

Costs of Trade Wars:
The Distributional Consequences of US Section 301 Tariffs Against China

Kara M. Reynolds, American University¹

June 2021

Abstract

Between 2018 and 2020, the United States imposed massive new tariffs under a variety of trade laws, most notably the Section 301 tariffs against China. This new protection is extensive in magnitude and breadth; tariffs range from 10 to 30 percent and cover 50 percent of US consumer imports from China and 16 percent of total US consumer imports. Using data from the Consumer Expenditure Survey, I estimate that these tariffs cost the average US household at least \$160 per year. I further find that the new taxes are highly regressive; the lowest income consumers pay more than 1.2 percent of their after-tax income to fight these trade wars, while the wealthiest consumers pay just 0.18 percent of their after-tax income. I find additional evidence that women and parents are paying an unfair share of efforts to put America first. While the current Administration has proposed to raise taxes on the wealthy to make the US tax system fairer, they should also eliminate tariffs which place undue burdens on the most vulnerable in our society.

JEL: F13

Key Words: Tariffs, Section 301, Consumer Loss

¹ Kara M. Reynolds, American University, Department of Economics; 4400 Massachusetts Avenue, NW, Washington, DC 20016. Telephone: (202) 885-3768. E-mail: reynolds@american.edu

1. Introduction

Traditional trade theories posit identical and homothetic preferences across consumers, implying that the cost of trade protection will be borne proportionately across consumers. However, researchers have increasingly found evidence that there are distributional consequences of tariffs due to heterogeneity and non-homotheticity in preferences. For example, Furman, Russ, and Shambaugh (2017) find that the poorest consumers face a much higher burden from the US tariff structure than wealthier consumers, with a particularly high cost borne by single parents, while Gaijes et al. (2019) find that women face a much larger tariff burden than men in the United States. Conversely, Carroll and Hur (2020) conclude that a reduction in trade costs would result in a 1.8 percent permanent increase in the consumption of the lowest income consumers, but only a 1.1 percent increase in the consumption of the highest income consumers.¹

Given these findings, one might hope that US politicians would be careful of distributional consequences when imposing protection in the name of recent populist demands to “put America first.” As detailed in Table 1, between 2018 and 2020 the United States raised tariffs on a wide variety of consumer products and against virtually all of our major trading partners.² Protection levels on consumer products started to increase in early February of 2018 when the United States imposed safeguard protection on imports of washing machines and solar panels, and rose dramatically starting in July of 2018 when the US targeted the first of four groups of products from China in retaliation for its policies ranging from restrictions on joint ventures to intellectual property rights violations under Section 301 of US trade law.

The tariffs imposed in these cases were large, ranging from 10 to 25 percent, and extensive; the Chinese Section 301 tariffs now cover nearly 7,000 products. Figure 1 illustrates the value of US consumer imports covered by the new tariffs described in Table 1. Note the decrease in this value in 2019, which was not due to a broad removal of tariffs but rather from the exception process associated with the 301 tariffs, in which US companies could apply to be exempted from the tariffs if there was no US source for the product in question; although slightly over 2,000 products were exempted from the tariffs through this process, most of these exclusions expired at the end of 2020. As of January 2021, new tariffs had been imposed on almost 50 percent of US consumer imports from China, and 16 percent of total US consumer imports.³

Theoretically, the cost of the tariffs to US consumers should depend on the tariff pass-through rate, often modelled as a function of the export supply elasticity. Research on the 2018 tariffs suggest that US consumers are paying the bulk, if not all, of the cost of the tariffs. For example, Amiti et al. (2019) find that the tariff inclusive import unit value of the goods subject to tariffs throughout 2018 increased

¹ These results are consistent with the findings of Hottman and Monarch (2020), who find that while the share of spending on imports is fairly consistent across income groups, because the composition of imports differs across income groups higher income consumers experience lower import price inflation than other consumers.

² This table does not include the extensive steel and aluminum tariffs that were imposed in the Summer of 2018 which also raise the cost of consumer products through increases in production costs; it also does not account for the retaliatory tariffs put in place by US trading partners, which likely also increased production costs of US firms and reduced US exports.

³ This likely underestimates the true amount of trade facing tariffs because while the tariff exceptions are often “product-specific,” I assume that the exception applies to all imports under the 10 digit HS code.

on average 10 to 30 percent, suggesting that pass-through to US consumers for these products was nearly 100 percent; the authors estimate that the total cost to consumers reached \$4.7 billion per month. Flaaen et al. (2020) use data on final point of sale prices to specifically study the impact of the Section 201 tariffs on washing machines; the authors find that while earlier antidumping duties imposed on China resulted in only minor price increases because retailers were able to source from other countries, the 2018 Section 201 tariffs resulted in an 11 percent jump in washer prices, corresponding to a tariff elasticity of consumer prices of 1.25. Interestingly, they also find a similar jump in the price of dryers, which were not subject to the 201 tariffs but which do have prices that are highly correlated with those of washers. In contrast, Cavallo et al. (2021) find nearly full pass-through of the Chinese tariffs to US import prices, but only a small (0.7 percent) increase in the retail prices of products from China. The authors suggest this may be because retailers (1) increased imports prior to the tariff implementation and (2) shifted suppliers away from China after the tariffs.⁴

Given recent findings that Chinese imports have significantly lowered US price levels (Bai and Stumpner (2019), Amiti et al. (2020)), it is not surprising that new tariffs on these imports would increase US prices. In this paper I investigate to what extent the new tariffs imposed on consumer products since 2018, and particularly the Section 301 Chinese tariffs, have had distributional consequences on US consumers. Using consumption data from the Consumer Expenditure Survey, I estimate the average cost that these tariffs imposed on US consumers by decile of income. The results suggest that the lowest income consumers, families with young children, and women have paid a disproportionately high cost for recent US trade wars.

2. Data and Methodology

In order to calculate the cost of the recent tariffs to US consumers, I utilize the methodology employed by Furman, Russ, and Shambaugh (2017) and Gales et al. (2018) by matching the tariffs implemented between 2018 and 2020 to consumption data from the 2017 Consumer Expenditure Survey (CES) from the US Census Bureau. The CES has detailed consumption and income data, which allows me to study the degree to which variation in consumption patterns results in variation in the cost of protection across US households. Unfortunately, the CES does not include retail price data, but I estimate the impact of the tariffs on consumer prices using the methodology detailed below.

Price Changes Due to Tariffs

I calculate the import-weighted average Section 301 tariff imposed upon Chinese imports as of January 2021 by six-digit NAICS code using nominal 2017 imports from China as weights. Section 301 tariffs impacted 90 percent of traded-good NAICS industries. As illustrated in Figure 2, although the average tariffs in some industries were fairly small, one-quarter of traded-good NAICS industries had average Section 301 tariffs of 25 percent and industries across agriculture (NAICS codes 111-114), mining (NAICS codes 211/212), and manufacturing (NAICS codes 311-399) were significantly impacted by at least some new protection.

⁴ Although not specific to the recent round of tariffs, the general equilibrium model of Fajgelbaum et al. (2020) also predicts almost complete pass-through of tariffs to US consumers.

Consistent with findings in Amiti et al. (2019), I assume full (100 percent) tariff pass-through to Chinese import prices. Such high levels of pass through are evident in Figure 3, which illustrates the mean tariff inclusive import unit values of Chinese products.⁵ The impact on import unit values is most dramatic for the more than 800 products targeted in July of 2018—the one year increase in unit-prices as of August 2018 for these products was 131 percent; comparable average unit price increases in the month after the imposition of the Section 301 tariffs was 10.6 percent for those products targeted in August 2018, 4.2 percent for List 3 products in October 2018, with an additional 6.5 percent in July 2019 after the tariffs on those products were increased from 10 to 25 percent.

The change in domestic prices is modelled as a function of the Chinese import penetration ratio. Specifically, assuming full pass through of the tariff to Chinese import prices, once can assume that the change in the US price for product i will equal:

$$\partial \ln(p_i) = s_{i,China} \ln(1 + \tau_{i,China}) + (1 - s_{i,China}) \ln(1 + \frac{\partial p_{i,non-China}}{\partial \tau_{i,China}})$$

where $s_{i,China}$ is the US market share of Chinese imports, τ_i is the Section 301 tariff, and $\frac{\partial p_{i,non-China}}{\partial \tau}$ is the change in domestic producer and non-Chinese trading partner prices in response to these Section 301 tariffs. In my baseline estimations, I assume that there is no impact on non-Chinese prices. However, previous research suggest that the decrease in Chinese competition will lead to price increases of non-Chinese producers. For example, Jaravel and Sager (2019) found that domestic manufactures lowered their mark-ups in response to higher Chinese import penetration rates, and Hayakawa and Ito (2015) found that the tariff pass through of cuts associated with regional free trade agreements for non-RTA members was as high as 0.73. Therefore, I also make a second assumption that the Section 301 tariff will increase prices of non-Chinese products by half the amount of the tariff, but only when China accounts for at least 25 percent of the US market share. Chinese market shares are calculated using trade data from the US Census Bureau and US production data from the 2016 Manufacturer and International Trade Report (MITR), also from the US Census Bureau.

I match these estimated price changes to Universal Classification Codes (UCC) product codes in the Consumer Expenditure Survey using the concordance created by Furman et al. (2017),⁶ which matches the CES UCC codes to harmonized system (HS) and (thus) North American Classification Codes (NAICS). Using this concordance, I am able to match slightly more than half of the six-digit UCC codes in the CES with the price increases associated with the Section 301 tariffs. While most of these price increases are extremely small – half of all products experienced price increases of less than 0.5 percent--one-quarter of products experienced price increases of 2 percent or more. For example, I estimate that luggage, boy's footwear, and "school supplies for other schools" experienced price increases of 11 percent, with

⁵ Unit values were normalized by the mean (tariff exclusive) unit value of the ten-digit HS code between 2017 and 2020.

⁶ Because the UCC codes are at a finer level of aggregation than six-digit NAICS, approximately 60 percent of NAICS codes are associated with more than one UCC codes. In this case, I assume that the price change calculated for the six-digit NAICS industry applies to all UCC codes matched to that NAICS. For example, the estimated price increase for NAICS code 339940 (office supply manufacturing) is applied to school supplies for college (UCC 660110), elementary and high school (UCC 660210) and vocational and technical schools (UCC 660410). Similarly, slightly more than 43 percent of UCC codes are matched to more than one NAICS code. In this case, I apply the weighted average price increase across the NAICS codes associated with the UCC code, where the weights are the relative size of the domestic market size of the NAICS industry.

other large increases of five to 7 percent in the price of uniforms, women’s accessories, lighting fixtures, microwave ovens, and other household appliances.

Calculating the Tariff Burden on Consumers

I use these price changes to calculate the tariff burden to US consumers as a compensating differential. In other words, I estimate how much money consumers would need to offset the price change holding their consumption patterns constant as of 2017. Specifically, the average price increase experienced by household h depends on their consumption bundle, and can be expressed as the expenditure-share weighted average of price increases across products in this bundle according to the equation:

$$\Delta CPI_h = \sum_i \partial \ln(p_i) * e_{hi,2017}$$

where e is the share of household h 's total expenditures spent on product i . Note that the average price increase can equivalently be described as the share of the cost of the tariff in the household's total expenditures. By multiplying this value by the household's total expenditures, I calculate the total cost of the tariffs to the household.

Although the focus of this paper is the Section 301 tariffs imposed against China, I also estimate the cost of the other new tariffs described in Table 1 (washer and dryers, solar panels, and the Boeing-Airbus retaliatory tariffs) using the same methodology.

3. Results

Using this methodology, I find that the Section 301 tariffs on Chinese consumer goods cost the average US household at least \$145 per year. However, further analysis reveals a great deal of heterogeneity in this cost across households. Figure 4(a) and (b) illustrate the average cost of these tariffs as measured in (1) dollars and (2) share of after-tax income, respectively, across the income distribution. The most conservative results, in which I assume that domestic and non-Chinese producers kept their prices unchanged in the face of these tariffs, suggest that the lowest income consumers paid an extra \$63 per year due to the Section 301 tariffs while the highest income consumers paid on average \$328 per year due to these same tariffs. The magnitudes are striking given the fact that Furman et al. (2017) estimate that the entire US tariff structure prior to 2018 cost the lowest income US consumers approximately \$95 (with comparable figures for the highest income consumers of approximately \$500.00). This reflects the magnitude of the tariffs (ranging from 10 to 25 percent), the breadth of coverage of these tariffs, and the importance of China as a US trading partner.

Further analysis suggests that these tariffs are indeed regressive, with the lowest income consumers paying on average 1 percent of their after-tax income on the Section 301 tariffs compared to only 0.21 percent of the after-tax income of the highest income consumers. Compare these increased taxes to the benefits accruing to US households from the 2018 Tax Cut and Jobs Act; the Tax Foundation estimated that this expansive tax policy shift would result in a 0.8 percent increase in the after-tax

income of the lowest income households, while taxpayers in the middle three quintiles of income would experience an increase in after tax income of approximately 1.5 percent in 2018.⁷

The price increases in products such as footwear, furniture, apparel, small appliances, and toys and games result in other heterogeneous impacts across consumers. For example, Table 2 illustrates that families with young children bear a greater share of the Section 301 tariffs than the rest of the society, particularly households headed by single mothers. Similarly, women bear a greater share of the cost of the tariffs; the cost to single women is on average 0.31 percent of their after-tax income compared to only 0.21 percent of the after-tax income of single men.

Although the tariffs imposed on China were extensive, the United States has targeted other consumer products for added protection over the past three years. These additional tariffs, listed in Table 1, are analyzed in Figure 5a and 5b. Although the magnitudes are much smaller, with the lowest income consumers paying on average slightly less than \$8 per year and the highest income consumers paying \$29 per year, they are still clearly regressive, with the lowest income consumers paying a significantly larger share of their total income for these protectionist measures. The bulk of these costs come from the increase in the price of washing machines, alcoholic beverages, and dairy products.

4. Conclusion

The increase in protection between 2018 and 2020, sometimes loosely referred to as the “Trump tariffs,” has been widely criticized by economists. The protection is extensive in magnitude and breadth, with individual tariffs ranging from 10 to 30 percent imposed upon products accounting for 50 percent of US consumer imports from China and 16 percent of total US consumer imports. Using data from the Consumer Expenditure Survey, I estimate that the Section 301 tariffs on Chinese consumer products costs the average US household at least \$145 per year, while other recent tariffs (including Section 201 tariffs on washers and solar panels, and retaliation tariffs against the European Union for Airbus subsidies) add an additional \$15.

These estimates clearly underestimate the true cost of the new protection, as the values assume that the tariffs had no impact on the prices of domestic producers and producers in the countries not impacted by the tariffs. Perhaps more importantly, the values exclude the impact of the extensive tariffs on intermediate goods and raw materials, particularly steel and aluminum, which have been imposed since 2018 and have also increased US prices.

I further find that these new taxes are highly regressive. The lowest income consumers, those in the bottom decile of the income distribution, are conservatively paying an extra \$71 dollars per year due to new tariffs on US consumer imports, or 1.2 percent of their after-tax income. The tax *increase* associated with these consumer tariffs is on par with the tax cut that these same consumers benefitted from in the much-touted Tax Cut and Jobs Act of 2018. In comparison, those in the middle of the income distribution are paying \$120 per year (0.27 percent of their after-tax income) while the highest

⁷ The Tax Foundation, “The Distributional Impacts of the Tax Cuts and Jobs Act Over the next Decade,” June 28, 2018, accessed at <https://taxfoundation.org/the-distributional-impact-of-the-tax-cuts-and-jobs-act-over-the-next-decade/> on June 3, 2021.

income consumers are paying \$358 per year (0.18 percent of their after-tax income). I find evidence that women and parents are paying an unfair share of the tax increase.

There has been much discussion of late regarding the need to increase taxes on the wealthiest Americans to make the US tax system fairer. Policymakers should start by reexamining the massive tariffs enacted over the past three years to eliminate this regressive tax and limit inflationary pressures.

References

- Amiti, Mary, Mi Dai, Robert C. Feenstra, and John Romalis. 2020. "How Did China's WTO Entry Affect U.S. Prices?" *Journal of International Economics* 126 (September): 103339.
- Amiti, Mary, Stephen J. Redding, and David E. Weinstein. 2019. "The Impact of the 2018 Tariffs on Prices and Welfare." *Journal of Economic Perspectives* 33 (4): 187–210.
- Bai, Liang, and Sebastian Stumpner. 2019. "Estimating US Consumer Gains from Chinese Imports." *American Economic Review: Insights* 1 (2): 209–24.
- Carroll, Daniel R., and Sewon Hur. 2020. "On the Heterogeneous Welfare Gains and Losses from Trade." *Journal of Monetary Economics*, SI:APR2019 CRN CONFERENCE, 109 (January): 1–16.
- Cavallo, Alberto, Gita Gopinath, Brent Neiman, and Jenny Tang. 2021. "Tariff Pass-Through at the Border and at the Store: Evidence from US Trade Policy." *American Economic Review: Insights* 3 (1): 19–34.
- Fajgelbaum, Pablo D, Pinelopi K Goldberg, Patrick J Kennedy, and Amit K Khandelwal. 2020. "The Return to Protectionism*." *The Quarterly Journal of Economics* 135 (1): 1–55.
- Flaaen, Aaron, Ali Hortaçsu, and Felix Tintelnot. 2020. "The Production Relocation and Price Effects of US Trade Policy: The Case of Washing Machines." *American Economic Review* 110 (7): 2103–27.
- Furman, Jason, Katheryn Russ, and Jay Shambaugh. 2017. "US Tariffs Are an Arbitrary and Regressive Tax." *European* (blog). January 12, 2017. Accessed at <https://european.economicblogs.org/voxeu/2017/russ-shambaugh-tariffs-arbitrary-regressive-tax> on June 4, 2021.
- Gailes, Arthur, Tamara Gurevich, Serge Shikher, and Marinos Tsigas. 2018. "Gender and Income Inequality in United States Tariff Burden," US International Trade Commission Economic Working Paper Series No. 2018-08-B.
- Hayakawa, Kazunobu, and Tadashi Ito. 2015. "Tariff Pass-through of the World-Wide Trade: Empirical Evidence at Tariff-Line Level." DP-2015-34. *Working Papers*. Working Papers. Economic Research Institute for ASEAN and East Asia (ERIA).
- Hottman, Colin J., and Ryan Monarch. 2020. "A Matter of Taste: Estimating Import Price Inflation across U.S. Income Groups." *Journal of International Economics* 127 (November): 103382.
- Jaravel, Xavier, and Erick Sager. 2019. "What Are the Price Effects of Trade? Evidence from the U.S. and Implications for Quantitative Trade Models." Working Paper.

Table 1
Timeline of Protection, 2018-2020

February 7, 2018	<ul style="list-style-type: none"> •Section 201 tariffs imposed on washing machines (ranging from 20 to 40 percent) and solar panels (30 percent). Canada was excluded from the washing machine tariff rate quota.
July 19, 2018	<ul style="list-style-type: none"> •First of China Section 301 tariffs imposed --25 percent on 818 products.
August 23, 2018	<ul style="list-style-type: none"> •Second tranche of China Section 301 tariffs imposed --25 percent on an addition 284 products
September 24, 2018	<ul style="list-style-type: none"> •Third tranche of China Section 301 tariffs imposed --10 % percent on an addition 5,733 products. These tariffs increased to 25 percent on May 10, 2019.
December 28, 2018	<ul style="list-style-type: none"> •First of the Chinese exclusions put in place, retroactive to July 6, 2018.
September 1, 2019	<ul style="list-style-type: none"> •List 4A tariffs of 15 percent put in place on China.
October 18, 2019	<ul style="list-style-type: none"> •US imposes tariffs of 25 percent on 150 products from the EU in retaliation for Airbus subsidies (authorized by WTO). These tariffs were modified on January 12, 2020, March 5, 2020, and suspended in March 2021 for four months (on March 4 for UK goods and March 11 for EU goods).
December 15, 2019	<ul style="list-style-type: none"> •List 4B tariffs of 15 percent put in place on Chinese products.
February 14, 2020	<ul style="list-style-type: none"> •Tariffs reduced on Chinese products from List 4A to 7.5 percent, and removed from list 4B.

Notes: In addition to the tariffs described above, the Administration imposed tariffs on steel and aluminum products in the Summer of 2018. Tariffs on such intermediate goods are not included in this analysis.

Table 2
Cost of Section 301 Tariffs by Family Structure

Family Type	Low		High	
	Cost of Tariff (\$)	Percent Decrease in After Tax Income	Cost of Tariff (\$)	Percent Decrease in After Tax Income
Married				
Married, Oldest Child<6	211	0.24	272	0.31
Married, Oldest Child 6-17	237	0.25	293	0.31
Married, Oldest Child>17	198	0.20	242	0.24
Other Married	172	0.22	211	0.27
Single Parent				
Single Male Parent	124	0.23	153	0.28
Single Female Parent	136	0.33	169	0.41
Single				
Male	81	0.26	99	0.32
Female	74	0.21	89	0.25
Female	87	0.31	107	0.39

Table Notes: Cost based on 2017 expenditure patterns. The low estimate assumes full tariff pass through to Chinese import prices, but no impact on the prices of non-Chinese producers. The high estimate assumes that non-Chinese prices increase by half the amount of the tariff in those industries in which China accounts for at least 25 percent of US market share.

Figure 1
 Consumer Goods Targeted by Imports, 2018-2020

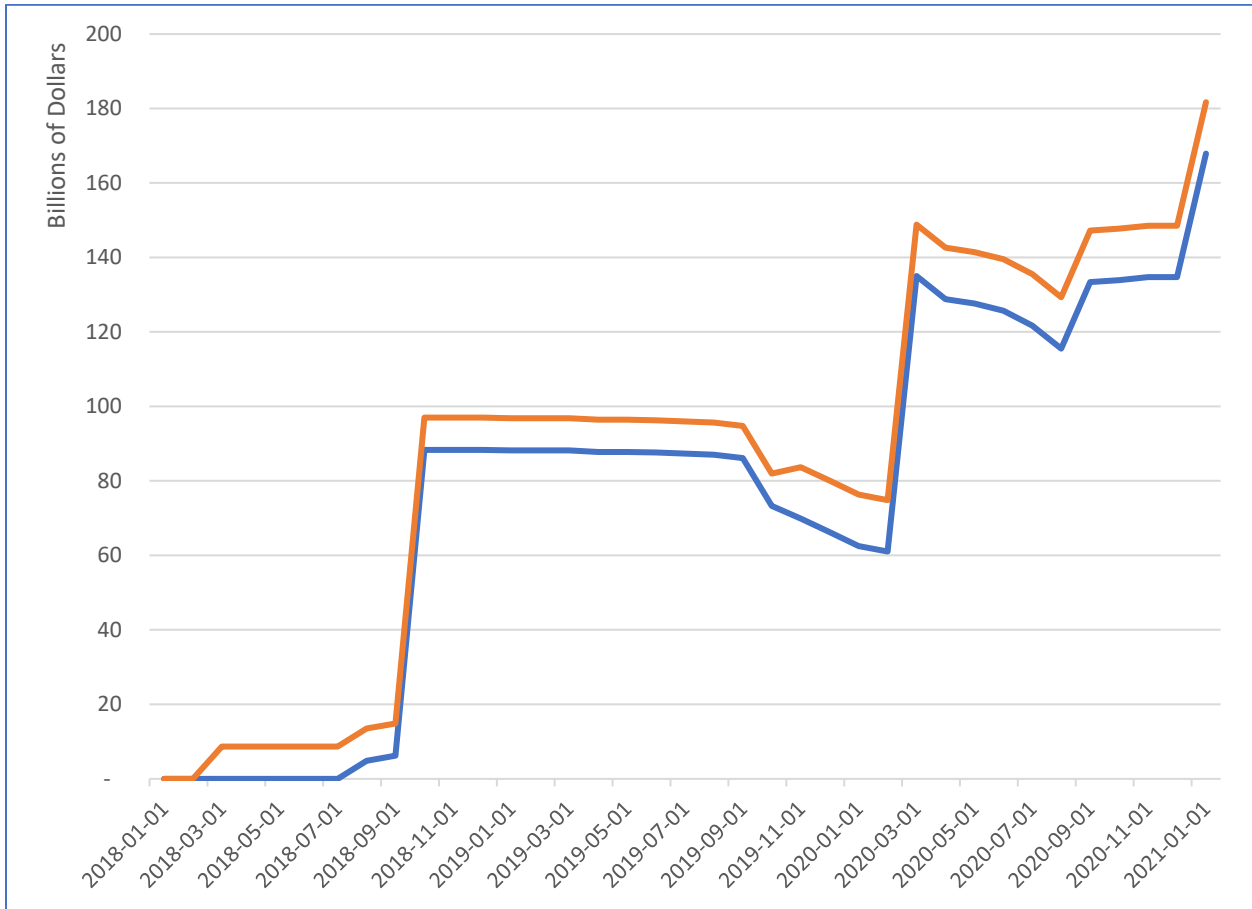


Figure Notes: Billions of dollars of imports covered by the new tariffs detailed in Table 1. These values do not allow for consumption distortions due to the new tariffs, but rather holds imports constant at 2017 nominal values and simply charts the new protection put in place. Consumer products are those categorized in Chapters 0 (Foods), 4 (Consumer Goods), 213 (Computers and Accessories), 214 (Telecommunications Equipment), 300 and 301 (passenger cars and trucks) of the Census' Import End-Use Classification.

Figure 2

Average Industry Section 301 Tariffs Imposed Against China, January 2021

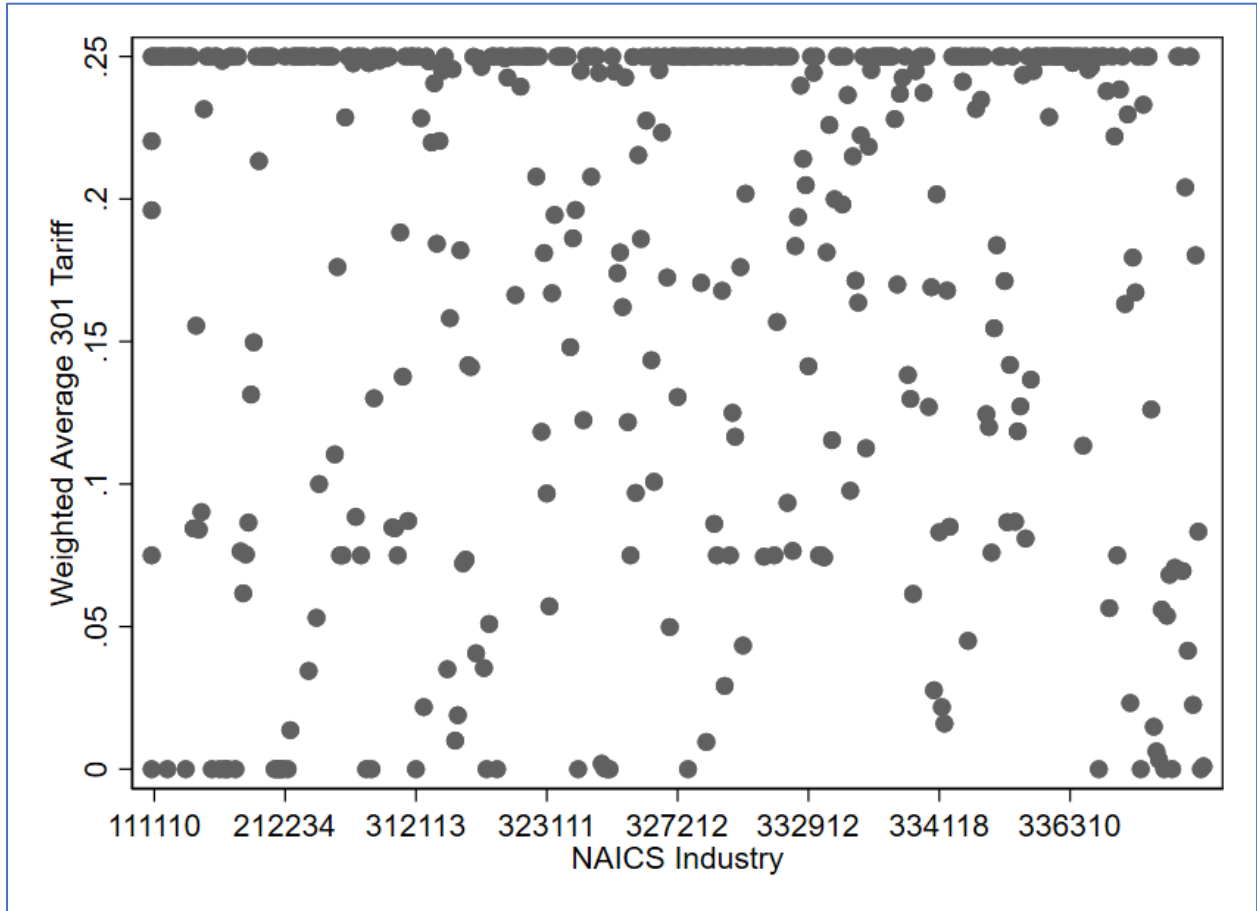


Figure 3

Average Chinese Import Unit Values (Consumer Goods)

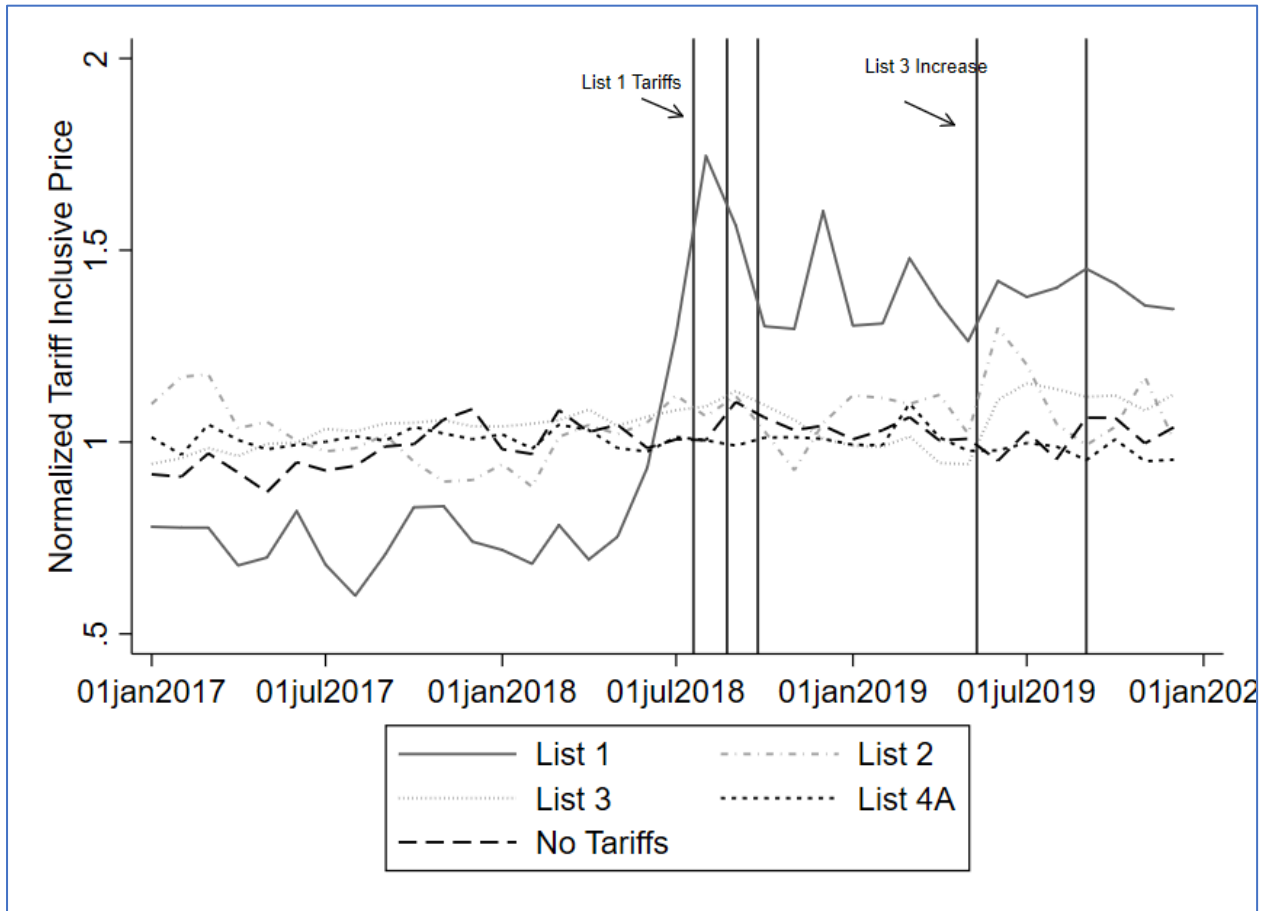


Figure Notes: Tariff inclusive import weighted unit prices by tranche of Section 301 Chinese tariffs. Monthly unit prices (customs value divided by first unit of quantity) calculated by ten-digit HS code, and normalized by the mean (tariff exclusive) unit price between 2017 and 2020.

Figure 4(a): Cost of Section 301 Tariffs Against China by Income Decile (Dollars)

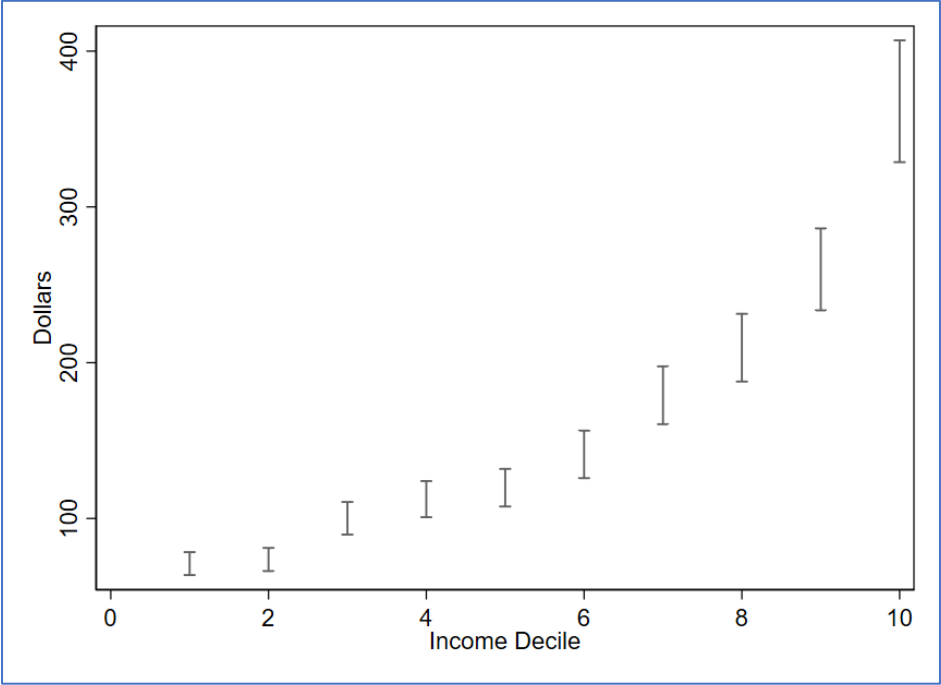


Figure 4b: Cost of Section 301 Tariffs Against China by Income Decile (Share of After-Tax Income)

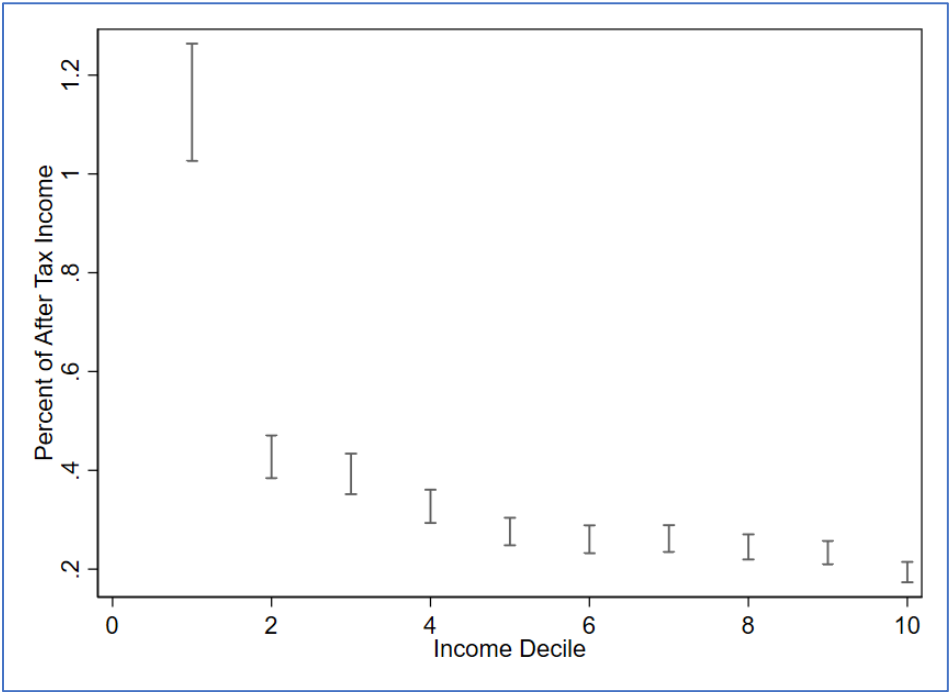


Figure Notes: Average Burden by decile of before tax income.

Figure 5(a): Cost of Section 201 and Airbus Retaliation Tariffs by Income Decile (Dollars)

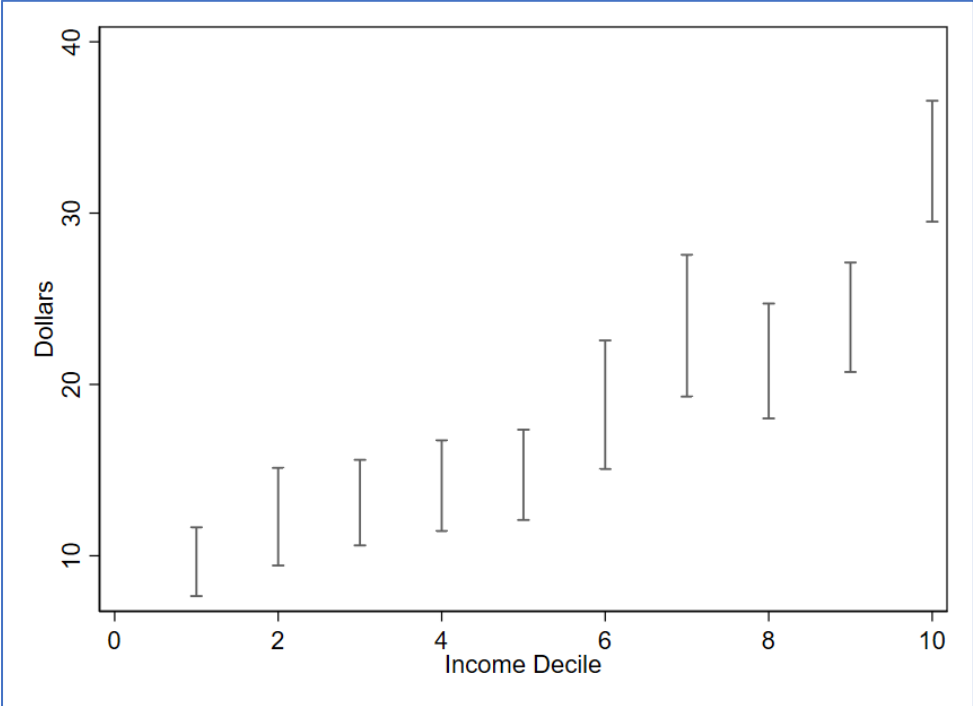


Figure 5b: Cost of Section 201 and Airbus Retaliation by Income Decile (Share of After-Tax Income)

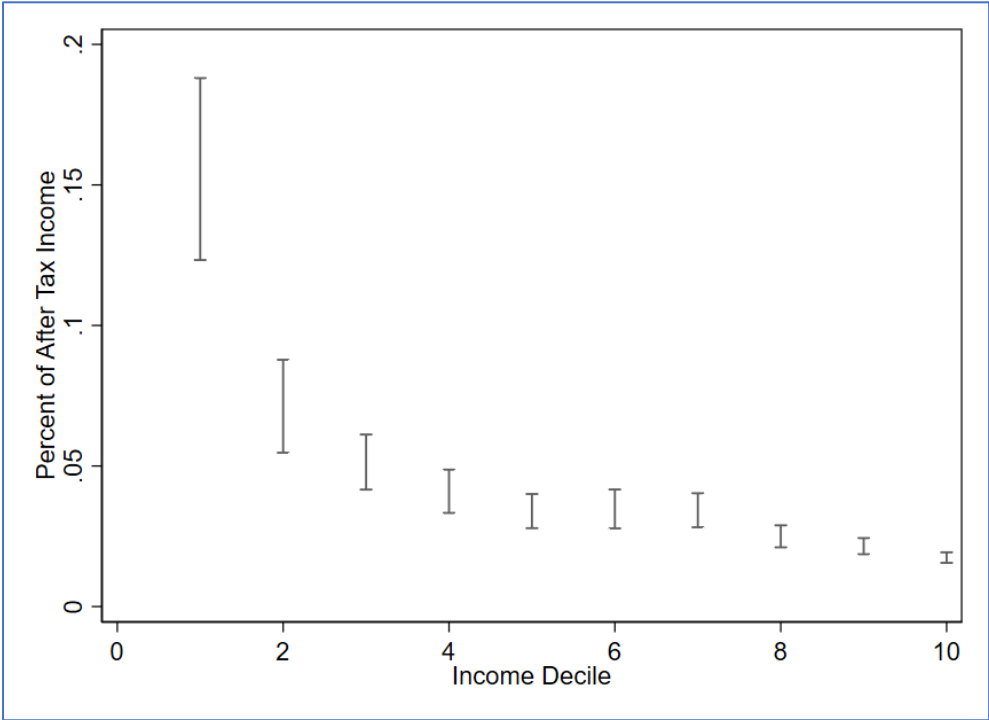


Figure Notes: Average Burden by decile of before tax income.