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THE RECENT CONSEQUENCES OF TRADE WARS AND TRADE THREATS

Who's Paying for the US Tariffs? A Longer-Term Perspective[†]

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Using data from 2018, numerous studies have found that recent US tariffs have been passed on entirely to US importers and consumers.[1] These results are surprising given that trade theory has long stressed that tariffs applied by a large country should drive down foreign prices. With almost another year of data and significant escalations in the trade war, one might wonder whether it continues to be true that terms-of-trade effects are absent or whether we can see evidence that in certain industries at least, the costs of the tariffs are now being paid by foreign firms. One might see terms-of-trade effects appear for many reasons. For example, US tariffs might cause foreign export prices to fall after a lag because long-term contracts or other factors render prices sticky. In this case, the initial results might not well describe the current situation. Alternatively, there might be important changes in how imports respond to tariffs because the passage of time may enable firms to more easily avoid tariffs by shifting production to Vietnam and other countries that were not targeted.

In this paper, we explore these issues and find that adding data for most of 2019 does not alter the main conclusions of earlier studies. US tariffs continue to be almost entirely borne by US firms and consumers. Similarly, we also find that the substantial redirection of trade in response to the 2018 tariffs has accelerated. Among goods that continue to be imported, a 10 percent tariff is associated with about a 10 percent drop in imports for the first three months, but this elasticity doubles in magnitude in subsequent months. These higher long-run elasticities suggest that the 2018 tariffs—many of which were applied in October—are only now having their full impact on US import volumes.

Interestingly, we do find evidence of significant differences in behavior across sectors. The data show that US tariffs have caused foreign exporters of steel to substantially lower their prices into the US market. Thus, foreign countries are bearing close to half the cost of the steel tariffs. Since China is only the tenth largest steel supplier to the US market, these costs have largely been borne by regions like the European Union, South Korea, and Japan.[2] This is likely good news for US firms that demand steel, but bad news for workers hoping that steel tariffs will bring back jobs. Indeed, the fact that foreign steel producers have lowered their prices in response to US tariffs may help explain why US steel production rose by only 2 percent per year between the third quarter of 2017 and the third quarter of 2019 despite 25 percent steel tariffs.[3]

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[1]See Amiti, Redding, and Weinstein (2019); Fajgelbaum et al. (2020); Flaaen, Hortaçsu, and Tintelnot (2019); and Cavallo et al. (2019).

[2]The steel tariffs on Canada and Mexico were lifted on May 19, 2019.

[3]Data are from FRED Economic Data, Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org).

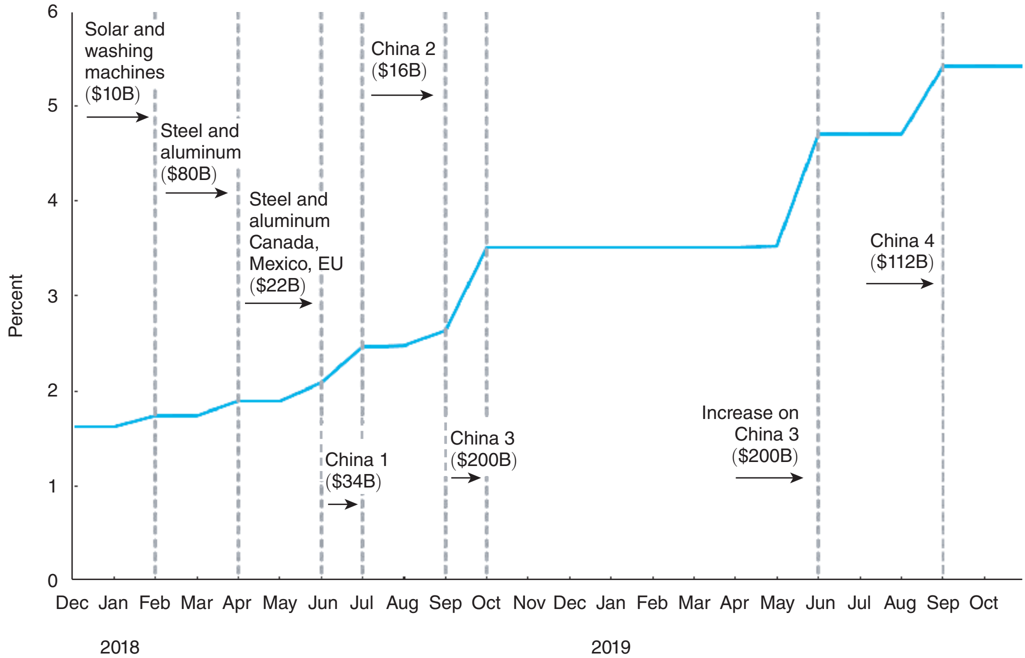

Figure 1. Average US Tariffs by Wave of the 2018–2019 Trade War

Notes: Dashed vertical lines indicate the implementation of each of the eight major waves of new tariffs during 2018–2019; tariffs implemented after the fifteenth of the month counted for the subsequent month. Four tranches of tariffs were imposed on China, designated by 1, 2, 3, and 4. Import values associated with each line correspond to headline numbers, not 2017 values, which are a little lower.

Source: Authors' calculations based on data from the US Census Bureau, US Trade Representative (USTR), US International Trade Commission; tariffs on HTS10 product code by country, weighted by 2017 annual import value

I. Data and Background

As Figure 1 shows, the trade war resulted in a tripling of the average US duty on imports—from 1.6 to 5.4 percent—with much of the increase coming after July 2018 as the United States applied tariffs of 10 to 25 percent on $362 billion of imports from China. The types of goods protected by tariffs have also expanded over time. The first five waves hit mostly capital goods and intermediate inputs, but the last three waves have included $126 billion of consumer goods.

To understand how these tariffs have affected US prices and import values, we make use of US customs data through October 2019, which report the foreign export values and quantities at the 10-digit level of the Harmonized Tariff Schedule (HTS10). These data break up monthly US imports from each country into approximately 16,000 narrowly defined categories. Dividing the import values by the quantities, we compute unit values for each source country and 10-digit product. Importantly, these unit values are computed before tariffs are applied, so they correspond to foreign export prices. Multiplying these unit values by the duty rates from the US International Trade Commission, we compute the tariff-inclusive import prices that we use in our regressions. We drop petroleum imports, because of the sensitivity of oil import values to fluctuations in oil prices, which add a lot of noise. To explore heterogeneity across different categories of goods, we separate HTS10 products into the three end-use categories of capital goods, consumer goods, and intermediate inputs, according to the US Census Bureau classification. We also further subdivide intermediate inputs into steel and nonsteel inputs.

II. Empirical Specification

We use an event-study specification to examine the impact of the tariffs on US import values and prices computed at the source country (i), HTS10 product (j), month (t) level. We pool all waves and define the treatment month zero as the month before a tariff is imposed. We measure the log change in tariffs between month s and the last untreated month $\left(\ln\left[(1+\tau_{ijs})/(1+\tau_{ij0})\right]\right)$. We regress log import prices or values $(\ln x_{ijt})$ on interactions between treatment month indicator variables $(\mathbf{1}_{ijs})$ and this log change in tariffs:

$$(1)\quad \ln x_{ijt} = \eta_{ij} + \sum_{s=-\underline{T}}^{\bar{T}} \beta_s \left(\mathbf{1}_{ijs} \times \ln\left(\frac{1+\tau_{ijs}}{1+\tau_{ij0}}\right)\right) + \delta_{jt} + \mu_{it} + u_{ijt},$$

where the excluded category is the last untreated month (i.e., $\beta_0 = 0$). We include country-time fixed effects (μ_{it}) to control for time-varying factors that affect the prices or values of exports (e.g., exchange rates). The HTS10-time fixed effects (δ_{jt}) allow for time-varying forces that affect imports of a product for in all countries (e.g., common technological change). The country-product fixed effects (η_{ij}) control for the level of import values or prices in the last untreated month and capture differences in quality or comparative advantage across countries and products.

This specification has a "difference-in-differences" interpretation, in which the first difference is between treated and untreated product-countries and the second difference is before and after the tariffs are applied. Since both the dependent variable and the right-hand-side tariff variable are measured in logs, the coefficients β_s are elasticities estimated over different time horizons, s. Many tariffs are defined at the level of HS8 tariff lines. Hence, we cluster the standard errors at the HS8 level, which allows the regression error (u_{ijt}) to be correlated over time and across HTS10 products within each HS8 tariff line.

We estimate this regression separately for each end-use category and for a pooled specification including all end-use categories. Figure 2 shows the estimated elasticities for tariff-inclusive import prices by month for the first 12 months before and after the treatment, where observations with treatment periods longer than 12 months are combined into the final 12-month category. As is apparent from the figure, we find little evidence of pretrends, with the estimated coefficients for the months before the treatment statistically indistinguishable from zero in most months. After the tariffs are applied, we see that tariff pass-through (β_s), which is a little below one in the first few months after the tariffs are applied, becomes indistinguishable from one about four months after they are levied. In other words, approximately 100 percent of these import taxes have been passed on to US importers and consumers.

This result masks some important heterogeneity. Tariffs on steel inputs show the opposite pattern: an initial pass-through of close to 100 percent to steel buyers falls to around 50 percent a year after the tariff is applied. These results suggest that the steel tariffs have a much smaller capacity to protect steel workers than other tariffs. By contrast, we find that for consumer and nonsteel inputs, complete tariff pass-through was immediate and then rose above 100 percent (although typically not significantly).

One reason why we may not be identifying terms-of-trade effects in industries other than steel is that general equilibrium effects that are common across all products for each country-year observation are absorbed into the country-year fixed effects. Nonetheless, it is interesting to note that the prices charged by Chinese exporters for goods exported to the US market have not fallen substantially. Between October 2017 and October 2019, the US import price index for all imports from China fell by 1.4 percent, much less than the terms-of-trade effects one might expect given the 25 percent tariffs applied to Chinese imports. This drop is comparable to the 0.7 percent drop for all US nonpetroleum imports over the same period. Thus, even if there are important general equilibrium forces at work, they have not been sufficient to yield a substantial overall drop in the prices (net of other factors) charged by Chinese exporters in the United States.[4]

Although the tariffs do not appear to be affecting foreign export prices, they are having

[4] Data are from FRED Economic Data, Federal Reserve Bank of St. Louis (https://fred.stlouisfed.org).

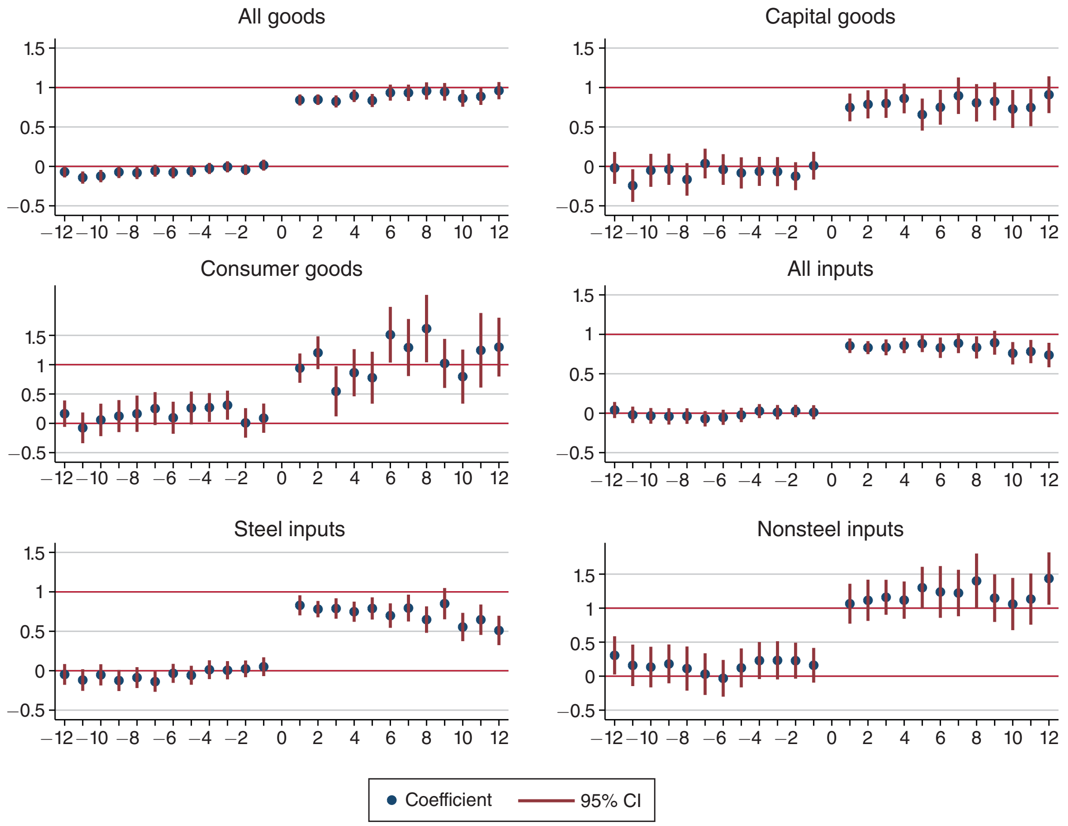

FIGURE 2. LOG IMPORT PRICES (INCLUSIVE OF TARIFFS)

Note: Points correspond to the elasticities of the tariff-inclusive import price with respect to tariffs (β_s) obtained from estimating equation (1).

Source: Authors' calculations based on data from the US Census Bureau, USTR, US International Trade Commission

a sizable impact on US import volumes. In Figure 3, we report the corresponding elasticities for import values. Again, we find little evidence of pretrends, with the estimated coefficients for months before the treatment close to zero and typically statistically insignificant. Here, however, we find large negative and statistically significant estimated coefficients for months after the treatment, with elasticities ranging up to between four and five for some categories of goods.[5] Interestingly, these estimated elasticities increase in magnitude over time, consistent with increasing redirection of imports as the trade war continues. The fact that the elasticity of imports with respect to tariffs doubles on average a year after a tariff is applied reflects the fact that it takes some time for firms to reorganize their supply chains so that they can avoid the tariffs. The one exception, again, is steel, where foreign firms absorbed much of the tariff cost and as a result the value of steel imports fell much less than in other sectors.

[5] As this specification uses the log of import values, only country-products with positive import values are included in the regression sample. In Amiti, Redding, and Weinstein (2019), we find that a substantial component of the response to the US import tariffs came via a change in the source of supply, with import values falling from positive to zero values, suggesting that the overall import value elasticities could be even larger once these zeros are taken into account.

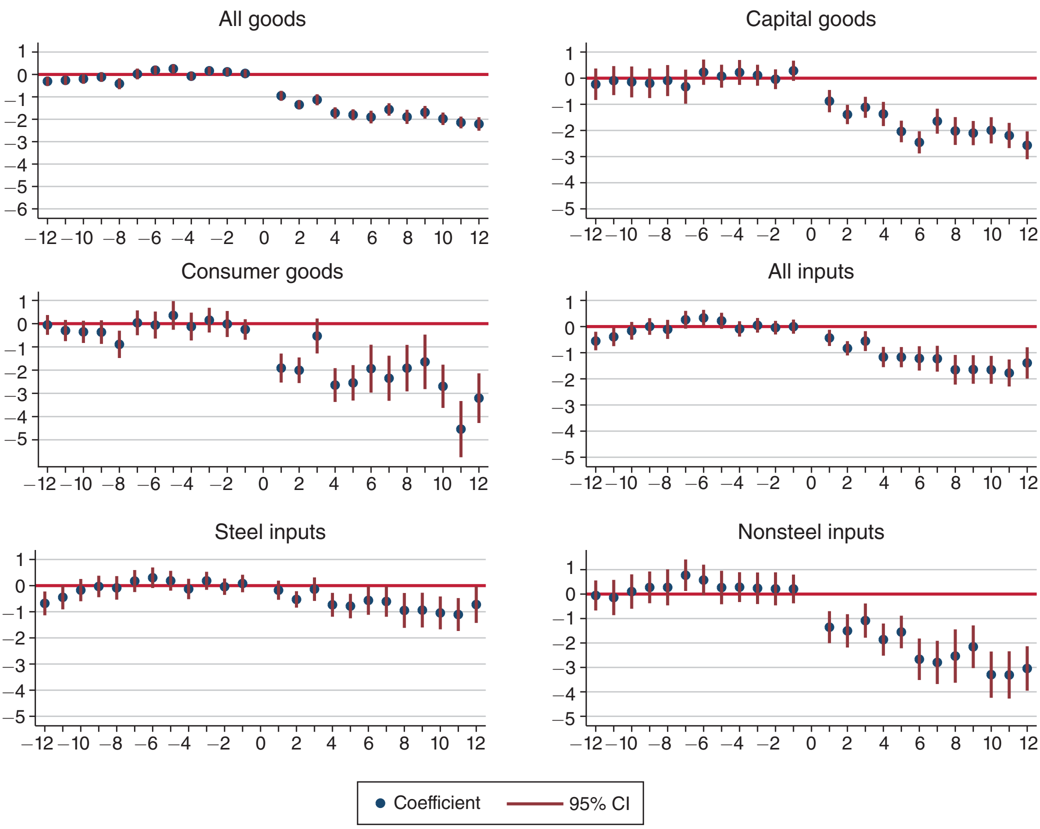

Figure 3. log Import Values

Note: Points correspond to the elasticities of import value with respect to tariffs (β_s) obtained from estimating equation (1).

Source: Authors' calculations based on data from the US Census Bureau, USTR, US International Trade Commission

III. Conclusions

Trade theory suggests that tariffs levied by a large country, such as the United States, should cause foreign firms to lower prices. However, until the 2018 trade war, economists have not had the opportunity to study tariffs on large economies in recent history due to the reluctance of governments in these economies to apply substantial tariffs. Thus, economists were forced to assess the impact of tariffs on the basis of estimates of export supply curves obtained from nontariff data as well as evidence of incomplete pass-through of exchange rates (e.g., Amiti, Itskhoki, and Konings 2014, 2019; Broda, Limão, and Weinstein 2008; Goldberg and Knetter 1997). The recent US application of substantial tariffs on imports from major trading partners provides a natural experiment for understanding these effects. Quite surprisingly, we have found that in most sectors, these US tariffs have been completely passed on to US firms and consumers. Moreover, the reorganization of supply chains has increased with time. Interestingly, there is also substantial heterogeneity in the responses of some sectors, such as steel, where tariffs caused foreign exporters to drop their prices substantially, enabling them to export relatively more than in sectors where tariff pass-through was complete.

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