



# Economic Letter

## Steeling the U.S. Economy for the Impacts of Tariffs

by Michael Sposi and Kelvinder Viridi

► **ABSTRACT:** Proposed steel and aluminum tariffs would likely trim a quarter percent from the U.S. gross domestic product over the long run. U.S. metals industries would likely expand, while heavy industries, such as machines and equipment, would probably contract along with aggregate capital formation. The main risks lie in the potential for retaliation by trading partners and the possibility of a trade war.

**T**he United States has announced that steel and aluminum imports will be subject to a new tariff plan. Steel imports would face a 25 percent duty and aluminum imports a 10 percent duty that would apply to all steel and aluminum imports except for those from North American Free Trade Agreement (NAFTA) countries, Canada and Mexico.

The U.S. had not previously applied tariffs on the steel products identified in the directive issued March 8. Those previously in place for aluminum products had averaged about 3.5 percent and ranged from 1.5 to 5.7 percent.

The set of steel products that would face the levy is fairly broad and covers finished products—carbon and alloy sheets, pipes, strips and plates, seamless or welded tubes, and stainless steel. Also included are semifinished products—solid forms of unfinished steel to be further forged, rolled or shaped into final steel products. Aluminum products include unwrought (raw) materials and processed materials, such as bars, rods, wire, foil, tubes, pipes, fittings, castings and forgings.

### Assessing the Impacts

The U.S. steel industry employed about 139,800 workers in 2016, and the aluminum industry employed about 160,888

workers.<sup>1</sup> Combined, these industries accounted for 0.19 percent of U.S. employment. While this share is small, the output is typically used directly or indirectly in many other large and important industries.

For instance, these materials are a direct input in the construction of large commercial and industrial structures and bridges and the production of automobiles and other transport equipment. They are also used extensively as inputs for machines that produce entirely unrelated goods or services such as robots that assemble computer chips, farm equipment that harvests wheat and X-ray machines used in medicine.

Thus, policies that affect the scarcity, or ultimately the price, of steel or aluminum could ripple through the entire economy. Baseline calculations suggest that the proposed tariffs could result in a long-run quarter-percent loss to U.S. gross domestic product (GDP). While production of metals would increase significantly, durable goods producers—the primary consumers of steel—would take a hit in production and in exports because of higher input prices.

While the aggregate effect is mild, retaliation and the threat of a trade war are the primary concerns. Depending how reactions unfold, there could be potent implications for economic activity.

TABLE  
1

U.S. Imports of Steel Come from Broad Range of Countries

Country	Steel imports		Steel net exports	
	Billions of U.S. dollars	% of U.S. steel imports	Billions of U.S. dollars	% of U.S. GDP
EU	5.84	20.21	-4.72	-0.03
Canada	4.62	16.01	1.13	0.01
Korea	2.71	9.39	-2.50	-0.01
Brazil	2.21	7.66	-2.07	-0.01
China	2.07	7.17	-1.62	-0.01
Mexico	2.06	7.14	2.37	0.01
<b>Total of top 6</b>	<b>19.52</b>	<b>67.58</b>	<b>-7.42</b>	<b>-0.04</b>
<b>Total of all countries</b>	<b>28.88</b>	<b>100.00</b>	<b>-15.03</b>	<b>-0.08</b>

NOTE: Totals reflect rounding of individual data points.

SOURCES: UN Comtrade Database; Bureau of Economic Analysis.

TABLE  
2

U.S. Imports of Aluminum Sourced from a Few Countries

Country	Aluminum imports		Aluminum net exports	
	Billions of U.S. dollars	% of U.S. aluminum imports	Billions of U.S. dollars	% of U.S. GDP
Canada	5.64	41.56	-3.72	-0.02
China	1.46	10.76	-1.21	-0.01
Russia	1.37	10.12	-1.37	-0.01
EU	1.20	8.87	-0.68	0.00
United Arab Emirates	1.12	8.27	-1.09	-0.01
Mexico	0.19	1.41	2.53	0.01
<b>Total of top 6</b>	<b>10.98</b>	<b>80.98</b>	<b>-5.54</b>	<b>-0.03</b>
<b>Total of all countries</b>	<b>13.56</b>	<b>100.00</b>	<b>-5.80</b>	<b>-0.03</b>

NOTE: Totals reflect rounding of individual data points.

SOURCES: UN Comtrade Database; Bureau of Economic Analysis.

### World Trade Organization Rules

The World Trade Organization (WTO) has strict bounds for tariff rates to which all 164 member countries must adhere. For instance, if the WTO sets a base rate of 40 percent for a product, all members must apply tariff rates less than or equal to 40 percent on imports from all other WTO members. In practice, applied rates are below the bound rates.

Another important WTO rule is the most-favored-nation (MFN) priority. MFN treatment precludes one member of the WTO from offering varying customs treatment to other WTO members. For instance, the U.S. cannot impose a tariff of, say, 25 percent on

imports from China while imposing a tariff of only 5 percent on Japan; the levies on both countries must be the same.

While this means WTO members cannot offer discriminatory treatment to other members, they may form bilateral or multilateral free trade agreements (such as NAFTA) or customs unions (for example, the European Union (EU)) subject to WTO approval. Such blocs may apply preferential treatment to participating countries.

The WTO provides exemptions allowing countries to deviate from the general guidelines. The U.S. administration is leaning on a security exception in Article XXI, pertaining to national defense:

*“Nothing in this Agreement shall be construed ... to prevent any contracting party from taking any action which it considers necessary for the protection of its essential security interests.”<sup>2</sup>*

Each country has full autonomy in judging whether there is a threat to its national security. Moreover, under this exemption, there is no set expiration date for the tariffs; a government can remove them at a time of its choosing.

### Steel and Aluminum Industries

The U.S. imported \$28.9 billion of steel, accounting for 1.3 percent of U.S. manufacturing imports in 2016 (Table 1). There was a wide range of source countries. The EU accounts for the largest share of U.S. steel imports at 20 percent. Canada is the largest individual foreign supplier to the United States, accounting for 16 percent of U.S. imports. China supplies 7 percent of U.S. steel imports—about the same as Mexico’s share.

In the global market, China’s share of steel exports has risen dramatically since 2000, making up 3.7 percent of global steel exports as of 2000 and 17.5 percent as of 2016. This increase was only slightly larger than the gains in China’s share in world exports of all merchandise, which increased from 3.9 percent to 13.5 percent over the period.

The U.S. imported \$13.6 billion of aluminum, accounting for 0.6 percent of U.S. manufacturing imports in 2016 (Table 2). U.S. imports of aluminum are sourced from a more concentrated set of countries than that of steel. Canada is, by far, the largest aluminum supplier, with a share of 42 percent. China is the second-largest source, accounting for 11 percent of U.S. imports.

China’s share of global aluminum exports rose from 1.3 percent in 2000 to 12.8 percent in 2016.

### Tariffs’ Economic Effects

The new tariffs are intended to protect U.S. steel and aluminum industries from foreign competition by making imports more expensive relative to domestically produced goods. To quantify the consequences of this policy, three impacts must be assessed.

One, the impact on domestic prices of steel and aluminum; second, prices,

production and demand in other U.S. industries that use steel and aluminum as inputs; and, three, the reallocation of capital and labor from other industries to increase capacity of steel and aluminum production. To quantify the overall impact, a version of a model created by one of this article's authors is used to gain insight regarding aggregate outcomes.<sup>3</sup>

Specifically, consider a scenario in which the U.S. uniformly imposes a 25 percent tariff on steel and a 10 percent tariff on aluminum (except for Canada and Mexico), assuming no retaliation by foreign countries. The tariffs are assumed to be permanent, and the long-run effects are computed to take into account sectoral adjustment of capital and labor and the adjustment of capital stocks over time.

The effects on U.S. GDP are not very sizable—the level of GDP is a quarter percent lower over the long run (*Table 3*). The aggregate effects are small since steel and aluminum constitute a thin slice of the U.S. economy. Investment would be the most susceptible component of GDP, since producer durables and construction—the largest components of capital formation—both rely heavily on steel and aluminum.

As the policy intends, imports of metals would decline by more than 5 percent, and U.S. production of metals would increase by more than 15 percent. The price of the broad-based metals index would increase

by 21.11 percent, in part due to the higher cost of imports.

Additionally, prices of domestically produced metals would also increase, for two reasons. First, domestic producers will engage in higher-cost extraction activity in the presence of higher prices. Second, capital and labor will be reallocated from other sectors of the economy to be used in production of steel and aluminum, meaning a less-efficient allocation of resources. The combination of these three responses results in a loss in productivity in the metals sector of 3.04 percent.

The machines and equipment sector, the largest consumer of metals, would feel the effects of higher metals prices first. Facing higher input costs that cannot be fully absorbed, production of machines and equipment would decline by 2.66 percent as a result of lower domestic and foreign demand. In turn, exports of machines and equipment would become less internationally competitive and decline 2.63 percent.

### Retaliation and a Trade War

While the effects of the baseline tariff scenario are mild, the consequences accompanying retaliation and a potential trade war could prove far more potent. The European Commission and China responded to initial tariff announcements with their own informal threats.<sup>4</sup> The U.S. replied with threats of further restrictions

**TABLE 3**

**Baseline Tariffs Have Mild Aggregate Effects on U.S. Aggregates**

	Baseline tariffs
<b>U.S. aggregates</b>	
Percent change in GDP	-0.24
Percent change in investment	-0.45
<b>U.S. metals sector</b>	
Percent change in imports	-5.57
Percent change in production	15.74
<b>U.S. machine and equipment sector</b>	
Percent change in exports	-2.63
Percent change in production	-2.66

NOTE: Baseline tariffs—a permanent 25 percent tariff on steel imports from all countries (ex. NAFTA) and a 10 percent tariff on aluminum imports from all countries (ex. NAFTA).

SOURCE: Authors' calculations.

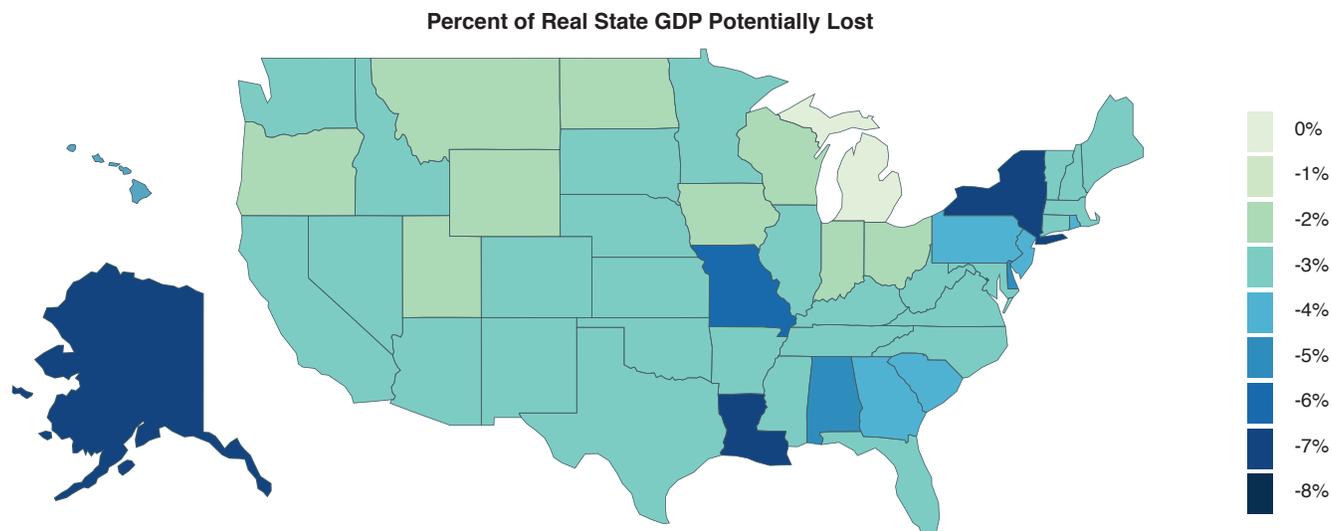
on trade between the U.S. and China.<sup>5</sup>

What happens if these threats escalate into a trade war? While such a situation is admittedly unlikely, it provides a possible upper bound on the magnitude to which the economy could be affected.

In particular, consider a situation in which the U.S. imposes baseline tariffs on steel and aluminum imports from all countries (except for Canada and Mexico); the EU and the U.S. engage in a trade war by imposing prohibitively high tariffs across all goods-producing industries, and

**MAP 1**

**Economic Effects of a Trade War Differ Across U.S.**



the U.S. and China engage in a trade war by imposing prohibitively high tariffs across every industry.

In this scenario, the tighter trade restrictions cut 3.49 percent from U.S. GDP in the long run. The trade deficit between the U.S. and China declines from 0.56 percent of U.S. GDP to 0, and U.S. productivity falls 1.65 percent. GDP in both the EU and China contract in this scenario, falling by 0.71 percent in the EU and by 1.68 percent in China. Most states experience about a 3 percent GDP decline, though some lose more than others (*Map 1*).

For instance, states in which production is concentrated in capital-intensive industries or export commodities can be easily purchased elsewhere—refining in Louisiana, for instance—are likely to experience larger declines. In addition, states that are tied heavily with China in services trade, such as New York, also experience larger GDP declines. The states that are the least adversely affected are concentrated around the rust belt—Ohio, Indiana and

Michigan—since they absorb manufacturing production in place of lower imports of manufactures.

### Lasting Impacts

Overall, there are situations in which tariffs can prove beneficial as a means to countervail unfair trade practices, such as dumping or foreign export subsidies, that in themselves may lead to inefficient resource allocation.

The analysis here shows a relatively small impact from a 25 percent tariff on most steel imports and a 10 percent tariff on most aluminum. If political tensions escalate and countries impose stiff, prohibitively high tariffs on the U.S., leading to a series of retaliatory moves, the effects can become much larger.

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### Notes

<sup>1</sup>"The Effect of Imports of Steel on the National Security," U.S. Department of Commerce, 2018, accessed March 21, 2018, [www.commerce.gov/file/effect-imports-steel-national-security-investigation-conducted-under-section-232-trade](http://www.commerce.gov/file/effect-imports-steel-national-security-investigation-conducted-under-section-232-trade), and "The Effect of Imports of Aluminum on the National Security," U.S. Department of Commerce, 2018, accessed March 21, 2018, [www.commerce.gov/file/effect-imports-aluminum-national-security-investigation-conducted-under-section-232-trade](http://www.commerce.gov/file/effect-imports-aluminum-national-security-investigation-conducted-under-section-232-trade).

<sup>2</sup>"General Agreement on Tariffs and Trade 1994," World Trade Organization, 1994, accessed March 21, 2018, [www.wto.org/english/docs\\_e/legal\\_e/06-gatt\\_e.htm](http://www.wto.org/english/docs_e/legal_e/06-gatt_e.htm).

<sup>3</sup>"Capital Accumulation and Dynamic Gains from Trade," by B. Ravikumar, Ana Maria Santacreu and Michael Sposi, Federal Reserve Bank of Dallas, Globalization and Monetary Policy Institute Working Paper no. 296, 2017.

<sup>4</sup>"Questionnaire on Announced U.S. Tariff Increase on Imports of Certain Steel and Aluminum Products and Possible EU Commercial Policy Measures in Response," European Commission, 2018, accessed March 21, 2018, [http://trade.ec.europa.eu/consultations/index.cfm?consultation\\_id=253](http://trade.ec.europa.eu/consultations/index.cfm?consultation_id=253).

<sup>5</sup>"USTR Announces Initiation of Section 301 Investigation of China," United States Trade Representative, 2017, accessed March 21, 2018, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2017/august/ustr-announces-initiation-section>.

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