The Economic Impact of the Trade Skirmish of 2018 on the Nation and Ohio

Limited Impact Today; Mounting Concern for the Near Future

By Edward (Ned) Hill and Fran Stewart
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Ohio is front and center in the trade conflict sparked by the Trump administration’s initiation of tariffs in 2018 to protect the U.S. steel and aluminum industries. Ohio is also a state with much at risk if national security trade protection is extended to the motor vehicle assembly and parts industries. Under the regime of retaliatory tariffs in place at the end of 2018:

- Ohio had the largest exposure of any state to retaliatory tariffs imposed by Canada;
- China is the largest international destination for Ohio’s soybeans;
- Ohio is the nation’s second-largest production location of motor vehicles and parts, before GM shuts-down its Lordstown assembly plant;
- Ohio is the nation’s largest production location of motor vehicle engines;
- Ohio is the location of a major Chinese industrial investment;
- Ohio is a major supplier state to both Boeing and Airbus’s U.S. assembly operations;
- Ohio is a production center for appliances; and
- Ohio’s iron and steel mills produce the third highest value of output among the states.

We have two objectives for this public policy briefing. The first is to document and clarify the moves and counter-moves in 2018’s international trade fight. The second is to discuss the economic impacts of the trade skirmish on the nation in general and Ohio in particular.
Those seeking definitive answers, however, will be disappointed in this policy brief, and they should look with skepticism on those who claim to have them. We describe the impacts and consequences of the trade actions as clearly as possible, but the results to date are both mixed and muted. There is too much uncertainty about public policy and the future path of the economy to be certain about the outcomes. Businesses are just beginning to react to the tariffs as if they are more than a short-term event. Additionally, the United States-Mexico-Canada Agreement (USMCA) needs to be acted on by the legislatures of three nations, the Trump administration has not acted on the trade investigation that could declare the motor vehicle and parts industry to be vital to the nation's defense, and, most importantly, not all of the trade cards have been dropped by both the United States and China. Only educated guesses can be made based on past experiences, current economic models, current data and survey results.

This policy brief proceeds in seven steps. The legal weapons the U.S. has deployed in the trade actions of 2018 are described in the first section. The second is a presentation of the trade actions: Who did what to whom and when. The third is a review of available economic estimates of the impact of the trade actions and possible additional measures. Evidence is presented on the impact of the 2002-2003 Bush steel tariffs, as are the results from four econometric models on the expected impact of the current ratcheting up of duties across the globe. The fourth portion of the brief examines the performance of the aluminum and steel, or metal-making, industries to determine whether the imposition of protective duties, or the anticipation of their imposition, had an economic impact. We present the metal-making industry data in sync with the way markets change—first looking for price movements that deviate from trend, then for changes in production levels, followed by increases in employment, culminating in potential investment in new or expanded plant and equipment. The fifth section is a review of the near-recession of 2015-2016 and its impact on the metals-making sector of the U.S. economy. Sixth, we look specifically at Ohio. The final section of the paper is our summing up.

We did not find any evidence indicating that Ohio’s employers or workers have experienced significant benefits from the American trade tariffs or the resulting trade skirmish, this includes metal-makers. And, at this point, they have not suffered major harm. The negative effects of the trade skirmish have been offset by the stimulus provided by the 2018 tax cuts and extremely strong consumer spending. The downsides from the trade war will be experienced as the stimulative effects of the tax cuts diminish, domestic manufacturers adjust their supply chains in reaction to increased costs, the global economy slows—partly in reaction to global trade tension—and business investment is trimmed due to increasing uncertainty about global economic performance.

The $3.3 billion in exports from Ohio to Canada, China, Mexico, and the European Union that is estimated to be affected by retaliatory tariffs needs to be put into context. Ohio exported $37.1 billion in goods (physical products) to these nations in 2017, meaning that 8.9 percent of the state’s exports of goods could be subject to their retaliatory duties. Ohio exported roughly $50 billion in goods in 2017 to all nations, but data on retaliatory duties from those outside of the four major trading partners are not available.

In terms of employment, Ohio’s Development Services Administration estimated that 260,000 full time equivalent jobs depend directly or indirectly on trade. These are jobs in exporting companies and in their supply chain. In May, 2018 Global Affairs Canada reported that 291 Canadian-owned companies directly employed over 25,000 Ohioans and that nearly 309,000 jobs in Ohio are dependent to some extent on trade with Canada or Canadian investment. This includes jobs in exporting companies and in their supply chains and jobs supported by the spending of those employees. The U.S. Chamber of Commerce estimated that 1.5 million of the state’s 5.0 million private-sector jobs are supported directly, indirectly or by spending by those employees.
The largest unanswered public policy question that Ohioans, especially Ohio’s business leaders, ask regarding trade is, What is the best way to address trade problems with China?

Ohioans understand, and oppose, trade barriers caused by China’s formal and informal policies on market entry, intellectual property theft and forced technology transfer, and interference with foreign corporate ownership of facilities in China.

Ohioans understand the troubles that can be caused if state-supported dumping of Chinese steel and aluminum occurs as the global economy slows. However, this is a global problem, not just a problem for the United States.

Ohioans do not understand is why the U.S. has gone to the mat wrestling with its closest trade partners and historic allies—Canada, Mexico and the European Union—when the nation’s dominant current and potential trade problems are with China.

Ohioans do not understand is why the United States attacked a multilateral coalition of trading partners that could be strong allies in countering China’s mercantilist trade practices.

Ohio’s manufacturers do not understand is why they are being taxed, or “tariffed,” in a global trade war designed to protect the U.S. steel and aluminum industries and how this is related to opening Chinese markets to U.S. investment.

Ohio’s manufacturers also do not understand assertions that charging them tariffs is good public policy and how increasing their costs improves their competitive position.

The net impact of the current trade conflict on Ohio’s industries cannot be assessed in isolation from its impacts on the U.S. and global economy— as those impacts will, in turn, affect Ohio’s economy. We stress that, while the current trade actions are not harmful enough to trigger a recession on their own, they are kindling that can feed the fires of recession by increasing costs of consumer goods, harming the construction industry, and increasing domestic motor vehicle production costs at a time when the industry has passed a cyclical peak and may have passed its secular peak and when the stimulus provided by the 2018 tax cuts is diminishing.

In sum, it is too soon to be declaring the winners and losers in Ohio from the Trump administration’s trade measures. However, there are enough data available to gauge effects of the measures as they reverberate throughout the state’s industries.
Findings

Bush-Era Steel Protection Failed

The picture the International Trade Commission drew of the George W. Bush-era tariffs was grim: “The [econometric] model [used by the ITC] estimates that earnings in industries where returns to capital fell, including steel-consuming industries, would decline by $601.2 million.” “Industries that are particularly affected include motor vehicle parts and several steel fabrication industries (metal tank manufacturing, railroad rolling stock manufacturing, and power boiler and heat exchange manufacturing).” Gary Clyde Hufbauer and Ben Goodrich of the Peterson Institute for International Economics also examined the impacts of the 2002-2003 tariffs, concluding that “President Bush's decision to protect the US steel industry with Section 201 tariffs had no economic justification... tariffs would cost over $400,000 annually per job saved in the steel industry. Moreover, they would result in net job losses in the economy due to downstream layoffs.” In other words, the tariffs hurt the customers of domestic steel as well as consumers.

Econometric Models Forecast Recession from Escalating Tensions

We draw out several observations about the potential effects of the trade frictions from econometric models of the U.S. economy. The first is that the stimulus that came from deficits associated with the December 2017 Trump tax cuts have, as expected, boosted the economy in 2018 and will continue to do so through early 2019. The stimulus from deficits associated with the tax cuts appears to have offset economic losses from retaliatory trade sanctions and increased prices on domestic products from U.S. imposed duties. If, however, the trade conflict escalates from a skirmish to sustained trade tension with China, with the steel and aluminum actions and counteractions still in place, then the U.S. is projected to experience, at best, diminished growth in 2019 and possibly a recession beginning in mid-2019, extending through 2020. If the trade war intensifies, with U.S. tariffs on imports coming from China increasing to 25 percent on, or after, March 1 and an additional 25 percent tariff hitting automobiles, trucks and parts coming from outside North America, a recession is likely to start in 2019 as the trade skirmish escalates into a global trade war and last through 2020. GDP growth is projected to decline by nearly 2 percentage points from baseline forecasts in the first quarter of 2020; full-time equivalent job losses above the baseline forecast would cross the million mark before mid-year 2019 and go above 2 million between the last quarter of 2019 and the first quarter of 2020, staying above 1.5 million throughout 2020.
Impacts on the U.S. Steel and Aluminum Industries

If the tariffs perform as we expect, higher prices for U.S. steel and aluminum are likely to be coupled with limited growth in production, as domestic mills gain market share and sales increase even in the face of declining overall demand. Employment gains in these two sheltered industries will be slow and modest because mills will likely use overtime to satisfy near-term increases in demand. New or expanded production capacity will take longer to bring online, and companies will hedge their bets on expansion as they wait to see if a recession is on the horizon and whether the new tariff wall will stay up to protect their investments. To date, industry data are bearing out our expectations.

STEEL PRICES

The United States was a high price island in world steel markets before fall 2017, and the price gap has widened since the steel tariffs were imposed. While market forces have reduced the cost of steel in the U.S. from the highs of mid-summer 2018, when the cost of a metric tonne of hot rolled band steel produced in the U.S. exceeded $1,000, prices have also been going down in China, reflecting that country’s economic slowdown. As of January 28, 2019, the cost of a metric tonne of hot rolled band steel in the U.S. was 64 percent higher than its cost in China ($764 compared to $467) and 39 percent higher than its price in Western Europe ($764 versus $548). While the price of hot rolled band steel has been declining in all three markets, the differences in the factory-gate prices among U.S., Chinese and European product remain large.

These cost differences can either steer the location of a metal-using product’s manufacturing operations out of the United States or shift where a metal-using product is sourced. The longer the trade skirmish carries on, the higher the probability of either offshoring production or sourcing metal-using products in regions with lower metals prices and the higher the probability of regional, if not national, recessions in the United States.

PRICE IMPACTS ON METAL-USING COMPANIES

Conversations with Ohio manufacturers and their representatives as well as with members of the construction bar indicated that, during the summer and fall, metal-users were mostly able to pass the tariff costs and increased metals prices along to their customers. In cases when they could not metal-users absorbed increased costs either out of profits or retained earnings. All of this was done expecting that the tariffs would be short-lived. The longer the tariffs go on, the more business will be lost to competitors with lower costs, both in domestic and international markets.

GROWTH IN DOMESTIC PRODUCTION

Steel production from U.S. factories started to increase in January 2017, which is after the economic slowdown, or the near-recession, of 2015-2016 ended and before the tariffs were announced. The production index (where 100 indicates that the volume
produced is equal to average monthly production in 2012) for raw steel fluctuated around 93.4 for most of 2017. In February 2018, the index moved up to 100.0. In June, when the duties were put in place, the index was 100.3; dropping to 100.2 in December. The fairest assessment of the change in the index of production of raw steel is to note that the index went from an average of 93.4 over 2017 to an average of 99.6 in the first half of 2018; then on to an average of 102.2 from June through December. The percent increase in raw steel production from the 2017 average to the average for the first half of 2018 was 6.6% and the percent increase from the average index of the first half of 2018 to average index value over the post-tariff second half of 2018 was 2.6 percent.

Was the increase from 2017 through the end of 2018 due to tariff-induced increases in market share, or a continuation of increased output due to the strength of the domestic economy? A dramatic discontinuity in the volume of production is not associated with the imposition of protective tariffs in June.

STAGNANT METALS-PRODUCING EMPLOYMENT GROWTH

U.S. employment in the steel-making industry has been stagnant. In January 2018, when duties were first mentioned by President Trump, the U.S. steel industry had 83,500 jobs. In March, when U.S. tariffs were announced, the iron and steel industry had 82,400 jobs. June's jobs number increased to 83,500. In December the number of jobs was 83,200, slightly less than at the beginning of the year.

The story is much the same for the aluminum-producing industry. The number of jobs in the industry was the same in December 2018 as it was in July.
NEW OR EXPANDED PRODUCTION CAPACITY

All of the steel plant expansions that have taken place in Ohio, with the exception of Republic’s Lorain mill, were in the works months before the Trump administration undertook its trade actions. New mills, such as Petmin’s proposed new half-billion-dollar pig iron mill in Ashtabula and revitalized facilities, such as JSW’s investments in the former Wheeling-Pitt mill in Mingo Junction, were planned and proceeding through regulatory processes well before the steel duties were announced. Nationally, projects that were announced after the tariffs were enacted were being studied in light of current market conditions (demand) and the permanence of the duties. Would these investments have been made based on the trend in market conditions without the imposition of duties? We do not know for certain, but we suspect that, with the exceptions of the reopening of U.S. Steel’s mills in Lone Star, Texas, and Granite City, Illinois, and Republic’s expansions in Ohio, the answer is yes. However, even in the case of U.S. Steel, the motivation for reinvestment and restarting the furnaces goes beyond the erection of a new tariff wall. The Granite City and Lone Star facilities produce pipe, and the oil production boom in Texas’s Permian Basin has provided a market that was absent in 2015 and 2016 when the plants were idled.

We also look at the $1.3 billion investment made by Big River Steel in Osceola, Arkansas. This massive project was proposed in 2013, production started in early 2017, and, in 2018, the company started planning a matching $1.2 billion expansion in Osceola and in April signed an option to build a new $1.6 billion plant in Brownsville, Texas. Big River Steel is a market-driven warning that the legacy steel industry in the United States may have to relearn a lesson that was taught in the past. Tariff walls and trade protections offer temporary respite from dumping or competition. However, the real economic challenge is investment in new metal-making technologies with lower operating costs and higher quality product located closer to growing markets. The possibility of dumping by Chinese state-supported mills when the economy slows is clearly unacceptable. That is a near-term threat. The long-term threat to legacy steel is located in Osceola. The rise of the modern flex-mill is as large a threat to integrated steel mills and older mini-mills today as Nucor was in the late 1980s.

Growing Perceptions that the Trade War Is Hurting the Economy

FEDERAL RESERVE BOARD OF GOVERNORS’ BEIGE BOOKS

Anecdotal observations in the press of negative impacts from the trade skirmish have increased over time as supply chains have begun to experience tariff-driven cost increases and lost business. These comments have been replicated with another set of data points in the Federal Reserve System’s Beige Books. The January 2019 book reported that “many Districts reported that contacts had become less optimistic in response to
increased financial market volatility, rising short-term interest rates, falling energy prices, and elevated trade and political uncertainty. … Most Districts indicated that firms’ input costs had risen, but reports were mixed on whether they could pass the higher costs on to customers. Reports often cited rising materials and freight prices as sources of cost increases, and a number of Districts said that higher tariffs were also a factor.” In the December 2018 book, 11 of the 12 Districts mentioned trade and tariffs negatively. This is a major change from reports made in the summer and early fall.

2019 OHIO MANUFACTURERS SURVEY

The affiliates of the Ohio Manufacturing Extension Program undertook a survey of manufacturers from mid-November through early-January on perceived strengths, weaknesses, opportunities, and threats to their businesses. Two of the questions directly related to trade concerns. The first asked whether “the recent tariffs imposed by the U.S. affected your company.” The second asked an open-ended question about which government regulations “concerned them the most.”

The question on the impact of trade actions was answered by 493 companies. The vast majority reported some degree of harm. The ratio of the extreme answers, those “very negatively” and “very positively” affected, was nearly 14:1. The ratio of manufacturers very negatively or negatively affected to those very positively or positively affected was nearly 9:1.

The 2018 and 2019 polling asked respondents the same open-ended question: “What government regulations concern you the most?” Close to the same number of companies answered the question in each year, 236 in 2018 and 213 in 2019. In 2018, only 4% of the respondents (9) identified tariffs as an area of regulation that concerned their companies. One year later, 141 establishments out of the 213 that answered indicated that tariffs were an area of concern; this constitutes 66 percent of those answering the question.
Observations and Conclusions

Ohio’s workers, businesses, and consumers face three different negative impacts from the current set of trade actions: (1) higher prices for purchased parts made with metal and imported materials resulting in lost domestic markets as customers source metal-using parts and finished products internationally, (2) lost international markets for both manufactured and agricultural products due to increased prices caused by retaliatory tariffs, and, ultimately, (3) higher prices for domestic consumer goods.

A reasonable question to ask is what is behind the strong performance of the national and Ohio economies if there is a trade war going on? The first response is that the drag from the current trade skirmish is just not large enough to cause an immediate downturn in the economy. However, economic decline will likely occur if the sanctions on China are ratcheted up and the U.S. imposes a new global duty against automobile imports and parts. The second response is that the duties are relatively new and trade statistics show an accelerated flow of shipments into the U.S. from China in advance of the threatened increase in duties that were to take place on January 1, 2019, and are now postponed to at least March 1. Supply chains have not been disrupted—yet. Our third response is that deficits associated with the tax cuts that took effect in 2018 generated enough consumer spending to offset the economic drag associated with the tariffs imposed from June through September. This source of stimulus will diminish in 2019.

Our conclusion about the impact of the tariffs on Ohio, Ohio’s steel industry, and Ohio’s metal-using industries is consistent with the observation of a senior economic analyst in Ohio’s state government: “The story of how the Trump administration’s tariffs impact facilities in Ohio is yet to be written. Lots of noise, news stories about what is to happen, but I have yet to see job and investment impact as of September 2018. Maybe next year there will be real data to point to, but after six months, most companies are taking a ‘wait and see’ approach before committing dollars, investment, or production. Overall, there is way too much on-again, off-again news to make a definitive decision.”

The comment holds true five months after it was recorded. However, anecdotal data coming from corporate earnings reports, comments recorded in the Federal Reserve’s Beige Book, and answers to the Ohio Manufacturers Survey all point to accumulating damage. The current trade skirmish is not disruptive enough to trigger a recession on its own. However, growing trade tensions between the U.S. and China, threats of additional trade actions against Europe, and continued actions against Canada and Mexico, coupled with signs of a softening domestic economy may provide enough kindling to stoke the fires of recession — either regional or national.
The Economic Impact of the Trade Skirmish of 2018 on the Nation and Ohio
As a state where steel gets made and turned into products and where goods are manufactured and shipped around the world, Ohio provides a fitting context for exploring the direct results, interconnected ramifications, and economic trade-offs arising from the Trump administration’s initiation of tariffs to protect the U.S. steel and aluminum industries. Tariff protections are expected to support the state’s iron and steel mills, which account for the industry’s third-largest share of national output. Yet, protection comes at a cost to other important state industries. Among the retaliatory tariffs in place at the end of 2018, Ohio had the largest exposure of any state to retaliatory tariffs imposed by Canada. China is the largest international destination for Ohio’s soybeans. Ohio also faces considerable risk if national security trade protection is extended to the motor vehicle assembly and parts industries. The state is the nation’s second-largest production location of motor vehicles and parts, as well as the largest production location of motor vehicle engines, with factories that are owned by domestically and internationally headquartered firms. It is the location of one of the nation’s largest Chinese manufacturing investment (Fuyao Glass), is the home of major producers of appliances, and is an important supplier state to both Boeing and Airbus’s U.S. assembly operations. It’s clear that Ohio has many dogs in this hunt and many hunters.
The Trump administration framed its trade policies against a backdrop of long-abandoned mills in what is commonly thought of as America’s traditional industrial heartland and used data on deficits in international trade in goods (physical products) to claim that the nation’s economic security has been diminished by the reduction of its durable goods manufacturing industries. The administration asserts that these losses were due to unfair trading practices, particularly on the part of China, and to poorly negotiated multilateral trade pacts that opened U.S. markets while protecting those of other nations. A second argument the administration has made is that, no matter the cause, a diminished durable goods manufacturing sector represents a threat to national security.

We have two objectives for this policy briefing. The first is to document and clarify the moves and countermoves in 2018’s international trade fight. The second is to discuss the economic impacts of the trade skirmish, and possible trade war, on the nation in general and on Ohio in particular. The last task is difficult because the first round of tariffs was put in place June 1, followed by a second round in late September. Data on how the economy reacted to these economic shocks are limited, and the reactions of businesses to these actions have not fully played out. Thus, for this analysis, we review work on past trade disputes and present econometric models that forecast outcomes from the current trade frictions before making observations from the data that are available. It is clear that for all but soybean and corn farmers we have been observing more of a trade skirmish than a war. However, as time passes, the indications of economic damage mounts, especially regarding trade with China.

What became clear in the fall of 2018 is that the United States has, in fact, initiated three separate but intertwined streams of public policies related to trade. The first was rewriting the NAFTA trade accord, now termed the United States-Mexico-Canada Agreement (USMCA) by the U.S. government. The second was protecting the steel and aluminum industries against global competition and a longer-term threat to global
steel and aluminum markets posed by overcapacity in China. And the third was an attempt to change the legal structure of U.S. trade and investment in Chinese markets.

Since we began gathering data for this essay, negotiators and the chief executives of Canada, Mexico, and the United States reached an agreement on a replacement for NAFTA. The agreement still requires congressional approval, which is now an uncertain outcome due to the Republican party losing its majority in the U.S. House of Representatives in November’s elections. The renegotiated pact also requires the approval of the legislatures of Canada and Mexico. Side letters to the USMCA were designed to hold Canada and Mexico harmless from the possible imposition of new global duties on imported automobiles and parts by the United States. However, the prospect of additional 10 percent or 25 percent tariffs being placed on motor vehicles and parts is worrisome to Ohioans in particular due to the important role of the automotive industry in the state’s economy and the uncertainty of what industries will bear the brunt of an inevitable new round of retaliatory duties from China, the European Union, and other nations where motor vehicles and parts are sourced. Beyond being a replacement for NAFTA, the USMCA appears to be the Trump administration’s framework for other bilateral trade pacts. Parts of the USMCA seem to be speaking more to China and Europe than to Canada or Mexico.

Hanging over the politics of international trade was the threat by the United States to increase duties on Chinese goods from 10 percent to 25 percent and to expand the scope of items covered by the new duty schedule on January 1, 2019. China had announced that it would retaliate against any such action. A verbal agreement was reached between the U.S. and China at December’s Group of 20 meeting in Argentina to put a hold on these trade actions until early March to allow for additional negotiations. More will become known as that deadline approaches.

This essay proceeds in seven steps. The legal weapons the U.S. has deployed in the trade actions of 2018 are described in the first section. The second is a presentation of the trade actions: Who did what to whom and when. The third is a review of available economic estimates of the impact of the trade actions and possible additional measures. Evidence is presented in this section on the impact of the 2002-2003 Bush steel tariffs, as are the results from four econometric models on the expected impact of the current ratcheting up of duties across the globe. There is a great deal of uncertainty about how long the trade disputes will last, how the rapidly unfolding events will affect business investment, and when the stimulus to the economy from the 2018 tax cuts will run out of steam. Estimates made during the spring and summer of 2018 indicate a slowing of the economy starting in mid to late 2019. The 2018 tax cuts have provided stimulus to the economy since January, inadvertently holding many of the potential negative effects of the June and September trade actions at bay. We also do not know how declines in farm incomes will play out in regional economies across the U.S. from China’s reduction in U.S. purchases. As occurred in 2015 and 2016, regional recessions in the middle of the country could occur before a national downturn becomes evident.

The fourth portion of the essay examines the performance of the aluminum and steel industries to determine whether the imposition of protective duties, or the anticipation of their imposition, has had any economic impact. We present the industry data in sync with the way markets change—by looking first for price movements that deviate from trend, then for changes in production levels, followed by increases in employment, and culminating in potential investment in new or expanded plant and equipment.

The fifth section examines the economic downturn, or near-recession, that occurred in 2015 and 2016 and caused a sharp decline in employment in the metals-producing industries. The lesson to be learned is that product demand, relative prices, and global economic
activity are the major drivers of business success in the U.S. metals-producing industries.

The sixth section looks specifically at Ohio, examining the scope of export activity affected. The section presents recent evidence of the impact of the U.S. steel and aluminum tariffs, and the international countermeasures, on steel employment in Ohio and on a group of metals-using industries. We discuss our

1. Four U.S. Trade Weapons

The oldest weapon in the trade armory is the anti-dumping provision of Section 705 of the Tariff Act of 1930. The Tariff Act of 1930, more popularly known as the Smoot-Hawley Tariff, increased duties on more than 20,000 items and contained a range of other protectionist actions. Although the Smoot-Hawley tariffs are not considered to be a cause of the Great Depression, they have long been derided by economists and historians as exacerbating the economic collapse. The importance of Section 705 to the 2018 trade disputes is that it was designed to protect U.S. industries from dumping, where nations subsidize the cost of goods shipped into the United States and sold at prices below production and shipping costs. This is the rationale used by the U.S. to impose countervailing duties against Western Canadian softwood mills in January 2018.

The industry disruption provision of Section 201 of the Trade Act of 1974 was employed to protect U.S. washing machine and solar panel manufacturers. Section 201 allows for the temporary protection of a domestic industry that is being “disrupted” by an increase in shipments from another nation. The structure of the countervailing tariffs imposed on both industries applied the logic of a Section 201 resolution: The countervailing duties are designed to provide time for the U.S. industry to adjust. Protections for U.S. washing machine producers will last for three years, allowing for 1.2 million washing machines to be imported under a 20 percent tariff in the first year, 18 percent in the second year, and 16 percent in the third year. If imports go above 1.2 million units, then the tariff rate jumps to 50 percent on additional machines in the first year. This rate drops to 45 percent in the second year and 40 percent in the third. Solar cells and panels have no base import level; duties in the four years the remedy will be active are 30 percent, 25 percent, 20 percent, and 15 percent.

The weapon used to limit steel and aluminum imports invokes the preservation of national security under Section 232 of the Trade Expansion Act of 1962. Section 232 allows the president to impose trade sanctions if products are “being imported into the United States in such quantities or under such circumstances as to threaten to impair the national security.” The statute does not contain a definition of national security. It does, however, require that the investigation consider the “domestic production needed for projected national defense requirements; domestic capacity; the availability of human resources and supplies essential to the national defense; and potential unemployment, loss of skills or investment, or decline in government revenues resulting from displacement of any domestic products by excessive imports.”
The Congressional Research Service noted in a report to Congress in November 2018 that the Department of Commerce used an expansive definition of national defense in its reviews of the steel and aluminum producing industries, defining national security to include “the general security and welfare of certain industries, beyond those necessary to satisfy defense requirements.” The Department’s Bureau of Industry and Security defined national security to include industries required for the “minimal operations of the economy and government.” For both the steel and aluminum industry, the secretary of commerce stated that imports needed to be reduced to a level that would allow domestic steel and aluminum producers to operate their plants at 80 percent of capacity or higher. Both the steel and aluminum reports asserted this was the minimum operating capacity associated with long-term financial viability.

Assertions about expanding and reopened mills and increasing employment accompanied the announcements, but such expansions and gains have largely failed to materialize, as will be discussed later in this brief.

China’s announced industrial policies are the targets of the fourth trade weapon, Section 301 of the Trade Expansion Act of 1974. Section 301 covers unfair trade practices. The Office of the U.S. Trade Representative (USTR) found that “China’s acts, policies and practices related to technology transfer, intellectual property, and innovation are unreasonable and discriminatory, and burden U.S. commerce.” The USTR cites two sets of offending trade and investment practices. The first are rules that force the transfer of American technology and intellectual property and compel the formation of joint-venture company with Chinese majority ownership as a pre-condition to a U.S.-headquartered company either producing in China or directly selling in China. These are long-standing complaints made by U.S. firms about Chinese trade policies. The Trump administration is also taking aim at China’s next generation economic development plan, Made in China 2025, and its implementation, which the administration sees as being founded on these unfair trade practices.

### 2. Tit for Tat: The Trade Skirmish of 2018

Table 1 sorts out the various tariff actions made during 2018 by the United States and the retaliatory measures taken by other nations. However, the steel and aluminum protections that occurred in 2018 were catalyzed in April 2017, when the Trump administration initiated a Section 232 review of trade conditions in the domestic steel and aluminum markets to determine whether the volume of imports into the United States threatened national security. The report on the steel industry was released by the Department of Commerce on January 11, 2018, and the aluminum report followed on January 17, 2018. The conclusion reached by the secretary of commerce was that domestic security was threatened by the lost market shares of these two industries to imports and the decreased volume of production.

Two other trade actions were settled in early January. Section 705 duties were imposed on imported products from Western Canadian softwood mills in response to evidence of production subsidies. The second was the imposition of countervailing duties on imported large washing machines and solar panels in response to U.S. industries filing dumping charges under Section 201 of the Trade Act of 1974. In both cases, U.S. manufacturers
claimed that a sudden increase in import volumes disrupted domestic markets, depressed prices, and reflected subsidies made by either the exporting countries or subnational governments. Multiyear temporary duties were imposed to slow the flow of those imports.

The trade skirmishes of 2018 took focus on March 23 when President Trump announced 25 percent tariffs on all steel imports and 10 percent duties on all aluminum imports in response to the two Section 232 findings announced by the Department of Commerce in January. To enable bi-lateral negotiations of nation-specific import restrictions, the administration temporarily exempted imports from a number of nations until June 1.

In May 2018, President Trump requested a new Section 232 investigation into the competitive position of the U.S. automobile assembly and parts industries on national security grounds. The threatened remediation is a new 25 percent duty on imports of automobiles and car parts. The European Union, Japan, and China responded with promises of retaliation. Within the U.S., auto and truck assemblers worried about the possibility of tariffs because costs would be increased and international supply chains disrupted, thereby negatively affecting production in their U.S. plants. Three of the assemblers are headquartered in the United States (Ford, General Motors, and Tesla); others are headquartered in China and Sweden (Volvo), Europe (BMW, Daimler, Fiat Chrysler, and Volkswagen), Japan (Hino, Honda, Nissan, Subaru, and Toyota), and Korea (Hyundai and Kia). The Department of Commerce turned its findings over to the White House on February 17, 2019 and the President has 90 days, May 20, to announce his determination.15

On June 1, 2018, the 25 percent duty on imported steel was assessed on all producers from all nations with the exception of Argentina, Australia, Brazil, and South Korea. All but Australia agreed to specific quotas on exports of steel to the U.S. The 10 percent duty was

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**Table 1**

Duties Imposed, Announced, or Threatened by the Trump Administration and Retaliatory Tariffs Announced by Other Nations

<table>
<thead>
<tr>
<th>Acting Nation</th>
<th>Action</th>
<th>Target Nation</th>
<th>Value of Goods Covered $Billion</th>
<th>Item</th>
<th>Date of Announcement</th>
<th>Effective Date</th>
<th>Additional Duty Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>Imposed</td>
<td>Canada</td>
<td>1.00</td>
<td>Softwood lumber, Washing machines</td>
<td>December 28, 2017</td>
<td>January 3, 2018</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Imposed</td>
<td>All Trading Partners</td>
<td>9.20</td>
<td>Solar panels</td>
<td>January 21, 2018</td>
<td>January 22, 2018</td>
<td>30%</td>
</tr>
<tr>
<td></td>
<td>Imposed</td>
<td>All Trading Partners</td>
<td>33.50</td>
<td>Steel</td>
<td>January 21, 2018</td>
<td>January 22, 2018</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Imposed</td>
<td>All Trading Partners</td>
<td>17.30</td>
<td>Various products (Section 301)</td>
<td>January 21, 2018</td>
<td>January 22, 2018</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Imposed</td>
<td>China Round 1</td>
<td>34.00</td>
<td>Various products (Section 301)</td>
<td>March 1, 2018</td>
<td>June 1, 2018</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Imposed</td>
<td>China Round 2</td>
<td>16.00</td>
<td>Primarily industrial products (Section 301)</td>
<td>March 1, 2018</td>
<td>June 1, 2018</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Imposed</td>
<td>China Phase 3, Part 1</td>
<td>200.00</td>
<td>Various goods</td>
<td>September 17, 2018</td>
<td>August 23, 2018</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Threatened</td>
<td>China Phase 3, Part 2</td>
<td>200.00</td>
<td>Increase in duty rate on China imports</td>
<td>September 24, 2018</td>
<td>September 24, 2018</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>511.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Imposed</td>
<td>Turkey</td>
<td>267.00</td>
<td>Steel &amp; aluminum (doubled the June tariff rate)</td>
<td>August 24, 2018</td>
<td>August 23, 2018</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Threatened</td>
<td>China Round 4</td>
<td>not available</td>
<td>All remaining imports from China Automobile imports</td>
<td>August 24, 2018</td>
<td>September 24, 2018</td>
<td>25%</td>
</tr>
<tr>
<td>China</td>
<td>Retaliatory</td>
<td>United States Round 1</td>
<td>3.00</td>
<td>U.S. products (wine, nuts, etc.)</td>
<td>April 1, 2018</td>
<td>June 1, 2018</td>
<td>15% &amp; 25%</td>
</tr>
<tr>
<td></td>
<td>Retaliatory</td>
<td>United States Round 1</td>
<td>34.00</td>
<td>U.S. products</td>
<td>July 6, 2018</td>
<td>June 1, 2018</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Retaliatory</td>
<td>United States Round 1</td>
<td>16.00</td>
<td>U.S. products (autos, energy products, etc.)</td>
<td>August 8, 2018</td>
<td>August 23, 2018</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Retaliatory</td>
<td>United States Round 2</td>
<td>60.00</td>
<td>U.S. products</td>
<td>September 17, 2018</td>
<td>September 24, 2018</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>93.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Threatened</td>
<td>United States</td>
<td>60.00</td>
<td>$60 B of U.S. products</td>
<td>August 3, 2018</td>
<td>August 3, 2018</td>
<td>25%</td>
</tr>
<tr>
<td>Canada</td>
<td>Retaliatory</td>
<td>United States</td>
<td>12.50</td>
<td>Targeted U.S. products</td>
<td>May 31, 2018</td>
<td>May 1, 2018</td>
<td>13%</td>
</tr>
<tr>
<td>Mexico</td>
<td>Retaliatory</td>
<td>United States</td>
<td>not available</td>
<td>Targeted U.S. products</td>
<td>June 6, 2018</td>
<td>June 6, 2018</td>
<td>25%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>6.80</td>
<td>Targeted U.S. products</td>
<td>June 6, 2018</td>
<td>June 6, 2018</td>
<td>20%</td>
</tr>
<tr>
<td>European Union</td>
<td>Retaliatory</td>
<td>United States</td>
<td>3.20</td>
<td>Targeted U.S. products</td>
<td>June 1, 2018</td>
<td>June 22, 2018</td>
<td>10% to 50%</td>
</tr>
<tr>
<td>Turkey</td>
<td>Retaliatory</td>
<td>United States</td>
<td>1.80</td>
<td>U.S. products (coal &amp; coal products, auto, etc.)</td>
<td>June 21, 2018</td>
<td>June 21, 2018</td>
<td>5% to 40%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>3.60</td>
<td>Same as in June</td>
<td>August 15, 2018</td>
<td>August 15, 2018</td>
<td>20% to 120%</td>
</tr>
<tr>
<td>India</td>
<td>Retaliatory</td>
<td>United States</td>
<td>0.24</td>
<td>U.S. products (almonds, apples, etc.)</td>
<td>June 18, 2018</td>
<td>June 21, 2018</td>
<td>5% to 100%</td>
</tr>
<tr>
<td>Russia</td>
<td>Retaliatory</td>
<td>United States</td>
<td>0.09</td>
<td>Fiber optics, mining &amp; construction equip.</td>
<td>June 19, 2018</td>
<td>July 6, 2018</td>
<td>25% to 40%</td>
</tr>
</tbody>
</table>
levied on all aluminum imports with the exception of products coming from Argentina and Australia.\textsuperscript{16} Argentina agreed to quotas on exports of aluminum, while Australia garnered its exemption from the duties without agreeing to specific tonnage quotas.\textsuperscript{17} Steel duties on imports from Turkey were doubled to 50 percent and aluminum duties to 20 percent on August 10, 2018. The stated reason was the erosion in the value of the Turkish lira, but the announcement coincided with a dispute between Turkey and the United States over the imprisonment of an American pastor.\textsuperscript{18}

The U.S. trade actions led to retaliatory tariffs being imposed on a wide variety of exports to Canada, China, the European Union, India, Mexico, Russia, and Turkey. Japan advised the World Trade Organization in May that it reserved the right to retaliate.

On September 30, the U.S. and Canada reached agreement, with Mexico concurring, on replacing NAFTA with the USMCA. What could be the most important statement made about the USMCA came in a background press call placed late the night the pact was agreed to by the negotiating teams. A senior U.S. administration official revealed that “the new agreement will include provisions … that will become the template (emphasis added) for the new Trump administration playbook for future trade deals.”\textsuperscript{19} Many components to the template appear to be aimed at China, rather than at America’s neighboring trading partners. These are provisions designed “to combat unfair trade practices in a number of areas — currency manipulations; new disciplines on state-owned enterprises; as well as duty evasions, which will prevent free-riding from countries that do not trade with the U.S., Canada, and Mexico on free and open terms.”

Neither the steel nor the aluminum duties on U.S. imports from Canada and Mexico were removed when the USMCA was announced, and the countervailing tariffs on U.S. exports put in place by Canada and Mexico also remained. The negative impacts from these tariff increases will continue until new bilateral steel and aluminum agreements are reached, perhaps using the Argentinian, Brazilian, and South Korean quota provisions as models.

The USMCA contains a pair of “side letters” that protect motor vehicle and parts shipments from Canada and Mexico into the U.S. from additional duties as a result of the Section 232 (national security) investigation that was initiated in May. The side letters allow unlimited numbers of light trucks to be shipped into the United States duty free, and 2.6 million automobiles from each nation can enter under current duty schedules. The letters also allow Canada to ship up to $32.4 billion in the customs value of motor vehicle parts into the United States under existing tariff schedules, while Mexico is allowed to ship up to $108 billion.\textsuperscript{20,21}

Trade tensions between the United States and China moved into the forefront in the second half of 2018. China retaliated when the steel and aluminum duties were imposed in June. The U.S. singled out China for establishing countervailing duties with a second round of tariffs in August, a third in late September and a threatened fourth round followed. If the fourth round of U.S. duties on Chinese imports is enacted, the entire dollar volume of U.S. imports coming from China in 2017 would be covered by increased duties. The threatened duties also accelerated imports from China into the U.S. during the summer and fall as companies raced to beat the September duties and the prospect of steep hikes that were expected to take place as 2019 dawned. That prospect was postponed, until at least March 1, 2019, during a dinner held between China’s President Xi and President Trump at the G-20 Summit in Buenos Aires on December 1. Reports of active bilateral negotiations began surfacing in early January 2019.\textsuperscript{22}
3. The Economic Impact

There is little in the way of publicly accessible economic modeling that can shed direct light on the likely long-term impacts from this rapidly evolving set of trade actions at either the national or state levels. However, one way of understanding the potential impacts of the steel and aluminum tariffs is to draw lessons from steel duties imposed from 2002 to 2003 during the George W. Bush administration. That review is supplemented with four estimates from econometric models of the likely impacts of the Trump tariffs on the U.S. economy based on initial announcements by the U.S. and affected trading partners.

THE 2002-2003 STEEL TARIFFS

In 2003 the U.S. International Trade Commission conducted an econometric analysis of the Bush steel tariffs that were in place from March 2002 to December 2003, concluding that the result was a $41.6 million loss to the overall economy. When considering the impact just on industry, steel users, labor and consumers, the ITC model estimated that returns to capital would “fall by $294.3 million and the returns to labor, based on the net effects on all labor in the U.S. economy, fall by $386.0 million … but tariff revenues increase by $649.9 million. The offsetting impact of revenue gains from duties paid from income lost to labor and capital results in an estimated annual GDP loss of $30.4 million.”23 Swapping $680.3 million in lost income to domestic capital and labor for $649.9 million in import duties for a net $30 million loss in the national economic accounts does not help American workers or investors. What looks like a small $30 million to $42 million loss when using a macroeconomic accounting lens is really 23 times larger when the benefits and costs are restricted to workers and investors and not offset by revenue gains realized by the Treasury through duty payments. Especially when most of those payments are made by U.S. importers and passed along to their domestic customers with price increases.

The picture the ITC drew of the George W. Bush-era tariffs looks even worse when individual industries are examined. “The model estimates that earnings in industries where returns to capital fell, including steel-consuming industries, would decline by $601.2 million. … Industries that are particularly affected include motor vehicle parts and several steel fabrication industries (metal tank manufacturing, railroad rolling stock manufacturing, and power boiler and heat exchange manufacturing).24 In other words, the tariffs hurt the customers of domestic steel.

Gary Clyde Hufbauer and Ben Goodrich of the Peterson Institute for International Economics also examined the impacts of the 2002-2003 tariffs, concluding that “President Bush's decision to protect the US steel industry with Section 201 tariffs had no economic justification. Before relief was granted …. tariffs would cost over $400,000 annually per job saved in the steel industry. Moreover, they would result in net job losses in the economy due to downstream layoffs, which is why most of President Bush's economic advisers
expressed their opposition.” President Bush’s Deputy Chief of Staff Josh Bolton came to a similar conclusion when interviewed by the Washington Post in March 2018 about the Trump tariffs: “Whether the original thing (the 2002-2003 Bush tariffs) was a mistake or not, and there’s a good argument that it was in 2002, there’s no question doing the same thing under 232 [today] is a mistake of a much bigger magnitude. … This is a bad idea overall for the whole economy.”

FOUR ECONOMETRIC MODELS PROJECT THE IMPACT OF TRADE SANCTIONS ON THE U.S.

MOODY’S ANALYTICS

In April 2018, Moody’s Analytics Chief Economist Mark Zandi released a summary of four scenarios of trade actions of varying intensities that could result from U.S. steel and aluminum tariffs. Moody’s Analytics’ econometric model is well-suited for estimating trade effects because it draws on data from 64 nations. Events have passed by the two more benign scenarios Zandi presented in April. Unless negotiations reverse course, the outcomes are more likely to be consistent with the scenarios Zandi termed “trade skirmish” and “trade war.”

The trade skirmish scenario includes the steel and aluminum tariffs and an additional $150 billion in global imports being hit with countervailing duties. As of September 24, 2018, a total of $311 billion in U.S. imports were exposed to retaliatory tariffs ranging from 10 percent to 50 percent, with the bulk being assessed new duties of 25 percent. The expected result of Zandi’s trade skirmish scenario is a reduction in U.S. real GDP by 1 percent from the baseline estimate, accompanied by the loss of 1.6 million jobs.

Zandi’s “Global Trade War” scenario included a breakdown in NAFTA and a devaluation of the yuan, followed by a string of devaluations by other nations to maintain their currency parity with China. A full-on trade war would push the U.S. into a recession during the first half of 2019, with real GDP dropping by 2.5 percent accompanied by job losses totaling 3.5 million. This scenario appears to have been averted due to agreement on the USMCA by the executives of the three participating nations and negotiations with China were ongoing as this brief was being finalized in late February.

Zandi and his team released an update to their trade war estimates in July reflecting global retaliation to the steel and aluminum tariffs but not including the additional rounds of trade actions taken against China. Zandi produced three scenarios and assigned probabilities of each:

- **“Expected Tariff Scenario”** is limited to the steel and aluminum tariffs and the mid-summer retaliation listed in Table 1 and is subjectively assigned a 60 percent probability of occurring. About $300 billion in imports into the U.S. and $100 billion in U.S. exports are affected. In July the Moody’s team expected that a total of $100 million in U.S. exports and imports would face higher duties. The model projected modest negative impacts of a drop in GDP of 0.1 percentage point and a loss of 170,000 jobs through the end of 2020. This scenario could be considered a trade skirmish and is actually where the conflict stood until the September 24 round of tariffs between the United States and China were initiated. In other words, events have bypassed this scenario.

- **“Threatened Tariff Scenario”** is becoming more likely but requires two major expansions from where things stood in late September. First, the United States would have to act on its threat to impose a fourth round of sanctions covering nearly all imports from China. Then the United States would have to impose 25 percent tariffs on all imports of motor vehicles and related parts and be met with countervailing duties. The model projected a modest negative impact of a drop in GDP of 0.1 percentage point and a loss of 170,000 jobs through the end of 2020. This scenario could be considered a trade war and is actually where the conflict stood until the September 24 round of tariffs between the United States and China were initiated. In other words, events have bypassed this scenario.
impact in the third quarter of 2019. The damage would be felt most deeply by agricultural and manufacturing businesses and the regions that house them. Zandi and his team gave this scenario a 30 percent probability of occurring. The side letters in the USMCA discussed earlier on motor vehicle and parts imports from Canada and Mexico should contain the economic damage from tariffs on the automotive industry. Instead, the focus has shifted to China and Europe.

**“Trade Conflagration”** is the term Zandi gives to the third scenario, which he puts at a 10 percent chance of occurring. The scenario is based on a meltdown of the global trading system triggering a recession in the United States. This scenario is built around a 25 percent tariff assessed by both the U.S. and China on all goods traded between them, coupled with Chinese administrative measures designed to slow down incoming trade and investment. Projected outcomes from such actions are that the U.S. economy experiences a recession in the third and fourth quarters of 2019, coupled with a global economic slowdown. The scenario does not include a breakdown of NAFTA.

If the round of U.S. tariffs that we label China Round 4 in Table 1 are enacted on March 1, 2019 or after, a bilateral increase in duties from 10 percent to 25 percent would occur. If auto and truck imports and parts begin to carry an additional 25 percent tariff from a Section 232 action, then the conditions for the trade conflagration scenario would be mostly met. The result would be a recession that begins in the third or fourth quarter of 2019, bottoms out in the third quarter of 2020, and continues through 2020. [The Moody report gives earlier dates than we are using in this briefing paper. We moved the dates back by two quarters to reflect the change in the target date in the next round of trade tariff expansions from mid-summer 2018 in the Moody’s document to May or June 2019.] Specifically:

- **GDP** is expected to decline by 1.8 percentage points in the third or fourth quarter of 2020.
- **Job losses** would peak at 2.6 million and stay above 2 million through 2020 and into 2021.
- **The unemployment rate** would increase by 1 percentage point above the baseline forecast in between the first quarter of 2020 and the second quarter of that year. It would take more than a year to fully recover from the recession.

The Moody’s Analytics team stated that the impacts would be concentrated in states that specialize in automobile and aircraft assembly and parts production. Zandi specifically mentioned Michigan, Ohio, and Tennessee for autos and Washington and Kansas for aircraft.

**OXFORD ECONOMICS**

Oxford Economics released state-by-state estimates of the impact of a trade war through the fourth quarter of 2018. Although the report was released only to the company’s clients, the Wall Street Journal’s Daily Shot reprinted its summary map on September 20.⁹ The results reproduced by the Daily Shot reinforces the estimates produced by Moody’s Analytics. The 10 states expected to experience the largest decreases in GDP growth rates are:

- South Carolina  -1.2%
- Louisiana     -1.1%
- Indiana       -1.1%
- Michigan      -1.1%
- Oregon        -1.1%
- Wisconsin     -1.1%
- Kentucky      -1.0%
- Minnesota     -1.0%
- Ohio          -1.0%
- Tennessee     -1.0%

**TAX FOUNDATION**

The Tax Foundation provided estimates of the impacts of trade strife on U.S. economic growth using its Taxes and Growth Model.³⁰ The Tax Foundation first released its results in late June and updates the results periodically as information improves and new
rounds of tariffs are implemented either by the U.S. on imports or by other nations on U.S. exports. The model estimates the long-term growth rates of both GDP and wages and the net change in full-time equivalent jobs over a 10-year forecast window.

The Tax Foundation’s September 19 estimate anticipated the U.S. and Chinese trade actions that took place on September 24 and actions that may occur on or after March 1, 2019. These include the September 24 tariffs of 10 percent on $200 billion in Chinese imports, increasing to 25 percent on March 1, and President Trump’s threatened duty on the remaining $267 billion in Chinese imports. The Tax Foundation’s estimates do not appear to include a Section 232 action on global automotive and parts imports.

The combined long-term impact of the trade actions taken by the United States on imports and actions taken by other nations on U.S. exports is projected to result in a decrease in the GDP growth rate of 0.59 percent, a decline in the long-run growth in real wages of 0.38 percent, and a loss of nearly 460,000 full-time equivalent jobs. To put this in perspective, the Tax Foundation states that the trade skirmish would offset one-third of the estimated long-run stimulative impact of the Trump tax cuts.

**PENN-WHARTON BUDGET MODEL**

The Penn-Wharton Budget Model released estimates of the economic costs of a trade war in March 2018, soon after the president’s steel and aluminum tariffs were announced, focusing on the U.S. deficit and accumulated debt. The estimates stretch out to 2027 and 2040 and contain two scenarios. (The long end dates of the model reflect when the modeling team asserted that the U.S. could possibly get its chronic deficits under control.) In the first scenario, the U.S. economy effectively closes as a byproduct of the trade dispute, meaning the U.S. Treasury is forced to sell its debt only at home instead of accessing world capital markets. The alternative is maintaining access to global capital markets in the absence of the trade dispute. This is termed the “open” markets scenario.

Closing off access to non-U.S. purchasers of Treasury issues would reduce private-sector capital investment in the U.S. because federal fiscal spending would need to be cut and domestic savings diverted from funding investments to financing the national debt. Preserving U.S. access to foreign savers would allow for international capital inflows to finance the debt and additional deficits, thereby freeing domestic capital to support domestic investment and federal spending. Capital market backwash effects from a trade war are an important component to understanding potential economic outcomes from closing off the Treasury Bill market to non-U.S. residents, businesses, sovereign wealth funds, and governments. However, they are so complicated and opaque that they are often not considered.

The Penn-Wharton Model forecasts that closing the international capital market to U.S. debt sales would reduce GDP by 0.9 percent in 2027 and by 5.3 percent in 2040 and reduce wages by 1.1 percent in 2027 and 4.8 percent in 2040. On the other hand, opening capital markets to finance U.S. deficits would increase GDP in a range from 0.2 percent to 0.7 percent in 2027 and from 1.3 percent to 4.0 percent in 2040, with wages growing in a range from 0.3 percent to 0.8 percent in 2027 and from 1.2 percent to 3.6 percent in 2040. The opportunity cost of engaging in a trade war that stops the flow of offshore savings into the U.S., compared to maintaining open capital markets, ranges from an adverse change in potential GDP in 2027 of 1.1 percent to 1.6 percent and a negative effect on wages of 1.4 percent to 1.9 percent. In 2040, the opportunity cost of a trade war on potential GDP ranges from -6.6 percent to -9.3 percent, with the loss in potential wages ranging from -6.0 percent to -8.4 percent.
Several observations drawn from these models regarding how the U.S. economy is functioning in the face of trade frictions have implications for both workers and employers. The first is that the stimulus that came from deficits associated with the December 2017 Trump tax cuts have, as expected, boosted the economy in 2018 and will continue to do so through early 2019. This is consistent with forecasts made by the Congressional Budget Office and the International Monetary Fund at the time the tax bill was passed. The stimulus appears to be offsetting economic losses from retaliatory trade sanctions and increased prices on domestic products from imposed duties. If, however, the trade conflict escalates from a skirmish to war—with the steel and aluminum actions and counteractions still in place and the initiation of a global Section 232 trade protection on motor vehicles and parts imports, with the exception of Canada and Mexico—then the U.S. will experience, at best, diminished growth in 2019 and possibly a recession beginning in mid-2019 and extending through 2020.

If the trade conflict stays at the levels experienced in late September, the economy should begin to slow in the first quarter of 2019, as stimulus from federal budget deficits associated with the tax cuts slackens and the drag from (1) tariffs increasing prices on consumer goods, (2) lost farm incomes taking hold triggering regional recessions, and (3) price increases in steel and aluminum beginning to negatively affect production in the manufacturing and construction industries. At that point, GDP growth is likely to decline in a range from 0.5 to 1.0 percentage points from the baseline growth estimates, with the decline concentrated in farm and manufacturing states and regions. Job growth will slow, and by the third quarter of 2019, between 450,000 and 700,000 full-time equivalent jobs will be lost.

If the trade war intensifies, with U.S. tariffs on imports coming from China increasing to 25 percent on, or after, March 1 and an additional 25 percent tariff hits automobiles, trucks and parts from outside North America, a recession is likely to start in mid-2019 and last through 2020. GDP growth would decline by nearly 2 percentage points from baseline forecasts in the first quarter of 2020; full-time equivalent job losses above the baseline forecast would cross the million mark before year-end 2019 and go above 2 million between the first and second quarters of 2020, staying above 1.5 million throughout 2020 and into 2021.

Another insight from the models is that a global trade war with restrictions placed on capital flows from nations with high savings rates would weaken U.S. production capabilities, raise interest rates to draw in capital to fund the federal debt and crowd out domestic investment. These outcomes would prolong a recession and lower long-term growth in the production possibility frontier.
4. Trade Protection and the U.S. Steel and Aluminum Industries

If the tariffs perform as we expect, higher prices for U.S. steel and aluminum are likely to be coupled with limited growth in production, as domestic mills gain market share and sales increase even in the face of declining overall demand. Employment gains in these two newly sheltered industries will be slow and modest because mills will likely use overtime to satisfy near-term increases in demand. New or expanded production capacity will take longer to bring online, and companies will hedge their bets on expansion as they wait to see if a recession is on the horizon and if the new tariff wall will stay up to protect their investments. Recent investment announcements across the steel industry give credence to this expected sequence of events.

**NEW MILLS, EXPANDED MILLS, AND REOPENED MILLS**

In July, Bloomberg Law counted more than 20 steel and aluminum plants that “intend to boost production and will return more than 7,000 jobs.” In this section, we review announcements on plant openings or reopenings. The purpose is to examine the timing of the announcements to determine if they were triggered by the tariff announcements, if the announcements were more likely attributable to market forces, or if it was a combination of the two sets of events.

**SMART STEEL VERSUS LEGACY STEEL: BIG RIVER STEEL AND U.S. STEEL**

The largest recent investment made in new steel production capacity was made by the steel-making startup company Big River Steel. Big River fashions itself to be a “technology company that happens to make steel.” The company located its “Flex Mill” (a trademarked name it gave to its technology) near the Mississippi River in the Arkansas Delta town of Osceola. Big River is termed a mini-mill because it uses steel scrap as its raw material and melts the scrap in an electric arc furnace (EAF), but there is nothing mini about the mill nor its $1.3 billion initial investment. The state-of-the-art EAF, metallurgy furnace, and degasser linked to continuous casters and pickling and annealing lines, all of which “talk” to each other, combine aspects of a mini-mill and an integrated steel mill. Big River is also working on adding an integrated coating line to its operations. The result is flat, hot rolled, sheet that competes with the highest-grade steel produced by traditional integrated steel mills for the automotive, appliance, energy (pipe), and other markets where the weight, strength, and finish of the metal is all-important. The project was proposed in 2013, Big River partnered with its German technology vendor, SMS Siemag, in July 2014, and opened in January 2017 with 541 jobs. In June 2018, Big River announced that it was undertaking a $1.2 billion expansion in Osceola. When the expansion opens in 2020, another 500 people will be hired, and production will more than double.

Osceola was chosen because of competitive energy costs, including natural gas, sufficient supplies of steel scrap, and water access for both deliveries of scrap from the Mississippi basin and shipments of steel to the Gulf of Mexico and to Southeastern oil and
gas producers and motor vehicle assembly plants. The company is signed an option for a $1.6 billion mill in Brownsville Texas that would be similar in size to the Osceola expansion.36

There are three observations about Big River Steel’s investment and its connection to the current trade conflict. The first is that the investments were made well before tariffs were considered and were carried out through the downturn experienced by the steel industry in 2015. The second is that Big River is deploying steel-making technologies that it and its technology provider SMS consider to be disruptive in terms of production efficiency and cost. John Tumazos wrote in an investment research note quoted by American Metal Market that Big River Steel might “be worth more when Section 232 quotas and tariffs—which have encouraged idled US steelmaking capacity to restart—are no longer in effect.” Big River has a “larger competitive advantage in bad markets, where competitors fail and its superior profitability would be more unique.”37 In other words, Big River’s technology is a greater threat to legacy steelmakers than metal imports because they are able to deploy and integrate highly efficient steelmaking operation technologies. Third, the pricing shelter afforded by the tariffs represents windfall profits to companies like Big River.

U.S. Steel made three announcements about its post-tariff investments in existing plants. The most visible is its Granite City, Illinois, plant, which has two blast furnaces. This steelmaking complex made tubular products for the oil and gas industry but shut down during the 2015 near-recession, which is discussed in a later section of this report. The company reopened one blast furnace in June 2018 and the second in October. A leader of the plant’s United Steelworkers union told the St Louis Post-Dispatch that “I’m sure the tariffs are helping” and “I’m sure the oil is helping.”38 In August, U.S. Steel announced an investment of $750 million in its Gary Works in Indiana to increase efficiencies. That investment represents 37 percent of the company’s $2 billion “asset revitalization” program. U.S. Steel CEO David Burritt credited the tariffs as being critical to justifying the investment program.39 And, on February 5, 2019, U.S. Steel announced the restart of its electric-weld pipe mill at the Lone Star, Texas, tubular (pipe) plant to service drilling activity in the Permian Basin in West Texas. This plant was shuttered in 2016 due to low drilling activity. Products from both the Granite City and Lone Star mills are dependent on demand from oil and natural gas drilling and production. In these three cases, U.S. Steel is reviving legacy steelmaking technologies and are likely to be the high-cost producer after tariff protection is removed or when oil drilling slows.

U.S. Steel’s investment decisions point out the dilemma that all legacy mills confront. New integrated EAF technologies allow new steel mills to encroach on markets that were dominated by the legacy integrated mills. The new mills are located in growing markets in the South and Southeast, giving them a shipping cost advantage over legacy mills in the Midwest. And, the new mills are also significantly more productive, both in terms of person-hours per ton and cost per ton. Highly integrated smart mills are the long-term threat to older steelmaking technologies, both integrated mills and mini-mills.

STEEL MILL EXPANSIONS IN OHIO

The expansions of two Ohio steel plants are either completed or nearing completion (Charter Steel in Cuyahoga Heights and Nucor in Marion). Republic Steel announced restart of its 9- and 10-inch rolling mill at some point during the second quarter of 2019. Global steel company JSW has recapitalized a historic EAF plant located south of Steubenville in Mingo Junction that closed in 2009. South Africa’s Petmin received air quality permits and awaits water pollution control permits before it begins construction of a $474 million nodular pig iron plant in the port of Ashtabula. Petmin USA expects the plant to open sometime in 2021. Bluescope's Delta plant outside of Toledo announced that it is undertaking a market study to see if demand justifies investing in expansion. Were these investments and announcements triggered by the steel tariffs? Examining the timing of the projects provides answers.
On January 31, 2017, Charter Steel initially announced that it would open a $153 million bar mill in Cuyahoga Heights adjacent to its existing mini-mill and coil operation. Cuyahoga County and the state of Ohio released a $74.8 million package of publicly supported loans in May 2017. In November 2018, construction was under way, and Charter expects the expansion to open in March 2019. The mill is expected to add 25 jobs to 385 existing positions. The investment activity began a year before the tariffs were publicly considered.

Nucor in Marion announced an $85 million investment in its existing rolling mill in April 2017, with the expectation of adding 15 jobs to the 265 existing jobs in its bar mill. The announcement was made a month after the Trump administration announced the Section 232 trade investigations of the steel and aluminum industries, three-quarters of a year before tariffs were publicly discussed by the president, and 11 months before the duties were announced in March 2018.

In the fall of 2018, Republic Steel hired “over 60 workers” and ran production trials in its refurbished 9- to 10-inch wire-making rolling mill that was shuttered in March 2016. In a January 22, 2019, press release, Republic said that it expected to receive enough production orders to justify restarting the Lorain, Ohio, mill during the second quarter of 2019.

Earlier in 2018, Republic discussed restarting the Lorain plant’s electric arc furnace in an email the company sent to Cleveland TV station WKYC. Republic’s Executive Vice President Ted Thielens wrote: “Future stages of increased production and employment at Lorain including the restart of EAF [Electric Arc Furnace] steel making will depend on the final outcome of how Section 232 is implemented, and the resulting impact of increased demand for domestic steel production.” This potential opening was not part of the January 22, 2019, press release.

Republic entered into a joint venture with ERP Iron Ore LLC in July 2017 to investigate restarting one of Lorain’s blast furnaces to make pig iron to sell to foundries and steelmaking electric arc furnaces. This was reconfirmed in a February 2018 press release stating that Lorain Pig Iron LLC (LPI) engaged technical service providers to “review and submit proposals for recommissioning” Republic’s Blast Furnace 4 and that LPI was negotiating agreements with Republic, among others, to allow the furnace to be recommissioned. In the same release, LPI announced that it was starting to evaluate Blast Furnace 3 at the Lorain facility for recommissioning. Each furnace is capable of producing 1 million tons of pig iron a year. These furnaces had not reopened as we completed writing this policy briefing.

In July 2018, Republic held a job fair to hire 50 workers and add a shift at its Canton melt shop after a $6 million investment to add to the 25 workers it had hired earlier in the year. JSW, India’s largest steelmaker, has been working since at least December 2016 to put financing in place for a $250 million investment to refurbish and reopen what was once Wheeling-Pittsburgh Steel’s largest steelmaking facility. The project received an electricity discount in May 2018 and tax credits from the state of Ohio on September 24, 2018. A December 13, 2018, article in the Wheeling Intelligencer reported that the caster in the 80-inch rolling mill was being started. JSW selected the site because of its access to low-cost natural gas, the available supply of scrap steel, and the condition of the existing capital equipment.

In mid-August 2018, Australia’s BlueScope Steel announced that it was undertaking a feasibility study for a $700 million expansion of its Northwest Ohio North Star mini-mill.

South Africa-headquartered Petmin began searching for a site to produce nodular pig iron, which is sold to metal-casting foundries, in 2011. The search focused on the Great Lakes because of the location of customers (the North American foundry industry is clustered around the Great Lakes), access to both North American and European customers by water
transportation, and the availability of iron ore pellets that can be shipped directly to the plant by lake freighter. The pig iron from the Petmin plant will compete with product that is currently imported from Brazil, Russia, and Ukraine.

Bradley Doig, Petmin’s CEO, told reporters that 11 sites along the Great Lakes were investigated. A spokesperson for the company building a natural gas pipeline into Ashtabula that will serve the mill indicated that the “project was going to Quebec, Canada,” until the natural gas pipeline was commissioned. The availability of natural gas changed the locational calculus. Doig indicated to the Ashtabula Star Beacon that the Pinney Dock in that city was selected because of the ability to directly off-load iron ore pellets into the plant, industrial scale natural gas service, oxygen and nitrogen supplies, rail and interstate highway access, lake water for cooling operations, and sufficient wastewater treatment capacity. Doig also stated that the site provided “crucial embedded overall logistics advantage given its proximity to key markets.” The company began to design the facility in September 2018, expecting to finish the design work in June 2019, with construction starting soon afterward. The company expects to begin commercial operation in the second or third quarter of 2021, employing 100 people.

These projects have different probabilities of opening or staying open, depending on a determination of long-term market conditions before millions of dollars are invested in plant and equipment. For example, Republic Steel said it has been “preparing its plants [in Canton, Ohio, Lackawanna, New York, and Lorain, Ohio] by investing $12 million over the last 18 months to supply increased market demand.” JSW selected its Mingo Junction investment based on raw material availability and the condition of the furnace in the mill long before import duties became a possibility. Petmin began its search for a site in 2011 and chose Ashtabula due to the location of potential customers, the availability of raw materials, and the ability to use water transportation to directly ship and unload iron ore at its plant. And BlueScope’s Delta, Ohio, mill is just starting to investigate the market. To summarize, the lead times and expenses associated with building or refurbishing plant and equipment require market justification.

INCREASED UNCERTAINTY, PRODUCTION COSTS, AND PRICES

There is a flip side to trade protection, and that is the cost borne by metal users and their customers. Ford Motor Company’s comments related to its earnings are instructive. The costs of new tariffs are spread all over Ford’s best-selling—and most profitable—product, the F150 pickup truck, which marries an aluminum bed to a steel frame. The cost of increased steel and aluminum prices compounds as metal moves up the supply chain in the form of parts and subassemblies. In late September, Ford CEO Jim Hackett told Bloomberg that the “metals tariffs took about $1 billion in profit from us” … and … “If it goes on longer, there will be more damage.” And it is more than the metal. Parts from China have been the subject of additional 10 percent tariffs as part of retaliatory duty schedules described earlier and an increase to 25 percent is in the offing. Similar comments were made later in the fall and at year’s end by Apple, General Motors, Fiat Chrysler, Caterpillar, and many others.
The impact on steel and aluminum users is anecdotal as we write this brief because not enough time has passed for businesses to adjust their prices and suppliers and for changes to show up in the data. The impact of the steel and aluminum tariffs on increased costs, investments, and sourcing was muted during the summer but picked up with increasing intensity through the fall.

The “Beige Book” is released by the Board of Governors of the Federal Reserve System approximately every other month.⁵⁷ The book presents information collected in interviews conducted in each of the system’s 12 districts on current and expected business conditions. The January 2019 book reported that “many Districts reported that contacts had become less optimistic in response to increased financial market volatility, rising short-term interest rates, falling energy prices, and elevated trade and political uncertainty. … Most Districts indicated that firms’ input costs had risen, but reports were mixed on whether they could pass the higher costs on to customers. Reports often cited rising materials and freight prices as sources of cost increases, and a number of Districts said that higher tariffs were also a factor.”⁵⁸ In the December book, 11 of the 12 Districts mentioned trade and tariffs negatively. This is a major change from reports made in the summer and early fall.

**THE DIRECT IMPACT OF TARIFFS ON THE STEEL AND ALUMINUM INDUSTRIES**

Domestic metals-producing companies will react to tariffs designed to protect them in messy, but predictable, ways as markets adjust, but the changes will not occur in lockstep. Prices on spot markets for commodities, such as steel and aluminum, react quickly to changes in supply and demand conditions and increase quickly as supplies are auctioned off. Changes in domestic supply will follow price increases as U.S. producers first work to produce more on current shifts, then extend shifts with overtime, causing capacity utilization rates to rise. After exhausting those possibilities, companies will add new shifts and employment in existing facilities. As supply is added, prices will come down but should stay above pre-tariff levels. If firms determine that increased demand for their product is sustainable, then they will consider investing in new and expanded facilities, with an accompanying increase in jobs. They will not invest based on a transitory, politically generated, positive bump in their sales books unless they think they have the political power to make the new duties stay in place.

**PRICES**

Figure 1 plots the producer price index (PPI) for both iron and steel mills and alumina and aluminum production and processing from June 2009, the end of the Great Recession, until December 2018. The version of the PPI graphed in Figure 1 reflects prices charged for steel and aluminum coming from U.S. mills. The basis for the index was the PPI in June 2009, setting it equal to 100. The points on the graph in Figure 1 should be read as the percentage point difference from the June 2009 producer prices, after subtracting 100. Figure 2 plots the price index for four steel commodities from the end of the Great Recession through August 2018. These reflect prices in the U.S. market and are agnostic as to the source of the metal, meaning they can be either manufactured domestically or be foreign-sourced.
Steel prices have increased by 43 percent since the Great Recession ended, and the price index for aluminum has grown by about 27 percent over that same period. There were two periods of price growth. The first was from January 2009 until May 2011. This coincides with recovery from the Great Recession, triggered by the stimulus coupled with the rescue of the financial services and motor vehicle industries. Then, as supply and demand became more balanced, prices fell through February 2016. Since the winter of 2016, steel prices were on a steady upward march through August 2018. The PPI for aluminum has been declining since May 2018.
What do these figures reveal about price increases around the tariff events? Prices were in a market-driven recovery beginning in the spring of 2016, with steel prices increasing by 40.0 percent and aluminum prices by 22.6 percent from March 2016 to August 2018. Anticipation of the tariffs appear to have added fuel to the price rise. Steel prices increased 2.1 percent in February 2018, 2.9 percent in April, and 2.1 percent in May. The tariffs were imposed June 1, and the rate of increase in the steel PPI actually moderated from July through October. In other words, prices began to move before the possibility of the U.S. imposing steel tariffs was announced in March. The tariff announcement accelerated a pricing trajectory that was well-established.

**THE UNITED STATES: A HIGH PRICE ISLAND IN A GLOBAL SEA OF STEEL**

Figure 3 demonstrates that the United States was a high price island in world steel markets before the fall of 2017, and since then the price gap has widened. While market forces have reduced the cost of steel in the U.S. from the highs of mid-summer 2018, prices have also
been going down in China, reflecting that country’s economic slowdown.⁵⁹ As of January 28, 2019, the cost of a metric tonne of hot rolled band steel in the U.S. is 64 percent higher than its cost in China ($764 compared to $467) and 39 percent higher than in Western Europe ($764 versus $548). While the price of a tonne has been declining in all three markets, differences in the factory-gate prices among U.S., Chinese, and European product remain extremely large.

SteelBenchmarker releases average mill prices for specific types of steel twice a month. These averages are derived from purchases made by midsized buyers from steel mills located east of the Mississippi in the U.S., in China, and from producers in France and Germany—referred to as Western Europe in the company’s reports. All of the reported prices are averages of recent purchases and do not include the cost of delivery. At times this is referred to as either factory gate pricing or FOB pricing. FOB means Free On Board and is a dated freight term for the cost of an item excluding delivery cost. SteelBenchmarker releases data for five types of steel: hot rolled band, cold rolled coil, plate, rebar, and shredded scrap. The data are most complete for hot rolled band and are presented in Figure 3. The data are also the basis for

Figure 3
Factory-gate Prices of a Metric Tonne of Hot Rolled Band Steel Purchased from U.S., Chinese, and Western European (French and German) Mills,
From the End of the Great Recession: July 13, 2009 to January 28, 2019

the calculations graphed in Figures 4 and 5. Figure 3 presents the average dollar mill price for a metric tonne of hot rolled band steel produced in the Eastern United States (drawn with the solid line), Western Europe (dashed line), and China (dotted line). The data in the figure begin on July 13, 2009, marking the start of recovery from the Great Recession, and end on January 28, 2019.

While U.S. steel prices have been the most expensive of the three markets tracked by SteelBenchmarker since the recovery from the Great Recession began, a disruption in the pricing relationships among the three geographic markets occurred in November 2016. Until that date, Western Europe’s prices closely followed U.S. prices, indicating that the markets responded similarly to supply and demand pressures. After that date, U.S. prices began to accelerate and decoupled from Europe. Although many will focus on the date of this decoupling and associate it with the presidential election and then-candidate Trump’s strong support for protectionist policies for the U.S. steel and aluminum industries, an economic event occurred that offers a better explanation for the acceleration in U.S. steel prices. A slowdown in the economies of the U.S. and China in 2015 and 2016 was accompanied by regional recessions in the United States. This slowdown will be discussed later in this brief. The acceleration in U.S. steel prices from November 2016 to April 2017 is associated with the rebound from that near-recession. Europe did not experience the same demand-side boost in its economy as did the United States. The jump in domestic prices from January to July 2018 may have been triggered by the anticipation of increased duties on imported steel products or it reflects the continued strength of the U.S. economy.

Steel is a commodity and, as such, its price changes quickly in response to supply and demand conditions. This has been true in the 10 years since the Great Recession. Changes in the cost of a metric tonne of hot rolled band steel over the past decade are discussed below.

- Domestic steel prices moved in sync with the recovery from July 2009 through March and April 2011, when steel supply started to catch up with renewed demand from the automobile assembly and construction industries. Prices peaked in March and April 2011 at $970 a metric tonne.
- Prices declined steadily in all three geographic markets from spring of 2011 to spring of 2013 as steelmaking capacity came online and international trade restarted.
- Price declines accelerated in November 2014 as a subtle macroeconomic slowdown affected U.S. agricultural and durable goods producers and their regional economies and continued for a bit more than a year.
- The macroeconomic recovery in China and the U.S. boosted steel prices in all three geographic markets starting in the winter of 2016, with the recovery in the U.S. market being the most robust. The price of hot rolled band steel reached $697 a metric tonne in June 2016.
- U.S. prices began another round of acceleration in late November 2017, as Chinese steel prices stagnated.

- The recent near-vertical portion of the U.S. price line in Figure 3 began in January 2018, which is when President Trump publicly signaled support for establishing new steel and aluminum tariffs.
- New duties on steel and aluminum were announced on March 1, 2018, but were suspended until June 1 to allow for bilateral negotiations mentioned earlier in this briefing paper.
- The price of hot rolled band steel increased by 6.7% at the end of the March 12 pricing period, reaching an average of $894 a metric tonne.
- Twenty-five percent duties were enforced on steel effective June 1, and the prices continued to power upward, peaking at $1,006 on July 9.
The January 28, 2019, SteelBenchmarker survey for hot rolled band showed the U.S. price per metric tonne was $764, while the price was $461 in China and $548 in Western Europe.

Figure 4 contains a plot of the ratio of the cost of a metric tonne of U.S.-produced hot rolled band steel to Chinese-manufactured hot rolled band, depicted with the solid line, and between U.S. and European hot rolled band, drawn with a dotted line. The ratios are calculated as the U.S. price divided by either the average mill price from China or Europe. A heavy solid line is drawn across the figure where the ratio value would be 1.00, which would occur if the factory-gate price per metric tonne were the same in the two markets. When the line is above 1.00, U.S. steel is more expensive than Chinese or European steel. (U.S. steel prices are only lower than Europe's from July to late November 2010.) Figure 3 shows that the price of domestically produced hot rolled band has declined since its July peak, as is also true in China.
and in Western Europe. However, the gap in prices demonstrated by the ratios shown in Figure 4 not only remains extremely large, but the ratio of the U.S. and Chinese prices increased through November.

Figure 5 is drawn to show the influence that the U.S. import duties have on the price differential between U.S.-produced steel and steel produced in China and Western Europe and consumed in the U.S., holding shipping and transportation costs constant. In this figure, the average factory-gate, or FOB, price of Chinese- and Western European-produced hot rolled strip steel purchased starting on June 1 is multiplied by 125 percent to reflect the new duty. This number is then subtracted from the U.S. average sales price to measure the effectiveness in narrowing the FOB price of steel to a U.S. steel consumer. The dashed lines in the figure, dark for the difference in U.S. and Chinese prices and lighter for U.S. and Western European differences, plot the adjusted price differences.

The imposition of duties narrowed the price advantage of Chinese and Western European steel compared with
U.S. steel in the first half of the year. This is, after all, the purpose of a tariff. Even after duties are assessed, the gap remains substantial and reflects the pre-tariff price hikes that occurred in the first half of the year in the United States. A metric tonne of U.S.-produced steel was $413 to $421 higher than Chinese steel in April and May. After tariffs were imposed, the cost differential decreased dramatically. In late January, the FOB price difference, including duty payment, on a metric tonne of hot rolled band in the U.S. and China was $180, while the difference between U.S.- and Western European-sourced steel was $79 a metric tonne.

The clearest way to present the impact of the imposition of tariffs on domestic steel users is to examine the difference in the average cost of U.S.- and Chinese-produced hot rolled band steel:

- In 2016, when the economy was recovering from the near-recession and there was little to no discussion of impending steel tariffs, the average difference in the factory-gate prices of U.S.- and Chinese-produced steel was $236 a metric tonne.
- The price difference between U.S. and China FOB steel prices started to narrow in April 2017 when it was $333 a metric tonne through October when it hit bottom at $128. The price of hot rolled band began its climb in December 2017 and lasted through May, 2018.
  - From January through May 2018, as the idea of tariffs was presented by the administration, the difference jumped to $332 a metric tonne.
  - From June to November 2018, after the new tariff was imposed, the adjusted differential (the mill price difference less the new duty) was $306 a metric tonne, with an additional average duty payment of $131 a metric tonne.

The U.S. remained a high price steel island in SteelBenchmarker's report through the end of 2018 and into the new year. The FOB cost of a coil of hot rolled band steel in China was 60 percent of the price of one in the U.S.; freight and duty are extra. And the price in Western Europe was 74 percent of the U.S. FOB cost. Transportation costs justify slightly higher prices on the U.S. steel island, but a price that is 1.64 times the China price and 1.39 times the cost in Western Europe needs either government assistance or oligopolistic collusion to be sustained.

**PRODUCTION**

Monthly production indexes (PI) for raw steel manufacturing and aluminum and alumina from January 1972 through December 2018 are plotted in Figure 6, with periods of economic recessions marked by a series of boxes on the graph. The production data are benchmarked to 2012’s average monthly output, meaning that, if the index is above 100, production that month was above the average monthly output in 2012.

The historical data demonstrate that major losses in production volumes coincided with the 1973 to 1975 and 1980 to 1982 recessions and that, since the late 1980s, production has remained near 2012 levels except for during cyclical movements. For most months from the late 1980s on, the steel index fluctuated between 80 and 110.

Monthly raw steel and aluminum production since mid-2009, as the nation began to recover from the Great Recession, is presented in Figure 7. Production recovered quickly in late 2009 through 2010. The stimulus and recovering private demand for metal had a positive impact on steel demand, resulting in levels of production in 2011 and 2012 that had not existed since the late 1990s. Steel production hit a peak in August 2014 with an index value of
Industrial Production Index, 2012 = 100

Figure 6
Monthly Industrial Production Indexes for Raw Steel and Aluminum Manufacturing in the U.S., January 1972 to December 2018, Index 2012=100


103.0. After that, steady decline set in, and the index fell to 79.8 in December 2015. Afterward, there was a slow increase in production over the next two years.

Steel production from U.S. plants started to grow in more vigorous fashion in January 2017, which is after the economic slowdown, or the near-recession, of 2015-2016 ended and before the tariffs were announced. The production index fluctuated around 93.4 for most of 2017. In February 2018, the index moved up to 100.0 and in June, when the duties were put in place, the index was 100.3; dropping to 100.2 in December. The fairest assessment of the more recent movements in the index is to note that it went from an average of 93.4 over 2017 to an average of 99.6 in the first half of 2018; then on to an average of 102.2 from June through December. The percent increase in raw steel production from the 2017 average to the average for the first half of 2018 was 6.6% and the percent increase from the average index of the first half of 2018 to average index value over the post-tariff second half of 2018 was 2.6 percent.

Was the increase from 2017 through the end of 2018 due to tariff-induced increases in market share, or a continuation of increased output due to the strength
of the domestic economy? A dramatic discontinuity in the volume of production is not associated with the imposition of protective tariffs in June. The data imply that the underlying strength of the economy was the force that powered steel demand.

**EMPLOYMENT**

Monthly seasonally adjusted employment in the iron and steel industry (NAICS 3311) and the alumina and aluminum industry (NAICS 3313) from January 1990 to December 2018 are graphed in Figure 8. These are the two industries that are the expected beneficiaries from the recent round of tariff protection. Comparing the employment trend lines in Figure 8 with the lines traced by the production indexes in Figures 6 demonstrates that declines in employment were not accompanied by equivalent decreases in physical production. In other words, productivity growth was responsible for most of the employment decline from 1990 until the

Employment in iron and steel mills recovered immediately after the end of the Great Recession (Figure 9), reaching its post-recession peak of 94,400 jobs in October 2011. Unfortunately, 14,300 jobs were lost over the two-year near-recession that followed, with employment bottoming out at 80,100 in April 2017. Employment among domestic aluminum producers was much the same, just less volatile than in the steel industry. A slow decline in employment began in July 2015 and lasted until November 2017.

How has employment fared since the steel and aluminum duties were imposed in June 2018? In January 2018, when duties were first mentioned by the president, steel employment stood at 83,500. In March, when U.S. tariffs were announced, the iron and steel industry had 82,400 jobs. June’s jobs number increased to 83,500. In December the number stood at 83,200. Despite the trade actions, the number of jobs in iron and steel mills did not grow. There has been some job growth among producers of aluminum. The aluminum production industry added about 1,000 jobs between mid-summer 2017 and December 2018, when the industry employed 58,200.

Figure 8
Total Employment in Iron and Steel Mills and Aluminum Production, January 1990 to December 2018

The steel and aluminum industries do not sit at the top of a long and complicated supply chain. Instead, they are components used to make other products, ranging from girders and rebar used in construction projects to appliances and agricultural machinery. In other words, when the price of a commodity metal increases, prices tend to rise for final products, demand often falls, and jobs are lost or their growth rate slowed in metal-using industries. The American Iron and Steel Institute’s 2018 Profile states that 43 percent of shipments from U.S. iron and steel mills are consumed in the construction industry, 27 percent in automobile and truck production, 10 percent in machine and equipment building, 7 percent in energy production, 5 percent by appliance manufacturing plants, 3 percent in the production of containers, and another 3 percent in defense and homeland security applications.⁶¹ If the imposition of duties increases the cost of infrastructure projects, new autos and trucks, appliances, or capital goods to the point where sales drop, then domestic employment will be harmed. At the time this briefing paper is being written, employment decreases in domestic metal-using industries have not occurred.
Nationally, there are 34 metal-using jobs for each metal-making job. This is a reality that has to be considered when increasing the operating costs for the 34 jobs in metal-using industries in order to protect the job of the single metal-maker. Figure 10 shows the 141,400 jobs in iron and steel manufacturing and aluminum production industries, which we refer to as metal-making, that were protected by the June 2018 duties. The figure also displays the 4.8 million jobs in eight metal-using industries. (Industries are graphed so that the industry with the largest number of jobs is at the bottom of the column. The two metal-making industries are at the top of each column, steel and aluminum production.)

Thirty percent of the metal-using and metal-making jobs are in fabricated metals manufacturing, 23 percent in machinery manufacturing, 12 percent in motor vehicle parts production, 11 percent in aerospace and parts manufacturing, 8 percent in electrical equipment and appliances, 7 percent in other transportation equipment, 5 percent in motor vehicle assembly, 1 percent in steel product manufacturing, 2 percent in iron and steel production, and 1 percent in aluminum production.

The dependence of the primary-metals-producing subsector on demand for products in other manufacturing sectors is further demonstrated in Table 2. These data are from the national input-output tables.
Table 2
The Input, or Use, Requirements for Primary Metals in Its Customer Industries and Multipliers in the Primary Metals Sector from Sales Made by Its Customers

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Importance of the Industry as a Customer of the Primary Metal Sector in 2016</th>
<th>Importance of the Primary Metal Sector as a Supplier to this Industry in 2016</th>
<th>Spending in the Primary Metals Sector for each Dollar of Final Demand in this Industry in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Percent of Direct Purchases from the Primary Metals Industry Rank</td>
<td>Fraction of Total Value of Material Input that comes from the Primary Metals Industry Rank</td>
<td>Direct and Indirect Gross Product Multipliers for the Primary Metals Industry Rank</td>
</tr>
<tr>
<td>Fabricated metal products</td>
<td>23.8% 1</td>
<td>19.8% 2</td>
<td>0.27 2</td>
</tr>
<tr>
<td>Primary metals</td>
<td>19.9% 2</td>
<td>29.5% 1</td>
<td>1.38 1</td>
</tr>
<tr>
<td>Motor vehicles, bodies and trailers, and parts</td>
<td>11.4% 3</td>
<td>5.2% 6</td>
<td>0.12 5</td>
</tr>
<tr>
<td>Machinery</td>
<td>9.4% 4</td>
<td>8.1% 4</td>
<td>0.15 4</td>
</tr>
<tr>
<td>Exports of goods and services</td>
<td>8.8% 5</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Electrical equipment, appliances, and components</td>
<td>5.7% 6</td>
<td>15.1% 3</td>
<td>0.22 3</td>
</tr>
<tr>
<td>Other transportation equipment</td>
<td>3.8% 7</td>
<td>3.8% 8</td>
<td>0.09 7</td>
</tr>
<tr>
<td>Miscellaneous manufacturing</td>
<td>2.6% 8</td>
<td>7.1% 5</td>
<td>0.10 6</td>
</tr>
<tr>
<td>Construction</td>
<td>2.2% 9</td>
<td>0.4% 15</td>
<td>0.03 11</td>
</tr>
<tr>
<td>Computer and electronic products</td>
<td>2.0% 10</td>
<td>1.7% 9</td>
<td>0.03 9</td>
</tr>
<tr>
<td>Food and beverage and tobacco products</td>
<td>1.8% 11</td>
<td>0.6% 14</td>
<td>0.02 17</td>
</tr>
<tr>
<td>Furniture and related products</td>
<td>1.1% 12</td>
<td>4.4% 7</td>
<td>0.08 8</td>
</tr>
<tr>
<td>Personal consumption expenditures</td>
<td>0.9% 13</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Plastics and rubber products</td>
<td>0.6% 17</td>
<td>0.7% 12</td>
<td>0.03 12</td>
</tr>
<tr>
<td>Rail Transportation</td>
<td>0.4% 18</td>
<td>1.6% 10</td>
<td>0.03 13</td>
</tr>
<tr>
<td>Waste management and remediation services</td>
<td>0.3% 22</td>
<td>0.8% 11</td>
<td>0.03 10</td>
</tr>
</tbody>
</table>

Sources: U.S. Department of Commerce, Bureau of Economic Analysis, Interactive Data, Industry Data, Input-Output, Use and Total Requirements Tables, 2016

maintained by the U.S. Bureau of Economic Analysis for 2016. The users of primary metals are listed along the rows of the table and ranked by their importance as a customer of the metal-producing subsector.

More than half of the purchases made from primary metals production comes from three industries. Fabricated metal products account for nearly 24 percent of direct purchases from the primary metals industry. The primary metals industry is its own second-largest customer, consuming nearly 20 percent of purchases. The third-largest customer in terms of the dollar value of purchases is the motor vehicle production and parts industry, at 11 percent. An industry’s share of sales made by the primary metals industry correlates well with the fraction of total material inputs that comes to the customer from primary metals. (See the second set of columns in Table 2.) There is one exception—the electrical equipment, appliance, and electrical component industry. Primary metals make up 15 percent of the value of material inputs consumed by the electrical equipment, appliance, and electrical component industry. The industry, however, only accounts for 5.7 percent of the sales of the primary metals industry.

The last two columns in Table 2 display the direct and indirect connections that exist between customers of the primary metals industry and products that are sold by other industries. (These are also known as the direct and indirect multipliers.) The largest set of backward linkages, or the connection between the sale of a final product and sales made by primary metals suppliers in its supply chain, are summarized below:

- Each dollar sold by the primary metals industry generates another 38 cents in additional indirect sales through its own supply chain.
- Every dollar of product sold by the fabricated metals industry generates 27 cents of sales for the primary metals industry.
- The electrical equipment and appliance industry generates 22 cents in sales from the primary metals industry for every dollar of product it sells.
• Every dollar of final product sold by the machine-building industry generates 15 cents of primary metals sales.

• The motor vehicle assembly industry generates 12 cents of primary metals sales for each dollar of final demand that it satisfies.

The message from each of these metal-using customer industries is the same: The long-term health of the steel and aluminum industries rests with sales of products by its customers. Increasing the cost of these customer products is, in the end, self-limiting and self-defeating for the metal-producing industries and hurts the end consumer of the domestically manufactured product.

THE NEAR-RECESSION OF 2015 AND 2016

What was behind the dip in both steel and aluminum production and employment that occurred in the fall of 2014 and lasted through early 2016? The New York Times headline called it “the most important, least-noticed, economic event of the decade.”⁶ The headline is an eye-catching statement in a decade of riveting economic-political events. The Neil Irwin’s article chronicled a series of events that transpired across the globe, interacting to depress demand in commodity markets and resulting in a near national recession in 2015 that lasted through 2016. Regional recessions occurred but were little-noticed because the U.S. GDP growth rate did not turn negative and employment gains at the national level were seen throughout the period.⁶⁴

This little-noticed economic slowdown is relevant to the trade debate, and to metals-producing industries in particular, because its narrow-gauge effects on a few industries resulted in harm to the regions that are home to them. A major cause of this economic event was the rapid increase in the value of the dollar, which typically creates mayhem in the industrial and agricultural heartland of the United States as it generally encourages imports of manufactured goods and depresses exports of agricultural commodities. The economic bases of heartland states and metropolitan areas frequently consist of commodity agriculture and manufactured products—most with global competitors.

The series of events leading to the near-recession included:

• A slowdown in business investment that started in mid-2014 and lasted through 2016.

• A run-up in the value of the U.S. dollar that began in earnest in July 2014 and was soon followed by signals from the Federal Reserve Board that increases in the federal funds target rate were imminent. However, the European and Japanese Central Banks lowered their rates over the same period, causing increases in the demand for dollars and drove the trade-weighted value of the dollar up (Figure 11).

• China’s concern about its post-2009 credit bubble caused it to restrain growth in shadow bank lending from 2013 through 2015, resulted in a slowing of its economy.⁶⁵ The slowdown in China soon spread to economies that depend on Chinese demand, particularly for minerals, consumer food products, tourism spending, and investment.

• The increase in the value of the dollar became a second source of drag on Chinese GDP growth because the yuan was pegged to the dollar in 2014. The rise in the yuan was
associated with a loss in Chinese competitiveness in labor-intensive goods production compared to Southeast Asian nations. China loosened its dollar peg in August 2015 to improve its competitive position in exports, but, rather than improving China’s economic performance by boosting its exports, as was expected, an outflow of capital ensued, further crimping domestic investment.

- Slower growth across Asia caused decreases in demand for oil and imported agricultural products, resulting in declining prices for both groups of commodities in the United States.

The Federal Reserve noticed this confluence of negative international forces and their effects on the U.S. economy and backed off raising its target federal funds rate. At the same time, China eased its credit restrictions and continued to loosen the ties between the yuan and the dollar. This combination of actions began to stimulate growth in Asia in late 2015 and in the U.S. in 2016. The Fed raised its target short-term interest rate by 25 basis points in December 2015, but the increase was modest and the language describing the rate increase was cautious. The Board of Governors did not increase the target federal funds rate for another year, waiting for sure signs that growth was back on track.
## Table 3
Changes in Select Prices and Production Volumes During the Near-Recession of 2015-2016

<table>
<thead>
<tr>
<th>Variable</th>
<th>Unit of Measure</th>
<th>Percent Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2014-2016</td>
</tr>
<tr>
<td>Trade Weighted Value of Dollar</td>
<td>Broad Index (1992=100)</td>
<td>19.2%</td>
</tr>
<tr>
<td>Motor Vehicle Assemblies</td>
<td>Monthly Assemblies</td>
<td>-1.4%</td>
</tr>
<tr>
<td>Oil</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brent</td>
<td>Dollars per Barrel</td>
<td>-64.2%</td>
</tr>
<tr>
<td>West Texas Intermediate</td>
<td>Dollars per Barrel</td>
<td>-63.8%</td>
</tr>
<tr>
<td>Producer Price Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iron &amp; Steel Mills</td>
<td>Index 2009 = 100</td>
<td>-10.0%</td>
</tr>
<tr>
<td>Alumina &amp; Aluminum</td>
<td>Index 2009 = 100</td>
<td>-10.0%</td>
</tr>
<tr>
<td>Corn</td>
<td>Index 2009 = 100</td>
<td>-4.3%</td>
</tr>
<tr>
<td>Soybeans</td>
<td>Index 2009 = 100</td>
<td>-29.4%</td>
</tr>
<tr>
<td>Industrial Production Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Steel</td>
<td>Index 2012 = 100</td>
<td>-13.9%</td>
</tr>
<tr>
<td>Aluminum</td>
<td>Index 2012 = 100</td>
<td>1.1%</td>
</tr>
</tbody>
</table>

Sources: Authors’ calculations from data contained in previous figures

During 2014 and 2015, sector-specific declines in prices and production appeared in the U.S., centering on agriculture, oil and gas production, and their supply chains. These industry-specific declines changed the trajectory of U.S. regional economies where oil and gas and agriculture are the economic drivers and then spread into regions where the supply chains of these two sectors are located. This was how metals manufacturers were affected, as can be seen in Table 3.

The decline in corn and soybean prices began in August 2012 and accelerated in both June 2013 and May 2014. The decreases in 2013 closely followed the pace of appreciation in the trade-weighted value of the dollar, which began its steady climb in January 2013. The commodity prices for corn and soybeans in the U.S. have yet to recover (Figure 12). The producer price index for corn fell by 44.4 percent from September 2012 to December 2013 and another 21.7 percent through the end of 2016. The price of soybeans began its initial decline between September and October 2012, but the sharp decline did not begin until May 2014. Prices fell by 29.4 percent from 2014 to 2016 and dropped another 4.6 percent from 2016 to August 2018. The downturn was a direct blow to regional economies that manufactured agricultural and construction equipment and the steel that such products contain.

A slow decline in the cost of oil also began in 2012, but the drop in price accelerated sharply in June 2014 with the onset of regional decline in Asia. The price of a barrel of oil...
declined from June 2014 through December 2015 by 66 percent for Europe’s North Sea (Brent) and 65 percent for West Texas Intermediate. The drop in prices put highly leveraged oil and gas production companies, drillers, and pipeline companies under stress and, as a result, the market for drill pipe declined rapidly (see Figure 13). Oil prices began to recover in January 2016 with the resumption of global economic growth. Prices for steel pipe and tube also began a steady recovery in November 2016, coinciding with positive results from the macroeconomic countermeasures taken by the U.S. and China.

The last area of market decline relative to metals manufacturers is automobile assembly. A number of challenges have confronted the U.S. automotive assembly industry. These include the rise in the dollar, shift in demand, and rising interest rates, coupled with a change in the U.S. income distribution. After the dollar began its sustained rise in mid-2014, followed by its 2015 acceleration, U.S.-produced auto parts and cars became more expensive compared with internationally sourced products. The second problem that some domestic automakers faced
was that they had devoted too much factory capacity to producing sedans and lightweight vehicles at a time when tastes were shifting in favor of small sport utility vehicles and light trucks, reflecting lower gas prices. Additionally, the U.S. income distribution shifted coming out of the Great Recession, with more income concentrated at the upper tail of the distribution. This had the effect of shifting new car demand away from entry-level and mid-market models. Finally, new automobiles and light trucks are expensive, which makes sales sensitive to interest-rate increases: When rates rise, sales fall. Table 3 shows that the number of cars and light trucks assembled in the U.S. fell by 1.4 percent from 2014 to the end of 2016 and declined by another 4.1 percent from 2016 to 2018. Automotive and truck assembly is second only to construction in its use of steel produced by domestic mills.

In sum, the macroeconomic near-miss of 2015-2016 explains the declines in metals production from 2014 to 2016, and the recovery from that setback is responsible for the recovery of the domestic metals manufacturing industry in 2017. The economy, with the additional stimulus from the Trump tax cuts of 2018, was then strong enough to power increased domestic production of metals through 2018 despite the drag imposed by the trade skirmish in June. (Figure 7)
What is troubling is that the same set of forces that brought the U.S. economy close to a recession in 2015 appear to be lining up today: China’s economy is slowing, the trade war is hurting exports of commodity agricultural products, oil and gas prices are dropping, motor vehicle production looks as if it has hit its cyclical high point, the stimulative effect from the 2018 tax cut is waning, and the Fed has curtailed increasing the target fed funds rate.

The trade fight helps to answer a mystery that came with the 2018 tax cuts: Where is the business investment that the cuts were expected to stimulate? The trade dispute has produced uncertainty in business investing. There is uncertainty about supply chains and sourcing due to shifting prices from tariffs and the prospects of tariffs yet to come. There is uncertainty about when the steel and aluminum tariffs and the accompanying retaliatory tariffs will be lifted, especially in North America. Uncertainty is having a negative impact on business investment in plants and equipment, which hurts metals sales and production directly and indirectly. Jay Timmons, the president of the National Association of Manufacturers, told Bloomberg Television’s David Westin the day after the September 24 matching sets of $200 billion tariff increases were imposed by the United States and China: “If you look back a couple of years ago, and the uncertainty that existed because of potential regulatory impediments that the past administration were putting forward, I’m starting to see the exact same type of uncertainty being generated (because of tariffs).”

Ford CEO Hackett echoed Timmons’ observations when he said that the trade disputes were paralyzing American business because of uncertainty. “In this case, we’re kind of frozen. A lot of businesses aren’t sure and that’s not good.” Uncertainty alone does not fully explain why the business tax cuts did not result in a leap in business investing in 2018. Many economists expected that money from the cuts would be used to increase the rate of return to shareholders in the form of stock buy-backs.

Ohio, along with Indiana and Pennsylvania, served as backdrops for many of President Trump’s protectionist pronouncements. The assertion made by the president was that Ohio’s steelworkers would benefit from his trade actions. Paying attention to heartland industries and the communities where they are located is welcomed by Ohioans. Yet, there is cause for caution, as well. Ohio is a state where many more people work in metal-using industries than in metal-producing industries, and an increase in the domestic price of metals relative to the cost in other nations will hurt metal-using products that compete globally. Moreover, Ohio is also a major agricultural exporter, and agriculture is a frequent retaliatory target in U.S. trade skirmishes. Soybean exports alone are a $2 billion business in the state. And, many of the services exported from an industrial state, such as Ohio, are directly connected to its manufacturing base.

The U.S. Chamber of Commerce produced a state-by-state accounting of the economic activity that could be affected by retaliatory tariffs, all of which were still in force as this brief was being finalized in late February. The Chamber took detailed data on U.S. exports in 2017 from the U.S. Bureau of the Census’s Origin of Movement data series and identified the value of shipments by state in each product category that was exposed to retaliatory duties by either Canada, Mexico, China, or the European Union. The reported dollar values are

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5. What Does the Trade Fight Mean for Ohio?

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The Economic Impact of the Trade Skirmish of 2018 on the Nation and Ohio

Table 4
Dollar Value of Exports to Canada, Mexico, China and European Union Potentially Affected by Retaliatory Duties

<table>
<thead>
<tr>
<th>U.S. exports exposed to retaliation in 2017</th>
<th>Total</th>
<th>Canada</th>
<th>Mexico</th>
<th>China</th>
<th>European Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>56,956,120,715</td>
<td>17,818,299,740</td>
<td>6,769,198,134</td>
<td>28,140,231,812</td>
<td>4,230,391,029</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ohio</th>
<th>Total exports to Canada, China, Mexico, and EU in 2017</th>
<th>37,072,228,804</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exports exposed to retaliatory tariffs</td>
<td>3,341,161,169</td>
</tr>
<tr>
<td></td>
<td>Ohio’s rank among states</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Percent share of affected U.S. exports</td>
<td>5.9%</td>
</tr>
<tr>
<td></td>
<td>Percent of Ohio’s exports subject to retaliation</td>
<td>11.4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>Canada</th>
<th>Mexico</th>
<th>China</th>
<th>European Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>17,818,299,740</td>
<td>6,769,198,134</td>
<td>28,140,231,812</td>
<td>4,230,391,029</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ohio</th>
<th>Total</th>
<th>Canada</th>
<th>Mexico</th>
<th>China</th>
<th>European Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,341,161,169</td>
<td>2,110,073,297</td>
<td>294,398,838</td>
<td>825,784,307</td>
<td>110,904,727</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ohio</th>
<th>Total</th>
<th>Canada</th>
<th>Mexico</th>
<th>China</th>
<th>European Union</th>
</tr>
</thead>
<tbody>
<tr>
<td>3,341,161,169</td>
<td>2,110,073,297</td>
<td>294,398,838</td>
<td>825,784,307</td>
<td>110,904,727</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ohio</th>
<th>7</th>
<th>1</th>
<th>5</th>
<th>10</th>
<th>15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ohio</td>
<td>11.4%</td>
<td>11.2%</td>
<td>4.5%</td>
<td>21.2%</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

Sources: United States Exports in 2017 from U.S. Chamber of Commerce. Trade works. Tariffs don’t and associated data tables. Ohio dollar exports in 2017 for Canada, Mexico, and China from Ohio Exports Report, Research Office, Ohio Development Services Administration. The report does not have a total for the European Union. Data for total dollar exports to the European Union is from Ohio Trade Facts, the Office of the U.S. Trade Representative. The Ohio Dollar tariff exposure is from the U.S. Chamber of Commerce. Trade Works for Ohio. Tariffs Don’t. Calculations are by the authors.

not forecasts of impacts based on 2018 shipments. Instead, they are a “what if” scenario that answers the question: “What dollar value of U.S. exports would be affected by retaliatory tariffs had they been in place in 2017, assuming that the increased tariff costs had not reduced shipments?”

The data show that $3.3 billion in 2017 shipments from Ohio would have been affected by retaliatory tariffs imposed on exports from the United States. This includes $2.1 billion in shipments to Canada, $826 million to China, $294 million to Mexico, and $111 million in Ohio products exported to the European Union. (See Table 4.) A bit more than 11 percent of the dollar volume of Ohio’s exports to the four nations listed in Table 4 is exposed to retaliatory duties. It is important to point out that these figures account for products covered by the retaliatory tariffs imposed before the September 24 round of additional Chinese duties.

Ohio is the state with the largest exposure to Canadian retaliatory tariffs. It ships 18 percent of the dollar value of all U.S. products exported to Canada, and Canadian purchases account for 38 percent of Ohio’s international sales. Ohio also has the fifth-largest exposure to Mexican retaliatory duties. Even though Ohio ranks ninth in the total value of 2017 exports, it is seventh in terms of total tariff exposure due to the mix of both products that it exports and products subject to retaliation.

The group that has the most exposure to new tariffs is iron and steel mill products, with $1 billion in exports being subject to retaliatory duties. More than three-quarters of that amount is assessed by Canada, as can be seen in Table 5. Soybeans and corn are in second place and could suffer long-term losses due to their being commodities with competitors selling substitute products around the globe. Soybeans play a dominant role in Ohio’s agricultural exports, and China is its dominant customer. After China assessed a 25 percent duty on the crop, farmers and their advocates expected major losses in Chinese market share (a study from Purdue estimated a 65 percent drop in shipments) and steep declines in soybean prices. June 2018 market prices for soybeans were $1.30 a bushel below a typical farmer’s break-even price, and prices continued to decline. The December PPI for soybeans was 6.7 percent lower than it was in June, while the PPI for corn was 0.5 percent higher. Soybean prices bottomed out in August, and some recovery was evident in December when China re-entered the U.S. market due to a combination of drought in South America raising the price of beans from the southern hemisphere and trade negotiations between the U.S. and China resulted in Chinese state-approved purchases.
The other product groups listed in Table 5 reflect the integrated nature of supply chains in North America’s manufacturing and retail industries. Cleaning products are in third place, driven by liquid soaps and detergents. Ohio’s home appliance industry was targeted by retaliatory tariffs, as were beauty products, lawnmowers, and plastic housewares.⁷⁷ Even Ohio’s nascent whiskey sales to Europe were hit in a backsplash as the European Union targeted Kentucky’s bourbon industry to get the attention of Senate Majority Leader Mitch McConnell.⁷⁸
THE INTERSECTION OF TARIFFS AND OHIO JOBS

Ohio’s workers, businesses, and consumers face three different negative impacts from the current set of trade actions: (1) higher prices for purchased parts made with metal and imported materials resulting in lost domestic markets as customers source metal-using parts and finished products internationally, (2) lost international markets for both manufactured and agricultural products due to increased prices caused by retaliatory tariffs, and, ultimately, (3) higher prices for domestic consumer goods.

The Ohio Development Services Agency’s research department estimated that 260,000 full-time equivalent jobs are directly or indirectly supported by Ohio’s exports and that 92 percent of those jobs are in the manufacturing sector.⁷⁹ This is 5 percent of Ohio’s nonfarm private-sector employment. The successful resolution of the trade issues, especially with Canada and Mexico, matters to the state’s workers, but the potential impact of the tariffs on Ohio and its workers is not so large that it is likely to trigger a statewide recession on its own.

Figure 14
Monthly Employment in Ohio’s Steel and Ferroalloy Manufacturing Industry from the End of the Great Recession (June 2009) to December 2018

However, an ongoing trade dispute will be difficult for Ohio workers in a number of industries, most related to manufacturing and agriculture. At this point, there is no evidence that Ohio’s steel industry has received an employment boost from the imposition of tariffs. As we noted earlier, employment would, at best, receive a slow boost, as plants try to maximize existing capacity before hiring new workers. As can be seen in Figure 14, Ohio employment in steel mill and ferroalloy manufacturing followed the national path of steel production’s recovery from the Great Recession discussed earlier. The number of post-recession jobs in steel production in Ohio peaked in May 2012 at 10,800 before experiencing a gradual decline through August 2016, when the hidden recession dropped employment from 9,000 to 7,500. In December 2018, the number of steel mill jobs in Ohio was 7,700, slightly lower than employment levels at the start of the year but close to the range of industry employment that has existed since 2016.

Yet, as was discussed earlier, steel lies at the base of a number of metal-using supply chains that are important to Ohio’s economy. Increases in metal prices that are above those in competitor nations endanger jobs associated with those activities. Figure 15 displays seasonally adjusted monthly employment in the steel and ferroalloy manufacturing industry and seven metal-using industries: fabricated metal products, machinery manufacturing, motor vehicle...
parts, electrical equipment and appliances, aerospace products and parts, motor vehicle manufacturing, and other transportation equipment. The purpose of graphing them as a stacked bar chart is to allow for a visual comparison of the relative employment sizes of these industries. Although the selected metal-using industries have supply chains that require more than steel and aluminum, they are all major metal users and involved in cross-border trade.

There is no primary aluminum production in Ohio because electricity is a major part of production costs and Ohio has expensive electricity compared to Quebec and British Columbia, where hydroelectric power gives Canada much lower costs. Canada smelts 6 percent of the world’s output of aluminum from nine plants in Quebec and one in British Columbia. Canada’s competitors are in the Middle East, China, and Russia, where extremely cheap natural gas, coupled with likely state subsidies, provide electricity costs that can compete with hydro-power.

Despite the increases in the price of Canadian aluminum due to the new tariff regime, this is not an industry that will relocate production to the U.S. outside of the Pacific Northwest or without the benefit of extremely deep electricity subsidies.

Steel production’s share of Ohio’s nonfarm employment is small; it was 0.2 percent in January 2014, as the unnoticed recession was beginning, and declined to 0.1 percent in November 2018. The number of jobs in Ohio’s seven metal-using industries was 321,800 in January 2014, rising to 338,100 in December 2018. Since the trade rumblings began in January 2018, steel production employment fell by 200 employees to 7,700, while the metal-using industries experienced job growth of 2.0 percent at a time when hiring, particularly in manufacturing, has been difficult.

RECENT COMMENTS FROM OHIO’S MANUFACTURERS AND OTHERS

The Ohio Manufacturing Extension Partnership (Ohio MEP), in cooperation with The Ohio State University’s Ohio Manufacturing Institute and Kent State University’s Corporate University, poll of the state’s manufacturers annually. The survey data were solicited by the Ohio MEP’s regional affiliate service providers, by the Ohio Manufacturers’ Association, and from commercial lists of Ohio manufacturers; in 2019 493 manufacturing establishments responded to the survey.

Two of the questions asked about the impact of the tariffs and trade.

The manufacturers were asked: “How have the recent tariffs imposed by the U.S. affected your company?” This question had 493 responses. The vast majority reported some degree of harm from the tariffs.

• 334 manufacturers (68% of respondents to the question) indicated that the tariffs had negatively affected their companies:
  o 14 percent (68) were “very negatively” affected.
  o 20 percent (101) were “negatively” affected.
  o One-third (165) were “somewhat negatively” affected.

• 96 (19%) responded that the new duties had not affected their operations.

• 63 (13%) stated that the tariffs provided some degree of benefit to their businesses:
  o 1 percent (5) reported that they were “very positively” affected.
  o 3 percent (13) were “positively” affected.
Sixty-eight Ohio manufacturers reported being “very negatively” affected by the tariffs, while five said they were “very positively” affected, meaning the ratio of extreme harm to extreme benefit was nearly 14:1. One-third (169) of the respondents were either “very negatively” or “negatively” affected, and only 18 establishments, or 4 percent of the 493, indicated that the tariffs had been either very positive or positive in their impact—a ratio of harm to benefit of nearly 9:1.

Those that were not affected (96), somewhat negatively affected (165) or somewhat positively affected (45) constitute the broad middle of the distribution and are 62 percent of the respondents. But even here, those experiencing modest harm outweighed those receiving modest benefit by a ratio of nearly 4:1.

Both the 2018 and 2019 polls asked respondents: “What government regulations concern you the most?” Answers were open-ended and classified by the research team. Close to the same number of companies answered the question in each year, 236 in 2018 and 213 in 2019. In 2018, only 4 percent of respondents (9) identified tariffs as an area of regulation that concerned their companies. One year later, 141 establishments out of the 213 that answered this open-ended question indicated that tariffs were an area of concern. This constitutes 66 percent of those answering the question. A 57-percentage point increase in the answer to this question in one year is eye-opening.

Those indicating that tariffs were a concern in the 2019 were concentrated in the fabricated metals industry (49), machinery manufacturing (28), plastics and rubber products manufacturing (15), and transportation equipment manufacturing (10).

Jeremy Nobile reported on the impact of the trade skirmish on Ohio manufacturing in Crain’s Cleveland Business in mid-January 2019 using the trade data from a draft of this policy brief as a jumping-off point. The broad themes from his interviews were that 2018 had been a very good year for Ohio’s manufacturers due to the general strength of the economy and that the higher cost of steel had been absorbed by supply chains through the fall of 2018 with the expectation that trade tensions would soon abate. Nobile quoted the CEO of Cleveland’s Stripmatic Products, a producer of metal tubular sleeves used by motor vehicle assemblers, as fretting about “the long-term impact” of the tariffs. The CEO noted that his products were not globally price competitive in the long term and that his customers would soon start shopping globally for lower bids. The Akron market president for KeyBank noted in the bank’s middle-market report that the tariffs were having split effects. The regional president told Nobile that “companies that manufacture and sell domestically appear to have fared better than those that rely on foreign supply or demand. … same goes for agriculture.” PNC Financial Services Group’s chief economist Gus Faucher described the economic balance: “The impact of the tariffs is fairly small compared to the overall macro-environment, which is positive for manufacturing right now.” Faucher added: “For most companies, this isn’t going to make or break them, but it is going to be a drag.”

Anecdotal observations of negative impacts from the trade skirmish have increased in the press as supply chains have begun to confront tariff-driven cost increases and the prospect of lost business. These comments have been replicated by another set of data points from the Federal Reserve System’s bimonthly Beige Books. The January 2019 book indicated that “many Districts reported that contacts had become less optimistic in response to increased financial market volatility, rising short-term interest rates, falling energy prices, and elevated trade and political uncertainty. … Most Districts indicated that firms’ input costs had risen, but reports were mixed on whether they could pass the higher costs on to customers. Reports often cited rising materials and freight prices as sources of cost increases, and a number of Districts said that higher tariffs were also a factor.” In the December book, 11 of the 12 Districts mentioned trade and tariffs negatively. This is a major change from the Beige Books from the summer and early fall.
AN OHIO PERSPECTIVE ON CHINA AND TRADE POLICY

The largest unanswered public policy question related to trade that is asked by Ohioans, especially by business leaders, is what is the best way to address trade problems with China?⁸⁵ They understand, and oppose, trade barriers caused by China’s formal and informal policies on market entry, intellectual property theft, forced technology transfer, and interference with foreign corporate ownership of facilities.

Ohioans understand the troubles that can be caused if Chinese state-supported dumping of steel and aluminum occurs as the global economy slows. However, this is a global problem, not just a problem for the United States.

Ohio's manufacturers do not understand why they are being taxed, or “tariffed,” in a global trade war designed to protect the U.S. steel and aluminum industries and how this is related to opening Chinese markets to U.S. investment.⁸⁶ And these manufacturers do not understand assertions that charging them tariffs is good public policy. They wonder how increasing their costs is purported to improve their competitive position because it does not.

Ohio's manufacturers do not understand why the U.S. has gone to the mat wrestling with its closest trade partners and historic allies—Canada, Mexico, and the European Union—when the nation’s dominant trade problems are with China. And they do not understand why the United States attacked a multilateral coalition of trading partners that could be strong allies in countering China's mercantilist trade practices.

Ohioans interviewed by the Carnegie Endowment for International Peace and The Ohio State University’s John Glenn College of Public Affairs in summer 2018 asked for “policies, both foreign and domestic, that afford them a fighting chance. As they explained, a fighting chance means:

- Not adopting free trade agreements that force American workers to compete with those in other countries earning very low wages.
- Taking a tough line against those who do not play by the rules in the global economy, particularly China.
- Not forcing local firms to compete with companies that have the size and clout to wrest special treatment from U.S. federal and state governments or that have received financial support and protection from other countries.
- Not incentivizing externally owned companies, as they relocate overseas, to leave local communities to deal with decaying buildings and infrastructure.

The challenge policymakers face is to provide communities and workers with this fighting chance, while preserving the benefits of America's global trade and engagement that enable many others to prosper.”⁸⁷
Ohio is ground zero for the Trump administration’s trade agenda, which aims to revive the vitality of the steel, aluminum, and automobile assembly industries with the use of protectionist trade measures. Ohioans welcome the attention to their heartland industries and communities. However, they also worry that actions to help select industries will come at the expense of others. It remains to be seen if the actions will ultimately benefit Ohio’s residents.

The net impact of the current trade conflict on Ohio’s industries cannot be assessed in isolation from its impacts on the U.S. and global economies—as those impacts will, in turn, affect Ohio’s economy.

However, the underlying strength of the economy due to consumer spending and the stimulus provided from the 2018 tax cuts have held the negative effects of trade tension at bay. Some of the most negative effects for Ohio’s economy appear to have been averted as a result of the side letters accompanying the renegotiation of NAFTA and the conclusion (though not yet ratification) of the USMCA.

In other words, it is too soon to be declaring the winners and losers in Ohio from the Trump administration’s trade measures. But it is possible to gauge the effects reverberating throughout the state’s industries.

As one of the nation’s top three steel-producing states, Ohio would be expected to benefit from the Trump administration’s imposition of a 25 percent tariff on imported steel. Recent investment announcements can be used to support that view. Three plants in Ohio are slated to reopen or expand, a fourth is recruiting a new shift of 25 workers, and a major new pig iron mill is working its way through the permit process. Note, however, that all of these steel plant expansions were in the works many months before the Trump administration undertook action, and others are being studied in light of the permanence of the duties.

U.S. steelmakers, including Ohio-based TimkenSteel and those with Ohio operations, reported increased sales and profits as a result of a return to “fair pricing.” Yet, steel prices began to trend upward in March 2016, according to PPI data, or November 2016, when measured using SteelBenchmarker’s transactional data. Would the investments be made based on the trend in market conditions without the imposition of new duties? We do not know for certain, but we suspect that the answer is “yes.”

The higher prices associated with tariffs may lead to higher profits and employment levels for Ohio’s steel producers in the near-term, but they may also threaten steel-using industries important to the state’s economy in the longer term. Cost difference can either steer the location where metal-using products are manufactured or influence purchasing agents to acquire metal-using products offshore. The longer the trade skirmish carries on, the higher the probability of either offshoring the production and sourcing of metal-using products and the higher the probability of regional, if not national, recessions.
In 2018 Ohio ranked second in the nation in the number of automotive parts supplied and number of cars produced. Higher steel and aluminum prices will drive up the cost of Ohio-made cars and trucks, providing more reason for moving assembly out of the state and nation as well as depressing the overall sales of new cars. In September, Ford Motor Chief Executive Officer Jim Hackett said that “metal tariffs took about $1 billion in profit . . . . If it goes on longer, there will be more damage.” Such words sound ominous for the 6,150 Ford workers in Ohio. Honda, which employs 15,000 Ohioans, also reported “hundreds of millions of dollars in new costs.” GM's Lordstown assembly plant is scheduled to close in March 2019, as production of the Cruz winds down. However, Ohio is also the site of GM's most productive transmission factory, as well as stamping plants and a foundry. Finally, Toledo is producing two new Jeep products, the Wrangler and the Gladiator pickup truck, that are specifically designed for sale in international markets. The steel tariffs and the retaliatory tariffs will hurt FCA's Jeep.

Ohio is a leader in manufacturing household appliances, an industry that is a major user of finished sheet steel. Higher prices for these products could potentially make cost-conscious consumers choose cheaper brands made in other countries or delay their purchases. In July, Whirlpool, which employs 9,800 Ohioans, suffered a 14.5 percent one-day drop in share price—its worst in more than 30 years—after steel and aluminum price increases were blamed for lower quarterly earnings. All told, the 7,700 Ohio steel production jobs are eclipsed by the 338,100 jobs in industries that use steel and aluminum.

In addition, Ohio is home to industries subject to retaliatory tariffs imposed by other countries. Ohio's iron and steel mill products are the most exposed, with $1 billion in exports subject to retaliatory tariffs. Soybeans are in second place and could be the state's largest area of loss due to foreign competition as they are the state's dominant export crop and China is the dominant customer. The $3.3 billion in 2017 exports from Ohio that the U.S. Chamber of Commerce estimates may be affected by retaliatory tariffs imposed on the United States are a diverse bundle of products, including agricultural crops, steel and fabricated metals, soaps, prepared foods, and cosmetics.

The $3.3 billion in exports from Ohio to Canada, China, Mexico, and the European Union needs to be put into context. Ohio exported $37.1 billion in goods (physical products) to these nations in 2017, meaning that 8.9 percent of the state's exports of goods could be subject to retaliatory duties. Ohio exported roughly $50 billion in goods in 2017 to all nations, but data on retaliatory duties from those outside of the four major trading partners listed in Tables 4 and 5 are not available.

In terms of employment, trade plays a noticeable role in the state's economy. The narrowest accounting of trade's employment impact is based on the number of full-time equivalent positions directly supported by exports and indirectly supported by the supply chains of exporting firms. The Ohio Development Services Agency’s research department estimated that 260,000 full-time equivalent jobs are directly or indirectly supported by Ohio’s exports with 92 percent in the manufacturing sector. The U.S. Chamber of Commerce estimates that 1.5 million, or 30 percent, of the state's 5.0 million private-sector jobs are supported either directly by exports purchased by final consumers, indirectly through supply chains of those exporters, or by the spending of the employees of those companies.

There is also a direct connection between trade and investments made in Ohio's economy. SelectUSA's Ohio factsheet lists 267,500 direct jobs being supported by FDI (roughly equal to those directly supported by exports). The largest source of FDI-supported projects listed by SelectUSA are from Japan (20%), Germany (14%), Canada and the United Kingdom (9% each) and France (7%). JobsOhio identified 3,700 business establishments owned by more than 1,000 companies from 49 nations operating in the state. Japanese headquartered businesses
account for 77,000 direct jobs in 484 facilities and are Ohio’s largest source of exports from foreign-owned establishments.⁹⁶ Over half of those facilities are involved in manufacturing; one-quarter are automotive related; and Honda is the state’s largest manufacturing employer. In May, 2018 Global Affairs Canada reported that 291 Canadian-owned companies directly employed more than 25,000 Ohioans.⁹⁷

FDI frequently begins with long-standing trade and business relationships. The same point was made in the interviews conducted by the Carnegie Endowment for International Peace and Ohio State University’s Glenn College of Public Affairs during the summer of 2018 citing investments from Germany, Japan, and China.⁹⁸

Our conclusion about the impact of the tariffs on Ohio, Ohio’s steel industry, and Ohio’s metal-using industries is consistent with that of a senior economic analyst in Ohio’s state government: “The story of how the Trump administration’s tariffs impact facilities in Ohio is yet to be written. Lots of noise, news stories about what is to happen, but I have yet to see job and investment impact as of September 2018. Maybe next year there will be real data to point to, but after six months, most companies are taking a ‘wait and see’ approach before committing dollars, investment, or production. Overall, there is way too much on-again, off-again news to make a definitive decision.”⁹⁹

The comment holds true five months after it was recorded; however, anecdotal data coming from corporate earnings reports, comments recorded in the Federal Reserve’s Beige Books, and answers to the Ohio Manufacturers Survey all point to accumulating damage. The current trade skirmish does not appear disruptive enough to trigger a recession on its own. Expansion of the trade war with China, hitting the imports of motor vehicles and parts from outside North America with Section 232 national defense duties, the effect on consumer spending and confidence from the recent shutdown of the federal government, and a reduction in size of the inadvertent stimulus from the Tax Cuts and Jobs Act of 2017 may provide enough kindling to stoke the fires of recession — either regional or national.
1 The data used in the figures and tables in this brief were updated in late December 2018.


4 Alfred E. Eckes, Jr., Opening America’s Market: U.S. Foreign Trade Policy Since 1776, University of North Carolina Press, 1995, pp. 100–03. Eckes is a historian and was a United States International Trade Commissioner from 1981 to 1990, serving as chair from 1982 to 1984. A free-trade skeptic, Eckes noted the growth in the U.S. economy that took place behind the selective tariff barriers that existed from the end of the Civil War until the Great Depression. He is also a defender of the Smoot-Hawley tariffs. While his book provides a nearly definitive and well-accepted history of trade policies, his interpretation of the economic consequences of those actions is contested. His book focuses on the inflection point that occurred with the New Deal and beginning of the post-World War II free-trade era.


Table 1 was compiled and verified by the authors from a wide variety of sources. The Congressional Research Service recently released a figure that used U.S. government documents to document the trade actions of 2018. See: Table 1, Retaliatory Actions by U.S. Trading Partners, Complied as of October 10, 2018, Section 232 Investigations: Overview and Issues for Congress. R45249, Congressional Research Service. Updated November 21, 2018, p. 16.


33 Big River Steel, https://bigriversteel.com/


Email communication with Kelly Moody of Silverlode Consulting, received on November 5, 2018. Silverlode Consulting is the economic development consultant to the Village of Cuyahoga Heights, Ohio, where Charter’s mill is located.


Wysochansk, ibid., December 22, 2018 and December 27, 2018.


The Economic Impact of the Trade Skirmish of 2018 on the Nation and Ohio

57 Research assistants at the Ohio Manufacturing Institute counted the number of times the words “tariffs,” “trade war,” “trade” in the context of trade policy, and “business uncertainty” were mentioned in the Beige Books from January 17, 2018, through January 16, 2019. Trade tensions were not mentioned or alluded to until the April book. Mentions escalated in the July and September books with the words moving into the national summary. Uses of the terms “trade” and “tariff” decreased in December 2018 and January 2019, but the terms “business uncertainty” and “uncertainty” increased noticeably, especially in the January book. Beige Book, Board of Governors of the Federal Reserve System. www.federalreserve.gov/monetarypolicy/beige-book201901-summary.htm


62 Examples of one portion of the primary metals subsector making purchases from other portions of the industry include pig iron sold as an ingredient in steelmaking using electric arc furnaces, steel product manufacturing from purchased steel, and foundries’ purchase of cast iron as well as steel.


64 The separation between GDP and job growth rates is now a characteristic of U.S. and metropolitan area economic performance, with GDP showing much greater sensitivity to shocks. Resilience to region-specific shocks is the subject of Harold Wolman, Howard Wial, Travis St. Clair, and Edward Hill, Coping with Adversity: Regional Economic Resilience and Public Policy (Cornell, 2017).


66 See FOMC’s target federal funds rate or range, change (basis points) and level. www.federalreserve.gov/monetarypolicy/openmarket.htm


The export data used are provided by both the U.S. Chamber of Commerce and the Ohio Development Services Agency's research department. Both work with data from the Census Bureau's Origin of Movement (OM) series, which aggregates information supplied by U.S. exporters on Shippers Export Declarations (SEDs) for goods leaving the United States. The following are cautions on the use of the data provided by the U.S. Department of Commerce, International Trade Administration, with minor editing: The OM data are for directly exported goods only. A direct export is one consisting of final goods shipped to a destination outside the United States. Indirect exports are excluded from the data. Indirect exports are intermediate goods, parts, or other inputs that are shipped within the United States, and subsequently incorporated in final export goods. Such shipments represent domestic transactions—they are not considered exports in U.S. trade statistics. The OM series was not designed to measure the state distribution of U.S. export production or export-related jobs. The focus is transportation origin, not manufacturing origin. There are nonetheless many cases when the state origin of movement and the state of production happen to be the same. The origin of movement and origin of production often coincide because many manufacturers ship exports directly from the factory gate or from a nearby distribution facility.

The data on value of exports exposed to retaliatory duties from Canada, China, the European Union, and Mexico come from the U.S. Chamber of Commerce’s dataset. Total exports for Canada, China, and Mexico come from Ohio Export Report 2017 from the Ohio Development Services Agency’s Research Office; total export data for the entire EU was not published. Total exports to the European Union came from Ohio Trade Facts, Office of the U.S. Trade Representative. //ustr.gov/map/state-benefits/oh


Manufacturers do not understand why the administration’s trade arguments are based only on the balance of payments on physical goods and why trade in services is not included. Many large U.S. manufacturing and consumer products companies export services to their international subsidiaries as a core part of their business strategy. U.S.-headquartered corporations with global footprints tend to localize both production and market-focused product development, unless there are overwhelming cost disadvantages in doing so.


The American Iron and Steel Institute (May 23, 2018) posted the state-by-state economic impacts of the iron and steel industry. The value of the iron and steel industry’s direct output is provided for each state. The twelve states producing more than $2 billion (B) in direct output are: Indiana $20.4B, Pennsylvania $15.5B, Ohio $13.3B, Texas $8.1B, Alabama $7.4B, Michigan $6.1B, Illinois $5.3B, Arkansas $5.2B, California $4.0B, Kentucky $3.0B, South Carolina $2.6B, and North Carolina $2.1B. www.steel.org/economicimpact


The U.S. Chamber of Commerce data were obtained from its Ohio fact sheet posted on www.thewrongapproach.com. Total private employment was calculated by subtracting government employment from total nonfarm employment from the U.S. Bureau of Labor Statistics, Economy at a Glance: Ohio. www.bls.gov/eag/eag.oh.htm. Then full- and part-time farm employment was added in. Those data were obtained from the National Agricultural Statistics Service, U.S. Department of Agriculture, 2017 State Agriculture Overview: Ohio, Operator Characteristics.


E-mail communication with author, received on September 5, 2018.