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Report

Engineering value: The returns to technological talent and investments in artificial intelligence

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Editor's Note:

This is a Brookings Center on Regulation and Markets working paper.

Abstract

This paper studies the extent to which firms also earn returns to their employees' AI skill investments and what might drive this value capture. Employees with technological skills are highly complementary to the intangible knowledge assets that firms accumulate. Companies signal that they own assets complementary to AI by employing workers with AI skills. Using over 180 million position records and over 52 million skill records from LinkedIn, I build a panel of firm-level skills to measure the market value of exposure to newly available deep learning talent from the open-source launch of Google's TensorFlow (a deep learning software package). AI skills are strongly correlated with market value, though variation in AI skills from 2014-2017 does not explain contemporaneous revenue productivity within firms. Using a variety of difference-in-differences specifications, I show that the TensorFlow launch is associated with an approximate market value increase of $11 million per 1 percent increase in AI skills exposure for firms with assets complementary to AI. Given a lack of contemporaneous productivity shifts, increases in the price of installed firm-specific AI complements following the TensorFlow AI skill shock is a likely mechanism for market valuation increases for AI adopters. These results suggest that the privately appropriable returns to open source software can be especially large when targeted toward scarce skillsets.

Download the full working paper here.

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