

Work has transformed in the United States . . . just not how you think it has

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How have jobs changed over time? The Industrial Revolution (1760 to about 1840) was a key turning point in the growth of the U.S. economy, as automation began replacing the tasks of unskilled workers. Twentieth century developments such as technological advances and outsourcing have only further transformed the labor force. Although more occupations are requiring individuals with higher skills, changes *within* specific occupations themselves are more difficult to study.

In “[The evolution of work in the United States](#)” (*The American Economic: Applied Economics*, 2 April 2020), Enghin Atalay, Phai Phongthientham, Sebastian Sotelo, and Daniel Tannenbaum attempt to quantify these shifts through a new data source: newspaper job advertisements (ads). The authors obtained a dataset of raw text files from *The New York Times* (1940 to 2000), *The Wall Street Journal* (1940 to 1998), and *The Boston Globe* (1960 to 1983), approximately 8.3 million total job ads. They then used a model to link each ad to a corresponding Standard Occupation Classification code, as well as a specific job title, through synonyms of words and phrases. This model was also implemented to identify and group any of the tasks or skills mentioned in an ad. The main method that the authors used to classify the ads followed that of Spitz-Oener (“Technical change, job tasks, and rising educational demands,” *Journal of Labor Economics*, April 2006), who created five categories of task content in occupations: “nonroutine analytic, nonroutine interactive, nonroutine manual, routine cognitive, and routine manual” tasks. In addition, the authors applied the findings of Deming and Kahn (“Skill requirements across firms and labor markets: evidence from job postings for professionals,” National Bureau of Economic Research, January 2018), as well as elements from the Occupational Information Network, to organize the ads based on skill content.

By comparing the prevalence of these five task groups over time for specific occupations and job titles, Atalay and colleagues found that more changes have occurred *within* jobs as opposed to *between* jobs. From 1950 to 2000, the number of mentions per 1,000 words in newspaper job ads fell for nonroutine manual tasks (from 0.91 to 0.75), routine manual tasks (from 0.97 to 0.06), and routine cognitive tasks (from 1.89 to 0.85). However, mentions of nonroutine analytic tasks (from 2.77 to 5.88) and nonroutine interactive tasks (from 5.06 to 7.39) increased over that same span. Once the authors accounted for movements in the overall proportions of jobs in the labor force, they concluded that “88 percent of the [economywide] task changes have occurred within job titles.”

The authors closed by drawing on four examples to show how tasks and job titles have changed over time. First, they examined the task content and the frequency of mentions of computer numerical control (CNC) technologies in job ads for machinists, further supporting a study by Bartel, Ichniowski, and Shaw (“How does information technology affect productivity?” 2007) that “the introduction of CNC technologies led to a reduction in the demand for worker-performed routine.” Second, the authors found that the frequency of words in managerial job ads related

to nonroutine interactive tasks increased from 1950 to 2000, confirming the findings of a 1999 study (*The Changing Nature of Work*) by the National Research Council. Third, a 2012 study (“Supersize it”) by Basker, Klimek, and Van about retail cashiers was backed, as “the frequency of routine cognitive tasks in cashier jobs decreased from 4.3 mentions per 1,000 words in the 1950s (3.4 times the average across all ads and years) to 1.4 mentions per 1,000 words (1.1 times the sample average) in the 1990s. Conversely, the frequency of nonroutine interactive tasks nearly doubled over the sample period.” Finally, the authors found that the task content in job ads for real estate sales has *not* changed over time, which is similar to the job descriptions in the *1965 Dictionary of Occupational Titles* and the present-day National Association of REALTORS.