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Pandemic Response: Are US Manufacturers Shifting Toward Digital Jobs?

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Online job postings can be used to assess manufacturers' response to an economic shock. Consider the following question: Are U.S. manufacturers moving toward digital jobs as a strategic response to the pandemic? In this issue, I answer this question with special attention to the US Midwest, where much of US manufacturing is concentrated.

Background

Government statistics allow us to track the evolving impact of the pandemic on domestic manufacturing. According to the Federal Reserve, manufacturing output dropped 13.7 percent in April 2020, its largest decline on record. Manufacturing employment fell by 1.3 million. Geographically, the biggest decline, in percentage terms, came in the East North Central division, which experienced a one-month 15.1% decline in manufacturing employment from March 2020 to April 2020.

But we can also bring to bear other statistical tools as well to study the continued response of the manufacturing sector to the pandemic. In particular, economists are increasingly using online job postings to give detailed real time information about labor market demand. Such job ads, because they typically contain information about the skills needed for the position and the location of the job, can give insight into the strategies that manufacturers are using to deal with the pandemic.

For this issue, data are drawn from the real-time database of online job postings collected by Indeed, which calls itself the "#1 job site in the world". Other online job posting databases exist, notably the one maintained by Burning Glass.

First, though, some caveats: Counts of online job postings, while very useful, are not like the carefully-curated figures that come out of the government statistical agencies. Job postings are often duplicated on multiple websites, so counts have to be "deduplicated." In addition, a single ad may be associated with multiple open positions, especially for less-skilled jobs. Consequently, there isn't a one-to-one relationship between ads and open positions.

A second important note: We're presenting this date on the broad regional level, but online job postings are available down to the state and even metro level. We chose certain job titles as representative of "digital jobs," even though a greater variety of job titles could have been chosen. Finally, we are

going to focus on jobs posted in the past 15 days as of May 28, 2020. Although this is just a snapshot, it provides a feel for what can be done.

Table 1. Selected Job Postings as of May 28, 2020.

Job Title Includes the Following Words	*Posting Count*
Machinist	816
Robot or robotics	159
Robot or robotics*	54
3D Printing or Additive Manufacturing	17
3D Printing or Additive Manufacturing **	237
Microbiology or Microbiologist	225

Notes: Data from Indeed and author calculations. All counts are 15 days older or less.
* includes "factory" or "manufacturing" in body of ad.
** Can include "3D printing" or "additive manufacturing" in any part of the ad.

Data and Analysis

Our main question will be to compare "classic" manufacturing jobs like machinist with "digital" manufacturing jobs in additive manufacturing and robotics. Table 1 shows the job posting counts for five categories of jobs: Jobs with 'machinist' in the title; with 'robots' or 'robotics' in the title; with 'robots' or 'robotics' in the title and 'factory' or 'manufacturing' anywhere in the body of the ad; with "3D printing" or "additive manufacturing" in the title; and with "3D printing" or "additive manufacturing" anywhere in the body of the ad. We also include job postings for microbiologists, an occupation which should be "hot" in the pandemic. Figure 1 shows the geographic distribution of these job openings across the United States.

Let's start with machinists, which represent the classic skilled manufacturing occupation. In May 2019, there were 383,000 machinists nationally according to the Occupational Employment Survey, one of the largest categories of production occupations. According to BLS data, about 38% of machinists work in the Midwest.

Table 1 shows that even in the pandemic, there are still openings for skilled machinists. Many of the associated job posts are looking for workers who can operate computer numerically controlled (CNC) machines. Many of those job openings are at defense contractors. Figure 1 shows the geographic distribution of these jobs. Geographically, 38% of job postings are in the Midwest, reflecting the distribution of machinist jobs.

The story is more complicated for robotics-related job postings. It has been suggested that manufacturers will react to the pandemic by substituting robots for human workers. However, there is no sign yet of that happening. Many of the robotics-related job postings pertain to surgical robots or warehouse robots. When we focus on manufacturing by requiring the body of the text to include the words "factory" or "manufacturing," the number of job postings nationally goes down to only 54. Those are mostly concentrated in the West, with hardly any in the South.

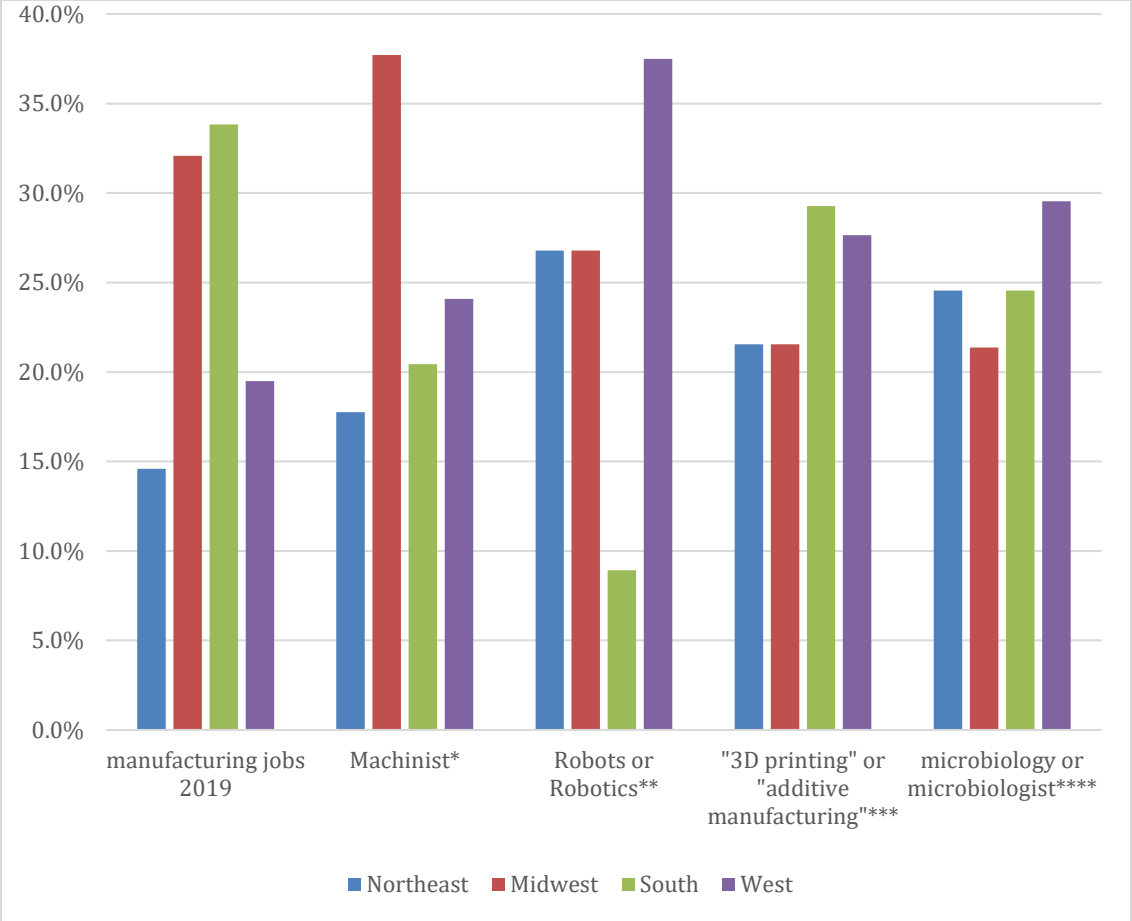

Figure 1. The geographic distribution of selected job openings.
Source of data: Indeed.com

The number of job postings with "3D printing" or "additive manufacturing" in the title is miniscule. That's surprising because the value and flexibility of 3D printing was shown in the early days of the pandemic, when many 3D printing companies quickly responded to the dire need for personal protective equipment (PPE) by quickly pivoting to making face shields and other equipment.

Nevertheless, these demonstrable benefits did not insulate additive manufacturing/3D printing from a pandemic-related drop in demand.

There are a lot more job postings with "3D printing" or "additive manufacturing" in the body of the ad, usually as an additional skill that the applicant should or must have. That suggests that additive manufacturing is still being used as a supplemental technology in factories, rather than the main affair. These jobs are weighted towards the West and the South.

Finally, we come to microbiology-related job postings. The employers include hospital systems, pharmaceutical companies, and the Centers for Disease Control and Prevention (CDC). These jobs are spread evenly across the different regions, as might be expected.

Conclusion and Policy Implications

Analysis of job postings can help determine how US manufacturers adjust to an economic shock. The analysis of US job postings data reported here suggests that domestic manufacturers are not shifting toward digital jobs in response to the pandemic.

What does this imply from the policy perspective? Digital manufacturing is one plausible route towards reviving U.S. manufacturing productivity growth. But it may be progressing slower than expected. That means there may be an important role for government intervention to accelerate digitization.

To be sure, this observation is based on only a snapshot of worker demand looking at a few specific job titles. A more robust analysis might show signs of increased investment by manufacturers in digital technologies as the economy recovers from the pandemic.

Further reading:

David Deming and Lisa B. Kahn, 2018. "Skill Requirements across Firms and Labor Markets: Evidence from Job Postings for Professionals," *Journal of Labor Economics*, 36(S1): 337-S369.

Michael Mandel and Judith Scherer, 2015. A Low-Cost and Flexible Approach for Tracking Jobs and Economic Activity Related to Innovative Technologies. Nesta Working Paper No. 15/11. Available at SSRN: https://ssrn.com/abstract=2872259 or http://dx.doi.org/10.2139/ssrn.2872259

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