The influence of the US trade war on steel and aluminum producing and consuming businesses.

Master Thesis | MSc. Financial Economics

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Abstract

After the election of Donald J. Trump as president of the United States, the Trump administration immediately began an investigation of the US Department of Commerce on the imports of steel and aluminum from foreign countries on April 20, 2017. This marked the beginning of the protectionist trade policy of the Trump presidency. In this paper, the focus is specified on the steel and aluminum producing and consuming industry. As an addition to the literature, this paper does not only look at protectionist announcements but also retaliatory announcements and tariff exemption announcements of the Trump administration. Trough the empirical analysis of the abnormal returns for these different portfolios, we find that producing companies indeed benefit in the short run from protectionist measures. However, if countries are exempted or retaliate the producing companies are negatively affected. On the other hand, consuming companies display a decline in return. Additionally, this research explains a non-economic rationale behind the protectionist policy of the Trump administration: a political agenda. Firms show better returns after the US-initiated trade war events when they have their majority of production facilities in a so-called "swing-state".

Key words: Trade policy, trade war, tariffs, stock returns, event study

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1. Introduction

The ongoing trade war between the US and China sparks global economic concerns in financial markets and companies, driven by the protectionism policy of the Trump administration. In 2018 the simmering trade war between the US and China escalated in a full-blown trade war when both parties could not agree on reducing the US trade deficit with China. The tariffs imposed by Trump are an effort to manage the large U.S. trade deficit with China[1] The U.S. trade deficit with China in 2019 was $345.6 billion.[1] That is 18% less than 2018's $419.5 billion deficit. The trade deficit exists because China only imported $106 billion of U.S. goods and the US imported $452 billions of Chinese goods. [2] The effects of this trade deficit are numerous. First, China buys a lot of US treasury notes and currently holds 16% of all US treasury notes held by countries. This situation gives China financial and thus political leverage over China, something the US is not happy with. Second, US business goes bust or have to move their production facilities to China because labor is cheaper. They are not able to compete with the cheap labor China offers due to a lower standard of living and fixing the Renminbi to the Dollar. At the beginning of this trade war, both countries raised tariffs worth billions of dollars on agriculture, steel and dozens of other products.[3] Where the Trump administration used the warning of the Department of Commerce that importing steel and aluminum could be a threat to national security. [4] The conclusion of this investigation was the spark that started the trade war between China and the US. Hence, not only China is subject to the protectionist view of the Trump administration. Other countries and allies such as Taiwan, Europe and India suffer from tariffs and imposed retaliatory tariffs. Therefore, Li et al (2018) find that with a mutual trade war not only China or the US will lose, but the whole world will suffer from the protectionist actions of the Trump administration. While a lot of industries get hit by these tariffs, one of the first products tariffed by the US were steel and aluminum. In the US this was positive for US steel and aluminum producers who saw their share prices surge on the day of

[2]U.S. Census Bureau. "Foreign Trade - Trade in Goods With China, https://www.census.gov/foreign-trade/balance/c5700.html" Accessed March 17, 2020.

[3] Department of Commerce. “Steel and Aluminum 232 reports” https://www.reuters.com/article/us-usa-trade-china-timeline/timeline-key-dates-in-the-u-s-china-trade-war-idUSKBN1ZE1AA

[4] https://www.commerce.gov/news/press-releases/2018/02/secretary-ross-releases-steel-and-aluminum-232-reports-coordination

the tariffs were announced. On the other hand, steel consumers saw their shares dropping drastically. [5]

In this research, a comparison is made about how US steel and producing companies are affected by the trade war in steel and aluminum. The paper this research is based on is the paper of Huang et al (2018). They find that the market returns respond negatively to the setting of trade tariffs and other protectionist policies.

This paper differs from Huang et al (2018), because it will focus on the steel and aluminum industries and how they are influenced by the different tariffs imposed by the US and the retaliation tariffs that China, India, Europe, etc. imposed. I will answer the following question in my paper: ***What is The influence of the US protectionist trade policy on US domestic steel and aluminum producing and consuming businesses?***

First, by answering this research question I will contribute to the literature research at an industry-specific level. The trade war is a complex playing field with different actors. However, the steel and aluminum industry is clearly under attack in this trade war. Therefore, by using a portfolio of steel and aluminum consuming and producing industries this paper will try to capture the results of the trade war policy of the US government in that sector.

Second, by doing this, the economic effect can be seen in the stock prices of the US industries that deal with steel and aluminum. On the one hand, the producers should benefit from the higher prices of imported steel and aluminum. On the other hand, consumers have to pay more for their raw materials. This paper will capture the net overall effect of this protectionist policy in this industry. Third, this paper will take a more political look at the trade-war and will examine the difference between returns of steel producing and consuming industries in states were Trump was favored during the elections. Last, this research distinguishes between different trade war events[6], and compares how these events influence the stock returns.

[5] https://www.reuters.com/article/usa-trade-companies/automakers-among-sectors-reeling-over-u-s-steel-aluminum-tariffs-idUSL2N1QJ2K5

[6] Retaliatory, protectionist and exemption announcements, see section 3.1.

2. Literature review

In this part of the paper the literature is described. First, the literature regarding international trade policy is set out. This is necessary to gain an understanding of the possible theoretical outcomes of the international trade policy that the Trump administration pursues. Second, the previously written literature about trade policy and its effect on stock prices is described. This is important to understand what assumptions this research make. Furthermore, a description of the stock price and event study literature is described, which is useful for the empirical test that is conducted in this paper. To conclude this section, we describe the purpose of this paper and construct four hypotheses based on the literature.

2.1 Literature on international trade policies and instruments

International trade policy is a theory that relates to the trading of goods and or services across borders of sovereign countries. Actions that governments take to protect their national economies include trade tariffs or quota on the import of certain goods. On the other hand, numerous international agreements encourage trade between certain countries. In the 18th century theories on international trade emerged from classical economists, such as David Ricardo. The theory of Comparative Advantage is one of the theories that is used even in recent strategic trade models. This theory is reliant on efficient markets, where countries could exchange their products in which they have a comparative advantage towards another country that has fewer resources to produce these products. On the other hand. These comparative advantages could be a higher-skilled labor force, lower wages, or better resources eventually leading to a better competitive position over the other for a specific product (Ricardo, 1817, Krugman et al., 2012). This theory leads to the Ricardian model, whereas countries that have a comparative advantage for a certain good end up exporting this good and import the goods that they have a disadvantage in producing. It is important to note that one of the assumptions of the Ricardian model is that there is open-trade, there are no restrictions or instruments used to restrict or boost trade. The Ricardian model has been widely accepted as a model for trade.

However, in the current international economy, no such thing as free-trade exists overall. Countries have imposed trade tariffs and subsidize their own companies for various reasons,

such as protecting jobs and higher overall welfare for their country. This has a reason, because not everyone benefits from free-trade, as Ricardo argues. The more recent Specific Factors Model and Hecksher-Ohllin model dispute the fact that everyone benefits from free trade (Krugman et al., 2012). This applies to the topic of this paper as well, whereas the US steel producers are losing their work because cheap labor and better resources make Chinese and Indian steel relatively cheaper. This gives an insight into why governments would like to interfere in the free-trade between countries. Besides employment other arguments in favor of protectionism include; National defense, the trade deficit[7], a level playing field, and infant industries in developing countries. Protectionism measures include (1) tariffs on imports on certain goods, (2) quota ceilings on the quantity of foreign products, (3) regulatory obstacles such as standardization requirements, (4) subsidies to domestic producers and (5) currency control in the form of manipulating the exchange rate of the domestic currency to increase the price of foreign products (Abboushi, 2010).

Hufbauer et al. (1986) did extensive research on the results of protectionist measures. This resulted in hefty efficiency losses to society. As a result of their empirical research, most of the trade protectionist measures cost more than 100.000 USD per saved job. In the end, the population of a country ends up paying the bill for the protectionist measures. The Organization for Economic Cooperation and Development (OECD) studied the effects of protectionist strategies on manufacturing industries. The OECD found out that there is a correlation between the drop in imports and exports as a result of protectionist policies. More importantly, the employment rate is decreasing as a result of job destruction in exporting industries. Due to a bias in reporting, created jobs are more publicized then lost jobs, creating the illusion that protectionism has a positive impact on employment (OECD,1985). For instance, the Trump Administration is arguing that it is creating a lot of jobs and people do believe this, whilst the US steel sector continues losing jobs.[8]

[7] Trade deficit is one of the arguments used in the US-China trade war by the Trump administration.

[8] https://www.bloomberg.com/news/articles/2019-09-18/u-s-steel-has-cut-1-800-jobs-in-europe-pares-earnings-forecast

Lenway, Morck, and Yeung (1996) examine protectionism in the steel industry and find out that protectionism did not stop the steel industry from declining. On the contrary, it even rewards poor industry performance and reduces the incentive for innovation.

Furthermore, Irwin and Douglas (2017) find in a recent paper that the Great Depression in the 1930s was marked by a severe outbreak of protectionist trade policies and even argue that this was one of the major reasons for the outbreak of the Great Depression. On the other hand, Frankel and Romer (1999) find that in the short run protectionism is indeed beneficial for the industry it tries to protect. Free-trade is deemed the best choice in the long run, but protectionism is favorable for some industries and could be favorable in the short run but the consumer will end up paying for the lost surplus (Pareto, 1927; Bown, 2004). The literature favors free-trade, especially in the long run. With a lot of evidence emerging from the past literature, clearly showing the disadvantages of protectionism in the long run, the question arises why does the Trump administration persist in this protectionist policy?

There are numerous explanations in the literature. First, Schnietz (1998) shows that partisan politics significantly influence protectionism, like other public policies. Rent-seeking could be another explanation, at which different industries lobby at the government for protection of their industry (Lenway, Morck, and Yeung, 1996). Third, the decision of the Trump administration to protect certain industries could be a result of protecting what the people already have against other producing countries, the so-called *status quo bias* (Knetsch, 1989).

Altogether, the literature shows that the protectionist policy that the Trump administration is implementing this term could backfire as well in the long or shorter term. Hence, the literature supports the hypothesis that this could support the steel-producing industries in the short term but could backfire other industries and the steel-producing industry in the long term. For example through lack of innovation, and the reward of poor performance (Lenway, Morck, and Yeung, 1996).

2.2 Literature on trade policy and stock prices

There is a substantial amount of papers written about global trade policy shocks and their effect on different variables. First, research shows that international trade affects stock market returns. For instance, Levine and Schmukler (2006) find that the liquidity of the stock market is affected by the globalization of firms, for example by cross-listing or raising capital in international equity markets. Second, the effect of global trade policy on different variables has been widely researched in financial literature. For example, Autor et al. (2013) find out that the rise in importing goods from China explains the decline in employment of manufacturing industries in the US. In line with these results, Pierce et al. (2016) find that there is a negative correlation between the shift in trade tariffs and employment in the US manufacturing industries (cars, machinery, etc.). In their paper, they use the US policy that prohibited an increase in tariffs on Chinese imports and shows that manufacturing firms tend to lay off more workers due to this policy change.

Furthermore, there exists extensive literature that is more focused on trade barriers and stock returns. The literature could give a good forecast of the possible results of the trade policy of the Trump administration. The paper of Wacziarg & Welch (2008) finds conclusive evidence for a positive correlation of liberalization in trade policy and the growth of a country's GDP and growth in their trading activity in the period 1950-1998. Subsequently, Bekaert et al. (2016) find that the level of engagement in international trade affects stock returns. Therefore, it could be concluded that the trade war is expected to influence the firm's performance.

More specific recent research on trade tariffs and stock returns is conducted by Jensen (2007) who shows that stock prices can show the information incorporated from trade tariffs in their stocks, as the Efficient Market Theory from Fama (1970) suggests. Furthermore, McGillivray (2003, 2004) finds that stock market movements inform us as to the industries receiving trade protection. Stock prices adjust to perceptions of future patterns of protection. Hence, Li et al. (2018) use a global general equilibrium model to simulate the outcomes of a possible trade war. They predict that China will be hurt the most but the negative impacts will eventually hit the rest of the world, not only China or the US.

Huang et al. (2018) show that the stock price is an effective parameter of changes in trade policy, although it is too difficult to measure the influences at the firm level. Furthermore, they come up with the fact that the effect of trade tariffs is not one-way as they could also influence the full supply chain across multiple countries. This could negatively influence both countries. Crowley et al. (2018) study the influence of the European trade policy shocks on the Chinese market of solar panel producers. They show that firms who are more reliant on exporting their goods had a negative return after the announcements of European import restrictions. Thus, confirming that specific sectors indeed respond to specifically targeted trade protectionism. Besides, they find that the government of country A is likely to raise tariffs on the equivalent product X if country B has already done so. This anomaly is called *Tariff Echoing*. In contrast to the foregoing literature, an interesting paper about trade agreements and stock returns is written by Breinlich (2016). Breinlich (2016) shifts his focus on the opposite of trade protectionism, in particular on the Canada-US Free Trade Agreement (CUSFTA) signed in 1989. He conducts an event study to the companies that would have been hurt by the trade barriers if the tariffs were not reduced. The CUSFTA agreement leads to an increase of 1.2% in increased yearly profits of Canadian manufacturing firms. The impact of lower resources, due to lower importing tariffs, positively neutralized the effect of lower importing costs of manufactured goods. Breinlich (2016) shows that the benefits of free trade outweigh the costs.

The trade-war that has started since the election of Donald J. Trump as the President of the US is not unique in the history of the US. There is comprehensive literature about the trade war on steel and aluminum in the US, when President Bush was in office, he implemented protectionist policies to protect the producers of steel in the US. In this situation Bush used the same argument as Trump did; a threat to national security. On 20 March 2002 Bush introduced the Emergency Safeguard Measures with the following substantiation; *'To ensure that American industries compete on a level playing field and to protect them from the harm of foreign countries who led them into bankruptcy and job losses due to cheap imports of steel and global overcapacity*[9]. The aforementioned is quite similar rhetoric the current President of the US is using, although in a more sophisticated manner.[10] which could support the fact that trade

[9] Bush, G. W. (2002), 'President Bush Imposes Safeguards on Steel Imports' (Press Release, 5 March, http://usinfo.state.gov/topical/econ/wto/02030502.htm).

[10] Donald Trump tweeted: "Trade wars are good, and easy to win."

protectionism is US International Trade Commission (USITC) closely monitored the effect that these tariffs had on steel-consuming industries because they were afraid that this could backfire to the consuming industries. They came up with results similar to Bown (2004), the consumer ends up paying for the protectionist approach of the government. The report of the USITC (Hillman et al. 2003) shows a loss of over 40 million USD. Besides, almost half of all the firms that consumed steel in the US said they were having trouble with their steel resources. Moreover, more than one-third of consumers moved their production facilities out of the US. In this research, we use the effect on consuming steel and aluminum sectors in one of the hypotheses, stated in section 2.4 of this paper.

In addition to the USITC report, Read (2005) researched the domestic benefits and costs of the Emergency Safeguard measures. Besides, Read (2005) looks at the origins of the measures, which is crucial for this paper as well to understand how and why the steel and aluminum industry was protected in 2003 and why it is nowadays. The economic downturn at the end of the 1900s, low steel prices, partisan politics, and a strong US steel industry lobby were the main elements that contributed to the tariffs. These factors are identical to the factors from the financial literature (Schnietz, 1998; Lenway, Morck, and Yeung, 1996; Knetsch, 1989) mentioned at the end of section 2.1. Furthermore, the empirical study indicated that the total significance for the GDP was negative since the only benefiting parties were the government and the steel industry. Hence, Read argues that the primary motivation of the measures was to satisfy domestic protectionist sentiments, so mainly politically motivated. This shows how powerful the US steel industry lobby is.

To continue the political side of protectionism, the motivation for tariffs and its link to (national) politics is widely explained in the literature. For example, Grossman and Helpmann (1994, 1995) emphasized the impact of national politics on the trade policy of certain countries. Hence, Fetzer and Schwarz (2019) study the combination of tariffs in a more recent setting: Trump's trade war. They come up with some remarkable findings. First, they look at the retaliation measures taken by the EU, NAFTA, and China as a repercussion for Trump's protectionist policy and if these measures are targeted explicitly towards areas that voted for Trump. They find substantial evidence that this was the case and show that the retaliation response of these countries was preliminary to maximize political harm to the Trump administration besides reducing domestic loss. The EU and China, for instance, raised tariffs on bourbon whiskey which is being produced in the home state of the Republican Senate

majority leader Kentucky. Subsequently, they test if the Republican candidates did worse during the 2018 midterm elections in the states that were more exposed to retaliatory measures. The results suggest that Republican candidates did 1.4-2.7% worse in counties that were in the top 10 percent. In this recent study, Fetzer and Schwarz (2019) are the first to empirically address the problem that countries face when choosing between political targeting of other countries and the economic harm it does. To put this in other words, the financial literature on protectionism shows us that important reason to implement such a strategy is politics and not economics. Additionally, Ma and Mclaren (2018) find that US trade policy is mainly biased towards the industries that are incorporated in swing states, again advocating for the political bias these trade policies have. As we have seen before, Bush and Trump both favored the national sentiments of industry workers in swing states and therefore this is the basis for one of the hypotheses of this paper, see section 2.4.

2.3 Literature on stock prices and event studies

Event studies are widely used in the financial literature. In this section, the paper explains the literature where the event study in this research is based on. Before we can do this, the paper must take a closer look at the Efficient Market Hypotheses of Fama (1970). The Efficient Market Hypothesis states that markets are efficient, and all information is directly incorporated in the stock prices. However, there is no doubt that there are numerous concerns with the Efficient Market Hypothesis. Not all investors could be deemed rational. This should not be a problem if markets work properly but there exist limits to arbitrage (Lamont and Thaler, 2003) and thus limitations to adjusted 'wrong' pricing by irrational investors. Therefore, this paper will use the announcements as described in section 3.1 of this paper as information that is incorporated by the stock returns of the day the information was made accessible to the public. For this paper, the semi-strong form of Market Efficiency is assumed. This means that all public information is incorporated in stock prices and what we particularly observe in stock markets these days.

Although it is difficult to measure the influence of the protectionist measures and its effects on such a short term. Therefore, based on the Efficient Market Hypothesis, an event study is used as the primary empirical method to explain the reaction of the stock market to the trade war.

This explanatory power of event studies is widely accepted in financial literature, for example, Schwert (1982) used financial data to analyze regulation. A more recent example could be the paper of Breinlich et al. (2018), who also researches the influence of political events (Brexit) on the stock market and provides significant evidence that stock markets adjusted their perception when political policies change. Binder (1998) published an extensive overview on the use of event study methodology. In addition to the explanatory power of stock prices in the short term, the paper of Binder (1998) summarizes that share prices also reflect future changes in the economy such as protectionist measures. In addition, Breinlich (2016) explains it perfect in his event-study on the CUSFTA: *'stock returns capture changes in the expected lifetime profits of a firm, rather than just changes over a pre-defined time horizon'*. This supports the fact that event studies are good measures to deduct future outcomes of these trade wars.

In section 4 this paper will elaborate more on the event-study models used in this paper in line with Mackinlay (1997).

2.4 Purpose and hypothesis

After all literature has been examined this paper will define a research objective and hypotheses. The goal of this paper is to examine whether the protectionist approach of the Trump administration benefits stock returns. More specifically, this paper will take a closer look at the Steel and Aluminum -producing and -consuming sectors. The events that will trigger the policies and thus influence the stock returns are further explained in section 3.1 of this paper. Therefore, the following research question is constructed: ***What is The influence of the US protectionist trade policy on US domestic steel and aluminum producing and consuming businesses?***

Based on the protectionist literature; the paper of Read (2006), and the findings after the report of the USICTS we can conclude that protectionist measures have a negative impact on the economy in the long run. As described above, Frankel and Romer (1999) and Bown (2004) amongst others find that the protected industries could benefit in the short run. However, the past literature demonstrates that protectionist measures have a negative impact in the long run, and move society away from its equilibrium (Hufbauer et al., 1986; Krugman and Obtsfeld,

2012). Since we assume that stock returns capture future changes in expected profits as well, the overall effect on steel-consuming and -producing stocks should be negative with the announcements of protectionist measures. Hence, there is a trade-off between the long-term and short-term effects for the steel-producing industries. Therefore, the following hypotheses is constructed.

Hypotheses 1. Steel-consuming industries experience a negative stock return and producing industries experience a positive stock return after protectionist announcements of the US.

In addition to this hypothesis, the announcements of other countries are retaliatory on the US market and could hit both producing and consuming industries. Hence, the steel and aluminum producing industry should respond negative on announcements in countries which are exempted for these trade tariffs, and consuming industries should react positive on these exemptions. If these hypotheses hold, this would support and reinforce the outcome of hypothesis 1, because an exemption should have the opposite effect (mentioned before by Hufbauer et al., 1986 , free trade is better in the long run). Furthermore, a retaliatory measure should not only hit the producing industry but could hit both due to tariff echoing, Breinlich (2016). Therefore, the following hypotheses are constructed;

Hypothesis 2a. Both industries face negative stock returns if there is a retaliatory announcement of another country.

Hypothesis 2b. Consumers will face positive returns when a country is exempted from these trade tariffs whereas producers face negative stock returns after an exemption announcement.

Hypothesis three is based on the paper of Lenway, Morck, and Yeung (1996) and is about the change in R&D expenses. In the literature, besides a reward for poor industry performance, a decline in R&D expenses is one of the main effects of protectionist measures. The incentive to innovate declines as a result of the protectionist measures, because their business is protected anyway. Therefore it could be argued that the steel producing industries are more conservative in their R&D expenses. Hence, this is argued to be another negative externality of protectionist policy.

Hypothesis 3. Steel-producing industries spent less on R&D as a result of events in the trade war, due to the protection they receive from the US government.

As we have seen in the paper of Fetzer and Schwarz (2019) they are able to look at the results of retaliatory tariffs and how they influence domestic politics in the US.
From another perspective it would be interesting to see that there is a positive relationship between the companies benefitting from Trumps protectionist measures regarding the steel-industry. For example, in the state of Pennsylvania, where a lot of steel companies are headquartered, Donald Trump became the first Republican candidate to win the state since 1988. Ma and Mclaren (2018) find that US trade policy is mainly biased towards the industries that are incorporated in swing states. Hence, it is interesting to see if producing company's performance, after US initiated trade war events, is positively correlated with the fact that the company has their production facilities in a "swingstate".

Hypotheses 4. Production companies that have a majority of production facilities in a 'swingstate', see a positive influence on their stock returns after US initiated events.

Altogether, with these four hypotheses this paper should give a better insight in how the Trump administration affects the producing and consuming companies in the steel and aluminum industry. Furthermore, this will give a more in-depth view of the political motives that are behind trade policy, as we have seen in the literature before. As a result, this research will not only be limited to the international economic spectrum of the Trade War but will cover the domestic and political aspect as well.

3. Data

In this section, an explanation is given about how the events in this trade war are selected. This is important because an event study typically measures the shocks directly surrounding the event date. Furthermore, this part describes the rationale behind the selection of the stocks included in the portfolio that is used in this event study. At last, the descriptive statistics are discussed.

3.1 Event selection

In an event study the essential part is to define the dates of the events that are used to calculate the abnormal returns. In this research, defining the correct dates is a difficult task. In this section we categorize these sources of information and divide them into groups. The Trade War started off in the beginning of 2017 when President Donald J. Trump and his administration took office. For this research we count official statements from the U.S. as events. This paper does not include the personal twitter account of Trump. There are multiple reliable sources available that communicate the information about the US trade policy. For example the White House, The Chamber of Commerce, The U.S. International Trade Commission or the US Trade representative are governmental organizations that communicated the policy. Furthermore, reliant sources could be the big data providers like Bloomberg, Reuters and the Peterson institute for International Economics.

We define which events are relevant for our research, importing and exporting industries who are specifically investigated by the Trump Administration. As shown in section 3.2 of this paper the focus is on steel and aluminum consuming and producing industries. The producing industries are aluminum and steel producing companies. The consuming industries are the car and construction industry.

3.1.1 Event list

In line with the Peterson Institute for International Economics (PIIE), this paper follows the following events regarding these industries.[11] In this section, the most important events are described and their importance of including them for this research is set out.[12] In addition to this, other events that are vital for this research are added to the event list, which is included in APPENDIX B.

First, the White House announcement of the investigation of the US Department of Commerce on the imports of steel and aluminum from foreign countries on April 20, 2017. This investigation was justified under section 232 of the Trade Expansion Act of 1962, which states that Commerce can investigate imports that could threaten national security.[13]

Second, the results of this investigation were released on February 16, 2018. However, the Trump Administration announced future tariffs on March 1, 2018. This policy included a 25% tariff on steel and a 10% tariff on aluminum.

Third, on March 8, 2018, Donald Trump announced that trading partners can file for exemption of the tariffs on steel and aluminum. In addition, he exempted Mexico and Canada due to the ongoing talks of the new NAFTA agreement. As a reaction to the tariffs on steel and aluminum, China imposed retaliatory tariffs on aluminum and scrap. This will hurt the aluminum producing industry in the US. The European Union was exempted from the trade tariffs until June 1, 2018. On June 22, 2018, they impose retaliatory tariffs on 3.2 billion USD of goods.

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[11] Source: Bown, C.P., Kolb, M., (2019). Trump's Trade-war Timeline: An Up-to-Date Guide. Peterson Institute for International Economics, retrieved from https://www.piie.com/blogs/trade-investment-policy-watch/trump-trade-war-china-date-guide

[12] In addition to PIIE, the paper confirms the events at the Governmental body that issued it and other databases such as Reuters. For example: https://www.reuters.com/article/us-usa-trade-china-timeline/timeline-key-dates-in-the-us-china-trade-war-idUSKCN1SE2OZ

[13] Source: Bown, C.P, (2017) Trump's Threat of Steel Tariffs Heralds Big Changes in Trade Policy. Peterson Institute for International Economics, retrieved from https://www.piie.com/commentary/op-eds/trumps-threat-steel-tariffs-heralds-big-changes-trade-policy

These products included 34% steel and aluminum, which directly affects the producing industry in the US. In addition to the EU, Turkey imposed retaliation tariffs on US cars and other consumer products on August 14, 2018. Furthermore, India retaliates on June 15, 2019, after they lost their special trade status with the US. The most recent step in the aluminum and steel trade war is the new tariff imposed by the Trump Administration on 450 million USD worth of goods. These tariffs will mostly hit allies, such as Taiwan, Japan, and the EU but China as well.

3.2 Portfolio selection

For this research the focus is on the tariffs and import quota on steel and aluminum. Although the US list of protectionist measures in the 2017-2020 period is extensive; the solar panel industry, car makers and manufacturing industry. As mentioned before in the events list, the Trump Administration got into a lot of different trade wars with countries all over the world concerning their steel and aluminum trade war. Whereas most countries imposed retaliatory tariffs or quota too.

The portfolio used in this thesis is divided in two parts. The first part are the steel and aluminum consuming industries. for the consuming industry this research will use the car industry, machinery, and construction industry as a proxy for steel and aluminum importing industries, as they account for 80% of steel consumption in the US.[14] The second part are the steel and aluminum producing industries. All data can be derived from Compustat Capital IQ. For the full list of GIC sub-industry codes, see the APPENDIX C.

3.2.1 Consuming industries

The goal of this research is to find out whether the trade war benefitted US-based industries. Based on the mentioned literature about protectionist policies it could be argued that there are short term winners and short term losers after the initiation of a protectionist measure,

[14] The detailed list of steel consumption in the US by industry can be retrieved from https://www.statista.com/statistics/752484/us-steel-demand-by-sector/

retaliatory announcement, or tariff exemption. On one hand, the steel and aluminum consuming industries are likely to be hit hardest because steel and aluminum prices will rise for them when there are protectionist announcements. On the other hand, there could be a positive impact when certain countries are exempted from trade tariffs and therefore can import cheaper raw materials from these countries. Accordingly, the paper constructs a sample of steel and aluminum consuming businesses based on the following criteria.

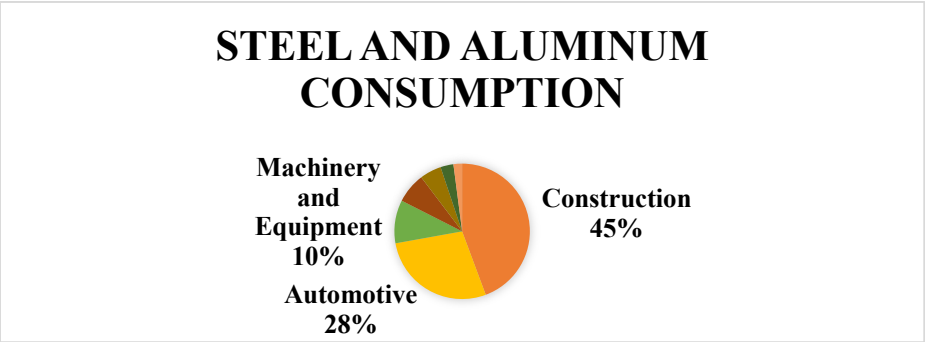

Figure 1. Steel and aluminum consumption by industry in the US by sector.

First, the industries selected are based on the steel and aluminum consuming industries that are the largest according to the American Steel & Iron institute; Construction (43%), automotive (28%), and machinery & equipment (10%) (see figure 1). With these industries included, the paper covers more than 80 percent of steel and aluminum importing businesses. Second, the firm should have its headquarters located in the US, which is important for the company to be affected by the protectionist policy of the Trump Administration. Last, for the event study, it is important that the company is of a certain size and thus is more likely to have higher volatility. Then the changes in stock returns from the estimation window and the event windows are likely to differ more, resulting in higher accuracy in the empirical part of this paper. Therefore a minimum of 1bn $ in total assets is a criterion to select a firm to participate in this research. After applying these criteria to the data we retrieved from Compustat, 29 firms could be found. Below are the descriptive statistics for the firms in the consuming industries.

Table 1.1 Descriptive statistics consuming industries

Table 1.1 provides descriptive statistics of our sample of producing firms, following the sample selection and variable definition in section 3 of this paper. The sample consists of 151 observations for 14 firms from 2016-2019. The table presents the mean, median, SD, minimum and maximum for each variable.

Variable	N	Mean	Std. Dev.	Min	Max
Stock market reactions					
CAAR (-5,5)	350	-0.0128	0.0261	-0.0634	0.0227
CAAR (-1,1)	350	-0.0068	0.0110	-0.0337	0.0089
CAAR (-2,2)	350	-0.0105	0.0130	-0.0363	0.0087
control variables					
roa	350	0.0565	0.0533	-0.0864	0.2008
size	350	8.431.032	1.082.295	632.528	1.123.477
mtb	350	0.9353	0.9613	0.0801	4.8004
leverage	350	0.7806	1.0264	0.0012	5.3831
bhar	350	-0.0147	0.1737	-0.7783	0.4673
Trade war measures					
exemption	350	0.3828	0.4867	0	1
retaliatory	350	0.3085	0.4625	0	1
protectionist	350	0.3085	0.4625	0	1

In this table are the descriptive statistics for the consuming industries. The N is the total number of events recorded. The CAAR is the average abnormal return for all companies in the portfolio on all event dates. From the descriptive statistics, we can derive that the CAAR (-1,1) is close to zero where the others are more than one percent positive. As mentioned before the -1,1 window is chosen because the fact that some events are close to each other there would be an overlap. The consuming industries CAARs are positive on average, which could imply that the consuming industries benefit from the trade war overall, but there is a chance that this difference is due to the differences in events.

3.2.2 Producing industries

The main area of interest for this paper is the steel and aluminum producing industries. These industries are protected by the different policies that are initiated by the US. So therefore we might argue that these industries would benefit from these protectionist measures, at least in the short term, as the aforementioned literature shows (Frankel and Romer, 1999). On the contrary, the events that exempt other countries from tariffs, or the events where retaliatory measures on the steel and aluminum industry take place, could damage the steel and aluminum

producing industries. This information could be harmful to the stock price of these companies and thus result in a negative return. Hence, for the steel and aluminum producing industries, the paper constructs a sample on the following criteria. First, a minimum of 1bn $ in total assets is a criterion to select a firm to participate in this research. This is similar to the criterion in the consuming section. Second, companies producing steel must have their headquarters in the US, because there are multiple overseas companies listed as well. They would not benefit from trade protection and vice versa, because their factories are overseas. At last, more than half of the company's revenue should come from steel and/or aluminum manufacturing. After applying these criteria, there were 13 companies left. This is because in the past decades' numerous US steel and aluminum producing companies moved overseas to cheap labor countries or went bankrupt. Therefore, it is even more interesting to take a closer look at these remaining companies and see how they react on the protectionist measures the Trump Administration undertakes to protect it. This recognizes the fact that the limited number of remaining steel and aluminum firms is a constraint, however, there are numerous events about which the average returns can be calculated. In table 1.2 below are the descriptive statistics.

Table 1.2 Descriptive statistics producing companies

Table 1.2 provides descriptive statistics of our sample of producing firms, following the sample selection and variable definition in section 3 of this paper. The sample consists of 151 observations for 14 firms from 2016-2019. The table presents the mean, median, SD ,minimum and maximum for each variable.

Variable	N	Mean	Std. Dev.	Min	Max
Stock market reactions					
CAAR (-5,5)	151	-0.0320	0.0252	-0.0899	0.0112
CAAR (-1,1)	151	-0.0118	0.0281	-0.0480	0.0391
CAAR (-2,2)	151	-0.0134	0.0317	-0.0645	0.0455
control variables					
roa	151	0.0853	0.0788	-0.0768	0.3196
size	151	7.9016	1.0190	5.4697	9.9142
mtb	151	0.5737	0.2845	0.1137	1.4934
leverage	151	0.9876	0.1261	0.1851	4.7760
bhar	151	0.1061	0.2266	-0.7346	0.8431
Trade war measures					
exemption	151	0.3841	0.4880	0	1
retaliatory	151	0.3178	0.4672	0	1
protectionist	151	0.2980	0.4589	0	1

In this table are the descriptive statistics for the producing industries. The N is the total number of events recorded. The CAAR is the average abnormal return for all companies in the portfolio

on all event dates. As mentioned in the consuming industry data section the -1,1 window is chosen because the fact that some events are close to each other there would be an overlap. From the descriptive statistics, we can derive that the CAAR (-1,1) is 1.18% positive. This could be interpreted that the average producing company benefits much from the protectionist measures and is not hurt by the exemptions or retaliatory events.

4. Methodology

This paper will measure the response of the private sector on the protectionist measures of the US government and the retaliatory measures that followed. . As argued before in the literature review, the economy will move away from the optimum and thus the measures will hurt the overall market in the long run (Hufbauer et al., 1986; Krugman and Obtsfeld, 2012). Besides, this paper tries to find out if there is a relationship between domestic politics and the ability of these protectionist measures to preserve jobs. The method used is a quantitative approach, allowing the author to take an impartial position. And therefore, make it simple to set aside any prejudices that exist around trade policies, foregoing literature, and the squabble around the current US President. Hence, to examine this effect an event study is implemented, and a cross-sectional regression is completed.

In the methodology section, we describe the empirical part of this paper. First, we will explain the event study method, which is the preeminent method to separate the reaction of the stock exchange and the reaction of stocks to specific events listed on the stock exchange. In this section is shown how the cumulative abnormal returns (CAR) are calculated, this is the dependent variable in this empirical study. To get a total picture per producers and per consumers of steel and aluminum, this paper will calculate the cumulative average abnormal return (CAAR) in addition to the CAR. For both these cumulative abnormal returns , we test for statistical significance.

Hence, the other variables used are described such as the independent variables and the control variables. Furthermore, a regression with these CARs and CAARs as dependent variables is explained. At last, the regressions to test hypotheses three and four are explained.

4.1 Event study and CARs

First, the Efficient Market Theory of Fama (1970) suggests that all the information that is available to the public is incorporated in the stock price. The market is able to capture all information that is given in trade tariffs and changes in policy quickly and digest this in the stock price. The semi-strong form of the EMH holds if the event is priced in within 1 working day Therefore, using the stock price as a quantitative measurement for the influence of trade

policy changes is valid. In this research the stock price is used in an event study, to compute the cumulative abnormal returns (CARs) surrounding the date of the selected events and CAARs for the group of producers and group of consumers. As described before in section 2.3 the used methodology is in line with Schwert (1981) and MacKinlay (1997). Mackinlay (1997) shows that unforeseen events influence the prices of the stock market and can be distinguished in the form of abnormal returns. The event study uses the expected returns and the actual returns of the market to calculate the abnormal returns. To calculate the expected returns there are different models used in this calculation. Research of Armitage (1995) suggests that the market model is the foremost method to calculate abnormal returns. Hence, Huang et al. (2018) use the market model as their main model and in addition to this model they use the factor and CAPM-model as robustness checks. In line with Huang et al. (2018) this paper will use the market model to calculate the abnormal returns. In the following section 4.1.1 the calculation of the CARs will be explained.

4.1.1 CA(A)R calculation

In this study the abnormal returns are measured over the chosen portfolio (see section 3.2) for the specific events (see section 3.1). The cumulative abnormal returns (CARs) are used as the dependent variable in this study. The CAR is calculated using an estimation window of -220 to -21 trading days before the event, to calculate the firm specific market model parameters relative to the event day. This is in line with the traditional event study methodology (Mackinlay 1997) and is used by Huang et al. (2018) as well who conduct research on the same topic. The event window surrounding the event is set on 5 days, 2 days before the event and 2 days after the event. In addition, robustness checks are done with a different event window of 11 days and 3 days, which is common in financial literature (Mackinlay, 1997). The market used in the market model is the S&P500, inspired on the approach of Huang et al. (2018). Further, it provides a value weighted index, with a broad scope of different industries (whereas for example the DOW Jones is not representative for the total US market) and incorporates US firms only. The choice between the CAPM model and the Market Model is made based on the previous literature (e.g. Campbell et al. 1997) and further on the fact that the CAPM-model relies on the risk-free rate, which has been highly volatile and low the past few years. The estimated returns are calculated as follows:

$$R_{it} = \alpha_i + \beta_i R_m + \varepsilon_{it}$$

$$E(\varepsilon_{it}) = 0 \;\; Var(\varepsilon_{it}) = \sigma^2$$

Whereas R_{it} is the return of the company's stock (i) on the event day (t) where t= T-220 to T-21. The S&P500 market index return is represented by the R_m. The alpha and beta are then used to calculate the abnormal returns (AR_{it}) using the following equation, where we capture the difference between the expected return and the realized return of the stocks, which results in the abnormal returns.

$$(1) \;\; AR_{it} = R_{it} - (\hat{a}_i + \beta_i R_{m,t})$$

Subsequently the cumulative abnormal returns are calculated (CARs) for each event (j). The returns of each company on each day in the event window (-2,2, -1,1, and -5,5) added up using the following formula:

$$(2) \;\; CAR_{ij} = \sum_{i=T-2}^{i=T+2} \mathrm{AR}_{it}$$

As explained earlier, this research will divide the companies in two different groups. The steel and aluminum producing group and the steel and aluminum consuming group. Due to the purpose of this research and the nature of the hypotheses it is necessary to calculate the average abnormal return per group (AAR):

$$(3) \;\; AAR_t = (AR_1 + \; AR_2 + AR_3 \ldots AR_n)/n$$

Additionally, I would like to know the average value of these abnormal returns in the different event windows (-2,2, -1,1, and -5,5) and therefore added these up:

$$(4) \;\; CAAR_t = (AAR_t + \; AAR_{t+1} + AAR_{t+2} \ldots AAR_{t+n})/n$$

In summary, I calculated the average abnormal return for each event window. Hence, it is possible to assess the differences in impact of the announcements of protectionist policies in the Trade War. Therefore, the CAAR of each industry will be the dependent variable in the cross-sectional regressions. This is useful to answer the hypotheses one and two and is useful in the cross-sectional regressions, which will be explained in section 4.2. To assess if the event study results or abnormal returns connected with the events chosen in this research are not the result of a random error but significantly different from 0, this paper performs a one sample T-test.

4.2 Regression

To test the hypothesis the paper will use an univariate analysis by regressing the CARs as dependent variable and include the control variables mentioned in this section. Multiple regressions will be conducted where the CAR will be regressed on various dummies adding control variables. In the section above the dependent variable is already described, the CA(A)R, in this section the reasoning behind the independent variables and control variables is explained.

4.2.1 Independent variables

For the first and second hypothesis the dependent variables used in the regressions are based on the nature of the trade war instrument. The three different categories are *Retaliatory, Protectionist* and *Exemption. Retaliatory* tariffs are defined as tariffs issued by a state as a reaction on the protectionist measures taken by the Trump administration. *Protectionist* measures are measures that the US imposed firsthand by raising tariffs or import quotas. Last, the *Exemption* measure is when a country is exempted from the particular trade protection measure. The distribution of these categories in the producing companies is shown and discussed in section 5.1 in table 3, the consuming table is in the appendix.

For the third hypothesis, the independent variable is R&D within the steel and aluminum industry. The R&D numbers of the various companies are derived from Compustat and are updated quarterly. Therefore, this could give some problems regarding the events that occur in the same quarter. The R&D variable is constructed as follows: the R&D expenditures divided by the firms total assets. This is in line with the paper of Lenway, Morck, and Yeung (1996) that is discussed in section 2.1 of this paper and find that protectionist measures withhold firms from spending on research and development.

For the fourth hypothesis, the ‘swingstate variable is constructed. The literature on the political influence of trade tariffs is numerous. For example, Ma and Mclaren (2018) find that US trade policy is mainly biased towards the industries that are incorporated in swing states. Therefore this research constructs a ‘swingstate’ dummy. These are states that are seen as states that do not lean to a particular political party within the last few presidential campaigns. The swingstate

dummy is 1 if the company has the majority of its manufacturing plants in one (or more) of the following states: Colorado, Florida, Iowa, Michigan, Minnesota, Nevada, New Hampshire, North Carolina, Ohio, Pennsylvania, Virginia, and Wisconsin. This results in 7 of the 13 steel and aluminium producing companies having their majority of production facilities in swingstates. Hence, the dummy can only be 1 if the event is initiated by the US, because the hypothesis is aimed at actions done by the Trump administration to support certain States. Therefore, the dummy is called; swingstate*InitiatedUS.

4.2.2 Control variables

The control variables are firm specific variables and is based on the control variables used in the paper of Huang et al. (2018). All the data used in the control variables is derived from *Compustat.* The first control variable is size, which in this paper is the LN of the company's market value. Further, the LN of the book value of total assets was used as a robustness check and gave similar results in the regressions. Second, leverage is calculated. The sum of the firm's long-term debt and short-term debt divided by the market value of its total assets measured at the end of the fiscal year prior to the acquisition and used as the leverage control variable. Third, the Market-to-book (MTB) ratio is used to capture the firm's value. Last, the return on assets (ROA) of a company is included.

Additionally, the macro-control variable EXR is added to control for the change in currency. Gupta et al. (2000) display a correlation between abnormal returns and exchange rates, and therefore could be of significant influence in these tests. China uses the devaluation of the yuan against the dollar to soften the impact of the trade tariffs imposed by the US. Since the Trump administration and its trade war is aimed at China, the renminbi per dollar exchange rate is used. This macro control variable is constructed in line with the paper of Harris and Ravenscraft (1991), who developed a method to use the exchange rate in cross-border merger announcements. The average exchange rate between 2017 and 2019 is calculated, then, this average is subtracted by the average exchange rate in the year of the specific announcement and is then divided by the average exchange rate. All the data on exchange rates is derived from the Bloomberg terminal.

For research purposes, it is important that the correlation between the variables of interest and the control variables is not too high. Therefore, a correlation matrix is included in appendix F. Hence, it is clear that the correlation between the variables of interest is not too high, and in most cases the collinearity is not above 0.1, except for the exchange rate in some cases. Additionally, the paper checks if there is a high level of multicollinearity, because in the regressions there are always more than 2 variables in the regressions. If the multicollinearity of the regressions is high, the std. errors will increase drastically and the coefficients become unstable. However, as displayed in appendix G, the variance inflation factor is well below 10, indicating there is no further action to conduct on this level of (multi-)collinearity.

4.3 Regression

To test the hypotheses stated in section 2.4 this paper conducts an univariate analysis by regressing the CARs as independent variables, with all different dependent variables (dummies) and include the control variables mentioned in section 4.2.2. In this section the regressions are formulated and described. One should note that these regressions are all conducted for consuming and producing companies separately.
For the first and second hypothesis the following regression is constructed:

$$CAAR_i = \alpha + \beta_1 PROTECTIONIST + \beta_5 MTB + \beta_6 LEV + \beta_7 ROA + \beta_8 SIZE + \beta_9 EXR + \varepsilon$$

$$CAAR_i = \alpha + \beta_2 RETALIATORY + \beta_5 MTB + \beta_6 LEV + \beta_7 ROA + \beta_8 SIZE + \beta_9 EXR + \varepsilon$$

$$CAAR_i = \alpha + \beta_3 EXEMPTION + \beta_5 MTB + \beta_6 LEV + \beta_7 ROA + \beta_8 SIZE + \beta_9 EXR + \varepsilon$$

In short, $CAAR_i$ is the cumulative average abnormal return, of firm i, calculated over the event days. The dummy's protectionist, retaliatory and exemption are used in hypotheses 1, 2a, and 2b. The protectionist dummy is 1 if the trade policy measure is initiated by the US tot protect the steel and aluminium industry. The retaliatory dummy is 1 if the event is initiated by a non-US country as a retaliation of their protectionist measures. Subsequently, the exemption dummy is 1 if a country, or a group of countries are exempted from certain trade tariffs. In addition, the control variables as mentioned in section 4.2.2. are included based on the paper of Huang et al. (2018).

Subsequently, the paper will conduct a regression where all dependent variables of hypotheses 1, 2a, and 2b are included. This is done to see which measure is most explanatory and if the hypotheses are correct, these dummies combined should have a higher explanatory value (adj. R-squared). The following regression is constructed:

$$CAAR_i = \alpha + \beta_1 PROTECTIONIST + \beta_2 RETALIATORY + \beta_3 EXEMPTION + \beta_5 MTB + \beta_6 LEV + \beta_7 ROA + \beta_8 SIZE + \beta_9 EXR + \varepsilon$$

Furthermore, it is interesting to further compare the differences between the different measures. Therefore, the following regressions are added for the fixed effects tests, in addition to the tests mentioned above. First, a sample test of the CAARs, without variables. Second, a regression with control variables only;

$$CAAR_i = \alpha + \varepsilon$$

$$CAAR_i = \alpha + MTB + \beta_6 LEV + \beta_7 ROA + \beta_8 SIZE + \beta_9 EXR + \varepsilon$$

For the third hypothesis the regression is repeated but the dependent variable is replaced with the R&D variable, based on the research of Lenway, Morck, and Yeung (1996). This variable is R&D ratio of the company at the time j in firm i:

$$CAAR_i = \alpha + \beta_4 R\&D_{ij} + \beta_5 MTB + \beta_6 LEV + \beta_7 ROA + \beta_8 SIZE + \beta_9 EXR + \varepsilon$$

For the fourth hypothesis the regression is changed, and the variable swingstate*InitiatedUS is introduced. Again, together with the control variables that are mentioned before. This variable is a dummy that is 1 if the company has its majority of production facilities in the US and the event is initiated by the US.

$$CAAR_i = \alpha + \beta_4 swingstate * InitiatedUS_{ij} + \beta_5 MTB + \beta_6 LEV + \beta_7 ROA + \beta_8 SIZE + \beta_9 EXR + \varepsilon$$

The results of these regressions will be further explained in section 5.2 of this paper.

5 Results and discussion

In this section the hypotheses are tested, the results of the empirical analysis are discussed, and the economic significance of these results is examined. The results and discussion part of this paper consists of two parts. First the outcomes of the event studies are discussed, and the returns of certain events are highlighted. Second, the most important tables of the regressions are shown and used to answer the hypotheses formulated in section 2.4 of this paper. This allows us to distinguish the drivers of these abnormal returns. Subsequently, robustness checks are done and discussed. The goal of this section is to achieve an overall view of the empirical impact of the trade measures and relate this to the literature part of this paper. Hence, this will bolster the paper in answering the main research question of the paper; ***What is The influence of the US protectionist trade policy on US domestic steel and aluminum producing and consuming businesses?***

5.1 Results of the event studies

5.1.1 Event study Producing companies

Table 3a, the market reaction of the producing companies, is presented in this section. In this section the paper will touch upon some noteworthy outcomes regarding some of the events for producing companies. Subsequently, the significance of the different estimation windows is discussed and a choice for the regressions is made.

Table 3a. Market reaction of Producing companies

IN this table the different cumulative abnormal returns are displayed of the producing companies, with a total of 151 observations. The first column denotes the date of the announcement of the trade policy. The following columns display the different estimation windows used whilst calculating the CAR. The event column indicates the type of event. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Eventdate	*CAR(-5,5)*	*CAR(-2,2)*	*CAR(-1,1)*	*Event*
20apr2017	-7.632%	4.185%***	3.319%***	Protectionist
16feb2018	0.325%	3.088%	2.476%*	Protectionist
01mar2018	-3.751%*	2.044%***	3.488%***	Protectionists
07mar2018	-4.465%***	-3.722%***	-4.333%***	Exemption
22mar2018	-2.641%*	-4.526%*	-0.954%	Exemption
23mar2018	-3.491%*	-2.660%*	-4.869%***	Retaliatory
30apr2018	0.640%	-3.499%*	-5.038%***	Exemption
01jun2018	-0.962%	0.458%	-0.623%	Exemption
20jun2018	-4.826%**	1.021%*	-2.240%**	Retaliatory
29jun2018	-2.855%*	-2.961%***	-1.216%	Retaliatory
10aug2018	-4.187%***	-2.798%**	-0.676%	Protectionist
14aug2018	-2.292%**	-3.128%**	-4.664%***	Retaliatory
17may2019	-9.066%***	-2.957%***	-3.335%***	Exemption

In this table 3a, we can see a pattern, the first three tariff barriers or investigation announcements to form such barriers by the US helped the producing industries, and the market perceived this as a positive flow in the short run. For instance, on the day the tariffs were announced on foreign steel and aluminium by the Trump administration on the 1st of March 2018, the steel and aluminium producing companies outperformed the market with 3.48%. Therefore, it is similar to the literature described in section 2.1. For example, Frankel and Romer, 1999 and Bown, 2004 describe that companies that are protected by trade policies could gain in the short run. Hence, investors value this, resulting in a higher share price. These returns indicate that hypothesis 1 could hold, however, the paper will further test the significance of this correlation in section 5.2. Especially the (-2,2) and (-1,1) estimation windows give this indication.

Furthermore, these smaller estimation windows show significant results at all tests except from the (-2,2) window at the second event. Hence, this could argue that these smaller estimation windows are more suitable for this research and the regressions. Hereafter, the protectionist measure from the 10th of August 2018, displays a contrary effect. A possible explanation for

this is that the tariff is imposed on Turkey only. Besides, the result is not significant in the estimation window of (-1,1).

Subsequently, the results of the event study show clear support for hypotheses 2a and 2b. First, the announcements of a tariff exemption all clearly show that the market values the steel and aluminium producing industry lower, if countries are exempted for tariffs. The CAARs for these events are all negative. The effects are more common within the smaller estimation windows. Hence, most of the exemptions have a significant return. Moreover, the majority at the 99% level, and especially in most of the returns in the (-1,1) window.

Second, the retaliatory announcements display negative returns. These returns are in line with the literature. For example, Li et al. (2018) present that not only China is hurt by the tariffs imposed by the US but the US is hit as well by the immediate retaliatory measures. The majority of these returns are highly significant and especially in the (-1,1) window.

The figure below (figure 1) gives an overview of the market reaction to these different events. The outperformance of the producing firms at a protectionist announcement is substantial. As described before, this is in line with Frankel and Romer, 1999 and Bown, 2004, who find a clear benefit in the short run. On the contrary, there is a clear difference with the retaliatory and exemption announcements, again in line with the formulated hypotheses.

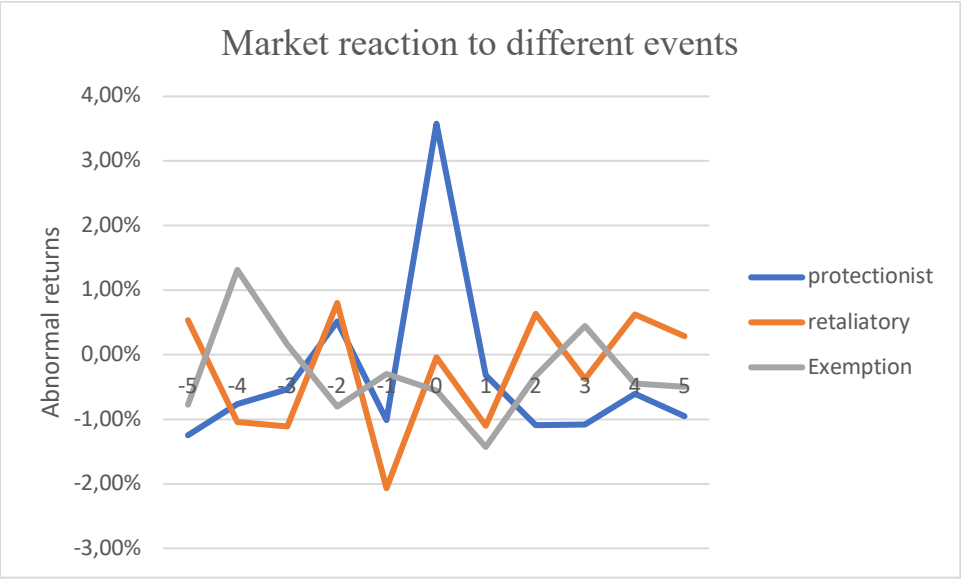

Figure 1 Producing companies market reaction to different events

When the differences in returns are used as independent variables in a regression with the CAARs, there is likely a positive correlation with the protectionist measures. Hence, there would be a negative relation with the exemption and retaliatory actions. In short, the outcomes of the event studies for the producing companies indicate the possible outcomes of the regressions and the acceptance of hypotheses 1 and 2. The results are in line with the literature discussed in section 2. In the next section, the consuming companies are discussed.

5.1.2 Event study Consuming companies

Table 3b is presented below. In line with section 5.1.1, the cumulative abnormal returns are presented. This table exhibits the returns of the consuming industries (automotive industry, construction, and machinery & equipment, see 3.2.1).

Table 3b. Market reaction of Consuming companies

In this table the different cumulative abnormal returns are displayed of the consuming companies, with a total of 151 observations. The first column denotes the date of the announcement of the trade policy. The following columns display the different estimation windows used whilst calculating the CAR. The event column indicates the type of event. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Eventdate	CAR(-5,5)	CAR(-2,2)	CAR(-1,1)	Event
20apr2017	1.715%**	0.876%**	0.622%*	Protectionist
16feb2018	-6.343%***	-1.491%**	-0.501%	Protectionist
01mar2018	-3.261%***	-1.842%***	-0.532%	Protectionists
07mar2018	-0.782%	0.030%	0.007%	Exemption
22mar2018	1.184%	-0.267%	0.897%*	Exemption
23mar2018	1.028%	0.574%	-1.017%**	Retaliatory
30apr2018	-2.614%*	-1.502%*	-0.561%*	Exemption
01jun2018	2.278%***	0.094%	-0.153%	Exemption
20jun2018	-0.881%	-0.558%	-0.336%	Retaliatory
29jun2018	-1.693%***	-2.813%***	-1.810%***	Retaliatory
10aug2018	-1.291%	-2.618%***	-2.178%***	Protectionist
14aug2018	-0.273%	-0.368%	-0.374%	Retaliatory
17may2019	-5.966%***	-3.350%***	-3.115%***	Exemption

The first thing to notice in this table of consuming companies is that the results are overall less significant than in the table of the producing companies. As described in section 3.2.1, the portfolio of the consuming industries is composed of the industries that combined cover more than 80 percent of steel and aluminium importing businesses. However, it could be that at a more detailed level, some firms are not heavily exposed to foreign steel or aluminium or barely use steel and aluminium. The lack of significance with some events could be a limitation of this research. However, this is a realistic view of the overall loss of these importing tariffs cause. As a result, these tariffs do not hurt the consuming industries at a high significance level.

First, the protectionist events show an overall negative return for the consuming companies, with a higher significance in the broader event windows. This may be the result of slower market forces. For example, the market digests the information that some companies are hit indirectly by these trade tariffs and not direct, although Huang et al. (2018) show that a window of (-1,1) should be enough.

Second, the second hypothesis suggests that a retaliatory measure from a non-US country should not only hit the producing industry but could hit both due to tariff echoing, Breinlich (2016). Table 3b displays results that are in line with this hypothesis. All the returns are negative in most of the estimation windows. Additionally, the returns of retaliatory measures have a higher significance than the other event types. Therefore, these returns could support part of the second hypothesis this paper tests in section 5.2.

Figure 2 gives an insight into the relationships between the different measures for the consuming companies. Hence, the retaliatory policy shows similarities with the literature. For example, Breinlich (2016) states that protectionist measures have an opposite effect on the consuming industries due to retaliatory measures. Furthermore, the exemption and protectionist announcements give a negative return and underperform the market as well around the event day (0).

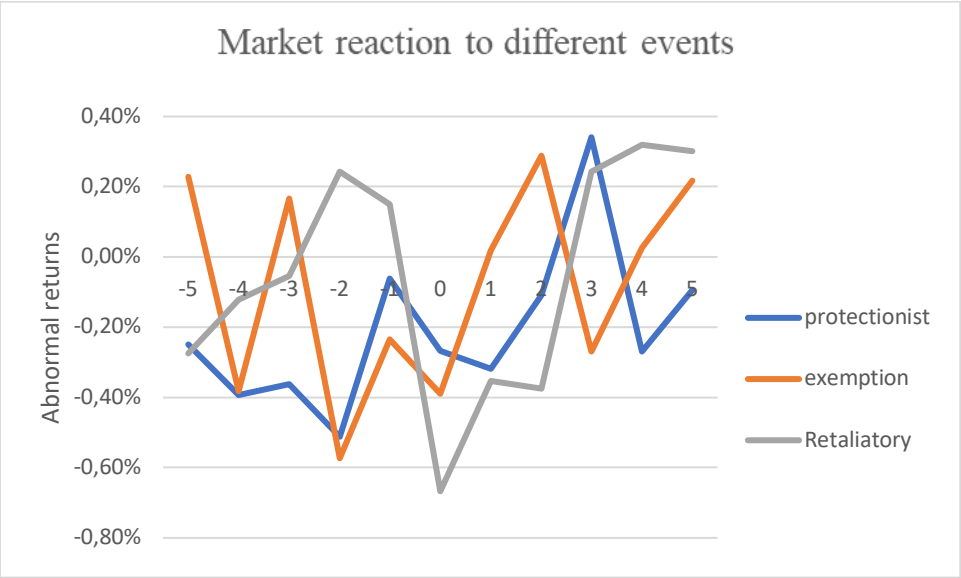

Figure 2 Consuming companies market reaction to different events

Subsequently, the returns for exemption announcements, exhibited in table 3b, display no clear support for the literature and for part of hypothesis 2. The signs of the returns are different over all events and have not much significance. The lack of significance and clear sign could be explained by the mix in different companies that are included in the consuming sample. However, this gives an honest view of how the consuming industries react to tariff exemptions. There is no clear outcome, and this suggests that there will not be significant results in the regressions for this trade war measure.

In contrary to the producing companies, the consuming companies display a less significant and clear result overall. As discussed before, this could be due to the sample in combination with the fact that the effect on consuming industries is less pronounced.

5.2 Results of the regressions

For the first and second hypotheses, the outcomes shown in table 4a and 4b for the producing and consuming companies. The methodology used to produce the tables 4a and 4b is described in section 4 of this paper. The selection process of the data is specified in section 3 of this paper. Furthermore, the event window used in the main regressions is (-1,1). First, because of the results exhibited in section 5.1 and because more recent papers about trade war events used this window (Huang et al., 2018). The main goal of hypotheses 1, 2a, and 2b is to capture the difference between different protectionist measures and their influence on steel and aluminium producers and consumers.

5.2.1 Hypothesis 1 – Protectionist

Hypothesis 1. Steel-consuming industries experience a negative stock return and producing industries experience a positive stock return after protectionist announcements of the US.

First, table 4 shows the regression of the CAARs of producing and consuming companies. As explained in the literature, the protected industry is likely to benefit from protectionist measures in the short run (Frankel and Romer, 1999 and Bown, 2004).

Table 4. Producing and consuming companies

Table 4 consists of 151 observations of events at different steel and aluminum producing companies and 352 observations of events at different steel and aluminum consuming companies. Columns (1)-(3) are the producing companies. Columns (4)-(6) the consuming. This table presents the results of the regression of the different trade policy announcements by the US and others during the trade war. The CAAR (-1,1) is used as the dependent variable in the regression. The independent variables used in this regression are dummies and are 0 or 1 if it is the action described. Furthermore, the control variables as described in the paper are included. The regression is controlled for year-fixed effects and tested for heteroskedasticity. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CAAR(-1,1)			CAAR(-1,1)		
Retaliatory	-0.0277*** (0.004)			-0.0016*** (-0.005)		
Exemption		-0.0117** (0.004)			0.0105*** (0.000)	
Protectionist			0.0451*** (0.003)			-0.0071*** (0.001)
control variables						
Run-up	0.0187	-0.0102	0,0032	0,01**	0,01**	0,01***
Exchange Rate	-0.0065	-0.0539***	-0.0412***	-0.0221***	-0.0136***	-0.0214***
leverage	0.0086	0.0001	0,0002	0,00	0,000	0,00
mtb	0.0019	-0.0013	0,0007	0,00	0,000	0,00
size	0.0001	0.0001	0,0000	0,00	0,000	0,00
roa	0.0006	0.0004	0,0024	-0,01	-0,007	-0,01
Constant	-0.0063	-0.0038	-0.0257	0.00	0.00	0.00
Fixed effects	YES	YES	YES	YES	YES	YES
R^2	0.4012	0.3431	0.7289	0.6630	0.7376	0.7010
Adj.R^2	0.3629	0.3046	0.7116	0.6544	0.7306	0.6931
N	151	151	151	350	350	350

In column 3, the coefficient shows a 4.5% increase in abnormal returns of producing companies in case of protectionist measures, supporting the literature. For example, Frankel and Romer (1999) and Bown (2004) amongst others find that the protected industries could benefit in the short run. The result is significant at the 99% level. Moreover, the window (-2,2) presents a positive coefficient of 3.74%, which demonstrates that this positive influence is robust (Appendix D). Furthermore, the (adjusted) R-squared in column three exhibits high explanatory power, thus the interpretation of these results is in line with the literature that argues that the

protection of the steel and aluminium industry would benefit these companies in the short run. Consequently, the market perceives this as a positive sign. However, this belief is contrary to other research, that states that in the long-term companies benefit from free-trade agreements more than protectionist policies. Therefore, it is argued that the market is more focused on the short-term gains the producing industry will receive. In short, the outcomes of this regression support part of this hypothesis, namely the producing industries experience positive stock returns after a protectionist announcement.

On the other hand, in column 6, the consuming industries experience a slightly negative abnormal return (-0.7%). However, in the appendix D, the window (-2,2) shows a -1.17% decrease in abnormal returns for the consuming industries. Additionally, the window (-5,5) shows a negative correlation of -3.37%. All these outputs are significant at the 99% level (see Appendix D and E). Additionally, the (adjusted) R-squared in column 6 is relatively high and therefore implies high explanatory power to the correlation. The economic meaning is that the market might not value the protectionist measures of the Trump administration to be positive for the consuming industries. As discussed earlier in the literature, a possible explanation could be that consuming industries, such as the automotive sector are paying more for their steel and aluminium imports. Therefore, the market perceives this as an increase in cost for the company. At last, the results from the different event windows give significant insight into the negative influence of the protectionist measures on consuming companies and thereby substantiate the hypothesis.

Producing firms show an increase in returns after protectionist announcements while consuming firms (automotive industry, construction, and machinery & equipment, see 3.2.1) produce negative returns. Therefore, hypothesis 1 is acceptable.

5.2.2 Hypotheses 2a & 2b – Retaliatory & Exemptions

In addition to hypotheses 1, this paper constructs 2 additional hypotheses to support and reinforce hypothesis 1. Since producing companies respond positive on protectionist announcements and vice versa, an exemption of this policy should have the opposite effect.

Hypotheses 2a. Both industries face negative stock returns if there is a retaliatory announcement of another country.

Hypotheses 2b. Consumers will face positive returns when a country is exempted from these trade tariffs whereas producers face negative stock returns after an exemption announcement.

To answer part 2a of this hypothesis, table 4 displays the outcomes of the retaliatory dummy in column (1) for the producing industries and in column (4) for the consuming industries. First, the producing companies CAARs give a negative correlation of -2.8% with the announcement of retaliatory measures aimed at the US, significant at the 99% level. Furthermore, the consuming companies display a small decline of 0.5%, significant at the 99%. This could be since the retaliatory tariffs are not aimed at all the industries chosen in the sample. Therefore, some industries show less/positive abnormal returns and soften the decline. However, there is still a significant decline in consuming companies, confirming the first part of the second hypothesis.

To answer the second part of this hypothesis, a dummy is constructed for the announcement of exemptions granted to certain countries by the US. In column (2) for the producing companies and column (5) for the consuming companies. The returns of the producing companies display a negative coefficient: -1.2%, significant at the 95% level. The economic interpretation of this effect is simple: there is less protection for the steel and aluminum industry from certain countries, they produce steel and aluminium at a lower cost. For example, Brazil and Mexico have been exempted from tariffs (see appendix A for a detailed list of exemption announcements).

Table 5. Producing and consuming companies

Table 5 consists of 151 observations of events at different steel and aluminum producing companies and 352 observations of events at different steel and aluminum consuming companies. Column (1) are the CONSUMING companies. Column (2) the PRODUCING. This table presents the results of the regression of the different trade policy announcements by the US and others during the trade war. The CAAR (-1,1) is used as the dependent variable in the regression. The independent variables used in this regression are dummies and are 0 or 1 if it is the action described. Furthermore, the control variables as described in the paper are included and the (adjusted) R-square is noted. The regression is controlled for year-fixed effects. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively

	(1)	(2)
Variable	CAAR(-1,1)	CAAR(-1,1)
Retaliatory	-0.0095*** (0.001)	-0.0187***(0.003)
Exemption	Omitted	omitted
Protectionist	-0.1175*** (0.001)	0.0463***(0.004)
Controls	YES	YES
Fixed effects	YES	YES
N	350	151
R^2	0.7451	0.7295
Adj.R^2	0.7375	0.7101

In contrast to the producing companies, and line with the hypothesis, the returns of the consuming companies are positively related to tariff exemptions. With the announcement of an exemption, the CAAR of consuming companies rose with 1.1% and is highly significant (99% level). Therefore, the second part of the hypothesis is confirmed too. From an economic perspective this compatible with the literature, for example with Breinlich (2016). This paper showed that lower tariffs as a result of the CUSFTA agreement lead to an increase of 1.2% in increased yearly profits of Canadian manufacturing firms, similar to the outcome of this hypothesis.

As previously stated, the hypotheses 2a and 2b are confirmed by the empirical research (table 4). The outcomes of these tests further strengthen the influence of protectionist measures and the exemptions of these on consuming and producing industries. Additionally, the retaliatory tariffs hit both industries, and endorse the evidence that protectionist measures are not the ultimum remedium to strengthen an industry. Furthermore, the switch from a (highly significant) negative return to a positive return and vice versa with a protectionist measure or an exemption of these measures amplifies the evidence on how the market perceives these trade policy announcements. Hence, hypotheses 2a and 2b are accepted. In section 5.2 the robustness of these results will be discussed in more detail.

5.2.3 Comparing different measures

This section will touch upon the differences between the measures used in this trade war. For research purposes and a comparison with the literature, it is relevant to see what type of announcement has the most influence on the regression model. Hence, the paper uses the R-squared as a descriptive measure for the level of correlation between the observed value and the fitted value line in this linear regression. The R-squared is the explained variation divided by the total variation. The variation results in a percentage between 0-100.

Furthermore, table 5 displays the different measures included in one regression. The R-squared is higher than the separate regressions (0.73) for producing and 0.1for consuming companies) and therefore has a higher explanatory value combined. The omitted variable here is the exemption variable, due to collinearity with the retaliatory variable. This finding is in line with the hypothesis, that both these announcements have a negative influence. To compare the differences in explanatory power, a fixed-effects test is conducted.

Subsequently, a Fixed effects test is conducted and displayed in table 6 below. In this table the CAARs are regressed on variables that are added gradually. The first and second column of both the consuming and producing industries do not show significant results for the F-test statistic, however, for the producing companies fixed effects have already an explanatory power of 19.62%, and for consuming companies 51.4% respectively. This explanatory power only increases modestly whilst including the control variables as mentioned in section 4.2.2 and the

F-tests are not significant. In contrast to rows (1) and (2) of both samples, the rows (3)-(5) in both samples give highly significant results for the F-tests, and therefore the fixed effects that are added in these rows are highly jointly significant.

Table 6. Fixed Effects

This table reports the joint significance of the fixed effects in the regression models of both the producing and consuming companies cumulative average abnormal returns. Controls used are the controls described in section 4.2.2. The tariff measures are gradually included in row (3)-(5). F-statistics are presented for the joint significance of the firms Fixed effects. In the parentheses the p-value is included. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively

Row	Controls	FE F-test	N	R^2	Adj.R^2
Producing					
(1)	none	0.00 (-)	151	0.2069	0.1962
(2)	control variables	1.40 (0.2170)	151	0.2486	0.2052
(3)	Protectionist, controls	30.44***(0.0000)	151	0.6531	0.6335
(4)	Retaliatory, protectionist, controls	64.86***(0.0000)	151	0.7295	0.7101
(5)	Exemption, retaliatory, protectionist, controls	64.86***(0.0000)	151	0.7295	0.7101
Consuming					
(1)	none	0.00 (-)	350	0.5172	0.5144
(2)	control variables	12.76***(0.0000)	350	0.6593	0.6513
(3)	Protectionist, controls	34.84***(0.0000)	350	0.7010	0.6931
(4)	Retaliatory, protectionist, controls	36.21***(0.0000)	350	0.7451	0.7375
(5)	Exemption, retaliatory, protectionist, controls	36.21***(0.0000)	350	0.7451	0.7375

Consequently, adding the protectionist variable in a row (3) gives an extra explanatory power of 45.5% in the regression with the producing companies. The consuming companies see an increase of 18.3% in explanatory power when the protectionist variable is added. This is in line with the results we found before, that the protectionist variable is highly significant and has a high impact on the returns, and that the producing industry is more exposed to this kind of announcements than the consuming industries. Again, this can be explained due to the increase in short term profits for the protected industries (Frankel and Romer,1999 and Bown, 2004). Furthermore, when we add the retaliatory variable, only a modest increase of explanatory power is reached within the producing sample (7.6%), again with a highly significant F-test. On the contrary, the consuming sample changes 4.41% in explanatory value. This could be explained since retaliatory measures are influencing both industries, as shown in the results of hypotheses 1 and 2. As expected from table 5, the addition of the exemption measure does not change the

explanatory power and all numbers remain the same in both panels. This is due to the collinearity of the exemption and retaliatory variables.

To summarize, the addition of the different trade instruments does increase the explanatory value of both the regressions and is highly significant. The added trade policy variables can add significantly more explanatory value, whereby the Retaliatory variable is most prominent with the consuming panel and the protectionist variable within the producing panel. The overall explanatory value is more pronounced within the producing companies, probably since all announcements are directly linked to the steel and aluminium producing companies and just indirectly linked to the consuming companies.

5.2.4 Hypothesis 3 – R&D

Hypothesis 3. Steel-producing industries spent less on R&D as a result of events in the trade war, as a result of the protection they receive from the US government.

Hypothesis three is based on the paper of Lenway, Morck, and Yeung (1996) and is about the change in R&D expenses. In the foregoing literature the influence of protectionism on trade tariffs, a decline in R&D expenses is one of the main effects of protectionist measures. The incentive to innovate declines as a result of the protectionist measures, because their business is protected anyway. Figure 3 displays the year on year percentage change in R&D/Assets of the producing companies sample.

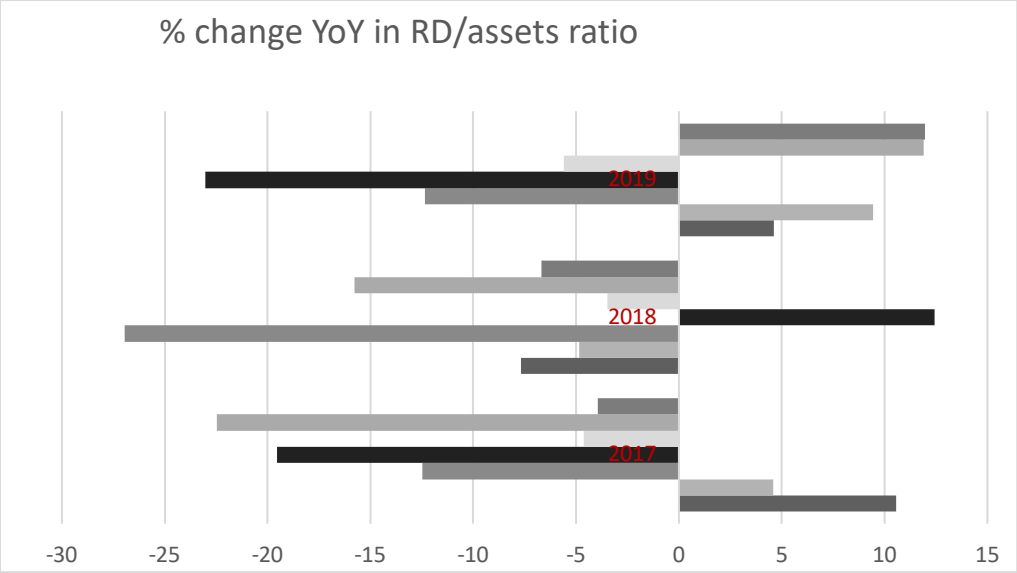

Figure 3. Year on Year percentage change in RD/Assets ratio within the producing companies

As figure 3. Displays, there is a clear decline of the spent in research and development relative to the assets of the company. Since the start of the trade war in 2017, companies started to invest relatively less in their R&D than the year before. At first sight, this figure supports the findings of Lenway, Morck, and Yeung (1996). To see if there is a correlation between the abnormal returns of the trade war and the R&D a regression is conducted and displayed below in table 7. In this regression, all control variables used in the regressions before are included (for a detailed description see section 4.2.2)

Table 7. R&D

Table 7 consists of 151 observations of events, including steel producing industries. This table presents the results of the regression of the R&D variable and CAARs. The CAAR (-1,1) is used as the dependent variable in the regression. Furthermore, the control variables as described in section 4.2.2 are included. The regression is controlled for year-fixed effects and heteroskedasticity. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	CAAR(-1,1)
R&D/Assets	0.3661 (1.454)
Controls	YES
N	151
R^2	0.2616
Adj.R^2	0.0995

As shown in table 7, the results of the regression do not deliver significant results. The p-value is 0.147 and thus not significant. The result could be explained since there is not a sufficient amount of data available for this topic, as some firms do not have quarterly data available. In addition, the different events follow each other closely sometimes and are therefore influenced by the same R&D ratio. As a result, it is difficult to say if the results nowadays are in line with Lenway, Morck, and Yeung (1996), who state that by rewarding this poor industry performance, there is a lack of intention to innovate, and the hypothesis.

It could be argued that they are similar when looking at the results in figure 3. However, it could also be argued that the downward trend of the steel industry in the US overall is part of the problem of innovation as well and is therefore difficult to test.

5.2.5 Hypothesis 4 – Political motives

Hypotheses 4. Production companies that have a majority of production facilities in a 'swingstate', see a positive influence on their stock returns after US initiated events.

For the fourth and last hypothesis the dummy "swingstate*InitiatedUS" is tested along with all the control variables used in the regressions before and mentioned in section 4.2.2. The results of the regression are displayed in the table below. As shown, the fact that a company has its majority of production facilities in so called 'swingstates' gives a positive coefficient of 1.48%. This result is significant at the 99% level. Hence, the outcome of this regression is in line with the literature and hypothesis 4. Further robustness checks have been conducted, for example testing with all events did not give any significant results, advocating for the fact that there is a clear US trade policy influence on these "swingstates".

Table 8. Swingstate

Table 8 consists of 151 observations of events, including steel producing industries. This table presents the results of the regression of the swingstate*InitiatedUS. variable and CAARs. The CAAR (-1,1) is used as the dependent variable in the regression. The swingstate*initiatedUS variable is explained in section 4.2.1. Furthermore, the control variables as described in the paper are included. The regression is controlled for year-fixed effects and heteroskedasticity. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

Variable	CAAR(-1,1)
Swingstate*InititatedUS	0.0148*** (0.0048)
Controls	YES
N	151
R^2	0.3037
Adj.R^2	0.2593

First, Grossman and Helpmann (1994,1995) showed the impact of domestic politics on the trade policy of certain countries, which is in line with the current situation, as Trump favored the national sentiments of industry workers in swing states. Second, Fetzer and Schwarz (2019) find out that retaliatory tariffs of the EU and China are aimed at industries in Trump-voting states. On the other hand, this paper adds to this theory that US-initiated events try the opposite; stimulating the steel industry in these states. The most prominent literature on this topic is from

Ma and Mclaren (2018), who find that US trade policy is mainly biased towards the industries that are incorporated in swing states. The outcomes of this regression are in line with the findings of Ma and Mclaren (2018), the positive coefficient for swingstates shows a clear bias towards swing states in US-initiated trade events, again advocating for the political bias these trade policies have.

5.3 Robustness checks

For an event study, the robustness of the results is derived from the significance of the cumulative abnormal returns. Therefore, these will be tested with a common Student T-test. The problem is that the t-test is prone to event-induced volatility. Additionally, from the research of Fama (1976) who argues that returns who are estimated on a day-to-day basis are more skewed to the tail of the distribution, and therefore are different from the normal distributions. Event induced volatility arises in this paper when we cluster the events when calculating the CAARs. Therefore, it could happen that the std. dev. is biased downwards, and therefore gives a T-statistic that is too high. Hence, a non-parametric test is suggested because it would be more powerful and trustworthy than a T-test for smaller samples it is more safe to select the Wilcoxon test. Besides, the Wilcoxon test considers event induced volatility. In this case, a Wilcoxon Signed rank test is added in table 9.

Table 9. Significance tests

Table 8 displays the statistics of the sign tests conducted in line with the Wilcoxon signed-rank test (Bown and Crowley, 2006) and the T-statistics in columns 2 and 4. These statistics are calculated for the CAR event window (-1,1). The P-value is denoted in the parentheses in the Wilcoxon signed rank test.

	Student T-test T-statistic		**Wilcoxon signed-rank test, Z-value**	
Eventdate	**Consuming**	**Producing**	**Consuming**	**Producing**
20apr2017	1.6475	4.9192	1.970(0.05)	2.547(0.01)
16feb2018	-1.0051	1.4406	-1.345(0.18)	1.490(0.13)
01mar2018	-0.7977	3.4823	-1.898(0.06)	2.746(0.00)
07mar2018	-0.8783	-3.1075	0.889(0.37)	-2.432(0.01)
22mar2018	1.7342	-1.4060	1.970(0.05)	-1.255(0.20)
23mar2018	-2.2433	-7.6176	-2.354(0.02)	-3.059(0.00)
30apr2018	-0.9569	-3.9372	-0.961(0.33)	-2.903(0.00)
01jun2018	-0.2240	-1.1512	-0.961(0.33)	-0.941(0.34)
20jun2018	-0.6621	-2.8138	-0.889(0.37)	-2.589(0.00)
29jun2018	-4.8517	-1.3665	-3.868(0.00)	-1.177(0.23)
10aug2018	-5.3249	-1.2282	-3.892(0.00)	-1.177(0.23)
14aug2018	-0.7959	-3.9267	-1.025(0.30)	-3.059(0.00)
17may2019	-4.8388	-5.4655	-4.238(0.00)	-2.803(0.00)

There is a clear difference between the T-statistics from the standard T-Test and the Signed Rank test Z-values. Overall the Z-values show less significance, however, they are still significant and display the same sign as the T-test values. the fact that the Wilcoxon signed-rank test does not rely on a normal distribution, could be the reason for a less significant outcome.

Second, the robustness of the results in event study literature is tested by changing the event window, which is displayed already in section 5.1.1 for the producing companies and section 5.1.2 for the consuming companies.[15] As mentioned before, almost all signs match each other. However, there are some differences within the significance levels, and therefore the window (-1,1) was chosen.

Third, the regressions are controlled for year fixed effects. The outcomes of the regressions did not change if there was a control for industry fixed effects, presumably since the industries are roughly the same.

[15] See tables 3a and 3b.

6 Conclusion

6.1 Summary & practical implications

Donald J. Trump clearly broke with the Republican "free trade above all" mindset. In fact, it was one of his main campaign outings, to restore jobs in states that are heavily reliant on industries, such as steel and aluminium producers. To answer the research question: ***What is The influence of the US protectionist trade policy on US domestic steel and aluminum producing and consuming businesses?***, this paper conducts empirical test that provide an insight in the different reactions of these business on certain trade war events. Based on the literature, an empirical test for a political explanation of the US protectionist measures is conducted.

To gain a better understanding of the economic implications, the literature discussed in this paper has shown a clear favour for free trade policies. For example, the paper by Breinlich clearly shows an increase in profits when trade barriers are removed. However, as we have seen in literature by Frankel and Romer (1999) there is some benefit for the protected industries in the short run, but on the other hand, retaliated industries and industries that are consuming these products are hit.

In this paper these effects have been captured by the first two hypothesis, where the different trade policy announcements regressed on stock returns gave results in line with the free trade theory. First, the paper shows that consuming industries indeed do not benefit from these protectionist measures in the first place and that producing industries do benefit. On the contrary, when certain countries are exempted from these tariffs the tables are turning and confirms the influence of the existence of these protectionist measures on both the consuming and producing industries. The paper adds to the literature that there is a clear distinction in how producing and consuming industries are hurt or benefit from certain announcements. Additionally, when other countries retaliate, the stock market interprets this as an overall loss. This is the moment where a trade war goes into the following stage, from gains in the short term, to an overall loss in the long run as shown by Bollen and Romagosa (2018).

Second, the paper takes displays an empirical research to a negative externality: the decline in R&D spending in the sector, inspired by the paper of Lenway, Meurck and Yeung (1996). At first, the data that was used showed a clear decline in R&D expenses relative to total assets by steel producing companies. However, there was insufficient evidence that the trade war events are related to this decline in R&D.

Third, the trade war announcements initiated by the US are used to see if these are supportive for companies that have their majority of production facilities in so called “swingstates”. The answer to this question finds an explanation for the incentives of protectionist measures, besides the financial gains in the short run. This is explained before in the literature by Fetzer and Schwarz (2019), who focus on retaliatory announcements. The focus of this paper is on US initiated policy. The paper adds to the literature that the choice to protect the steel industry could be merely political, because 8 out of 13 US steel and aluminium producers are Headquartered in such states. Besides, the regression shows a clear positive influence of swingstates on returns.

In short, the paper displays a clear influence of the different trade war announcements on the steel consuming and producing industries in the US. Further, the paper adds an extra possible explanation for protectionist measures within the steel and aluminium industry: domestic politics. Therefore, Donald Trump clearly is not putting America first, as we have seen in the outcomes of the empirical part. It should

6.2 Limitations and further research

An event study always has its limitations, and it is no different with this research. The main limitation is that the empirical part of this research is focused on the stock market and its interpretation of trade war events. This is only a small part of the total social and economic effects this trade war has. Therefore, further research could focus on the overall loss for society as a result of the trade war, and not just the reaction of the stock market. For example, Hufbauer et al. (1986) did extensive research on the results of protectionist measures. This resulted in hefty efficiency losses to society. It would be interesting to repeat this research in the current trade war.

Numerous articles have been published around the trade war of the Trump administration. Therefore, a lot of research has been done already. However, besides R&D, Lenway, Meurck and Young (1996) come up with another explanation for protective industries: lobbying. It would be interesting to see if there is a correlation between lobby expenses and protected industries.

Subsequently, further research could focus on one of the main goals of the Trump administration is his slogan: Make America Great Again. This is frequently referred to keep jobs inside the US and this is one of the main drivers of the protectionist policy Trump pursues. The paper of Pierce et al. (2016) finds that there is a negative correlation between the shift in trade tariffs and employment in the US manufacturing industries, but it would be interesting to repeat this paper after the trade war is over.

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APPENDIX A: Event list of the Aluminium and Steel trade war

This list focusses on events that affect the steel and aluminium consuming and producing industries in the USA. The events are inspired by the Peterson Institute for International Economics (PIIE) and their researchers Bown and Kolb.

Date	Event	Description	Issuing country	Source
April 20, 2017	National Security investigations commence	Do imports of steel threaten US national Security?	USA	Department of Commerce
February 16, 2018	Results National Security investigations Commission	Imports of steel threaten US national Security	USA	The Department of Commerce
March 1, 2018	Announcement of tariffs on steel (25%) and aluminum (10%)	Tariffs on all trading partners of the US	USA	The White house
March 7, 2018	Trump exempts Canada and Mexico, other partners can file for exemption as well	The white house awaits the outcome of the NAFTA trade talks	USA	The White House
March 22, 2018	Exemptions on the steel and aluminum tariff for EUR, Korea, Brazil and Australia.	In addition to Canada and Mexico, there are more exemptions made totaling 1/3 of countries is exempted	USA	The White House
March 23, 2018	China proposed a list of 128 products as a retaliation on US tariffs	Trade tariffs worth 2.4 billion	China	Chinese Government
April 30, 2018	US extends Tariff exemptions	Tariffs exemptions are extended for the countries	US	The White House

		except South Korea		
June 1, 2018	US ends Tariff Exemptions for EU, Canada and Mexico	Other countries like Argentina, Brazil get quotas in exchange for tariff exemptions	US	The White House
June 20, 2018	EU impose retaliatory tariffs on 3.2 billion USD on US goods	Products include steel and aluminum for 34%, and motors and boats amongst others	EU	The European Commission
June 29, 2018	Canada imposes tariffs on 12.8 billion USD of US goods from 1 July onwards.	Products include 50% steel (at a 25% tariff) and aluminum. Consumer goods make up for 24% of these tariffs.	Canada	The Canadian Department of Finance
August 10, 2018	US increases the tariff for steel from 25% to 50% in response to the depreciation of the lira		USA	The Department of Commerce
August 14	Turkey retaliates and imposes tariffs more US products	Products include Cars, Tobacco and consumer products.	Turkey	Turkish Government
May 17, 2019	US lifts tariffs on Canada and Mexico	To boost the new NAFTA trade agreement all countries postponed their tariffs	USA, Canada, Mexico	Joint statement USA, Canada, Mexico

	India retaliates after losing special trade status	India implemented retaliatory tariffs on Steel, aluminum and Food products		Indian Government
January 24, 2020	Trump imposes new tariffs on 450 million USD	Tariffs mostly hit allies Taiwan, Japan and the EU but China as well	US	The White House

APPENDIX B: List of industries

Consuming/Producing	**Industry**	**Code used**
Producing	Steel	15104050
Producing	Aluminum	15104010
Consuming	Automobiles and Auto components	25102010
Consuming	Building products	20102010
Consuming	Construction & engineering	20103010
Consuming	Auto Components	25101010
Consuming	Aerospace and defense	20101010
Consuming	Industrial machinery	20106020
Consuming	Construction machinery	20106010
Consuming	Industrial conglomerates	20105010

APPENDIX C: Variable list

Variable	Description	source
Dependent Variables		
CAR	Dependent variable| Cumulative abnormal return of the acquiring firm stock over the event window (-1, +1) surrounding the announcement date. The return is calculated using the market model with the benchmark being the CRSP value weighted index. The model parameters are estimated over the (-220, -21) period prior to the announcement.	CAR calculation, Compustat/stata
BHAR	Dependent variable| BHAR is the difference between the buy price and sale price in between the holding periods.	Compustat/stata
Independent variables		
PROTECTIONIST,	Dummy variable that is 1 if the event is marked as a protectionist event.	Various governments
RETALIATORY	Dummy variable that is 1 if the event is marked as a retaliatory event.	Various governments
EXEMPTION	Dummy variable that is 1 if the event is marked as a retaliatory event.	Various governments
Swingstate*InitiatedUS	The swingstate dummy is 1 if the company has the majority of its manufacturing plants in one (or more) of the following states: Colorado, Florida, Iowa, Michigan, Minnesota, Nevada, New Hampshire, North Carolina, Ohio, Pennsylvania, Virginia, and Wisconsin. Can only be 1 if the event is initiated by the US.	Government websites.

R&D/Assets	the R&D expenditures divided by the firms total assets. This is in line with the paper of Lenway, Morck, and Yeung (1996).	Compustat
Control variables		
SIZE	LN of the market value of the firm's equity 11 days before the announcement date in $US dollar million.	Compustat
EXR	The average exchange rate between 2017 and 2019 is calculated, then, this average is subtracted by the average exchange rate in the year of the specific announcement and is then divided by the average exchange rate. because there is a link between stock prices and the exchange rates (Gupta, Chevalier and Sayekt, 2000) small details matter	Bloomberg
LEVERAGE	The sum of the firm's long-term debt and short-term debt divided by the market value of its total assets measured at the end of the fiscal year prior to the acquisition.	Compustat
MTB	Market value of the firm's assets divided by book value of its assets for the fiscal year prior to the announcement. The market value of assets is equal to book value of assets plus market value of common stock minus book value of common stock minus balance sheet deferred taxes.	Compustat
ROA	Return on assets of a firm.	Compustat

APPENDIX D: Regression CAAR (-2,2)

Table 10. Producing and consuming companies

Table 4 consists of 151 observations of events at different steel and aluminum producing companies and 352 observations of events at different steel and aluminum consuming companies. Columns (1)-(3) are the producing companies. Columns (4)-(6) the consuming. This table presents the results of the regression of the different trade policy announcements by the US and others during the trade war. The CAAR (-2,2) is used as the dependent variable in the regression. The independent variables used in this regression are dummies and are 0 or 1 if it is the action described. Furthermore, the control variables as described in the paper are included. The regression is controlled for year-fixed effects and tested for heteroskedasticity. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CAAR(-2,2)			CAAR(-2,2)		
Retaliatory	-0.0038***			0.0075***		
	(0.004)			(0.001)		
Exemption		-0.0446**			0.0041***	
		(0.005)			(0.001)	
Protectionist			0.0374***			-0.0117***
			(0.004)			(0.001)
control variables						
Run-up	0.0007	-0.089	0.0100	-0.0180**	-0.0162**	-0,0138***
Exchange Rate	-0.0284***	-0.0745***	-0.0342***	-0.0319***	-0.0203***	-0.0214***
leverage	0.0000	-0.0004	0.0005	-0.0006	0,0006	-0.0005
mtb	0.0019	-0.0018	0.0022	-0.0006	0,0006	0.0004
size	0.0001	0.0001	0.0000	0.0001	0,0002	-0.0002
roa	0.0006	0.0006	0.0007	-0.0172	0.0150	0.0119
Constant	0.1708***	0.4913***	0.1999***	0.1980***	0.1233***	0.1346***
Fixed effects	YES	YES	YES	YES	YES	YES
R^2	0.2554	0.5654	0.4910	0.5313	0.4914	0.6016
Adj.R^2	0.2079	0.5376	0.4585	0.5195	0.4786	0.5916
N	151	151	151	350	350	350

APPENDIX E: Regression CAAR (-5,5)

Table 11. Producing and consuming companies

Table 4 consists of 151 observations of events at different steel and aluminum producing companies and 352 observations of events at different steel and aluminum consuming companies. Columns (1)-(3) are the producing companies. Columns (4)-(6) the consuming. This table presents the results of the regression of the different trade policy announcements by the US and others during the trade war. The CAAR (-5,5) is used as the dependent variable in the regression. The independent variables used in this regression are dummies and are 0 or 1 if it is the action described. Furthermore, the control variables as described in the paper are included. The regression is controlled for year-fixed effects and tested for heteroskedasticity. The symbols ***, **, and * denote significance at the 1%, 5%, and 10% levels, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	CAAR(-5,5)			CAAR(-5,5)		
Retaliatory	-0.0017			0.0110***		
	(0.003)			(0.002)		
Exemption		0.0029			0.0239***	
		(0.004)			(0.002)	
Protectionist			-0.0011			-0.0336***
			(0.003)			(0.002)
control variables						
Run-up	-0.0029	0.0029	0,0032	-0.0416***	-0.0324***	-0.0298***
Exchange Rate	-0.0251***	-0.0232***	-0.0262***	-0.0133*	0.0254***	0.0083
leverage	0.0001	0.0001	0,0002	-0.0014	-0.0012	-0.0011
mtb	0.0017	-0.0006	0,0007	-0.0014	-0.0001	-0.0010
size	0.0001	0.0002	0,0000	0,0000	-0,0002	0.0003
roa	0.0002	0.0002	0,0024	0.0423	-0.0307	0.0275
Constant	0.1330***	0.1403***	0.1189***	0.0712	-0.1865	-0.0534
Fixed effects	YES	YES	YES	YES	YES	YES
R^2	0.5910	0.5925	0.5906	0.3726	0.4656	0.6049
Adj.R^2	0.5649	0.5665	0.5654	0.3568	0.4522	0.5950
N	151	151	151	350	350	350

APPENDIX F: Correlation Matrix.

Table 12. Correlation matrix.

	Variable of interest					Control variables					
	CAAR (-1,1)	**protectionist**	**exemption**	**retaliatory**	**Swingstate**	bhar	leverage	EXR	mtb	size	roa
CAAR(-1,1)	1.0000										
Protectionist	0.7959	1.0000									
exemption	0.3075	0.5145	1.0000								
retaliatory	0.4606	0.4448	0.5391	1.0000							
Swingstate	0.2941	0.2833	0.3251	-0.6179	1.0000						
bhar	0.1080	0.0539	0.2440	0.2019	-0.0858	1.0000					
leverage	0.0445	0.0411	0.0172	0.0224	-0.1533	0.2296	1.0000				
EXR	0.0796	0.1616	0.2698	0.1231	-0.0913	0.1357	0.0498	1.0000			
mtb	0.1053	0.0966	0.0547	0.0377	-0.0516	0.0735	0.6992	0.0823	1.0000		
size	0.0433	0.0401	0.0146	0.0242	0.0913	0.1981	0.8461	0.0540	0.6776	1.0000	
roa	0.0193	0.0201	0.0385	0.0600	-0.0272	0.0595	0.1417	0.1389	0.3324	0.2196	1.0000

APPENDIX G: Variance inflation factor

Table 13. Variance inflation factor

Variable	**VIF**	**1/VIF**
leverage	4.58	0.2184
size	3.79	0.2639
mtb	2.64	0.3783
retaliatory	2.22	0.4495
Swingstate	1.89	0.5290
exemption	1.59	0.6276
roa	1.23	0.8116
bhar	1.23	0.8160
EXR	1.18	0.8441
Mean VIF	2.26	