



# Do tariffs help America's workers? The impact of trade wars on manufacturing employment

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Making Action Possible in Southern Arizona (MAP Dashboard)

White Paper #16

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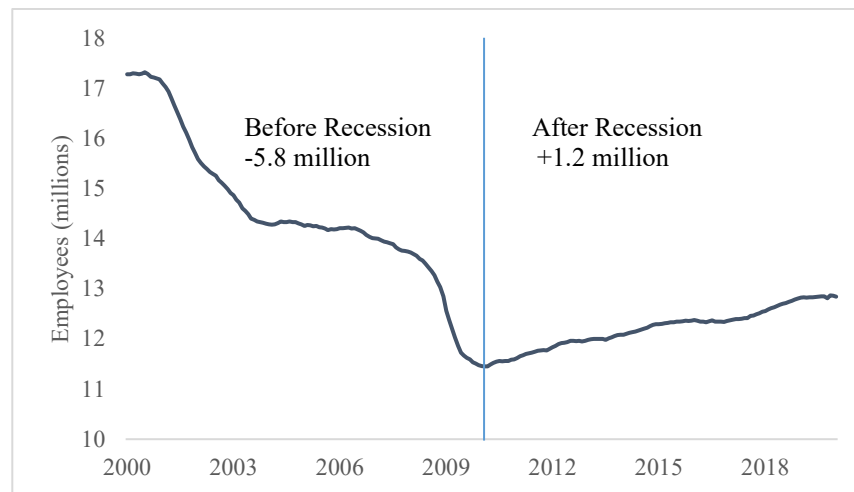
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## Executive Summary

The Trump administration made headlines when it increased trade barriers in 2018 and 2019. Those tariffs—the largest in over 75 years—are designed to help America's ailing manufacturing sector. The U.S. lost 5.8 million manufacturing jobs between 2000 and 2010.<sup>1</sup> And, since the Great Recession, only 20 percent of those losses have been recovered. The White House argues that trade protection will help reboot American production and send workers back to the factories.

### Manufacturing Job Losses



*Notes:* The graph reports total employment in private manufacturing, millions of jobs, 2000-2020. Manufacturing enjoyed a mild rebound during the recovery from the Great Recession. However, employment in the sector remains lower than 20 years ago. (Sources: FRED, U.S. Bureau of Labor Statistics (BLS) series MANEMP.)

However, not everyone agrees that tariffs work. Most economists—along with many prominent American industry organizations—argue that trade protection does more harm than good. Thus, there is a debate over whether trade wars are a good idea.

This report asks whether tariffs help U.S. workers. It focuses specifically on the U.S.-China trade war and on America's manufacturing sector. This is because China and manufacturing have been the focal points of President Trump's rhetoric and policy.

This study collects fine-grained data on the specific industries subject to trade protection in America. It then assesses whether tariffs on those products had any effect on import levels, employment numbers, or wage growth. It looks at national trends and then turns specifically to Arizona and Pima County.

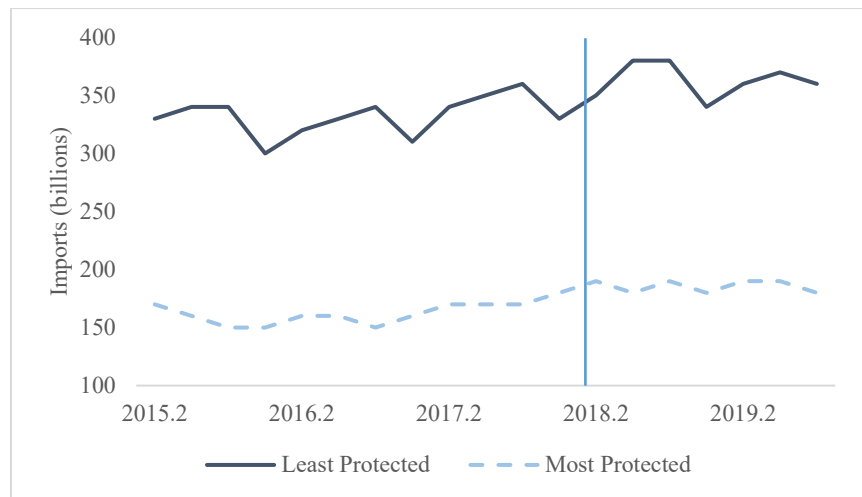
Key findings include the following:

- **Import penetration is not a strong predictor of either job loss or wage stagnation.** Rather, imports could be a sign of a thriving industry.

<sup>1</sup> United States Bureau of Labor Statistics (BLS). "All employees, Manufacturing." Data series MANEMP, retrieved from Federal Reserve Bank of St. Louis. Available at: <https://fred.stlouisfed.org/series/MANEMP> (accessed June 10, 2020).

- **Tariffs did very little to interrupt import flows in either 2018 or 2019.** For most industries, trade continued as normal and costs were passed on to customers.

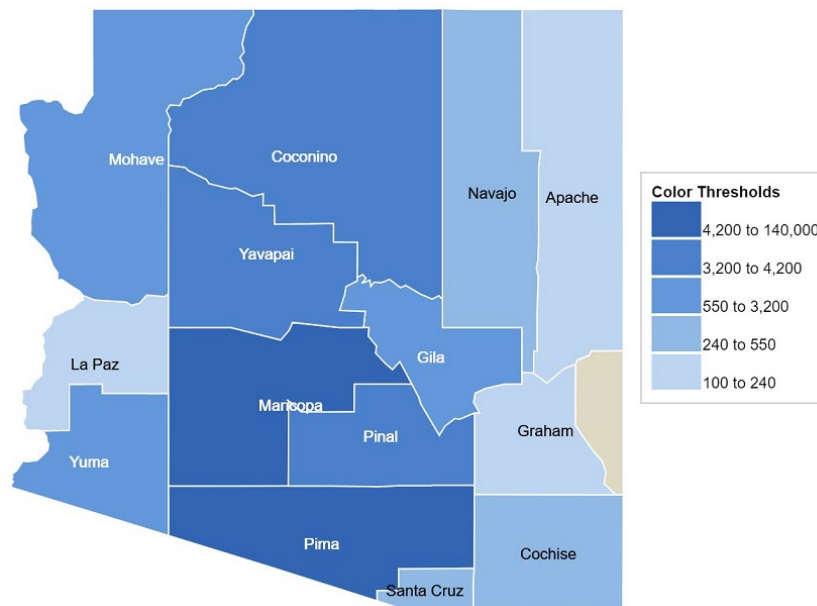
### Manufacturing imports by protection level



*Notes:* The graph reports quarterly imports, billions USD, from 2015 through 2019. The solid line represents total imports of industries below the mean level of tariff protection. The dotted line represents total imports of industries above the mean. There is no perceptible change in import levels after the introduction of tariffs, which are represented by the vertical line. (Sources: USA Trade Online and USTR.)

- **Manufacturing was not the driver of economic growth in 2019.** Arizona enjoyed positive overall GDP growth in 2019. However, this was driven mainly by strong performance in services and non-traded industries. Manufacturing growth was more modest.
- **Arizona's manufacturing is concentrated heavily in Maricopa and Pima counties.** The potential benefits of manufacturing tariffs ought to be concentrated in specific portions of the state. The impact

### Concentration of manufacturing employment by county



*Notes:* Map displays number of total private sector manufacturing employees by county, Arizona, 4<sup>th</sup> quarter, 2019. The two major centers are, predictably, Maricopa County (Phoenix) and Pima County (Tucson). (Sources: BLS, *QCEW State and County Map* utility.)

- **Tariffs did not boost job growth.** In 2019, neither jobs nor wages grew any faster in protected industries. This pattern holds nationwide as well as in Arizona and in Pima County.
- **Pima County's economic performance is consistent with nationwide trends.** Tariffs affecting many of Pima County's main industries did not have a positive effect on jobs or wages.

In sum, there is very little evidence that tariffs benefit manufacturing workers. Neither jobs nor wages are correlated with trade protection. Note that this report is focused on imports and, as such, does not assess the impact of trade retaliation. In practice, the costs of trade protection are much higher. There is anecdotal evidence to suggest that responses from Beijing hurt key U.S. industries—not least, America's farmers.

None of this diminishes the very real challenges facing the U.S. economy. Manufacturing job losses have to be taken seriously as an economic and social policy problem. However, tariffs are an incomplete—if not “wrong”—solution. U.S. competitiveness needs to be boosted by deeper investments at home. This includes investment in higher education, which has been systematically de-funded since the Great Recession. At the same time, the U.S. needs to build a coalition of like-minded trade partners. Many countries share an interest in confronting unfair trade practices. There is no need to go it alone through costly tariffs.

The conclusions in this report have to be understood in context. There are only about 18 months of employment and wage data to analyze from the start of tariff hikes until the COVID-19 pandemic caused historic disruptions in the US labor market. Those 18 months do not provide enough time to observe the lasting costs and benefits of tariff protection. Moreover, any analysis of employment and wages is limited by the large amount of undisclosed data within narrow industry categories. Those two caveats aside, this analysis shows that tariffs failed to result in a broad, short-term increase in the economic welfare of manufacturing workers.

## 1. Introduction

America's recent trade wars signaled a major shift in foreign policy. For over seven decades, the United States was a driving force behind economic globalization and trade liberalization. One has to go back to the Smoot-Hawley Act of 1930 to find the last time the United States closed its market to such a large degree.<sup>2</sup>

Trade barriers are designed to protect domestic producers from fierce, unforgiving, international competition. In the United States, this is especially relevant for manufacturing. The U.S. steadily lost manufacturing jobs in recent decades as production moved to the new centers of global production. Lower costs in places such as China give foreign competitors an advantage over U.S. firms. In response, tariffs are supposed to level the playing field.

Of course, not everyone agrees that tariffs work. Back in the 1930s, Smoot-Hawley worsened the Great Depression by exposing America's exporters to retaliation and driving up prices. Today's economists have the same fears. Foreign markets do not sit on their hands when the U.S. raises its tariffs. They respond with costly measures of their own—and this can leave the market worse off.

The debate over trade policy leaves open a few important questions. Do trade barriers benefit workers in protected industries? Or, are the costs of hiking tariffs greater than the benefits? Answering these questions requires a close look at the global trade's *local consequences*. It is widely understood that free trade generates “winners and losers” in the domestic economy. And, since industries are concentrated in certain areas of the country, this means some communities do better than others.

This report examines what trade and tariffs mean for manufacturing employment and wages. The report relies heavily on data made available by MAP (Making Action Possible) for Southern Arizona. The paper looks first at nationwide trends in employment and wages, comparing performance before and after the trade war began. It then focuses more specifically on Arizona and Pima County. It compares key indicators of economic health across states and counties with similar economic profiles. The analysis includes economic performance through the end of 2019.<sup>3</sup>

The findings speak to a couple of important issues. First, there is very little support for the idea that imports drive down jobs or wages, *on average*. Certainly, individual firms may be hurt by import competition. However, industry-wide measures of employment and wages are not correlated with import penetration. This is true at each level of geography—national, state (AZ), and county (Pima). Second, tariffs are not associated with either job creation or wage gains in protected industries. It turns out that imports in most industries have carried on as usual. While there are a few anecdotal success stories, such as the strong performance of steelmakers in 2019, there is very little evidence that tariffs serve their intended purpose. The opposite may be true. In Arizona, the largest job gains were in industries enjoying comparatively less protection.

It is too soon to issue a final analysis of the trade war's full economic impact. However, this report casts doubt on the logic underpinning trade protection. It also questions whether trade protection is the best solution to the problems facing the U.S. economy. No one denies that many of America's workers face real challenges. Wages in most manufacturing industries still lag

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<sup>2</sup> Officially, the Tariff Act of 1930 (Pub.L. 71-361).

<sup>3</sup> Unfortunately, the COVID-19 outbreak of early 2020 brought unique economic challenges. By the middle of April, it has displaced around 25 percent of American workers, resulting in unemployment not seen since the Great Depression. COVID-19's far-reaching impact obscures the independent effects of the trade war. As a result, this report is limited to the time period before the global economic shock brought on by the pandemic.

behind pre-recession levels and the U.S. has not recovered most of the jobs lost between 2000 and 2010. At the same time, America's working poor have been struggling to meet their basic needs for over a decade. Some portion of those problems is, absolutely, related to trade. Yet, there is very little evidence to suggest that tariff barriers make things better. Investments in domestic capacity and a more cooperative approach to foreign policy are more attractive policy alternatives.

This report proceeds by describing the origins of the current trade wars (Section 2). It then presents nationwide patterns in manufacturing employment (Section 3). After establishing a national benchmark, it discusses Arizona and Pima County, specifically (Section 4). The report ends with some additional discussion of the data and a final word on the bigger implications (Section 5).

## 2. Background on current trade war

It was not long ago that the United States was a driving force behind economic globalization and the spread of free trade. For about 70 years after the end of World War II, the U.S. liberalized its own market while also encouraging other countries to do so.<sup>4</sup> There were isolated incidents of tariff hikes<sup>5</sup> but America's tariffs fell steadily from 20 percent in 1932 to 1.6 percent by 2017.<sup>6</sup> That is because, for 70 years, all presidents, Democrat or Republican, actively promoted globalization.<sup>7</sup>

Of course, the United States has never been entirely open to trade. America protects its market through a variety of barriers. These include common "trade remedies" such as anti-dumping and safeguard measures, which are both forms of import duties. The U.S. is also a relatively heavy user of indirect barriers such as subsidies.<sup>8</sup> The federal government deploys these barriers to soften the impact of tariff cuts on the industries who suffer from globalization.

Those barriers aside, the U.S. steadily became one of the world's most open economies during the tail end of the 20<sup>th</sup> century. It also became the leading importer of foreign goods. Imports into the U.S. grew at breakneck speed, doubling every decade since 1960 (Figure 1).

Imports give American consumers greater access to cheap goods, making our groceries, clothing, and other consumer goods less expensive. But that luxury also comes at a cost. Globalization's critics alleged out that cheaply priced imports crowd out domestic production. Those critics often point to the fact that the U.S. saw steady erosion of its manufacturing base over the last several decades.<sup>9</sup> This culminated in a steep decline in manufacturing jobs in the early 2000s. America lost one-third of its manufacturing jobs from 2000 to 2010—or, 5.8 million positions.

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<sup>4</sup> Douglas Irwin, *Clashing over Commerce: A history of U.S. trade policy*, Chicago: University of Chicago Press, 2017.

<sup>5</sup> E.g. President Bush's steel tariffs in 2002.

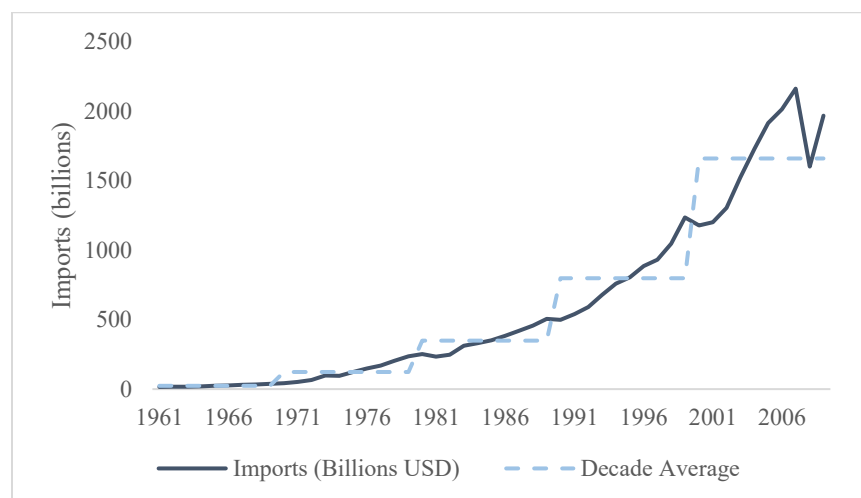
<sup>6</sup> Weighted mean of manufactured products. Reported in Drew DeSilver "U.S. Tariffs are among the lowest in the world—and in the nation's history," *Pew Research Center*, March 22, 2018.

<sup>7</sup> Tariff-setting Members of Congress are beholden to the interests of their individual districts or states. Those interests are more likely to prefer protection. Conversely, presidents represent the national interest, which is generally thought to be freer trade.

<sup>8</sup> Subsidies are more commonly linked to agriculture than manufacturing. The United States paid farmers \$13.6 billion in 2018. United States Department of Agriculture, "Government Payments by Program," *Farm Income and Wealth Statistics*, available at: <https://data.ers.usda.gov/reports.aspx?ID=17833> (accessed June 10, 2020).

<sup>9</sup> The idea that the U.S. enjoyed a long tenure as the center of global manufacturing is a myth. Shifts in comparative advantage, automation, and outsourcing were already leading to factory closures in the 1960s.

Figure 1. Total U.S. imports



Notes: The graph reports total U.S. imports, billions USD, 1961-2010. Imports more than doubled each decade, from an average of \$23.7 billion in the 1960s to \$349.1 billion in the 1980s and \$1659.1 in the 2000s. (Sources: World Bank's *World Integrated Trade System* (WITS).)

Understandably, attitudes toward globalization began to shift in recent years, particularly in communities hit hardest by globalization and the Great Recession. Americans generally believe that free trade works, but attitudes have ebbed and flowed in the last few years, with a sharp dip in support in 2016.<sup>10</sup> Moreover, the issue has become highly partisan, which was not true of trade attitudes in previous decades.<sup>11</sup>

### 2.1 The move away from liberalization

The Great Recession was a tremendous blow to worker welfare. Manufacturing jobs evaporated overnight, many workers lost huge portions of their retirement savings<sup>12</sup>, and millions of America's working poor found it difficult to meet their basic needs. Manufacturing wages lagged behind pre-recession levels. And, in spite of over 80 consecutive months of positive jobs reports between 2010 and the 2016 election, the U.S. economy had recovered only 20 percent of the lost manufacturing jobs<sup>13</sup> by the time voters cast their ballots.

All of these conditions feed the common narrative about how that election turned out. Years of economic frustration meant that voters across wide swaths of America demanded a break from the 70-year status quo of neoliberalism. Trump promised a turn away from globalism toward putting "America First." It was a new brand of economic nationalism that sought to "level the

<sup>10</sup> Bradley Jones, "Americans are generally positive about free trade agreements, more critical of tariff increases," *Fact Tank*, Pew Research Center, May 10, 2018.

<sup>11</sup> Lydia Saad, "American's views on trade in the Trump era," *Gallup Blog*, October 25, 2019.

<sup>12</sup> Employee-sponsored private retirement plans (401(k)s) and IRAs lost \$2.4 trillion in the crash of 2008. CalPERS, California's massive public employee pension system, lost \$100 billion alone. Teresa Ghilarducci, "The recession hurt Americans' retirement accounts more than anybody knew," *The Atlantic*, October 16, 2015.

<sup>13</sup> Total manufacturing employment grew by 1.2 million from the start of 2010 through the end of 2015—still down significantly from the 5.8 million position lost a decade earlier.

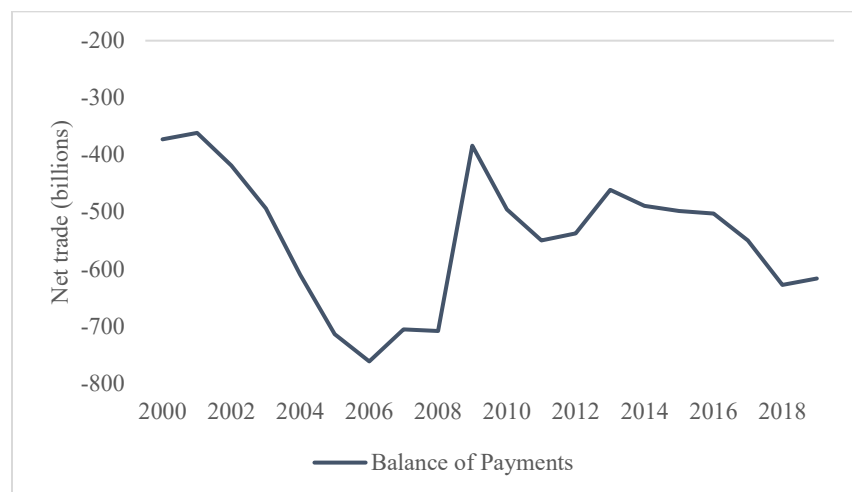
playing field” in the global economy.<sup>14</sup>

Once in the White House, Trump's tough rhetoric became policy. He withdrew the United States from the Trans-Pacific Partnership, demanded renegotiations of the North American Free Trade Agreement, and threatened to pull the U.S. out of the WTO—an organization America helped create just 25 years earlier. Most notably, the U.S. also introduced a spate of new tariffs.

## 2.2 Motives behind the trade war

Trade protection is motivated by a diversity of factors. For example, U.S. government's 2017 investigation was premised on national security concerns.<sup>15</sup> At the same time, there are widespread accusations that one of America's leading trade partners—China—violates core principles of the global trade regime through anti-competitive subsidies, intellectual property theft, and reliance on state-owned enterprises.<sup>16</sup> Most commonly, the White House argues that trade protection is an effective way to narrow America's trade deficit and to promote jobs.

**Figure 2. America's trade deficit**



*Notes:* The graph reports America's balance of payments, goods and services, billions USD, seasonally adjusted, 2000-2019. The U.S. trade deficit exceeded \$600 billion in both 2018 and 2019—the highest levels since before the Great Recession. (Sources: U.S. Federal Reserve Economic Data (FRED), U.S. Bureau of Economic Analysis (BEA) series BOPGSTB.)

The trade deficit has been controversial for several decades, particularly after NAFTA's formation when imports from Mexico started to soar.<sup>17</sup> The deficit is now cited frequently as

<sup>14</sup> Wilbur Ross, Jr, "Level the playing field for American workers," *CNBC*, October 5, 2018.

<sup>15</sup> The investigation invoked a little-used area of U.S. trade law, Section 232, which allows for protection in the interest of protecting national security.

<sup>16</sup> United States Trade Representative, "2018 report to Congress on China's WTO compliance," *Executive Office of the President of the United States*, February 2019.

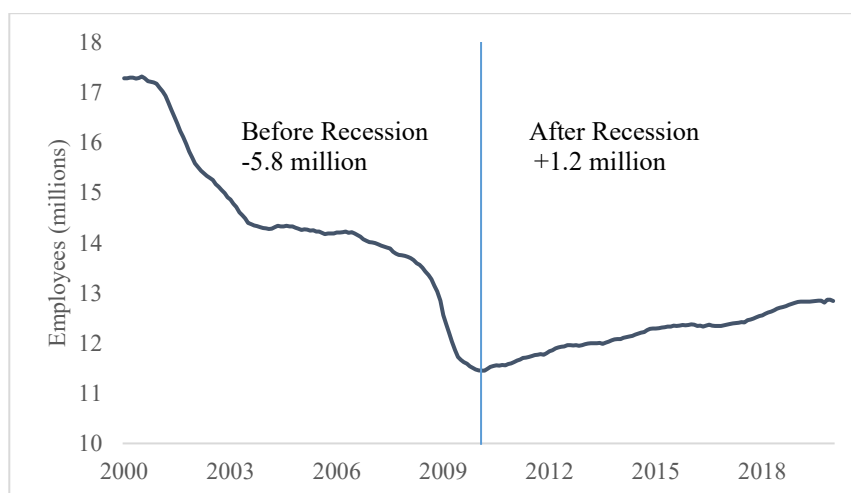
<sup>17</sup> This report does not evaluate the arguments over the trade deficit. Economists disagree with the common political rhetoric. While running a "deficit" sounds like a bad thing, it is a symptom of America's shifting comparative advantages and, more broadly, a statement about the purchasing power of the U.S. consumer. As some economists put

evidence that the U.S. is disadvantaged in the global economy. The deficit grew 63 percent from \$372 billion in 2000 to \$616 billion in 2019 (Figure 2). The only significant interruption came during the Great Recession, when economic slowdown drove down import consumption.

That sum of \$616 billion includes both goods and services trade. America runs a surplus in services trade. That means the trade deficit is entirely a result of the wide gap between America's exports and imports of goods. Removing services from the equation, the U.S. trade deficit in 2019 was \$866 billion—the highest ever. That is the equivalent of 4 percent of U.S. GDP.

Trade deficit is controversial because the growth in import consumption coincided with the widespread loss of American manufacturing jobs. While service sector employment skyrocketed<sup>18</sup> the manufacturing sector has suffered significant losses (Figure 3). Between 2006 and 2016, America lost manufacturing jobs in every major industry category with the one exception of beverages and tobacco production (NAICS 312). And, as mentioned above, the mild rebound in recent years—about 1.2 million jobs before the COVID-19 pandemic—has not made up for the hemorrhaging that took place in the 2000s.

**Figure 3. Manufacturing job losses**



Notes: The graph reports total employment in private manufacturing, millions of jobs, 2000-2020. Manufacturing enjoyed a mild rebound during the recovery from the Great Recession. However, employment in the sector remains lower than 20 years ago. (Sources: FRED, U.S. Bureau of Labor Statistics (BLS) series MANEMP.)

### 2.3 Size and scope of the trade war

The recent trade wars began with barriers against specific imports—notably, solar panels and washing machines. U.S. trade authorities<sup>19</sup> found that these products were imported “in such

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it, “we all run trade deficits with our local grocery stores.” See James McBride and Andrew Chatzky, “The U.S. trade deficit: how much does it matter?” *Council on Foreign Relations*, March 8, 2019.

<sup>18</sup> Even at the height of the Great Recession, services jobs were up by 6 million from the 2000 levels.

<sup>19</sup> These investigations are frequently conducted by the United States International Trade Commission and the Department of Commerce, which are tasked with measuring the economic harm (i.e., “injury”) done by imports.

increased quantities as to be a substantial cause of serious injury” to America’s producers.

Those initial investigations recommended “global remedies”—that is, new entry barriers against all exporters of the named products. Yet, in spite of escalating tensions between the U.S. and many of its key trade partners, the “trade war” has become associated most frequently with China. This is partly because of early campaign promises Trump made to hitting Chinese imports with significant tariffs.<sup>20</sup> Those promises became tangible policy in 2017, starting with investigations into steel imports (April 2017) and intellectual property rights violations (August 2017). Both investigations ended with findings of injury to the U.S. economy—and recommendations to raise tariffs. Steel tariffs were announced on March 1, 2018. Later that month, Trump threatened 25 percent tariffs on over 1,300 products amounting to \$50 billion worth of Chinese imports. The U.S. eventually revised this list. On July 6, 2018, tariffs were implemented on imports worth \$34 billion (Figure 4).

Figure 4. U.S.-China trade war timeline

| U.S. Action                 | China Action                   |
|-----------------------------|--------------------------------|
|                             | July 6, 2018                   |
| <b>\$34 Billion</b><br>25%  | <b>\$34 Billion</b><br>25%     |
|                             | August 23, 2018                |
| <b>\$50 Billion</b><br>25%  | <b>\$50 Billion</b><br>25%     |
|                             | September 24, 2018             |
| <b>\$200 Billion</b><br>10% | <b>\$60 Billion</b><br>5-10%   |
|                             | May 10, 2019                   |
| <b>\$250 Billion</b><br>25% | <b>\$110 Billion</b><br>20-25% |

Beijing was quick to respond. It replied with retaliatory measures against \$34 billion in U.S. exports. The trade war was off and running. The US increased barriers again in August and September, with China retaliating each time.

By May of 2019, U.S. measures affected \$200 billion worth of goods and China’s retaliation hit \$60 billion (see Box 1). That is the equivalent of 40 percent of total imports between the two nations. Thousands of individual products are implicated. America’s tariffs naturally focus on manufactured goods while China’s retaliation singled out agriculture—one of the U.S. major export-oriented sectors. Although some announcements have been made of progress on resolving the disagreement, temporary truces have been short-lived and, at the time of writing this report, there is no clear end in sight. The question becomes: what impact do these policies have? Do tariffs help their intended beneficiaries?

<sup>20</sup> Reuters, “Here’s how Donald Trump plans to get tough on China,” *Fortune*, August 25, 2016.

*Box 1. Logic of Trade War*

The White House's strategy is based on recognizing the fact that America's market power derives from its import consumption. As a leading consumer of global imports, many countries depend on access to the U.S. market. In theory, that gives the U.S. leverage over its trade partners because America's tariffs have an out-sized effect on foreign firms' economic welfare. At the same time, there are simply more goods for the U.S. to target. As Trump pointed out, the U.S. can hit far more Chinese goods than Beijing can retaliate against. Hence, the Oval Office's statement that "trade wars are good and easy to win."

### 3. National perspective

The U.S.-China trade war is, in large part, predicated on the idea that free trade hurts the U.S. economy. That seemingly simple proposition is quite difficult to measure. Researchers continue to debate the extent to which imports are responsible for job loss. One side of the argument goes like this: If cheaply priced foreign goods crowd domestic producers out of the market, then industries subject to deep import penetration will lose jobs.

However, there are also a lot of heavily traded industries that thrive on imports. The automotive industry has become a classic example. Car parts cross borders many times during production and assembly.<sup>21</sup> These days, an "American car" is made from components from, potentially, dozens of countries. As a result, some of that automotive trade that shows up as imports actually helps support the broader industry, which sells 17 million cars across America each year. And, in spite of the controversy around outsourcing, the automotive industry added jobs every year from 2010 to 2019. That means there are strong reasons to think that imports and job creation do not sit at odds with one another.

#### *3.1 Do imports drive down jobs and wages?*

The links between imports and job loss are the subject of their own economics literature.<sup>22</sup> This report offers a general picture. Figure 5 compares the 10-year change in employment to the 10-year change in imports by industry.<sup>23</sup> If imports drove down jobs, we should see a negatively sloped trend.

The data show very little correlation between import growth and job loss from 2006 to 2016. In fact, the linear trend line is very modestly positive. Almost all industries lost jobs, but industries subject to *larger import surges* lost relatively *fewer jobs*. Moreover, the five industries that lost the highest percentage of jobs were exposed to less import penetration, on average.

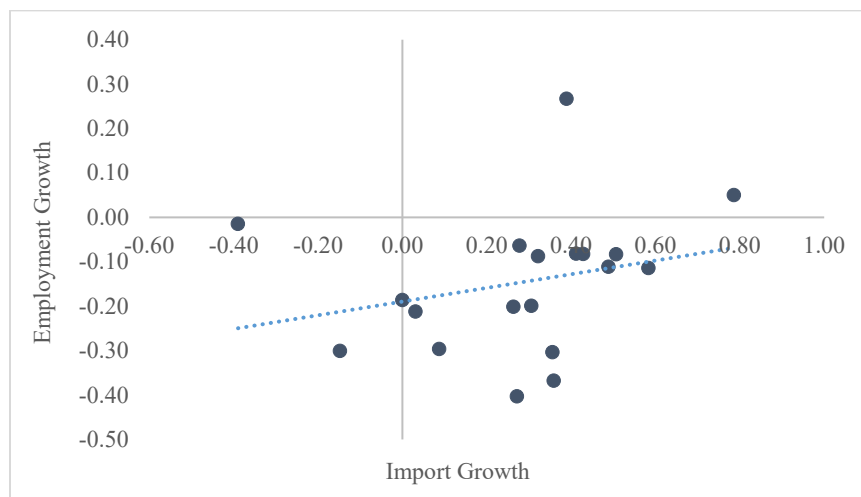
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<sup>21</sup> See John Humphrey, "Globalization and Supply chain networks: the auto industry in Brazil and India," *Global Networks*, 3.2 (2003): 121-141.

<sup>22</sup> See work by Autor (2018; 2016), who investigates the precise amount of job loss in America that can be attributed reasonably to free trade. David Autor, "Trade and labor markets: Lesson from China's rise," *IZA World of Labor*, 2018 and David Autor, David Dorn, and Gordon Hanson, "The China shock: Learning from labor market adjustment to large changes in trade," *Annual Review of Economics*, 8:205-240, 2016.

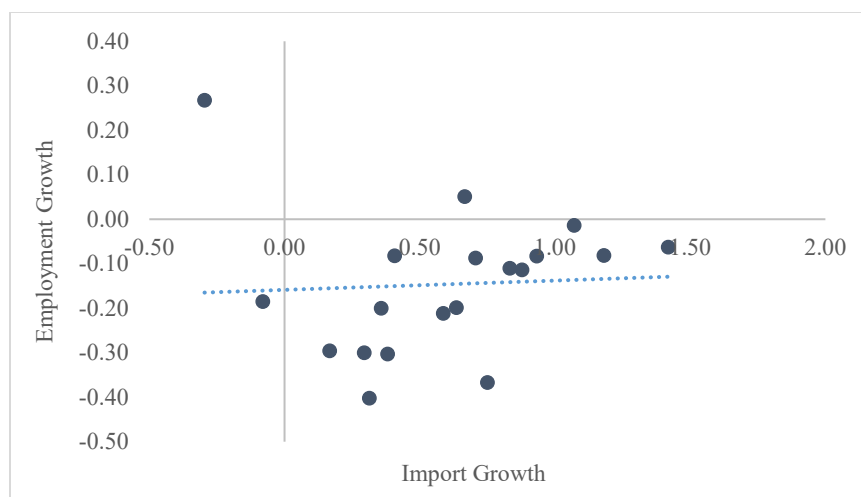
<sup>23</sup> Data is grouped by 3-digit NAICS codes and reports manufacturing industries only—NAICS codes 311-339.

**Figure 5. Manufacturing employment growth over import growth (all countries)**



*Notes:* The figure plots employment growth over import growth from 2006-2016 by manufacturing industry. Each dot represents an industry recorded in 3-digit NAICS codes. Import growth refers to imports from all trade partners, by industry. Import growth does not appear to be associated with job loss, on average. The mildly positive trend line implies that industries exposed to greater import penetration lost relatively fewer jobs (as a percentage). (Sources: BLS, *Occupational Employment Statistics* (OES) and U.S. Census Bureau's *USA Trade Online*.)

**Figure 6. Manufacturing employment growth over import growth (China)**

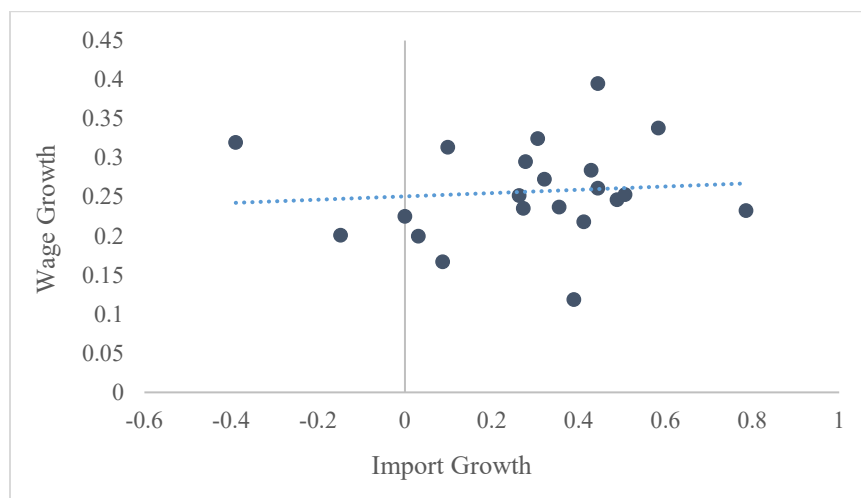


*Notes:* The figure plots employment growth over import growth from 2006-2016 by manufacturing industry. Each dot represents an industry recorded in 3-digit NAICS codes. Import growth is limited here to imports from China, by industry. Import growth does not appear to be associated with job loss, on average. The nearly flat trend line implies essentially no relationship between job loss and import penetration from Chinese goods. (Sources: BLS, *Occupational Employment Statistics* (OES) and U.S. Census Bureau's *USA Trade Online*.)

The five industries<sup>24</sup> that lost the most jobs saw average import growth of 18.5 percent. That is 10 points lower than the average across all manufacturing industries—28.1 percent. Measured another way, the five hardest-hit industries were responsible for 42 percent of all manufacturing job losses. However, from 2006-2016, they accounted for only 9 percent of total import growth. That is the opposite of what we would expect if imports crowded out domestic employment. Instead, imports are just as likely to signal that an industry is thriving.

The same holds for wages. The logic about imports should be the same—namely, higher imports ought to drive down domestic wages. Figure 7 plots wage growth over import growth. It appears that wage growth does not track import growth very well. Looking again at the period from 2006 to 2016, wages grew in almost every industry. But that growth—either modest or significant—was not related to how much import penetration an industry suffered.

**Figure 7. Annual wage growth over import growth (all countries)**



*Notes:* The figure plots annual wage growth over import growth from 2006-2016 by manufacturing industry. Each dot represents an industry recorded in 3-digit NAICS codes. Import growth includes all countries. The results are the same when isolating imports from China. Import growth does not appear to be associated with wage growth—in either direction. (Sources: BLS, *Occupational Employment Statistics* (OES) and U.S. Census Bureau's *USA Trade Online*.)

None of this is to deny a relationship between trade and worker welfare. Free trade has important distributional consequences. No one can credibly claim that free trade is cost-free. However, to understand the trade war's origins—and consequences—we have to start by questioning whether trade is the principal force behind the erosion of American manufacturing. The weak correlation shown here is not the whole story, but it suggests there are a lot of other things going on. Economists argue that automation has done more damage than free trade.<sup>25</sup> At the

<sup>24</sup> The biggest losses (by percentage) were in apparel (40 percent), textiles (37), wood products (30), furniture (30), and beverages (27).

<sup>25</sup> Sterling, Amy. "Millions of jobs have been lost to automation." *Forbes*. June 15, 2019.

same time, the decline of America's industrial base ignores huge gains in productivity as well as services development.

Nevertheless, the experience of job loss through 2016 helped influence the decision to raise tariffs on a variety of industries. Table 1 shows the intensity of protection by manufacturing industry. There is a weak, positive association between the intensity of protection and an industry's share of total manufacturing imports. For example, chemical products (NAICS 325) were the most-protected industry and account for 12 percent of all manufacturing import.

**Table 1. Trade protection by industry**

| NAICS3 | Industry                                    | Count of Tariffs | Share of Imports |
|--------|---------------------------------------------|------------------|------------------|
| 311    | <i>Food Products</i>                        | 216              | 3.2%             |
| 312    | <i>Beverage and Tobacco Products</i>        | 12               | 1.3%             |
| 313    | <i>Textile Mills</i>                        | 405              | 0.4%             |
| 314    | <i>Textile Mill Products</i>                | 71               | 1.1%             |
| 315    | <i>Apparel</i>                              | 20               | 4.1%             |
| 316    | <i>Leather Products</i>                     | 52               | 1.8%             |
| 321    | <i>Wood Products</i>                        | 87               | 0.9%             |
| 322    | <i>Paper Products</i>                       | 151              | 1.0%             |
| 323    | <i>Printing and Related Activities</i>      | 10               | 0.3%             |
| 324    | <i>Petroleum and Coal Products</i>          | 20               | 2.9%             |
| 325    | <i>Chemical Products</i>                    | 654              | 12.1%            |
| 326    | <i>Plastics and Rubber Products</i>         | 72               | 2.8%             |
| 327    | <i>Nonmetallic Mineral Products</i>         | 152              | 1.1%             |
| 331    | <i>Primary Metal Products</i>               | 202              | 4.0%             |
| 332    | <i>Fabricated Metal Products</i>            | 172              | 3.5%             |
| 333    | <i>Machinery Manufacturing</i>              | 210              | 8.8%             |
| 334    | <i>Computer and Electronic Products</i>     | 112              | 18.0%            |
| 335    | <i>Electrical Equipment, Appliance, Etc</i> | 88               | 5.8%             |
| 336    | <i>Transportation Equipment</i>             | 83               | 19.1%            |
| 337    | <i>Furniture and Related Products</i>       | 36               | 2.0%             |
| 339    | <i>Miscellaneous</i>                        | 66               | 5.9%             |

*Notes:* The table reports the number of tariff lines protected by industry. Harmonized system codes at the 8-digit level were converted into 3-digit NAICS codes using concordance tables. (Sources: Office of the United States Trade Representative (USTR) and author.)

### 3.2 The nationwide consequences of trade protection

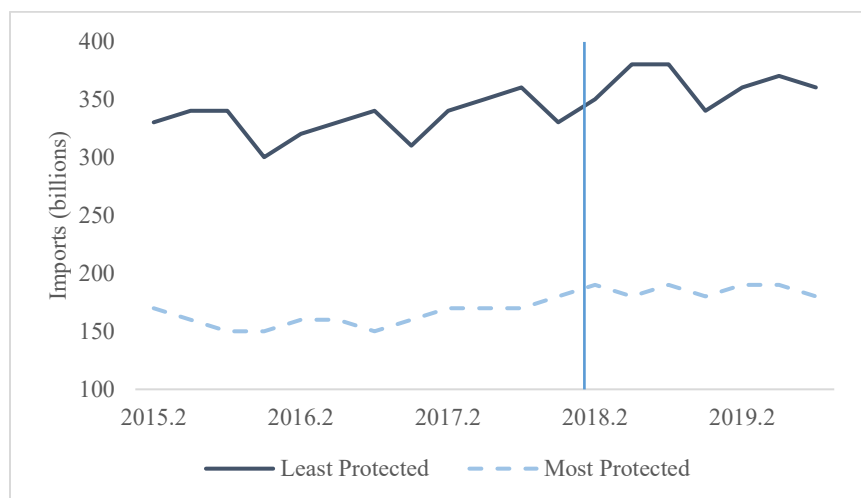
The question remains: do tariffs provide their intended benefits? To answer that question, we can start at whether they do an effective job reducing imports.

Tariffs work by reducing the price gap separating foreign and domestic goods. Because manufacturing costs are cheaper in most parts of the world, foreign-made manufactured goods can be sold at lower prices than American-made alternatives. Apparel is good example. The U.S. apparel industry has been decimated in the last decade, falling from 161 thousand employees in January 2010 to only 106 thousand in December 2019.<sup>26</sup> That is a loss of 34 percent. Costs are a huge reason. U.S. firms generally cannot compete with the low costs in global centers of manufacturing production—e.g. Bangladesh and Vietnam. As a result, it is estimated that only about 2 percent of clothing bought in the United States is American-made.

Tariffs are supposed to fix that problem by slapping a tax on imports. This effectively raises the price of foreign goods and shifts demand toward domestic products. Thus, one observable consequence of tariffs should be fewer imports.

Tariffs have not led to a decline in imports. Figure 8 plots manufacturing imports, split into the most- and least-protected industries, from 2014 through 2019. There is no perceptible decline in imports after the imposition of tariffs. And, the numbers from 2018 and 2019 look reasonably consistent with the longer-term trend. There is no major interruption caused by the introduction of tariffs.

**Figure 8. Manufacturing imports by protection level**



*Notes:* The graph reports quarterly imports, billions USD, from 2015 through 2019. The solid line represents total imports of industries below the mean level of tariff protection. The dotted line represents total imports of industries above the mean. There is no perceptible change in import levels after the introduction of tariffs, which are represented by the vertical line. (Sources: USA Trade Online and USTR.)

Why is there no result? Steel is a useful example. President Trump threatened to increase steel tariffs throughout his first year in office. This threat actually drove steel imports upward. Consumers of steel—everyone from major carmakers to local craft brewers—wanted to stockpile steel products before costs increased. Therefore, the threat of tariffs did not reduce imports right away. It drove them upward. Steel imports did eventually fall in 2019, not least because steel prices

<sup>26</sup> U.S. Bureau of Labor Statistics, “All employees, thousands, apparel, seasonally adjusted, apparel,” Data series CES3231500001. Available at: <https://data.bls.gov/timeseries/CES3231500001> (accessed June 10, 2020).

grew 33 % in 2018.<sup>27</sup> However, even prices were consistent with the 10-year in 2019.<sup>28</sup>

The steel example shows the difficulties shaping consumption habits through trade protection. Consumers anticipated the rise in prices—and the fall in supply. As a result, early tariff threats had a counterproductive effect, leading to increases in imports. When imports started to fall in 2019, the market was only correcting for a surge that took place in previous period.

Steel illustrates another important thing about tariffs—namely, their contradictory effects on worker welfare. On the upside, U.S. steel producers posted huge earnings increases in 2018. At the same time, United Steelworkers cited Trump's tariffs when announcing the reopening of an “idled” plant outside of Birmingham, Alabama at a gain of just over 1,000 jobs. This opened up an opportunity to raise wages for thousands of steel mill workers.<sup>29</sup> However, earnings fell significantly for companies like US Steel<sup>30</sup> and industry-wide job gains amounted to only about 3,000.<sup>31</sup>

At the same time, prices rose for steel users. One study estimated that the opportunity cost of creating more steel jobs could be over \$600,000 per position.<sup>32</sup> It is possible that some believe protecting American jobs is worth the price. However, politics aside, the math does not add up. There are ten times as many workers in industries that rely on steel than in actual steel mills.<sup>33</sup> Higher prices leave those workers worse off. It is no coincidence that U.S. firms requests tens of thousands of exemptions to the tariffs.<sup>34</sup> And, most importantly, employment in primary metals production, of which steel is a major component, actually fell in 2019—precisely when steel tariffs should have had their strongest effects.<sup>35</sup>

The same story is common across the country. Tariffs have underperformed when measured in terms of stemming imports and creating jobs. The problem is, as steel illustrates, that protection comes with a high price tag. Many other industries pay those costs. Just ask General Motors, which announced \$1 billion in losses in 2018 and up to 14,000 layoffs. Rising costs were one reason.

And none of this says anything about the damage done by more direct trade retaliation. That retaliation has punished America's farmers—notably soybean growers, who were targeted by Beijing's retaliatory measures at the very start of the trade war.<sup>36</sup> In 2018, agricultural exports to

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<sup>27</sup> Focus Economics, “Steel price history,” *Steel (USA) Price Outlook*. Available at: <https://www.focus-economics.com/commodities/base-metals/steel-usa> (accessed June 10, 2020).

<sup>28</sup> U.S. Bureau of Labor Statistics, “PPI commodity data for metals and metal products-steel mill products,” Data series WPU1017. Available at: <https://data.bls.gov/timeseries/WPU1017> (accessed June 10, 2020).

<sup>29</sup> Bloomberg, “U.S. Steel workers seek payout from trade war as prices rise,” *Industry Week*, September 5, 2018.

<sup>30</sup> U.S. Steel Corporation, “Annual Report,” *Form 10-K, SEC filing 1-16811*, FY2019.

<sup>31</sup> Jesse Chase-Lubitz, “The true cost of creating jobs vis Trump's steel tariffs,” *Politico*, February 13, 2019.

<sup>32</sup> Gary Clyde Hufbauer and Euijin Jung, “Steel profits gain, but steel users pay, under Trump's protectionism,” *Peterson Institute for International Economics*, December 20, 2018.

<sup>33</sup> Lydia Cox and Kadee Russ, “Steel tariffs and U.S. jobs revisited,” *EconoFact: International Trade*, February 6, 2020.

<sup>34</sup> Christine McDaniel and Joe Brunk, “Section 232 steel and aluminum tariff exclusion requests continue apace,” *The Bridge, Mercatus Center*, January 21, 2020.

<sup>35</sup> U.S. Bureau of Labor Statistics, “All employees, thousands, primary metals, seasonally adjusted, primary metals,” Data series CES3133100001. Available at: <https://data.bls.gov/timeseries/CES3133100001> (accessed June 10, 2020).

<sup>36</sup> Soybeans represent about half of U.S. agricultural exports to China. See Su Ye, “China: Top market for U.S. agriculture exports,” *Minnesota Department of Agriculture*, 2018. Available at: <https://www.mda.state.mn.us/sites/default/files/inline-files/profilechina.pdf> (accessed June 10, 2020).

China dropped by about \$10 billion—a 50 percent reduction from 2017.<sup>37</sup>

That retaliation is hugely important. However, this report is focused more on the domestic impact of the trade war on manufacturing. The next section zeros in on Arizona and Pima County, putting them in a national context, in order to better understand how trade policy impacts specific communities in the United States.

## 4. Local perspective

International trade impacts specific communities in different ways. Not every community has a steel or textile mill, just as not every community has soybean farmers or pharmaceuticals. That means communities' experiences with trade vary tremendously. The remainder of this report focuses on Arizona and southern Arizona.

### 4.1 State-level: Arizona

The U.S. Chamber of Commerce ranks Arizona as one of the states least affected by the trade war.<sup>38</sup> Before the trade war began, Arizona ranked 24<sup>th</sup> nationally in total imports (2017). Arizona's trade openness—a measure of trade divided by GDP—was 37<sup>th</sup> in the country. Openness is a common measure of “how important” trade is a given economy.<sup>39</sup>

However, being ranked 37<sup>th</sup> in the country does not mean trade is irrelevant for Arizona. It is estimated that over 700,000 residents work in trade-dependent industries—representing nearly one-fifth of total employment. That places Arizona 19<sup>th</sup> nationally in terms of the sheer number of jobs linked to trade.<sup>40</sup>

Table 2 lists Arizona's leading imports, which include aircraft and aircraft components, tomatoes, and electrical components and machinery. Statewide, Arizona imports over 700 individual products (measured at 6-digit HS codes). The majority of those—390 products—fall under the broad categories of “nuclear reactors, boilers, machinery” (HS84) and “electrical machinery” (HS85).

Arizona's heavy concentration in manufactured goods imports means that current tariffs stand to either greatly help—or severely damage—the economy. Over 85 percent of all goods imported by Arizona's firms (600 product lines) were protected under Trump's tariffs in the very first round of the trade war. That amounted to 83 percent of total imports—or, the equivalent of \$8.3 billion in 2018.

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<sup>37</sup> Foreign Agricultural Service, “Top markets for U.S. agricultural exports in 2018,” *U.S. Department of Agriculture*, 2019. Available at: <https://www.fas.usda.gov/data/top-markets-us-agricultural-exports-2018> (accessed June 10, 2020).

<sup>38</sup> See the U.S. Chamber of Commerce's online impact utility, available at: <https://www.uschamber.com/tariffs> (accessed June 10, 2020).

<sup>39</sup> Openness is measured as trade divided by GDP. The quotient represents how much trade is done relative to a geography's total market size. It is an imperfect measure, however. The U.S. is one of the world's largest traders. However, because of America's huge GDP (about \$21 trillion) the U.S. ranks around 160<sup>th</sup> worldwide in trade openness.

<sup>40</sup> Laura Baughman and Joseph Francois, “Trade and American jobs: The impact of trade on U.S. and state-level employment,” *Trade Partnership Worldwide Report*, February 2019. Available at: <https://tradepartnership.com/wp-content/uploads/2019/03/Trade-and-American-2019-FINAL.pdf> (accessed June 10, 2020).

**Table 2. Arizona's top 10 imports**

| HS Code | Industry                                         | Imports |
|---------|--------------------------------------------------|---------|
| 85      | Electrical Machinery and Equipment               | 3,600   |
| 84      | Nuclear Reactors, Boilers, Machinery, Appliances | 2,600   |
| 7       | Vegetables                                       | 1,200   |
| 88      | Aircraft, Spacecraft, and Parts                  | 1,000   |
| 90      | Optical, Photographic, Surgical Instruments, Etc | 610     |
| 8       | Fruits and Nuts                                  | 330     |
| 87      | Vehicles (Other than Railway)                    | 290     |
| 39      | Plastics and Articles Thereof                    | 62      |
| 2       | Meat Products                                    | 49      |
| 3       | Fish and Crustaceans                             | 45      |

*Notes:* The table reports total imports by 2-digit HS codes for the Arizona's top 10 industries in 2017. HS84 and 85 clearly dominate other industries, with imports tailing off quickly after that. (Sources: USA Trade Online.)

On the plus side, those tariffs could benefit local firms that produce goods that compete directly with imports. On the negative side, industries that rely on imports are left facing higher prices. In other words, Arizona faces precisely the same tradeoff as the rest of the U.S., as illustrated by the steel industry example above.

The most common indicator of overall economic health is GDP growth. By that measure alone, Arizona had a good year in 2019. In spite of the risks associated with trade protection, Arizona's economy grew over 3 percent, slightly exceeding its average growth since the Great Recession (2.4 percent). Arizona was also one of the fastest-growing states in the country.

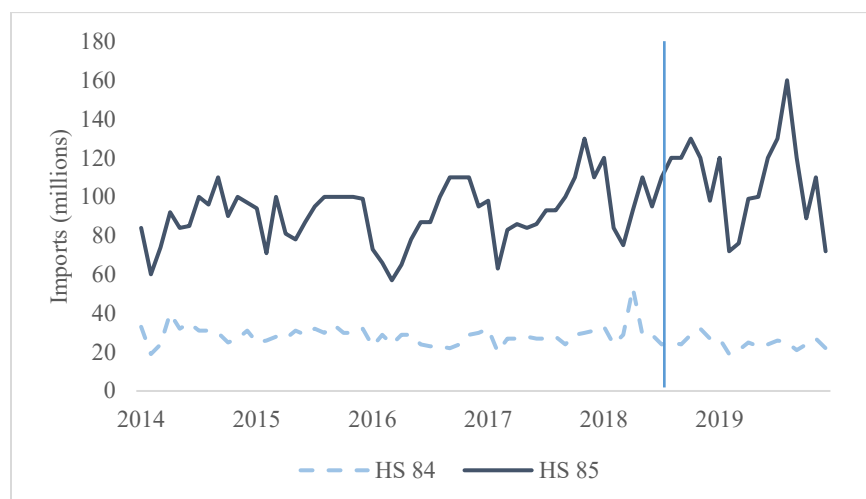
Positive growth implies good news for Arizona's economy. However, GDP is not the whole story. First, tariffs did little to have an immediate, significant effect on actual import flows. Consistent with national trends, imports since the trade war have barely budged from pre-tariff levels. Figure 9 shows monthly imports from China in the two most heavily protected industries (HS84 and 85).<sup>41</sup> Total annual imports in both 2018 and 2019 were broadly consistent with flows since the Great Recession.<sup>42</sup>

Second, Arizona's GDP growth was not driven primarily by manufacturing. That growth was mainly due to services and the non-traded sector. Manufactured goods GDP—both durable and nondurable—grew right at the statewide average of 3 percent in 2019. However, the utilities, retail and management sectors all grew faster, pulling up statewide economic performance.

<sup>41</sup> Notice that there are seasonal patterns in the data, which is common to most trade flows.

<sup>42</sup> Trade dipped by a larger amount in early 2020, but that has less to do with tariffs and more to do with how public health concerns—and policy responses to the pandemic—affected the market.

**Figure 9. Import trends in top industries**



*Notes:* Monthly imports of HS84 and 84, millions USD, 2014 through 2019. Patterns suggest that trade protection has relatively little impact on imports—compared to years before tariffs went into effect. (Sources: USA Trade Online.)

It is also important to point out one of the casualties of the war. Agriculture, the sector hit hardest by China's retaliation, was the only private, traded industry that did not grow in Arizona from 2018 to 2019. This also mirrors nationwide trends, which saw America's farmers struggle to find alternative export opportunities after China raised barriers.

Therefore, Arizona's aggregate GDP growth is not concentrated in the industries who enjoyed the highest levels of trade protection—and certainly not in industries hit by retaliation. Moreover, GDP growth does not say anything about worker welfare. The question remains: did growth translate into employment gains for wage increases?

Arizona's manufacturing employment grew by 3.8 percent in 2019. That places it 5<sup>th</sup> nationally in terms of total jobs added. At the same time, wages grew by about 1.7 percent.<sup>43</sup> That places Arizona 17<sup>th</sup> compared to the rest of the country, above the national average of only 0.5 percent. By historical standards, that wage growth is relatively slow, which raises questions about how well employees are doing (Box 2). Regardless, Arizona enjoyed above average performance in terms of both wages and the raw number of manufacturing jobs gained.

How much of this apparent success is attributable to tariffs? It turns out that tariffs are uncorrelated with Arizona's job creation and wage growth. There is no relationship between protection and jobs (Figure 10).<sup>44</sup> In fact, 5 of the 7 most heavily protected industries saw *below average* employment growth. Rather than promoting jobs, protected industries grew more slowly.

The major outliers in that figure are chemicals (NAICS 325), which was the most heavily protected industry. Second place is textiles (NAICS 313). Textiles employment shrank while chemicals employment grew, illustrating the diverging, inconsistent effects that tariffs have on employment.

<sup>43</sup> Measured as growth in weekly wages across the manufacturing sector (unweighted by industry employment).

<sup>44</sup> A simple bivariate correlation between the number of tariffs affecting a given industry and employment in that industry is a paltry 0.092.

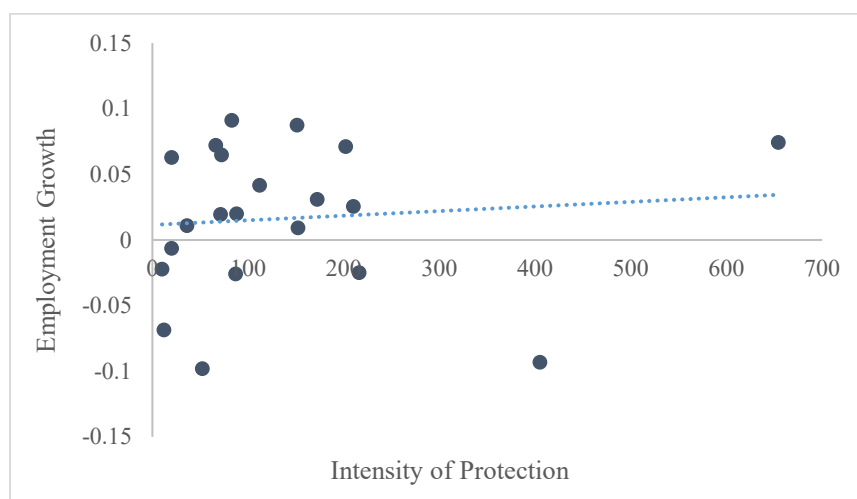
The same is true of wages. Wages did not increase any faster in the industries that enjoyed higher levels of trade protection. The lack of a relationship is consistent with the nationwide trends reported above.

*Box 2. Manufacturing Wage Growth*

Wages have recovered slowly since the Great Recession. While the U.S. enjoyed positive employment reports for almost one decade, wages have not kept up with employment growth. Across America's manufacturing sector, wage growth lagged behind pre-recession levels. This fed concerns that the economic recovery was not translating into improvements in worker welfare. The problem is worse for working- and middle-class Americans. Increases in wages have barely kept pace with inflation. Studies show that average Americans have seen virtually no increase in their purchasing power—in over 40 years.

As a result, Arizona's 2019 economic success has to be understood in context. The state grew faster than the national average, and its manufacturing jobs and wages increased. But most of that GDP growth was driven by services and the non-traded sector. At the same time, employment and wage gains were modest. Importantly, they were not concentrated in the most heavily protected industries. Therefore, it is more accurate to say that Arizona did well in spite of the tariffs—not because of them.

**Figure 10. Arizona's manufacturing employment growth over protection level**



*Notes:* The figure plots employment growth over the number of tariff lines per industry. Intensity of protection is the count of tariff lines converted from 6-digit HS codes to 3-digit NAICS codes. Each dot represents an industry recorded in 3-digit NAICS codes. Employment growth is largely uncorrelated to the level of protection around an industry. (Sources: BLS, *Occupational Employment Statistics* (OES), USTR, and U.S. Census Bureau's *USA Trade Online*.)

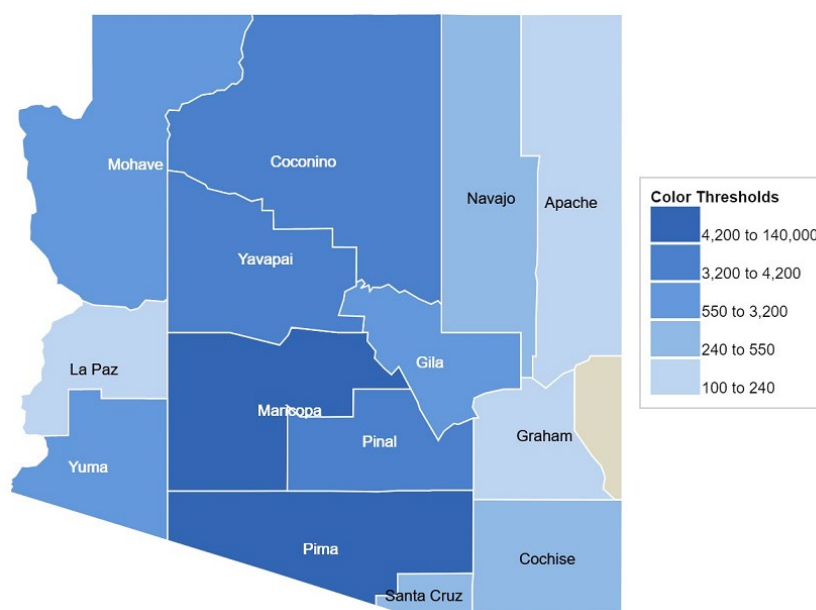
#### 4.2 County-level: Pima County

There are features of the Pima County's economy that leave it vulnerable to economic shocks such as trade wars. For one thing, markets are better able to withstand shocks when they are more diversified.<sup>45</sup> Unfortunately, Pima County is relatively concentrated compared to national averages. A Herfindahl index of employment by manufacturing industry places Pima County in the bottom 30<sup>th</sup> percentile of counties nationwide.

Based on available data, the county's largest manufacturing employers are fabricated metals (NAICS 332), computer and electronic products (334), and beverages and tobacco (312). Together, those three industries made up nearly half of Pima County's manufacturing employment in 2017—before the trade war began.

Pima County contains 6.5 percent of Arizona's total manufacturing jobs. Unsurprisingly, Maricopa towers over the rest of the state, accounting for 73 percent of statewide manufacturing employment.<sup>46</sup> Arizona's 13 other counties make up only 11.5 percent combined (Figure 11).

**Figure 11. Concentration of manufacturing employment by county**



*Notes:* Map displays number of total private sector manufacturing employees by county, Arizona, 4<sup>th</sup> quarter, 2019. The two major centers are, predictably, Maricopa County (Phoenix) and Pima County (Tucson). (Sources: BLS, *QCEW State and County Map* utility.)

<sup>45</sup> Markets are not unlike investment portfolios in this regard. More diversified markets are less vulnerable to volatility in any individual area of the economy. If a market is focused heavily on producing one (or a few) industries, then its economic welfare is tied closely to performance in those industries. All else equal, it is better to have a more diversified market.

<sup>46</sup> Maricopa's population is 4.5 times larger than Pima County. However, it employs more than ten times as many workers in manufacturing.

As above, we want to consider the performance of specific industries within the manufacturing sector. Unfortunately, at the county level, there is a lot of missing data due to non-disclosure by specific firms. This is true even at the 3-digit NAICS level, which is a reasonably high level of aggregation.<sup>47</sup> As a result, publicly available data on industry-specific employment and wages, by county, covers only about half of all manufacturing employees. In 2018, 3-digit NAICS codes account for about 13,000 employees out of the County total of around 25,000. Incomplete data affects our ability to understand the fine-grained effects of tariffs on specific segments of the economy. Nevertheless, it is possible to speak to general trends.

Prior to the onset of the trade wars, Pima County manufacturing employment grew 3 percent from 2010 to 2017. The largest gainers were fabricated metals (710 jobs) and food (134). Losses were seen in industries such as machinery (312) and paper products (138). Since the Great Recession, then, Pima underperformed compared to national averages. Job growth was above national averages in only 3 of 18 manufacturing industries.<sup>48</sup> The same is true of wages. Growth in average weekly manufacturing wages lagged behind national averages in almost every industry. Therefore, Pima did not enjoy the same rebound in manufacturing that many other areas of the country did after the Great Recession.

The question remains: how has the county fared since the trade war escalated in 2018? Fine-grained import data is not available for either Pima County (Tucson) or Maricopa County (Phoenix).<sup>49</sup> Luckily, trade policies are national, not local. As a result, we can only infer how much trade barriers might impact the county's economy based on which products enjoyed nationwide protection.

Table 3 shows employment performance for industries from 2018 to 2019. Pima County did not report jobs in some heavily protected industries, such as textiles (NAICS 313) or paper (326).<sup>50</sup> There was a net increase of 1,675 jobs—given available data—mostly in fabricated metals and electrical products. Both of those industries enjoyed protection under the first wave of July 2018 tariffs. However, there were job losses in other protected industries, such as appliance manufacturing, food, and beverages—one of the county's largest employers.

Table 3 also reports Pima County's job and wage performance relative to comparable counties around the nation. The comparison group is defined by having a location quotient within 10 percent of Pima County values.<sup>51</sup> This is calculated for each industry separately so that comparisons are as detailed as possible.

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<sup>47</sup> As BLS documentation states, there is missing data because, "In accordance with the BLS Confidentiality policy, data reported under a promise of confidentiality are published in a way so as to protect the identifiable information of respondents" (see accessed June 20, 2020.) This is problem at particularly fine-grained levels of observation, including 4- and 6-digit NAICS codes. Unfortunately, there is also a lot of non-disclosure at the 3-digit level. As a result, inferences from the data have to be understood in the context of missingness.

<sup>48</sup> This includes only industries where Pima County had non-zero jobs in 2010.

<sup>49</sup> The United States Census Bureau's trade utility, USA Trade Online, provides import data for 22 ports across the U.S., including Nogales, AZ. That leaves researchers with only state-level import data rather than information for specific geographies within the state.

<sup>50</sup> Textiles had lost all of its jobs by the time the trade war began.

<sup>51</sup> Location quotients are provided by the Bureau of Labor Statistics and defined as, "Location quotients are ratios that allow an area's distribution of employment by industry, ownership, and size class to be compared to a reference area's distribution. LQs are calculated by first, dividing local industry employment by the all-industry, all-ownerships total of local employment. Second, national industry employment is divided by the all industry, all ownerships total for the nation. Finally, the local ratio is divided by the national ratio." Described in BLS, "QCEW Location Quotient Details," *Quarterly Census of Employment and Wages*, n.d.

**Table 3. Pima County employment and wage growth**

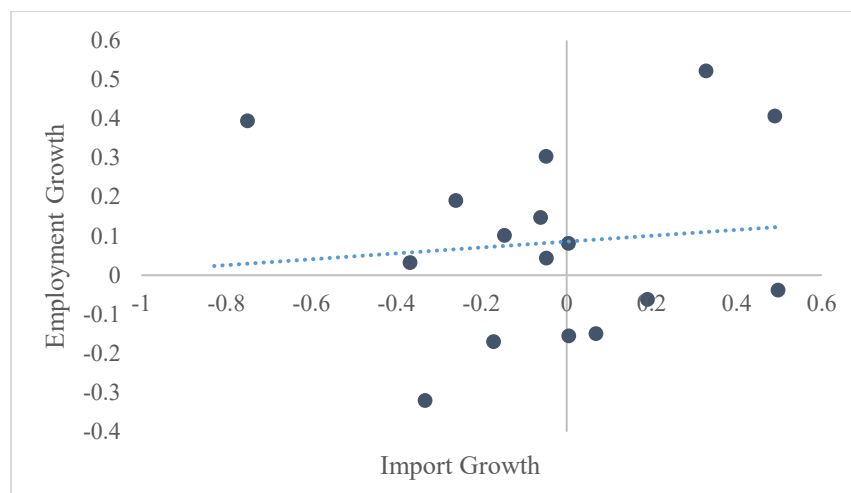
| NAICS | Title                                   | Employment Growth | Above Ave of Comp. Cos. | Wage Growth | Above Ave of Comp. Cos. |
|-------|-----------------------------------------|-------------------|-------------------------|-------------|-------------------------|
| 311   | <i>Food Products</i>                    | -6.2%             | No                      | 6.9%        | No                      |
| 312   | <i>Beverage and Tobacco Products</i>    | -32.0%            | No                      | -8.7%       | No                      |
| 314   | <i>Textile Mill Products</i>            | -15.6%            | No                      | 4.9%        | No                      |
| 315   | <i>Apparel</i>                          | -                 |                         | -           |                         |
| 316   | <i>Leather Products</i>                 | -                 |                         | -           |                         |
| 321   | <i>Wood Products</i>                    | 10.2%             | Yes                     | 26.6%       | Yes                     |
| 322   | <i>Paper Products</i>                   | -                 |                         | -           |                         |
| 323   | <i>Printing and Related Activities</i>  | 4.4%              | Yes                     | 8.9%        | Yes                     |
| 324   | <i>Petroleum and Coal Products</i>      | -3.8%             | No                      | -33.2%      | No                      |
| 325   | <i>Chemical Products</i>                | 19.1%             | Yes                     | 11.1%       | Yes                     |
| 326   | <i>Plastics and Rubber Products</i>     | 8.1%              | Yes                     | 3.2%        | Yes                     |
| 327   | <i>Nonmetallic Mineral Products</i>     | -17.0%            | Yes                     | 12.3%       | Yes                     |
| 331   | <i>Primary Metal Products</i>           | 39.4%             | Yes                     | 20.9%       | Yes                     |
| 332   | <i>Fabricated Metal Products</i>        | 14.7%             | No                      | -2.5%       | No                      |
| 333   | <i>Machinery Manufacturing</i>          | 40.6%             | Yes                     | 48.2%       | Yes                     |
| 334   | <i>Computers and Electronics</i>        | 52.2%             | Yes                     | -30.7%      | No                      |
| 335   | <i>Electrical Equipment, Appliances</i> | -15.0%            | No                      | 7.1%        | No                      |
| 336   | <i>Transportation Equipment</i>         | -                 |                         | -           |                         |
| 337   | <i>Furniture and Related Products</i>   | 30.3%             | Yes                     | 7.8%        | Yes                     |
| 339   | <i>Miscellaneous</i>                    | 3.2%              | No                      | 1.3%        | Yes                     |

*Notes:* The table reports percentage employment and wage growth by 3-digit NAICS industry from the 1<sup>st</sup> quarter of 2018 to the 4<sup>th</sup> quarter of 2019. Data only available for disclosed industries. Comparable counties calculated as location quotients within +/-10% of Pima County values—calculated by industry. (Sources: BLS, *Quarterly Census of Employment and Wages* (QCEW).)

During the trade war, Pima County manufacturing slightly outperformed peer counties. Pima County employment grew faster than comparable counties in 10 of 16 manufacturing industries. And, wages grew faster in 9 of 16. Outcomes were better, then, in more than half of industries. That is the thinnest possible majority, but it still suggests that Pima County outperformed peer counties—where data was available.

This section concludes with a final observation. Throughout this analysis, there has been very little correlation between jobs, wages, and imports. The same (lack of) pattern holds when looking at county data on employment and imports. Figure 12 plots Pima's County's employment growth over the intensity of trade protection. The trend is visible here that was seen at the state level and nationwide. Neither import penetration nor trade protection was correlated well with employment growth.

**Figure 12. Pima County employment growth over Arizona import growth**



*Notes:* The figure plots employment growth (Pima Co.) over import growth (Arizona) from 2018-2019. Each dot represents an industry recorded in 3-digit NAICS codes. Employment growth is largely uncorrelated to imports. (Sources: BLS, *Occupational Employment Statistics* (OES), USTR, and U.S. Census Bureau's *USA Trade Online*.)

## 5. Discussion

This report assesses employment and wage growth across major categories of manufacturing in the United States. Before the economy was crippled by the COVID-19 outbreak, jobs were steadily increasing, on average, across the manufacturing sector. Wages were also growing on pace with levels seen before the Great Recession. Are tariffs the reason for manufacturing's modest success?

There is very little evidence to support the idea that tariffs help America's workers, on average. For one thing, many industries have performed in 2019 as they did prior to President Trump taking office. Import levels remained relatively constant—even after tariffs went into force. Moreover, employment gains seen in 2019 were a continuation of the modest rebound manufacturing enjoyed in the last decade. Unsurprisingly, there is very little correlation between trade protection and employment growth or wage increases.

### 5.1 Caveats and other considerations

Before drawing any definitive conclusions, a few caveats are in order. First, this report looks at industries defined in terms of 3-digit NAICS codes. The virtues of this approach are that (i) it allows us to unpack the “manufacturing” sector in some detail, (ii) while using broad enough categories for a tractable analysis. The downsides are that 3-digit codes are still very broad. For example, looking at “fabricated metals” includes steel, but it also includes a variety of metal products less protected by trade barriers. This analysis does not speak to those more fine-grained products or specific firms. Rather, some of the “winners and losers” within manufacturing industries are conflated.

Part of the problem is limited data. As mentioned above, employment and wage data is

heavily censored due to non-disclosure that would identify specific firms. This means much of the data for specific manufacturing industries is missing—particularly for America's counties.<sup>52</sup> As mentioned above, the data limitations are apparent at 3-, 4- and 6-digit NAICS codes, which would allow researchers to take a closer look at specific industries within “manufacturing.”

This report looks at 3-digit codes to limit problems of missing data while still trying to offer a detailed account of the trade war's impact. This is also why the report looks at national, statewide, and county-level trends. It shows that there is, it turns out, very little difference across these geographies.

Second, it is possible that not enough time has passed to truly see the positive—or negative—effects of the trade war. There is relatively little evidence that tariffs curbed import consumption. However, trade flows are slow to respond to political conditions. Orders for goods are often placed weeks, months, or even years in advance. That means tariffs will not immediately interrupt established trade routes. Holding that concern aside, we can still be confident that there have been some distributional consequences from 2018's spate of tariff barriers. This report merely suggests the effects have not been as intended.

Third, it has to be repeated that any analysis of economic performance is clouded by the unique circumstances brought about by COVID-19. This report stops at the end of 2019. That is because it is nearly impossible to distinguish the effects of the trade war from the market shock brought about by the pandemic. It certainly possible that the trade war made things worse in some regards.<sup>53</sup> However, more time will need to pass to see how the global economy recovers from the dual shocks of trade wars and the additional restrictions brought on by efforts to contain the outbreak.

## 5.2 Recommendations

Those caveats aside, this report offers some insight into an important question: whether trade protection benefits America's ailing manufacturing sector. The evidence is highly limited. That is probably due to a couple of factors. For one thing, import penetration is not a strong predictor of job loss, contrary to the oft-repeated argument against free trade. In fact, import consumption could be a sign that an industry is thriving—not dying. Moreover, the challenges facing American manufacturing have been around for decades. The political decisions that facilitated globalization—specifically, the globalization of production and outsourcing of U.S. jobs—cannot be reversed easily.

Tariffs appear to be an incomplete, if not entirely a wrong solution, to the problems facing American manufacturing. At least, there is strong evidence that the U.S. has gained hugely from trade, including the addition of four services jobs for every individual manufacturing job lost.

There are two underlying concerns at play. One is the lack of competitiveness of America's firms. If that is the problem, then tariffs will not fix it. Instead, policymakers need to look at the United States itself. While politicians bemoan the yawning trade deficit, state governments around the country have systematically under-funded America's engine of innovation: higher education. The great promise of higher education was that it provided a step up on the socioeconomic ladder while, at the same time, driving innovation in the marketplace. Since the Great Recession, per-student funding has dropped in almost every single state. As a result, tuition has skyrocketed and many would-be students are unable to afford college—at least, not without the tremendous burden

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<sup>52</sup> State-level data is more complete and the data is also more complete when looking at high levels of industry aggregation—e.g. 2-digit NAICS codes. At that level, the identities of specific firms is more likely to be obscured.

<sup>53</sup> E.g. Edward Alden, “No, the pandemic will not bring jobs back from China,” *Foreign Policy*, May 26, 2020.

of student loans, which are approaching \$2 trillion. Rather than building a barrier around the U.S. economy, investments in education should help make that barrier unnecessary.

The second concern is that the United States is exploited by its trade partners. If we accept that claim is true, then unilateral tariffs are still the wrong solution. Instead, the U.S. ought to lean on the existing systems for rules enforcement in the international economy—namely, the World Trade Organization. That system exists to harmonize trade policies and adjudicate disagreements over discriminatory measures. Unfortunately, rather than leaning on that system for aid, the United States has systematically undermined its authority—and directly violated the rules through the current trade wars. It is an irrational approach. Confronting anti-competitive policies is an interest that many of America's trade partners share. Those partners should be aligned in a coalition to fight against discrimination. Instead, the current trade wars leverage American market power to alienate important allies. That is an economic—and a strategic—mistake.

### *5.3 Conclusion*

After years of witnessing a steep decline in American manufacturing, the White House broke from tradition and raised barriers around the U.S. economy. The hope was that tariffs would bolster demand for American-made goods. This ought to reopen shuttered factories and bring workers back to “the line.”

The problem is that tariffs have done relatively little to stem imports. And they have done relatively little to boost employment or wages in industries that enjoy protection. Taken together, there are strong reasons to think that tariffs do not fulfill their promise. No surprise, then, that many of America's industry organization have joined economists in opposition of trade protection. Their worry is that tariffs hurt more than they help.