Tracking the Geographic Footprint of R&D: New National and State-Level Measures of R&D Production and Investment

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Accurate and comprehensive measurement of research and development (R&D) activity is essential for understanding its contribution to innovation, productivity, and long-run economic performance. Although progress has been made in estimating rates of return to R&D, challenges remain, especially in linking R&D activity to the specific locations and sectors where the resulting knowledge capital is used in production. This paper introduces new R&D production measures developed by the Bureau of Economic Analysis (BEA) and outlines ongoing research on the geographic assignment of R&D investment. These experimental statistics expand the data foundation available to researchers and support new analyses of how R&D affects economic performance across industries, sectors, and regions.

This work builds on BEA's last major advance in R&D measurement, implemented during the 2013 comprehensive update of the National Income and Product Accounts (NIPAs). As part of that update, BEA reclassified R&D from an intermediate service input to a capital asset, a change that increased both investment and GDP. This change recognized the long-lasting contribution of R&D to economy, enabling economists to measure its impact on productivity and economic growth within a framework consistent with other forms of capital.

The new statistics include national and state-level measures of R&D value added, compensation, and employment for 2012–2024 by R&D performing sector: business, nonprofit institutions, and government. Their development relies on survey data from the National Science Foundation (NSF) and other sources and incorporates several methodological advancements, including integrating disparate R&D data sources into a cohesive national and geographic framework, improving the establishment-level allocation for R&D, and building up estimates of R&D value added based on its components: compensation, gross operating surplus, and taxes on production and imports less subsidies. These efforts align R&D production measurement with the national accounting framework used to estimate GDP, enabling direct comparisons with national, state, and industry GDP data.

The next major step in this research is the development of state-level measures of R&D investment. Although NSF collects company-level data on where R&D is performed, the productive services generated by that R&D may be utilized in different locations—for

example, when multi-establishment firms centralize R&D in specific facilities but utilize that R&D in their manufacturing establishments. Allocating R&D investment by location of use rather than performance presents conceptual and operational challenges but is essential for aligning R&D inputs with downstream economic activity.

To address this, we outline an approach for allocating R&D investment to states based on where the resulting R&D capital is used in production, linking company-level data from the Business Enterprise R&D (BERD) Survey to establishment-level data from the Business Register. Because this allocation problem raises important conceptual and empirical questions, we seek feedback from the conference community on our proposed framework and potential alternative approaches. Input from researchers working on estimating rates of return to R&D will be especially valuable, as the accuracy of these estimates depends on correctly linking R&D inputs to the economic outcomes they generate.

In summary, we estimate R&D production by state, which can support efforts to calculate geographic-level returns to R&D. In addition, we are researching ways to develop state-level estimates of R&D investment by linking R&D production and use. This geographic decomposition reveals the regional dynamics that underlie national trends, providing a better understanding of where knowledge capital is created and how it flows into production. By integrating disparate data sources into a consistent national and geographic framework, the new R&D statistics offer additional insights into where R&D is produced, how it contributes to local economic activity, and how its benefits may spill over across industries and regions. The forthcoming state-level R&D investment measures further align R&D investment with the locations where knowledge capital is used, providing new opportunities to study R&D's role in productivity, innovation, and economic growth. Feedback from this community will be essential for refining the methodology and ensuring that the resulting measures effectively support empirical research on the economics of R&D.