

## New Measures of Prices for R&D

Leonard Nakamura  
Federal Reserve Bank of Philadelphia  
[leinakam@msn.com](mailto:leinakam@msn.com)

As economies shift from tangible to intangible investment, how to deflate intangibles becomes a more important issue in practice. But how do we measure properly the real value of the intangible investment? What, indeed, do we mean by the real value of intangible investment? Can we draw a simple parallel between tangible and intangible investment?

This paper follows upon a recent reexamination of the nature of intangibles set forth by Kortum and Eaton (2021) that uses endogenous growth theory as its micro foundations rather than the neoclassical foundations of Corrado et al (2005). It focuses on developing new measures of deflation for the iconic intangibles -- research and development.

In this paper, I attempt to explore the speed of change of intangible investment which leads to rapid depreciation. As I do so, I intend to raise questions about how to estimate the deflation of intangible investment and the contribution of intangible investment to the economy. Elsewhere I and other economists have raised questions about the scope of what to consider intangible investment, in particular, whether to include consumer and organization capital as part of intangible investment, but here we look to the core of intangible investment – research and development – to try to understand what we mean by depreciation and what we mean by deflation of intangible investment. I find a number of complexities that have not been the focus of work on GDP measurement, including a gap between social and private depreciation of intangible capital and, therefore, a gap between the social and private stock of intangibles. I also find a difficulty relating to international trade and the measurement of GDP and the social stock of intangibles. In exploring this question, I raise more questions than I answer.