

Trade, Productivity and the Decline in U.S. Manufacturing
August 1, 2022

In reviewing the decline in manufacturing employment from the 1970s to 2019 in my comments of April 6, 2022, I noted the pressures from imports in the 1980s and the rise of China as a global manufacturing powerhouse in the 1990s and especially the 2000s. I also observed that many economists are skeptical that trade played much of a role in the decline of U.S. manufacturing employment; and I said I would look at recent thinking on this subject.

My conclusion is that the debate goes on. Some economists think that trade, specifically import competition, has had a meaningful negative impact on manufacturing employment and that the profession has not been sufficiently attentive to the adverse consequences of these job losses, particularly at the community level. Others remain unsympathetic. It is not so much that they disagree about the extent of the job losses attributable to trade, but they see these as small, relative to both total employment and the normal rate of job loss in a dynamic economy. They argue that the primary reason for the decline in manufacturing employment is rapid productivity growth in combination with the limited demand of a wealthy society for manufactured goods. They are concerned about a lack of U.S. leadership on free trade.

Trade versus Productivity Growth in the 1980s and 1990s

The decline in manufacturing's share of U.S. employment was the focus of much research and discussion in the 1980s and 1990s. The motivation was not just whether import competition was responsible for the loss of manufacturing jobs, but whether the growth in trade – rising imports and exports - might also explain increasing income inequality in the United States. At first blush, trade seemed a plausible explanation for why incomes for more highly skilled (and more highly paid) workers were growing more rapidly than incomes of lower wage, less skilled workers.

The Heckscher-Ohlin theory of comparative advantage argues that countries gain from trade by exporting goods that use their relatively abundant factor of production more intensively and importing goods more intensive in their relatively scarce factor.¹ Trade then increases the return to the relatively abundant factor of production by expanding the market for the good using it intensively and reduces returns to the relatively scarce factor. Compared to the rest of the world, the United States was relatively well supplied with skilled labor, and unskilled labor was relatively scarce.² Accordingly, increased trade should benefit the relatively abundant skilled workers in the United States and disadvantage the relatively scarce unskilled.

¹ The model is highly stylized, assuming two countries, two goods and two factors of production.

² Within the United States, skilled workers were less numerous than unskilled; but compared to the rest of the world, with its many low-income developing countries, skilled workers were abundant in the United States.

Upon close inspection, however, the theory did not fit the facts so well. The patterns of trade did not match. Although the United States had a relative abundance of skilled workers globally, most U.S. manufacturing imports at that time came from other industrial countries, like Japan and Germany, that also had relatively large supplies of skilled workers. Moreover, when one took account of the job gains from U.S. exports, as well as the jobs lost to imports, the net impact on total employment was very small. Finally, if trade were the primary driver of inequality, the increase in wages of skilled relative to unskilled workers should have encouraged all industries to economize on skilled workers. Instead, most manufacturing industries increased their use of skilled workers relative to unskilled, suggesting other influences.

The preferred explanation for the shift to more skilled workers became “skill-biased technical change” – or technological advances that favored the use of skilled workers and displaced unskilled. Advances in computer technology that complemented the talents of highly paid workers and that facilitated automation of routine tasks seemed a plausible explanation both for rising inequality and for productivity gains that reduced manufacturing jobs. Even if workers are displaced, productivity growth is essential to raising living standards. And in a dynamic, flexible U.S. economy, job losers should find alternative opportunities.

“The China Shock”

By 2000, according to Autor, Dorn and Hanson (2016, 2017), a consensus among economists had developed that trade played little role in explaining declining U.S. manufacturing employment and increasing wage inequality. But with the 2000s came big changes. Most notably, China became a dominant player on the world’s economic stage.

China’s share of world manufacturing output jumped from roughly 7 percent in 2000 to 18 percent in 2010.³ Its share of world goods exports increased from less than 4 percent to more than 10 percent.⁴ The U.S. trade deficit with China grew dramatically, while its overall trade deficit set records, surpassing 5 percent of GDP in the mid-2000s.⁵ Meanwhile, U.S. manufacturing employment fell by over 5 ½ million.

These developments led some economists to re-consider the dismissal of trade as a contributor to the decline of U.S. manufacturing. Autor, Dorn and Hanson (2016) and Acemoglu, Autor, Dorn, Hanson and Price (2016) looked at U.S. communities that were exposed to competition from Chinese imports, by virtue of their industry mix, and found that they suffered larger job losses than those that were less vulnerable. These researchers

³ Author’s calculations using data (US\$ at current prices) from the United Nations Statistics Division, National Accounts section, Basic Data Selection, unstats.un.org (accessed June 30, 2022.) Manufacturing output for China is not available until 2004, but output for 2000 can be approximated from manufacturing, mining and utilities. China’s growth continued: as of 2019, China accounted for 28 percent of world manufacturing output.

⁴ Shares of world goods exports were calculated using data (US\$ at current prices) from the World Bank World Integrated Trade Solution (WITS) data base, wits.worldbank.org (accessed July 30, 2022.).

⁵ The previous high was 3 percent of GDP in 1987.

estimated that the direct impact of increased Chinese imports was roughly 10 percent of the loss of U.S. manufacturing jobs in the 2000s. Taking account of job losses at the suppliers to the import vulnerable manufacturers increased the estimated impact to almost 20 percent of U.S. manufacturing job losses. Non-manufacturers were also affected by the secondary effects. In addition, migration of displaced workers out of adversely affected industries and regions was limited; so the negative effects of manufacturing job losses were not diffused across the national labor market but remained geographically concentrated. ⁶

The Productivity Argument

Others remained skeptical, noting that even the largest estimates of job losses attributable to Chinese imports were small relative to total employment and normal job churn.⁷ In their view, the primary reason why manufacturing employment has fallen so much absolutely and relative to overall employment is more rapid productivity growth in manufacturing than in other industries, coupled with a wealthy country's limited demand for manufactured products, compared to services.

From 1980 to 2000, real value added grew slightly faster in manufacturing than in all private industries (including manufacturing) even though manufacturing employment fell roughly 10 percent while employment in all private industries increased almost 45 percent. From 2000 to 2010, manufacturing employment fell by a third compared to a decrease of 3 percent in all private industries; yet real value added still rose 16 percent in manufacturing compared to 19 percent in all private industries. In both periods, manufacturing prices grew more slowly than prices for all private industries, causing manufacturing's share of nominal GDP to decline, while its share of real GDP was little changed.

On balance, this is a positive story. Manufacturers are becoming more efficient, producing more output with fewer workers; and consumers of manufactured goods are benefiting from the lower prices that result. While we should be concerned about workers who have lost their jobs, for whatever reason – technological progress, import competition or something else, the challenge is to help them make a transition to other industries. But we do not need to worry that the United States is losing its manufacturing capability.

Unfortunately, this narrative does not describe the past decade. Additionally, Houseman (2018) argues that the picture of a growing, but increasingly efficient manufacturing sector has been distorted by the computer and electronic products industry.

Productivity growth was almost nil in the past decade for both manufacturing and all private industries. From 2010 to 2019 productivity grew about 0.5 percent per year in both, compared to productivity growth of 5 ½ percent per year in manufacturing and 2

⁶ Adverse effects are examined in Charles, Schwartz and Hurst (2018.)

⁷ See for example Rose (2021) and DeLong (2017.)

percent in all private industries in the 2000s.⁸ Even though manufacturing employment actually increased 11 percent from 2010 to 2019, real value added rose only 15 percent⁹ – the same as in the prior decade when employment fell sharply.

Productivity and Computers

As explained by Houseman (2018), the high rates of productivity growth in manufacturing (before the recent slowdown) were not caused by most U.S. manufacturers automating and replacing workers with robots.¹⁰ The manufacturing productivity numbers have been skewed by the computer and electronic products industry (henceforth, computers.) The speed and other capabilities of computers have advanced very rapidly. These quality improvements are treated by the Bureau of Labor Statistics and in the national income accounts as a decline in the price of computers. In most industries, output prices rise over time. Since growth rates for industries' real value added are derived from nominal value added deflated by the appropriate price index, the fall in computer prices has a big effect on the estimates of real value added for computers and gives an overly positive picture of the health of the total manufacturing sector.

Between 2000 and 2010, the nominal value added for the computer industry grew less than 7 percent – far less than the nominal growth for all private industries (45 percent.)¹¹ However, the price index for the computer industry fell almost 70 percent over the decade. Applying this declining price index to nominal computer value added results in an increase in real computer value added of over 200 percent. Meanwhile, twelve of the eighteen other major manufacturing industries experienced declines in real value added during this period.

The computer and electronics industry also played a major role in the recent falloff in productivity growth. Quality improvements have slowed down, and the price index fell “only” 15 percent from 2010 to 2019 and real value added rose “only” 55 percent. Both figures are much smaller than those in earlier decades.

Problem or Not?

What should one make of all this? Estimates of job losses due to import competition do seem small. At the same time, the seemingly upbeat story about rapid productivity growth accounting for most of the decline in manufacturing employment is distorted by the

⁸ Productivity calculated as the growth in real value added (GDP) relative to that in employment using data from the U.S. Bureau of Economic Analysis (BEA) “GDP-by industry” and the BEA’s interactive active data tool.”

⁹ Real value added for all private industries rose 24 percent and employment increased 19 percent.

¹⁰ While productivity gains through automation were not the key driver of these patterns in the United States, they may be elsewhere. According to the article “Singapore’s Industrial Revolution,” *WSJ*, Thursday, June 23, 2022, Singapore has automated aggressively, causing the share of GDP from manufacturing to rise since 2015, even as manufacturing’s share of employment has fallen.

¹¹ These and other numbers in this section are the author’s calculations using the BEA’s interactive data tool and “GDP-by-industry.” Data were accessed in July 2022.

extreme decline in estimated computer prices – and the associated ballooning in estimated computer output.

Nor can rapid productivity growth explain why once sizable industries like textiles and apparel and shoes have almost disappeared in the United States, even as consumers continue to buy such products. The answer is imports; these and many other products can be acquired more cheaply from other countries. But what, then, is happening to exports?

One would expect increased imports of manufactured goods to be offset by increased exports, with employment losses caused by imports offset by gains in other firms and industries from increased exports. In the trade debates of the past, a common view was that the United States imported consumer goods made with low wage, unskilled labor and exported high technology products made by high wage, skilled labor. However, for the past three decades, imports have grown faster than exports for most manufactured products, regardless of technical sophistication; and we do not see large employment increases in any major manufacturing industry.¹²

Instead, increases in net imports of manufactured goods have been balanced by net exports of services, income on U.S. investments abroad, and capital inflows. Also, since the early 2010s, increased domestic production of oil and natural gas has allowed the United States to cut back imports of petroleum products.

U.S. Comparative Advantage

The United States runs a surplus in trade in services and derives more income from its investments in other countries than it pays to other countries with investments in the United States. Both surpluses have grown over time. The largest categories of services exports are financial and other business services; travel and tourism expenditures by visitors to the United States, including educational expenditures by foreign students studying here; and income from royalties and licenses of intellectual property. Financial and other business services have grown particularly rapidly since the 1980s.

With U.S. imports of manufactured goods balanced increasingly by exports from non-manufacturing industries and investment income, the manufacturing jobs lost to import competition have been offset by job gains in other sectors of the economy.

And then there is the issue of the overall U.S. trade deficit. In discussing the effects of trade on an economy, it is common to assume that imports and exports balance – not country by country or year by year but in the aggregate over time. However, the United States has been running a trade deficit with the rest of the world since the 1970s and a deficit on current account (balance in trade in goods and services plus net income flows) since the

¹² The United States does have a trade surplus in aircraft, engines and parts, which is part of “other transportation equipment.” However, employment in other transportation did not increase 2000-2019. This is probably due to domestic issues, including airline difficulties after the terrorist attack of September 11, 2001.

early 1980s. This current account deficit has been funded by capital inflows from other countries. Some analysts have characterized this situation as the rest of the world lending to the United States so that we can buy their exports. Others see the inflows motivated more by foreign investors wanting to participate in dynamic and liquid U.S. financial markets and by the desire of official authorities in other countries to build war chests of U.S. dollars.

As the world's reserve currency, the dollar is the preferred currency for engaging in international transactions of all kinds. Having substantial dollar reserves insulates countries from volatile capital flows. In a crisis, investors around the world look for safety in dollar assets. As the issuer of the world's reserve currency, the United States enjoys many benefits; but other countries' demand for dollars does raise its value relative to other currencies.

A higher dollar, in turn, makes U.S. products more costly in the global marketplace. This need not cause unemployment, as the capital inflows will tend to lower interest rates, if the central bank allows, thereby stimulating economic activity. But the industries that add jobs will not be the same as those that lose. Manufacturing will tend to lose. Interest-sensitive sectors such as construction and activities associated with real estate and financial transactions are most likely to benefit.

Conclusion

This was intended to be a brief summary of the latest thinking on reasons for the long term decline in manufacturing employment. However, the debate is complicated, bringing in issues ranging from measuring productivity growth to the dollar's role as the world's reserve currency.

In general, I think economists as a group have been too dismissive of the decline in manufacturing employment and its relationship to global competition. Even when sympathetic to the challenges facing displaced workers, they have often been vehement in rejecting a meaningful role for trade, perhaps seeing a need to defend free trade against the dark forces of protectionism. Higher productivity growth in manufacturing has been presented as a sign that all is well in manufacturing, rather than largely a peculiarity of the computers and electronic products industry. There has not been enough discussion of the determinants of manufacturing exports and the ramifications of the apparent shifts in the U.S. comparative advantage away from advanced capital goods and manufacturing generally.

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