

RESEARCH SPOTLIGHT

Industrialization and the Workforce

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Employment in the United States since the 1980s has increased the most at the high end and the low end of the skill spectrum. That is, employment in high-wage, high-skilled occupations and in low-skilled, low-wage occupations has been growing relative to middle-tier occupations — such as white-collar clerical work and blue-collar factory work. This trend is known by the non-technical, but descriptive, term “hollowing out.”

Labor economists generally attribute hollowing out in large part to the technology revolution that has brought computers and computer-controlled machines to offices and factories, reducing demand for middle-tier workers, and to developments in international trade — partially enabled by technology — that have moved much middle-tier work elsewhere. But the past 30 years do not, of course, mark the first time that technological change has come to the labor market. In a recent working paper, Lawrence Katz of Harvard University and Robert Margo of Boston University seek to assess whether hollowing out also took place during the manufacturing revolution of the 19th century.

The researchers consider the question in three parts: how the distribution of occupations across different skill levels changed within the manufacturing sector, how it changed within the U.S. economy as a whole, and whether those changes in the broad economy reflected mainly a shift in demand or a shift in supply.

With regard to manufacturing, Katz and Margo divide workers into three categories: high-skilled white-collar workers, middle-tier artisans, and low-skilled operators and laborers. They note that factory owners increased efficiency by simplifying production tasks so as to enable them to replace artisanal labor with unskilled labor plus specialized machines. The adoption of steam-powered machines — and, later, electric ones — gave rise to greater economies of scale, further favoring large factories over artisanal shops. At the same time, the growth in factory size led to growing employment of managers.

Using 19th-century census records from the University of Minnesota’s Integrated Public Use Microdata Series (IPUMS) and elsewhere, Katz and Margo conclude that the skill distribution in manufacturing did hollow out. The proportion of artisans declined from 39 percent in 1850 to 23 percent in 1910. Conversely, the proportions increased at the low and high ends: The unskilled share grew from

58 percent to 65 percent during that period, while white-collar employment grew from 3 percent to about 12 percent.

The researchers point out that “while manufacturing was a growing share of GNP in the 19th century, it was (very) far from the whole economy.” In considering the changes in skill distribution across the economy as a whole, they again divide workers into high skill (white collar), middle skill, and low skill, but they consider alternative definitions for middle skill. When they define the middle tier to include both artisans and farm operators, they find that its share did fall and that the overall economy did see hollowing out.

When they define the middle tier to include only artisans, however, as in their estimates for manufacturing, they find that the skill distribution did not hollow out in the overall economy as it did within manufacturing; in fact, the overall employment share for artisans was slightly higher in 1910 than it was in 1850. They attribute this in part to growth

in construction (which used artisanal labor heavily) and to the fact that although the artisans’ share was declining within manufacturing, manufacturing itself was growing and artisans were still strongly represented in it compared to other sectors of the economy. Thus, instead of hollowing out, the pattern was one of general upgrading in

skill levels: The share of high-skill jobs expanded, that of middle-tier jobs remained around the same as before, and that of low-skill jobs went down.

Katz and Margo use data on wages to determine whether the increase in high-skill employment in the overall economy reflected mainly a shift in demand (as the needs of employers changed) or a shift in supply (as educational attainment increased). They rely on data about wages at army forts; past work by Margo indicated that “wages at the forts were very similar to those in the purely civilian economy in the local labor market.” They find that for white-collar workers, wages rose relative to those of other workers from 1820 to 1880, which was also a period in which the share of white-collar employment increased. “It follows,” they write, “that the relative demand for white-collar workers increased with relative supply over this period.”

Katz and Margo conclude that the rise in the relative earning power of white-collar workers began as long ago as the early years of industrialization and that this trend hit a lull by 1915 — a lull that would continue until 1980, when the skill premium began another ascent that has continued to the present day.

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“Technical Change and the Relative Demand for Skilled Labor: The United States in Historical Perspective.” Lawrence F. Katz and Robert A. Margo. National Bureau of Economic Research Working Paper No. 18752, February 2013.