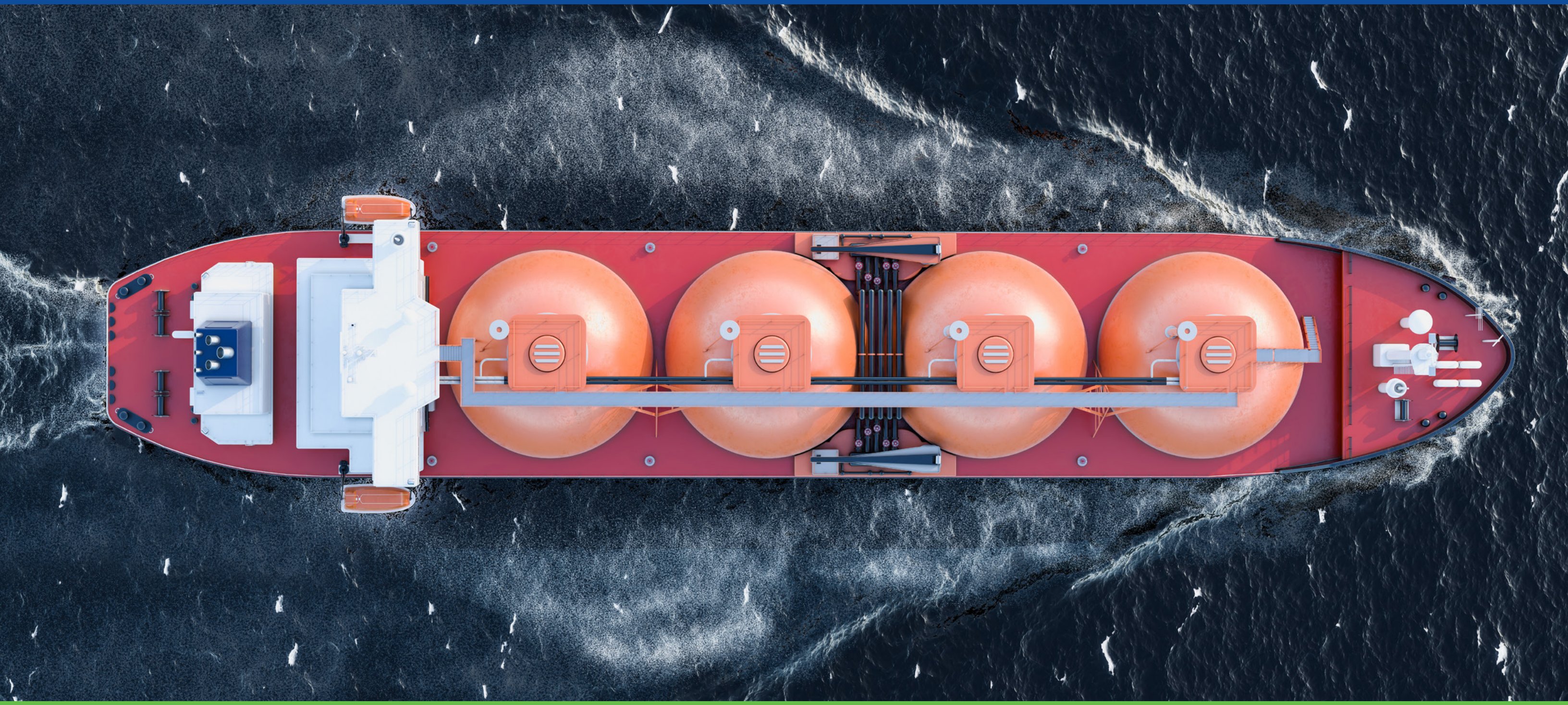

MERCANTILISM'S GROUNDHOG DAY: THE US-CHINA TRADE WAR AND SOME REGIONAL ENERGY MARKET IMPLICATIONS

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Extended Abstract

An expanding trade deficit and mounting concerns over intellectual property rights alongside slow economic growth and rising inequality created a political upheaval in the US that paved the way for anti-trade sentiment and protectionist policies. While this has impacted a broad set of US trading partners across a number of commodities, the relationship between the US and China, the world's two largest economies, has drawn the most attention. As such, we examine the potential impacts of the US-China trade dispute for US and Northeast Asian economies, with a specific focus on energy markets.

In general, barriers to international trade are detrimental to US and global energy security, as they raise uncertainty, harm investment, and harm efficiency, ultimately leading to higher prices. Market depth, which is critical for energy security, can be compromised if policy becomes burdensome for new investments, capital flows, and market participation. Shifts in US-China trade policy will likely drive a reshuffling of the international energy supply portfolio. However, Northeast Asian trading partners that are mutual to the US and China—in particular, Japan, and South Korea—are at risk of being caught in a vortex of expanding collateral damage. That stated, long-run negative implications for the broader international energy market are likely to be mediated as long as the US-China trade rift remains bilateral in its focus.

Given the Trump administration's apparent desire for trade surpluses, we consider it likely that the US will take steps to facilitate greater energy exports. This will carry spillover benefits for global energy markets and enhance energy security more broadly. However, if an implication of a protracted US-China trade war is slower global economic growth, there is a risk that any positive balance of trade impacts from expanding US energy exports will be limited. Therein lies a conundrum: promote growth through more open trade, thereby expanding US energy exports or adopt protectionist measures, thereby compromising trade and diminishing the prospects for expanding US energy exports.

We find evidence that tariffs on imported energy-related commodities, such as solar panels, do not appear to be negatively impacting imports due to a shift in the source of imports and counterbalancing policies at the federal, state, and local levels. In the latter case, for example, if direct and/or indirect subsidies to residences for the installation of solar panels encourage demand, then those policies work to offset the negative effects of tariffs. Hence, there appears to be a contradictory approach to policy when it comes to addressing costs.

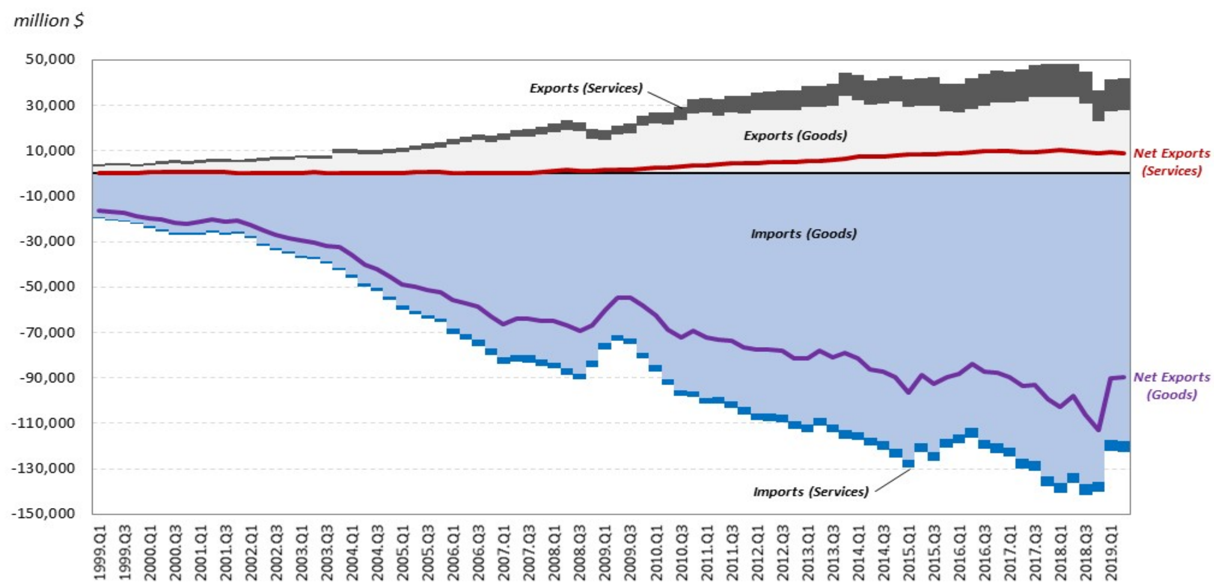
Finally, the recently signed "Phase One" agreement is a positive step toward resolution of the US-China trade dispute, but the road ahead remains rife with challenge. The agreement, given the current energy commodity landscape across crude oil, natural gas and coal, presents some serious logistical challenges. These challenges will ultimately render a positive outcome dependent on the economic health of nations other than China and the US. In particular, meeting the terms of the Phase One agreement will

depend heavily upon the broader market's ability to absorb the increased volumes of crude oil, LNG and coal. Beyond this, a more robust "Phase Two" is not expected until after the 2020 US presidential election, so although the US-China trade dispute may be temporarily relaxed, it is far from settled.

I. Introduction

US economic growth has been slowing in recent decades. In contrast, although weakening slightly in recent years, China's economic growth has been robust. According to the World Bank, China could surpass the US to become the largest economy in the world by the middle of this century.[1] In combination with other factors, such as geopolitical interests and the two countries' polar opposite political systems, this has led to an increasingly adversarial posture between the two economic superpowers, as China establishes itself on the world stage. This tension has manifested in trade discussions, largely due to the significant trade imbalance that exists, with the US running a sizable trade deficit with China (Figure 1).

Figure 1. US Overall Trade Balance with China, 1999q1–2019q2

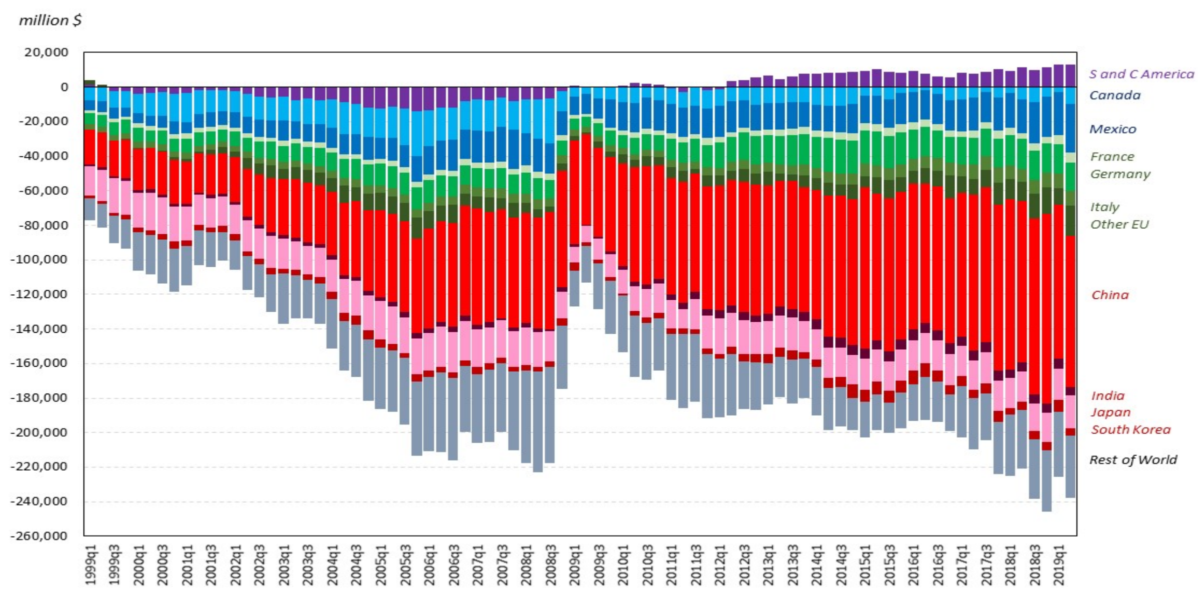


Source: US Bureau of Economic Analysis, depicted in quarterly rates

To be clear, the US also runs a trade deficit with the rest of the world, with Mexico, Japan, Germany, and the broader European Union having a relatively large surplus vis-à-vis the US. China, on the other hand, runs a trade surplus with the rest of the world. Moreover, the US trade deficit with China is the result of trade in goods, as the US runs a net surplus in services (Figure 1).

The US runs an aggregate trade deficit in goods with the rest of the world, about half of which is due to the imbalance with China (Figure 2). More specifically, the US runs a trade deficit in goods with the EU and the rest of North America, at about 19% and 13%, respectively, in 2018. Asia accounted for the largest source of the US trade deficit in goods in 2018 at 57%, with China accounting for a massive 45% of the total. The US ran a trade surplus with the countries of South and Central America, collectively, but was in deficit with the rest of the world, with more than $887 billion annual trade deficit in goods. So while US-China trade is a significant contributor, the US trade deficit is not solely due to its trading relationship with China. Rather, it is the result of the consumer-oriented disposition of the US economy, the gradual migration of labor-intensive activities offshore, and the relative strength of the US dollar.

Figure 2. Overall US Trade Balance in Goods by Country/Region, 1999q1–2019q2



Source: US Bureau of Economic Analysis, depicted in quarterly rates

The US dollar has strengthened considerably since 2010, following the rounds of quantitative easing that occurred in the wake of the global financial crisis of 2008 (Figure 3). This should, all else equal, render foreign goods cheaper to US consumers and US goods more expensive to foreign consumers, thereby driving up imports relative to exports increasing the trade deficit. Indeed, this is exactly what we have seen.

Regardless of the reason, the US trade deficit has been a point of emphasis for the Trump administration, even prior to President Donald Trump's election, with a focal point of his campaign being on trade and negotiating new trade deals with various countries. During 2018, the Trump administration imposed 10-50% import tariffs on over $280 billion of US imports. US trading partners have retaliated with tariffs on over $120 billion of US exports. The resulting "trade war" is something the world economy has not experienced since the

1930s. This, of course, raises important questions for the US economy and the economies of its trading partners and allies. In this paper, we explore a subset of these issues. Namely, what is the potential impact of a continuing trade war on energy markets? More specifically, how is the trade war affecting Northeast Asia's energy landscape? Given the economic significance of Northeast Asian countries, answers to these and related questions are also relevant for the entire world.

Figure 3. Real Trade Weighted US Dollar Index (Broad, Goods)

Source: US Federal Reserve Database

Unfortunately, the broader macroeconomic impacts are not fully identifiable because data is still becoming available, and some of the proposed "Trump tariffs" have yet to materialize. Indeed, some of these tariffs may never take effect, pending the outcome of ongoing trade negotiations at the time of this writing. Moreover, while there appear to be discernible impacts on financial markets, it is largely news-oriented, with stock market indices declining when new tariffs are announced, then rebounding when some positive news emerges about a trade deal possibly being reached. The impacts on GDP, however, are not measurable on a daily basis because they accumulate over a longer time horizon. As such, we rely on basic trade theory to demonstrate *potential* impacts and lean on observable data to make inferences on what may come to pass. Nevertheless, what is becoming clearer is the fact that the Trump administration has taken an aggressive protectionist stance toward trade policy, with China as the largest protagonist in an evolving story.

II. Recent US Trade Policy

Then-candidate Trump's election campaign had a strong anti-globalization sentiment that has carried over, as now-President Trump even denounced globalization at a recent speech at the United Nations. The associated anti-trade rhetoric materialized in 2018, when tariffs were introduced in several waves throughout the year. The first wave in February imposed a 30% tariff on imported solar PV cells and panels and a 20-50% tariff on washing machines under the Section 201 safeguard. The second wave was implemented in March on steel (25%) and aluminum (10%) imports under Section 232. Initially, Canada, Mexico, and the European Union (EU) were exempt, but this changed when the third wave of tariffs was imposed in June. China-specific tariffs (25%) began in July on $34 billion worth of imports and then on a further $16 billion of imports in August. A 10% tariff on an additional $200 billion of Chinese imports was imposed at the end of September. Smaller tariffs on $0.1 billion of aluminum imports from South Korea were imposed in May under Section 301. In total, nearly $283 billion worth of imports were hit by these tariffs.

As expected, many countries retaliated against these US measures by applying tariffs of their own on several US exports. In April, China imposed tariffs on $3.3 billion of US exports of steel, aluminum, food, and agricultural products, followed by tariffs on $50 billion of US exports in July and August, and another $60 billion in September. The EU, Mexico, Russia, and Turkey also imposed tariffs on US exports. In total, over $120 billion of US exports were affected by retaliatory tariffs, ranging from agricultural products to steel and aluminum to Harley-Davidson motorcycles.

The tariff war between the US and China continued through 2019. The tariff rate on $200 billion of Chinese imports imposed in September 2018 was increased from 15% to 25% in May 2019 and a 15% tariff rate on an additional $300 billion of Chinese imports was imposed on September 1. The US has threatened tariffs on nearly all imports from China and is clearly counting on the asymmetric trade situation with China. It will be hard for China to retaliate in the same fashion, since it does not import a similarly high value of goods from the US. However, China could choose to retaliate in other ways, including restricting investment, which would distort the supply chains of several multinational companies, or using geopolitical strategies to adversely affect US interests in its area of influence. More broadly, the trade war has adversely affected global confidence and investment, and further escalation would almost certainly carry significant negative economic consequences.

On the Use of Presidential Orders for Policymaking

There are several policymaking tools at the US president's disposal. The use of presidential orders gives the administration flexibility to, among other things, detail information about various policies (including trade) and declare intent regarding future actions. Once a president signs an executive order, proclamation, memorandum, notice, determination, etc., the Office of the Federal Register publishes it, some with specific numbers, such as executive orders and proclamations, and others without. Executive orders are a vehicle through which a president manages the operations of the executive branch, including its oversight and intent on matters relating to trade, immigration, national security, and other matters. Proclamations are a means to communicate a variety of things, ranging from national observances to trade and other policies. Other presidential orders can also be used to communicate policy or intent of policy. In sum, each of these types of instruments has been used by US administrations to varying extents in the past.

Table 1. The Use of Presidential Orders in the Past Four US Administrations

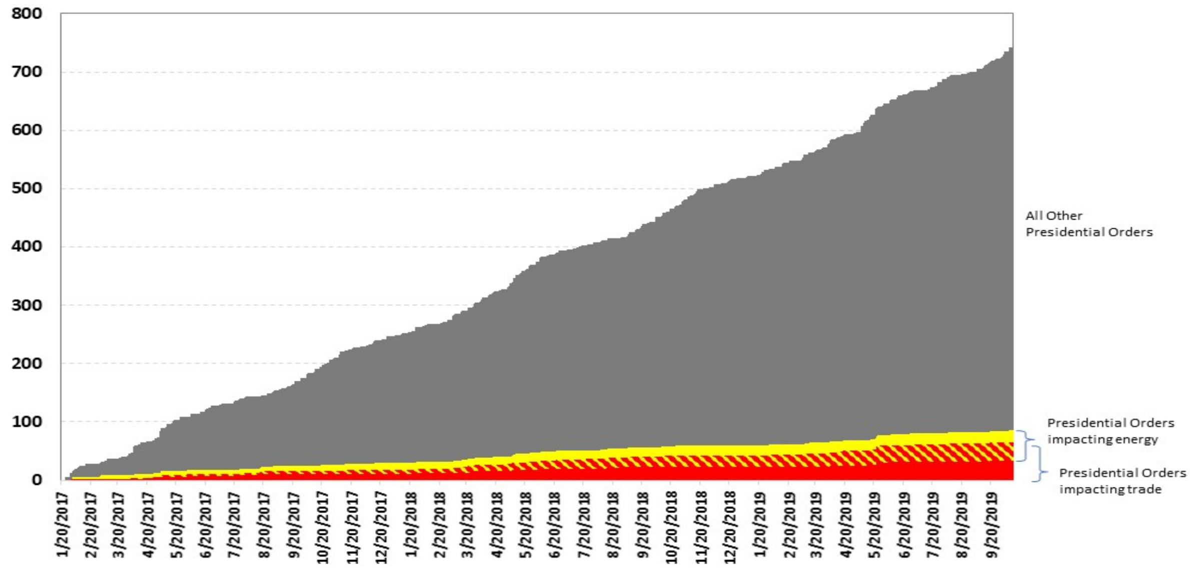
	Trump	Obama	Bush	Clinton
Executive Orders	126	295	294	290
per year	*34*	*37*	*37*	*36*
Proclamations	377	1,230	941	606
per year	*101*	*154*	*118*	*76*
Other Presidential Documents	209	608	572	337
per year	*56*	*76*	*72*	*42*
Total	712	2,133	1,807	1,233
per year	*190*	*267*	*226*	*154*

Source: Office of the Federal Register; Trump administration figures based on 3yrs 9mos

As a point of reference, Table 1 indicates the use of presidential orders by the past four administrations. To be clear, the data in Table 1 do not indicate the policy emphasis of each administration; rather it indicates the use of these instruments to communicate policy direction. As can be seen, the Trump administration is actually less proactive in the use of presidential orders than the previous two administrations. Moreover, the use of presidential orders to affect trade or energy policy is not an extreme aberration compared to previous administrations. However, the Trump administration has taken a more concerted, bilateral approach toward trade, even targeting specific trading partners and specific commodities through the use of presidential orders.

Figure 4 highlights the entirety of presidential orders as of October 8, 2019, under the Trump administration. A variety of policy issues have been addressed through these tools, including health care and immigration, as well as the typical litany of proclamations regarding national observances. Orders that impact energy and trade— both directly and indirectly—account for, collectively, about 11.5% of the various executive orders (27 of 126), proclamations (30 of 377), and other presidential documents (28 of 209) signed by Trump. Therefore, much as his predecessors did, Trump has utilized an array of presidential orders to exercise his policy directives, especially regarding trade.

Figure 4. Presidential Orders Under the Trump Administration, 1/20/17–10/12/19

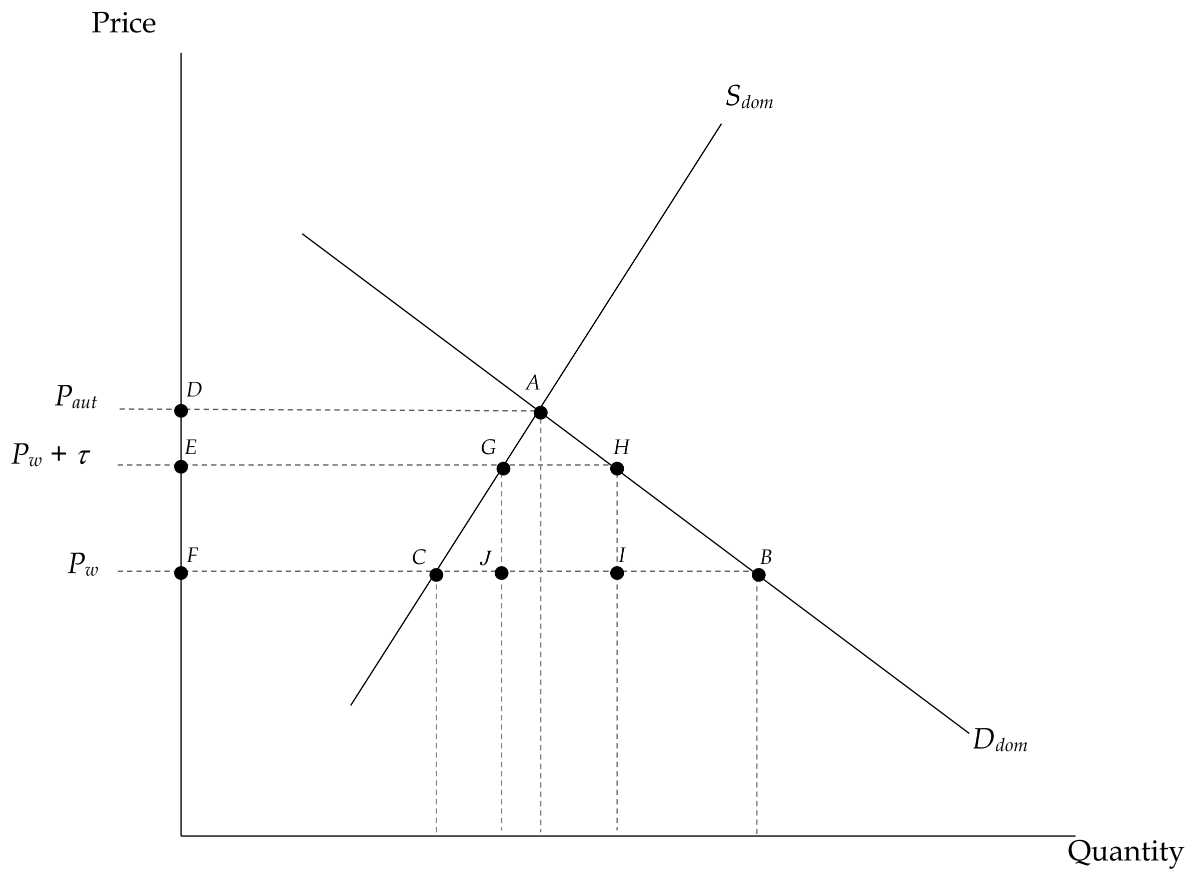


Source: Office of the Federal Register

III. Trade Theory, in Brief

International trade models provide a framework for understanding the potential effects of a trade war on prices, quantities traded, and welfare. Indeed, the impact of tariffs can be demonstrated with standard trade theory models using a simple supply and demand framework, such as that depicted in Figure 5. The depth of research on the overall impacts of tariffs on trade and welfare is astounding. Moreover, the subject is addressed in great detail in texts on international trade, macroeconomics, international finance, etc. So suffice it to say that the subject is addressed extensively in terms of its micro-level impacts on specific industries as well as its broader macroeconomic effects. Nevertheless, it is useful to outline the matter herein.

Figure 5. Gains from Trade for an Importer and the Impact of a Tariff



First, it is useful to define variables to make use of Figure 5. Domestic demand is denoted as D_{dom} and domestic supply is denoted as S_{dom}. The price to domestic consumers and producers in the absence of trade (the autarkic price) is denoted by P_{aut}. The world market price is denoted as P_w. When the world price is below the domestic price, there will be an incentive to import. When there are no barriers to trade and no transaction costs, the resulting gain in consumer surplus (welfare) is denoted by $\square DABF$. However, there is also a loss in domestic producer surplus denoted by $\square DACF$. Notice that $\square DABF > \square DACF$, although the extent to which this is true will depend on the relative slopes (or elasticities) of the domestic demand and supply curves. Hence, we see a *net* gain from trade given as ΔABC, which is equal to $\square DABF - \square DACF$. It is precisely this welfare gain that motivates trade.

In practice, there are few instances of perfectly free trade, and protectionist measures such as tariffs can be employed to protect certain domestic special interests, generally domestic producers. Denoting a tariff as τ we can use Figure 5 to demonstrate the impact of a tariff on domestic welfare. In particular, the imposition of a tariff will raise the price domestically to $P_w + \tau$ while lowering the amount imported and raising domestic production. This results in a non-trivial gain in producer surplus, denoted as $\square EGCF$, but also a loss in consumer surplus, denoted as $\square EHBF$. While the gain in producer surplus is not as large as the loss in consumer surplus, so $\square EGCF < \square EHBF$, there is an offsetting receipt to the government associated with the tariff, denoted as $\square GHIJ$. The tariff revenue can be redistributed by the domestic government in a variety of ways, and exactly how this is done will impact the welfare consequences of the tariff. Regardless, the sum of the two triangles, denoted as $\Delta HBI + \Delta GJC$ in Figure 5, represents a *net* welfare loss (or deadweight loss) associated with the tariff.

In general, tariffs make foreign products relatively more expensive for domestic consumers. In addition, if domestic manufacturers rely on imported components or other inputs, their costs will rise, generally resulting in a pass-through of the increased cost to domestic consumers. Of course, the relative elasticity of supply and demand will impact the degree to which the incidence of the tax is borne by the producer versus the consumer, but the overall impact is a rise in price. If, say, the price of steel increases due to tariffs, individual consumers pay more for products using steel, and businesses pay more for steel that they use as an intermediate input for making other goods. Overall, tariffs redistribute dollars away from domestic consumers toward domestic producers.

The effects from tariffs become even more negative in the long run as protected domestic industries lose efficiency due to lack of competition, and government revenue from tariffs declines as businesses and consumers find substitutes. In a well-cited study on international trade theory, J. Sachs and A. Warner used a large sample of nations to empirically study whether countries that are more open to trade enjoy greater prosperity. They found that open economies have historically grown significantly faster than closed ones. In addition, when economies moved from being *closed* to *open* to international trade, they saw an increase in growth rates. Leading examples include South Korea in the 1960s and, more recently, Vietnam in the 1990s.

It is worth commenting on partial equilibrium (such as that depicted in Figure 5) versus general equilibrium analyses of trade. General equilibrium analysis also considers the impacts on investment in sectors affected by trade and trade policy. Economic activity that is affected by increased/decreased international trade has second order effects not captured in the partial equilibrium analysis, largely because the partial equilibrium analysis focuses on trade in a specific commodity without consideration of potential multiplier effects. In general, the "gains from trade" argument is augmented by higher order impacts captured in a general equilibrium framework. Hence, it is useful to understand those when analyzing multi-sectoral trade.[2]

Given the above analysis, one might think arguments for tariffs would fall flat given that they generate sub-optimal results in terms of welfare. In fact, it is relatively straightforward to demonstrate that, in the presence of free trade, imposing a tax on domestic consumers and subsidizing domestic producers would yield a similar result. Hence, the imposition of a tariff on imports, while postulated as a tax on foreign producers, is equivalent to a tax on domestic consumers and subsidy to domestic producers. Nevertheless, in the United States, an anti-globalization/pro-protectionist sentiment has taken on rather significant political meaning as various constituents have adamantly voiced their opposition to the status quo, a point that culminated in the last presidential election. This, in turn, has led to a to a shift in US trade policy that is aimed specifically at "striking a better deal" for the US in global trade agreements, which reflects a mercantilist view that trade surpluses are superior to trade deficits. One rationale behind the administration's policy is to protect domestic industry from foreign competition. As mentioned before, by making domestic consumers pay higher prices for imports, tariffs make foreign products less desirable relative to domestically produced ones.

Since at least the 1930s, economists have been almost uniformly against imposing taxes to address trade deficits, largely because the latter are not perceived on their own as being a problem.[3] In any case, economics argues that the best way for a country to reduce its trade deficit and improve the overall efficiency of resource allocation is to reduce barriers to trade and improve competitiveness. As a result, domestically produced goods would become attractive to consumers, both at home and potentially abroad, thereby reducing imports and perhaps even driving exports. Such an outcome improves the balance of trade without artificial measures that simply reduce imports by making them more expensive. Indeed, these arguments rest in the foundation of modern economics and were made convincingly by Adam Smith and David Ricardo. Inspired by Adam Smith's *Wealth of Nations*, Ricardo developed the theory of comparative advantage. The core principle posits that instead of producing everything, nations (or regions, or households) will be better off producing only goods where they have an advantage and buying everything else in the marketplace.

The principle of comparative advantage and its application to trade can be expounded by a simple example. A consumer typically runs a "trade deficit" vis-à-vis, say, their neighborhood grocery store because the consumer buys groceries from the store, but the store does not generally buy anything in return. This does not make the consumer a "loser" in the transactions. Rather, economic theory asserts that both the consumer and the grocery store are better off specializing and trading than they otherwise would be. International trade is no different.

Of course, as economist Paul Samuelson noted, while it leads to a more efficient use of resources, globalization also creates losers.[4] This is why the welfare gains from trade are generally referred to as *net* gains. For example, higher cost domestic producers will suffer when they must compete with lower cost foreign producers. However, as the winners' gains from international trade (typically the increase in consumer surplus domestically and the increase in producer surplus internationally) exceed the losses of those who have been adversely affected by globalization, appropriate redistribution compensates the losers while retaining the overall efficiency gains. One criticism of the world economic system is that this kind of compensation has not taken place—a situation that has led to the rise of populism and protectionism in many countries.

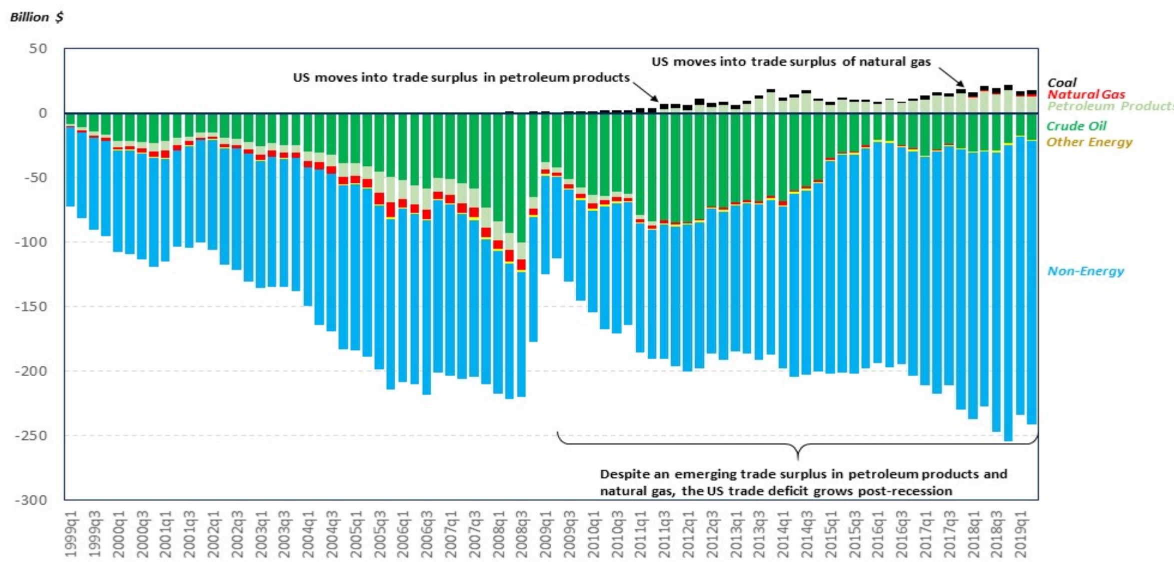
Occasionally, countries use protectionist measures to foster home industries until they are able to compete against established foreign competitors—the so-called "infant industry" motivation for protectionist policies. Such may be the case, for instance, when there are sufficient economies of scale in a particular industry that, once captured, would allow a new entrant to compete on the global stage. This argument was used in the US in the 19th century when competing against Great Britain, and it is still relevant for China in a number of sectors. China is not as open to trade as the US and the EU, and there are serious concerns about Chinese companies regularly violating property and copyright laws, as well as receiving other unfair advantages from its government. Economic theory suggests that these issues should be at the center of the US negotiations with China. For example, pressure could be put on China to open its services sector. While this would convey a benefit to US service exports, it would also benefit consumers of services in China. However, while economic theory may be clear in its prescriptions, politics and special interests are another matter.

During 2018, the US experienced reductions in the availability of imported varieties, and a high degree of the "incidence" of the tariffs passed to US consumers through increases in the prices of imported goods. Indeed, economists have found little or no evidence that foreign exporters lowered their prices in order to accommodate the price increase created by the US-imposed tariffs. In addition, there is every indication that the tariff revenue the US is collecting is insufficient to compensate for the losses to US consumers.[5]

IV. The US Trade Deficit and The Energy Conundrum

The US has been rapidly moving toward energy self-sufficiency since 2008. This has been spurred by the dramatic increase in oil and gas production from shale. Altogether, the value of US net energy exports has been rising. This presents a stark contrast to the reality of the US trade balance just over a decade ago when US crude oil imports accounted for over 45% of the total trade deficit, and energy imports in their entirety accounted for about 56% of the total trade deficit (Figure 6).

Figure 6. US Trade Deficit in Goods (Energy and Non-Energy), 1999q1-2019q2



Source: US Bureau of Economic Analysis

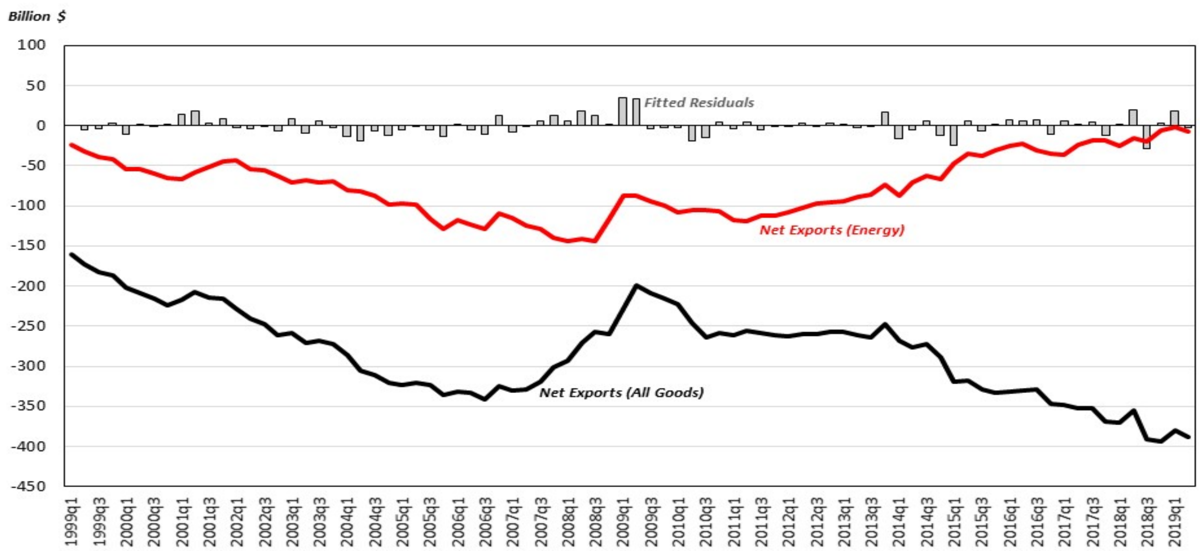
In Figure 6, we see that the overall trade deficit in goods has been growing despite an emerging trade surplus in energy-related goods. Hence, it worth exploring the drivers of the recent robust growth in the non-energy goods trade deficit. We can estimate a traditional relationship between the real trade balance, real gross domestic product, and the real exchange rate. Doing so will lend some insight into what drives current trade policy and the direction trade policy may take going forward. We can then begin to address the broader ramifications of US trade policy and whether or not any particular policy pathway represents a “new normal” or simply a “perturbation” in the US approach to interaction with global markets.

Regression of a specification using quarterly data spanning from the first quarter of 1999 through the second quarter of 2019, assuming real net exports, NX_t, are dependent on real gross domestic product, GDP_t, the real trade-weighted exchange rate (a broad measure for major trading partners of the US), XR_t, and the previous quarter's trade deficit, NX_{t-1}, yields

$$NX_t = \underset{(26.3339)}{66.6568} - \underset{(0.0038)}{0.0091} GDP_t - \underset{(0.1366)}{0.4413} XR_t + \underset{(0.0349)}{0.9050} NX_{t-1} + \varepsilon_t \quad (1)$$

where equation (1) is estimated using two stage least squares recognizing the potential endogeneity of the right-hand side variables.[6] The R^2 of the regression is 0.9527. Using robust standard errors, all estimated coefficients in equation (1) are significant at the 3% level or higher. The fitted residuals, $\hat{\varepsilon}_t$, from equation (1) are plotted in Figure 7 for reference along with the actual data for net exports as well as net *energy* exports.

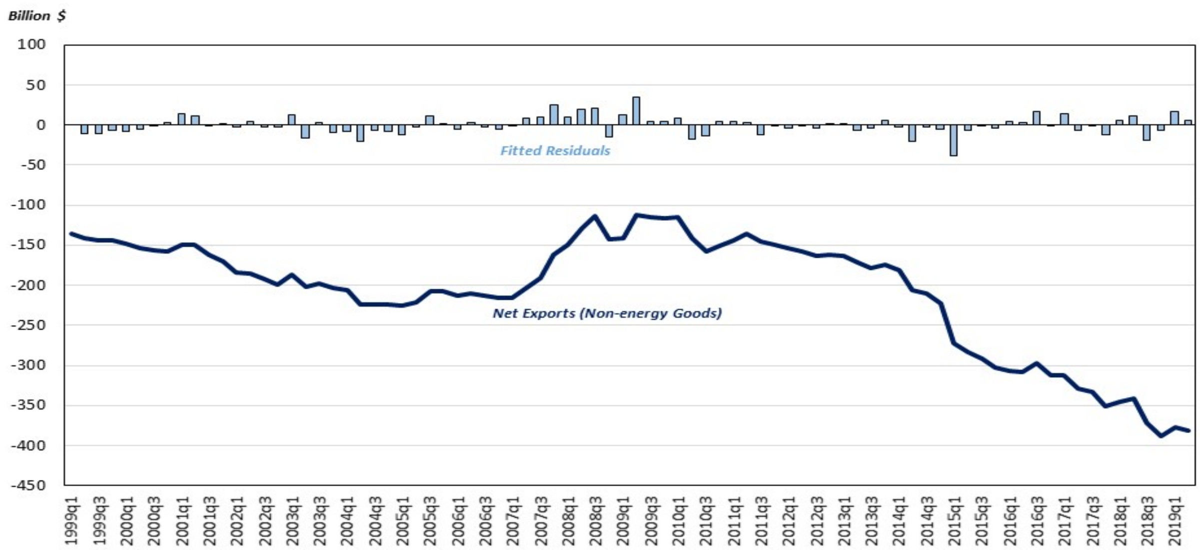
Figure 7. US Trade Deficit (All Goods, Energy, Eq [1] Residuals), 1999q1-2019q2



Source: US Bureau of Economic Analysis, Federal Reserve Database, and author calculations

There is a potential issue with equation (1) insomuch as the US position in *energy* trade has shifted dramatically since 2008. This structural shift, as noted above, is the result of the well-documented shale revolution. Indeed, the energy share of US net imports has declined precipitously since the peak in 2008. This decline has been the result of international energy prices declining post-2008 (thus affecting the *value* of energy imports and exports), as well as a rapid increase in the domestic production of shale oil and gas that has triggered a shift in trade patterns. As such, we re-estimate equation (1) after removing energy trade from the trade balance, effectively examining only the trade deficit in non-energy goods. The data for net non-energy exports are plotted in Figure 8 for reference.

Figure 8. US Trade Deficit (Non-energy Goods, Eq [2] Residuals), 1999q1-2019q2



Source: US Bureau of Economic Analysis, Federal Reserve Database, and author calculations

Regression of a specification using quarterly data spanning from the first quarter of 1999 through the second quarter of 2019, assuming real non-energy net exports, NX_t^{n-e}, are dependent on real gross domestic product, the real trade-weighted exchange rate (a broad measure for major trading partners of the US), and the previous quarter's non-energy trade deficit, NX_{t-1}^{n-e}, after correcting for autocorrelation, yields

$$NX_t^{n-e} = \underset{(60.1005)}{170.0017} - \underset{(0.0076)}{0.0204}\, GDP_t - \underset{(0.3029)}{0.8453}\, XR_t + \underset{(0.0597)}{0.8727}\, NX_{t-1}^{n-e} + \mu_t \quad (2)$$

where equation (2) is estimated using two stage least squares recognizing the potential endogeneity of the right-hand side variables.[7] The R^2 of the regression is 0.9764. The fitted residuals, $\hat{\mu}_t$, from equation (2) are plotted in Figure 8. Using robust standard errors, the coefficients in equation (2) are all significant at the 1% level or higher.

Notably, an estimation of equations (1) and (2) indicates that the trade deficit increases with GDP and the strength of the US dollar, which is exactly what we should expect. In particular, as income increases in the US and the purchasing power of the dollar grows, foreign goods will look more attractive to US consumers. However, we see upon examining the parameter estimates and the associated standard errors in equations (1) and (2) that the impact of economic expansion and the value of the dollar are understated in equation (1), each by a statistically significant amount.

Another point worth mentioning is the distinct increase in fitted residuals in the 2007 to 2009 period, which coincides with the global financial crisis. This may indicate non-linearity in the relationship between the trade deficit and the included explanatory variables or some other potential bias, perhaps warranting a deeper examination of that period, but that is not the focus of this analysis.

In sum, these results indicate the existence of a conundrum for any policy that aims to proactively reduce the US trade deficit. Namely, economic expansion is typically accompanied by Fed policy that eventually increases interest rates, especially if the expansion brings inflationary pressures. All else equal, this will raise the value of the dollar relative to other currencies. But therein lies the conundrum. A strengthening dollar and a robust economy will also tend to accelerate the non-energy goods trade deficit, which is what we have seen in the US.

Of course, a rising US energy trade surplus can serve as a counterbalance to an expanding non-energy trade deficit. Such a surplus can arise if energy exports continue to expand and/or the price paid for US energy exports rises. However, reliance on such an outcome is hardly prudent, especially since US energy exports must compete in a competitive international marketplace. However, the realization that US energy exports are capable of delivering such a counterweight for the US trade deficit may encourage the US administration to more ardently support US energy exports going forward. At the very least, any administration that is aiming to reduce the trade deficit should think seriously before adopting any policy that either raises costs or otherwise hampers the US energy sector. Ironically, this also favors policies that promote economic growth abroad, which is precisely the outcome that a trade war will ultimately encumber. Hence, rather than adopt a protectionist stance favoring industries where the US does not have a comparative advantage, the above results suggest the US trade balance would be better served promoting those sectors where it has a comparative advantage.

V. Some Implications for the US Energy Sector

The US imports a number of goods that have implications for the price and disposition of energy, some of which have been targeted by import tariffs.[8] These include goods such as solar modules and steel for pipelines, among other things. The reaction has been complicated. For instance, when steel tariffs were levied, a number of pipeline developers filed for, and subsequently received, tariff exemptions. For developers that do not receive similar treatment, the steel tariff will ultimately be rolled into the cost of pipeline construction, thereby affecting the pipeline tariff rate charged to shippers. Thus, unequal treatment of tariff imposition would inevitably lead to a competitive advantage for those who are exempt.

In the case of solar modules, there are three different tariff schemes on exported solar modules to the US: anti-dumping duties (AD) and countervailing duties (CD) initiated in October 2012, followed by Section 201 and Section 310 tariffs imposed in the middle of 2018. Few Chinese-made modules have been imported to the US since then. The PV module price in the US has been higher than the global average due to legacy tariff policies even though the US module price has been decreasing over time. To secure business with the US, Chinese module manufacturers either moved their facilities to tax-free locations outside of China (such as Southeast Asian countries with relative low production costs) or absorbed some of the tariff costs. Thus, tariffs imply that low-cost suppliers from outside China enjoy a competitive advantage relative to domestic suppliers. This advantage will grow as the Section 201 tariff declines by 5% each year.

In what follows, we rely on data on international trade reported by the US Census Bureau through the commodity trade database available at usatrade.census.gov by free subscription access. We refer to the data for imports and exports using the harmonized code schedule. This allows for a simple cross-reference to the Harmonized Tariff Schedule Codes (see www.findhs.codes/HTSCodes), which is broken into the categories indicated in Table 2. A deeper dive into the data allows one to distinguish energy-specific commodity trade down to the 10-digit level, although in some instances the data is not detailed to that level. Accordingly, we have also indicated in Table 2 those categories where energy and energy-related trade to the 4- and 6-digit level is affected and highlighted in the discussion and figures below.

Importantly, Table 2 depicts a specific representation of the data that we use in what follows to highlight how tariffs have impacted various import and export values of trade in the energy sector. For example, the far left of Table 2 highlights 'All Commodities' by Sections I through XXI, while the middle of Table 2 highlights 'Energy, Energy-related, Other' by Sections V, XV, and XVI. The far right of Table 2 details a further refinement, highlighting 'Crude Oil, Natural Gas, Petroleum Products' and 'Electricity (incl. equipment).'

Table 2. Harmonized Codes for Commodity Trade

All Commodities
Section I-IV, VIII (Animals, vegetables, related products)
Codes 01-24, 41-43
Section V (Minerals, related products)
Codes 25-27
Section VI-VII (Chemicals, plastics, rubber)
Codes 28-40
Section IX-X (Wood, related products)
Codes 44-49
Section XI-XIV (Textiles, ceramics, jewelry, related products)
Codes 50-71
Section XV (Base metals, related products)
Codes 72-83
Section XVI (Machinery, appliances, equipment)
Codes 84-85
Section XVII (Vehicles, aircraft, transport equipment)
Codes 86-89
Section XVIII (Optical, photographic, medical, instruments)
Codes 90-92
Section XIX-XXI (Arms, Toys, Art, Miscellaneous)
Codes 93-99

Energy, Energy-related, Other
Crude Oil
Natural Gas
Petroleum Products
Oil and Gas Equipment
Electricity (incl Equipment)
Coal
All Other

Crude Oil, Natural Gas, Petroleum Products
Crude Oil (2709, 2714, 2715)
Natural Gas (271111, 271121)
LNG (271121)
Petroleum Products (2710, 271112-271119, 271129, 2712, 2713)

Electricity (incl Equipment)
Wind towers, structures (7308)
Solar panels, components, LEDs (8541)
Batteries, magnets (8505,8506,8507,8548)
Generators, motors, parts (8401,8402,8406,8501,8502,8503)
Transmission, other (8504,8534,8547)
Electrical energy (2716)

Source: US Census Bureau (https://usatrade.census.gov/)

US Imports

In what follows, we focus on imports of energy and energy-related commodities, then turn to exports. In general, one would expect imports to be negatively impacted by the imposition of tariffs. However, the extent to which they are impacted will depend on the price elasticity of demand for the affected commodity, the elasticity of substitution (or readily available alternative sources of supply) for the affected commodity, the extent to which the supplier of the affected commodity adjusts their prices to absorb the impact of the tariff, and the degree to which demand for the affected commodity is being stimulated by other factors (such as income growth or offsetting domestic policy incentives). Hence, the full realized impact of tariffs is complicated by multiple factors. The effect of the US-China trade dispute on US exports is equally complicated by similar factors, a point we return to in the next section.

Before proceeding, it is worth expanding on the data below. To begin, the data are depicted in units of $/day to normalize differences in the number of days per month. Figures 9, 13, 14, and 15 each illustrate significant detail regarding the value of US imports from January 2016 through September 2019. In each case, the figures consist of three panels. The first depicts the value of US imports (exports) for ‘All Commodities’ by the Harmonized Code Schedule depicted in Table 2. The second panel depicts the value of US imports (exports) for Sections V, XV, and XVI, denoted as ‘Energy and Energy-related,’ thus capturing a subset of the total value of US imports that bears some connection to energy. The data in Panel 2 are represented such that the value of coal, electricity (including equipment), oil and gas equipment, petroleum products, natural gas, and crude oil are distinguishable in the cohort. Finally, Panel 3 in each figure captures the ‘Batteries, magnets, solar panels, etc.’ in the ‘Electricity (incl. equipment)’ category, which is a subset of Panel 2. For example, Figure 9 draws attention to the 'Electricity (incl. equipment)' subset of 'Energy and Energy-related.'

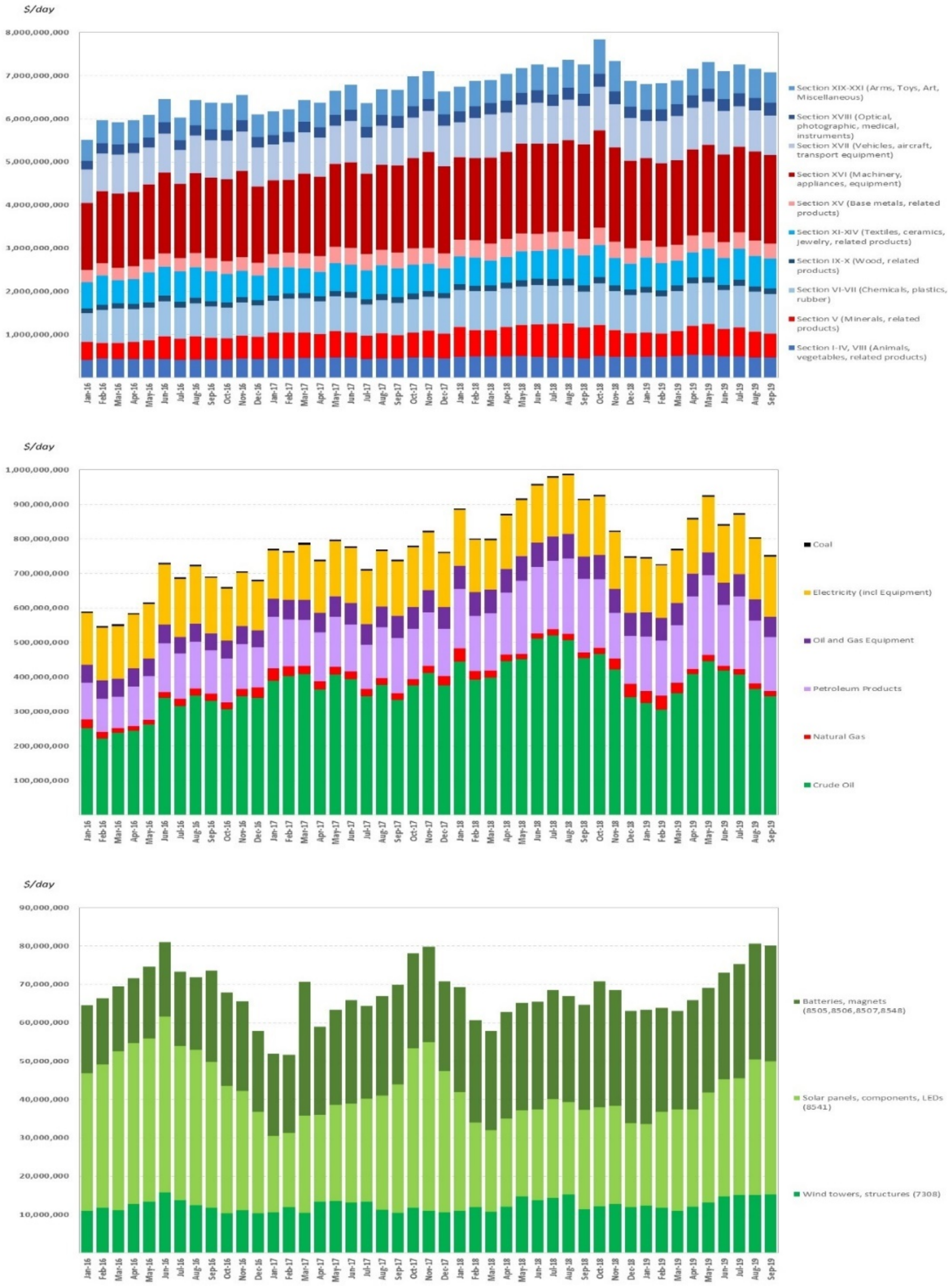
This allows us to fully contextualize the discussion of impacts of tariffs on the energy sector. In particular, the value of imports of all commodities is higher today than it was when the Trump administration took office, but is lower than the middle of 2018, thereby indicating that tariffs have likely had an impact. However, any impacts felt in the energy sector, while having potentially profound impacts on commercial profitability for agents in that domain, are relatively small in comparison to broader impacts on *overall* trade, precisely because energy commodities—especially individual energy and energy-related commodities targeted by tariffs—are a relatively small part of the overall imports.

Finally, we focus on monthly data since January 2016, a year before the Trump administration began. This enables a better sense of how the US-China trade dispute has impacted energy-related trade, especially since the beginning of 2018.

According to the Harmonized Tariff Schedule Codes, we see a definitive uptick in the value of imports into the US since the Trump administration began (Figure 9, Panel 1). In fact, the dutiable value of imports[9] increased by 238 million $/day from January 2016 to January 2017, which was the year prior to Trump taking office. Subsequently, the dutiable value of imports increased by 206 million $/day from January 2017 to January 2018, and 394 million $/day from January 2018 to January 2019, and has totaled over 503 million $/day since Trump took office through September 2019. Increased economic growth in the US plays a role here, as higher incomes translate to higher imports due to a positive income propensity. But the introduction of tariffs in 2018 seemed to have slowed the momentum on imports overall, as they have been flat-to-declining since mid-2018.

Although not indicated in Figure 9, the US did report a drop in the value of imports in November 2019. As reported on January 7, 2020 in a US Census Bureau news release (see www.census.gov/foreign-trade/index.html), the trade deficit decreased by $3.8 billion (from $46.9 billion in October to $43.1 billion in November). While this announcement is not specific to trade in energy and energy-related commodities, it is largely the result of tariffs coupled with a continued increase in US exports of crude oil, petroleum products, and natural gas.

Figure 9. Value of US Imports—World



All Commodities

Energy and Energy-related

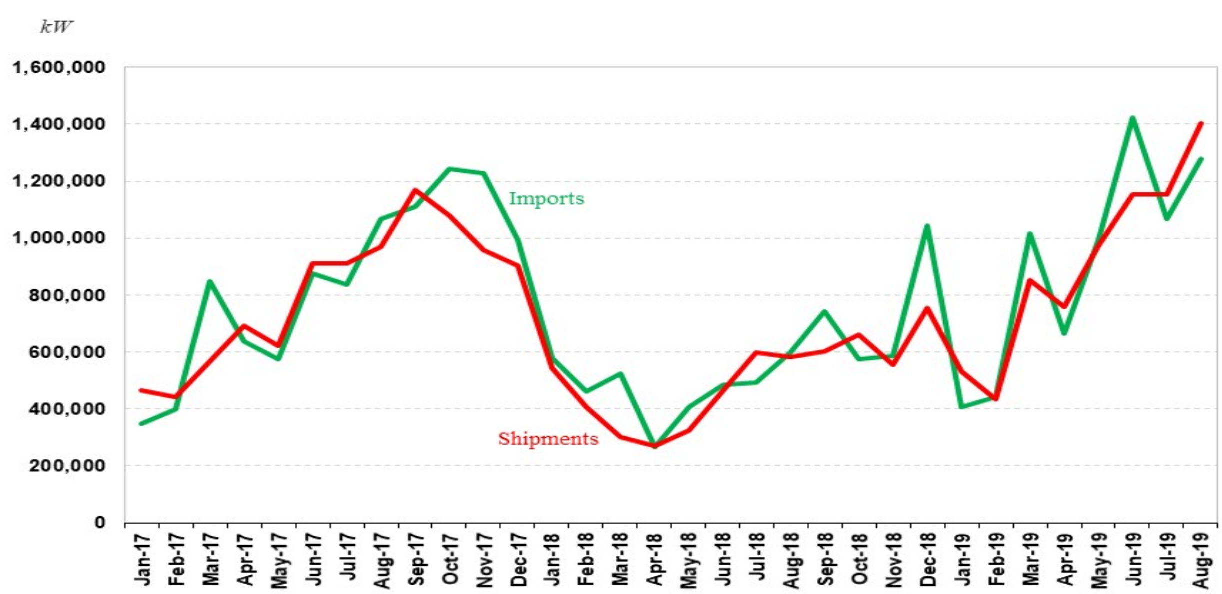
Batteries, magnets, solar panels, etc. in the Electricity (incl. equipment) category

Source: Data from the US Census Bureau (https://usatrade.census.gov/)

The value of total energy and energy-related imports has declined since mid-2018 (Figure 9, Panel 2), which is largely the result of declines in the value of imports of crude oil, natural gas, and petroleum products to the US. This, in turn, is the result of continued increases in the domestic production of these commodities, which are resulting in a growth in exports (we take this up again in the exports discussion below). Strikingly, even with tariffs on imports of solar panels and equipment, the value of imports in that category has generally increased since January 2016 (Figure 9, Panel 3).

The solar photovoltaic industry has been specifically targeted for tariffs by the Trump administration. Hence, the increase in the value of US imports of 'Solar panels, components, LEDs (8541)' depicted in Figure 9, although perhaps unexpected, likely reflects a host of other domestic policies—including direct and indirect subsidies, such as a 30% investment tax credit that is slated to fall in value after 2019, as well as mandates—that have stimulated demands for those items. Indeed, domestic incentives for the installation of solar panels (many of which are local) and continued declines in cost (not pictured) are likely serving to more than offset the impact of tariffs. As seen in the US Energy Information Administration's (EIA) 2019 Monthly Solar Photovoltaic Module Shipments Report, October 2019, data on module shipments remains robust and continues to grow (Figure 10) after a decline in early 2018.

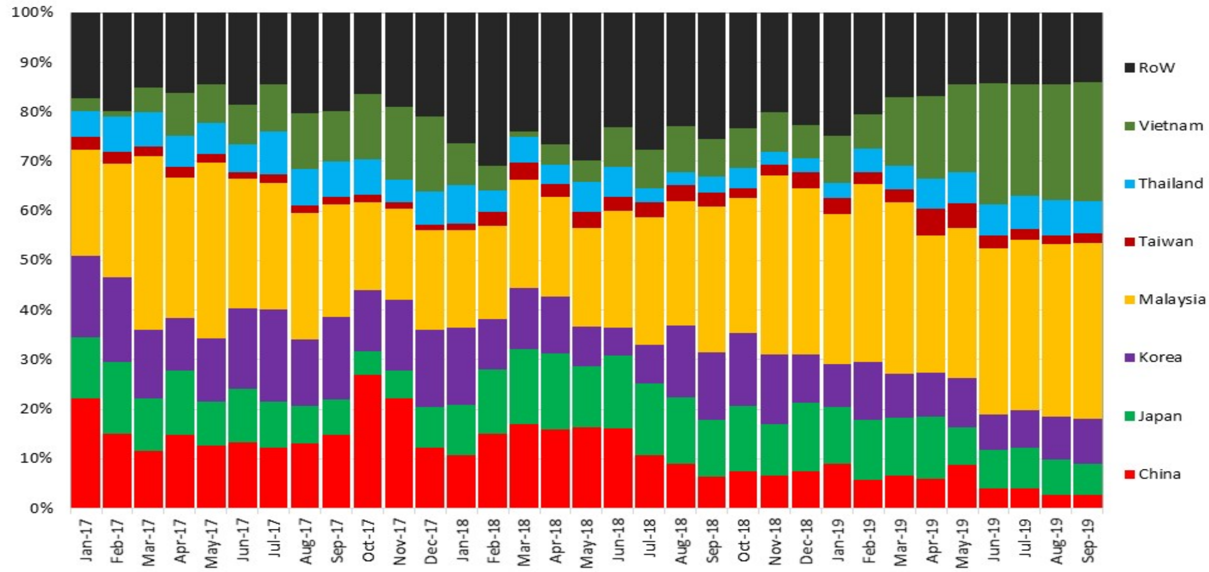
Figure 10. US Photovoltaic Module Imports and Shipments, Jan17-Aug19



Source: US Energy Information Administration

The growth of imports of photovoltaic modules indicated in Figure 10 has been accompanied by a shift in the *source* of imports. As indicated below in Figure 11, the value of imports of solar panels and related equipment from China has fallen since the tariffs were imposed. Since the middle of 2018, US photovoltaic module imports have been sourced increasingly from Southeast Asian countries such as Malaysia and Vietnam (Figure 11). In fact, from the beginning of 2018 through September 2019, the share of imports (by value) from Malaysia increased from 19.7% to 35.5% and the share of imports (by value) from Vietnam increased from 8.4% to 23.8%, all while the share of imports (by value) from China declined from 10.8% to 2.7%. Moreover, this occurred as the total value of US imports increased by 16.7%.[10]

Figure 11. US Photovoltaic Import Share by Select Country, Jan17-Sep19

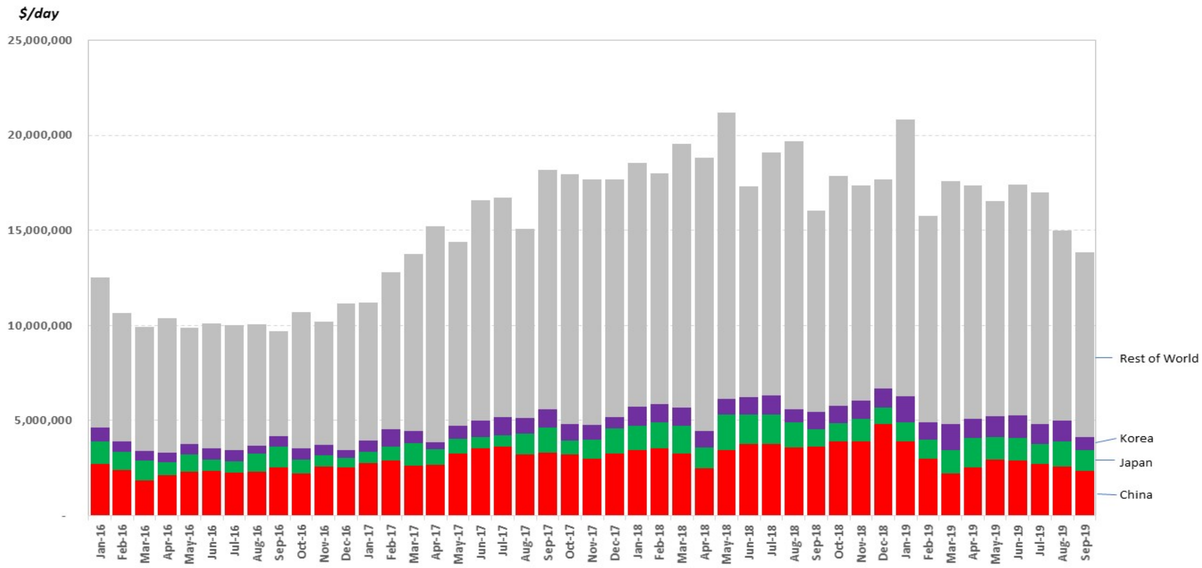


Source: Data from the US Census Bureau (https://usatrade.census.gov/)

The imposition of tariffs on imports from a specific trade partner should, all else equal, result in a "reshuffling of the deck" of imports rather than a massive decline in imports, provided there are ample opportunities for low-cost switching. Hence, the realized price impact of a bilateral tariff is not necessarily the tariff itself; rather, it is the change in price to the substituted commodity. In this way, the domestic welfare impacts noted above in Figure 5 are mitigated, but not completely avoided. Moreover, it highlights the manner in which the impacts of bilateral trade policies can be overstated, especially when they do not fully account for import-source substitution opportunities.

Tariffs have also been broadly imposed on US imports of steel used in the pipeline industry. Figure 12 depicts the value of US imports of iron and steel tubes, pipes, and fittings. There appears to be a sudden increase in imports just before the tariffs were put in place, indicating some products may have been imported and warehoused to avoid the tariffs. Although imports of iron and steel tubes, pipes, and fittings have decreased over the last year or so, they are in line with levels in early 2017, and still exceed 2016 levels. Even South Korea, which saw a significant decline in shipments to the US in 2018, saw a recovery in shipments to the US over the first three quarters of 2019.

Figure 12. Value of US Imports of Seamless Iron and Steel Tubes, Pipes, and Fittings (HC7304 and HC7307), Jan16-Sep19



Source: Data from the US Census Bureau (https://usatrade.census.gov/)

Imports of seamless iron and steel tubes, pipes, and fittings should be expected to ebb and flow with the pace of pipeline development activity, so some variability should be expected. Moreover, although not pictured in Figure 12, the value of imports of seamless iron and steel tubes, pipes, and fittings declined throughout 2015 from a January high of almost 30 million $/day before bottoming out in mid-2016 at around 10 million $/day. The trends since January 2016 must be considered in that context because it was prior to the Trump administration's tariff actions. That stated, the variation in imports has certainly increased, and the trend since June 2018 is a reversal of what was witnessed from mid-2016 through mid-2018. In general, higher variation and a reduction in imports are exactly what one should expect when introducing a constraint on flow (in this case in the form of a tariff), especially when that constraint is sporadically relaxed (through tariff waivers and specific country exemptions, for example). Thus, tariffs on imported steel tubes, pipes, and fittings appear to have introduced an at least partially binding hindrance to those imports and, it can be argued, have injected new uncertainties into the market.

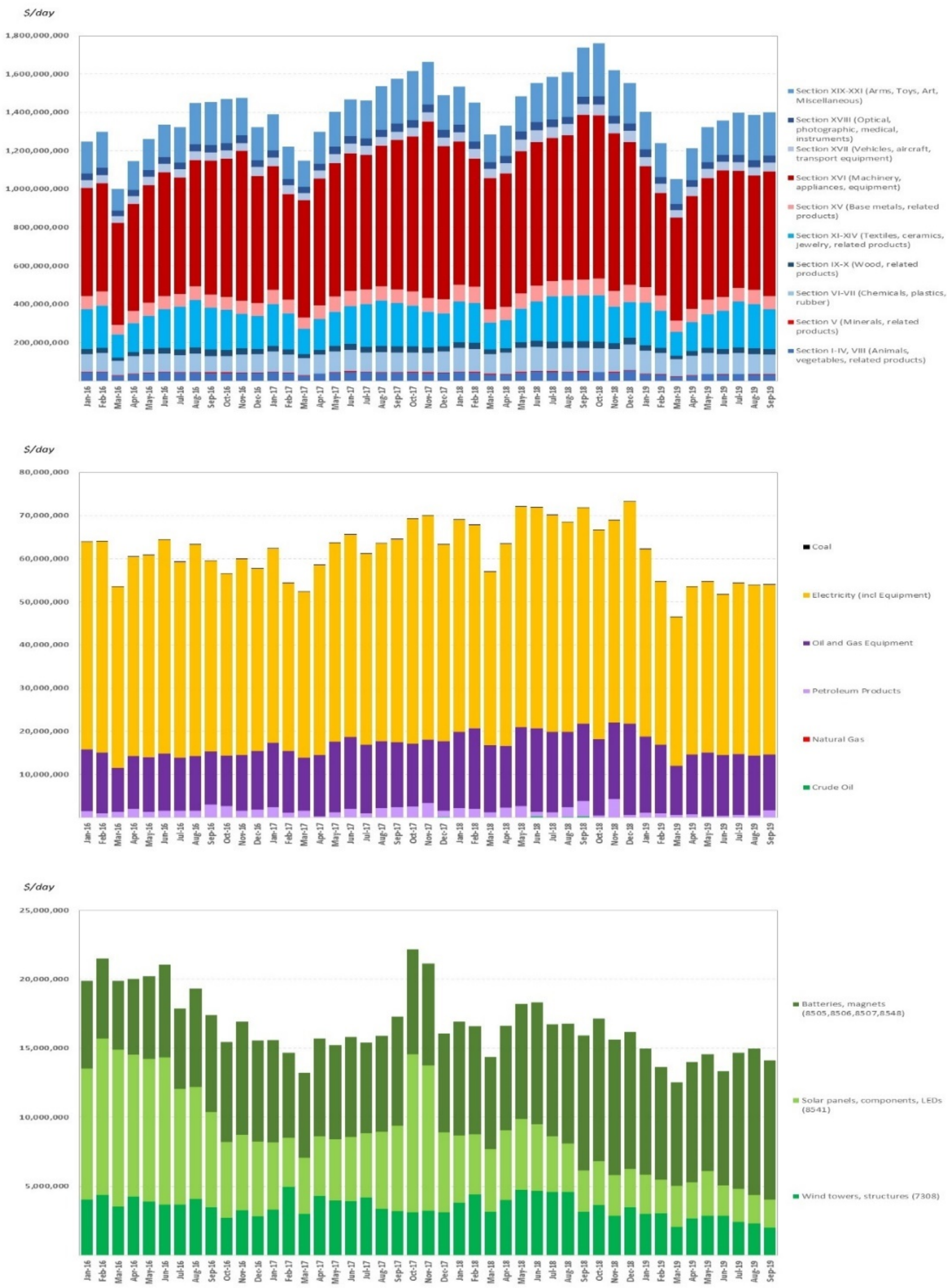
US Imports: A Focus on Northeast Asia

In this section, we focus on the value of US imports from China, Korea, and Japan. Figures 13, 14, and 15 depict the import data to the US from each country, respectively. As noted above with regard to photovoltaics and related equipment, the distributional impacts on the sources of imports to the US for energy and energy-related commodities are complicated, with clear declines seen in the value of imports from some countries but not others. We see in Figure 13 (Panel 3), for example, the reduction in imports from China, especially in the 'Electricity (incl. equipment)' category and most notably for solar panels. We also see a dramatic increase in the value of solar panel imports from China in late 2017 (also visible in Figure 11), which could be due to a warehousing effect of anticipated tariff action—i.e., commodity imports rising to avoid tariffs, followed by the imported commodity being stored for later use.

The total value of all US imports from China appears to follow a seasonal pattern (Panel 1, Figure 13), with a peak in August/September. However, the upward trend over the past several years (not all of which are pictured) appears broken in 2019 as the seasonal peak appears to be much lower, which may be a direct effect of the tariffs on imported Chinese goods. Notably, however, the seasonality across all commodities does not track into 'Energy and Energy-related' commodities or the subset of 'Batteries, Magnets, Solar Panels, etc.' (Panel 2 and 3, respectively, in Figure 13). Rather, we see a marked drop in the value of US imports from China in the categories as we move out of 2018. Again, this coincides with the imposition of tariffs. As noted previously and evident in Panel 3, Figure 13, the steepest decline is in 'Solar Panels, Components, LEDs (8541),' followed by a modest decline in 'Wind Towers, Structures (7308).' There is also a drop in the value of imports of 'Oil and Gas Equipment' (Panel 2, Figure 13). So despite increased activity in all of these areas in the US domestic market, the value of imports from China declined, thus indicating demand has been met through other means.

In Figures 14 and 15, we see a different story emerge for Japan and Korea. In Japan, the value of imports appears to have been unaffected. In fact, the total value of imports to the US from Japan for all commodities continues to rise throughout the time period (Panel 1, Figure 14). In the other categories, absent the aberrant data point of March 2017 (which is largely confined to batteries and magnets), the value of imports has been stable to slightly increasing (see Panels 2 and 3, Figure 14). Thus, while Japan is certainly not the point of origination for import substitution on goods from China, the value of US imports of Japanese goods has apparently not been negatively impacted.

Figure 13. Value of US Imports—China



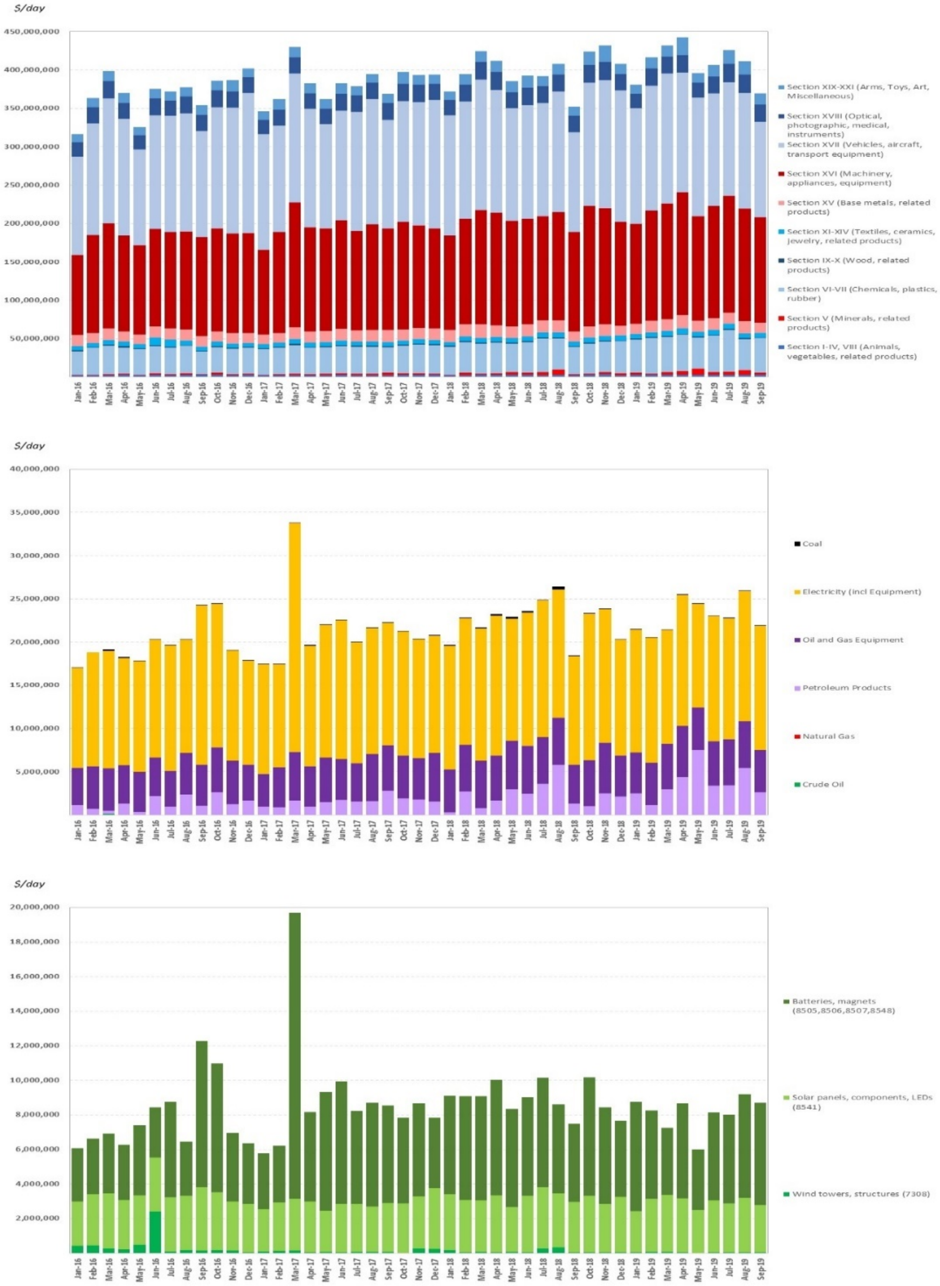
All Commodities

Energy and Energy-related

Batteries, magnets, solar panels, etc. in the Electricity (incl. equipment) category

Source: Data from the US Census Bureau (https://usatrade.census.gov/)

Figure 14. Value of US Imports—Japan



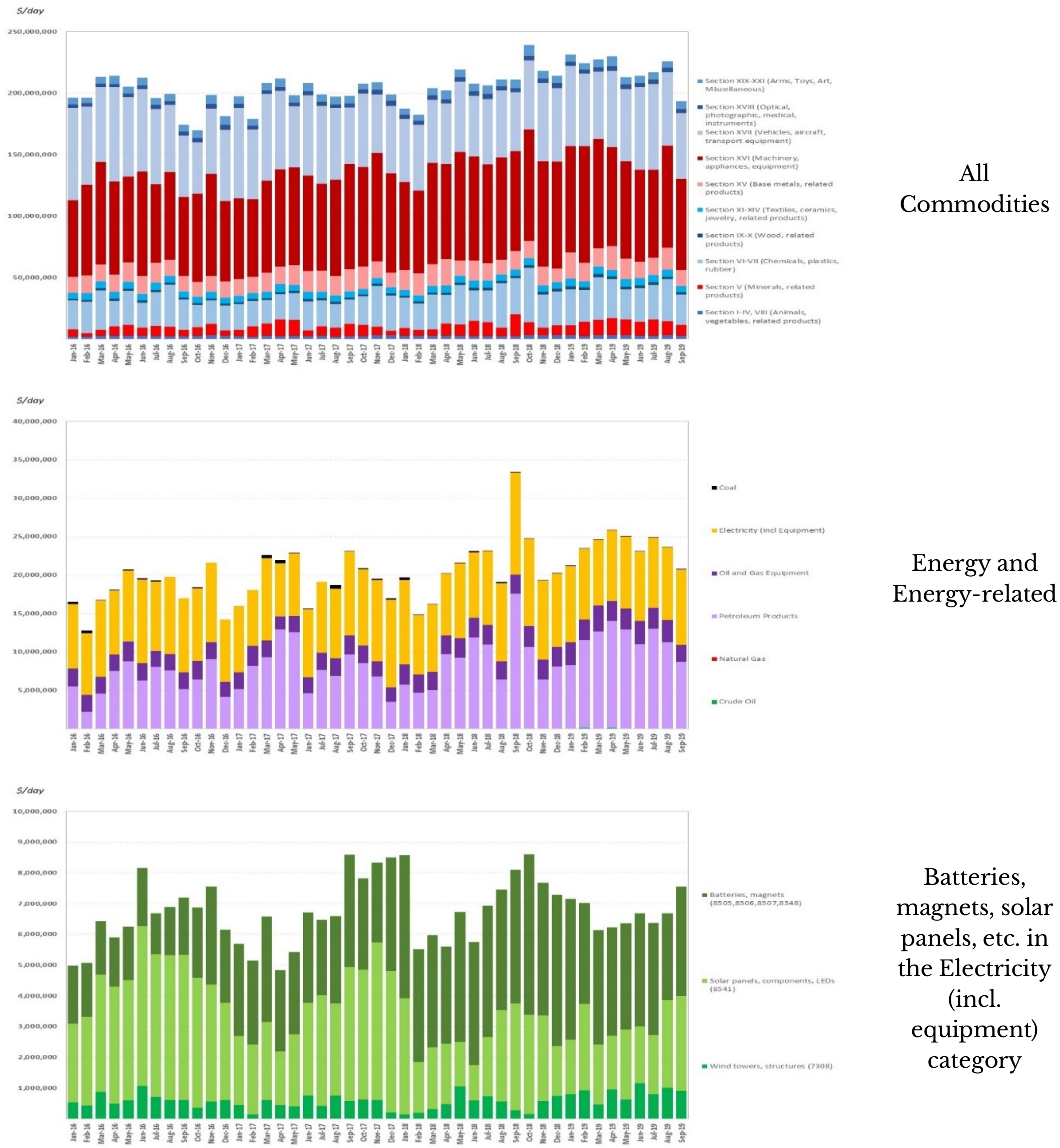
All Commodities

Energy and Energy-related

Batteries, magnets, solar panels, etc. in the Electricity (incl. equipment) category

Source: Data from the US Census Bureau (https://usatrade.census.gov/)

Figure 15. Value of US Imports—Korea



Source: Data from the US Census Bureau (https://usatrade.census.gov/)

The value of imports from Korea demonstrates a different pattern since January 2016, but they do not decline (Figure 15). In fact, the value of imports of petroleum products increased over the period, with a particular aberrant spike in September 2018. Almost all of the import value is contained in 'petroleum oils and oils from bituminous minerals, including biodiesel and waste oil, but not crude.' There also appears to be a seasonal element to the value of US imports from Korea of 'Energy and Energy-related' commodities, but it is not especially regular, with annual peaks oscillating between August and November (Panel 2, Figure 15). The value of imports of 'Batteries, magnets, solar panels, etc.' has been relatively unchanged in total, although the value of imports of 'Solar panels, Components, LEDs' declined significantly at the beginning of 2018 and has not since recovered to its pre-2018 levels. Hence, Korea is certainly not the point of origination for import substitution on goods from China, but the value of US imports of 'All Commodities' from Korea has climbed over the time period represented.

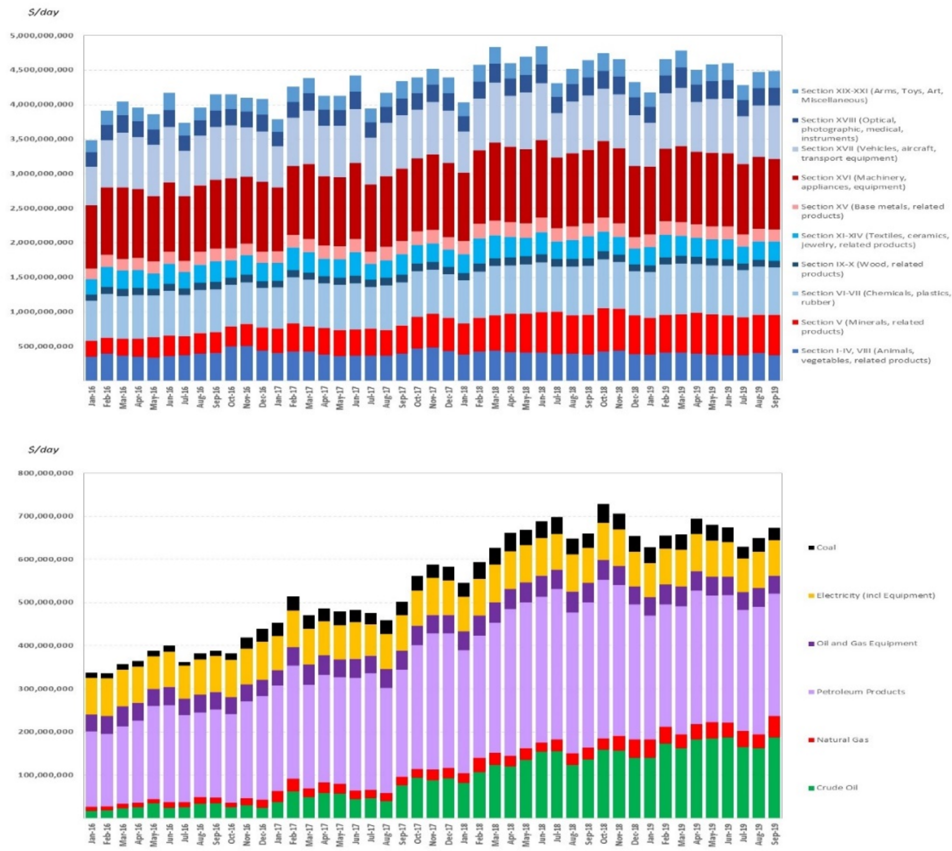
US Exports

The data on US export values are depicted in units of $/day to normalize differences in the number of days per month. Figures 16, 20, 21, and 22 depict similar detail for the value of US exports over the reference time period. Each of the figures consists of two panels focused on the value of exports. Specifically, the first panel depicts the value of US exports for 'All Commodities' by the Harmonized Code Schedule depicted in Table 2. The second panel depicts the value of US exports for Sections V, XV, and XVI, denoted as 'Energy and Energy-related,' thus capturing a subset of the total value of US imports that bears a connection to energy. The data in Panel 2 are represented such that the value of coal, electricity (including equipment), oil and gas equipment, petroleum products, natural gas, and crude oil are distinguishable.

As before, the data are depicted in this manner to fully contextualize the discussion of the impacts of tariffs on the energy sector. In contrast to energy and energy-related *imports*, energy and energy-related *exports* are a significant fraction of total exports, which signals that the economic the health of countries outside the US will play a major role for the overall trade balance in the US, a conundrum highlighted above. Namely, if economies outside the US falter, their energy demand will be negatively affected, which will in turn adversely impact US energy exports.

The total value of US exports has increased since January 2016 (Figure 16, Panel 1). About half of the increase has been in 'Energy and Energy-related' commodities, primarily due to growth in oil, gas, and petroleum product exports (Figure 16, Panel 2). The 12-month daily average export value of oil, gas, and petroleum products was $2.891 billion from January 2016 through December 2016 and $6.097 billion from October 2018 through September 2019—an increase of $3.205 billion. By comparison, the total daily average value of all commodity exports over the same two periods was $47.602 billion and $54.292 billion, respectively—an increase of $6.690 billion. Thus, oil, gas, and petroleum products accounted for 47% of the increase since 2016.

Figure 16. US Export Values to World, Select Commodity Groupings, Jan16-Aug19



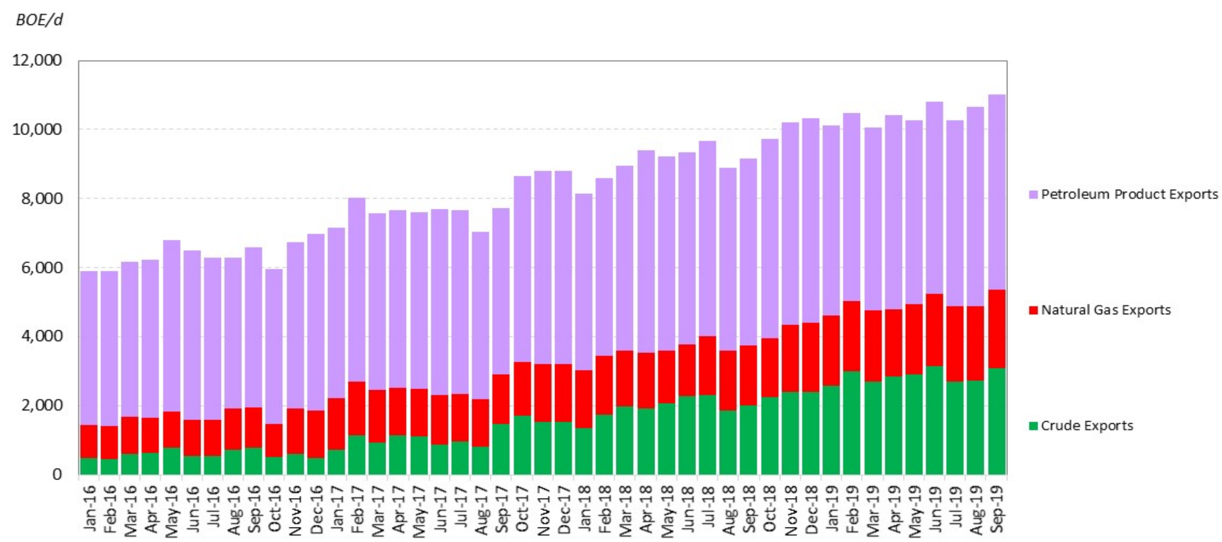
All Commodities

Energy and Energy-related

Source: Data from the US Census Bureau (https://usatrade.census.gov/)

Despite the trade dispute between the US and China, the value of US exports of oil, gas, and petroleum products climbed through mid-2018, then remained relatively flat through September 2019. Noting that domestic production of relatively low-cost supplies continued to grow throughout, fueling steady growth in the volume of exports (Figure 17), the flattening of the value of exports after mid-2018 is an indicator of slowing global demand and a flattening of price rather than a flattening of quantities shipped. Indeed, the trade war does not appear to have yet had any discernible impact on the overall quantity of US oil, gas, and petroleum product exports.[11] In fact, the effects appear to be more distributional, particularly in Asia, rather than impacting the overall level. Total exports from the US to the world of oil, gas/LNG, and petroleum products were all higher year-on-year in September 2019.

Figure 17. Quantity of US Exports of Oil, Gas, and Petroleum Products, Jan16-Sep19

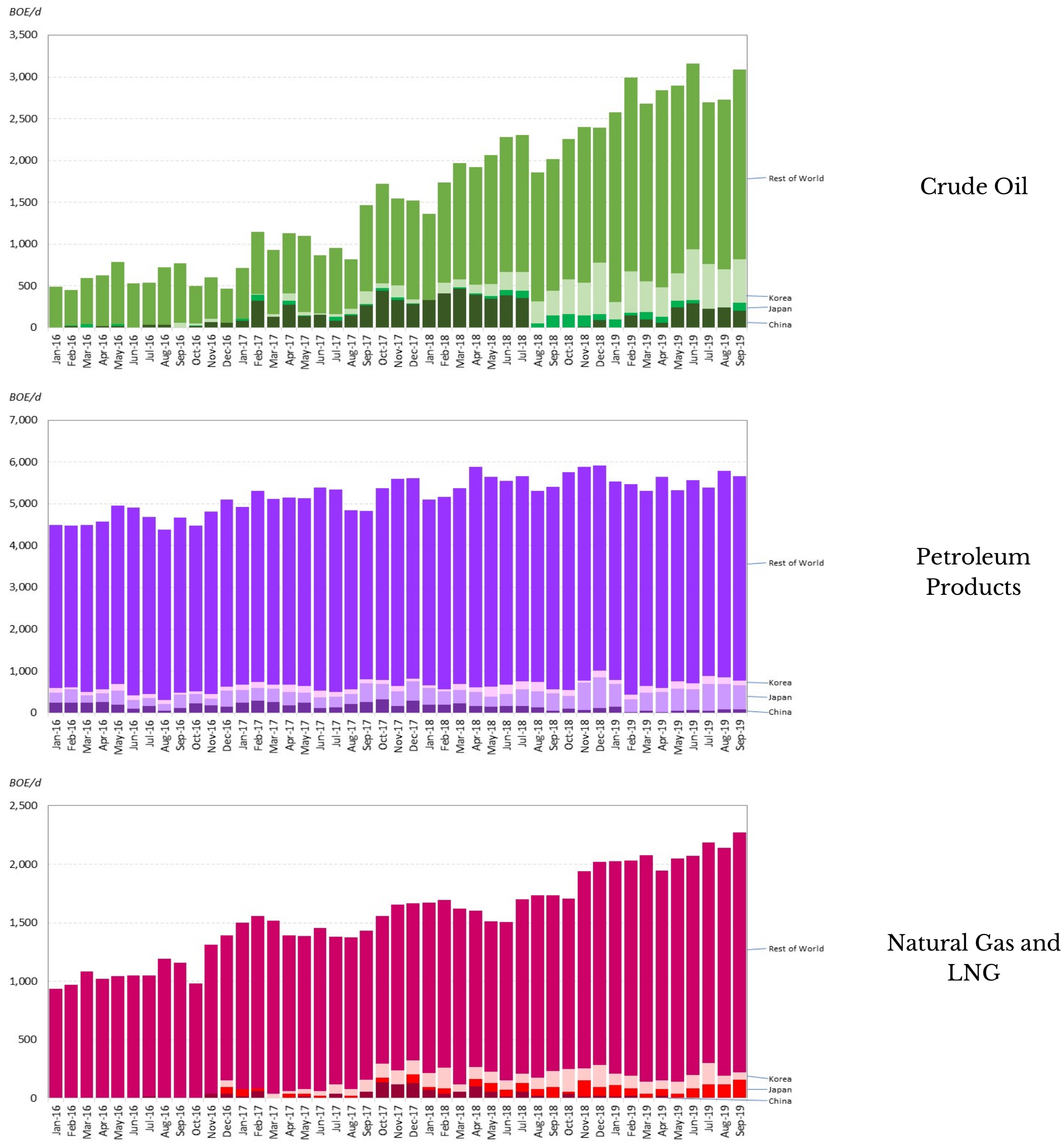


Source: Data from US Energy Information Administration, author conversions to BOE/d

Although the overall quantity of US exports of oil, gas, and petroleum products does not appear to have been encumbered by the US-China trade dispute, the *distribution* of exports has changed. This can be attributed to a number of factors, including trade tensions, shifts in regional commodity prices (especially for natural gas), and different rates of demand growth around the world. As indicated in Figure 18, US exports of oil, petroleum products, and gas (LNG) to China, Korea, and Japan are relatively small fractions of total US exports of each of those energy commodities. Moreover, trade tensions certainly had a negative impact on volumes exported to China, but the flows were largely redirected, as total volumes did not decline.

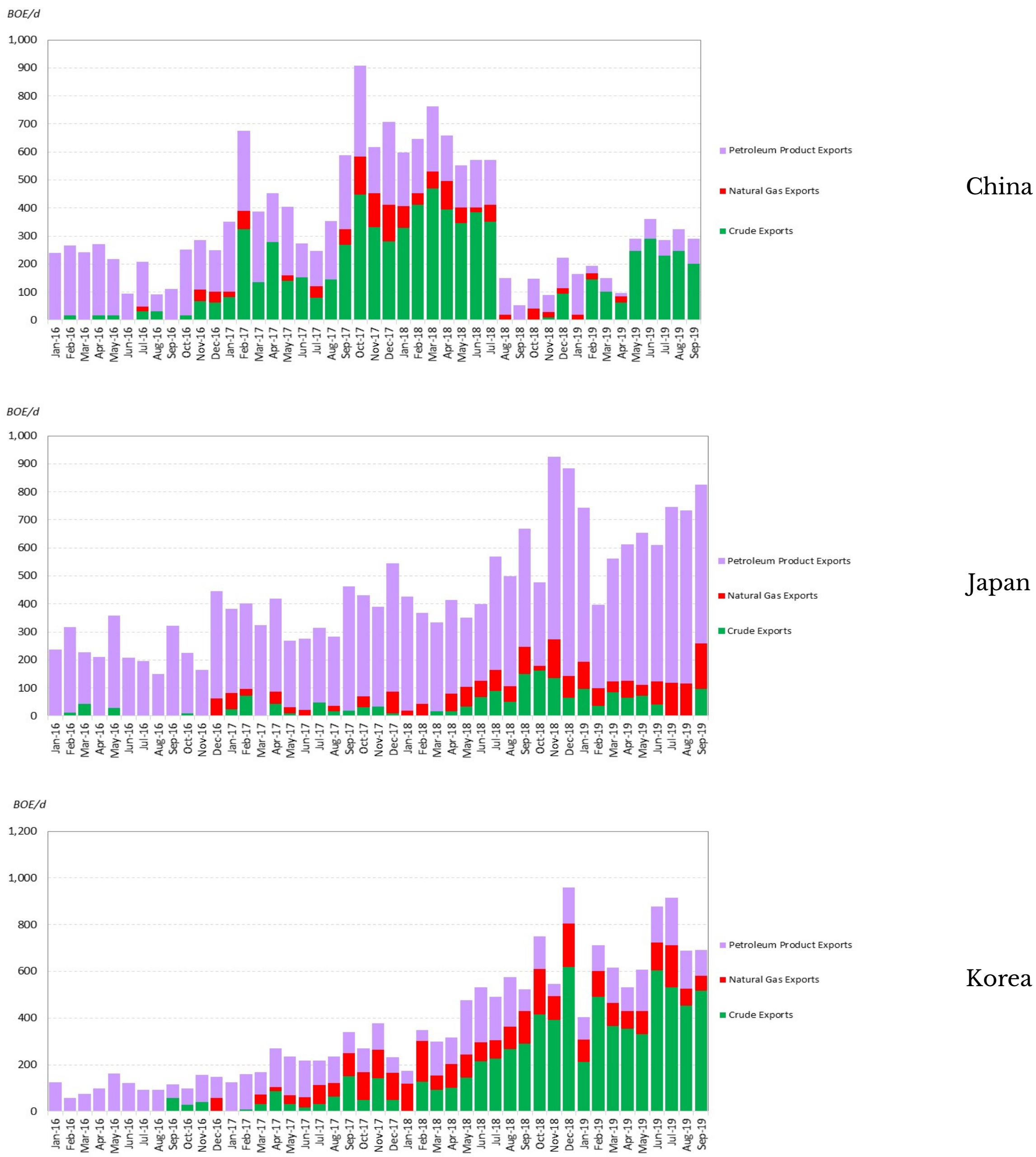
As demonstrated in Figure 19, the value of exports had a distinct shift away from China in mid-2018, which was directly attributable to the US-China trade dispute. However, Japan and South Korea fared differently. As seen in Figure 18, destinations outside Northeast Asia saw an increase in flows of US volumes of oil, gas (LNG), and petroleum products. Hence, the trade tensions have, to date, resulted in a reshuffling of trade flows, but have not seriously impacted overall US energy commodity exports.

Figure 18. US Exports of Oil, Oil Products, and Gas by Select Regions, Jan16-Sep19



Source: Data from US Energy Information Administration, author conversions to BOE/d

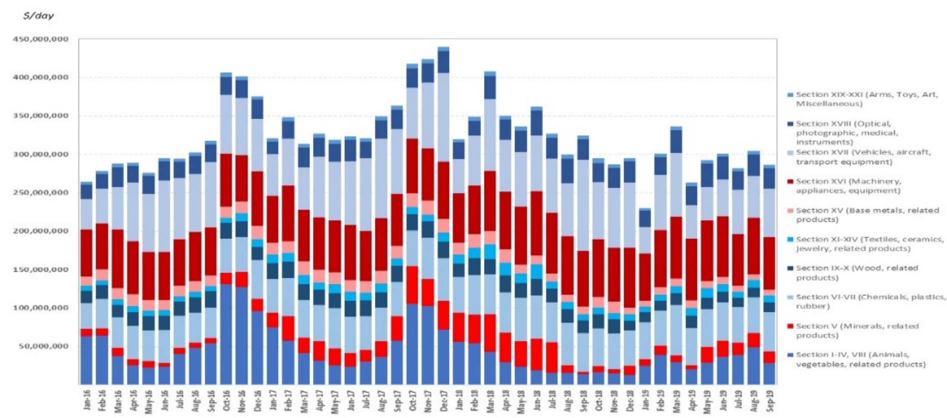
Figure 19. US Petroleum Products, Crude Oil, and Natural Gas Exports to China, Japan, Korea, Jan16-Sep19



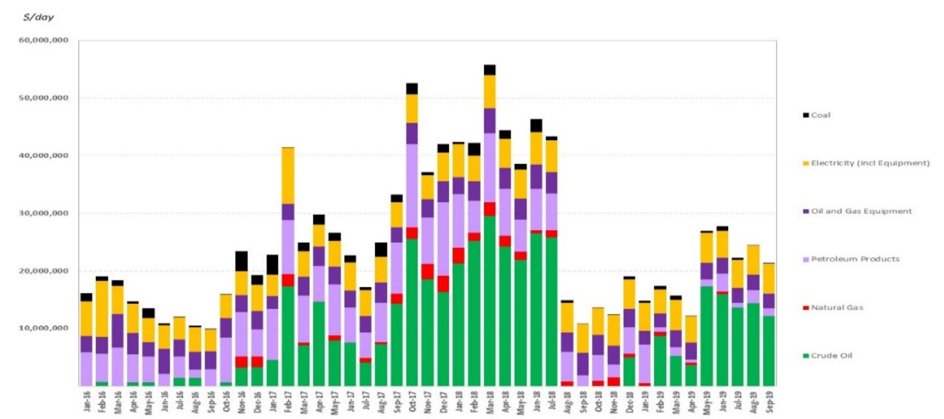
Source: Data from US Energy Information Administration, author conversions to BOE/d

Figures 20 through 22 depict the export values of 'All Commodities' in the first panel, and 'Energy and Energy-related' exports in the second panel—which is where crude oil, natural gas, and petroleum product exports can be seen—for China, Japan, and South Korea, respectively. From these figures we see that the total value of exports in all commodities expanded in Japan and South Korea, but declined in China. This pattern has been even more pronounced with exports of crude oil, natural gas, and petroleum products. In sum, the patterns observed in the data are indicative of a bilateral trade dispute where the two parties most heavily affected are the parties directly involved.

Figure 20. US Export Values to China, Select Groupings, Jan16-Sep19



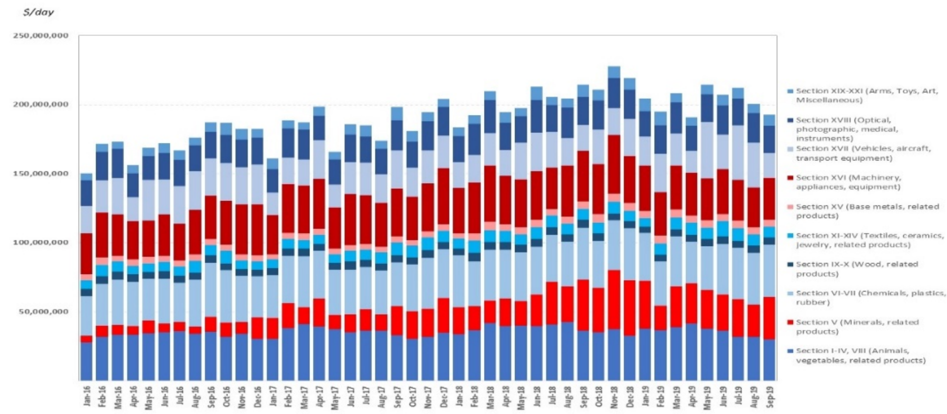
All Commodities



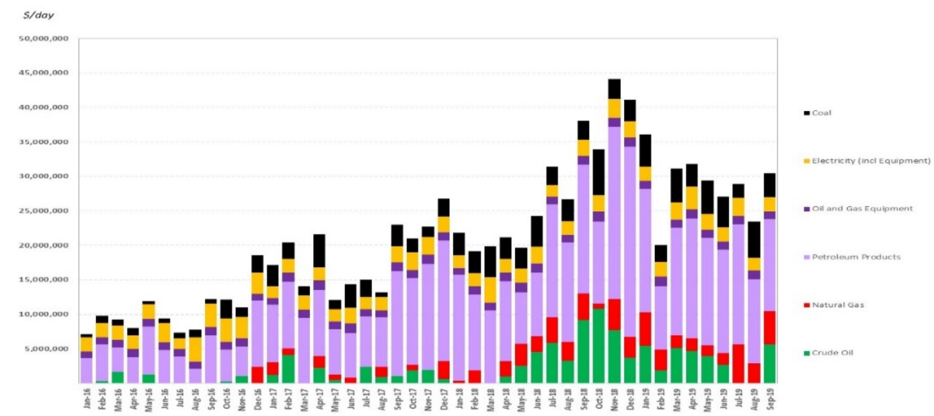
Energy and Energy-related

Source: Data from the US Census Bureau (https://usatrade.census.gov/)

Figure 21. US Export Values to Japan, Select Groupings, Jan16-Sep19



All Commodities

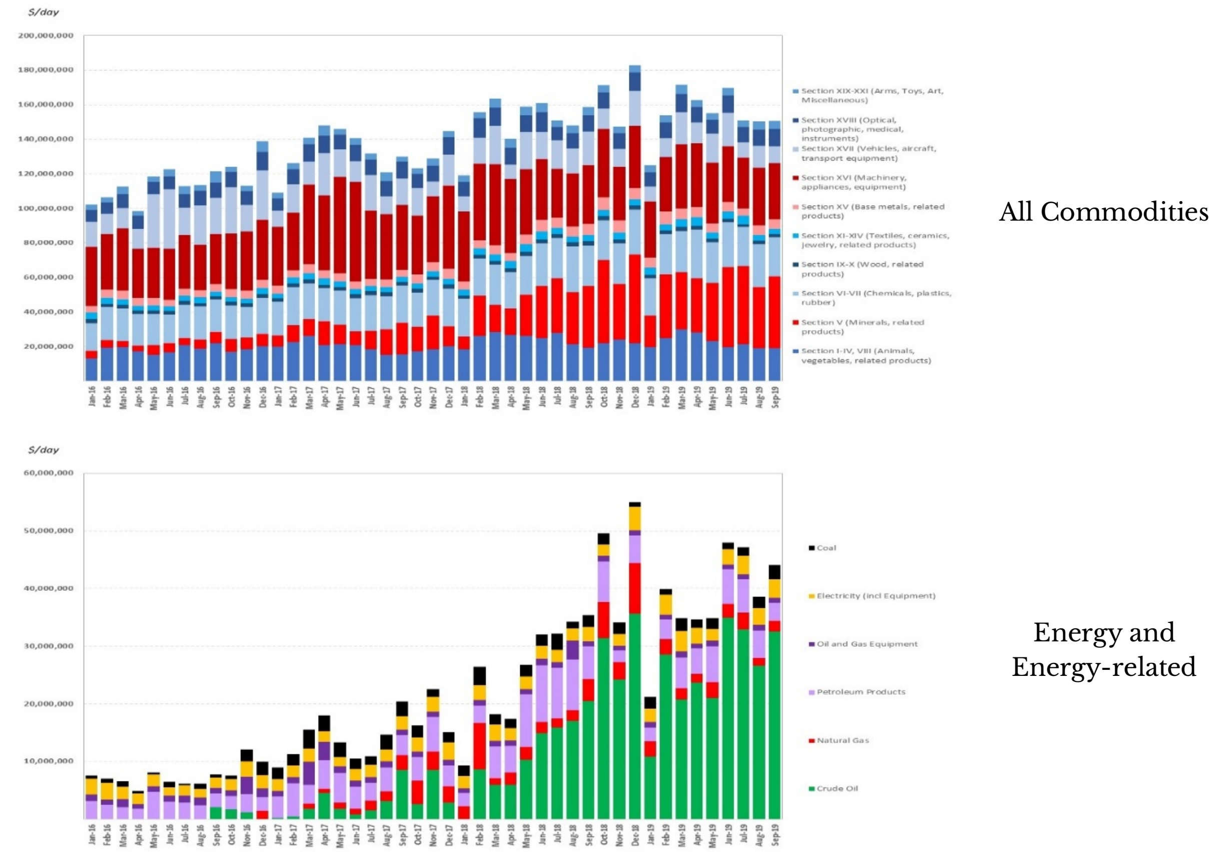


Energy and Energy-related

Source: Data from the US Census Bureau (https://usatrade.census.gov/)

Importantly, the outcomes to date do not fully encapsulate the risks that escalating trade tensions could bring. With LNG in particular, as concerns over the ability to trade long term with China mount, US export project developers may find it increasingly difficult to secure long term offtake agreements with Chinese importers. This could be especially problematic given that China is projected to be a major source of demand growth globally for natural gas, most of which will be sated by waterborne supplies.[12] To the extent that China turns increasingly to alternative sources for LNG supply—such as Mozambique, Australia, Russia, Canada, etc.—US export projects may find it more difficult to reach a final investment decision (FID). Of course, the outcome may not actually be so dire, especially if other sources of demand growth emerge, such as from India and the ASEAN region. But even with a reshuffling of long-term contractual arrangements, the trade tensions between China – the fastest growing source of demand for LNG – and the US – the fastest growing source of new supply for LNG – have without doubt injected a new source of uncertainty into a rapidly evolving global LNG market.

Figure 22. US Export Values to Korea, Select Groupings, Jan16-Sep19



Source: Data from the US Census Bureau (https://usatrade.census.gov/)

VI. Some Implications for Northeast Asia

While the US-China trade dispute may not be having dramatic impacts on US energy trade, there are signs that it is negatively affecting the economies of China and its neighbors, especially in the high-tech manufacturing sector. Exports to China from both Japan and South Korea have declined. Chinese factories import Japanese auto parts and South Korean semiconductors and use them to manufacture finished goods, some of which are exported to the US. This process has clearly been affected by the trade war. More broadly, the trade war between the US and China, Japan's trade friction with South Korea, and the Hong Kong political crisis have introduced an unusual level of uncertainty in the region.

Exports to China by themselves account for a small portion of the total output for Japan. However, a decline in exports could begin a downward trend if leading companies decide to reduce investment, or if consumer confidence is adversely affected. Still, the news is not all bad. The economies of Japan and South Korea both grew in the last quarter, while Germany, another big exporter to China, seems to be entering a recession. In fact, Japan's total exports to the US rose, offsetting losses from China.

Overall macroeconomic fundamentals in the region are mixed and involve a moderate level of downside risk. A few key points are as follows:

- China's economy recently experienced its lowest quarterly growth in decades, but was only slightly down from the previous quarter and still quite strong by global standards.
- China and the US accounted for 25% and 12%, respectively, of South Korea's total exports last year. Escalating trade tensions would place South Korea firmly at risk of significant collateral damage and be rather costly to its economy.
- Japan's economy is linked through multiple avenues of trade with China and South Korea, as well as the US, so spillovers from escalating trade tensions would similarly affect its economy.
- South Korea's central bank cut its economic growth forecast for 2019 to 2.2% (some analysts expect growth to be closer to 2%) and made its first interest rate cut in three years in July 2019, with a second cut expected to follow.[13]

These are a few of the factors that have contributed to analyst expectations that the economies of both Japan and South Korea will slow and may soon enter a recession, an outcome fueled by the depth of the US-China trade war.

South Korea has an export-oriented economy, and China and the US are South Korea's two largest trading partners. With South Korea's exports accounting for more than 50% of its total GDP, the country's economy is subject to an increased level of risk as a result of the trade war between its two largest trading partners. The risk, however, is not all downside. There may be opportunities for South Korea to benefit from trade frictions between the US and China in certain commodities, like PV cells.

In a way, the trade war between the US and China has found South Korea caught in the middle, since the US is its strongest political ally, while China is a major trading partner. It is worth pointing out that electronics and semiconductors are included in the US's second set of tariffs, and semiconductors are the main intermediate product exported by South Korea. Chips from South Korea accounted for 25.3% of the total imported by China last year, while semiconductors from the US accounted for just 4% of China's chip imports. Even if the trade war somehow results in China importing more semiconductors from the US, South Korean chip exports would fall. Amid this uncertainty, the South Korean government is looking to other export destinations, including Russia and Latin America, in order to diversify its export mix. Longer term, this diversification could bear a benefit by buffering the Korean economy from short-term shocks in China.

Aside from the collateral effects of the US-China trade dispute, there are other, more direct trade-related concerns that have bearing. The recent trade dispute between South Korea and Japan, which are major trading partners, makes matters in the Northeast Asian region even more complex. For instance, Japan announced that it would tighten control over materials that are crucial inputs to Korea's production of semiconductors. Under the new regulations, Japanese companies would need a license to export them to South Korea, introducing a process that could take up to three months. Since semiconductors are Korea's biggest export item, this development could have a significant negative impact on its economy.

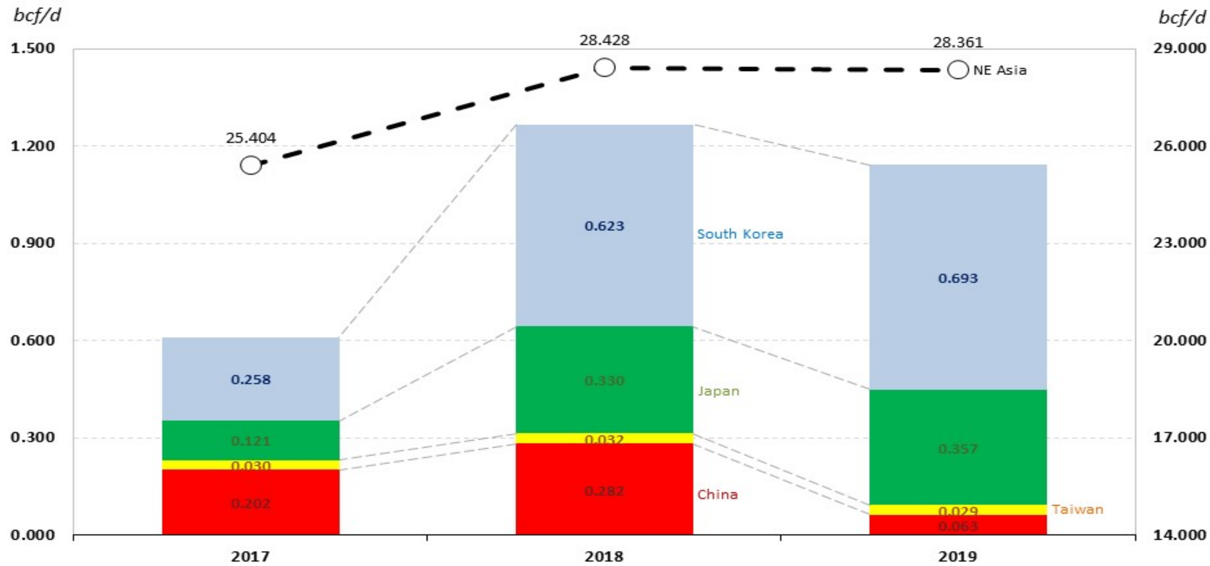
Recently, Japan removed South Korea from its list of trusted trade partners, which could lead to additional delays in exports of auto parts, electronics, and related items to South Korea. The roil poses a threat to the world tech supply chain. For example, South Korean companies provide the majority of DRAM memory chips, which are used in electronic devices throughout the world, including the US.

Returning our attention to energy trade, the shale revolution in the US has presented some interesting opportunities for major fuel importers in Asia. To begin, the US is the fourth-largest and fastest-growing LNG exporter in the world, while China is the fastest-growing importer of LNG, due to its insatiable energy needs to fuel its economic growth and as it tries to move away from coal in order to address pollution concerns. However, after the escalation of the trade war between the US and China, fewer LNG vessels from the US have reached China. In fact, China added LNG to its list of proposed tariffs in August 2018, and imposed a 10% tariff on US LNG in September. The impact on China's imports of US LNG were tangible as only two vessels moved from the US to China after their imposition, compared to 14 during the first four months of 2018. At the same time, demand for LNG cargoes remains robust around the world, and US LNG exporters are not expected to experience a strong negative impact going forward, thanks to increasing LNG export diversification from countries outside Northeast Asia, such as South America and Europe.

China has ambitions to boost its domestic natural gas production, including from the development of its vast unconventional sources, but geologic issues and inadequate infrastructure will likely remain a challenge for the foreseeable future. China will at the same time likely try to diversify and increase its LNG imports from sources other than the US, such as Australia, Qatar, Mozambique, Russia, and Canada. PetroChina is also likely to raise investment in Central Asia, Russia, and the Middle East, especially in natural gas projects. Overall, other than a potential reduction in global LNG demand due to an economic slowdown, the trade war is likely to lead to a reshuffling of the LNG supply portfolio, or who supplies whom, but it is unlikely to change aggregates. On the supply side, Russia, for example, stands to benefit significantly from a protracted US-China trade war as its recent LNG investments in the Arctic and Yamal regions are affording it an opportunity to reach other, higher value markets outside of Europe.

On the demand side, another country that is likely to become increasingly important in the region's LNG reshuffling is Vietnam. Vietnam has become a big beneficiary of the U.S.-China trade war, as several companies have shifted production from China in order to avoid US sanctions. Increasing energy needs in Vietnam are also driving development of an LNG import terminal in the Binh Thuan province, which will allow Vietnam to import LNG from the US as well as other countries.

Figure 23. Northeast Asia LNG Imports from US, 2017-2019 (as of Nov.)

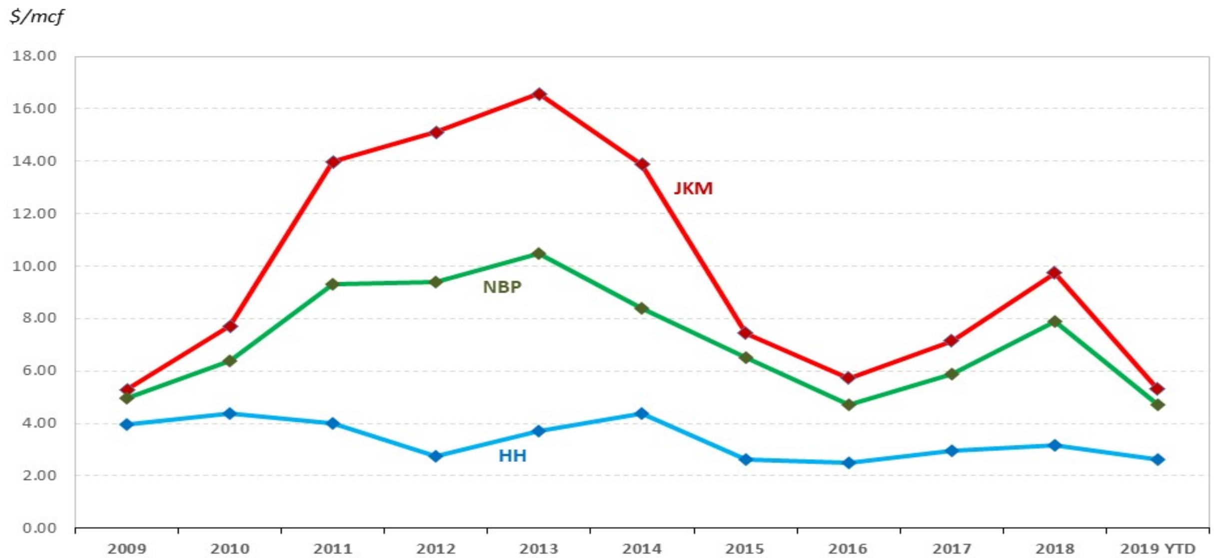


Source: Poten and Partners LNG Database

As indicated in Figure 23, LNG exports from the US to Northeast Asia have declined from 2018 to 2019. The destination of US LNG exports tells an interesting story. Average daily deliveries of US LNG to Japan and South Korea have actually increased from 2018 to 2019, while deliveries to China have declined dramatically. This is even more striking when juxtaposed against all LNG deliveries to Northeast Asia. In sum, LNG deliveries to Asia have been virtually flat from 2018 to 2019, and Chinese LNG imports have actually increased. This highlights two important points. First, a reduction in US LNG deliveries to China has resulted in increased deliveries from other LNG exporters. Second, the reduction in US LNG deliveries to China has resulted in an effective swap of cargoes to other Northeast Asian economies.

Importantly, we cannot attribute everything we see in Figure 23 to the trade dispute between the US and China. Regional LNG prices matter. As indicated in Figure 24, the price of natural gas in Asia (JKM) increased from 2017 to 2018, then declined from 2018 to 2019 (as of Nov.). Given the relatively stable price in the US (HH), this means the margin for deliveries of US LNG to Northeast Asia has compressed. All else equal, this should result in less US LNG exports to Asia. Thus, the effects of commercial and economic drivers on US LNG exports to Asia must be carefully considered. That said, it does appear that the trade tensions between the US and China are reshuffling the supply deck in Asia, effectively redirecting US LNG toward Japan and South Korea. As long as the tensions remain bilateral, a reshuffling of the supply portfolio is likely to be the most likely consequence. However, if the trade dispute widens, it could have broader ramifications for LNG, as well as trade in other energy markets.

Figure 24. Regional Natural Gas Prices, 2009-2019 (as of Nov)



Source: Platts; Annual prices are computed from daily averages

VII. Closing Remarks

An expanding trade deficit alongside relatively meager economic growth set the stage for a political upheaval in the US that took aim at upending the status quo. While correlation is not causation, the perception that the US has been losing out to foreign manufacturing is real, and perception *is* reality, especially in politics. Hence, the mercantilist push by the Trump administration should not come as a surprise. Indeed, some of the highlights of the Trump campaign were entirely focused on trade, and the president has been systematically delivering on those campaign promises, which included:

- renegotiating NAFTA,
- threats to impose import tariffs and destination-based taxes,
- a formal withdrawal from Trans-Pacific Partnership (TPP), and
- a preference for bilateral trade negotiations.[14]

This paper sought to shed light on the potential energy market impacts of the US-China trade war that has erupted since Trump took office. Much work has been done in an attempt to assess the economic impacts of previous shifts in trade policy in other countries (see, for example, TaxFoundation.org), but the predicted dire consequences of various proposed policies are generally not realized. That stated, the magnitude of the US-China trade dispute is significant, and, as it involves the world's two largest economies, its ramifications extend well beyond just the US and China, so ongoing analysis is paramount.

A mercantilist approach by the US in trade negotiations has emerged, and the idea that trade surpluses are desirable appears to be at the core of US trade policy under the Trump administration. However, there remains considerable uncertainty about how exactly this will shape strategy and outcomes. Indeed, if anything has proven true it is that predicting the Trump administration's next move is difficult at best. While a general theme has emerged that is very much in line with Trump's campaign promises, the exact approach to international trade policy and how it will impact energy markets remain uncertain.

Policy that raises barriers to international trade does not bode well for US and global energy security. Unencumbered trade enhances fungibility and allows short-term disruptions to be arbitraged quickly. Impeding this through policy actions that raise uncertainty and/or negatively impact investment will ultimately limit market responsiveness and raise costs. Market depth, which is critical for energy security to consumers and producers, can be compromised if policy becomes burdensome for new investments, capital flows, and market participation.

It is important to engage a measured approach that considers the relative elasticities and appropriate incidence of tariffs and other protectionist trade policies on consumers and producers. Without question, any shift in US trade policy will inevitably impact energy markets—directly, indirectly, or both—and will likely drive a reshuffling of the international energy supply portfolio as exporters seek lower cost outcomes in the presence of newly erected constraints on trade. Therefore, to the extent that the affected energy commodity markets are fungible, any long-run negative implications are likely to be more or less mediated.

As argued above, it is not in the best interest of the mercantilist agenda for the Trump administration to limit access by foreign countries to US energy exports. Thus, it is more likely that the administration will take steps to facilitate energy exports. This will carry spillover benefits for global energy markets and enhance energy security more broadly. However, if trade policy becomes restrictive in other dimensions—solar panels, steel, etc.—one wonders what the ramifications, retaliatory or otherwise, may be for US exports of oil and gas. At the moment, the impact of tariffs on imports of solar panels and other energy products seems to be mitigated by other domestic policies—at the federal and state levels—that at least somewhat offset the impact of tariffs by encouraging greater deployment of solar energy technology.

Going forward, if the implications of a protracted trade war include slower global economic growth, then any positive balance of trade impacts from expanding US energy exports will be limited. Therein lies a conundrum: promote growth through more open trade, thereby expanding US energy exports (something in which the US has a comparative advantage), or adopt protectionist measures, thereby compromising trade (an important vehicle for global economic growth) and diminishing the prospects for expanding US energy exports. To be clear, there is uncertainty in both directions, but there is a conundrum nonetheless. More generally, the global economy, and hence energy system, is fraught with uncertainty as we hurdle through a trade war between the world's two largest economies less than a decade removed from one of the deepest recessions in history.

Addendum — Phase One: Steps Toward Settlement of the US-China Trade Dispute?

"Phase One" of a trade deal between the US and China was signed as the latest version of this paper was being drafted, signaling a positive turn in the US-China trade saga. The 96-page agreement includes promises by China to protect intellectual property rights, cease forced technology transfers, enforce laws against online piracy and counterfeiting, and allow US financial service firms greater access. It also includes provisions aimed to increase exports from the US agricultural sector, and (of relevance to this exposition) a commitment to purchase an additional $52.4 billion in US energy commodities (including LNG, crude oil, refined products and coal) over the next two years – ramping by an additional $18.5 billion in 2020 and $33.9 billion in 2021.

To be clear, the phase one agreement does not eliminate tariffs, as 25% levies on $250 billion of imported goods will remain, including materials and components used in US manufacturing. In addition, the specter of tariffs returning certainly looms, especially if China does not meet its commitments under Phase One.

In the energy commodity space, the Phase One agreement implies China's energy commodity imports from the US in 2020 will have to rise substantially, to levels never previously reached. Then, in 2021, those levels must again be exceeded. Meeting such aggressive increases in energy commodity imports from the US presents some serious logistical challenges and, arguably, may not even correspond to actual need in the near-term, given China's connectivity with other long-term suppliers in Russia, Australia, Saudi Arabia and Qatar, to name a few.

Oil import targets may be problematic, lest a redirection of volumes (swaps) occurs. Increasing volumes of US oil exports to China will require a significant increase in tanker traffic, as well as a potential addressment of Chinese refinery configurations. On the positive side, the ability to load sufficient crude oil supplies at US ports for export to China is not likely a constraint. Nevertheless, all issues taken together suggests that US volumes as indicated in the Phase One agreement may not physically land in China, instead arriving on other shores via cargo swaps to optimize scheduling. In turn, this highlights an important role that other countries will play in ensuring China meets its Phase One targets. Namely, if economic growth at large is disrupted in any way, meeting the stated targets may become very difficult, at best, which brings us back to the US energy trade conundrum highlighted herein.

The ability for China to meet its Phase One targets for US LNG imports and US coal imports appears to be much more feasible, but still rife with potential difficulties. In this exposition, we have not expounded on coal, as it is a rather small fraction of US energy trade, but it could become domestically encumbered as various legal battles over mining and exports ensue. On the LNG front, the wave of expansions that are forthcoming from the US will be more than capable, but the questions of price and cost remain critical. For example, if the Chinese market (or Asian market more generally) becomes flush with natural gas supply as various other regions such as Russia (via pipeline and LNG), Australia (LNG) and Qatar (LNG) all compete with US LNG, what will the outcome be? If it results in a depression of the Asian price then a redirection of LNG cargoes is likely to result. The question of commercial viability then becomes central to market function, and the economic health and LNG demand in countries other than China will be a major point of focus. In any case, it is highly unlikely that other suppliers of LNG will readily relinquish market share for the sake of a US-China trade deal; rather, the terms of trade across all markets must be sufficient for such an outcome to occur. Moreover, unless China removes or reduces the 25% tariff on US LNG that was effective June 2019, it remains a challenge for Chinese gas buyers who already bear losses to import a large amount of US LNG.

In summary, the Phase One agreement is certainly a positive development, but the road ahead is far from smooth, especially since the consequences of failing to meet specified targets are unclear. Moreover, a more robust "Phase Two" is not expected in 2020 and there remains a high risk around subsequent trade negotiations. So, the US-China trade dispute, while relaxed at the moment, is far from resolved. The saga will continue.

VIII. Bibliography

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IX. Endnotes

[1] World Bank and the Development Research Center of the State Council, P. R. China, "China 2030: Building a Modern, Harmonious, and Creative Society" (Washington, DC: World Bank, 2013).

[2] Of relevance to this research is the online tool available from the Asian Development Bank, "Trade Conflict Analysis Online Tool." This allows the user to examine the economic impact for Asian countries of tariffs proposed by the Trump administration. Given the uncertainty associated with how tariffs may ultimately be implemented due to ongoing trade negotiations and exemptions that the Trump administration has allowed in previous tariffs, we do not use that tool to report any hypothetical results. Rather, we leave the reader to explore that option.

[3] In May 2018 more than 1,100 economists across the political spectrum, including several Nobel laureates, signed an open letter to Trump and to Congress expressing strong opposition to tariffs and protectionism.

[4] See Stolper and Samuelson, 1941.

[5] See Amiti, Redding, and Weinstein, 2019.

[6] Variables used as instruments are contemporaneous and two lagged values of the Federal Funds Rate and the Labor Force as well as the second lag of the right-hand side variable. Tests for endogeneity (Durbin and Wu-Hausman) of the regressors for equation (1) reveal GDP and lagged net exports must be treated as endogenous, while the exchange rate can be treated as exogenous (test result available upon request). In the last case, it should be noted that excluding energy from the trade balance reverses the result. See endnote 7 below.

[7] Variables used as instruments are contemporaneous and two lagged values of the Federal Funds Rate and the Labor Force as well as the second lag of the right-hand side variable. Tests for endogeneity (Durbin and Wu-Hausman) of the regressors for equation (2) reveal GDP, lagged net exports, and the exchange rate must be treated as endogenous (test result available upon request). In the last case, as noted above in endnote 6, excluding energy from the trade balance reverses the finding of endogeneity. This is likely the result of net energy exports rising even as the US dollar has strengthened since 2009, with supply-side forces in the US upstream dominating any effects of exchange rate movements. This, of course, raises an interesting research question, but is beyond the scope of this report.

[8] It is worth noting that according to the SITC data on trade available from the US Census Bureau, over half the US trade deficit with China is accounted for in six categories—telecommunications equipment; toys and sporting goods; automatic data processing machines; furniture, bedding and accessories; articles of plastic; and footwear—none of which has a direct connection to energy trade.

[9] The customs value of imported goods subject to duties.

[10] The Harmonized Code six-digit classification referenced for this analysis is "854140—Photosnsitve Semicndctr Dvice Inc Phtvltc Cell Etc."

[11] We can also consider US coal exports, but that data by destination of export is only available quarterly.

[12] The IEA World Energy Outlook 2019 projects developing Asia to account for half of global growth in gas demand, with China accounting for over half of the projected increase in Asia.

[13] As we were conducting this research, the Bank of Korea Governor on October 16, 2019, announced a cut in the central bank's key rate by 25 basis points to 1.25% and hinted at further easing in the future.

[14] Each of these is expounded in Kenneth B. Medlock III, "The Trump Administration, Trade and Energy," *IEEJ Energy Journal*, Special Issue, October 2017.