

## **Commentary: The Impact of Trade on Inequality in Developed Countries**

*David Dorn, University of Zurich*

*Address: Department of Economics, Schoenberggasse 1, CH-8001 Zurich, Switzerland*

*E-mail: david.dorn@econ.uzh.ch*

The past three decades witnessed a dramatic expansion in global merchandise exports, whose annual real value quadrupled from 1985 to 2015. During the same period, the share of low- and middle-income countries in world exports rose rapidly from 12 to 29 percent, with China alone accounting for two thirds of that increase. An uneven expansion of exports and imports led to substantial trade imbalances in some countries, including a growth in the United States' trade deficit by \$500 billion that was matched by an equally large expansion of China's trade surplus. These changing global patterns of goods production have potentially important impacts on income inequality and on workers' outcomes more broadly. Nina Pavcnik's essay for the 2017 Jackson Hole Symposium reviews and interprets a rich set of empirical studies that analyze the distributional consequences of trade primarily in developing countries. My commentary complements this work with corresponding observations from developed economies.

### **I. Income inequality between countries**

The dramatic expansion of trade has coincided with a historic decline in world poverty, driven by rising wages in developing countries such as China and India. At the same time, real wages in major developed countries like the United States or Germany have been stagnant, so that the income gap between rich and poor countries has fallen. It is however difficult to quantitatively assess the contribution of trade to reduced global income inequality. The expansion of trade coincides with other major developments in the global economy such as the growing use of computers and robots in the production process, and economic policy reforms that occurred at the same time as changes in trade regimes. For instance, China's reintegration into the world economy following near-autarky in the 1970s

was part of a larger transition from central planning to market orientation that would likely have generated rising incomes even absent a major expansion in trade.

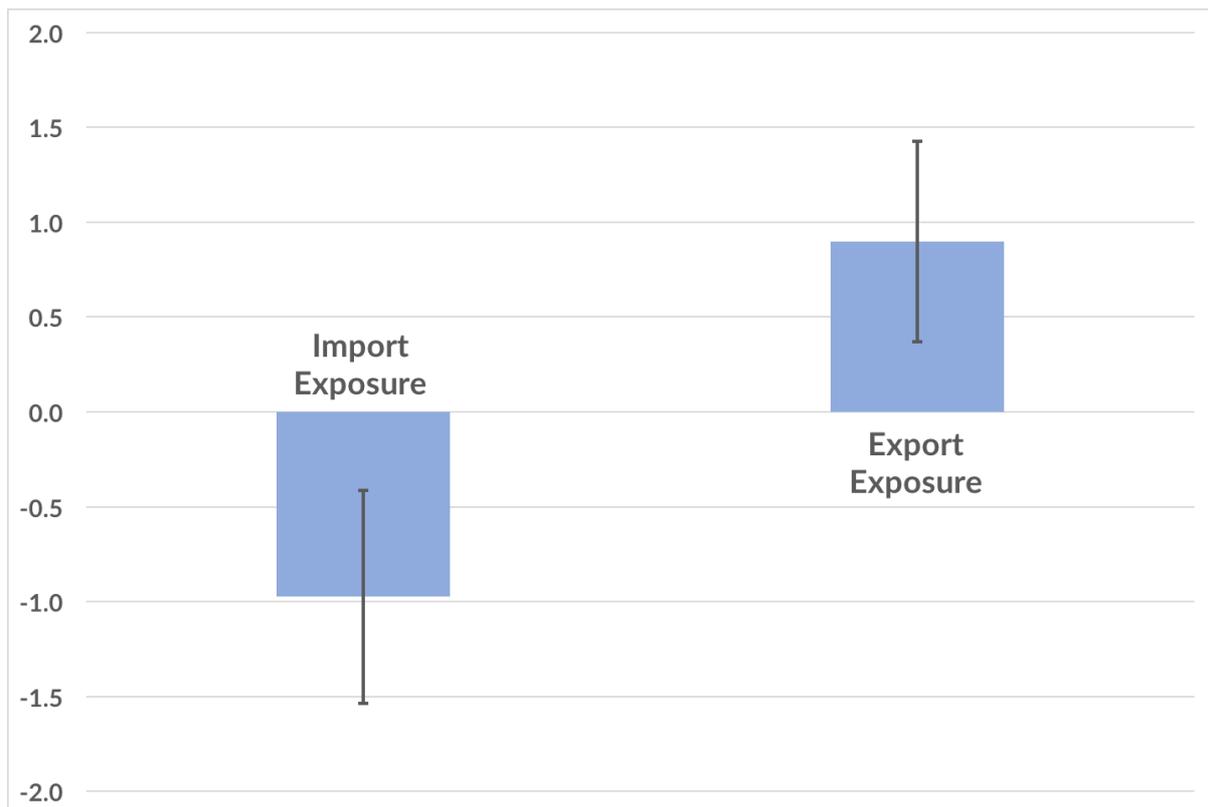
Despite the conceptual difficulties in quantifying the macroeconomic effects of trade, there is a collage of evidence supporting the notion that trade expansion has generally had more favorable effects on labor incomes in developing rather than in developed countries. Nina Pavcnik (2017) adds to this evidence by analyzing fascinating data from the PEW Global Attitudes Survey. Her results indicate that the impact of trade on the labor market is perceived much more favorably in low-income relative to high-income countries. In the United States, less than a quarter of survey respondents say that trade has raised wages and created jobs, while these statements are supported by three quarters of survey respondents in Vietnam. The survey evidence cannot provide scientific proof that trade indeed had differential effects on workers in high- and low-income countries, but public perception about the labor market impacts of trade is certainly also interesting in itself as it can influence future trade policy.

Another takeaway from the survey data is that perceptions about trade's labor market impacts vary considerably between countries with similar income levels. Nina Pavcnik (2017) emphasizes that the labor market consequences of changes in trade policy depend critically on the extent to which they generate import competition or export opportunities for affected countries. For instance, the most immediate effect of India's large-scale reduction in import tariffs in 1991 was a declining labor demand in industries with large tariff cuts, whereas Vietnam experienced a strong growth in labor demand after a bilateral trade agreement with the United States in 2001 raised the demand for its exports. Perhaps not coincidentally, Vietnam joins China among the countries whose populations view the labor market consequences of trade more favorably than people in other countries with similar income levels. Survey respondents in India are instead somewhat less enthusiastic about trade, as are people in Colombia, a country that is running a large trade deficit.

There are parallels to these patterns among high-income countries. The opening of China to international trade since the early 1990s, and the fall of the Iron Curtain in Europe have led to a dramatic expansion of trade between developed countries and lower-wage countries

that adopted a market economy and integrated into world trade. Yet not all countries have expanded imports and exports to the same extent. The United States and the United Kingdom are examples of countries that enormously raised their imports from China while expanding exports to a much lower extent. Both of these countries now have a large overall trade deficit. Germany and Switzerland instead rapidly increased not only imports but also exports to China, and both have an overall trade surplus.

Dauth, Findeisen and Südekum (2014) compare the evolution of manufacturing employment in German local labor markets whose initial industry composition created a differential exposure to either industry-level import competition or export growth when trade with Eastern Europe expanded rapidly following the fall of the Iron Curtain. Figure 1 shows that an increase of annual imports by EUR 1,000 per worker in a local labor market reduced the share of manufacturing employees in the working age population by nearly one percentage point. Local labor markets whose industries were able to generate an additional EUR 1,000 per worker in exports to Eastern Europe however experienced a symmetric one percentage point growth in the manufacturing-to-population ratio. Since Germany's exports to Eastern Europe grew more than the imports over the period of analysis (exports grew by EUR 2,944 per worker over a decade while imports grew by EUR 1,826 per worker), the estimated net effect of increased trade with Eastern Europe on manufacturing employment is positive.



*Figure 1. Effect of a EUR 1,000-per-worker increase in imports from Eastern Europe or exports to Eastern Europe on the percentage of working-age individuals employed in manufacturing in German local labor markets, 1988-2008. Source: Based on Dauth, Findeisen and Südekum (2014).*

The estimated employment effect of import competition from Eastern Europe in Germany is quite similar in magnitude to an earlier estimate for the impact of Chinese import competition in local labor markets in the United States (Autor, Dorn and Hanson, 2013). Different from Germany, however, the United States did not simultaneously experience a strong expansion in exports, and trade with China has thus likely caused a net decline in U.S. manufacturing jobs.

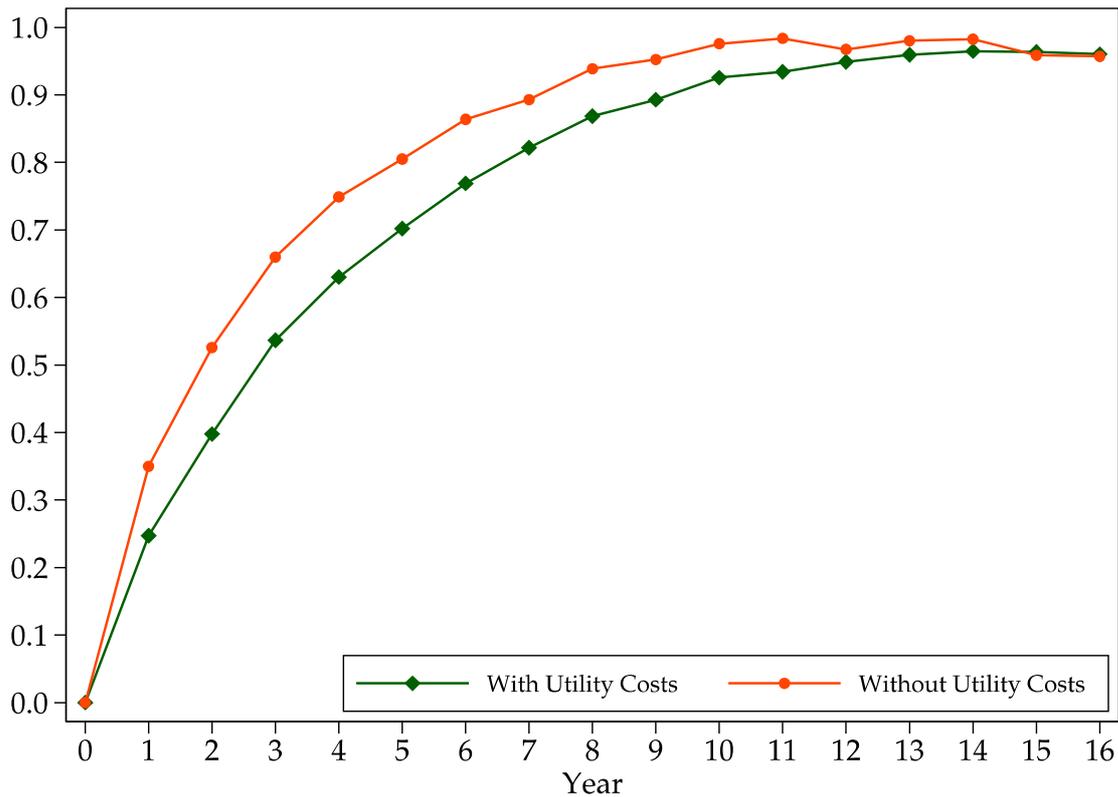
Despite these results, one should not jump to the conclusion that a country would do best by strongly restricting imports. Goods imports are vital for many economies, and serve as crucial inputs to firms that produce for the domestic and international markets. Moreover, consumers benefit from imports that provide a greater variety of goods and lower prices.

Nevertheless, a key insight from the literature is that rising trade does not necessarily lead to a balanced labor market impact where decreases in labor demand in some industries are offset by increases in labor demand in other industries. Depending on the nature of the change in trade, the former or the latter effect can dominate.

## **II. Income inequality within countries**

A large number of empirical studies analyze the impact of trade shocks on earnings within individual countries. Many of these studies contrast the experiences of workers whose firms, industries or geographic regions have been differentially exposed to changes in trade regimes. The observation that workers' outcomes vary based on their employers, industries or locations implies that labor market adjustment to shocks is not frictionless and immediate across these margins.

The basic 2-country, 2-sector Heckscher-Ohlin model, which long guided economists' thinking about labor market adjustment to trade, posits that labor demand falls in the importing sector and rises in the exporting sector when a country opens up to trade. These opposite changes in sectoral labor demand are immediately counterbalanced by a flow of workers from the importing to the exporting sector that equilibrates wages across sectors. Empirical analyses however show that this adjustment process is slow in reality, as many workers do not rapidly move to sectors that offer a higher earnings potential. One example is a study by Ashournia (2015) that simulates a structural model of workers' sectoral choice in the Danish labor market. The simulation assumes a hypothetical trade shock that immediately and permanently lowers manufacturing prices by 10% and doubles the unemployment risk of manufacturing workers. Therefore, workers should move from manufacturing to other sectors of the economy. Figure 2 however shows that this process is so sluggish that it takes up to a full decade until 90% of the reallocation is complete. Workers' transitions across sectors are slowed by a direct utility cost of switching sectors, the presence of sector-specific human capital that will no longer provide returns in a different line of work, and transitory human capital and preference shocks.



*Figure 2. Speed of labor reallocation across sectors in Denmark following a trade shock that reduces manufacturing prices by 10% and doubles the unemployment risk for manufacturing workers. Source: Ashournia (2015).*

In many countries, there is also important spatial variation in the incidence of trade shocks. Industries that raise or reduce their labor demand are concentrated in different regions, and an equilibration of wages at the national level would require worker reallocation across space. Pavcnik (2017) emphasizes that geographic mobility in response to localized trade shocks is remarkably weak in many developing economies. The same assessment also applies to developed countries such as Germany (Dauth, Findeisen and Südekum, 2014) and the United States (Autor, Dorn and Hanson, 2013).

The low worker mobility across sectors and regions suggests the presence of sizeable labor market frictions that impede a speedy adjustment to changes in trade. Molloy, Smith, Trezzi and Wozniak (2014) document that the United States are more generally experiencing a secular decline in job-to-job and geographical mobility, whose exact causes are not yet fully understood. The lower mobility rates make it harder for the labor market to rapidly disperse

the effects of localized shocks in the broader economy, so that many workers face a small impact of the trade shock rather than a few workers being very strongly affected.

The literature has long studied the impact of trade on the wages of employed workers, but has given less attention to adjustment at the employment margin. However, recent work indicates that import competition from low-wage countries such as China caused substantial employment losses in the most exposed U.S. firms, industries and geographic locations (Bernard, Jensen and Schott, 2006; Autor, Dorn and Hanson, 2013; Acemoglu, Autor, Dorn, Hanson and Price, 2016; Pierce and Schott, 2016). Autor, Dorn and Hanson (2013) find that Chinese import competition had sizable employment effects in the United States. They study local labor markets whose initial industry specialization generated a differential exposure to Chinese imports since the 1990s, and find larger declines in manufacturing employment and correspondingly larger increases in unemployment and non-participation in more exposed locations. The overall negative impact of import competition on average household earnings results primarily from reduced employment, while declining wage rates of the employed only explain one-fifth of the decline in earnings.

The impact of trade shocks on domestic inequality again depends on the extent to which it stimulates exports or creates import competition. Several studies from developed countries find that import competition and offshoring tend to reduce the relative earnings of less-skilled and lower-wage workers (e.g., Autor, Dorn, Hanson, and Song 2014; Utar 2014), while Hummels, Jorgensen, Munch and Xiang (2014) observe no impact of rising exports on the skill wage differential.

Despite the perception that trade does affect jobs and wages, globalization is not typically considered the main or only contributor to income inequality. That assessment results both from survey data on popular opinion, as summarized in Pavcnik (2017), and from academic assessments that point to technological and institutional change as additional drivers of inequality (Autor, 2014; Helpman, 2016).

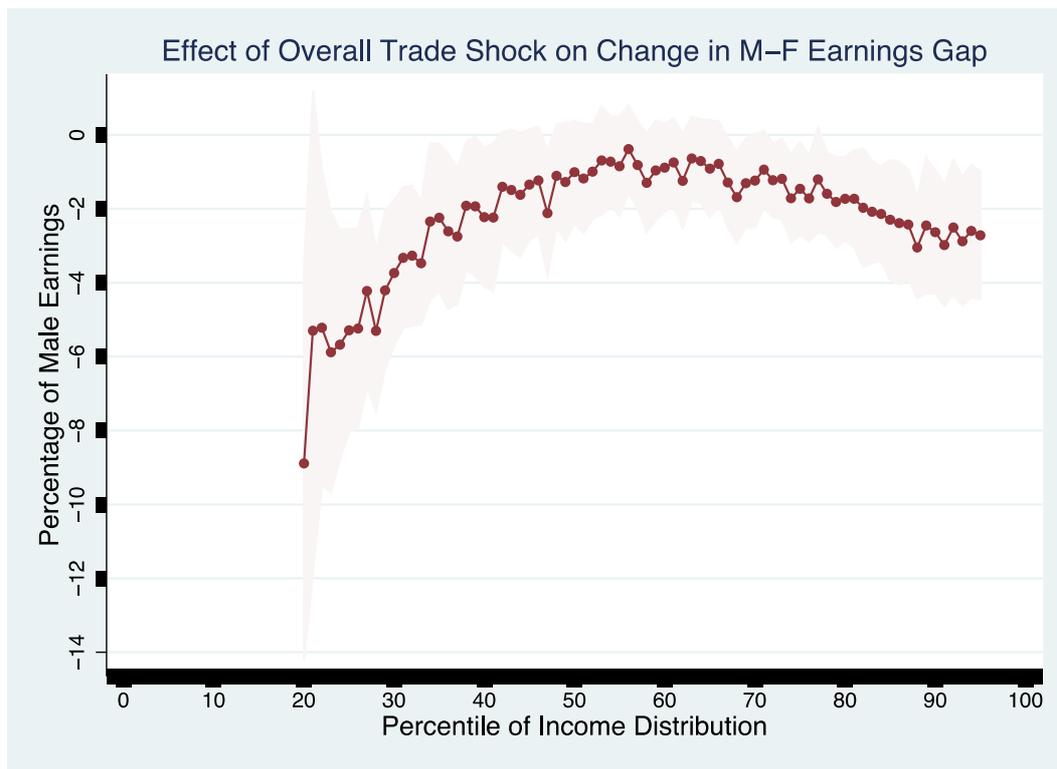
The slow labor market adjustment however implies that the negative consequences of a trade-induced decline in labor demand will not be felt equally by all workers of a given skill

group. Instead, earnings and employment declines concentrate on relatively small subsets of workers who are present in the most exposed firms, industries and locations. Those workers experience sharp declines in their economic fortunes that may be more salient to the observer than consumer benefits from trade, which are typically more evenly distributed in the population.

### **III. Income inequality between men and women**

The job loss in the United States due to increasing import competition from China is concentrated in the manufacturing sector, although additional negative employment effects accrue in industries such as mining or transportation that sell sizable shares of their outputs to manufacturing firms (Acemoglu, Autor, Dorn, Hanson and Price, 2016). Workers in manufacturing differ notably from those in other sectors of the economy. First, two thirds of U.S. manufacturing workers are males, while the employment composition elsewhere in the economy has reached gender parity. And second, the annual earnings of manufacturing workers are about \$5,000 higher than the incomes of similarly skilled workers who are employed in other sectors in the same locations. A primary consequence of a decline in manufacturing employment is thus a reduction in financially attractive employment opportunities for males.

Autor, Dorn and Hanson (2017) establish that U.S. local labor markets with greater exposure to Chinese import competition experienced a differential decline in male relative to female earnings. Figure 3 indicates the magnitude of this contraction in the gender earnings gap across the income distribution in response to a one percentage point increase in import penetration, which approximately corresponds to the growth of import competition in the average location. The reduction of the gender earnings gap is observed throughout the income distribution, but the effect is largest among individuals with low earnings. A one unit import shock lowers the 25<sup>th</sup> percentile of the local distribution of male annual earnings by \$830, while the 25<sup>th</sup> percentile of female earnings falls only by \$158. The resulting excess decline of male earnings by \$672 corresponds to about 6% of males' start-of-period earnings at the 25<sup>th</sup> percentile of the local labor market earnings distribution, as indicated in Figure 3.



*Figure 3. Effect of a one percentage point increase in import penetration from China on the male-female gap in annual earnings among young adults age 18-39 in U.S. local labor markets, 1990 to 2014. The impact of the shock is computed for each percentile of the unconditional male earnings distribution in a local labor market and for the corresponding percentile of the female distribution. The differential decline in male vs. female earnings at a percentile is expressed as a percentage of initial male earnings at that percentile. Source: Based on Autor, Dorn and Hanson (2017).*

The decline in young men’s absolute and relative earnings is in part a result of greater employment loss in import-competing local labor markets. While employment falls both among men and among women, the male losses are significantly larger. Among very young adults age 18 to 25, women compensate for lower employment by a greater likelihood of being non-employed but in school. Young men however are also increasingly found in the status of not employed and not in school. As fewer local men earn an income or an education, they have more time for other, potentially less desirable activities. Aguiar, Bils, Charles and Hurst (2017) document a rising consumption of leisure by young men which largely consists of playing video games, although they do not investigate how this trend

relates to local shocks. Feler and Senses (2017) find that greater local import competition is associated with increased rates of property crime, which tends to be committed primarily by young men. Autor, Dorn and Hanson (2017) also find that the mortality rate of young men has risen relative to young women in import-exposed labor markets, which is primarily due to an increased rate of drug- and alcohol-related deaths among men. Other related research links greater import competition to rising mortality among broader age groups in the United States (Pierce and Schott, 2017), and a greater incidence of mental health problems in the United Kingdom (Colantone, Crino and Ogliari, 2016).

All of these effects plausibly combine to make young men less desirable marriage partners for young women. Indeed, Autor, Dorn and Hanson (2017) show that greater local exposure to import competition reduces the fraction of young women who are married or cohabiting with a partner. The impact on fertility is also negative, but not as strong as for marriage. As a consequence, a rising fraction of children in import-competing locations is growing up in households that are headed by a single parent and have an income below the poverty line.

That a particular trade shock can contribute to such a wide range of adverse outcomes does not imply that trade is undesirable overall. Indeed, Pavcnik's (2017) evidence from the 2011 PEW survey shows that more than two thirds of Americans state that international trade and business ties are good for their country. But these results from studies of import competition in local labor markets again reinforce the notion that a negative impact of trade is not primarily felt in the form of a slightly reduced national wages for unskilled workers, as a basic Heckscher-Ohlin model would have suggested. Instead, the populations of more exposed local labor markets face a wide range of concentrated adverse outcomes.

#### **IV. Programs for income redistribution**

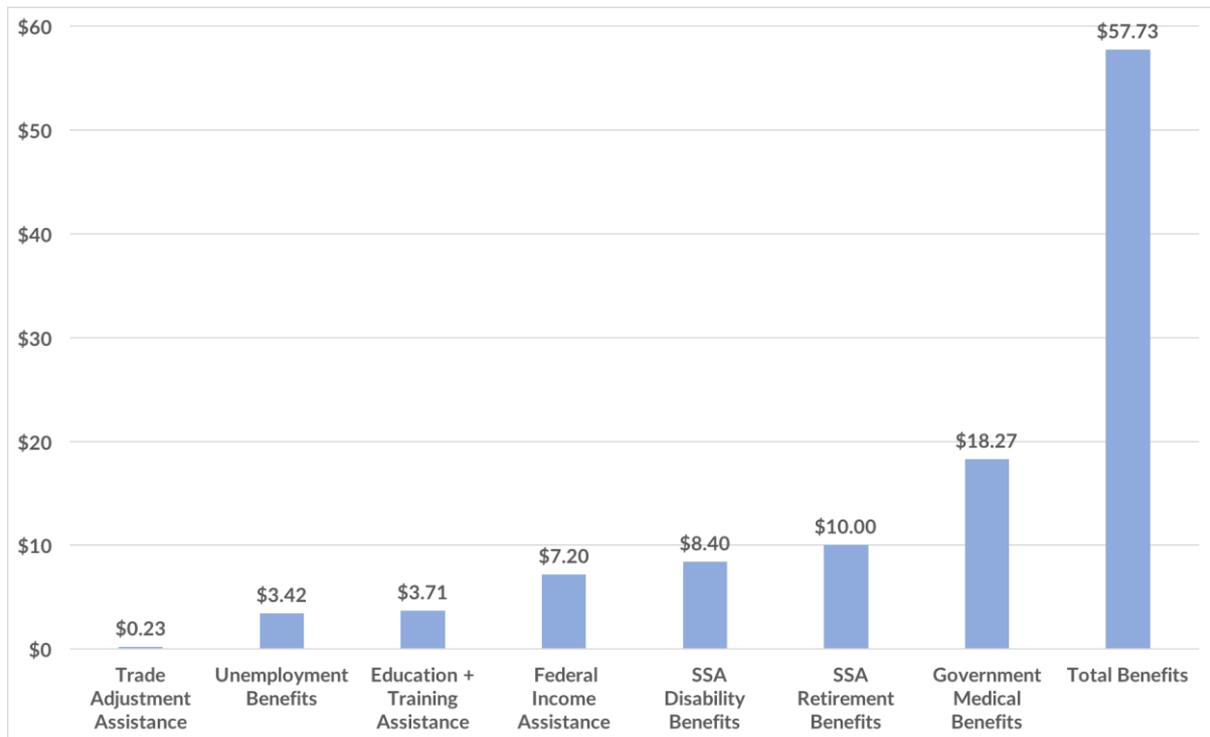
There is widespread agreement among economists that trade raises aggregate income, at least in the long run. In theory, greater aggregate income should allow a redistribution that fully compensates everyone who suffered an income loss due to a trade shock. Both the United States and the European Union indeed established programs that provide financial support to workers whose jobs were adversely affected by trade.

The U.S. program is called Trade Adjustment Assistance (TAA). It already exists since 1962 but has more recently been expanded under the governments of presidents Clinton, Bush and Obama. A group of at least three workers can apply to the Department of Labor (DOL) for TAA benefits, and the petition is approved if the DOL's investigation determines that their jobs are lost or threatened due to trade competition. TAA benefits comprise income support for workers who are enrolled in re-training courses while already having exhausted their unemployment benefits, reimbursement for relocation costs for workers who find employment outside their commuting area, and a two-year wage subsidy for workers who are re-employed in a job with lower wages. In the fiscal year 2013, the federal government distributed \$756 million through TAA.

The European Union's European Globalisation Adjustment Fund (EGF) was set up in 2006 and supports the active labor market policies of EU member states in cases of large trade-induced layoffs that exceed 1000 workers per event. In 2013, the program paid out EUR 20 million in 12 events, with half of the total benefits going towards 1019 workers of Air France.

Autor, Dorn and Hanson's (2013) analysis of import competition in U.S. local labor markets during the period of 1990 to 2007 found that the receipt of TAA benefits increases strongly in areas with greater trade exposure. The decline in employment and wages in these locations however also triggers a much broader set of transfer payments including unemployment benefits, disability benefits from the Social Security Administration, medical benefits, or food stamps. Overall per capita transfers have risen by 1 percent for a \$1,000-per-worker increase in local import exposure, while TAA benefits increased by 14 percent. However, the total benefit amount dispersed by TAA is by several orders of magnitude smaller than the benefits from many other transfer programs. Figure 4 shows that a \$1,000-per-capita increase in local import competition raised total annual benefits by \$58 per person, with only \$0.23 being due to TAA. Most of the dollar increase in government benefits resulted from medical benefits such as Medicaid and Medicare, and Social Security Retirement and Disability benefits. Since these programs have much larger transfer budgets than TAA, even a small relative increase in payments translates to a substantial dollar

amount. The same import shock that caused the \$58 increase in per capita transfers shown in Figure 4 also lowered average household income from wages and salaries by \$550 per adult in exposed local labor markets. The transfers thus fall way short of providing a full compensation for the relative earnings loss in these locations.



*Figure 4. Effect of a \$1,000-per-worker increase in imports from China on dollar change of annual government transfer receipts per capita in U.S. local labor markets, 1990 to 2007. Source: Based on Autor, Dorn and Hanson (2013).*

Intuitively, it would seem desirable to channel a greater proportion of the transfers through programs like TAA that do not just provide income assistance, but instead directly support retraining that may help workers to transition to new jobs. Unfortunately, however, the track record of such active labor market policies tends to be disappointing, and TAA is not an exception. An evaluation of an earlier version of the current program determined that workers with TAA benefits do not fare better, and indeed seem to do rather worse in terms of re-employment and income compared to workers who receive only regular unemployment benefits (Dolfin and Schochet, 2012).

The empirical research summarized in Nina Pavcnik's (2017) essay and in this comment strongly suggests that the expansion of global trade over the last three decades has had notable impacts on the labor markets both in developing and in developed countries. While the general public in wealthier economies tends to have a less favorable assessment of these labor market effects, there are nevertheless three important parallels with the experiences of emerging economies: (i) the domestic labor market effects of increasing trade depend strongly on the composition of the expanding trade flows, including the balance between imports and exports, (ii) labor market reallocation across industries and space is slow, and thus concentrates the labor market gains and losses from trade in specific sectors and locations, and (iii) public assistance compensates for some of the financial losses of workers who are displaced by trade, while it remains a challenge to design policies that speed up the reallocation process itself in order to disperse the impacts of trade more evenly in the population.

## References

- Acemoglu, Daron, David H. Autor, David Dorn, Gordon H. Hanson and Brendan Price. 2016. "Import Competition and the Great U.S. Employment Sag of the 2000s." *Journal of Labor Economics*, 34(S1), S141-S198.
- Aguiar, Mark, Mark Bilal, Kerwin Charles and Erik Hurst. 2017. "Leisure Luxuries and the Labor Supply of Young Men." NBER Working Paper no. 23552.
- Ashournia, Damoun. 2015. "Labor Market Effects of International Trade When Mobility Is Costly." University of Oxford Discussion Paper no. 751.
- Autor, David H. 2014. "Skills, Education, and the Rise of Earnings Inequality among the 'Other 99 Percent'." *Science*, 344(6186), 843-851.
- 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(6), 2121-2168.
- Autor, David H., David Dorn and Gordon H. Hanson. 2016. "The China Shock: Learning from Labor-Market Adjustment to Large Changes in Trade." *Annual Review of Economics*, 8, 205-240.

Autor, David H., David Dorn and Gordon H. Hanson. 2017. "When Work Disappears: Manufacturing Decline and the Falling Marriage-Market Value of Men." Working Paper, University of Zurich.

Autor, David H., David Dorn, Gordon H. Hanson and Jae Song. 2014. "Trade Adjustment: Worker-Level Evidence." *Quarterly Journal of Economics*, 129(4), 1799-1860.

Bernard, Andrew B., J. Bradford Jensen and Peter K. Schott. 2006. "Survival of the Best Fit: Exposure to Low-Wage Countries and the (Uneven) Growth of U.S. Manufacturing Jobs." *Journal of International Economics*, 68(1), 219-237.

Colantone, Italo, Rosario Crino and Laura Ogliari. 2017. "Globalization and Mental Distress." Working Paper, Bocconi University.

Dauth, Wolfgang, Sebastian Findeisen and Jens Südekum. 2014. "The Rise of the East and the Far East: German Labor Markets and Trade Integration." *Journal of the European Economic Association*, 12(6): 1643-1675.

Dolphin, Sarah, and Peter Z. Schochet. 2012. *The Benefits and Costs of the Trade Adjustment Assistance (TAA) Program Under the 2002 Amendments*. Mathematica Policy Research, Princeton NJ.

Feler, Leo and Mine Z. Senses. 2017. "Trade Shocks and the Provision of Local Public Goods." *American Economic Journal: Economic Policy*, forthcoming.

Helpman, Elhanan. 2016. "Globalization and Wage Inequality." NBER Working Paper Series no. 22944.

Hummels, David, Rasmus Jorgensen, Jakob Munch and Chong Xiang. 2014. "The Wage Effects of Offshoring: Evidence from Danish Manufacturing Firms." *American Economic Review*, 104(6): 1597-1629.

Molloy, Raven, Christopher L. Smith, Riccardo Trezzi and Abigail Wozniak. 2016. "Understanding Declining Fluidity in the U.S. Labor Market." *Brookings Papers on Economic Activity*, 2016, 183-237.

Pavcnik, Nina. 2017. "The Impact of Trade on Inequality in Developing Countries." Jackson Hole Economic Policy Symposium, Jackson Hole WY.

Pierce, Justin R. and Peter K. Schott, 2016. "The Surprisingly Swift Decline of US Manufacturing Employment." *American Economic Review*, 106(7), 2016.

Pierce, Justin R. and Peter K. Schott. 2016. "Trade Liberalization and Mortality: Evidence from U.S. Counties." Working Paper, Yale School of Management.

Utar, Hale. 2014. "When the Floodgates Open: "Northern Firms' Response to Removal of Trade Quotas on Chinese Goods." *American Economic Journal: Applied Economics*, 6(4), 226-250.