



WORKING PAPER

STEEL & ALUMINUM TARIFFS PRODUCE MINIMAL IMPACT ON JOBS, GDP:

CPA ECONOMIC MODEL REFUTES ALARMIST TRADE PARTNERSHIP STUDY

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The Coalition for a Prosperous America's (CPA) modeling study of the impact of the Section 232 tariffs on the U.S. economy shows minimal national macroeconomic impact of the tariffs. This study shows that U.S. GDP would fall by 8/1000s of 1 percent of GDP, or \$1.4 billion. Economy-wide net job gains or losses would be negligible, as the 19,000 jobs gained in the steel and aluminum sectors would largely offset any job losses in metal-consuming industries.

On March 1, President Trump announced his intention to adjust the level of steel and aluminum imports by imposing a 25 percent tariff on imports of steel and a 10 percent tariff on imports of aluminum. The tariff was recommended by the Department of Commerce¹ and approved by the President² due to the threat to national security arising from the weakened state of the steel and

aluminum industries caused by excessive imports. The CPA study finds that the domestic prices of steel and aluminum would rise far less than the tariff rate, due to available U.S. capacity and competition. Specifically, steel prices are forecast to rise 6.29 percent and aluminum prices just 2.5 percent. These small price increases limit the effect of the tariffs on other sectors of the U.S. economy. The CPA study was carried out using the publicly available GTAP general equilibrium model and 2016 data.

Figure 1 below shows the changes in U.S. jobs by sector resulting from the imposition of tariffs. Specifically, manufacturing jobs fall by a total of 7,454 jobs due primarily to the higher costs borne by steel-consuming and aluminum-consuming industries. Service sector jobs rise by 6,021 jobs due, in part, to the economic impact of the expanding steel and aluminum industries. Both industries spend money and create jobs in related supporting service industries. The U.S. steel industry has a high "employment multiplier," with each steel industry job supporting seven jobs in other industries.³ Because aluminum employment multipliers were unavailable at the time of this study, CPA's employment analysis is conservative. Regardless, CPA's model assumes that tax revenue generated by the tariffs is simply absorbed into general federal government revenue. CPA finds that the tariffs will generate an additional \$5.97 billion in federal revenue. CPA believes that if this revenue is proactively invested by the federal government, it could

¹ U.S. Dep't of Commerce, Bureau of Indus. and Sec., Off. of Tech. Evaluation *The Effect of Imports of Steel on the National Security: An Investigation Conducted Under Section 232 of the Trade Expansion Act of 1962, as amended* (Jan.11, 2018).

² Proclamation No. 9704, 83 Fed. Reg. 11, 619 (Mar. 15, 2018); Proclamation No. 9705, 83 Fed. Reg. 11,625 (Mar. 15, 2018).

³ Timothy J. Considine, *Economic Impacts of the American Steel Industry: Key Findings* (Mar. 2012) at 1.

Figure 1. Net Number of U.S. Jobs Impacted by Steel and Aluminum Tariffs

	Number of jobs
Primary agriculture	464
Primary energy, mining	-123
Utilities	680
Manufacturing	-7,454
Processed Food	403
Beverages, Tobacco	56
Petroleum and coal products	-134
Chemical, rubber, plastics	18,859
Iron and steel	-8,598
Nonferrous metals	-3,585
Fabricated metal products	-2,539
Motor vehicles and parts	-4,489
Other transportation equipment	-5,328
Electrical equipment	73
Other machinery	121
Textiles	101
Clothing	-2,393
Leather products, footwear	6,021
Paper and paperboard	-10,635
Other manufactures	29
Services	6,021
Construction	36
Air transport	3,503
Water Transport	-1,112
Other Transport	468
Trade and distribution	155
Communications	740
Financial services	1,693
Insurance	1,321
Business and prof. services	9,822
Recreational services	-411
Other Services	-411
Total	-411

Source: Adjusted GTAP database and model simulations; U.S. Bureau of Economic Analysis (base year full-time equivalent employees).

lead to net job creation. CPA's model looks at change over a single period, *i.e.* before tariffs and after tariffs. Over a longer period, the additional investment in the steel and aluminum industries will likely produce a positive growth effect on both employment and GDP via the traditional multiplier effect.

COMPARING JOBS AND WAGES

Steelworkers, aluminum workers, and mineworkers in industries supplying steel and aluminum earn higher wages on average than those in steel-consuming and aluminum-consuming industries. As **Figure 2** demonstrates, production jobs in the steel industry pay \$45,220 per year, compared to jobs in steel consuming industries, which have averages ranging from \$39,000 to \$41,000. Likewise, alumina and aluminum industry wages are also at the upper end of the

aluminum consuming industry wages. This somewhat offsets the effects of job losses in steel-consuming and aluminum-consuming industries.

EXPLAINING ALTERNATE STUDY RESULTS

The Trade Partnership (TTP), a consulting firm, recently released a study⁴ claiming that the 232 tariffs would reduce employment by a net 145,870 jobs. The TTP results are driven by an assumption that is neither justified by current economic conditions nor by recent experience. Had the study employed the standard assumption consistent with the current U.S. labor market, the net job effects simulated by the model would have been far lower and consistent with the results above.

Like CPA, TTP used the static GTAP

Figure 2. Wages of Production Workers in Major Industries that Product and Use Steel and Aluminum

Industry	Annual Mean
<i>Steel and Aluminum Producing Industries</i>	
Iron and Steel Mills and Ferroalloy Manufacturing	\$45,220
Alumina and Aluminum Production and Processing	\$40,500
Coal Mining	\$57,480
Metal Ore Mining	\$59,160
<i>Steel and Aluminum Consuming Industries</i>	
Fabricated Metal Product Manufacturing	\$39,080
Motor Vehicle Parts Manufacturing	\$37,410
Other Transportation Equipment Manufacturing	\$39,380
Machinery Manufacturing	\$40,520
Electrical Equipment Manufacturing	\$38,340

Source: Bureau of Labor Statistics, May 2016 National Industry-Specific Occupational Employment and Wage Estimates for Occupation Code 51-0000 Production Workers in NAICS 33110, 331300, 332000, 336300, 336900, 333000, and 335300; and for Occupation Code 47-0000 Construction and Extraction Occupations in NAICS 212100 and 212200.

⁴ Dr. Joseph Francois and Laura M. Baughman, *Does Import Protection Save Jobs? The Estimated Impacts of Proposed Tariffs on Imports of U.S. Steel and Aluminum*, Trade Partnership Worldwide, LLC/ The Trade Partnership (Mar. 5, 2018). A report issued subsequently provides an even higher job loss figure to account for alleged potential retaliation. See Dr. Joseph Francois and Laura M. Baughman, *Policy Brief: Round 2: Trading Partners Respond – The Estimated Impacts of Tariffs on Steel and Aluminum*, Trade Partnership Worldwide, LLC/ The Trade Partnership (Mar. 13, 2018).

computable general equilibrium (CGE) model to simulate the effects of the proposed tariffs.⁵ However, such models require a number of assumptions and modeling choices that could influence results, including the magnitude of the tariffs applied, the split between fixed and endogenous variables, and any changes to the database. TTP's short paper provides little detail to enable replication.

The United States currently has a strong economy characterized by low unemployment. The current unemployment rate is 4.1 percent, which is consistent with full employment.⁶ This is an important fact because the GTAP model requires that a choice be made between one of two different model "closures" in order to calculate employment effects,⁷ and that assumption should be consistent with the economy and relevant time period. If the economy is at full employment, it is appropriate to impose the full employment closure, which allows wages to adjust in order to re-equilibrate labor supply and demand.⁸

If the country's unemployment rate is high, it is appropriate to utilize a closure in which wages are fixed and the quantity of jobs in the overall economy can expand and contract. Given the current rate of unemployment in the U.S. economy, the unemployment closure is inappropriate for the current U.S. economy. Notably, the U.S. International Trade Commission's (ITC) studies using the GTAP model to assess the economic effects of changes in tariffs frequently assume a

fixed quantity of labor.⁹ Indeed, the ITC's 2003 study of the effects of the Section 201 safeguard tariffs on the U.S. economy also used a full employment closure.¹⁰ CPA's model is therefore consistent with the approach used by the ITC in similar circumstances, while the TTP's approach is not.

This inappropriate assumption drives the TTP's results. In their results, the manufacturing sector loses just 2,612 jobs. TTP's model shows a far larger decline of 142,305 jobs occurring in service sectors, and most of that decline occurs in sectors that do not use purchased steel or aluminum as an input. The outsized decline in service sector jobs is a direct result of TTP's assumption that firms in service sectors will adjust to the duties by firing workers. This scenario is implausible under current economic conditions, which are even stronger now as compared to even the 2016 employment conditions upon which the TTP's model was constructed.

CPA STUDY CONSISTENT WITH PRIOR STUDIES

CPA's results are consistent with prior economic modeling studies and U.S. experience following the imposition of Section 201 tariffs on steel in 2002. This is in contrast to the TTP study results published by authors Francois and Baughman in 2001, which were found to be too high.

The TTP's job loss estimates are

⁵ However, TTP's model used V10 of the GTAP, which is not publicly available. CPA used the publicly available V9 model and updated the data to reflect the economic conditions in 2016. The difference in the versions does not appear to have any material effect on the conclusions generated.

⁶ In 2016, the base year for the database, the unemployment rate was 4.9 percent. Bureau of Labor Statistics via the Federal Reserve Bank of St. Louis. Civilian unemployment rate (UNRATE), monthly, seasonally adjusted.

⁷ Closure refers to the achievement of equilibrium in the model. Different closures are possible, depending on which variables are fixed and which are endogenous, *i.e.*, generated by the model's calculations

⁸ See, *e.g.*, Mary E. Burfisher, *Introduction to Computable General Equilibrium Models* 27, 162 (Cambridge University Press, 2d ed. 2016).

⁹ See Justino De La Cruz and David Riker, *The Impact of NAFTA on U.S. Labor Markets*, U.S. Int'l Trade Comm'n (June 2014) at 12 (showing a recent study conducted when the U.S. unemployment rate was low).

¹⁰ *Steel-Consuming Industries: Competitive Conditions with respect To Steel Safeguard Measures*, Inv. No. 332-TA-452, USITC Pub. 3632, vol. 3 (Sept. 2003) ("USITC Pub. 3632") at G-4.

inconsistent with prior CGE modeling estimates of job losses from the Section 201 steel safeguards, which were in place from March 2002 to December 2003. Using its own CGE model, the ITC found a net decline in labor income of \$386 million, equivalent to 10,365 jobs.¹¹ Using the GTAP model, Francois and Baughman estimated that the 201 safeguard measures would lead to a loss of 36,200 to 74,500 jobs.¹²

Historically, the modeling performed by Francois and Baughman has tended to generate excessive job losses that do not necessarily correlate to the effects of the tariffs or the health of the economy at that time. Economist Peter Morici (2003) pointed out that employment for industries falling within the scope of Francois' and Baughman's broad definition of steel-consuming industries actually increased by almost 53,000 jobs between March 2002 and December 2002, and that employment fell by about 281,000 during the same period in 2001.

An article in the *Financial Times* also questioned the temporal correlation between the employment losses cited in Francois and Baughman's estimates and the imposition of the Section 201 measures:

What the study also failed to mention was that all the jobs lost in 2002 actually occurred in January 2002, two months before tariffs were imposed and when steel prices were near historic lows. Between January and December 2002, total employment in industries that buy steel grew by about 228,000 jobs, despite higher steel

prices.¹³

NOTES ON METHODOLOGY

The simulation using the full employment closure was conducted using the GTAP model and database v9, which has a base year of 2011¹⁴. The model was updated to 2016 by adjusting U.S. final demands, capital, labor, U.S. total and merchandise trade flows, and rest-of-world final demands. In this study, results for the full employment simulation were applied to 2016 data on full-time equivalent employees maintained by the U.S. Bureau of Economic Analysis (BEA). Because of the manner in which BEA presents its sectoral data, results for certain GTAP sectors had to be combined. In these cases, weighted average growth rates were used to calculate sectoral employment effects. A 25 percent duty was applied to total imports in the steel sector and a 10 percent duty was applied to the value of aluminum imports.

¹¹ *Id.* at 4-5 (Table 4-3). This calculation is based on a GDP per capita of \$37,240 per person. See U.S. Bureau of Economic Analysis, Gross domestic product per capita (A939RC0A052NBEA), retrieved from FRED, Federal Reserve Bank of St. Louis, <https://fred.stlouisfed.org/series/A939RC0A052NBEA> (last updated Feb. 28, 2018).

¹² Joseph F. Francois and Laura M. Baughman, *Estimated Economic Effects of Proposed Import Relief Remedies for Steel, Trade Partnership Worldwide*, LLC (Dec. 19, 2001), http://tradepartnership.com/wp-content/uploads/2014/06/Steel_Remedies.pdf, (last visited Mar. 19, 2018). See also USITC Pub. 3632 at F-5 n.4.

¹³ *The Devil's in the Details*, Observer Column: Financial Times (Feb. 10, 2003).

¹⁴ The aggregated database had 2 regions (USA and Rest of World), 30 sectors, and five factors of production, including skilled and unskilled labor.