NICRE National Innovation Centre Rural Enterprise

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Policy Briefing

Exploring the micro-geography of innovation in England: Population density, accessibility and innovation revisited

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Innovation is driven by knowledge; technological, commercial and strategic. Knowledge may be acquired or generated through local learning or through non-local interaction. Recent studies have emphasised the micro-geography of such interactions and related innovation outcomes in an urban context. Here, we extend this micro-geographic approach to rural areas and examine the role of population density and accessibility in shaping innovation intensity in each of the 32,000 Lower Super Output Areas or LSOAs in England. Our analysis focuses on firms' registered intellectual property – patents, trade marks and registered designs.

Key findings

We derive new measures of patent, trade mark and design intensity for each of the 32,000 LSOAs in England. We match these with data on population density, travel times to city centres and a range of control variables relating to the quality of the business environment. This enables us to isolate the role of population density and accessibility on local innovation outcomes. Our analysis suggests three key results.

- We find a positive relationship between population density and innovation intensity. A 1 per cent increase in population density is associated with a 0.15-0.17 per cent increase in patent intensity.
- There is a consistent negative relationship between journey time to the nearest town centre and innovation intensity. For instance, at variable means, a one per cent increase in journey time is associated with a fall of 0.15-0.18 per cent in patent intensity.
- We find strong interaction effects between population density and accessibility meaning that population density or sparsity effects are amplified where journey times are greater, i.e. in more remote areas.

Our results provide strong support for conceptual arguments around 'buzz' and the importance of accessibility for innovation and suggest the potential importance of a micro-geographic approach to innovation policy and analysis.

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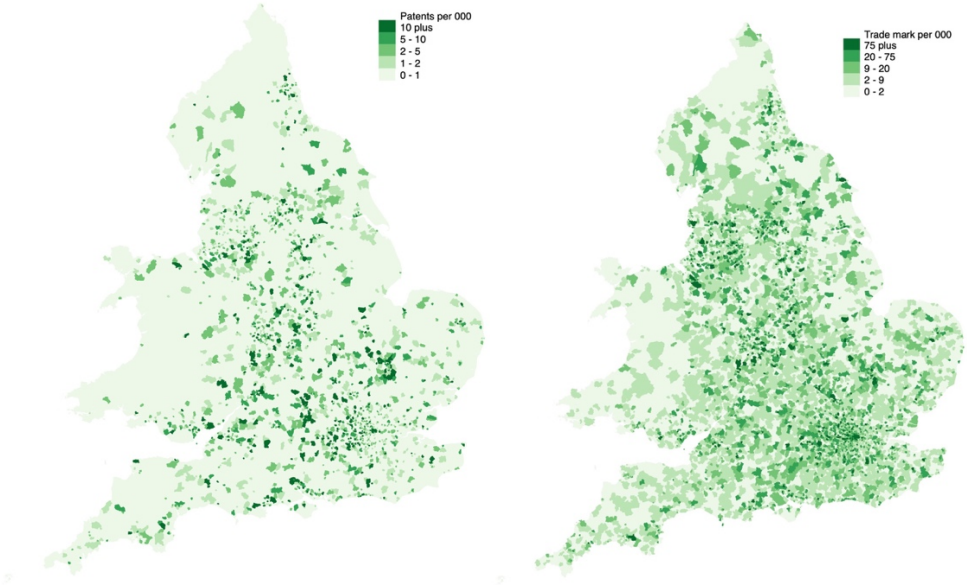
Understanding the micro-geography of innovation

Conceptual arguments emphasise the importance of learning and interaction between individuals to generate innovations. Population density raises the level of interaction as can accessibility to urban areas. More rural areas distant from a city may face a double disadvantage for innovation: low population density and low levels of accessibility. Both may reduce levels of innovation with potentially negative effects for business growth and productivity.

We construct intellectual property histories for all UK firms and position these spatially to innovation intensity measures for LSOAs (Figure 1).

Figure 1: Patent (left) and trade mark (right) intensity in England and Wales: 2016



Policy implications

Previous analyses have suggested the variation in innovation performance across Local Enterprise Partnership areas in England. Adopting a micro-geographic perspective suggests these differences are even more strongly localised with sparsely populated and less accessible areas facing two re-enforcing disadvantages for innovation. Measures to promote accessibility or otherwise stimulate local interaction – through innovation hubs or co-working spaces – seem obvious steps to increase rural innovation. Future work will investigate the role of 'third spaces' in stimulating local interactions and innovation.

Full paper link: https://www.enterpriseresearch.ac.uk/our-work/publications/