

The Importance of Markets for Technology for Innovation – New Study by Daniel Spulber and Pere Arque'-Castells

By TAP Staff Blogger

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“Understanding the precise channels through which knowledge is transmitted is necessary to inform sound innovation policies.”

- *Pere Arque'-Castells, University of Groningen, and Daniel Spulber, Northwestern University*

In a recent paper, Professors [Daniel Spulber](#), Northwestern University, and [Pere Arque'-Castells](#), University of Groningen, have established the importance of markets for technology for innovation. “[Measuring the Private and Social Returns to R&D: Unintended Spillovers versus Technology Markets](#)” shows that some of the external benefits of R&D are transmitted through markets for technology.

Professors Spulber and Arque'-Castells developed a general framework that allows R&D to diffuse through both spillovers and voluntary technology transfers. They note: “Taking market channels into account decreases the observed difference between social and private returns to R&D as compared with the canonical approach. The analysis suggests significant gains from trade in markets for technology.”

Below are a few excerpts from “[Measuring the Private and Social Returns to R&D: Unintended Spillovers versus Technology Markets](#)” by Pere Arque'-Castells and Daniel Spulber (*Journal of Political Economy*, Vol. 130, No. 7, July 2022, pp. 1860–1918) [subscription required to access full article].

Policy Relevance

Understanding the precise channels through which knowledge is transmitted is necessary to inform sound innovation policies. If spillovers dominate technology transfers, then public policy makers should pursue increased enforcement of IP and consider R&D subsidies and tax credits to align private investments with the social optimum. Alternatively, if technology transfers dominate spillovers, oversubsidizing R&D could be harmful, as it would reinforce superstar trends (Autor et al. 2020) in firms that are already capable of internalizing the multilateral effects of their research. If technology transfers dominate spillovers, public policies should maintain enforcement of IP and help facilitate technology transfers.

The Many Ways that Firms Share Technology

Firms share technology through a mixture of voluntary transfers and involuntary spillovers. Adopters obtain various benefits from voluntary transfers of technology in addition to benefits obtained from spillovers. The adopter may license or purchase IP to avoid penalties for infringement and additional legal costs. The adopter that licenses or purchases IP may experience increases in revenues, reductions in production costs, and improvements in transaction efficiencies. The adopter that licenses or purchases IP avoids costly workarounds and diminished product performance needed to conceal infringement. The adopter that licenses or purchases IP benefits by conforming to technology standards established by standards organizations. The adopter benefits from voluntary transfers when the provider bundles

technology transfers with other goods and services that have value to the adopter. The provider may reveal additional know-how about how to implement inventions when making a technology market transfer that would not be available with a technology spillover. Finally, the adopter benefits from technology gains from trade when the provider makes reciprocal payments for cross-licensing the adopter's technology.

Firms may also benefit from the R&D of other firms through various types of involuntary spillovers. "Involuntary spillovers" refers to technology transfers that are external to market transfers, even though the activities that generate the transfers may be voluntary. Firms benefit from other firms, revealing information about their inventions through patent claims. Firms benefit from observations of the technical publications and conference presentations of academics, research labs, and other firms. Firms benefit by observing and learning from the products, production technologies, and transaction methods of other firms. Based on this information, firms may imitate other firms or focus on more promising directions in R&D. Firms benefit from informal and formal disclosures by other firms in technical committees of standards organizations as well as technology standards published by standards organizations.

Study Findings

We obtain several findings of interest. First, the market-for-technology pool enters the product market revenue equation with a positive and statistically significant sign. This implies that technology markets serve an important function by granting access to valuable production inputs. Second, the prevalence of genuine spillovers is ambiguous after accounting for technology markets because the weights used to construct standard spillover pools are correlated with matching in the market for technology. This finding cautions against the common practice of assuming that spillover pools contribute purely to the social returns. Standard versions of external knowledge pools are contaminated with transfers and therefore also contribute to the private returns. Third, the private return to R&D is considerably larger (particularly for prominent technology providers) in the general framework than in the canonical model. As a result, the wedge between the social and private returns to R&D is smaller than estimated in earlier studies. Finally, back-of-the-envelope estimates suggest that the gains from trade in the market for technology are larger than \$1 trillion per year and account for at least 10% of total output. Overall, knowledge diffusion seems to take place through more channels than suggested by the unintended spillovers narrative.

The full article is available at the *Journal of Political Economy* [though subscription is required]: "[Measuring the Private and Social Returns to R&D: Unintended Spillovers versus Technology Markets](#)" by Pere Arque'-Castells and Daniel Spulber (*Journal of Political Economy*, Vol. 130, No. 7, July 2022, pp. 1860–1918).

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