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THE ECONOMIC BENEFITS OF PUBLICLY FUNDED BASIC RESEARCH: A CRITICAL REVIEW

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Abstract:
This article critically reviews the literature on the economic benefits of publicly funded basic research. In that literature, three main methodological approaches have been adopted — econometric studies, surveys and case studies. Econometric studies are subject to certain methodological limitations but they suggest that the economic benefits are very substantial. These studies have also highlighted the importance of spill over's and the existence of localisation effects in research. From the literature based on surveys and on case studies, it is clear that the benefits from public investment in basic research can take a variety of forms. We classify these into six main categories, reviewing the evidence on the nature and extent of each type. The relative importance of these different forms of benefit apparently varies with scientific field, technology and industrial sector. Consequently, no simple model of the economic benefits from basic research is possible. We reconsider the rationale for government funding of basic research, arguing that the traditional 'market failure' justification needs to be extended to take account of these different forms of benefit from basic research. The article concludes by identifying some of the policy implications that follow from this review.

Keywords: *Economic Benefits; Basic Research; Government Funding.*

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1. Introduction

In this article the authors review a gaggle of econometric studies, surveys and case studies to summarize the economic benefits that can be expected to accrue from investments in basic research (e.g. publicly funded research and development). Overall, the economic benefits of basic research emerge in one of six 'flavours':

1) Increasing the stock of useful knowledge (the path from discovery to application of knowledge can be long (e.g. Lasers), knowledge can complement and catalyze industrial R&D vs displace it);
2) Training skilled graduates (graduates with advanced training in instrumentation and techniques are well poised to make contributions; academics may teach what industry needs without directly doing 'relevant' research);

3) Creating new scientific instrumentation and methodologies (an underappreciated economic output from basic research is the development of new equipment, laboratory techniques and analytical methods);
4) Forming networks and stimulating social interaction (Informal relationships between academic and industrial individuals lead to increased exchanges of ideas thereby increasing the variety of scientific options firms may be able to explore to resolve technological challenges);
5) Increasing the capacity for scientific and technological problem solving (investments in the public basic research knowledge base increases the feedstock (trained individuals, background supply of knowledge) industry can draw upon);
6) Creating new firms (there is mixed evidence that increasing investments in basic research increases the supply of technology based firms in a region).

2. Policy Implications

The authors discuss estimates of rates of return on investments in basic research. Of course, the methodologies for arriving at these estimates are subject to some reservations but one estimate places the return at 28% for whatever that is worth. How these benefits will express will be idiosyncratic and vary depending upon the scientific field, technology and industrial sector.

The policy implications from this paper are built upon the concept that (as messy as the quantification of benefits may be) the function of basic research is crucial for a region's strategic economic position. Simple policy recommendations are difficult as policy will need to be nuanced to compliment the regions scientific, technological and industrial assets. Furthermore, the ability of knowledge to 'spillover' (a topic I will discuss in a future post) geographically and between sectors makes basic research policy development far from simple and unified.

3. Basic Research Policies

- Support training of graduates closely linked to leading organizations in their field
- Ensure that the benefits from the development of new instrumentation is maximized by supporting access for researchers to leading edge instrumentations, labs and fund the technicians assist in operations.
- Increase the industrial recruitment of qualified scientists and engineers
- Utilize a portfolio approach to invest in a range of research fields and a range of methods (programs and institutions) to transfer and exploit basic research knowledge.
- Recognize that a region's ability to exploit the global scientific knowledge base requires investment in the capabilities to understand and deploy said knowledge. A region cannot 'free-ride' on global scientific knowledge.
- I hope that you found my summary of the key points of this research paper enjoyable and empowering.

References

[1] Allen Consulting Group (2004) Measuring the impact of publicly funded research, Department of Education, Science and Training, Canberra.

[2] Alston, J.M. and Pardy, P.G. (2001) 'Attribution and other problems in assessing the returns to agricultural R&D,' Agricultural Economics 25, pp141-152.
[3] Hall, B.H., Mairesse, J. and Mohnen, P. (2010) Measuring the returns to R&D, in eds. Hall, B.H. and Rosenburg, N. (2010) Handbook of the Economics of Innovation.
[4] Harrison, M. (2007) 'Valuing the future: Choosing the discount rate in cost-benefit analysis,' OPBR Cost Benefit Analysis Conference, November 2007.
[5] Jaffe, A. (1989) 'Real effects of academic research,' American Economic Review 79, pp957-970.

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