Comments and Discussion

COMMENT BY

MARIANNE BERTRAND Autor, Dorn, and Hanson build on their highly influential prior work on the China shock to examine longer-term adjustments in the local labor markets most exposed to Chinese imports during the 2000s. Their main takeaway is that while Chinese imports reached a plateau in 2010, adverse impacts on manufacturing employment, overall employment-population ratios, and income per capita were still present in the more negatively exposed areas as of 2019. Expected labor market adjustment via out-migration to areas with better job opportunities broadly failed to occur. Looking at heterogeneity across commuting zones (CZs), the authors show that the persistence of adverse outcomes is more acute in areas that started with high levels of industrial specialization as well as with a less-educated workforce. Using some of the most generous estimates of the consumer benefits of rising trade with China, the authors conclude that more than 5 percent of the US population may have suffered absolute declines in average real incomes due to China's entry into the World Trade Organization (WTO).

AGGREGATE TIME SERIES PERSPECTIVE The authors, both in the current paper and in their prior work, have been mainly concerned with the regional variation in exposure to the China trade shock and have mostly stayed away from discussing the aggregate implications of China's entry into the WTO for the US labor market. Yet their findings have at times been hijacked to feed a populist backlash against free trade that has put the blame for the decline of US manufacturing employment on a rape by China.[1] The authors' work has inspired an active and growing literature that attempts

1. "Trump Accuses China of 'Raping' US with Unfair Trade Policy," BBC News, May 2, 2016, https://www.bbc.com/news/election-us-2016-36185012.

to provide answers to the aggregate impact question, a question that is less well suited to a cross-regional, reduced-form identification strategy. It was worthwhile for me, as a discussant who is an outsider to this literature, to start with a review of the aggregate time series evidence on manufacturing employment in the United States.

Bureau of Labor Statistics data reveal a linear decline in the share of manufacturing employment from about the mid-1960s to the early 2010s, with a stabilization since.[2] Economic recessions are typically associated with somewhat faster decline in the manufacturing share (with the COVID-19 recession a likely outlier), and the 2000s were characterized by two such recessions. Beyond this, it is hard to discern anything off-trend about the first decade of the new millennium, which coincided with China's entry into the WTO.

As pointed out to me by the authors, a steady downward trend in the manufacturing share of overall employment may mask more complex dynamics when it comes to the number of manufacturing versus non-manufacturing jobs in the economy. Indeed, in levels, there is much clearer evidence of faster drops in the number of manufacturing jobs in the 2000s, compared to a steady level from the mid-1960s to the late 1990s.[3] Yet, even in the level series, a direct link between the China shock and these aggregate manufacturing employment losses seems somewhat tenuous. In particular, the manufacturing job losses are concentrated during the 2000–2001 recession and during the Great Recession. The number of people employed in manufacturing is pretty constant from 2003 to the beginning of the Great Recession. This is in contrast with the very smooth increases in China's share of world manufacturing exports, as seen in figure 1 in the paper, and in China's share of US imports, as seen in figure 3. Furthermore, a large share of the employment losses during the first of the two dips occurred before December 2001, which marked China's entry into the WTO. It is possible, as Pierce and Schott (2016) have argued, that the China shock truly began more than a year earlier, when the US Congress granted permanent normal trade relations to China in October 2000. Nevertheless, the contrast between the smooth increase in Chinese imports during the 2000s and the more business-cyclical changes in manufacturing employment over the same period raises questions as to how first-order

2. FRED Economic Data, "All Employees, Manufacturing/All Employees, Total Nonfarm," https://fred.stlouisfed.org/graph/?g=cAYh.

3. FRED Economic Data, "All Employees, Manufacturing," https://fred.stlouisfed.org/series/MANEMP.

the China shock might have been in explaining the overall decline in US manufacturing since the beginning of the new millennium. To be clear, this does not take away from the authors' core interest in how local experiences of extreme exposure to Chinese imports may have left some communities economically battered for the longer run.

MEASUREMENT OF THE CHINA SHOCK Building on Autor, Dorn, and Hanson (2013) and Acemoglu and others (2016), the authors measure exposure to the China shock at the US CZ level. Exposure as of year *t* is defined using a shift-share approach: average change in Chinese import penetration across industries between year *t* and a baseline year (in most cases 2000), weighted by industry shares in the CZ employment in the baseline year.

While this is a highly reasonable measure of Chinese import competition in a given CZ, it is much less clear to me why it would be the best proxy for an area's overall exposure to the China trade shock. First, this measure excludes US exports to China, which have also grown since China's entry into the WTO. The authors argue that this exclusion is justifiable because US imports from China dwarf US exports to China: they mention that the 2000–2012 increase in US manufacturing imports from China was 4.1 times the increase in US manufacturing exports to China. Yet one may counter that a quarter of a massive number is still a massive number. Furthermore, unlike US imports from China, which have plateaued since 2010, US exports to China have continued to increase; this would further speak in favor of including them in an analysis of the long-term effects of the China shock.

Also, and as importantly, a sole focus on direct import competition from China abstracts away from a richer supply chain perspective and the upstream and downstream channels via which the trade shock may have had an impact on local economies. For example, Wang and others (2018) use a methodology at first blush similar to Autor, Dorn, and Hanson (2013) and suggest that the employment benefits from being able to use (cheaper) imported intermediate goods, that is, downstream effects, outweigh the negative effects of direct import competition and of being upstream of US firms that directly compete with China.

In summary, it is unclear, except maybe for reasons of path dependence in research, as to why the authors stick exclusively with one channel of impact for the China shock, while the data exist to consider the other channels and the identification strategy appears generalizable to these other channels.

IDENTIFICATION There are several empirical challenges the authors face while trying to assess the causal impact of differential geographical exposure to Chinese imports. The first challenge is with regard to the endogeneity

of US imports from China to domestic demand conditions. To address this concern and identify the foreign supply–driven component of this change in import penetration, the authors instrument the US import exposure measure with non-US exposure, using industry-level growth of Chinese exports to other developed countries.

A second challenge, which the instrumentation strategy cannot address, is that the low-skill industrial sectors that were most exposed to direct competition from China throughout the developed countries might be the same sectors that were also exposed to skilled-biased technological change and the adoption of other labor-saving technologies. Here, the authors' approach is to control for as much as is measurable and relevant, which the authors do by including controls for baseline specialization in occupations according to their routine-task intensity and offshorability, following Autor and Dorn (2013). It is unclear whether these controls can fully capture these technological forces and there is little in the analysis to assess the sensitivity of the results to other proxies for these forces (such as capital investment measures). Furthermore, it is unclear how to think about a control such as offshorability. One could argue that this is overcontrolling to the extent that some US firms may have responded to the shock via offshoring some of their operations to China, as suggested by Pierce and Schott (2016).

Other baseline controls are meant to account for other sources of variation across CZs that might be correlated with the import exposure measure and could explain changes in employment, labor force participation, or the take-up of government transfers over the period under study. Again here, little sensitivity analysis is reported on the list of controls included. For example, one excluded control I was curious about is the baseline share of male employment in the CZ. The male employment share might be correlated with exposure to the China shock and could be a nontrivial force in the longer-term trends the authors document, given the secular decline in US prime-age male employment and labor force participation over the last fifty years, especially among less-educated men (Binder and Bound 2019).[4] More generally, given the non-randomness of which CZs were most exposed to Chinese imports, it would be valuable to discuss in more detail how the baseline controls were selected and how sensitive the results are to different choices.

4. Share of women (and hence men) in CZ employment is included as a control in the analysis of labor market adjustment to the decline of coal. Instead, as far as I understand it, the analysis of labor market adjustment to the China shock includes the fraction of working-age women who are employed.

The authors further argue that none of the forces or factors above would have changed as abruptly as the China shock. This is a fair point. One easy way to further substantiate this would be to report pre-trends. The figures presented in the paper do not allow the reader to assess these pre-trends, as they only display effects starting in 2002. The authors could easily start these figures, say, a decade earlier, to help the reader assess whether or not the CZs experiencing the greatest impact from the China shock were (or were not) already differentially trending prior to 2002. This is the approach they follow for the analysis of the long-term impacts of the Great Recession in figure 13.[5]

LONG-TERM EFFECTS OF A PAST SHOCK, OR CONTINUING EFFECTS OF A NEVER-ENDING SHOCK? The central motivation of the authors is to assess whether areas most battered by Chinese imports between 2000 and 2010 had been able to adjust by 2019, roughly a decade after Chinese imports reached their plateau. While figure 3, panel B, indeed shows a plateauing of US import penetration from China by 2010, the figure also suggests the possibility of a continuing increase in import exposure when other low-wage Southeast Asian countries to which China may have been offshoring some of its own production over time (such as Vietnam) are included. The fact that the rate of increase in the 2010s is lower than in the 2000s (and somewhat comparable to the 1990s) does not tell us about the distribution of this additional import pressure across CZs. Given this, it would seem relevant for the authors to consider whether the areas that were most exposed to China in the 2000s are also those most exposed to increased import penetration from these low-wage Southeast Asian countries in the 2010s. Absent this, it is more difficult to conclude that the paper is truly looking at the persistence of the (past) China shock rather than the continuing effects of two decades of increased exposure to Southeast Asian import competition.

INTERACTION OF THE CHINA SHOCK WITH THE GREAT RECESSION As already discussed above, the losses of manufacturing jobs in the 2000s were concentrated during the 2000–2002 period and during the Great Recession, while the increase in Chinese imports was continuous during the entire 2000s. The possibility that local labor markets most exposed to the China shock may have had a particularly difficult time adjusting because the shock partly coincided with one of the biggest financial sector–driven recessions in US history deserves more consideration. This seems especially relevant in terms of the generalizability of the findings to other large and sudden

5. The analysis of pre-trend in online appendix figure A1 is limited to the 1991–2000 trade shock, and hence limited to pre-trends up to 1990.

shocks, such as those one may expect from a fuller energy transition in the United States toward renewables. The US unemployment rate was above 8 percent from 2009 to 2012. Low-skilled workers, who dominate the industrial sectors exposed to Chinese imports, were particularly hurt by the Great Recession, with the unemployment rate among those with less than a high school degree well above 12 percent from 2009 to 2012.

We know from Davis and von Wachter (2011) that the effects of mass layoffs are much more persistent when they occur in a period of high unemployment. Davis and von Wachter (2011) show that losing a job in a mass layoff when the unemployment rate is less than 6 percent results in income losses over the next twenty years that are about one-seventh of counterfactual income. In contrast, losing a job in a mass layoff when the unemployment rate is over 8 percent results in losses twice as large over the next twenty years. In this regard, it is informative that there is a nontrivial correlation between the Great Recession shift-share variable and the China shock shift-share variable (0.48, as mentioned in a footnote). In their quest to understand the sources of the long-term persistence, the authors may have benefited from studying heterogeneity across CZs based on their exposure to the Great Recession.

The Great Recession may have further restricted trade-displaced workers' ability to find new jobs in that, besides constraining the number of job opportunities, it may have also made displaced workers, but especially homeowners, less geographically mobile. The Great Recession was preceded by a sharp increase in homeownership, and many of these homeowners saw the value of their housing wealth decline sharply as the recession hit. Households that would otherwise have found it beneficial to relocate may have been locked in to their existing residence (and town) in that they were not able to sell their home for enough to pay off their lender and would not have had enough cash for a new down payment. Here again, the paper could do more to assess the relevance of this channel to the long-term persistence of the China shock by exploring variation across CZs based on the share of homeowners and their exposure to the housing market collapse.

Putting aside any direct effect of the Great Recession on Americans' ability to relocate, existing research also shows that there has been a substantial downward trend in Americans' mobility over time (Molloy, Smith, and Wozniak 2011). Some of the explanatory factors that have been identified relate to both higher costs of moving (increase in the homeownership rate, aging population, rising share of dual-earn households) but also lower benefits of moving (such as increasing housing costs in job-rich cities and states, or the rise in state- or city-specific occupational licensing). One may

wonder about additional barriers that are specific to the population and regions that were most exposed to Chinese imports. In many of these disproportionately lower-income communities, extended family and friends may be a crucial part of a private safety net that is difficult to let go of in the absence of a strong government-provided safety net. One may also wonder about the extent of the negative self-selection among those who are still residing in the manufacturing towns that had already experienced decades of decline prior to the China shock.

INDUSTRIAL RELATIONS, CORPORATE GOVERNANCE, AND ACTIVE LABOR MARKET POLICIES Germany's experience with the China trade shock was very different from that of the United States. While the United States witnessed a large trade deficit, Germany maintained balanced trade accounts with China. This was in part because Germany was uniquely able to increase its exports to China while the United States (and many other developed economies) were not. Some of this might be due, as the authors argue, to Germany's unique comparative advantage in a set of specific manufacturing goods for which China's demand was fueled by its economic growth and its rising level of consumer income (such as manufacturing tools and luxury cars). But there might be other useful contrasts between the United States and Germany worth discussing as they raise broader questions for future research. In an interesting piece, Dustmann (2021) speculates as to what might be distinctive about Germany, beyond its industrial structure and much longer history of integration in international trade, especially with other (mostly lower-income) European countries than the United States.

One factor might be Germany's distinctive industrial relations and labor market institutions. One may wonder whether stronger union representation, worker representation on corporate boards, or structures akin to Germany's work councils might have led to different longer-term outcomes and more internalization in business decisions pertaining to the welfare losses for exposed workers, their families, and their community. Relatedly, it would be interesting to know whether firms characterized by local ownership, such as family-held firms, might have been more willing to consider the well-being of their workers when looking for corporate responses to these new competitive pressures.

Also, publicly owned firms and private equity investment are likely more common in the United States than in Germany. These ownership structures might be more focused on short-term profitability and hence less willing to make the investment, including in their workforce, that would be required to reorient future production toward goods for which China does not present

such a competitive threat, such as higher value-added niche products or products that involve greater customization.

Another distinctive feature of the German economy is its greater preparedness to reskill or upskill its workforce, in particular via its large apprenticeship program. Battisti, Dustmann, and Schönberg (2017) show that German firms that adopt new technological or organizational practices that displace otherwise routine work manage to limit worker losses by retraining or upskilling their workforce. Interestingly, they also show that these positive retraining outcomes are largest for workers in firms that run large apprenticeship training programs and have strong union representation. It would be interesting to know whether the same dynamics of worker reskilling and upskilling happened in Germany in response to the China trade shock.

Finally, and not as much a matter of Germany's than of United States' distinctiveness, government spending on active labor market policies (ALMP)—which include improving job readiness, providing help in finding suitable employment, and expanding employment opportunities—may play an important role in easing labor markets' adjustment process to large and sudden negative shocks. According to the OECD, the United States was ranked second to last among OECD countries in its ALMP spending as a percentage of GDP as of 2017, only ahead of Mexico.[6] The United States spends annually only 0.1 percent of GDP on ALMP, compared to an OECD average of 0.65 percent, and a high of 1.96 percent in Denmark. While evidence on the effectiveness of ALMP is mixed, it is also the case that not much good can happen from spending (close to) nothing to support displaced workers. While such a low level of government spending might have been historically justified by higher levels of internal mobility in the United States, it seems thoroughly inadequate given the decline in American workers' mobility discussed above.

It is true that workers displaced by trade have received disproportionate support, with Trade Adjustment Assistance (TAA) often used as a carrot to win enough support for new trade deals, while no such carrot is needed when purely private decisions, such as the adoption of labor-saving technologies, rather than political decisions are the source of worker displacement. But even here, the level of spending seems inadequate given reasonable expectations about how much it would cost to retrain a worker. The 2002

6. OECD, "Active Labour Market Policies: Connecting People with Jobs," https://www.oecd.org/employment/activation.htm.

TAA program capped training funds at $220 million per year throughout the 2000s when the China shock was full-blown; it was only in 2009 that the cap was raised to $575 million as part of the American Recovery and Reinvestment Act. This amounted to less than $1,700 per new worker certified by TAA petitions in 2007 (Vijaya 2010).

CONCLUSION This paper complements a large literature in labor economics showing that the assumption of perfect labor markets is refuted by the data. This assumption is built into much of government policy beyond trade, such as cost-benefit analysis calculations in rule making or antitrust enforcement. I hope this paper will help contribute to a much needed policy discussion on better accounting for labor market imperfections and worker welfare.

REFERENCES FOR THE BERTRAND COMMENT

Acemoglu, Daron, David H. Autor, David Dorn, Gordon H. Hanson, and Brendan Price. 2016. "Import Competition and the Great US Employment Sag of the 2000s." *Journal of Labor Economics* 34, no. S1: S141–98.

Autor, David H., and David Dorn. 2013. "The Growth of Low-Skill Service Jobs and the Polarization of the US Labor Market." *American Economic Review* 103, no. 5: 1553–97.

Autor, David H., David Dorn, and Gordon H. Hanson. 2013. "The China Syndrome: Local Labor Market Effects of Import Competition in the United States." *American Economic Review* 103, no. 6: 2121–68.

Battisti, Michele, Christian Dustmann, and Uta Schönberg. 2017. "Technological and Organizational Change and the Careers of Workers." Working Paper. https://www.qmul.ac.uk/sef/media/econ/events/Technological-and-Organizational-Change-and-the-Careers-of-Workers.pdf.

Binder, Ariel J., and John Bound. 2019. "The Declining Labor Market Prospects of Less-Educated Men." *Journal of Economic Perspectives* 33, no. 2: 163–90.

Davis, Steven J., and Till von Wachter. 2011. "Recessions and the Costs of Job Loss." *Brookings Papers on Economic Activity*, Fall, 1–72.

Dustmann, Christian. 2021. "Trade, Labor Markets, and the China Shock: What Can Be Learned from the German Experience?" Discussion Paper 2112. London: Centre for Research and Analysis of Migration.

Molloy, Raven, Christopher L. Smith, and Abigail Wozniak. 2011. "Internal Migration in the United States." *Journal of Economic Perspectives* 25, no. 3: 173–96.

Pierce, Justin R., and Peter K. Schott. 2016. "The Surprisingly Swift Decline of US Manufacturing Employment." *American Economic Review* 106, no. 7: 1632–62.

Vijaya, Ramya M. 2010. *Broken Buffer: How Trade Adjustment Assistance Fails American Workers*. New York: Demos.

Wang, Zhi, Shang-Jin Wei, Xinding Yu, and Kunfu Zhu. 2018. "Re-examining the Effects of Trading with China on Local Labor Markets: A Supply Chain Perspective." Working Paper 24886. Cambridge, Mass.: National Bureau of Economic Research. https://www.nber.org/papers/w24886.