Returns to publicly supported and privately funded R&D

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Research background

- Innovation is an important means through which firms compete and grow *(Mason et al., 2009)*

- Innovation involves the production of new knowledge through activities such as R&D *(Roper et al., 2008)* - R&D is very much part of the innovation process

- Appropriability problem *(Arrow, 1962)* – firms carrying out private R&D are unable to fully appropriate the returns to their investment

- Public support for R&D is justified on the basis of this appropriability problem or market failure *(Roper and Hewitt-Dundas, 2016)*

Research Questions

- How important is R&D in driving firm innovation?

- Which types of innovation have the greatest productivity payoffs?

- Which types of innovation have the greatest growth payoffs?

- How do innovation payoffs vary depending upon whether the innovation was publicly supported or wholly privately funded ?

Data and method

- UK Innovation Survey (waves 4-10) provides only a binary indicator of whether firms received or did not receive public support for their innovation

- We cannot be clear what proportion of firms' R&D spending was publicly supported, only that a proportion was supported

- Our approach is to estimate the relationship between R&D (innovation input) and innovation outputs, and to partition the R&D variable into that which was and was not publicly supported

Data and method

- We undertake a causal analysis of the links between R&D, innovation of different types, and productivity and growth

- We adopt a value-chain perspective suggesting that R&D may influence innovation in the short term, but that any productivity/growth effects may take some time to emerge

- We consider how innovation is related to productivity or growth in the subsequent survey period

- We allow for a range of other factors to influence firm performance

Estimation approach

- The model is estimated using the CMP procedure which instruments the binary right-hand side innovation indicators

- The first stage estimates a series of probit models to model the impact of R&D on the probability of innovation

- The second stage links the innovation probit models with a simple productivity or growth equation

- The innovation variables (and their determinants) are lagged to reflect the time taken for innovation to influence productivity or growth

Results – Modelling the link between UK-supported and unsupported R&D engagement, innovation and productivity: All firms
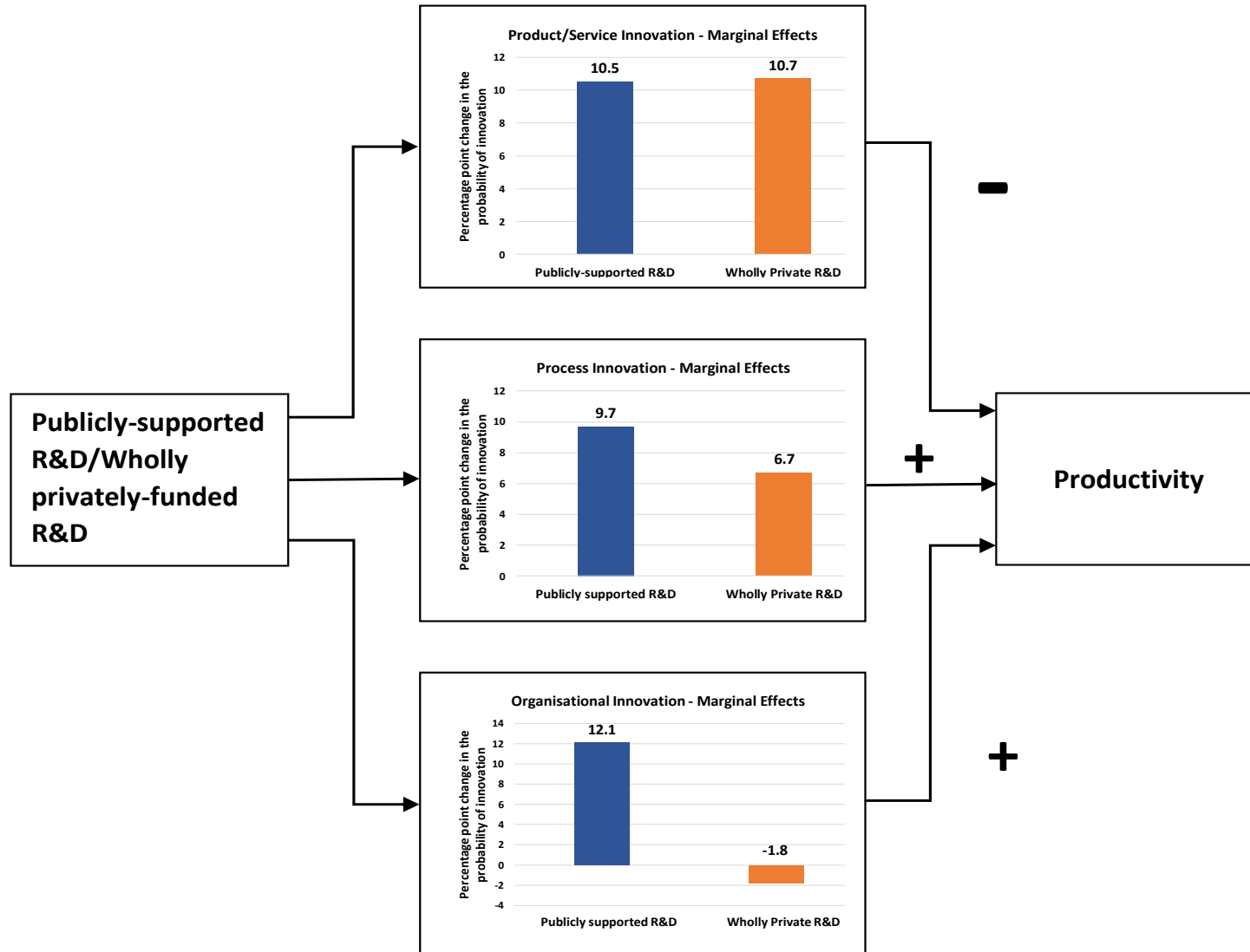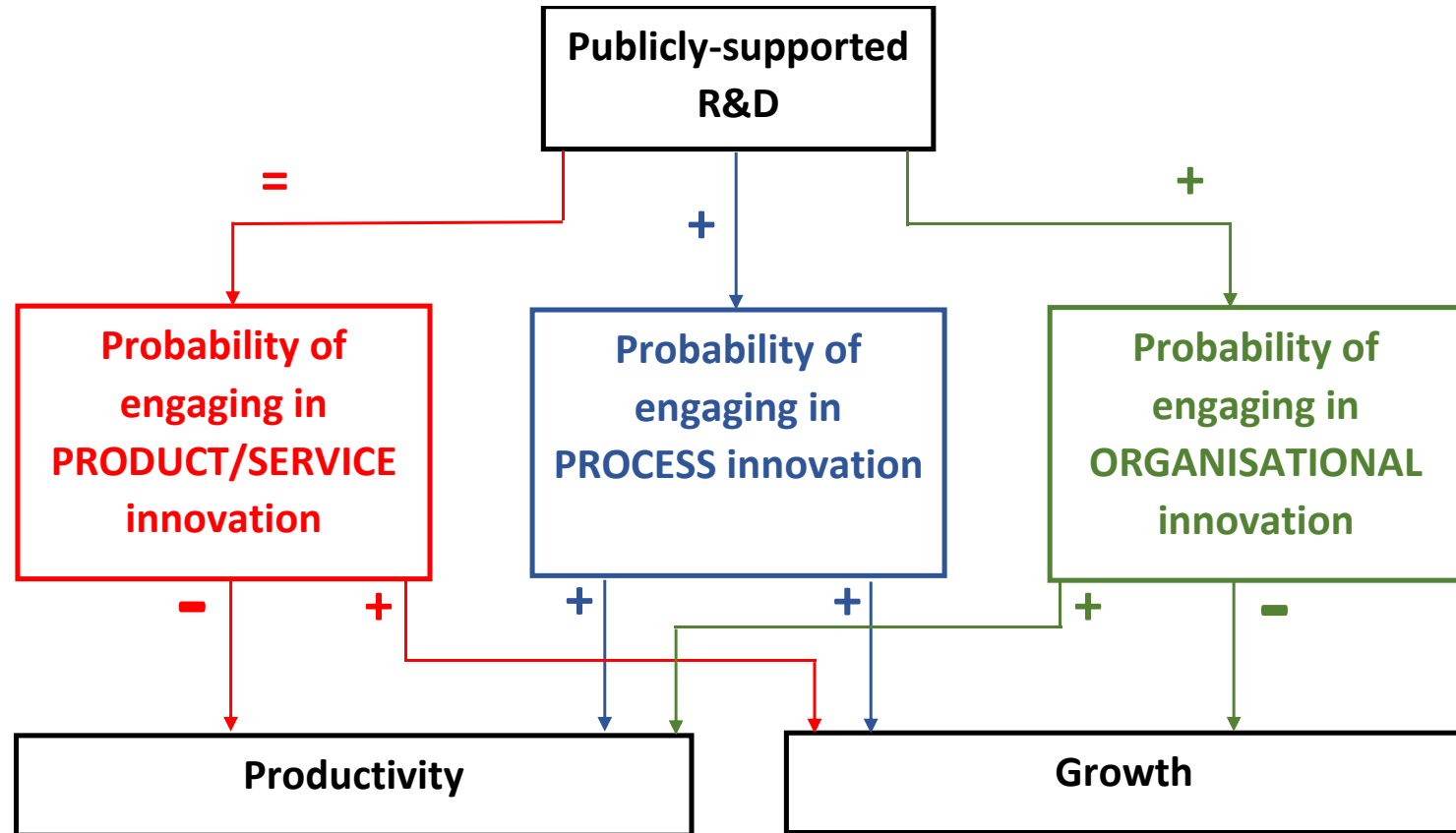
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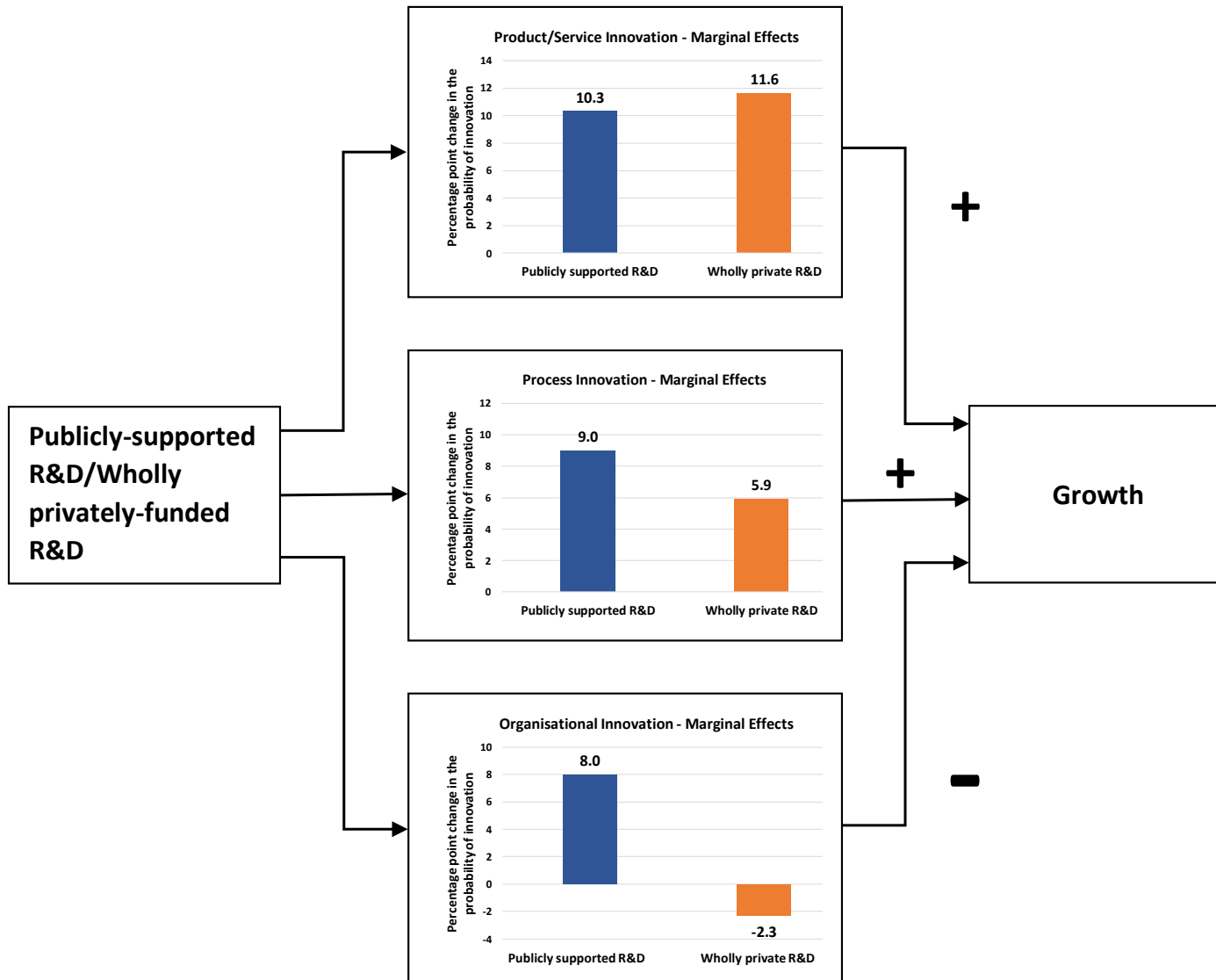
Key findings

Thank you!

References

Arrow, K. (1962). Economic welfare and the allocation of resources for invention, in The Rate and Direction of Inventive Activity, R. Nelson (ed.), Princeton University Press, Princeton, US, 1962.

Mason, G., Bishop, K. and Robinson, C. (2009). Business growth and innovation: The wider impact of rapidly-growing firms in UK city-regions, edited by NESTA. London.

Roper, S. and Hewitt-Dundas, N. (2016). The legacy of public subsidies for innovation: input, output and behavioural additionality effects. ERC Research Paper, No 21.

Roper, S., Du, J. and Love, J. H. (2008). Modelling the innovation value chain, Research Policy, 37, 6-7, 961-977.