
How the steel industry has been affected by the trade war between the USA and China

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Abstract: This research paper mainly focuses on how the US and Chinese steel industry has been affected by the trade war between the USA and China. One of the main election manifestos of Donald Trump was to reduce and eventually stop the steel import from China – the argument behind the manifesto was that “China dumps their cheap steel in the USA, resulting in the US steel industry to suffer.” The implementation of the manifesto caused a significant number of relevant business organisations to shut down along with a significant number of US labourers to lose their jobs. As we use data from 2013 to 2019, we find that the US steel imports from China started to decline when Trump took the helm. The import decline continued until the end of 2019. As a result of the import decline, China also reacted strongly and reduced steel imports from the USA. Therefore, this trade war has had a direct impact on US steel exports, and the country has lost a substantial amount of their export revenue.

Keywords: the USA; China; steel; export; import.

JEL codes: F13, F16, F17.

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1 Introduction

President Trump's launching of a trade war with China was one of the most impactful actions of his entire presidency along with dropping numerous treaties with international organisations, appointing a large number of right-wing federal judges and trying to reverse the outcome of the 2020 presidential election. Trump was more famous for what he did not do as the President, such as saving the country from a COVID-19 pandemic disaster than for what he did.

The USA and China trade war caught attention all over the world for many reasons. Those reasons included: China's economy is quickly catching up with the USA's in total size; many democrats in the US government also thought something needed to be done against the huge US trade imbalances with China and Chinese corporate espionage (and many other Chinese government and corporate activities) and Trump did not seem to have a defined goal or a clear strategy for the trade war as to how he could go about.

Kapustina et al. (2020) took a political economy approach for the US-China trade war and predicted four potential outcomes even after the trade war had been going on for two years. They are as follows:

- 1 trade war will escalate into Cold War II
- 2 consensus to avert the trade war will be reached
- 3 the trade conflict is frozen on by the already implemented bilateral measures
- 4 trade war will escalate into Hot World War III.

The second one did not occur, since the trade war started right after Trump took over. It seems that the third one did not occur either, since the trade war continued to change several times over a significant period with moves and countermoves, some only threatened and others implemented. But as Joe Biden has been elected the President of

the USA, it is highly unlikely that there will be a new Cold War, or a new World War. It is also now possible that the US-China trade diminished or ended.

A lot already has been written about the US-China trade war both generally and specifically. But a lot of what was published was written before the trade war started, or in the early period. Now, in late 2020, it is possible to look back on several years of trade war, which President Biden may or may not have it continue. In this paper, we focus only on the steel industry, which historically was a major industry in the USA and which politicians talk about a lot even when it is now a very small part of the US economy.

China is a significant market for US steel in relative terms and may represent a potential growth market, even though it is a small market, and probably will continue to be due to its own steelmaking capacity, other countries competing to sell to China, and the effects of Trump's trade war. Because of Trump's trade war, US steel exports to China dropped 31% in 2019, followed by a 29% drop in steel exports to Belgium, a 24% drop with Canada, 12% drop with India, and a 5% drop with Mexico (US steel exports to some other countries also increased, led by Spain, with a 72% increase, the Dominican Republic with a 29% increase, Brazil with 11%, South Korea with 10%, and UK with 6%. The reasons for these increases, even Spain's, are not easily available).

In this paper, our main aim is to analyse how steel industry was like during pre-Trump trade war and how it was during post-Trump trade war. To conduct this research, we used data from 2013 to 2019. Our results suggest that before Trump took over the White House in 2016, the US steel industry used to heavily rely on China. Before 2016, the USA used to import more from China but from 2016 onwards till 2019, the amount of steel import from China reduced dramatically. If we look at previous relevant papers, then we can see that those papers were based on pre-Trump trade war or early stage of trade war whereas this research paper focuses on the US-China trade war during the Trump Administration with trade war data during 2013–2019. The period covers the pre- and post-trade war data and therefore it will provide better understanding of the paper to the reader.

Rest of the paper is organised in the following way: Section 2 is the relevant literature review, Section 3 is the methodology and data, Section 4 is the results and discussion, and Section 5 is the conclusions.

2 Literature review and trade war history analysis

2.1 Recent history of US trade wars

Trade wars have been relatively rare in recent US history. In 2000, George W. Bush ran for presidency, promising to protect the US steel industry if he was elected. He asked the International Trade Commission (ITC) to investigate the situation of the US steel industry under Section 201 of the Trade Act of 1974 to determine if tariffs should be used to protect the industry. The ITC decided that the required conditions were met, and the ITC recommended that tariffs, varying by specific product, be put in place, ranging from 10% to 20% and falling over time to be eliminated in three years.

As summarised by the Feenstra and Taylor (2017), steel “imports had been rising and prices falling in the steel industry from 1998 to early 2001, leading to substantial losses for U.S. [steel] firms. Those losses, combined with falling investment and employment, met the condition of ‘serious injury’.” Falling import prices were because of the value of

the US dollar increasing during that period, which made foreign current currencies (and therefore imports) cheaper. The ITC also decided that rising imports were a 'substantial cause' of the 'serious injury', which meant that rising imports were hurting US steel companies as much or more than any other cause.

Bush hit foreign steel with tariffs ranging from 8% to 30%, but exempted Canada, Mexico, Jordan, Israel and 100 small developing countries from the tariffs. Despite the exemptions, US companies that bought a lot of steel objected to the tariffs. European countries that made and exported steel also objected. European countries were among the countries that were affected the most, along with Japan, South Korea, Brazil, India, Turkey, Moldova, Romania, Thailand and Venezuela. The European Union formally complained to the World Trade Organization, and the EU's complaint was joined by Brazil, China, Japan, South Korea, New Zealand, Norway and Switzerland. In November 2003, the WTO decided that the USA had not proved that the US steel industry had been hurt by a sudden increase in imports and did not have the right to start 'safeguard tariffs'.

Feenstra and Taylor (2017) wrote in their textbook that, even if tariffs are a good idea, tariffs should not be implemented because of changes in exchange rates. The US dollar had been increasing for 'much of the 1990s', but the steel industry did not complain to presidential candidate George W. Bush until about 2000. In addition, every other US industry that competed against imports was also being affected by the US dollar's increase in value, so it was not fair to other industries to protect only the steel industry.

The WTO's decision against the USA in the steel industry case entitled the countries that complained to the WTO about the USA's tariffs to retaliate, and EU countries started hitting imports from the USA with the most damaging tariffs. Bush dropped the tariffs after only 19 months, instead of three years, which is what he planned.

Bush's experience does not support starting a tariff war, and Feenstra and Taylor (2017) say that Bush refused to implement tariffs all four other times during his presidency when the ITC voted in favour of tariffs. Apparently, Bush learned a lesson to avoid tariffs.

In 2009, the Steelworkers Union, which represents US tyre industry workers, asked the ITC to hit China, and only China, with 'safe-guard tariffs' on tyres. The ITC recommended three years of tariffs, 55% in the first year, 45% in the second year, and 35% in the third year (Chinese tyres already were being hit with a 4% tariff). Targeting one country with tariffs violates the 'most favoured nation' principle of the World Trade Organization and the General Agreement on Trade & Tariffs (GATT), which says that all countries in WTO and GATT must be treated equally. But China was exempted from the principle when it joined WTO. According to Feenstra and Taylor (2017), another difference between the steel tariffs and tyre tariffs was that none of the ten US tyre producers asked for the tariffs, clearly because seven of them also produce tyres in China. Obama reduced the tariffs to 35%, 30% and 25%, respectively.

China retaliated, hitting US exports of chicken feet, auto parts, some nylon products, and automobiles, and then the USA retaliated by putting new tariffs on steel pipe and investigating other products, according to Feenstra and Taylor (2017). China filed an official complaint about the tyre tariffs with the WTO, which sided this time with the USA.

But the tyre tariffs still were not a success for the USA. Feenstra and Taylor (2017) showed in their textbook that the economic impacts of tariffs need to include deadweight loss to a country's economy that is caused by the tariffs. In the case of the tyre tariffs on

China, they showed that since China's sales in the USA would go down because of higher prices (caused by the tariffs), US buyers would buy more tyres from US tyre makers and from countries besides China. Other countries could raise their tyre prices at least some, as long as they remained less than the new prices for Chinese tyres. The number of tariffs the US government collected would be based on the new, lower amount of sales of Chinese tyres, not the past level of Chinese tyre sales. Feenstra and Taylor (2017) showed that the discriminatory tariff against China cost the USA relatively more than Bush's tariff on all imported steel. Obama bragged that his tariff saved about 1,000 tyre industry jobs in the USA, but economists easily showed that each job saved cost the US population millions of dollars.

2.2 General conclusions of economists about trade wars

One big problem with starting trade wars through tariffs or any other way (like import regulations) is that it is difficult to accurately predict specific outcomes. Tariffs may achieve planned goals better or worse than expected. Trade wars also can have unexpected consequences. A second problem with starting trade wars, even when based on good predictions, is that politicians will see that different economists make different predictions about trade war outcomes because economists cannot agree about what assumptions to use when they make predictions. This is because every trade war is different in its details and because economists make different judgements about the different variables involved in a trade war, which can result in each economist predicting several different outcomes. With Trump's trade war, as said already, Kapustina et al. (2020) predicted four possible outcomes, one a new Cold War with China and another 'World War III'!

According to Thompson and Jones (2019), "Not all trade wars are created equal", summarised the results of 30 institutions' predictions about Trump's US-China trade war to find out if there was any consensus or other way to generalise about predictions. Their review seems like a good summary of predictions about many or most trade wars. They concluded that the overall results of the US-China trade war would be 'moderate' and that they would be 'comparable with the IMF's latest analysis' (for this paper, the IMF's analysis has not been consulted).

Thompson and Jones (2019) made several other general conclusions or observations in their short, useful article. First, trade policy decisions have a 'relatively limited overall impact on global growth' and 'higher trade costs', which were 'direct effects' from recent trade wars, have been 'small' and that governments involved in trade wars have acted to 'offset adverse impacts on confidence'. (They admitted that the US-China trade war could still escalate after they wrote in January 2019, but they were writing after the truce that China and the USA signed at the G20 summit. They also acknowledged that if an escalation occurred despite the truce, the results could range from 'negligible' to 'deterioration in some countries' financial economic conditions approaching that seen during the global financial crisis of the late 2000s).

Thompson and Jones's (2019) general conclusions emphasised that 'substantial economic effects' from a trade war would happen only through 'extreme asset price or tariff moves', such as the USA raising tariffs more than at any time in the last 100 years. They also emphasised that the outcome of a 'full-blown global trade war' was 'very low probability', since that would require the USA imposing 'additional tariffs on China and other major trading partners, including the EU and Japan', in addition to more limited

'rising protectionism' scenario. For this paper, no research could be found that credibly predicted that Trump would hit the Europe Union, Japan or any other country with trade war types of tariffs (since he ran for president, Trump mostly threatened only China with increased tariffs, although he slightly renegotiated NAFTA treaty, rejected the Trans-Pacific Partnership Treaty, and criticised trade policies or practices with some European countries).

Thompson and Jones' (2019) predictions about the trade war with China do not include other likely results, and it does not seem that the 32 institutions' predictions included them. One result is that Trump would drop his tariffs as quickly as he imposed them because of reactions from US consumers, US companies, or other US politicians. Trump has a reputation among his voters for being a tough politician, but he has repeatedly collapsed when faced with opposition, in addition to simply changing his mind for good reasons, bad reasons, or no reason (again, Bush dropped steel tariffs after only 19 months due to WTO-approved retaliation). A second outcome that Thompson and Jones (2019) did not consider was that Trump would lose the 2020 presidential election and that a new president would change Trump's tariff policies a little or a lot before his tariffs would have their full effects. A third outcome they did not consider was Trump dying, resigning, or being removed as president before his term finished. A fourth outcome they did not consider is that an event like a global pandemic (such as COVID-19) or a military war or something else could affect US-China trade as much or more than a trade war.

After reviewing the predictions from 32 different institutions, Thompson and Jones (2019) made several specific conclusions. The first is that that 32 institutions' predictions 'vary enormously' about the US-China trade war, up to cutting global GDP by up to 3% and cutting US GDP by 5%. Their second specific conclusion is that one cause of 'extreme results' from a trade war would be 'extreme trade policy measures', such as 'rising protectionism' – the USA increasing automobile imports from all over the world and additional tariffs against China. In that case, average global tariff rates would increase from 2.5% before Trump to almost 4% after Trump [The Bank of England was afraid of an average global tariff rate of 7% and the Banque of France assumed up to 12.5%. Thompson and Jones (2019) did not say why the central banks made such extreme predictions.]. Their third specific conclusion is that 'extreme results' could be caused by tariffs even higher than 'rising protectionism', like a global average of 6.6%. Their fourth specific conclusion was that predictions of extreme results from a global tariff war are based on extreme assumptions, like the Bank of England's assumption of globally fixed monetary policies combined with investors demanding 'significantly' higher returns for investing in risky stocks and bonds. Their final specific conclusion was that predictions about extreme results from the US-China trade war are based on extreme assumptions by economists about the trade war and are not based on the trade war itself.

Thompson and Jones (2019) suggests that, it is reasonable to conclude that the effects of trade wars always somewhere between minimal and negative. They did not provide any information that suggested that trade wars are positive for even one country involved in the trade war, let alone for any other country. Economists generally oppose tariffs for all of the reasons identified here, but some politicians still want to try them at least on a limited basis, even Presidents George W. Bush and Barack Obama.

2.3 *Summary of Trump's trade war strategy and tactics*

President Trump started his presidential campaign by declaring a trade war against China in 2016 in a bid to keep his campaign promise tough on China and to gain apparent ongoing political benefits. It is obvious he thought that his trade war decision would bring him more votes. Trump's purposes in starting the trade war was to reduce the trade deficit; protect US manufacturers (from unfair trade practices by China) including bringing back more US factory jobs, making tariffs more reciprocal, and protecting intellectual property theft by China. Other reasons were addressing the Chinese Government's subsidies of its state-owned enterprises which, by some measures, make up 50% of the Chinese economy (Bekkers and Schroeter, 2020), the Chinese Government's forced technology transfers by foreign companies (Bekkers and Schroeter, 2020), US national security concerns (Kapustina et al., 2020), and reducing the US federal budget deficit (Kapustina et al., 2020).

The Trump Administration posted its own position statement on the website whitehouse.gov with claims about why it did and did not start the trade war with China: "United States Strategic Approach to the People's Republic of China." Overall, it claimed China chose to be economically aggressive in global trade and business, but Trump ignored China having the largest population in the world and increasingly becoming, through its own efforts and cooperation with countries and corporations worldwide, the heart of the global economy. It stated that the USA hoped that, as the Chinese economy developed, China would become freer and more open both politically and economically, but this did not happen. In fact, it blamed the Chinese Communist Party for reforms that 'have slowed, stalled or reversed' over 20 years.

The Trump Administration claimed the USA is facing challenges from China like economic challenges, challenges to US values, security challenges (including but not limited computer hacking) and so on. The US Strategic Approach statement said Beijing did not follow international business codes, damaged international business, violated environmental regulation and so on. It was angry that China called itself as a mature economy when it wanted to and called itself a developing country when it wanted to. The US Strategic Approach attacked the Chinese Government on dozens of points.

The US Strategic Approach statement claimed that the European Union also is getting tougher with China, based on its March 2019 report, 'EU-China: a strategic outlook', and that the USA is dealing with China through specific related policies and programs by the Association for Southeast Asian Nations (ASEAN), Japan, India, Australia, South Korea and Taiwan.

The US Strategic Approach statement summarised this with "first, to improve the resiliency of our institutions, alliances and partnerships to prevail against the challenges the PRC presents; and second, to compel Beijing to cease or reduce actions harmful to the United States' vital, national interests and those of our allies and partner."

The US Strategic Approach summarised its 'implementation' in several major sections. The first was 'Protect the American people, the homeland and the American way of life', and focused primarily on Chinese hacking and theft, 'malign foreign investment' in the USA, and the Chinese Government's propaganda efforts in the USA such as Confucius Institutes (the University of Idaho still has one), and Chinese-made counterfeit goods exported to the USA.

The second section is 'Promote American prosperity', which includes discussion of tariffs. It started by attacking China's 'unfair and abusive trade practices and industrial

policies', which the Trump Administration says the USA has been working on since 2003 with unsuccessful 'regular, high-level dialogues'. Therefore, the US Strategic Approach said that the USA is being forced to hike tariffs because other actions did not work, and that the 'tariffs will remain in place until a fair Phase 2 trade deal is agreed to'. It said the Trump Administration wanted to protect the USA's 'strategically important steel and aluminium industries' and also was increasing US Government 'antidumping and countervailing duties laws'.

This second section also summarised the January 2020 Phase 1 agreement, which was described as requiring 'structural reforms and other changes to China's economic and trade regime'. Specifically, the "agreement prohibits the PRC from forcing or pressuring foreign companies to transfer their technology as a condition for doing business in China; strengthens protection and enforcement of intellectual property in China in all key areas; creates new market opportunities in China for United States agricultural and financial services by addressing policy barriers; and addresses longstanding, unfair currency practices." In addition, the "PRC committed over the next 2 years to increase imports of United States goods and services by no less than \$200 billion in four broad categories: manufactured goods, agriculture, energy, and services."

The third section summarised the USA's military defence measures related to China. The fourth section was called 'Advance American influence', which mainly attacks China's intolerance of certain religious and ethnic minorities, but also addressed other issues.

2.4 Specific detailed timeline of Trump's trade war with steel industry highlighted

In Table 1, we have provided details timeline of Trump's trade war with China specifically within steel industry.

2.5 Impact of trade war on the US economy

2.5.1 Macro-economics effects (interest rates, stock market behaviour, etc.)

Stock market analysts every day give reasons why stock markets have increased or declined that day, and they seem to range from big reasons to small reasons, and from obvious to subtle. It is expected that announcements of various events in the trade war between the USA and China would have impacts on the stock market, and they did.

Selmi et al. (2020) says:

"Generally, the initial effects of trade tensions appear more significant than had been expected, reflecting the uncertainty shock. Specifically, the responses of information technology, industrials, and energy were even more severe than the reactions of financials, consumer discretionary items and staples, healthcare, real estate, aerospace and defense, and utilities. Designed to create portfolio with balanced exposure, certain sectors have been positioning for offense (information technology and industrials) with others for defense (healthcare, real estate, and utilities). Our results clearly show that the sentiment and confidence of investors are impacted by heightened uncertainty."

2.5.2 How US large businesses have been hurt otherwise by Trump's trade war

The effects of the trade war on big businesses in the USA depended on a wide variety of factors. Businesses – such as agricultural producers, automobile companies, and others – that relied on significant amount of exports to China got hit hard, declining by 25% in the first three quarters of 2019 (Bekkers and Schroeter, 2020).

US businesses that relied on importing goods from China, including steel, also were hit hard by US' tariffs on Chinese goods, since some US businesses were buying raw goods from China, some were buying intermediate goods from China, and some were buying finished goods from China [The US imports “disproportionately fewer intermediate goods from China than the rest of the world and disproportionately more final goods” (Bekkers and Schroeter, 2020), but that only shows the weakness of the US manufacturing sector. If the US had more manufacturing, the US would need more intermediate goods.].

All research so far shows that US businesses buying Chinese goods with higher tariffs on them have been simply raising their prices to pass along the entire tariff to their consumers. This does not mean that those businesses have not been hurt, since US consumers can choose to not buy those products at all, or they buy substitute products made in other countries and being sold to US consumers by other companies (Polatay, 2020).

The World Trade Organization March 2020 paper (Bekkers and Schroeter, 2020) compared trade relationships between the USA and China for 2017, 2018, and 2019 for tariffed products and non-tariffed products. US imports of non-tariffed products from China increased from \$10.78 billion in 2017 to \$12.47 billion in 2018 to \$13.09 billion in 2019, which strongly suggests that, without tariffs, total imports from China probably would have increased, because the number of products that did not have tariffs was much smaller in 2019 than it was in 2017.

For tariffed products, and a lot more products were tariffed in 2019 than in 2018, US imports of Chinese products went from \$507.81 billion in 2017 to \$542.92 in 2018 to \$469.68 billion in 2019. Overall, the decrease in US imports of Chinese goods, tariffed and not, was 12.51% just from 2018 to 2019 (while the total US imports from China actually increased from 2017 to 2018).

Specific amounts of steel imported and exported, and dollar values, are later in this paper.

As the WTO (Bekkers and Schroeter, 2020) points out, “Both in 2018 and 2019 there has been a complete pass-through of US tariffs to importer prices... Hence, until 2019 Chinese exporters did not reduce their prices to (partially) compensate [US] importers for the higher tariffs.” So Chinese exporters did not give US importers any kind of help due to tariffs for one or more reasons. One possible reason is that Chinese firms overall believed that US importers had no choice but to buy Chinese products even at much higher prices. Another possible reason is that Chinese firms did not think that higher prices for US importers were their fault or their problem, even though higher prices for US importers would surely decrease US demand by at least some amount. Another possibility is that Chinese firms were operating on such tight profit margins that accepting any lower price would cut their profit margins too much, perhaps to negative levels.

Table 1 Detail's timeline of Trump's trade war with China specifically within steel industry

<i>Date</i>	<i>Activity</i>
Mar. 2016	The USA puts 266% duty on Chinese steel for 'dumping'.
Aug. 18, 2017	US trade representative Lighthizer started investigating China regarding harm to US intellectual property rights, innovation and technology.
Jan. 22, 2018	Trump Administration put tariffs on \$8.5 billion in solar panels and \$1.8 billion in washing machines, including those coming from China.
Feb. 5, 2018	China hit the USA with \$1 billion in duties on sorghum, which analysts assumed was retaliation for the US tariffs on solar panels and washing machines.
Feb. 16, 2018	US Commerce Dept. reported that aluminium and steel imports threatened US national security.
Mar. 1, 2018	Trump announced 25% tariffs on steel and 10% on aluminium, but only 6% of covered goods come from China (others from EU, Canada, Mexico, South Korea). They took effect on March 23.
Mar. 22, 2018	Trump Administration released report criticising China on technology transfer, intellectual property and innovation.
Apr. 2, 2018	China retaliated for steel and aluminium tariffs by putting its own tariffs on aluminium waste/scrap, pork, fruits and nuts and other US products.
Apr. 3, 2018	Trump Administration released its list of 1,333 Chinese products being considered for 25% tariffs. Most affected industries are machinery, mechanical appliances and electrical equipment. About 85% of the products were intermediate inputs, which raised costs in US corporations' supply chains. (<i>Steel generally is an intermediate good but was being focused on separately</i>).
Apr. 4, 2018	China released its list of 106 US products that it would consider for 25% tariffs, including vehicles, aircraft, vessels and vegetables (mostly soybeans).
Apr. 5, 2018	Trump told trade officials to find \$100 billion more in US imports from China to hit with tariffs.
Apr. 17, 2018	China hit the USA with antidumping duties of 178.6% on sorghum.
May 18, 2018	China ended tariffs on sorghum during negotiations.
May 29, 2018	The Trump Administration announced \$50 billion in Chinese goods subject to new tariffs, not \$100 billion like suggested on April 5.
June 15, 2018	The USA tweaked the \$50 billion list.
June 15, 2018	China released a revised retaliation list.
June 16, 2018	The USA filed disputes with WTO against retaliatory tariffs by China, Canada, the EU, Mexico and Turkey.
June 18, 2018	Trump asked for \$200 billion more in Chinese products to hit with 10% tariffs, on top of the \$50 billion list from June 15. He threatened another \$200 billion of goods with new tariffs if China retaliates for the \$200 billion on June 18.
July 4, 2018	USA Government announced it will subsidise US farmers for up to \$12 billion for \$27 billion worth of lost exports of soybeans, corn, nuts, fruit, beef and other items.
July 6, 2018	First tariffs went into effect on \$34 billion in goods going each direction.
July 10, 2018	\$200 billion in tariffs requested by Trump on June 18 were announced. Intermediate goods make up 47% of the list, plus consumer goods: telephones, computers, furniture, lamps and luggage. (<i>Again, steel is generally an intermediate good, but was dealt with separately</i>).

Table 1 Detail's timeline of Trump's trade war with China specifically within steel industry (continued)

<i>Date</i>	<i>Activity</i>
July 20, 2018	Trump threatened tariffs on all imports from China.
Aug. 3, 2018	China threatened the USA with \$60 billion in tariffs, again mostly intermediate goods. (<i>Steel is generally an intermediate good, and the Chinese government did not appear to choose it for special treatment</i>).
Aug. 7, 2018	Administration decided that \$16 billion of the \$50 billion will be hit with 25% tariffs instead of 10% tariffs.
Aug. 8, 2018	China revised its \$50 billion tariff list by removing crude oil and adding other products.
Aug. 14, 2018	China filed a case with the WTO against the USA over the solar panel tariffs.
Aug. 23, 2018	The USA and China started second phase of tariffs on \$50 billion.
Sept. 17, 2018	Trump finalised \$200 billion tariff list: 10% starting Sept. 24, then 25% on January 1, 2019. 50% are intermediate goods. (<i>Again, steel is generally an intermediate good, but was dealt with separately</i>).
Sept. 18, 2018	China finalised tariffs on \$50 billion in US goods.
Sept. 24, 2018	Next phase of tariffs, in both directions, started. The USA now has tariffs on 12% of its total imports for 2018.
Nov. 15, 2018	The USA announced that, despite tariffs, US steel imports had increased in the previous six months, but that imports of steel from developing countries had declined despite being exempt from US tariffs! Both results were surprises.
Dec. 1, 2018	China and the USA agree to 'truce', preventing new tariffs phase on Jan. 1.
Dec. 20, 2018	Peterson Institute report showed that prices of steel imports increasing by an average of almost 9% had created 8,700 US jobs, but that each job cost US steel buyers \$650,000! The media reported many stories about this.
Feb. 15, 2019	Now apparent that Trump protected 15% of US imports.
Feb. 24, 2019	Trump delayed increase in tariffs that would have gone from 10% to 25%.
May 5, 2019	Trump renewed tariff threats: planned tariffs to increase to 25% on May 10, plus new tariffs of 25% that would hit a large percentage of other Chinese exports to the USA.
May 13, 2019	China planned to raise tariffs on June 1 (covers \$36 billion of Sept. 2018 \$50 billion). This included tariff of 20%–25% on US steel effective in June, including carbon and stainless-steel products: billet, hot-rolled coil, cold-rolled coil, hot-dipped galvanised flat steel, colour-coated steel, hot-rolled bar and rod and structural steel.
Aug. 1, 2019	The USA announced tariffs on almost all remaining Chinese exports to the USA.
Aug. 23, 2019	China retaliated on \$75 billion of US exports, including raising tariffs on cars from 12.6% to 42.6%! Trump retaliated for that move by raising tariffs from 10% to 15% and from 25% to 30%.
Sept. 11, 2019	China removed a few tariffs, and Trump delayed start date of tariff hike.
Oct. 11, 2019	Trump cancelled October tariffs and announces Phase 1 of deal.
Dec. 13, 2019	Trump cancelled December tariffs because of deal.

But when Chinese products arrived in the USA, it was a mostly different situation. A 2019 study by Cavallo et al. found as Bekkers and Schroeter (2020) summarised, “for

some products higher import prices are in turn passed on to consumers in the form of higher retail prices (for example for washing machines). However, for most products preliminary data indicate that retailers absorbed the higher import prices in the form of lower profit margins.” Second, Cavallo et al. (2019) discovered that that the export prices from the US declined in response to the retaliatory tariffs. “Products affected by the tariff measures displayed declining prices since mid-2018, whereas non-affected prices displayed a flat pattern.” In short, US companies, whether importing from China and/or exporting to China, were much more willing than Chinese companies to accept lower profit margins (presumably to preserve market share or their customer base or both). Perhaps, US companies expected the tariff war to be relatively short, because Trump could change his mind about it or he could be defeated in the 2020 presidential election and replaced with a new president who would stop the trade war. Again, amounts of exports/imports of steel and dollar amounts are later in this paper.

2.5.3 Trade diversion

Trade diversions are a part of trade wars that are well known to economists and politicians, but generally the public is not aware of trade diversions or gives them little thought. In the case of tariffs on Chinese tyres during the Obama Administration, tyres that other countries would have sold to other countries ended up being sold in the USA, because not only were those tyres much more competitive against tariffed Chinese tyres, but companies in those other countries could even raise their prices and make US sales as long as their prices were lower than tariffed Chinese tyres, according to Feenstra and Taylor (2017).

The World Trade Organization’s 2020 paper (Bekkers and Schroeter, 2020) on the US-China trade conflict compared the first two quarters of 2018 with the first two quarters of 2019, concluding that trade diversion due to the trade war was about \$21 billion – the amount of imports into the USA from countries other than China that could be assumed to not happen unless the USA and China were having a trade war. It said the ‘major beneficiaries’ are Mexico (\$6.8 billion, mainly vehicles, computers and electronic devices), European Union (\$6 billion besides Germany, mainly transportation equipment and machinery), Taiwan (\$4.5 billion) and Vietnam (\$2.8 billion).

Bekkers and Schroeter (2020) explained trade diversion effects of US imports:

“The sectors machinery and electrical equipment are most hit by the trade tensions with a decrease in US imports from China of 9.3 billion and 10 billion respectively. Increased imports from third countries of about 7 billion in the sector Machinery do not fully compensate for the trade loss with the trade diversion effects split among various countries such as Taiwan, Korea, Japan and the European Union. This is also the case for the sector Electrical equipment where Taiwan and Viet Nam benefit from increased exports to the United States which is however accompanied by decreased exports from other Southeast Asian countries and Mexico. In the sector Motor vehicles, the increase of US\$6.3 billion is mostly to the advantage of Mexico which contributes with increased exports of \$5 billion. This more than compensates for the decrease of \$1 billion imports from China. Finally, in the sector Transport equipment, the European Union is the major beneficiary and trade diverted to third countries makes up for the trade loss with China.”

The WTO (Bekkers and Schroeter, 2020) report, summarising the trade diversion effects of Chinese imports, pointed out:

“The patterns in China are remarkably different from the patterns in the US. The reduction in imports from the US in the first two quarters of 2019 are not countered by more imports from third countries but reinforced by a fall in imports from third countries. There are two main reasons for this pattern. First, the growth of the Chinese economy has slowed down in 2019 leading to less demand for imports. Second and subtler, the exports from China to the US are much larger than the imports from the US into China. This implies for Chinese imports from third countries that the diversion of trade towards other sources is less important than the reduced demand of intermediaries used for further processing to export to the US.”

2.5.4 US businesses hurt by trade policy uncertainty

Economic and finance research often focuses on the role of uncertainty in increasing expenses or even losses, and in decreasing profits or even assets. For example, uncertainty in the financial markets means that investors do not know whether to buy, sell, or hold their stocks, bonds, etc. Being uncertain about buying can cost one profit (and preventing losses). Maintaining the status quo can cost money and certainly not investing liquid assets can cost money. Businesses that do not know if tariffs on Chinese imports are going to be low or high, or happen quickly or not, or be in effect for a short period or a long period, experience expensive uncertainty. The WTO report (Bekkers and Schroeter, 2020) said that “trade uncertainty is concentrated in the economically largest countries of the world,” and that in 2019, “uncertainty about trade increased to levels not seen before.” As Trump’s presidency went on, and it looked like he could be, and then would be, defeated by a democratic candidate in the 2020 election, uncertainty about trade continued to increase.

2.5.5 How US businesses are helped by the trade war

Theoretically, US businesses are being helped by the trade war, because China agreed to import \$200 billion worth of more goods and services from the USA in an effort to partially balance. For example, one paper from the Economic Policy Institute’s writer Robert E. Scott suggested aluminium tariffs helped to bring more jobs and investment in the US economy. That paper claimed that US primary aluminium production was projected to increase by 67% (500,000 tons per year) between 2017 and the end of 2018. That would significantly help to create 1,000 new jobs by generating more than \$100 million in new investment in the US economy.

The trade war also helped US steel companies become more profitable, at least for two years, and slightly increased the number of steelworkers, but the deadweight loss to the US economy was extensive. China retaliated against the USA at every step and overall steel trade going both directions has been declining a lot. Perhaps in a few years, China and the USA will not have any steel trade except for steel that neither country can get anywhere else.

2.5.6 How US consumers are hurt by the trade war

US consumers can be hurt by trade wars in many ways. In Trump’s war with China, harms could be higher prices on Chinese goods; perhaps fewer choices of Chinese goods; and fewer US jobs as the trade war resulted in more expensive, and less trade, in both directions, if the number of job cuts was larger than the number of jobs created by US

protectionism. The WTO report (Bekkers and Schroeter, 2020) confirms that, about US manufacturing employment at least, Trump's China trade war resulted in both 'falling employment because of higher prices of intermediate inputs making production in the US more expensive' and 'falling employment because of retaliatory tariffs', thus 'leading on net to a fall in manufacturing employment'.

3 Methodology and data

3.1 Methodology

Research philosophy is an important aspect that guides the structure and direction of the research process. According to Easterby-Smith et al. (2001), there is two basic philosophies underpin all research: positivism and phenomenology. From the operational point of view, positivism takes a reductionist approach to exploring the relationship among the variables being studied. Reductionist approach is helpful in controlling an investigation in order to ensure the understanding of behaviour of variables concerned. On the other hand, phenomenological approach of research is holistic in nature and allows much more complicated situation to be examined. It allows researcher to examine as many variables as possible and incorporate as many contexts of research as possible (Remenyi et al., 1998). For the current study, the choice of research philosophy is positivism because of the following reasons:

- 1 Studies that follow positivist approach are easy to replicate to arrive at a general conclusion. On the other hand, studies that use phenomenological approach are difficult to replicate and generalisations are much more difficult (Remenyi et al., 1998).
- 2 Remenyi et al. (1998) also identified that positivist's model is more likely to be expressed mathematically than the phenomenologist's, which is usually expressed either in words or in diagrams. As the current study will predominantly use numerical data and charts to address various research questions, positivist approach better fits with this piece of study.

The choice of research philosophy has an impact on the choice of research methodology. There are three main research methodologies that are widely used, which are, quantitative, qualitative and mixed method. In this study, we going to use mixed method. The reason behind to use mixed method because mixed method approach attained its recognition and prominence only during the last two decades. According to Teddlie and Tashakkori (2009), the mixed methods research tradition is less well known than the quantitative and qualitative traditions because it has emerged as separate orientation during the only past 20 years. In very simple terms, mixed methods are an approach, rather a philosophy, to social enquiry that uses two or more methods, processes and philosophies in undertaking a research study. It is based upon the belief that different paradigms and methods have different strengths, and for certain situations, their combined strength would result in improving the depth and accuracy of the findings.

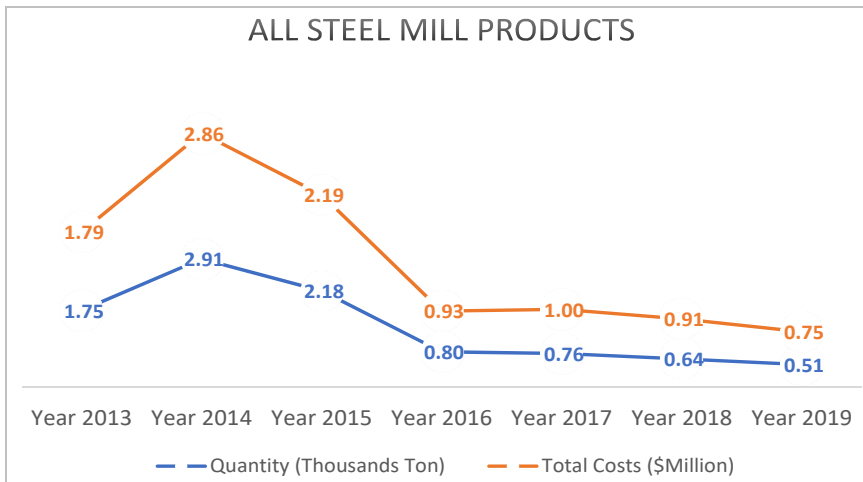
3.2 Data

To conduct this research paper, we used data from year 2013 to till year 2019. All the research data was collected from The USA's International Trade Administration's website (<http://beta.trade.gov>; <http://beta.trade.gov/gstm>).

4 Results and discussion

During the 2016 presidential campaign, Trump promised to control and punish China for a many reason from industrial espionage to simply being, in his view, too successful of a growing economic power. He also promised to help the steel industry. It soon became clear, if had not been already, that he did not know much about China or the steel industry, or what the connection between US steel imports from China and trade policy. Trump had no experience in manufacturing, imports or exports (let alone both), or any other relevant subject, seemed to think that the USA can easily win a trade war with China, regardless of how much and how quickly China retaliated for US tariffs. Trump also seemed to think that when the US imposes tariffs on imports, it magically results in US companies investing billions of dollars in new operations because the tariffs will be effective in limiting imports and also permanent enough to make large investments worth it. Many economists and others have written that Trump does not understand that economies are highly interdependent with each other, like the same parts crossing the US-Mexico several times during a long car manufacturing process. He possibly did not know that US sells some steel to China while China sells steel to the USA, and that the USA's imports of Chinese steels is only a small part of total Chinese steel exports.

Figure 1 All steel mill products US import from China (see online version for colours)



4.1 The USA import from China

If we look at Figure 1 (based on Appendix 1), we can see that all steel mill products that the US import from China start following from year 2016, after US president Trump win

the election in 2016. Because as we mention, he promised that he will reduce and eventually stop importing still related product from China. This commitment is reflecting in Figure 1 and in Figure 2. His main argument behind taking this decision was, because of the Chinese steels, US steel mills are making huge lose, so he made a promise during his election campaigning that he will do everything to save US steel industry and its related jobs. He also mentioned that it will help to reduce the costs as well, eventually we can see from both Figures 1 and 2 that because import reduce dramatically dure to that costs also reduced from year 2016 onwards than from years 2013 to year 2015.

Figure 2 Individual steel products US import from China (see online version for colours)

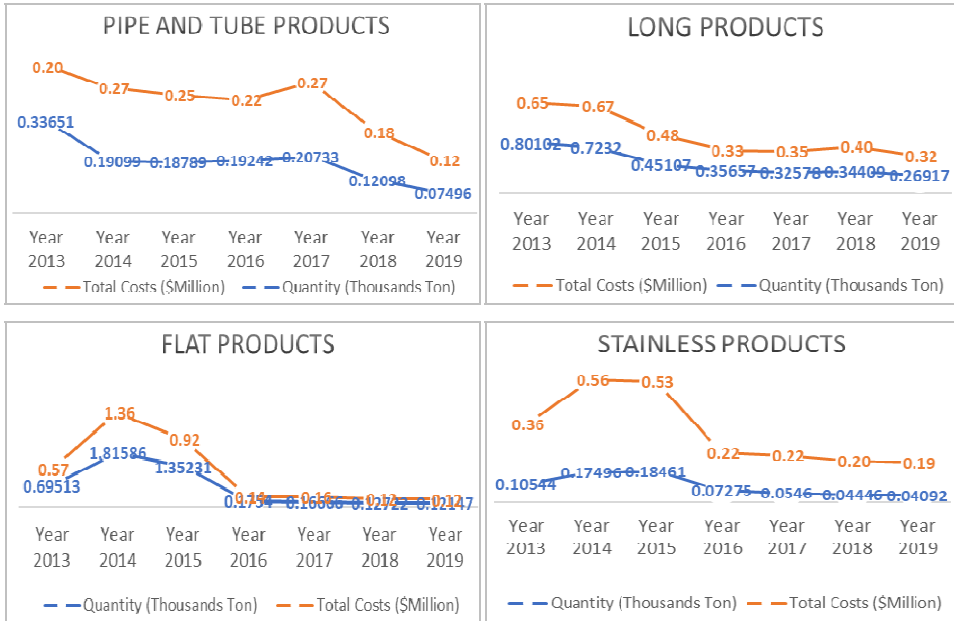
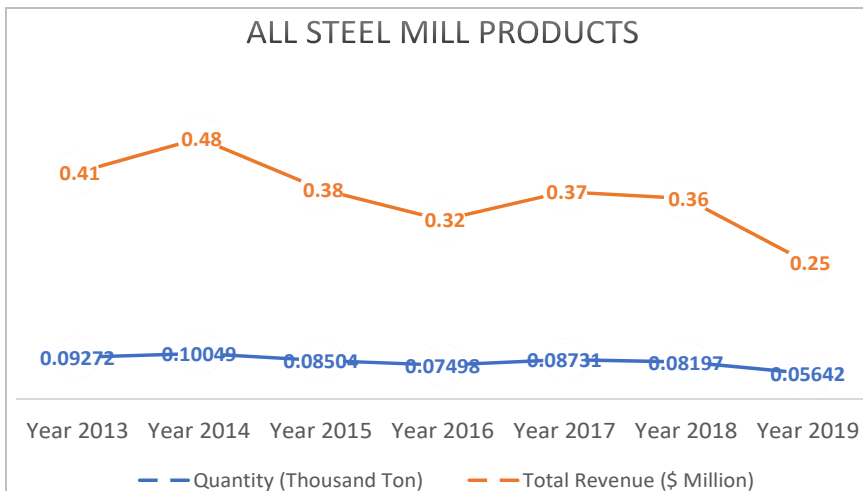


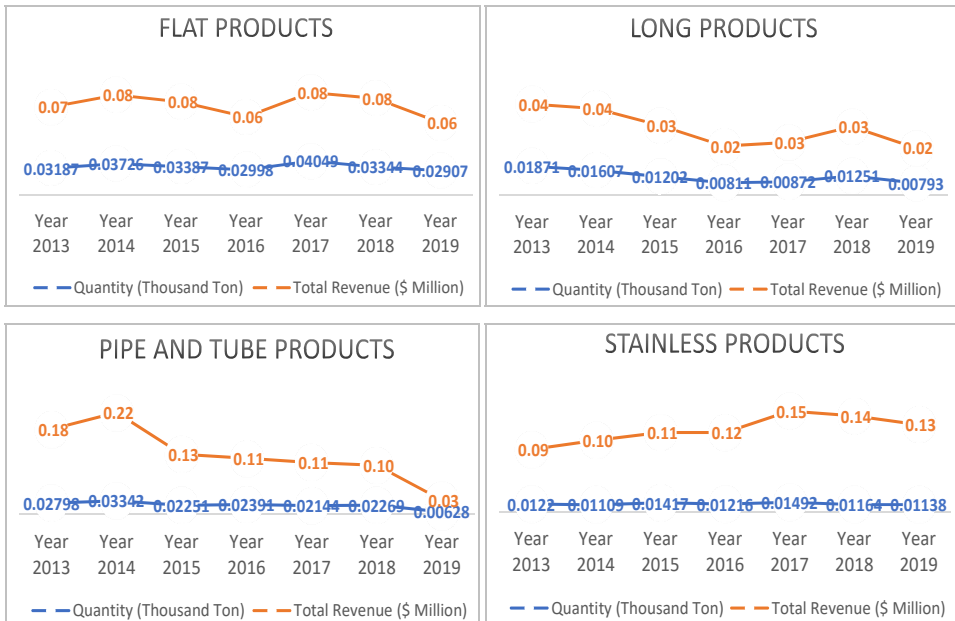
Figure 3 All steel mill products export from the USA to China (see online version for colours)



4.2 Export from the USA to China

Similar kind of pattern we can observe in Figures 3 and 4 when US’s export was reduced because consequence of Trump decision. Because when Trump have taken the decision that he will reduce and eventually stop to import steels and steel related products from China, then China also took a decision that they also reduce importing steels and steel related products. After that US steel export to China reduced sharply which is clearly visible in Figures 3 and 4.

Figure 4 Individual steel mill product export from the USA to China (see online version for colours)



5 Conclusions

Starting a trade war with steel and aluminium, while at the same time specifically targeting China through the trade war, was an incompetent strategy by President Trump for many reasons. Firstly, China could and did retaliate against US tariffs, which made it much more difficult for US producers of steel and other goods to sell them in China. Secondly, China may have been a potential market for growth of US steel exports before the trade war, but that is much more unlikely now. Thirdly, US tariffs did raise the prices of Chinese steel being exported to the USA, but this hurt the steel users in the USA generally as they had to pay more for steel from China (and any other country that was not exempted from new tariffs), possibly switch to US-made steel, and possibly use less or no steel by changing or cancelling plans or processes needing steel.

The trade war, which included but was not limited to China, had tremendous deadweight effects on consumers of steel in the USA, as Chinese and other countries’ steel became much more expensive for US steel users. Price increase due to the trade war

was added to global price increase for steel that was happening anyway in the last few years.

The trade war did not have the desired effects on China. US buyers were buying only 4% of Chinese steel before the trade war and only about 2% after the trade war had been occurring for a period. China has a long list of other customers for its steel and likely does not need purchases from the USA at all.

The Peterson Institute and others calculated that while the trade war created some of the recent new jobs in the US steel industry, the number of other jobs lost in the US economy due to the trade war's effects only on steel was perhaps 25 times as many.

What the Trump trade war with China, over steel, primarily accomplished was allowing US steel companies to make huge profits, at least for a short period of time, through both higher prices and increased production. No one could be guaranteed that the tariffs on Chinese steel would continue for many years even while Trump was president. Now that Joe Biden will be president, the trade war may be changed a lot or completely stopped. Massive infrastructure development by the US steel industry is not a good idea unless the US steel industry is convinced the tariffs will continue for a long time.

This paper also shows that the international trade in steel is complicated and should not be overgeneralised more than necessary. For example, while Mexico and Canada are the largest markets for US steel by far, the list of other major buyers for US steel varies by type of steel product and included in 2019 (in alphabetical order): Bahamas, Brazil, China, Dominican Republic, Germany, Guyana, Honduras, India, South Korea, Spain, Taiwan and the UK. This list also can change from year to year.

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Appendix 1*The USA import from China***Table 2** All still mill products

<i>Year</i>	<i>Quantity (thousands ton)</i>	<i>Total costs (\$ million)</i>
Year 2013	1.75	1.79
Year 2014	2.91	2.86
Year 2015	2.18	2.19
Year 2016	0.80	0.93
Year 2017	0.76	1.00
Year 2018	0.64	0.91
Year 2019	0.51	0.75

Table 3 Flat products

<i>Year</i>	<i>Quantity (thousands ton)</i>	<i>Total costs (\$ million)</i>
Year 2013	0.69513	0.57
Year 2014	1.81586	1.36
Year 2015	1.35231	0.92
Year 2016	0.1754	0.14
Year 2017	0.16666	0.16
Year 2018	0.12722	0.12
Year 2019	0.12147	0.12

Table 4 Long product

<i>Year</i>	<i>Quantity (thousands ton)</i>	<i>Total costs (\$ million)</i>
Year 2013	0.80102	0.65
Year 2014	0.7232	0.67
Year 2015	0.45107	0.48
Year 2016	0.35657	0.33
Year 2017	0.32578	0.35
Year 2018	0.34409	0.40
Year 2019	0.26917	0.32

Table 5 Pipe and tube product

<i>Year</i>	<i>Quantity (thousands ton)</i>	<i>Total costs (\$ million)</i>
Year 2013	0.33651	0.20
Year 2014	0.19099	0.27
Year 2015	0.18789	0.25
Year 2016	0.19242	0.22
Year 2017	0.20733	0.27
Year 2018	0.12098	0.18
Year 2019	0.07496	0.12

Table 6 Stainless products

<i>Year</i>	<i>Quantity (thousands ton)</i>	<i>Total costs (\$ million)</i>
Year 2013	0.10544	0.36
Year 2014	0.17496	0.56
Year 2015	0.18461	0.53
Year 2016	0.07275	0.22
Year 2017	0.0546	0.22
Year 2018	0.04446	0.20
Year 2019	0.04092	0.19

Appendix 2

Export from the USA to China

Table 7 All still mill products

<i>Year</i>	<i>Quantity (thousand ton)</i>	<i>Total revenue (\$ million)</i>
Year 2013	0.09272	0.41
Year 2014	0.10049	0.48
Year 2015	0.08504	0.38
Year 2016	0.07498	0.32
Year 2017	0.08731	0.37
Year 2018	0.08197	0.36
Year 2019	0.05642	0.25

Table 8 Flat product

<i>Year</i>	<i>Quantity (thousand ton)</i>	<i>Total revenue (\$ million)</i>
Year 2013	0.03187	0.07
Year 2014	0.03726	0.08
Year 2015	0.03387	0.08
Year 2016	0.02998	0.06

Table 8 Flat product (continued)

<i>Year</i>	<i>Quantity (thousand ton)</i>	<i>Total revenue (\$ million)</i>
Year 2017	0.04049	0.08
Year 2018	0.03344	0.08
Year 2019	0.02907	0.06

Table 9 Long products

<i>Year</i>	<i>Quantity (thousand ton)</i>	<i>Total revenue (\$ million)</i>
Year 2013	0.01871	0.04
Year 2014	0.01607	0.04
Year 2015	0.01202	0.03
Year 2016	0.00811	0.02
Year 2017	0.00872	0.03
Year 2018	0.01251	0.03
Year 2019	0.00793	0.02

Table 10 Pipe and tube products

<i>Year</i>	<i>Quantity (thousand ton)</i>	<i>Total revenue (\$ million)</i>
Year 2013	0.02798	0.18
Year 2014	0.03342	0.22
Year 2015	0.02251	0.13
Year 2016	0.02391	0.11
Year 2017	0.02144	0.11
Year 2018	0.02269	0.10
Year 2019	0.00628	0.03

Table 11 Stainless products

<i>Year</i>	<i>Quantity (thousand ton)</i>	<i>Total revenue (\$ million)</i>
Year 2013	0.0122	0.09
Year 2014	0.01109	0.10
Year 2015	0.01417	0.11
Year 2016	0.01216	0.12
Year 2017	0.01492	0.15
Year 2018	0.01164	0.14
Year 2019	0.01138	0.13