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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, we believe for the first time, 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. Our analysis suggests three key results. First, we find a positive relationship between population density and innovation intensity. For example, a 1 per cent increase in population density is associated with a 0.15-0.17 per cent increase in patent intensity. Second, we find 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. Third, 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. For trade mark intensity, for example, any difference in population density has 1.5 times as large an effect on innovation intensity when journey time is 80 minutes compared to a situation when journey time is 40 minutes. Our analysis suggests the value of a micro-geographic perspective on rural innovation and emphasises the positive innovation benefits of measures to improve rural mobility and strengthen local interactions.