Empirical Analysis of Quantity and Quality of Rural Entrepreneurship in France, Germany and UK: Understanding Key Enabling Factors

Objective and Contribution

Entrepreneurship is broadly recognized as a key catalyst for regional economic growth and competitiveness (Acs and Armington, 2004; Content et al., 2020), with the potential to play a significant role in bridging the disparities between rural and urban areas. Nonetheless, most research on entrepreneurship has focused on urban environments, where agglomeration effects create conditions that are particularly conducive to entrepreneurial activity (Glaeser et al., 2015). Rural areas, which cover the majority of the world's land, face unique challenges compared to urban regions due to poor socio-economic infrastructure, logistical disadvantages, and limited access to education and institutional support (Terluin, 2003; Reichert et al., 2014). Additionally, rural areas are not homogeneous, as those situated closer to cities face different challenges than those in more isolated locations (Perpiña Castillo et al., 2024). As a result, rural areas have received significant policy attention aimed at promoting economic development, with a particular focus on supporting entrepreneurial ventures in these regions.

With this research we aim at proving novel empirical evidence concerning the factors that enable or hinder rural entrepreneurial activity. Specifically, the primary objective of this study is to assess both the quantity and quality of rural entrepreneurial activity across regions in in Europe's three largest economies—the UK, Germany, and France. We define entrepreneurial quantity as the number of new businesses created in a region, while entrepreneurial quality refers to the number of growth-oriented firms—those with a higher potential for successful growth around the time of their founding (Guzman and Stern, 2020). Rural areas are identified using the Degree of Urbanisation (DEGURBA) classification and the Eurostat Urban-Rural typology applied to NUTS level 3 regions.

Second, we identify the key factors embedded in rural areas that are associated to entrepreneurial activity, by focusing on the key components of the entrepreneurial ecosystem, i.e. the agents and institutions shaping the business environment for rural entrepreneurs. This encompasses access to knowledge, resources (skilled human capital and financial capital), and institutional factors (Stam and Ven, 2021).

Third, in addition to factors that are embedded within rural areas, we consider the influence of inter-regional spillovers from large urban areas by including in our analyses spatially weighted measures of quality and quantity of entrepreneurship in proximate urban areas.

This study has significant implications for both policymakers and practitioners. By examining the key factors influencing both the quality and quantity of rural entrepreneurial activity, the findings can provide valuable insights into how rural entrepreneurs can leverage local resources and conditions to foster high-potential ventures. For policymakers, the research highlights critical areas where policy improvements can be made to create and sustain an environment that nurtures entrepreneurial activities in rural areas.

Data and Methods

Our analysis is based on business registry data from the UK, Germany, and France covering the period from 2009 to 2023. We focus on limited liability business entities, as these are more likely to experience successful growth and represent common legal structures across the three countries. For the UK, we utilize the Companies House database, which provides demographic information on active firms and additional data such as insolvency filings, takeovers, and changes in capital structure. For Germany, we rely on the Mannheim Enterprise Panel, which builds on the German Business Registry and is maintained by Creditreform. For France, we use data from SIRENE which records the identity of all private-sector firms in Metropolitan France, and complement it with information from BODACC, covering a variety of corporate events and procedures. Overall, our data allows to map the entrepreneurial activity in the selected countries and to identify more than 9 million firm births in the period 2009-2023.

Following the approach of Guzman and Stern (2020), we consider the quantity and a quality-adjusted measure of entrepreneurship by aggregating business registry data at the regional level. Using this information, we can measure entrepreneurial quantity as the number of new business registrations in area r and year t. For each business registrant, we then apply a predictive analytics approach to estimate its quality by linking the growth outcome a few years after foundation to firm characteristics in the founding year retrieved from observable business registry data and from secondary data sources (Moody's Orbis and Zephyr). Specifically, we estimate three logit regression models to examine how the presence or absence of a startup characteristic predicts the probability of growth in UK, France, and Germany. The dependent variable is a dummy variable equal to 1 if a firm achieves an IPO or is acquired within 6 years of registration, as reported in Moody's Zephyr database. Key predictors include indicators related to intellectual property, naming conventions, and legal structure. Additionally, industry classifications are incorporated to account for sectoral differences.

We then exploit the panel structure of the data using fixed effects estimations to compare the performance of different regions and how it is associated with the characteristics of each regional ecosystems. Following Tartari and Stern (2021), we use a fixed effects panel estimator in the form of the model:

$$Y_{rt} = \beta X_{r(t-1)} + \alpha_r + \gamma_t + \epsilon_{rt} \quad (1)$$

where Y_{rt} is the measure of local entrepreneurial activity (quantity or the quality-adjusted measure), $X_{r(t-1)}$ is the set of time-varying characteristics of the entrepreneurial ecosystem of the region, α_r are region fixed effects and γ_t year fixed effects. Our parameters of interest are β, which are the vector containing estimates of the association between our measure of local entrepreneurial activity and the embedded factors of each area that could explain the quantity and quality of business activity in these regions.

In our analysis, we explicitly distinguish rural areas from other regions by using the Eurostat Urban-Rural typology classification based on the NUTS 3 level5, and include interaction terms to capture how the characteristics of rural areas interact with other factors influencing entrepreneurial activity.

Preliminary Results and Conclusions

Figure 1, Figure 2, and Figure 3 illustrate the quality-adjusted measure of entrepreneurial activity across NUTS 3 regions in France, the UK and Germany, respectively. The left map shows all regions, while the right map focuses exclusively on rural areas, with urban areas (as defined by the Eurostat Urban-Rural typology) shown in gray. Not surprisingly, rural regions exhibit lower values than intermediate and urban areas across all selected countries. Not surprisingly, rural regions exhibit lower values than intermediate and urban areas across all selected countries. However, notable exceptions exist. In France (Figure 3), some rural regions stand out with relatively higher values, including Ain (FRK21), Charente-Maritime (FRI32), and Morbihan (FRH04). A similar pattern is observed in the UK (Figure 4), where the rural regions ofWest Norfolk (UKH17), Monmouthshire and Newport (UKL14), and Shropshire (UKG11) emerge as outliers. Likewise, in Germany, Göttingen (DE949) and Schleswig-Flensburg (DEF07) show relatively higher entrepreneurial quality.

Figure 1. Quality-Adjusted Entrepreneurial Activity in France

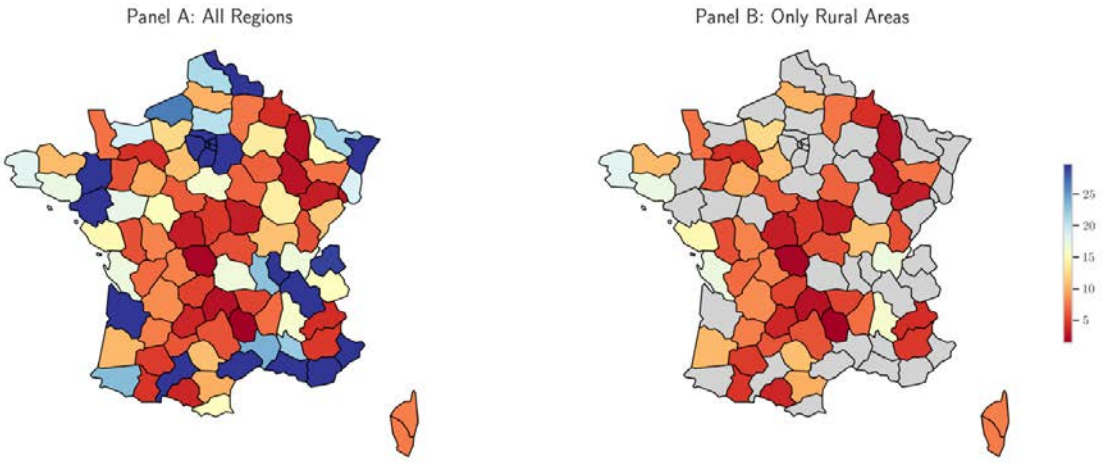

Figure 2. Quality-Adjusted Entrepreneurial Activity in the UK

Figure 3. Quality-Adjusted Entrepreneurial Activity in Germany

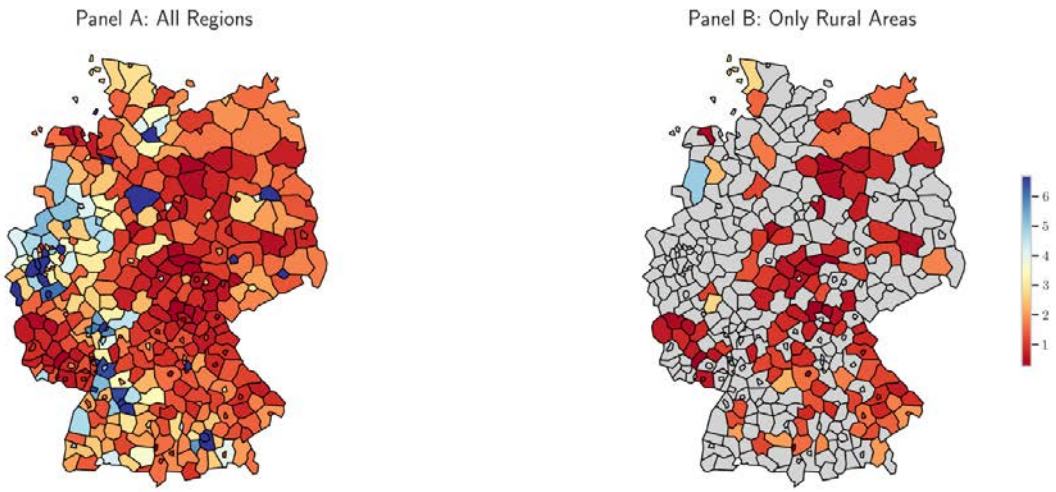

Table 1 presents the results from estimating the fixed-effects regression model described in Equation 1. The dependent variable *Quantity* represents the total number of startups created in a region within a given year for each country, while *Quality* corresponds to the region's measure of quality-adjusted entrepreneurial activity. The analysis covers the period 2009–2023 for France and Germany and 2010–2020 for the UK. All specifications include region (NUTS 3) and year fixed effects, with standard errors clustered at the region level. Each covariate is interacted with a dummy variable identifying rural areas based on the Eurostat Rural-Urban Typology. These results serve as a preliminary exploration of the association between regional covariates of interest and entrepreneurial activity across the three countries.

Preliminary findings from econometric models suggest that factors like GDP per capita, venture capital availability, and educational attainment are significantly associated to superior entrepreneurial outcomes in France. In rural areas, however, these factors show weaker associations with entrepreneurship, suggesting that rural regions face unique challenges that cannot be overcome by focusing on individual factors alone. A similar trend is observed in the UK, where population density and venture capital activity appear to drive high-quality entrepreneurship, but not in rural regions. In Germany, while some point estimates align with expected signs, the coefficients are not statistically significant.

Table 1. Results from Fixed Effects Regression Models

	Dependent variable:					
	France		UK		Germany	
	$log(\text{Quantity}_t)$	Quality_t	$log(\text{Quantity}_t)$	Quality_t	$log(\text{Quantity}_t)$	Quality_t
	(1)	(2)	(3)	(4)	(5)	(6)
$\log(\text{GDP per capita}_{t-1})$	0.375***	12.627***	0.153	0.194	0.182*	0.042
	(0.143)	(4.535)	(0.151)	(0.582)	(0.101)	(0.035)
$\log(\text{GDP per capita}_{t-1}) \times \text{Rural}$	−0.050	−15.757***	−0.156	−0.806**	−0.135	0.022
	(0.141)	(4.426)	(0.120)	(0.310)	(0.093)	(0.023)
$\text{Population density}_{t-1}$	0.00003	−0.013	−0.0002***	0.002***	0.00000	0.0004
	(0.00004)	(0.009)	(0.0001)	(0.001)	(0.0001)	(0.0003)
$\text{Population density}_{t-1} \times \text{Rural}$	0.014***	0.077***	0.025	0.037	0.001	−0.0003
	(0.004)	(0.018)	(0.020)	(0.026)	(0.001)	(0.0002)
$log(\text{Graduates HEI}_{t-1} + 1)$	−1.910**	44.877**	−6.260**	−61.370	−0.292	0.812
	(0.787)	(19.538)	(2.930)	(38.160)	(2.835)	(1.326)
$log(\text{Graduates HEI}_{t-1} + 1) \times \text{Rural}$	1.736	−35.664**	24.332**	101.629*	−0.526	0.931
	(1.827)	(14.642)	(12.000)	(51.627)	(11.158)	(1.742)
$log(\text{VC deals (3 Years)}_{t-1} + 1)$	0.039	49.426***	0.245	10.856***	0.142	0.160
	(0.167)	(11.632)	(0.190)	(2.493)	(0.407)	(0.573)
$log(\text{VC deals (3 Years)}_{t-1} + 1) \times \text{Rural}$	0.211	−39.043***	−0.286	−12.029***	−0.649	−0.304
	(0.767)	(11.307)	(1.104)	(3.421)	(0.909)	(0.554)
Region (NUTS 3) Fixed Effects	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	1,100	1,100	1,593	1,593	4,400	4,400
R^2	0.997	0.966	0.989	0.962	0.972	0.991
Adjusted R^2	0.996	0.961	0.988	0.957	0.969	0.990

There are important factors to consider when interpreting the results for the UK and Germany. In the UK, the number of rural regions is relatively small (18), and rural entrepreneurial activity is minimal according to our data. In Germany, the high level of regional disaggregation – comprising over 400 NUTS 3 regions - may contribute to the lack of statistical significance. This greater granularity could result in limited variation in the dependent variables, as many regions exhibit very little fluctuation in the outcomes we are measuring.

These caveats underscore the importance of accounting for the structural differences across countries when evaluating the factors influencing rural entrepreneurial activity. Moreover, the choice of geographical unit of analysis significantly affects the results and comparisons, highlighting the need to select an analytical level that accurately reflects entrepreneurial activity in a way that allows for meaningful comparisons across these countries. While ecosystem perspectives are essential, data limitations in certain regions may lead to divergent conclusions that warrant further exploration.

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