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Accepted Version

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Audretsch, D. B. and Belitski, M. (2020) The role of R&D and knowledge spillovers in innovation and productivity. *European Economic Review*, 123. 103391. ISSN 0014-2921 doi: 10.1016/j.euroecorev.2020.103391 Available at <https://centaur.reading.ac.uk/88863/>

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To link to this article DOI: <http://dx.doi.org/10.1016/j.euroecorev.2020.103391>

Publisher: Elsevier

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# The Role of R&D and Knowledge Spillovers in Innovation and Productivity

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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

## Acknowledgement:

We are thankful to two anonymous reviewers and two editors Virginia Batte Phillips Distinguished Professor Al Link, UNC Greensboro and Professor Robert M. Sauer, Royal Holloway, University of London for valuable advice and suggestions throughout the revision process. We appreciate financial support by the British Academy on the project “Knowledge frontiers and boundaries for the New UK” Award Reference: IC160084

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