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Abstract
The use of both research and development (R&D) and knowledge spillovers has been identified as the source of relative innovation underperformance in Europe vis-à-vis the United States. In this paper, we investigate R&D and knowledge spillovers at the firm level to evaluate the extent to which they complement innovation and firm productivity.
We use data on a large unbalanced panel of 9,213 UK firms constructed from six consecutive waves of a community innovation survey, an annual business registry survey and a business enterprise research and development survey during 2002-2014. We estimate the knowledge spillover-augmented version of the CDM model of R&D, innovation, and productivity to find that complementarities between R&D and knowledge spillovers are strongly associated with firm productivity rather than firm innovation. R&D is important for both innovation and productivity, while knowledge spillovers are more important than R&D for firm productivity. We also explore the differences between returns to R&D and knowledge spillovers across three distinctive innovation strategies.

Keywords: R&D; innovation; productivity; knowledge collaboration, knowledge spillover
JEL Classification: D24; O31; O33

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