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Where Have All the “Creative Talents” Gone? Employment Dynamics of US Inventors

Based on BFI Working Paper 2023-32, “Where Have All the “Creative Talents” Gone? Employment Dynamics of US Inventors,” by Ufuk Akcigit, University of Chicago; and Nathan Goldschlag, US Census Bureau

Technological progress is key to economic growth; likewise, economists have long focused on how many resources a society dedicates to research and development (R&D), whether in aggregate R&D spending or in the share of inventors in the workforce. However, this new research argues that focusing on the quantities of R&D investment misses an important point: It is not only the level of innovation inputs that matters for growth, but also the allocation of those investments.

The authors’ investigation has its grounding in a 1962 insight from the economist Kenneth Arrow, who intuited that monopolists have incentives to defend their market positions rather than produce radical technological breakthroughs. If true, this means that while the number of inventors and total R&D spending in an economy is important, the efficacy of that spending is mediated by where those inventors are employed.

Figure 1 illustrates the authors’ provocative hypothesis. Panel A shows total factor productivity (TFP) in the United States since 2000 (left axis) and a per capita measure of inventor labor (right axis). While there is a visible acceleration between 2000-2005, after 2005 there is a marked slow-down in TFP growth, even as the share of inventors grew by over 70%. In other words, innovation inputs are rising as technical progress slows. Equally striking is the shifting allocation of inventors across different-sized firms. Not only did the US economy allocate a bigger share of its employment into innovation, but its composition has also shifted toward the largest players in the economy.

Inventors are increasingly concentrated in large incumbent firms, less likely to work for young firms, and less likely to become entrepreneurs; also, an inventor hired by an incumbent earns 12.6% more than an inventor hired by a young firm, but their innovative output declines by 6-11%.

Note: Please see text of this Finding for description of this Figure, and see working paper for further details. Source: Fernald and Jones (2014), Inventor Employment History, BDS, author’s calculations.

1 Any opinions and conclusions expressed herein are those of the authors and do not represent the views of the U.S. Census Bureau. The Census Bureau has reviewed this data product for unauthorized disclosure of confidential information and has approved the disclosure avoidance practices applied to this release. DRB Approval Number(s): CBDB-FY20-CES007-004, CBDRB-FY21-CES007-004, CBDRB-FY22-CES008-008, CBDRB-FY23-CES020-001, CBDRB-FY23-CES020-002. DMS Project Number 7083300.

2 TFP attempts to measure the impact of technological improvement, including worker knowledge, on economic output.
The authors then take their model to the data, examining the employment history of over 760,000 US inventors, finding the following:

- Inventors are increasingly concentrated in large incumbents, less likely to work for young firms, and less likely to become entrepreneurs.
- Inventors working for incumbent firms earn more and produce less impactful innovations than inventors at young firms.
- Finally, when an inventor is hired by an incumbent, compared to a young firm, their earnings increase by 12.6 percent and their innovative output declines by 6 to 11 percent; also, these patterns are robust to alternative explanations, and are not driven by promotion to managerial positions in large incumbents, for instance. (See Figure 2.)

**Bottom Line:** Innovation matters, and talent is key to invention; however, this research also reveals the importance of where innovation occurs. For policymakers, the lessons are salient. First, aggregate inputs (e.g., R&D spending or inventors per capita) may give a misleading picture of innovation capacity; second, factor reallocation toward large incumbents may lower growth capacity; and third, policies that encourage more incumbent innovation might occur at the expense of entrant innovations, which are higher quality on average.

This research also points to a number of interesting, policy-relevant questions. First, what role do non-compete agreements play in explaining when inventors work for incumbents or young firms? Policies that encourage or discourage spin-offs and inventor entrepreneurship may have significant impacts on innovation and growth. Second, what role do financial frictions play in the inventor’s choice to work for incumbent firms? The availability (or lack thereof) of capital may weaken incentives for inventors to start a new firm. These and other questions will benefit from further research, and the authors’ current and recent work—with its insights into the “black box” of inventor employment—offers a valuable starting point.

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