west of Frankfurt. Plunging regions exhibited relatively high shares of manufacturing employment, as well as high levels of population density, in 1895. Interestingly, the population density in the year 2019 is also much higher for plungers than for leapfroggers.

## **5. Conclusions and outlook**

Our comparison of entrepreneurial league tables of German regions in the years 1895 and 2019 identified some important long-term developments. Despite a tendency of persistence of regional self-employment, there is also considerable change. The reasons behind these developments deserve further investigation. The empirical patterns suggests that spillover effects from growing regions such as Berlin, Hamburg, Munich, and Stuttgart to their surroundings play some role, but there are also quite a number of regions where such spillovers do not seem to play a role. The observation that many of the regions with increasing levels of entrepreneurial activity are rather rural clearly indicates that entrepreneurship in Germany is not a particularly urban phenomenon. However, the reasons behind the observed patterns deserve deeper analysis.

Further empirical research should focus on different types of self-employment. For example, it would be interesting to learn more about the regional development of innovative and knowledge-intensive self-employment that can be assumed to be particularly relevant for growth. We also require a better understanding of persistence at the top and at the bottom of the entrepreneurial league table. While it is important to analyze plungers and leapfroggers, understanding the reasons why certain places are in the lead for long periods of

time should not be neglected. This also implies investigating the historical roots of regional entrepreneurship. It may also be helpful to account for the dynamics regional entrepreneurship by considering multiple points of time. Last but not least, international comparisons of the determinants and of the geographic pattern of persistence and change of regional entrepreneurial activity are clearly warranted.

## Appendix

Table A1: The top 15 and the bottom 15 positions in the entrepreneurial league table for Germany 1895 and 2019

Position	1895		2019	
<i>Top 15</i>	Name	Self-employment rate	Name	Self-employment rate
1	Erzgebirgskreis	11.299	Garmisch-Partenkirchen	11.391
2	Leverkusen	10.850	Husum	10.395
3	Sonneberg	10.850	Bad Tölz	10.371
4	Krefeld	10.112	Berlin	10.268
5	Hof	9.973	Rosenheim	9.706
6	Vogtlandkreis	9.534	München	9.667
7	Stadthagen	9.343	Kempten	9.554
8	Viernsen	9.261	Erzgebirgskreis	9.422
9	Remscheid	9.227	Vogtlandkreis	9.392
10	Görlitz	9.067	Lindau	9.335
11	Lübeck	9.005	Bad Reichenhall	9.223
12	Lindau	8.849	Hamburg	9.094
13	Berlin	8.741	Passau	9.036
14	Heinsberg	8.736	Finsterwalde	8.926
15	Mittelsachsen	8.698	Traunstein	8.904
<i>Bottom 15</i>				
243	Vechta	4.224	Holzminden	6.069
144	Cloppenburg	4.167	Hildesheim	6.068
245	Freyung	4.166	Germersheim	6.060
246	Nienburg	4.158	Leverkusen	5.951
247	Nordhorn	4.143	Halle	5.908
248	Lingen	4.093	Nordhorn	5.865
249	Altenkirchen	4.092	Merzig	5.792
250	Dortmund	4.048	Duisburg	5.776
251	Zeven	3.907	St. Wendel	5.746
252	Saarbrücken	3.785	Braunschweig	5.676
253	Mecklenburgische Seenplatte	3.622	Gelsenkirchen	5.666
254	Essen	3.565	Nordenham	5.582
255	Gelsenkirchen	3.404	Helmstedt	4.527
256	Bochum	3.080	Wolfsburg	4.492
257	Bremen	2.961	Salzgitter	4.291

## References

- Bundesinstitut für Bau-, Stadt- und Raumforschung (BBSR) (2012). Raumabgrenzungen und Raumtypen des BBSR. Bonn: BBSR. <https://www.bbsr.bund.de/BBSR/DE/forschung/raumb Beobachtung/Raumabgrenzungen/deutschland/regionen/arbeitsmarktregionen/Arbeitsmarktregionen.html>.
- Fotopoulos, G. and D.J. Storey (2017). Persistence and change in interregional differences in entrepreneurship: England and Wales, 1921–2011. *Environment and Planning A*, 49(3), 670–702. <https://doi.org/10.1177/0308518x16674336>
- Fotopoulos, G. and D.J. Storey (2019). Public policies to enhance regional entrepreneurship: another programme failing to deliver? *Small Business Economics*, 53, 189–209. <https://doi.org/10.1007/s11187-018-0021-9>
- Fotopoulos, G. (2022). Persistence and Leapfrogging in Regional Start-up Rates: England and Wales 1981-2020, mimeo (OECD Centre for Entrepreneurship, SMEs, Regions and Cities).
- Fritsch, M. and D.J. Storey (2014). Entrepreneurship in a Regional Context—Historical Roots and Recent Developments. *Regional Studies*, 48, 939-954. <https://doi.org/10.1080/00343404.2014.892574>
- Fritsch, M. and S. Kublina (2019). Persistence and Change of Regional New Business Formation in the National League Table. *Journal of Evolutionary Economics*, 29, 891-917. <https://doi.org/10.1007/s00191-019-00610-5>
- Fritsch, M. and M. Wyrwich (2023). Entrepreneurship in the Long Run: Empirical evidence and historical mechanisms. *Foundations and Trends in Entrepreneurship*, 19, 1-125. <https://doi.org/10.1561/0300000100>
- Fritsch, M., M. Greve and M. Wyrwich (2023). The Long-run Effects of Communism and Transition to a Market System on Self-Employment: The Case of Germany. *Entrepreneurship Theory and Practice*, 47, 1594-1616. <https://doi.org/10.1177/10422587221094498>
- Fritsch, M., M. Greve and M. Wyrwich (2024). The Deep Historical Roots of Industrial Culture and Regional Entrepreneurship — A case study of two regions. In: Robert Huggins, Fumi Kitagawa, Daniel Prokop, Christina Theodoraki and Piers Thompson (Eds.): *Entrepreneurial Ecosystems in Cities and Regions: Emergence, Evolution, and Future*. Oxford: Oxford University Press. <https://ideas.repec.org/p/jrp/jrpwrp/2022-012.html>
- Potter, J., H. Qian, M. Fritsch, D.J. Storey and G. Fotopoulos (2023). *Leapfrogging and Plunging in Regional Entrepreneurship Performance in the United States, with European Comparisons*. Paris: OECD publishing, OECD SME and Entrepreneurship Papers No. 44. <https://dx.doi.org/10.1787/bc031b11-en>
- Statistik des Deutschen Reichs (1898). *Gewerbliche Betriebsstatistik der kleineren Verwaltungsbezirke nach der Zählung vom 14. Juni 1895*. Volume 116, Berlin: Verlag von Puttkamer & Muehlbrecht.

Statistik des Deutschen Reichs (1927). *Volks-, Berufs- und Betriebszählung vom 16 Juni 1925: Die berufliche und soziale Gliederung der Bevölkerung in den Ländern und Landesteilen*. Vol. 403–405. Berlin: Reimar Hobbing.

Statistische Ämter des Bundes und der Länder (2022). *Erwerbstätige in den kreisfreien Städten und Landkreisen der Bundesrepublik Deutschland 1991 bis 2021*. Wiesbaden: Hessisches Statistisches Landesamt.

[https://www.statistikportal.de/sites/default/files/2023-10/ETR\\_R1B1\\_OB2022\\_BSAug2023\\_0.pdf](https://www.statistikportal.de/sites/default/files/2023-10/ETR_R1B1_OB2022_BSAug2023_0.pdf)



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