

IARIW-ESCoE Conference

“Measuring Intangible Assets and Their Contribution to Growth”

Intangible Capital and US Productivity Growth in 61 Industries

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This paper examines the connection between tangible and intangible assets in US productivity growth using the official multifactor productivity growth measures for the US private business economy. We examine data for 61 different industries from 1987 to 2019, which jointly cover the total private nonfarm economy. These data provide a detailed sectoral description of the role that intangibles play in output and productivity growth in the US private economy.

We use the intangible measures of own-account software, R&D, and artistic originals now included in the US National Accounts and explore how further information on advertising and free goods, following the work of Nakamura, Samuels, and Soloveichik, can be added to our detailed industry data base. Although we can only account for a portion of intangible capital, we explore the impact that intangible capital has had on growth, before and after the Great Recession, within a broad range of individual industries.

We construct measures of the stocks of intangibles, and examine whether inclusion of intangibles at the industry level improves our understanding of U.S. productivity growth since 1987. Corrado et al. have reported that intangible capital does not help greatly in explaining the aggregate productivity slowdown which has occurred since 2009. However, these additional forms of capital explain some productivity, so that the capital contribution increases and less growth remains in the aggregate residual. We examine how this pattern of results shows up in the data for individual industries.

We also examine how sensitive our pattern of results is to various adjustments to the parameters which determine the intangible and tangible stocks. We investigate the recent literature which has proposed further intangible additions to the US national accounts. We survey the directions that the BLS official MFP accounts will have to consider in order to continue to measure productivity growth in the US economy more accurately.

We explore the extent to which intangibles are correlated with other inputs to understand if there are systematic trends in the various industries that show a clear relationship. One of our inputs, the labor composition of the workforce, has had a notable impact on growth throughout the 1987-2019 period. In U.S. data, one major limitation of any analysis that examines both intangible capital and labor skills is that own-account software and IT capital are frequently allocated to individual industries on the basis of occupational employment, which is correlated with measures

of overall skill or education. We examine relationships between these different inputs in various industries and explore methods of potential adjustment for this systematic bias.

Bibliography

James Bessen. 2017. Information Technology and Industry Concentration. Working Paper 17-41, Boston University School of Law, Law and Economics Paper Series

Erik Brynjolfsson, Daniel Rock, and Chad Syverson. 2018. The Productivity J-Curve: How Intangibles Complement General Purpose Technologies. NBER working paper 25148

Carol Corrado, Charles Hulten, and Daniel Sichel. 2009. Intangible capital and U.S. economic growth. *Review of Income and Wealth*. <https://doi.org/10.1111/j.1475-4991.2009.00343.x>

Carol Corrado, Jonathan Haskel, Cecilia Jona-Lasinio, and Massimiliano Iommi. 2016 Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth, EIB Working Papers, No. 2016/08, European Investment Bank (EIB), Luxembourg.

Sallie Keller, Gizem Korkmaz, Carol Robbins, and Stephanie Shipp. Opportunities to observe and measure intangible inputs to innovation: Definitions, operationalization, and examples. *Proceedings of the National Academy of Sciences* 115(50):201800467. DOI: 10.1073/pnas.1800467115

Leonard Nakamura, Jon Samuels, and Rachel Soloveichik. 2017. Measuring the 'Free' Digital Economy Within the GDP and Productivity Accounts, Federal Reserve Bank of Philadelphia, Working Paper 17-37, October 2017.

Carol A. Robbins, Gizem Korkmaz, José Bayoán Santiago Calderón, Daniel Chen, Claire Kelling, Stephanie Shipp, and Sallie Keller. 2018. Open Source Software as Intangible Capital: Measuring the Cost and Impact of Free Digital Tools. IARIW 2018.