Trump’s Trade Tariffs

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Abstract

Since the Inauguration of Donald Trump in January 2017, the president has kept himself busy, & the U.S. policy with regards to international trade has been no exception. The U.S. has imposed import tariffs on products such as steel, aluminium, solar panels and more. In November of 2017, Trump also started a full out trade war with China. Economic theory has widely supported free trade and studies have demonstrated that it is beneficial for all, meaning that Donal Trump's policy challenges existing literature. While welfare has been demonstrated to decrease for economies establishing import tariffs, little research had been conducted on the financial implications of import tariffs to the private sector. After exploring pre-existing literature to establish a set of expectations, this research establishes a framework for announcement day returns (41 event days are evaluated where new information was announced by official sources relating to import tariffs) for the stock market as a whole as well as for the specific affected industries in question. Primarily, this is done through constructing and evaluating a subset of models for a cross sectional analysis of the returns on event days. The following regressors are used (1) value of tariff, (2) momentum, (3) which country announcing the news (China/U.S./other), (4) if the announcement relates to a trade war, (5) the proximity to the U.S.. Additionally, the effects of the tariff announcements are measured on the specific industries using event studies to determine if the market perceives the protected domestic industries as “winners" and the domestic consuming industries + foreign producers as “losers”. The preliminary results of this research support the economic theory and demonstrate that the announcements have had a negative impact on the private sector returns. Additionally, evidence is provided that domestic “winners" have experienced positive abnormal returns around event days whereas “losing" industries have experienced negative abnormal returns on average. This demonstrates that the tariffs have benefited a few companies at the expense of many.

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Preface:

I'd like to take this opportunity to thank a certain number of people who helped me complete this research paper.

Firstly towards my colleagues & close friends, you may have not been directly involved in contributing towards this thesis, but you helped me more than you can imagine by picking up certain responsibilities I had to hand over which has allowed me to invest the many needed hours of work into this thesis. I thank you for the support & wish to return the favour to you soon.

Secondly, I'd like to thank my supervisor for being accommodative to my ideas & working style. I have to admit, you have helped more than you can imagine by allowing me to be flexible & write this thesis later into the year when I had more time available. Additionally, you encouraged me to pick a subject I found interesting which I would be happy to research, & now that I have finished this thesis, I can say that I have learned new things which I plan to use in my professional career. Thank you for that!

Finally, I'd like to thank my family for giving me the opportunity to study in a prestigious university and school. The Erasmus School of Economics at the Erasmus University of Rotterdam has helped me establish great career opportunities & it is your hard work and sacrifices that have allowed me to gain a step up in my life. I appreciate everything you have done for me over the years & promise to make the most of it!

1. Introduction

Import Tariffs have been on the decline globally over the past century. Many Economic models & theories have been built around the topic & all show that countries benefit from free-trade. Countries have worked on building diplomatic ties to encourage free-trade and as such have created the global economy in which we live in today. In January of 2017, a controversial figure entered world politics when they were inaugurated as the 45th president of the United States. Donald John Trump, was elected after a radically unique campaign which promised many reforms especially in terms of foreign affairs. Trump has maintained a policy of putting "America First" & to "Make America Great again", & one of the promises of his campaign to do so, was to take action & reduce the size of the USA's ever increasing trade deficit. The Trump administration has used the available economic instruments of trade policy (primarily import tariffs) to reduce the quantity of imports & to protect domestic industries.

The Trump Administration has broken records in terms of the amount of announcements that have been made relating to the implementation of new or higher import tariffs. In a period of under 18 months, more than 50 announcements have occurred. Some of the specified import tariffs have focused on the import of specific products to protect different industries (e.g. Solar Panels), some tariffs have been targeted at specific countries (e.g. Trade War with China) & others have been used as threats if certain conditions are not met by other countries (e.g. Putting a stop to illegal immigration from Mexico).

The nature of the economic policy of the Trump Administration has presented an interesting opportunity to measure the impact of Import Tariffs on Financial Markets. Firstly, a large number of events can be studied over a short-time frame (50 events in 18 months) occurring in one specific country. This means that the effect of the import tariffs can be measured without needing to adjust the returns for long-term trends (changes from a bull to a bear market or a sudden crisis) or geographical factors (all focused on the economic policy of one country). Secondly, the USA is the largest Global economy & should therefore not exclusively bear the cost of the implemented tariffs but share it with the exporting countries as well by lowering global prices *(Krugman, Obstfeld, & Melitz, 2018).* This presents an opportunity to observe if the USA exhibits the behaviour of a large economy. And finally, with the introduction of new technology markets have become more efficient than ever, meaning that events which have a Financial Impact should be instantaneously reflected in their respective prices.

This brings us to the central research question of this paper, which is to study:

"What effect has the Trump Administration's economic trade policy had on the Financial markets in question?"

2. Literature Review

2.1. Efficient Market Hypothesis

Concepts that led to the "Efficient Market Hypothesis" date back to the 16th Century, when an Italian Mathematician published a book on the fundamentals of gambling and how players have equal conditions (information) *(Sewell, 2011)*. For the purpose of this research, only literature written after the introduction of the modern definition of the concept by Fama in 1970 will be reviewed. The Efficient Market Hypothesis (EMH), states that all information that is available is always directly processed by the market & represented by the asset's respective price. As such, assets are consistently available at their true value & an individual trader can not outperform the market through superior knowledge of market trends. The only possible method to do so would be to take on a portfolio with a larger exposure to risk, & outperform through sheer luck. *(Fama, 1970).* While researching the topic, Fama relaxed the assumption that ultimately no arbitrage opportunities exist & introduced three subsets of market efficiency to be able to measure the efficiency of the market in three levels.

In the Weak-form of efficiency, Fama stated that no information relevant to predicting future prices can be derived from historical data (the present stock prices reflect all historical price data). Investors are able to outperform the market through technical or fundamental analysis. This means that the prices follow a random walk (increase or decrease completely random). Although as the market is efficient, opportunities for "arbitrage" seize to exist. (*Fama, 1970).* The Semi-Weak follows a similar logic to the weak form of Market Efficiency, but in addition to historical data, all publicly accessible information respective to stocks (Profit/Loss reports, News announcements, etc.) is also processed immediately by the market. In the Semi-Weak form only private information could be acted on by an individual investor to outperform the market. In the strong form of Market Efficiency, all information that exists (historical, public & private data) is represented by a particular asset's current price, meaning that no arbitrage opportunities exist at all.

Issues with the Efficient Market Hypothesis have been raised, namely the existence of other factors (factor investing) which can be exploited to outperform the market without increasing risk. Investors tend to act irrationally, creating inefficiencies in the market that can be systematically used to beat it, implying that the perfect efficiency of the market does not hold.

One example of such an inefficiency is the momentum factor, which disputes the concept of market efficiency even in its weakest form. The Momentum factor indicates that historically well performing stocks will have the tendency to continue doing. A portfolio holding recent winners will boast a significant alpha over a portfolio holding recent losers, and this effect has been proven to be significant across geographical markets & industries (*Jegadeesh, Titman, 1993*).

In this thesis, the returns on days in which announcements have been made relating to the international trade policy of the United States of America (USA) are analysed to determine if the there were abnormal returns. All event days are marked on the first accessibility of the information to the general public with the respective stock return of the closing price of the stock/index in question. Under the logic of the Efficient Market Hypothesis in the semi-strong & strong form, the significance of the announcements should be instantly reflected on the price of the asset in question. Therefore it can be assumed that to measure the effect of the announcements, the return on the same trading day of the announcement should be examined.

2.2.Event Studies (Models)

To measure the effects of particular events on the share price of firms, economists use the practice of event studies. Under the assumptions of the Efficient Market Hypothesis, all new information should be reflected in the capital market. Therefore a new significant event should directly cause a reaction in the market & impact the price of an asset. As the value of a firm depends on a number of factors, event studies isolate & quantify the dependent & independent variables to measure the effect of the event on the value of the firm in question *(MacKinlay, 1997).*

In the strong form of market efficiency, investors are not able to beat the market & therefore should hold a portfolio correlated 100% to the market portfolio, as any other distribution would provide a higher risk for the same or lower return. Incase the market portfolio changes, an investor should readjust their holdings instantly to maintain the best risk to return ratio. The Modern Portfolio Theory, introduced by Harry Markowitz provides a framework of how investors build a portfolio of assets to maximise return for a particular level of risk. As all investors are rational and have their individual risk appetites, every investor builds the optimal portfolio relative to their risk appetite which overall creates the “Efficient Frontier”: the market portfolio *(Harry Markowitz, 1952).*

$$E(Ri) = Bi \times Rm,t + ai$$

Under the Portfolio Theory, investors set their holdings based on the expected market returns alone. The Capital Asset Pricing Model (CAPM) builds onto of the Modern Portfolio Theory, and adds the risk free return (e.g. governmental bonds) as a factor, allowing investors to combine a Tangency Portfolio (Portfolio constructed with a combination Market Portfolio with a risk free asset. Under the CAPM theory, investors change the holdings in their portfolios based on their expectations of the market & risk-free return alone *(Sharpe, 1964)*.

$$E(Ri) = rf + Bi \times (Rm,t - rf) + ai$$

The CAPM has also had its fair share of criticism, with most notably researchers finding groups of stocks which exhibit significantly higher returns than what are estimated by the CAPM, demonstrating an inefficient market. The following factors are examples of such inefficiencies:

- Price to earnings ratio (P/E) : Securities with low Price to Earnings ratios have significantly higher returns than securities with high Price to Earnings ratios (S.Basu, 1977)
- Small to Big Ratio (SMB: **S**mall Market Cap. **M**inus **B**ig): Small companies (expressed in terms of market capitalisation) outperform big companies (Fama, French, 1993)
- Book-to-market Ratio (HML: **H**igh Book-to Market Ratio **M**inus **L**ow): (Fama, French, 1993)

To account for these inefficiencies, the Fama-French three-factor model was introduced which estimates the return of a stock as a function of the risk free rate, the Market Return, SMB factor & HML factor *(Fama, French, 1993)*. The three-factor model typically demonstrates higher R-Squared coefficients than the CAPM.

$$E(R) = rf + Bi\ (Rm,t - rf) + Bs\ x\ SMB + Bv\ x\ HML + a$$

Fama, Fisher Jensen & Roll (1969) researched the effect of new information on the adjustment of stock prices, by conducting an event study on Stock Splits to measured if abnormal returns were noticeable & to test if the market was “efficient” at quickly incorporating the information. Their methods have served as a basis for event studies research since.

The research aimed at establishing if significantly abnormal returns were being observed in the months surrounding the event day “t” (security split). To calculate the effect of the event, first the estimated return which would have occurred in absence of the event must be calculated.

The mean adjusted return model is one of the simplest methods to estimate the returns of an asset. In the Mean adjusted return model, the average return for the asset in question is calculated over an estimation period by calculating the average return over this period. The Estimated return is equal to the Average return calculated over the estimation window. *(MacKinlay, 1997)*

$$E(Ri,t) = Av(Ri(t-x,t-y) + ai$$

In section 3.4, further information is provided on which model is chosen for the purpose of this research to calculate Expected Returns and accordingly, the Abnormal Returns.

2.3.International Trade theory

David Ricardo introduced the concept of Comparative advantage *(Ricardo, 1817)*. The concept explains that each country has a comparative advantage in producing a specific product over other countries, whether it is through low wages or high productivity. Through efficient markets, both countries should shift their resources to products in which they have a comparative advantage , resulting in a larger pool of products to be shared by participating countries, meaning consumers have access to more and cheaper goods.

The modern adaptation of Ricardo's theory of comparative advantage is known as the Ricardian model, & had been adapted to modern Neoclassical Economics. Similarly to the theory of comparative advantages, the Ricardian model depends on the differences in productivity relative to certain products being produced across countries to estimate the benefits of trade. The Ricardian Model measures this comparative advantage by the amount of labour hours that are invested to complete the good. The difference in productivities allows countries produce a good only if its opportunity cost of doing so is lower than other countries opportunity cost. Countries end up exporting products which they are more efficient in producing ("comparative advantage") & importing the products they are relatively less efficient in producing. Trade makes the price of goods equalise between the trading parties. An essential factor to the Ricardian Model is that open-trade benefits all parties involved as the price of the exporting goods rise and imported goods become cheaper. The Ricardian Model has strong support and is a very simplistic model that. Although, it does leave out many factors which are relevant to corporation supply chains *(Krugman, Obstsfeld, 2012).*

The Specific Factors model relaxes some of the assumptions made in the Ricardian model & tries to make a more representative Model for how goods are produced in the real world. The Specific Factors model incorporates new product specific inputs that cannot be used to create other products (e.g. Land to produce tomatoes) & retains the labour input from the Ricardian Model that can be reallocated between products to obtain the optimal split *(Samuelson, 1971) (Jones, 1971)*. In this Model, all of the product specific inputs are used to build their respective products & the labour is allocated between products so that wages are equal to the value of the marginal product of labour. In this model, domestically, wages must stay constant between industries as then workers would move industry, subsequently lower the marginal product of their output (labour), which in turn lowers wages till wages equalise. Under the Specific Factors model, when a country opens up to free-trade, it produces winners & losers in contrast to only winners as in the Ricardian Model. As the Specific Factors model depends on relative prices between countries, in the event that the relative price increases for a good, the owners of the factor specific to the production of that good benefits, while the owners of the factor specific to the good that experienced a relative price decrease loose. This being said, the Specific Factors Model demonstrates that as a whole countries that open up to trade experience a net benefit *(Krugman, Obstsfeld 2012).*

Alternative theories to the benefits of International trade are the Hechsher-Ohlin Model. The Hecksher-Ohlin model follows a similar logic to the Specific Factors Model, but focuses on resource endowments of product specific factors as opposed to the marginal productivity across factors. In the HO Model, in the absence of trade price differences are derived by differences in relative factor abundance to specific products, & when countries open to trade prices converge benefiting each country overall. Similar to the Specific Factors Model, when opening to trade, the owners of the abundant factor benefit while the owners of the scare factor loose *(Krugman, Obstsfeld 2012).*

The academic literature examined in this research, which have been worked on over the previous century all maintain the stance that international trade benefit all participating economies as a whole. Although trade is beneficial for economies, from a supply perspective, producers working in "Exporting" industries are winners where producers working in "Importing" industries become losers due to being outperformed on an international level.

2.4.Instruments of Trade Policy: Tariffs

The Governments of countries have instruments at their disposal to influence the trade-equilibrium achieved under free-trade and to increase domestic competitiveness of specific industries. Governments can restrict the quantity of imports (Import Quotas), subsidise the production of certain products (Export Subsidies), implement a tax on imported goods (Import Tarrifs), as well as others *(Bown, 2014)*. This research will focus on the implementation of Import tariffs primarily, hereafter to be explored further.

Import Tariffs are taxes which come into effect when an entity purchases & transports a product to the domestic market from a foreign country. Import Tariffs are primarily designed to help increase the competitiveness of local producers by decreasing competition from abroad. Domestic consumers are required to pay an amount to the government to purchase products from abroad. This makes foreign products more expensive to purchase encouraging consumers to satisfy their demand on domestic suppliers. Tariffs create a gap in the price consumers pay domestically versus internationally. Theory dictates that import tariffs imposed by a small country are fully reflected in the domestic price as they have no influence on worldwide markets, whereas tariffs imposed by a large country would increase domestic prices while bringing down world prices as global demand would shrink *(Krugman, Obstsfeld 2012)*.

Using the consumer and producer surplus the effect a Tariff has on the domestic market of a country can be estimated.

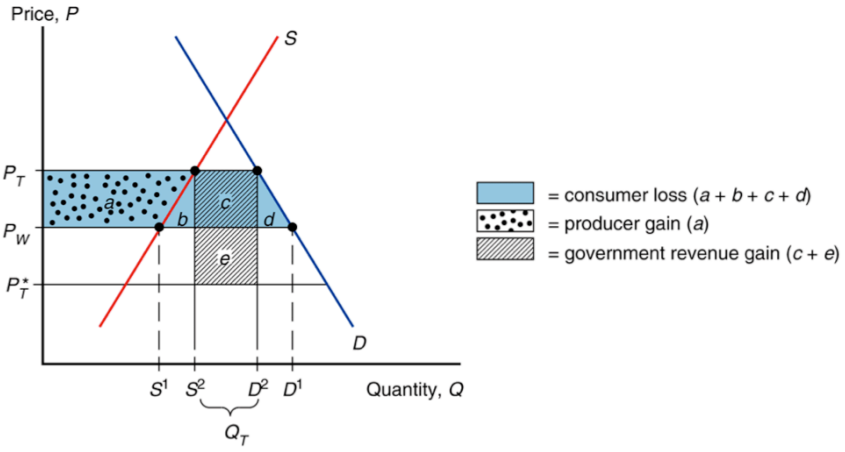


Fig. 1 - Consumer & Producer Surplus (Source: Krugman, Obstsfeld, 2012: page 200)

The price charged under free-trade is equivalent to the world price: Pw. Consumers purchase the total quantity of goods “D1” freely, and only certain domestic producers are willing to supply goods making the total domestic supply “S1". The difference, D1-S1 is imported from abroad. When a tariff is implemented increasing the domestic price to Pt, Demand shrinks to D2 while the domestic supply increases to S2 showing that domestic producers are better off. The area “a” demonstrates the producer surplus, area “a+b+c+d” is the consumer loss & area c+e is the government revenue gain *(Krugman, Obstsfeld 2012).*

2.5.Prior Literature into Tariffs & stock returns

The effects of trade liberalisation have been studied extensively over the years by many researchers. The effects of trade liberating events, such as removing import/export tariffs, removing import/export quotas on the welfare of overall economies have been the main focus. The majority of studies around trade liberalisation have been focused on the macro-economic consequences for the economies in question. Broadly generalising previous research, studies have focused on factors such as the change in prices end consumers pay, the extra/loss in tariff revenue for governments, and if the gain/loss in purchasing power by end customers is off-set by the loss/gain in revenue received by the governments from trade instruments. Economic growth associated with trade liberalisation has also been a large focus in research on open trade. In this section, the previous research on the international trade policies of governments and their associated outcomes are discussed to provide a framework for the expectations with regards to the recent trade “de-liberalisation” followed by the Trump administration since 2017.

Wacziarg & Welch study the relationship between trade liberalisation on economic growth globally over half a century (1950 to 1998). Their results are consistent with the theoretical expectations discussed in section 2.3. Shortly put, countries which experienced liberalisation started trading more (demonstrated by the trade to GDP ratio which was 5% higher after liberalisation) and in

turn, these countries experienced 1.5% higher annual growth post trade liberalisation relative to pre trade liberalisation. Additionally, Wacziarg & Welch discovered a positive correlation between higher trade liberalisation & investment rates *(Wacziarg & Welch, 2008)*. This demonstrates that trade liberalisation has a positive impact on investments which spur growth. Although these results affirm our expectations, the researchers do mention that these results were based on global averages, & that exceptions did occur where trade liberalisation in certain countries demonstrated the opposite effect. Bekaert, Harvey & Lundblad examine financial liberalisation (removal of restrictions to foreign participants in financial markets) & demonstrate that financial liberalisation, on average increases real economic growth by 1%. Their methods also show that countries with strong institutions experience the largest growth *(Bekaert, Harvey, Lundblad, 2005)*.

Carneiro & Kovak examine the effects of tariff cuts in regional areas of Brazil and detail a case where this opposite effect was demonstrated. Their results show that regions with relatively larger tariff reductions, experienced relatively larger short-term & long-term decrease in earnings and employment. Carneiro & Kovak dive deeper to deduce the reasons for this peculiarity, and find significant evidence of “imperfect interregional labor mobility”. Their study sheds light on the idea of winners & losers from trade liberalisation on a macro economic level, although his has implications to our research. Regions with a large dependancy on a certain industry, and a high concentration of involved companies are losers due to new international entrants which reduce their competitiveness. This considered, Brazil has many characteristics which set it apart from a first world country such as the United States of America *(Carneiro, Kovak, 2017)*. Many more recent studies in the area of macro-economic benefits of trade liberalisation exist, especially for developing countries (I imagine this to be due to the fact that developed countries in western countries have maintained a high level of liberalisation ever since the second world war, whereas developing countries which have experienced changes over this time). Zohonogo studies the effects of trade openness in Sub-Saharan Africa from 1980 to 2012 & discovers a non linear causal relationship between trade openness & economic growth, concluding that while openness is beneficial, these countries need to manage their trade openness: while export restrictions limit growth, import quotas can prove to protect industries ensuring growth so they can compete later on internationally. Although relevant, these findings apply completely to the United States of America, who are traditionally first movers, and where industries shrink due to being outcompeted by cheaper foreign substitutes (which rely on cheaper labour to provide cheaper products) as opposed to economies of scale *(Zohonogo, 2016)*.

The afore mentioned literature focuses on trade liberalisation as this has been a global trend across the world ever since the Second World-War and on which macro-economic literature has been focused on. This study researches the effects of trade de-liberalisation & it is assumed that such events would have the opposite effect on economic growth.

These studies generally claim that trade & financial openness benefit the respective economies through increased economic growth (macro-economics) but show little insight into the effect the changing policies have on the companies that operate in these regions. The main driver of economic growth through trade liberalisation are the businesses which can take advantage of newly accessible markets and bring more jobs, revenue & potentially profits to the economy. A great example of this phenomenon is China, which after opening its doors to foreign investment & improving trade openness has become the second largest economy globally & will become the largest if it maintains its 6.3% annual GDP growth compared to the USA's 2.5% *(U.S. Bureau of Economic Analysis)*. Next, firm specific studies around events related to trade liberalisation & implementation of trade instruments such as tariffs/quotas are examined with a focus on studies conducted on the United States of America.

Brienlich, studies the effects of trade liberalisation on the profits achieved by affected companies (micro-economic study). Brienlich conducts this study as they also believe that the profitability of firms is the main mechanism with which open trade translates into economic growth *(Brienlich, 2016)*. Brienlich conducts an event study around the Canada-U.S.A Free Trade Agreement from 1989 and measures how the reduction in both Canadian & U.S. tariffs affected the profitability of manufacturing firms that would be affected by them. Brienlich measures profitability through the abnormal returns seen in the stock prices of the respective companies around event days rather than looking at the recorded profits in annual reports, as trade liberalisation should have long term effects which would not be present in the short-term, but should be accounted for by the market through the Efficient Market Hypothesis *(section 2.1)*. Brienlich finds that the 1989 agreement increased profits for Canadian manufacturing firms by 1.2% on average. Although this is the average results across Canadian & U.S. reductions, Brienlich discovers that Canadian tariff reductions for finished products led to negative abnormal returns while Canadian tariff reductions for intermediate goods used by the manufacturing companies led to positive abnormal returns. This has interesting implications for this research, as it shows that the removal of tariffs "protecting" a domestic industry can hurt it, while removal of tariffs on products the domestic industry consumes helps it. The Trump administration announced safe-guard tariffs on imported steel & aluminium on the 1st of March 2018. Following the logic of Brienlich's results, we expect domestic steel & aluminium producers to benefit, while domestic consumers such as General Motors/Ford to suffer (this is tested).

Following the topic of Steel & Aluminium tariffs, 2018 was not the first time the U.S. used its international trade instruments to protect its shrinking steel/aluminium manufacturing industries. In March of 2002, the Bush administration implemented emergency steel safeguard measures to protect domestic producers under the reasoning that it was a national security threat to be dependent on foreign producers of a strategic asset such as steel. This is the same reasoning that Trump used in 2018 so this event is vital to examine in more detail. To measure the effect of the measures, the administration requested a 300 page report made by the U.S. International Trade

Commission, *(Okun et. al, 2003),* to monitor the developments in the domestic industry & measure its effect on Steel-Consuming Industries. This report estimated that over the 18 months that the tariffs have existed, a net welfare loss of $41.6 Million occurred to the US economy with a GDP loss of $30.4 Million. Steel consuming firms across multiple sectors were interviewed to assess their view on the implemented tariffs. Firms reported that the price of steel increased initially, and 49% of firms reported that they struggled with obtaining a sufficient quantities of steel to run their operations. 37% of firms reported that they or other steel consuming firms relocated production to facilities abroad due to the tariffs. While the tariffs did have unwanted consequences towards the consumers, on average the companies reported an increase in sales & profitability during the 18 months in question. On average, more steel consuming companies stated that they expected an increase in profits if the tariffs were terminated as opposed to it not having an effect. From the analysis into the consumers we can summarise that the steel tariffs had a negative impact in overall profitability, which in turn would be ingested by the market as a drop in the stock price (this relation is not explicitly stated in the report, but is an assumption made by this research based on provided results).

Looking at the previous articles mentioned in this literature review, an argument that can be made in favour of the steel tariffs put in place by the Bush administration is that the lost productivity & loss in purchasing power by consumers was recouped in tariff revenue by the government & redistributed to create a net positive result. After all, the highly educated bureaucrats running the most powerful economy in the world did not get there by making value destroying decisions. Read conducts a study on the 2002 US steel safeguard measures to determine the reasons behind implementing the tariff & to see if the motivation behind the implementation was grounded in economic principals *(Read, 2005)*. According to Read, steel prices were the lowest they had been in 20 years & 30% of the market participants (domestic steel manufacturers) were near bankruptcy with large net losses. Coupled with the strong lobbying capabilities of these industrial giants, Read deduces that the safeguards were more related to political reasons rather than being rationalised with economic motives. The later case would justify protecting the industry from unfair practices from foreign market players and would be approved by the World Trade Organisation (WTO) while there was insignificant evidence which showed this was the case. Political motivations (lobbying) result in a winning minority and a loosing majority. As such, domestic steel manufacturers were able to charge higher prices & imports reduced by 20 to 50% across tariffed countries increasing domestic producers market share, bringing significant gains. The US government also received gains, while domestic consumers of steel bore the brunt of the losses in terms of falling profits resulting in wage cuts & employee cutbacks. Another factor not yet discussed in this review mentioned by Read were the retaliatory actions of foreign economies which did not look fondly at the new tariffs. Trade partners threatened the U.S. with retaliatory measures if the tariffs were not removed. This phenomenon is important to note as it is a behaviour exhibited by many countries being targeted by Trump's international trade policy & has serious implications for all domestic companies who wish to sell their goods on the international market, lowering their revenues & profits.

In relation to countries retaliating to Trump's international economic policy, it would be amiss to not mention his ongoing trade war with China. Never before have we had the number 1 & 2 global economic powerhouses step in the ring to see who can come out ahead. This ongoing contest is a central aspect to this research paper. Trump has stayed true to his promise & seems to have no intent in backing down. Aware of Trump's campaign promises, Balisteri & Hillberry measure the optimum tariff levels using game theory in terms of welfare creation/destruction that could be imposed in response to another economy's implemented tariff *(Balisteri, Hillberry, 2017)*. Balisteri & Hillberry examine the specific cases of tariff implementations with Mexico & China. The results of the research show that in the case of Mexico, both parties could improve their domestic welfare by implementing a very small tariff rate although the optimum tariff rate for the US (12%) would bring a welfare loss for Mexico, and the optimum tariff rate for Mexico (5%) would bring a welfare loss for the US. Using game theory, their results demonstrate a nash equilibrium for US:Mexico of (12%:6%) which creates welfare losses for both (-$0.99B:-$20.41B). With regards to China, the nash equilibrium is found to be an increase 11% tariff from the U.S. (+$14.96B welfare gain) while the research advises China to reduce their tariffs in response by 5% resulting in the lowest possible welfare loss (-$45.79B). The research finds that if China retaliates to the proposed tariffs they will experience an even larger welfare loss, which is in stark contrast to what has happened over the last year. Just his month China allowed its currency to depreciate to an all-time low against the dollar showing China has every intent to suffer through the pain to discourage the U.S. in achieving their optimal tariff level. Although the research does reaffirm that implementing tariffs may actually help "Make America Great Again" contrary to public belief, the proposed tariffs by Trump are far larger than what the research suggests. Trump has implemented tariffs of 25% against china & suggested tariffs of 35% against Mexico which both would cause significant welfare losses according to the research by Balisteri & Hillberry.

After analysing prior research, expectations can be made for the effect the economic policy implemented by the Trump administration would have on the stock market. Firstly, with regards to domestic protected industries, we can expect positive abnormal returns, whereas foreign competing industries should experience negative abnormal returns incase the domestic market makes up a significant portion of global demand (this is the case for the U.S.). Secondly, consumers of imports which receive tariffs should be losers as prices & scarcity of the protected products increase. Finally with regards to the trade war with China, although it is advised for the U.S. to increase tariffs (~10%) to improve overall welfare, the amounts suggested by Trump are well over the recommended tariff level & this creates the expectation that if implemented, they will destroy value to the U.S. economy. Another expectation that can be drawn from the covered research is that even though it is recommended for China to reduce tariffs in response to the tariffs implemented by the U.S., in the event that China makes use of retaliatory measures, this will destroy even more value for the U.S. as well as for China.

2.6.Hypotheses

This prior literature brings us to the objective of this research, which is to study the effects the Trade Policy of the Trump Administration has had on the stock market returns. Since the inauguration of Trump, the Administration has kept itself busy in global affairs and its economic policy has not been an exception. In 2 years time, there have been more than 50 announcements on import tariffs that would be & have been implemented. In the two years in question, markets have maintained a steady & positive return, exhibiting no sudden falls, and being consistent with the bull run that has been experienced globally since 2011. The United States of America is also a large player on global markets meaning that their economic policy should also have an effect on a global scale. Tariffs have been placed on specific products for example solar-panels and aluminium/steel, while other tariffs have been aimed at individual countries, for example the Trade War that is happening with China, starting on the 22nd of March, 2018.

Past literature shows that increases in tariffs negatively effect the population as a whole. Consumers are forced to pay higher prices than what is optimal moving the economy away from its equilibrium. Due to this effect, one could argue that companies operating in this country should experience a negative return. Hypothesis 1 aims to test this:

H1: Increases in tariffs have a negative short-term effect on the stock returns of the domestic U.S. market (SP500)

In the scope of the first Hypothesis, this research additionally would like to determine if there are factors within the tariff announcements which have a significant effect on the magnitude of the abnormal returns. Factors such as the value of the import tariff (value of trade x the tariff rate), if it is a retaliatory tariff, which country implements the tariff & if the tariff is related to a trade war are of interest here.

The second hypothesis of this research paper relates to the afore mentioned research of Read (2005) & the report of the U.S. International Trade Commission on the effects of the 2002 steel tariffs on Steel-Consuming industries (2003). This research examined the qualitative effects on consumers & measured the welfare effects, but did not dive into how the market incorporated the information through stock price returns of the affected companies. The second hypothesis dives into this area and aims to test if the market creates domestic winners (producers of the protected product) & domestic losers (consumers of the protected product) by examining abnormal returns around the announcement dates. This can be summarised as the following hypothesis:

H2: Around the announcement dates of the 2018 Trump import tariffs for steel & aluminium, domestic producers experienced positive abnormal returns, while domestic consumers experienced negative abnormal returns

While steel & aluminium is an intermediary product used in the production of further products, Trump also implemented tariffs on finished goods. These were namely solar panels & washing machines. This specific tariff implementation presents an interesting case to study in more detail, as the higher cost of foreign solar panels & washing machines would not be absorbed by the next company in the production chain but by the end consumers, which are the general population. This should hypothetically allow U.S. producers like Whirlpool to charge higher prices increasing their margins, while still being able to under cut the prices of foreign producers such as Midea (Chinese producer). This should make foreign products less attractive, in turn lowering their sales & profits, while domestic producers should increasing domestic producer sales & margins due to absorbing the market share lost by foreign producers. Under this logic, around the announcement of the import tariff on solar panels & washing machines, we can argue that domestic producers of finished goods should experience positive abnormal returns, while foreign producers should experience negative abnormal returns as the U.S. is a big purchaser of such products & plays a substantial role on the global market for all washing machine & solar panel producers. This brings us to the third hypothesis of this research:

H3: Increases in tariffs on finished goods have a positive effect on the stock returns of the domestic producers & have a negative effect on the stock returns of foreign producers.

The final hypothesis of this research paper focuses on the trade-war that is currently occurring with China, which has caused the most uncertainty & has been worrisome to almost all companies who have any linkages to China. Historically, mutually beneficial trade liberalisation has gradually taken place between the U.S. & China, & many companies have depended on this to decrease their costs & improve their margins. As opposed to the previous two hypotheses, Trump's tariffs on China have not been isolated on a particular product but rather on all of the imports coming from China, in an attempt to reduce the U.S. trade deficit with China. Although the tariffs do not target any industry in particular, the Tech industry has one of the largest economic exposures to Chinese production facilities. 43.6% of global electronic circuit component exports come from China (Taiwan, Hong Kong & China) *(Workman, 2019),* which the Tech industry relies on massively. The bi-lateral tariffs put in place over the last 2 years would cut profits drastically for U.S. firms like Apple, which depend so heavily on these cheap exports. This brings us to the fourth and final hypothesis of this research paper:

H4: The Trade-War with China has had a significant short-term effect on the technology industry & companies with a higher exposure to the Chinese market have experienced larger negative abnormal returns.

Answering these 4 hypotheses should provide a holistic view into how the Trump administrations foreign trade policy has affected the Stock Market as a whole & should provide us with enough details to provide an answer to the central research question of this research. First we cover the aspects of the tariffs, second producers versus consumers, next domestic/foreign companies, & finally take an in depth analysis into the trade war & measure how exposure to China plays a role in the stock returns.

3. Methodology

3.1. Purpose

The purpose of this research paper is to measure the effects trade tariffs have on the private sector. As discussed in the literature review, theoretically, due to pushing markets away from their equilibrium states, the market should suffer as a whole (fig.1). This considered, theory also suggests that trade instruments such as tariffs can create winners & loosing industries (section 2.3). Most research in this area has focused on the welfare effects of governmental trade instruments. Governments are in place to run a country and look after all of its citizens, so when implementing trade instruments, the main concern is what effect will it have on the domestic population. Under this logic, governments should concern themselves with the macro-economic effects when creating import tariffs & should aim to improve the average standard of living for its citizens. As this research is most interested on the financial implications of these policies, this research will provide new insights into the effects these instruments have on the private sector.

This research paper takes a quantitative approach into testing the afore mentioned hypotheses to answer the central research question. As research is being conducted on the stock price returns of the market as a whole, of specific industries as well as individual stocks, this research uses a quantitive approach to answer the research question. Stock price returns are represented as numbers, meaning quantitive methods suit this research best as these methods will permit testing assumptions, to either confirm or reject the expectations that have been set after conducting the literature review through the basis of statistical analysis. A benefit of conducting research on stock prices, is that there is an abundance of data collected daily that can be used. This feature suits quantitative research as well. Finally, quantitive research will also allow us to maintain an objective stance to this research, & make conclusions based on math as opposed to sentiment, which is a vital factor when conducting research on a highly subjective subject such as the economic policy of a specific political party. On top of this research being related to politics, Donald Trump is also a highly polarising figure (strong supporter as well as strong opposition), so maintaining a stance of objectivity is key to be able to create an unbiased measurement on the effect of his foreign economic policy on the stock market.

This research is foremost interested in the stock price returns on days where announcements were made regarding the foreign economic policy of Trump. The Efficient Market Hypothesis is a key factor for this decision. Publicly traded companies release 100 page reports with details on their quarterly performance in terms of revenue, profits, growth, targets, changes in market, their future strategy & much more. The market is the most efficient mechanism to process all of these details, and represents this digested details as one figure: the stock price. Although company quarterly earnings announcements are always the best determinants to assess the perforce of a company, this happens four times a year & investors are left to closely watch the news as well as any other announcements to fill in the gaps. As such, in the event that any announcement is made

which has a significant impact on the earnings potential & profitability of a company, through mechanisms of demand & supply, company stocks change value to represent the market's assessment of what the announcement means to the company. For this reason, the stock price of companies will be the main variable of interest through which the impact of trump's trade policy on the private sector will be assessed.

Examining announcement days returns is insufficient to determine the effect the announcements have on the private sector. Certain stocks have a high volatility compared to the market & a more extreme return on an announcement day can be attributed towards the stock's volatility rather than being caused due to the event. As a very simple example of this problem, on a day where the market as a whole experiences a negative return, a stock experiencing a negative return twice as large as that of the market could be completely explained by having a market beta of 2 (in the event the market experiences a positive return, the stock would on average have a positive return twice as large as the market). For this reason, event studies is the method of choice in this research for measuring the effect of the announcements on the stock returns. With event studies, firstly the correlation of stocks to the market is measured to be able to predict the expected returns. Subsequently the experienced returns are compared with the expected returns. With this method, in case of the earlier example, the abnormal return will be insignificant.

The subsequent sections explain which data has been collected to test the afore mentioned hypotheses on a case by case basis. The theory & selection criteria that were used to maintain consistency & avoid bias are explained & the methods used to test the hypotheses are explained next.

3.2. Data Collection - Event Days

In the scope of the study, the first step to conducting an event study is to decide which announcements qualify as an event for which the abnormal returns would be studied in further detail. Many sources are available which could be used as the announcements are heavily documented by new sources & often the same information is circulated multiple times. Additionally, Donald Trump maintains direct communication with the public by tweeting his opinions. While Twitter is a great platform to reach the masses, it did provide Donald Trump with the ability to easily spread his opinions and make sudden announcements without any proof or supporting evidence. After the inauguration of Donald Trump, the New York Times conducted a study to "catalogue" how many lies were released by the president over the first 11 months of his presidency *(Leonhardt, Thompson, 2017)*. Leonhardt & Thompson show that 180 blatant lies were told to the public through tweets, meetings, speeches, etc. After conducting an analysis by interviewing the public, the article also states that 60% of Americans believe that the president is not honest. Donald Trump self-proclaimed his approach to be "Modern Day Presidential" *(Trump,*

2017), but this does present challenges to the research. If the presidents announcements are not trustworthy, which announcements can be chosen for the analysis?

Although Donald Trump's Modern Day Presidential approach is an interesting area to explore, for the purpose of this research a stringent set of rules and criteria for what categorises an announcement are set out to mitigate this issue. Foremost, official statements and releases from governmental bodies relating to the international trade policy were used to distinguish which days would be used as events. The U.S. has a complicated bureaucratic system with many departments which share responsibilities relating to the trade policy of the U.S.. The governmental bodies as well as other credible sources which were selected are summarised in following table:

ID	Body	Responsibility	Number of Events
1	White House Office	The White House office is the governmental entity which is the direct official source of information regarding news originating from the Presidential office. The White House office primarily consist of aides that are appointed by and work under Donald Trump. The White House office can be considered as a direct source of verified information coming from Donald Trump.	5
2	U.S. International Trade Commission (USITC)	The USITC is an independent agency in the U.S. that holds expertise in trade and consults the legislative & executive branches of the U.S. government. The USITC investigates the current state of imports & conducts research to determine what effect the current state of trade has on U.S. industries with a main focus on violations of intellectual property as well as to avoid injury to domestic industries.	1
3	U.S. Trade Representative (USTR)	The USTR is "responsible for developing & coordinating U.S. international trade, commodity, and direct investment policy, and overseeing negotiations with other countries" (*USTR website).* The USTR therefore takes the role of being the presidents main trade advisor and are also directly involved in negotiations with foreign countries as well the World Trade Organisation (WTO)	8
4	U.S. Departments of Specific Sectors	The U.S. has many departments running responsible for coordinating efforts in specific industry sectors. An example thereof is the Unites States Department of Agriculure, Unites States Bureau of Mines, Commerce Department	1
5	Federal Register	The Federal register is the official new source operating as a daily journal (except weekends & national holidays) which publishes information on government rules & propositions, & public notices. The Federal Register also maintains an archive to hold this information.	1
6	Research Institutes & finance information providers	In the scope of this research, research institutes are considered to be any independent institute which focuses on conducting research on ongoing activities & closely documents occurrences for the purpose of research rather than to share news & opinions towards the general public (core distinction). The three sources of information used in this paper are from the Peterson Institute for International Economics (PIIE), Reuters & Bloomberg.	18
7	Foreign Country Offices	In this research foreign announcements are also used to study the effects of retaliatory measures used by foreign countries, therefore the equivalents to the U.S. departments mentioned above are also used on a global level. A list of these offices are: - European Commission - World Trade Organisation (WTO) - Department of Finance Canada - Presidential office of Turkey	3

8	Chinese Government Offices	Identical to the previous section for the world but sources are provided in further detail for China due to the ongoing Trade War: - Ministry of Finance of the People's Republic of China - Ministry of Commerce of the People's Republic of China - Chinese State media - State Council Information Office of the People's Republic of China	3

Table 1 - Event day information sources

While more events were available, these did not qualify for the purpose of this research as there was insufficient evidence to claim that these are legitimate sources of information. The events that did not qualify were: tweets from Donald Trump, News articles from popular News information sites. Examples of such sources are the BBC, Fox news, NY Times, Washington post, among others. These news sources provide information but cannot be regarded as unbiased sources. Additionally, these sources write multiple stories on the same announcement making it an inconsistent source of information. The data sources which were used for this research were selected using the following selection criteria to produce the complete list of events:

Step 1: From the sources in Table 1, all announcements made relating to the trade policy of the US were compiled. For each event, based on the released news & information in question, the earliest report of the respective information were selected as the source of information, discarding the remainder of the reports. With this method, it is assured that the market has digested the information released in the report & has respectively reacted to it. Accordingly, this improves the accuracy of the event study. During initial selection, any announcements which were not related to a proposed tariff were removed as this study focuses on the tariff policy of Donal Trump. Events such as import quotas, export subsidies, export quotas & discussions on trade agreements belong to this category of events which were discarded. Additionally, only events that have occurred after 2017 have been accounted in this study since this is when the trade policy of the Trump administration ramped up massively. Adding events from 2017 would provide more data to test the hypotheses of this research, although presents challenges to this research due to the changes in the average returns experienced. In 2017 markets performed extraordinarily well in line with the expectations of the bull run we have experienced since the global financial crisis of 2017. For example, the SP500 index returned 18.74% in 2017 (*PK, 2019*), and has since kept a horizontal return. Therefore this research only examines events from 2018 onwards to maintain uniformity between returns. This brought the total amount of events to 51.

Step 2: Next, the event days were split into four groups relating to a specific "battle" that the U.S. was "fighting" in order to protect its domestic interests. Each battle was targeted at a specific product or country. Every return belonged to one of the four "battles" as the tariffs and development of the tariffs over time were all linked to either a particular product or targeted at a particular foreign economy. These 4 groups are: 1. Solar Panel & Washing Machine related tariffs 2. Steel & Aluminium Related tariffs 3. Trade War with China & 4. Miscellaneous. The idea to separate the returns into the 4 battles was inspired by the ongoing research of Bown & Kolb from

the Pearson Institute of International Economics (PIIE) who have kept an up to date timeline of all of the announcements that have occurred (this up to date timeline was used as a secondary source to find a significant portion of the events as well) *(Bown, Kolb, 2019)*. The PIIE splits their events into 5 battles, with the same first three groups (solar+washing machines, steel+aluminium, china) but splits the battle this research describes as miscellaneous into 4. Autos as a National Security Threat & 5. Illegal immigration from Mexico. This research groups these two battles as miscellaneous as they both primarily concern tariffs being implemented against Mexico & both have very few events to research. After completing this step, the events were split in to the 4 groups as such: Battle 1 has 5 events, Battle 2 has 10 events, Battle 3 has 30 events & Battle 4 has 6 events. Total amount of events remains at 51.

Step 3: This research is primarily concerned with the effects of trade de-liberalisation and the effects implementing or announcing new tariffs have on the private sector. Negotiations occur in-between the announcement & implementation of tariffs as well as after. Donald Trump has used tariffs as a negotiation tactic if other measures unrelated to the trade policy were not met (e.g. Mexican immigration situation to the U.S.). This results in event days where the U.S. government retracted their proposed tariffs and this has occurred multiple times. The retraction of proposed tariff should have an opposite effect on the private sector compared to the announcement of a new tariff & would distort the abnormal returns calculated in this research. As such, these event days were next eliminated from the event pool. This removed 10 events leaving a total of 41 events to be studied in the scope of this research paper. The 41 events are described in the annex of this paper where each event date is mentioned with accompanying information. For future research & readers that may be interested in the effect of tariff removals on the private sector, the tariff decrease events are summarised in table 2. As no further research is conducted into tariff removals, this research measured that the average SP500 return over the 10 events where tariff removals occurred to be 0.65%. No conclusions can be drawn from this statistic, although it does seem that tariff removals have a positive effect on the returns of the private sector.

Date	SP 500 return	Event Description
08/03/18	0.44%	Steel and Aluminum NAFTA Tariff Exemptions
18/05/18	-0.26%	China Ends Tariffs on US Sorghum During Negotiations
20/05/18	0.73%	Treasury Secretary Steven Mnuchin said the tariffs were “on hold” on May 20
03/08/18	0.46%	China warns it could add duties of 5 to 25 percent on $60 billion of US goods following Trump’s threat to raise proposed tariff rates on $200 billion of Chinese goods
08/08/18	0.57%	China Revises Its $50 Billion Tariff List, Removing Crude Oil
27/08/18	0.76%	President Trump and President Enrique Peña Nieto of Mexico announce a preliminary US-Mexico trade agreement that would potentially replace the North American Free Trade Agreement (NAFTA).
30/10/18	1.54%	All three countries sign the US-Mexico-Canada Agreement (USMCA) to replace NAFTA. Canada and Mexico sign side letters aimed at preventing threatened auto tariffs.

01/12/18	1.08%	United States and China agree on a 90-day halt to new tariffs. Trump agrees to put off the Jan. 1 scheduled increase on tariffs on $200 billion of Chinese goods until early March
24/02/19	0.12%	President Trump announces via Twitter that he will delay the tariff increase on $200 billion of imports from China that had been scheduled to go into effect on March 1, 2019
07/06/19	1.04%	Trump says he is suspending the scheduled tariffs against Mexico after reaching a “signed agreement” with the country to reduce or eliminate illegal immigration
AVERAGE	0.65%	

Table 2 - Tariff Decrease events

3.3. Data Collection - Hypothesis testing

In the previous section, it is explained how the event days were chosen. In this section, we explore the variables of interest which are necessary to effectively test the hypotheses set out in this thesis.

3.3.1 Hypothesis 1

The first hypothesis of this research paper (H1: Increases in tariffs have a negative short-term effect on the stock returns of the domestic U.S. market (SP500)) aims to assess the effect the announcements have on the returns of U.S. private sector as a whole. As discussed in the literature review through the mechanisms of an efficient market, the repercussions of the tariffs should be fully & instantly (to a reasonable degree) reflected in the returns of the companies affected by it. In terms of being instantly reflected, with modern trading technology, the effect of the tariffs should be incorporated in stock prices before the daily closing price of the stocks in question. For this reason the daily return should be enough to measure the significance of the tariff & a longer time window is not necessary. The aim of the first hypothesis is to test the effect the tariffs have on the domestic private sector as a whole, so the next question is which company stocks should be used as the dependent variable. The obvious answer is to use a reputable market index which has appropriate weightings that represent the overall private sector, but which market index should be chosen? In the scope of this hypothesis, multiple major U.S. indexes were evaluated, but ultimately the SP500 was chosen due it being unbiased to any specific industry & relying exclusively on the market capitalisation of the firms. This makes it best at representing the overall U.S. Market. The following table covers the evaluated market indexes and justifies why the SP500 index was selected as the dependent variable to test this hypothesis.

Market Index	Description	Suitability	Chosen
S&P 500	Standard & Poor's 500 index (S&P500) is a market index comprised of the 500 largest companies in the U.S. based predominantly on the market capitalisation of firms. It is market weighted (capitalisation weighted)	The SP500 is best suited for the scope of this Hypothesis. It is capitalisation weighted, exclusive to the U.S. & covers a large portion of the market	Yes
NASDAQ Composite	Nasdaq Composite Index is an index comprised of firms which are traded on the Nasdaq exchange & is capitalisation weighted. The Nasdaq exchange trades predominantly tech stocks. Companies from outside the U.S. can also be traded on the Nasdaq exchange meaning this Index is also effected by non domestic returns.	Although the Nasdaq is a widely used index & capitalisation weighted, it is affected by foreign companies & has a disproportionately large exposure to the technology market. Therefore it is not chosen for this hypothesis.	No
DOW Jones Industrial Average	Dow Jones Industrial Average (DJIA) is a historically important index which is comprised of 30 large companies from the US. It is price weighted so therefore a 1% drop in the DJIA does not imply the US market drops 1%	Due to being price weighted & only consisting of 30 companies, the DJIA is a poor representation of the domestic private market	No
Willshire 5000	The Wilshire 5000 index includes all publicly traded companies which have their HQ's based in the U.S. & it is capitalisation weighted. It excludes companies which do not have readily available information as to not distort the index price due to trading anomalies. It covers a larger portion of the domestic market than the S&P500, although is not considered a "index of choice" as a representation of the market performance.	While on paper the Willshire 5000 has all of the elements that make the S&P500 suitable for this research and on top of that it covers a larger portion of the market, it is not the industry standard. As this research aims to be pragmatic & useful to market participants, this research opts for the market standard which is the S&P500 index	No

Table 3 - Market Indexes

While the main purpose of this hypothesis was to estimate if the private sector experienced an abnormal return around the event days, cross-sectional data was collected so that the characteristics of the tariff could be used as independent variables in testing if these characteristics played a role in the magnitude of the respective abnormal returns. To be used as an independent variable, each announcement needed to provide this information which led to 3 additional characteristics of the tariffs being collected:

1. The percentage ratio of the tariff in question
2. The total Value of the imports that are subject to the tariffs
3. The Country that is implementing the tariff (as retaliatory tariffs where implemented)
4. If the tariff was related to an ongoing trade war.

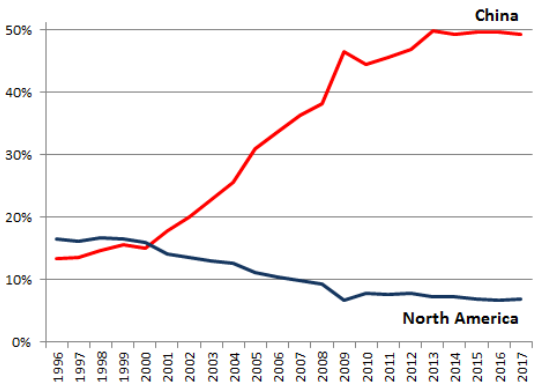
3.3.2 Hypothesis 2

The second hypothesis of this research paper (H2: Around the announcement dates of the 2018 Trump import tariffs for steel & aluminium, domestic producers experienced positive abnormal returns, while domestic consumers experienced negative abnormal returns) firstly isolates the effect of the tariff on the specific industry in question & aims to distinguish the winners & losers from another & measure the impact on the specific industries domestically. In the literature review evidence is presented to demonstrate this phenomenon, & in this section we describe which companies were chosen & which conditions the companies needed to abide by. For hypothesis 2 the event day of interest was 01/03/2018 as this is when the tariffs were first announced and the other events in this battle were retaliation from other countries or exemptions being given to certain trade partners. Starting with the winning industries (steel & aluminium producers) 10 companies were selected. These companies are summarised in the table 4 along with the losing companies. On top of being publicly traded companies, the winning companies were selected based on the following criteria:

1. The Head Quarters of the company in question must be in the U.S.
2. The company must record a yearly revenue of over $1 Billion
3. 50% of their operations must be concentrated in Steel or Aluminium production

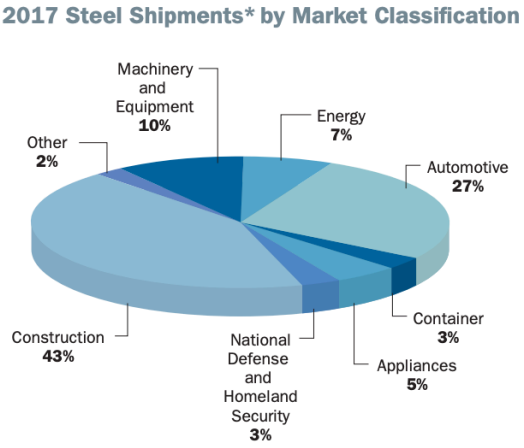
These criteria were chosen to assure that the tariffs would have a very relevant impact on the firms and so that there were not large disparities between the individual companies. Steel & Aluminium production is a shrinking industry in the U.S., and many manufacturing plants do exist. This considered, in the recent decades the steel & aluminium industries have experienced a rather unique phenomenon where manufacturers from emerging economies have started conducting mergers & acquisitions with firms in developed countries *(Sun, Peng, Ren, Yan 2012)*. Due to this phenomenon it was critical to assure that the Head Quarters were based in the U.S. to guarantee that the majority of the operations would be protected by the tariffs & that the manufacturing plants were not under ownership of a foreign entity. Secondly, as this research conducts event studies where the expected return is estimated in absence of the event through a beta coefficient with a relevant market index that was not directly affected, a high revenue increased the chances that the stocks in question had a high trading volume and would demonstrate daily changes to improve the R-Squared of the prediction models.

Finally, the 3rd criteria was chosen to even further ensure that the majority of the companies operations would be protected by the tariff. The steel & aluminium manufacturing industry has shrunk drastically over the course of the last 6 decades which limited the amount of companies which could be studied in the scope of this hypothesis to 10 firms. I acknowledge this as a limitation to this research, although this is the nature of studying the effect of a protective tariff for a decaying industry.



Graph 1 - Steel production Market Share
Source: WorldSteel

The losing industries were chosen based on the industries which are the largest consumers of raw steel materials. The American Steel & Iron Institute identifies the Construction, Automative/ transportation, Machinery & Equipment industries to be the largest consumers *(AISI, 2019)*. Based on these figures & the same criteria used for the selection of the steel & aluminium producers, 10 steel consuming firms were selected to be tested in a similar fashion with the exception of the third criteria. The third criteria instead was that the consuming firms had released a public statement directly relating to the implementation of the tariffs mentioning that the import tariffs would increase the costs of production & reduce profits. While for the consumers more than 10 firms could be found, the largest firms from the industries were selected based on yearly revenue from the individual market segments and the amount of firms was restricted to 10 to ensure consistency and to allow for 2 sample equality of mean tests for the experienced abnormal returns.



Graph 2 - Steel consuming industries
Source: American Iron & Steel Institute

3.3.3 Hypothesis 3

The third Hypothesis of this paper (H3: Increases in tariffs on finished goods have a positive effect on the stock returns of the domestic producers & have a negative effect on the stock returns of foreign producers) focuses on the dynamic of winners & losers but on an international level. The third hypothesis is tested using events from the first battle (related to washing machines & solar panel producers). For Hypothesis 3, the research was focused on a single trading day: 22/01/18. This event day was when announcement of the tariff was first announced & the market had the opportunity to react to the news. There were other trading event days which relating to this battle which are used in other sections of this thesis, but these days were more focused on giving certain countries exemptions or other countries retaliating towards them which are not of large importance. Similar to hypothesis 2, publicly traded companies from these industries are selected and split into two groups. The difference is that here the distinguishing factor is the location of the producers. In this hypothesis it is believed that domestic producers win, whereas foreign producers loose. The stocks for both groups are selected following similar criteria followed in Hypothesis 2, although the criteria have been relaxed to accommodate a larger set of companies to make testing possible.

1. For the domestic producers the HQ must be in the U.S. & for the foreign producers the HQ must be abroad
2. The yearly revenue must be over $100 Million (set for the Solar Panel industry).

The first criteria is in place for obvious reasons. This considered, similar to the case of Hypothesis 2, an even smaller sample of domestic producers of washing machines & solar panels are available. The home appliance industry (which washing machines make up a small part of) has been subject to mergers & in the U.S. only two producers still remain (Whirlpool & General Electric Company). For the solar panel industry, over the course of 20 years the U.S' global market share has plummeted from 45% in 1995 to 3% in 2013. This explains why the protective tariffs have been put in place, although it does seem to be too little too late. This is another limitation to this research and follows the trend experienced in the previous hypothesis. Additionally, there are only two large U.S. publicly traded firms which produce washing machines & washing machines are only a small subset of their products as they specialise in producing Home Appliances. Whirlpool & General Electronics produce washing machines as well as fridges, baths, coffee machines, driers, showers, home spas & far more. From my estimates, washing machines account for under 10% of their revenue, meaning it is a very limited portion of their income. This research acknowledges this as a limitation but due to there being no alternative, these companies are used to try make a conclusion regardless.

Introducing foreign players presents another challenge to this research. So far, this research has exclusively studied U.S. companies which are traded on the New York Stock Exchange as well as the NASDAQ stock exchange. Foreign companies are traded on foreign stock exchanges such as the Frankfurt Stock Exchange or the HongKong Stock Exchange which have different vacation days compared to the U.S. stock exchanges. This results in days where there is missing data related to the U.S. stock returns & extra returns when the U.S. stock returns do not exist. In the scope of this research, the U.S. stock returns are considered as the primary source of information & the foreign stock returns are adjusted to match up with U.S. stock returns. While time intensive, this is rather rudimentary. For trading days where U.S. exchanges are open but foreign stock exchanges are closed resulting in no data, the return of the foreign stock return is marked as 0% for that day. For days where U.S. stock exchanges are closed but foreign stock exchanges are open, the return for the foreign asset for that day is ignored & the return of the foreign asset on the next available trading day when the U.S. stock exchanges are open is equal to the foreign close on the most recent day where U.S. exchanges were open divided by the foreign close on the next day where U.S. exchanges will be open, minus 1. This simulates that the foreign exchange was closed on the same trading days the U.S. stock exchanges were closed, without altering any of the actual stock price closes. For event day T being studied, this process was used exclusively for days (T-120:T-30) to create the model for expected returns and was never used for the actual event day. Fortunately, the event days were all available for all assets & did not need to be altered using this method.

3.3.4 Hypothesis 4

The fourth Hypothesis (The Trade-War with China has had a significant short-term effect on the technology industry & companies with a higher exposure to the Chinese market have experienced larger negative abnormal returns) focuses on tech stocks & required two sets of data two be

collected. Firstly a set of technology stocks which has an exposure to the Chinese market needed to be collected, & secondly the exposure of these stocks to the Chinese Market needed to be collected as well. Fortunately, Goldman Sachs conducted a global investment Research into the exposure of SP 500 U.S. companies to China in 2017, which was used to select the companies to be studied in this hypothesis, as well as providing the revenue exposure factors which would be used in the regression *(Swaminathan, 2018)*. Goldman Sachs estimated the revenue exposures to China as the portion of revenue arising from the Chinese market. Goldman Sachs produced a list of 41 companies with a revenue exposure of greater than 10%. In the scope of this hypothesis, only companies with an exposure of greater than 15% were evaluated which reduced the sample of companies to
32 companies. Next the companies which were non IT companies were eliminated to make sure they would have proportionate responses based on industry specific risk factors This brought down the list of companies to 18 on which the analysis was conducted. It is interesting to mention, that from the top 20 U.S. companies with the highest revenue exposures to China (exposure > 28%), 17 were IT companies. This concentration made it logical to eliminate outliers from other industries which would not be easy to predict estimated returns for using the NASDAQ market index.

For this hypothesis, 14 event days were used from the list of events collected for Hypothesis 1, due to the ongoing trade war between the U.S. and China. Unlike in Hypothesis 1 & 2 where one announcement was made regarding the tariff by the U.S. and that was that, in this case announcements have been traded back and forth between the two nations, each time adding new products to the list, or raising the tariff rate as continued retaliation to the others retaliation. After all it is a trade war, & this provides far more data which can be used to assess this Hypothesis. The event days are summarised in the table below. Due to this hypothesis being focused on tech stocks & using the logic provided in table 3, in this case the NASDAQ composite index is used as the market return due it suiting the chosen stocks better.

Date	Average Return	Event Description
22/03/18	-2.43%	The United States orders new tariffs on about $50 billion of Chinese goods and says it will take action against China at the World Trade Organization.
23/03/18	-2.43%	China outlines plans to hit back with tariffs on more than 120 US goods, including pork and steel pipes.
02/04/18	-2.74%	Ministry of Commerce of China responded by imposing tariffs on 128 products it imports from America, including aluminium, airplanes, cars, pork, and soybeans (which have a 25% tariff), as well as fruit, nuts, and steel piping (15%).
06/04/18	-2.28%	Trump responded saying that he was considering another round of tariffs on an additional $100 billion of Chinese imports as Beijing retaliates
29/05/18	-0.50%	announced that it would impose a 25% tariff on $50 billion of Chinese goods with "industrially significant technology;"
19/06/18	-0.28%	Trump threatens China with new tariffs on another $200 billion of goods
11/07/18	-0.55%	China vowed to retaliate with additional tariffs on American goods worth $60 billion annually

01/08/18	0.46%	Trump orders USTR to increase the tariffs on $200 billion of Chinese imports to 25% from the originally proposed 10%.
07/09/18	-0.25%	Trump threatens tariffs on $267 billion more of Chinese imports.
17/09/18	-1.43%	Trump Finalizes $200 Billion Tariff List: The US announced its 10% tariff on $200 billion worth of Chinese goods would begin on September 24, 2018, increasing to 25% by the end of the year
05/05/19	-0.50%	Trump stated that the previous tariffs of 10% levied in $200 billion worth of Chinese goods would be raised to 25% on May 10
13/05/19	-3.41%	China announced details of retaliation, to begin June 1.
01/08/19	-0.79%	Immediately following another round of US-China trade talks, President Trump said the United States would impose a 10 percent tariff (not 25 percent as earlier threatened) on an additional $300 billion of imports from China, going into effect September 1, 2019. The list covers final consumer goods, such as toys, footwear, and clothing. Once in effect, 97 percent of US imports from China will be covered by some type of special tariff.
05/08/19	-3.47%	China introduced a powerful weapon to the trade war on Monday, letting its currency weaken sharply in a move that left financial markets lurching and investors worried about how the worsening hostilities between Beijing and Washington would affect corporate profits and the already slowing pace of global growth.
Average	**-1.47%**	

Table 4 - Event Days

3.4. Testing Methods & Models

3.4.1 Event Studies

In this research, the main method to answer the research question & hypotheses is event studies. The objective of this research is to isolate the reaction of the market & stock returns to the occurrence of events, & measure if the abnormality is statistically significant. As discussed in the earlier sections the main challenge here is to accurately measure the expected returns using a model of choice. In this research, a number of models are tested although ultimately the market model is used to predict the expected returns of the stock prices.

The models which were tested in the research phase of this project were the CAPM & the Market model (formulas mentioned during literature review). Specific factors were also tested & Momentum was deemed statistically significant in the scope of Hypothesis 1 and therefore was added as a control variable, but not for other models. The 10 day Moving average was used as the control variable to account for momentum as a factor. The test for the accuracy of the CAPM or the market model were done on a subset of the data, specifically on the 18 US tech companies used to test Hypothesis 4. The model of choice was selected based on the model which produced a higher R-Squared on average. Based on this test, the marked model was chosen to be used as the model to predict expected returns. The market model produced smaller residuals on average & produced a higher R-Squared for every one of the 18 companies tested. Table 5 shows the R-squared of the CAPM & the market model to justify why the market model was selected and used for the rest of the sections of this research.

Company	Ticker	Index Used	R2 MM	R2 CAPM
Skyworks	SWKS	NASDAQ COMPOSITE INDEX	0.402714	0.341793
Qorvo Inc.	QRVO	NASDAQ COMPOSITE INDEX	0.161755	0.149766
Qualcomm, Inc.	QCOM	NASDAQ COMPOSITE INDEX	0.165385	0.159962
Micron Technology Inc.	MU	NASDAQ COMPOSITE INDEX	0.279012	0.213363
Broadcom Inc.	AVGO	NASDAQ COMPOSITE INDEX	0.375435	0.353548
Nvidia Corporation	NVDA	NASDAQ COMPOSITE INDEX	0.538425	0.383555
Texas Instruments Incorporated	TXN	NASDAQ COMPOSITE INDEX	0.391345	0.371252
IPG Photonics Corporation	IPGP	NASDAQ COMPOSITE INDEX	0.353143	0.291341
KLA Corp	KLAC	NASDAQ COMPOSITE INDEX	0.370374	0.339394
Applied Materials Inc.	AMAT	NASDAQ COMPOSITE INDEX	0.494807	0.403363
Microchip Technology Inc.	MCHP	NASDAQ COMPOSITE INDEX	0.420187	0.388001
Intel Corporation	INTC	NASDAQ COMPOSITE INDEX	0.311253	0.281437
Western Digital Corp	WDC	NASDAQ COMPOSITE INDEX	0.162318	0.161257
Lam Research Corporation	LRCX	NASDAQ COMPOSITE INDEX	0.436379	0.357346
Advanced Micro Devices, Inc.	AMD	NASDAQ COMPOSITE INDEX	0.235927	0.189143
Xilinx, Inc.	XLNX	NASDAQ COMPOSITE INDEX	0.497328	0.462406
Apple Inc.	AAPL	NASDAQ COMPOSITE INDEX	0.558251	0.543354
Analog Devices, Inc.	ADI	NASDAQ COMPOSITE INDEX	0.409394	0.409011
		Average	**0.364635111**	**0.32218289**

Table 5 - Expected Return Model

The CAPM model also presented significant challenges relating to the risk free rate. Traditionally, the returns from 10 year government bonds are used as the risk free. For European areas German 10 year government bonds are used, whereas for the U.S., 10 year treasury bills are used. On 01/08/2019, the yield for 10 year German Government bonds was -0.45 and for 10Y U.S. Treasure bills the yield was 1.89. As we are analysing global returns, this disparity makes it challenging to decide on one uniform risk free rate to use. When this is evaluated in unison with the fact that my tests demonstrate that the Market Model is better at estimating returns, there remains little reason to pursue the CAPM further.

Step 1: For every estimated return that was calculated in this research relative to an event day “T”, the Beta constant & Beta coefficient relating to the Market return were estimated using a

regression on the returns during a 91 period window, starting 120 trading days prior to the event up until 30 days prior to the event. This process provided the Beta coefficients to be used in the subsequent step.

Step 2: Calculating the Estimated returns "$E(R)$" using the Market model for the stocks in question using the beta coefficients calculated through a regression in step 1, & the actual return of the market which occurred at time "T":

$$E\ (R)_{\mathrm{i}} = \beta 0_{\mathrm{i}} + \beta 1_{\mathrm{i}}(E(Rm)$$

Step 3: Comparing the Expected Return with the Realised Return for a specific stock "i" to calculate the Abnormal Return. By subtracting the Expected Return from the Realised Return, we get the difference between the two, which represents the Abnormal Return.

$$AR_{\mathrm{i}} = R_{\mathrm{i}} - E(R_{\mathrm{i}})$$

$$AR_{\mathrm{i}} = R_{\mathrm{i}} - (\beta 0 + \beta 1(E\ (R_{\mathrm{M}}))$$

Step 4: As multiple stocks are evaluated for a specific event, the individual Abnormal Returns can be grouped to calculate the Average Abnormal Return occurring on a specific event day "t". This provides an average figure for the overall average abnormal return that occurred to a group of companies. This process will be central instrument in evaluating the hypotheses laid out in this thesis. This Step can also be taken one step further and the Average Abnormal Returns can be averaged over a longer time period than the single day to measure how the Average Abnormal Return changes over time. This is useful to check if a reversal occurs, & how fast if it does. This is called a Cumulative Average Abnormal Return, and is denoted as $CAAR_{\mathrm{t:t+i}}$ from "t" to "t+i".

$$AAR_{\mathrm{t}} = (AR_{1,}, AR_2, AR_3, \dots, AR_{\mathrm{n}}) / \mathrm{n}$$

$$CAAR_{\mathrm{t}} = (AAR_{\mathrm{t},}, AAR_{\mathrm{t+1}}, AAR_{\mathrm{t+2}}, \dots, AAR_{\mathrm{t+i}}) / \mathrm{i}$$

Step 5: Incase the event does not have a significant effect on the stock price, the Average Abnormal Return and Cumulative Average Abnormal Returns should not be statistically different to zero. To test this, a simple one-sample T-test is used to see if the mean of the group is equal to a specified mean. For a particular hypothesis, all of the abnormal returns are calculated and a data set of the abnormal returns is created. This data set is tested with the one-sample T-test, so that the hypothesis can be rejected, or to demonstrate that there is insignificant evidence to reject the Null hypothesis. As abnormal returns should normally not exist, the specified mean value we test against is "0".

For certain hypotheses (2 & 3), a group of losers is being evaluated versus a group of winners, and aside from testing if the groups have statistically significant abnormal returns, it is also of interest to see if the returns are statistically different from one another. In this case an independent two-sample T-test is used. As mentioned prior, the sample size for assumed losers and winners were maintained equal for consistency reasons & to allow for two sample equality tests to be conducted for equal sample sizes. While we assume that the variance of the two groups are equal, to permit a standard two-sample t-test, Welch tests (two sample test which assumes that the samples have unequal variance) are also conducted to test the hypothesis incase this assumption is not true.

3.4.2 Variables used in Models

For Hypothesis 1, Event studies was not the main focus but a study to create a cross-sectional model is conducted to see if the tariff announcements had a significant effect on the overall market and to see if the characteristics of the announcements affected the return as well. In this section we explain which variables were used for this part of the study:

Dependent variable: Due to reasonings mentioned in 3.2, the S&P500 daily returns on the event days was the chosen as the dependent variable for which a model would be attempted to be created. The S&P500 daily returns were calculated for the last 3 years & a sample of returns for the 41 events in question were created. The descriptive statistics & an accompanying histogram for the dates in question are provided in figure 3 (3.B) as well as the descriptive statistics for the S&P500 from the first event day to the last event day as a whole without excluding any daily returns (3.A). From an initial assessment we can see that on average over the the S&P500 performed well over the time period averaging a return on 0.004% on a daily basis. Meanwhile on the event days the S&P500 on average dropped by 0.67%. While this is first figure that demonstrates our expectations with regards to Hypothesis 1, no conclusions can be drawn from this information until statistical methods have been used.

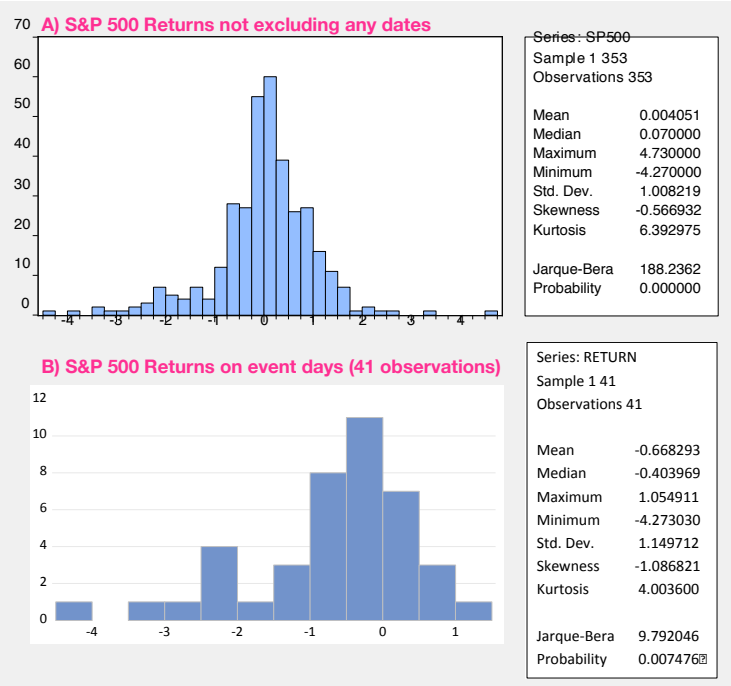


Figure 3 - S&P500 returns

Independent Variables:

1. Constant: A constant is used in the testing to account for the consistent effect of the tariff on the private sector across all announcements. From the histogram, it is expected that the constant will be negative & in the area of -0.6%
2. Value of Tariff: The Value of the Tariff was defined as the percentage of the tariff (25% e.g.) multiplied by the total import value of the goods ($10 Billion e.g.) which would give the revenue that the U.S. government would receive from the tariff (in this example case it would be $2.5 Billion).
3. U.S. Tariff: As this research evaluates tariffs implemented by the U.S. as well as tariffs implemented against U.S. exports by foreign economies, this dummy variable was added to see if the private sector considered U.S. tariffs implemented against foreign economies.
4. Trade War Variable: This trade war relates heavily to the previous 2 variables as any tariff which is part of the trade war will be either a Chinese or U.S. tariff. This dummy variable is = 1 in case the event announcement is a part of the ongoing trader between the U.S. & China. This variable is used with caution regarding this information as it is almost perfectly correlated with the previous two variables.
5. Tariff from China: China is the second largest global economy in terms of GDP, & one of the main trading partners of the U.S.. Due to the trade war, many observations were available from retaliatory tariffs from the U.S. & these could be considered more/less severely by the market. This dummy variable is = 1 in the case the event is related to a Chinese tariff announcement.
6. Target proximity to U.S.: This variable is a dummy variable which is = 1 in the case that the country affected by the tariff is in North America. Countries trade larger amounts with neighbours & industries rely heavier on this trade routes, so implementing tariffs on neighbours may have a significant effect.

Control Variables:

1. Long term Average: The Long term average return is added as a constant to the model to account for the long term trend. the Long term average was calculated by averaging the return of the S&P500 index for the previous 120 to 30 trading days prior to the first event (22/01/2018). This was measured to be 0.072%.
2. Momentum factor: The Momentum factor was added as a control variable as well through calculating moving averages through lagged returns. Multiple moving averages “MA"s were assessed, these being the 120 day MA, the 60 day MA, the 30 day MA & the 10 day MA. the S&P500 was regressed together with the long term average as a constant and a beta coefficient was provided for the MA. The 10 day MA had the highest probability & provided the highest R-squared, so it was chosen as the best option to account for momentum.

3.4.3 Evaluated Models

The evaluated models followed the following format. The independent variable “R(SP500)” was the market return of the S&P500 index. The control variables were included in all of the regressions for consistency purposes so the models could be compared to one another & so that the dependent variables were not absorbing the effect of these control variables in their absence. “LTA” stands for the Long term Average and was equal to 0.072% in all models. “MOMENTUM" was added and was the 10 day MA for the previous 10 trading days & was given a coefficient to allow for adjustments. The Momentum factor's coefficient varied from 2.08 to 2.876 and was always significant at 99.9%.

$$R(SP500) = LTA + \beta_1 \cdot MOMENTUM + \beta_2 + \beta_3 \cdot \ldots + \beta_n \cdot x$$

The models included different combinations of the independent variables mentioned in the previous section. The method for creating and testing new models generally followed a process of expansion. This means that at first models with 1 variable were tested, & if the independent variable has a significant effect on the dependent variable (at a minimum of 90%) it would be included in the subsequent test & additional variables were added (exceptions were made to double check that the eliminated independent variables indeed had an insignificant effect when more variables were added). The order of adding variables follows the order in which the independent variables are mentioned in the previous section.

In total 9 models were tested:

- 2 Models with 1 independent variable:
  - 1 model with a constant to account for the average return not explained by the control variables(not including the control variables)
  - 1 model with a coefficient for the value of the tariff in question
- 3 Models with 2 independent variables:

  - 1 model with a constant & a coefficient for the Value of the Tariff
  - 1 model with a constant & a dummy variable for U.S. announcements
  - 1 model with a constant & a dummy variable for the Trade-war
- 2 Models with 3 independent variables:
  - 1 model with a constant, a dummy variable for U.S. announcements & a dummy variable for Chinese announcements
  - 1 model with a dummy variable for the US, a dummy variable for China, & a dummy variable for retaliatory tariffs from
- 2 Models with 4 independent variables
  - 1 model used a dummy for the U.S., a dummy for China & a dummy for “abroad” countries (countries which made retaliatory tariffs excluding China) & a dummy variable for proximity (retaliatory tariffs from countries in North America)
  - 1 model used a constant, a coefficient for the value of the Tariff, a dummy for the U.S. announcements & a dummy for Chinese announcements

This concludes the section on the methodology used to create the tests & model used to evaluate the hypotheses. The results of the regressions, including the value of coefficients, the significance of the coefficients, the R-Squared & adjusted R-Squared are discussed in the following section.

4. Results

4.1.Hypothesis 1: Overall effect

Using the methods described in section 3.4.3, the OLS regressions were completed to determine the coefficients swell as the significance of the respective coefficients for the control variables and the independent variables. These are described in the table 6 presented below:

Model	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
NO. REGRESSORS	*3*	*3*	*4*	*4*	*4*	*5*	*5*	*6*	*6*
Dependent Variable	*R(SP500)*	*R(SP500)*	*R(SP500)*	*R(SP500)*	*R(SP500)*	*R(SP500)*	*R(SP500)*	*R(SP500)*	*R(SP500)*
Control Variables									
LTA	*x*	*x*	*x*	*x*	*x*	*x*	*x*	*x*	*x*
Momentum	*2.9468*** (0.0002)*	*2.4808*** (0.0044)*	*2.8767*** (0.0003)*	*2.8841*** (0.0004)*	*2.6257*** (0.0012)*	*2.0286*** (0.0068)*	*2.1271*** (0.0044)*	*2.1097*** (0.0053)*	*2.0270*** (0.0076)*
Independent Variables									
Constant (to 2 d.p.)	*-0.81%*** (0.0000)*		*-0.70%*** (0.0010)*	*-0.95%*** (0.0006)*	*-0.51%* (0.0573)*	*-0.11% (0.7473)*			*-0.11% (0.7562)*
Value of Tariff (In Billions of $)		*-0.02%*** (0.001)*	*-0.006% (0.335)*						*-0.002% (0.751)*
U.S. Dummy				*0.22% (0.4952)*		*-0.58% (0.1330)*	*-0.70%*** (0.0003)*	*-0.68%*** (0.0010)*	*-0.54% (0.1864)*
China Dummy						*-1.59%*** (0.0025)*	*-1.69%*** (0.0000)*	*-1.69%*** (0.0000)*	*-1.54%*** (0.0050)*
Abroad Dummy							*-0.35% (0.3861)*	*-0.35% (0.3957)*	
Trade War Dummy					*-0.46% (0.1687)*				
Proximity Dummy								*-0.13% (0.7640)*	
Accuracy Measures									
R-Squared	*0.297985*	*0.086895*	*0.315172*	*0.306640*	*0.332567*	*0.460696*	*0.470175*	*0.471518*	*0.462230*
Adjusted R-Squared	*0.279984*	*0.063482*	*0.279129*	*0.270148*	*0.297439*	*0.416969*	*0.427216*	*0.412797*	*0.402477*
F-Statistic	*16.554 (0.0002)*	*X*	*8.7442 (0.0008)*	*8.4028 (0.0010)*	*9.4673 (0.0005)*	*10.5356 (0.0000)*	*X*	*X*	*7.7357 (0.0001)*

Table 6 - Summary statistics of OLS regression for determinants of S&P500 returns around tariff announcements

Table 6 covers the models that are used to estimate the S&P500 return. As a first step, the control variables are discussed: The LTA has no coefficient as it is added into the model as a fixed amount, similar to the risk free rate in the CAPM model. The 10 day moving average (represented as “Momentum" in Table 6) is shown to be extremely significant in every one of the 9 models created. With the introduction of more regressors, the coefficient of the control variable decreases and the probability (significance of the regressor) also gradually decreases. With only a constant included as an independent variable, momentum has a coefficient of 2.9468 with a probability of 0.0002. With 4 independent variables, momentum’s coefficient shrinks to 2.0270 & the probability becomes 0.0076. Although this is not the purpose of the research, In all models the test demonstrate that momentum has a statistically significant effect on S&P500 returns on days where tariff announcements relating to the U.S. occurred.

Moving on to the independent variables, the tests provided interesting results which provide new insights into how the nature of the tariff announcements statistically affected S&P500 returns and these models should suffice to answer the first hypothesis. Next the individual regressors are assessed individually across the 9 models. As a note relating to these sections, all percentage affects caused by dummy variables are rounded to two decimal places.

4.1.1 Constant

The constant has shown interesting results in the scope of this research. The more regressors that were used, the lower the magnitude of the constant became. When used as the only independent variable, the constant is -0.81% across the 41 events and can be said to have a significant effect on the S&P500 returns at a 99% confidence level. With each added independent variable (with the exception of model “D") the constant became smaller and less significant. This considered, in every model where the constant was used, the constant was negative. From an initial assessment, it looks like the constant across the 41 event days was negative & statistically significant. In Model F & I, the constant is only -0.11%. It is important to note here that in model F & I dummies were included for announcements which came from the U.S. (U.S. Dummy) as well as China (China Dummy) which had relatively larger effects (± -0.56% & ±-1.56% respectively). Due to the trade war, the majority of announcements came from these two economies which has important implications for the significance and magnitude of the coefficient as it gives precedence to the U.S. & Chinese Dummies.

4.1.2 Value of Tariff Variable

The Value of the Tariff was evaluated as an independent variable in three models but was only considered statistically significant (to 99%) when it was the sole independent variable (model B). The Value of the Tariff is measured in the scope of these tests in Billions of $ and in all three models the coefficient for the value of the tariff was negative. This means, that for each extra billion dollars that the tariffs would bring in revenue to the U.S. government, the S&P500 experienced a relatively lower return. That being said the Value of the Tariff was only statistically

significant when it was the only independent variable. Looking at the descriptive statistics of the S&P 500 returns of the 41 event days, on average it drop 0.66%. The Tariff Value is always a positive number due to it not being a relative change. This has important implications to the significance of the Value of Tariffs on the S&P500 returns

4.1.3 U.S. Dummy Variable

When the U.S. Dummy is used as an independent variable exclusively together with the constant (Model D), the U.S. dummy coefficient is positive. For Model D though, the U.S. Dummy coefficient was insignificant and far from being so (0.4952 probability). For all of the other Models where the U.S. dummy was used, the U.S. dummy coefficient was negative, but was only statistically significant (99% confidence level) when the constant was not used as a regressor (Model G & H).

4.1.4 China Dummy Variable

Along with the momentum control variable, the China Dummy Variable was the only regressor which was statistically significant in all models where it was used (Model F,G,H & I). Specifically, the China Dummy Variable was significant to 99% in all 4 models. The China Dummy Variable had a tight coefficient spread across all 4 models, only varying by 0.15% across the four models (F: -1.59%, G: -1.69%, H: -1.69%, I: -1.54%). Unlike the U.S. Dummy variable, the China Dummy variable coefficient hardly changed between models with or without the constant as a variable.

4.1.5 Abroad Dummy Variable

The Abroad Dummy variable was introduced in the two models where the constant was removed (model G & H). In neither of the cases was is statistically significant (probability of 0.386 & 0.395) although it did outperform the constant in terms of significance & magnitude of coefficient (-0.35% in both models) when both the U.S. & China dummy variables were included. The Abroad Dummy Variable is affected by the same limitation in models G & H that affects the Constant in models F & G, that the majority of the events were related to U.S. & Chinese announcements.

4.1.6 Trade War Dummy

The Trade War Dummy was used exclusively in model E & was subsequently dropped. This is due to the reasoning provided in section 3.4.2. (perfectly correlated with U.S. & China Dummy as every announcement related to the trade war is either a Chinese or U.S. announcement so either the country dummies or the Trade War dummies had to be selected). The trade dummy was close to being significant with a probability of 0.1687 and had a coefficient of -0.46%.

4.1.7 Proximity Dummy

The proximity Dummy was introduced exclusively to model H and was not added to any other models. The Proximity dummy has a coefficient of -0.13% and a probability of 0.764. This was not

near to being significant and had little to no explanatory power to the S&P500 returns therefore was not researched further.

4.1.8 Models & Results in scope of Hypothesis 1

Of the 9 models, model H had the highest explanatory power with a R-Squared of 0.471518. If we account for the amount of variables used, Model G has the highest explanatory power, with an Adjusted R-Squared of 0.427216. The only difference between these two models was that model H also included a dummy for proximity which had a small magnitude for the coefficient and was also far off from being significant. For this reason, event though Model H has a higher R-Squared, Model G is the model of choice for this research paper. When more independent variables were added, the largest gains in explanatory power were from segregating the returns based on the economies the tariffs were originating from. The Revenue the government would raise from the tariffs had an inverse relation (not always significant though) with the S&P return. Figure 4 presents the Actual returns, the fitted returns and Residuals for Model G.

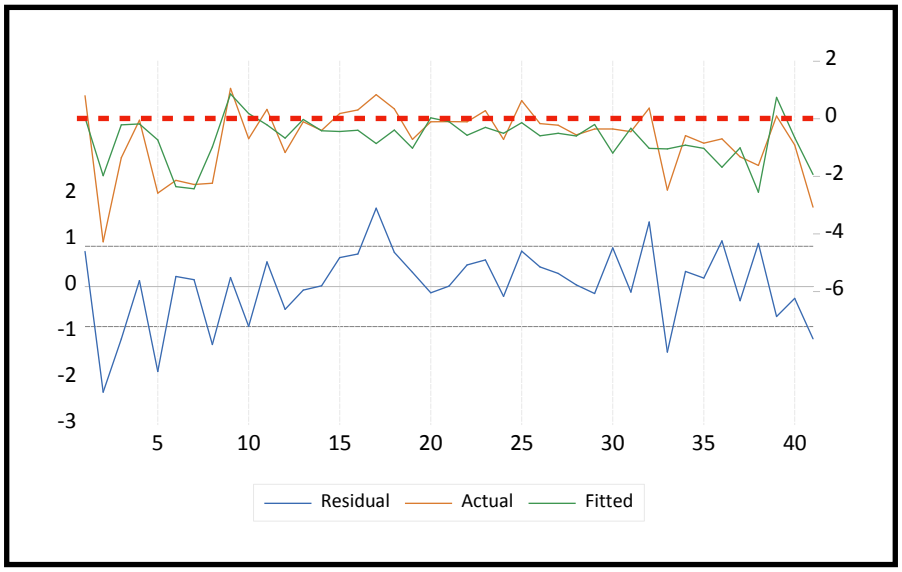


Figure 4 - Model G Actual, Fitted & Residuals Graph

In the scope of answering Hypothesis 1, multiple models are created to test which aspects of the tariff announcements affect the private sector. The aim here is to understand how the nature of the announcements effect the S&P500, so 7 independent variables are examined to see their effect on the market return. Of the 22 tariff coefficients created through OLS regression only one was positive (U.S. Dummy return in model D of 0.22%), and it was insignificant (probability of 0.4952). Additionally for model D, the predicted return in the event of a U.S. announcement was still negative when ignoring control variables (-0.95% + 0.22% = -0.73%). All of the statistically significant coefficients (which were all significant to 99% except for the constant in model E which was significant at 90%) imply a negative S&P return, so the results show that there is insignificant evidence to reject Hypothesis 1. This implies that the announcement of tariffs have a negative effect on the S&P500 & as such have a negative effect on the private sector.

4.2.Hypothesis 2: Steel & Aluminium

The overall methodology used to evaluate Hypothesis 2 is described in section 3.4.1 and the methods and selection criteria to collect the data are mentioned in section 3.3.2. Hypothesis 2 is included in this research paper because it allows us to measure the effect of the tariff announcements on the concerned industry as opposed to the economy as a whole, and to evaluate if the protective tariffs are considered advantageous by the market for protected industry, and to test if it destroys value for the consuming industries. The expected returns for the companies were first calculated using the market model and the S&P Metals & Mining index was used for the winning companies due to it being highly relevant to the industry being evaluated, it is a U.S. market index & it is capitalisation weighted. The S&P 500 index was used for the consuming companies. The results regarding the actual, expected & abnormal returns for both the winning (protected industry) & loosing (consuming industries) are summarised in the table below:

Company	Industry	Realised Return	Expected Return	Abnormal Return
AK Steel Holding	Steel	9.50%	-3.38%	12.88%
U.S. Steel	Steel	5.75%	-2.51%	8.26%
Steel Dynamics, Inc.	Steel	4.00%	-1.49%	5.49%
Nucor	Steel	3.26%	-1.37%	4.63%
Commercial Metals Company	Steel	4.98%	-1.68%	6.66%
Carpenter Technology Corp.	Steel	0.65%	-1.45%	2.10%
Alcoa	Aluminum	0.22%	-1.98%	2.20%
Century Aluminum	Aluminum	7.51%	-3.14%	10.65%
Arconic	Aluminum	-1.52%	-0.76%	-0.76%
Kaiser Aluminum	Aluminum	1.43%	-1.05%	2.48%
Average Winning Companies:		**3.58%*** **	**-1.881%**	**5.46%*** **
Fluor Corp.	Construction	-1.97%	-1.48%	-0.49%
AECOM	Construction	-1.46%	-1.64%	0.18%
Tutor Perini Corp.	Construction	-8.07%	-3.36%	-4.71%
General Motors	Automobile	-3.96%	-1.75%	-2.21%
Ford	Automobile	-3.02%	-1.03%	-1.99%
Fiat Chrystler	Automobile	-2.83%	-3.36%	0.53%
Boeing	Aircraft	-3.46%	-1.32%	-2.14%
Lockheed Martin Corp.	Aircraft	-3.62%	-1.05%	-2.57%
Caterpillar Inc.	Machinery	-2.85%	-1.26%	-1.59%
John Deere	Machinery	-2.52%	-0.87%	-1.65%
Average Losing Companies:		**-3.38%*** **	**-1.71%**	**-1.66%*** **

Table 7 - Abnormal Returns Domestic “Winning” & “Loosing” industries

To test the significance of the Abnormal Returns, T-tests were conducted to test the hypothesis of the group mean = 0. In both cases for the winners & for the losers, the hypothesis is rejected with a 99% confidence level (Probability of 0.0028 for the winning group and a probability of 0.0067 for the loosing group). The detailed test results can be found in the appendix. This means that when using the one sample t-test, we say with 99% confidence level that the abnormal returns for the protected industries & consuming industries are statistically different to zero. Looking at the group averages, the average realised return was 3.58% and the average abnormal return (AAR) for steel & aluminium manufacturers was 5.46% on the day of the steel/aluminium announcement. The average return for steel consumers (which was made up of 10 companies from the construction, Automobile production, Aircraft production & machinery production sectors) was -3.38% and the AAR was negative and stood at -1.66%. The difference in returns between the loosing companies & winning companies was 6.96% on the event day. Next a two sample t-test to test the equality of means between the winner & looser group abnormal returns was conducted to verify if the abnormal returns were statistically different to one another. The t-test rejected the null hypotheses (equality of means the two groups) with a 99% confidence level (0.0001 probability). Incase of unequal variances, a Welch F-test was also conducted which rejected the null hypothesis as well at 99% (0.0004 probability).

This research's results demonstrate that Hypothesis 2 is not rejected after testing and that there is a clear significant difference between the returns of U.S. steel/aluminium producing companies and U.S. steel/aluminium consuming industries. Additionally, the results show that the U.S. steel/aluminium producers experience statistically significant positive abnormal returns while steel & aluminium consuming industries experienced a negative abnormal returns on the day of the announcement.

4.3.Hypothesis 3: Washing machines & Solar Panels

The methodology used to test Hypothesis 3 is described in section 3.4.1 and the methods and selection criteria to collect the data is mentioned in section 3.3.3. Hypothesis 3 is included in this research paper as it aims to test if tariffs are perceived by the market as helpful to the domestic producers of the products in question and to evaluate if the tariffs are considered harmful to foreign producers of the same products. The hypothesis is tested by evaluating the returns of domestic & foreign washing machines + solar panels producers on the day the Trump administration announced the import tariff. The results of the event study analysis are presented here. Similar to Hypothesis 2, the expected returns are first calculated using the market model. Due to the diversity in the companies being evaluated in terms of industry (solar + home appliances) & geographical distribution thereof (U.S., China, Norway, Canada, Germany) multiple indexes were used to calculate the estimated returns & the index per stock (to be used in the market model) was chosen based on the prediction accuracy of the market model for the respective stock. The indexes used were the S&P500 index (used for U.S. appliance industry), the

MAC Global Solar energy Index (used for solar companies: SUNIDX) and the Nasdaq China index (used for Chinese tech companies: NASDAQCH). The results for the actual, expected & abnormal returns for both the winning (domestic producers) & loosing (foreign producers) are summarised in the table below as well as the cumulative abnormal returns over extended time windows. The full breakdown per company of these statistics are provided in the appendix:

Group	R(T)	AR(T)	CAR (T:T+1)	CAR (T:T+2)	CAR (T:T+5)	CAR T:T+10	CAR T:T+30	CAR T:T+60
Winners								
CAAR Home Appliances	-0.55%	-0.93%	1.49%	1.34%	0.81%	0.45%	0.13%	0.12%
CAAR Solar	-1.53%	0.01%	0.92%	0.64%	0.26%	0.01%	0.40%	0.38%
CAAR Domestic	**-0.53%**	**-0.18% (0.745)**	**1.04% (0.108)**	**0.78% (0.114)**	**0.37% (0.251)**	**0.1% (0.530)**	**0.35% (0.113)**	**0.33%** ** **(0.022)**
Losers								
CAAR Home Appliances	4.88%	4.87%	3.27%	1.19%	0.19%	0.03%	-0.07%	-0.18%
CAAR Solar	0.20%	0.45%	-0.27%	-0.54%	-0.10%	-0.30%	-0.27%	-0.14%
CAAR Foreign	**1.13%**	**1.33% (0.136)**	**0.44% (0.559)**	**-0.19% (0.687)**	**-0.04% (0.864)**	**-0.23% (0.416)**	**-0.23% (0.258)**	**-0.15% (0.256)**
Test of Equality								
CAAR Domestic vs CAAR Foreign		(0.137)	(0.531)	(0.146)	(0.305)	(0.302)	(0.049) **	(0.012) **

Table 8 - AR & CAR for solar/home appliance industries

For the industry of Home Appliances & Solar Panels, neither the domestic nor foreign producers experienced Average Abnormal Returns on the day of the announcement which were statistically different to zero. Due to this fact, results were also collected for the prolonged periods after the event. Cumulative Abnormal returns were measured over 6 extra periods (T:T+1, T:T+2, T:T+5, T:T+10, T:T+30, T:T+60). T-Tests were next conducted on the sample of CARs across the 10 domestic & foreign producers. For all time periods evaluated, the CARs for foreign producers were never considered to be statistically different from zero, and the null hypothesis of the mean=0 was never rejected. The same was the case for domestic producers with one exception: only the CAR (T:T+60) rejected the null hypothesis that the mean was = 0 with a confidence level of 95%. The CAAR (T:T+60) was equal to 0.33%, which shows that over a period of 60 days, domestic producers on average, averaged positive abnormal returns of 0.33%. A test of equality between the CAR of domestic producers & foreign producers was also conducted for each time window & only for time windows (T:T+30) & (T:T+60) were the means between the domestic and foreign producers significantly different to one another with a confidence level of 95%.

4.4.Hypothesis 4: IT stocks, Trade-Wars & Exposure to China

The methodology used to in assessing Hypothesis 4 is described in section 3.4.1 and the methods and selection criteria to collect the data is mentioned in section 3.3.4. Hypothesis 4 is included in this research paper as it aims to provide new insights into the ongoing trade war. In Hypothesis 1 it is demonstrated that retaliatory tariffs from China make the S&P500 returns significant lower by over 1% (with a 99% confidence level) so it was considered useful to provide further context into this characteristic. Additionally, it was considered useful to test if the revenue exposures of companies had a significant effect on the abnormal returns of the tested companies. This made Hypothesis 4 a two step exercise where the abnormal returns were first calculated & subsequently a simple regression was made to test if exposure had a significant effect on the returns of the evaluated tech companies. The NASDAQ index was used exclusively in calculating the abnormal returns & the reasoning for using the market model is covered in the Methodology section of this research paper. The below table summarises the actual, expected & abnormal returns for the 18 tech stocks evaluated over the 14 announcement days across the trade war.

Company	Exposure	Average Realised Return	Average Expected Return	Average Abnormal Return
Skyworks	84%	-2.71%	-2.71%	0.00%
Qorvo	71%	-2.28%	-2.00%	-0.28%
Qualcomm	65%	-2.07%	-1.51%	-0.57%
Micron	64%	-2.45%	-2.93%	0.49%
Broadcom	54%	-1.27%	-2.21%	0.94%
Nvidia	50%	-2.55%	-2.96%	0.42%
TI	44%	-2.22%	-1.85%	-0.38%
IPG	44%	-2.79%	-2.26%	-0.53%
KLA	44%	-2.69%	-2.37%	-0.32%
Applied Mat.	42%	-2.42%	-2.99%	0.57%
Microchip	41%	-2.85%	-2.46%	-0.39%
Intel	40%	-1.88%	-1.99%	0.11%
Western Dig	39%	-1.97%	-1.64%	-0.33%
LAM	39%	-2.75%	-3.06%	0.31%
AMD	33%	-2.71%	-3.22%	0.50%
Xilinx	26%	-2.48%	-2.37%	-0.11%
Apple	20%	-1.61%	-1.91%	0.30%
Analog Dev.	16%	-2.48%	-1.71%	-0.77%
Average	**45%**	**-2.34%*** (0.0000)**	**-2.34%**	**0% (0.9845)**

Table 9 - RR, ER & AR for tech stocks with rev. exposure to China

Using a t-test, it is measured that the realised returns of the 18 tech stocks are statistically different from zero at a 99% confidence level (probability of 0.000). The 18 tech stocks in question averaged a negative return of -2.34% across the 14 trading days where announcements were made by either China or the U.S. regarding tariffs. A t-test was also conducted to test if the mean of the averaged realised returns for the 18 companies was equal to the the average return of the NASDAQ index for the 14 trading days (= -1.47%). This hypothesis was also rejected at a 99% confidence level (probability of 0.000), showing that the returns of the 18 tech companies were significantly different from the returns experienced by the NASDAQ index. Next, although a large average negative return was recorded for the 18 tech stocks evaluated, the average abnormal returns across the 14 tradings days was equal to 0.00% & the null hypothesis of the mean of the average abnormal returns being equal to 0 was not rejected. The market model predicted an average expected return for the companies of -2.34% which is astonishingly close to how the 18 tech stocks ended up performing over the 14 trading days.

Next the returns of the 18 companies over the 14 trading days (18 x 14 = 252 observations) were used a dependent variable in a simple OLS regression based on the market model & exposure to the Chinese market was added to see if exposure to the Chinese market had a significant effect on the returns. 3 models were tested here, one being the simple market model, one where the constant was removed from the market model & a coefficient for exposure was added, and one model with a market model as well as a coefficient for exposure.

Model	*J*	*K*	*L*
NO. REGRESSORS	*2*	*2*	*4*
Dependent Variable	*Return*	*Return*	*Return*
Indépendant Variable			
Constant	*-0.725%*** (0.000)*		*-0.66%** (0.026)*
NADAQ return	*1.100*** (0.000)*	*1.166*** (0.000)*	*1.100*** (0.000)*
Exposure		*-0.012*** (0.000)*	*-0.0014 (0.8060)*
Accuracy Measures			
R-Squared	*0.451809*	*0.440893*	*0.451943*
Adjusted R-Squared	*0.449617*	*0.438656*	*0.447541*
F-Statistic	*206.046 (0.000)*	*X*	*102.66 (0.000)*

Table 10 - Regression on Tech Stock Returns with IV exposure

Although exposure seems to have a significant effect on the returns of the tech companies when added as a variable in Model “K", when added as an additional variable to the market model exposure has an insignificant effect (probability of 0.8060). Model “L" has the highest R-Squared, although the simple market model (model “J") has a higher adjusted R-Squared and a higher F-Statistic. Model “L" has a higher R-Squared due to having the same variables as model J & an additional one (exposure). Model "K" has the worst explanatory power of the three models. In model K, it seems as if exposure has a significant effect because it is always positive & in a relatively tight range. Therefore the OLS regression uses exposure as if it were a constant. When a constant is included (model “L”), it looses significance completely. From the event study & regression, enough statistical evidence has been gathered to reject hypothesis 4. This means that exposure does not have a significant effect on event day returns, and there is insufficient evidence to claim that tech stocks have abnormal returns significantly different to zero.

5. Conclusion

In this section the results from section 4. are interpreted and elaborated upon further. Here, the results are extrapolated and interpreted in unison so that a cohesive answer can be given to the central research question of this paper:

“What effect has the Trump Administration’s economic trade policy had on the Financial markets in question?”

I will start with discussing the results produced under hypothesis 1 and supplement the findings with results from the additional hypotheses. After evaluating the results in section 4, it was determined that indeed, the announcements relating to the tariff policy of the U.S. (both U.S. import tariffs as well as retaliatory tariffs) had a significant negative effect on the return of the S&P500 market index. When all events are evaluated (announcements by all countries) the S&P500 lost 0.81% of its value on days where new information was released relating to import tariffs. The S&P500 market index was chosen as it is was the ideal instrument to represent the private sector in the U.S. In the scope of the research it was statistically proven that the S&P500 experienced negative returns on the event days, & if we extrapolate the results we can make the conclusion that the announcement of import tariffs & implementation thereof by the U.S. as well as retaliatory tariffs by other economies, have a significant negative impact on the U.S. private sector as a whole. With regards to this conclusion, my results are consistent with economic theory, which state the tariffs push markets away from their equilibrium & generate revenue for governments at the cost of the private sector (supplier surplus & consumer surplus decrease) (section 2.4 & 2.5). As a side-note, in the models created to assess hypothesis 1, I also provide substantial evidence that momentum (the 10 day moving average) is positively correlated with the returns on event days with announcement. While this is not the focus of this research, it is interesting to note & could be examined further in future research.

While the announcements in general had a negative effect on stock returns of publicly traded companies, this research also looks into the characteristics of the tariffs to see if aspects such as the value of the import tariffs or the country making the announcement made the market perceive the news differently. There was insufficient evidence to claim that the value of the tariffs (percentage multiplied by import value) had an effect on the S&P500 returns, but we can claim that the market perceived the tariffs differently based on which country was implementing a tariff. In all models where a dummy variable was added to account for tariffs implemented by China against the U.S., the dummy variable was statistically significant to 99% and had a coefficient of over 1.5% at its lowest, & 2.1% at its highest (in the latter case no dummy variable was used). This means that tariffs implemented by China on imports from the U.S. were perceived as far more damaging to the U.S. private sector. This makes sense as there is no U.S. industry that wins from Chinese import tariffs as it makes all U.S. producers less competitive on the Chinese market.

U.S. producers need to chose between loosing market share in China for their products, or to lower prices, both of which lower their revenues & accordingly their profit (If U.S. producers do not want to loose market share, they would need to lower their prices to absorb the costs customers now pay towards the government). Simply put, when China adds import tariffs, everyone in the U.S. looses.

Tariff announcements/implementations by the U.S. are also perceived negatively by the market & have a negative effect on the U.S. private sector. Inadvertently, it seems as if Donald Trump is harming the U.S. private sector in the short-term with every announcement or threat that is made relating to import tariffs. That being said, the market does perceive these tariffs to be less harmful to the U.S. private sector than retaliatory tariffs, especially when put in comparison to Chinese retaliatory tariffs. Some of the prior research covered in the literature review did provide reasons why tariffs could be advantageous to the U.S. economy, but the majority state that tariffs do more harm than good to the domestic market. One reason to why import tariffs implemented by the U.S. are less harmful to the U.S. private sector than that of China is that there still are winning industries in the face of import tariffs. Another reason could be attributed to behavioural finance, for instance the confirmation bias. The U.S is quite polarised in its support/disapproval of the trump administration, & investors who are supports maybe interpret the announcements as positive news due to their pre-existing position that Donal Trump is running the country as business & indeed: "Putting America First”. While the behavioural explanation is a speculative reason, I test the first reason to find if there are indeed winning & loosing industries.

When the event study was conducted for the steel/aluminium tariff announcements, based on prior research on the 2002 Bush administration Steel tariffs, expectations were that the domestic producers would benefit strongly while steel/aluminium consumers such as car manufactures would incur losses. The 2002 steel tariffs increased the cost of steel in the U.S., made steel relatively more scarce, and even pushed certain consumers to relocated to outside of the U.S.. These consequences are all unwanted for consumers but to provide a competitive advantage to domestic producers versus foreign exporters. The tests to answer hypothesis 2 strongly supported these expectations and showed statistical evidence that the returns of the “winning" industries (steel & aluminium producers in this case) on the event day were far higher than those of the “losing" industry (steel & aluminium consumers). Domestic producers experienced an average positive abnormal return of 5.55% on the day of the announcement whereas domestic consumers experienced an average negative abnormal return of -1.45%. Winners outperformed losers by 6.95% on the day of the announcement. While the positive abnormal return of the producers is far larger than the abnormal return of the losers, the steel / aluminium producing industry is far smaller than even the U.S. construction industry in itself, let alone of the large steel consumers combined (automobile, transport, construction, machinery, energy, etc.). If we expand these findings to the market as a whole, then the argument could be made that the reason the U.S. import tariffs on average made the S&P500 drop is due to the fact that the tariffs produce

gains for one industry at the expense of losses for many others and the losses for many, outweigh the gains for the few.

When a similar event study was conducted for the specific import tariffs aimed at protecting domestic producers of Washing Machines & Solar panels (hypothesis 3), the results were far less conclusive but still provided some insights for this area. What was surprising, is that on the event day itself, the complete opposite abnormal returns were witnessed for the producers then what was expected. Following the logic of the previous tests, domestic producers of the protected product should win while foreign producers of the protected product should loose. On the event day the complete opposite occurred, with Domestic producers experiencing an average abnormal return of -0.18% & foreign producers experiencing an abnormal return of 1.33%. That being said, on the subsequent day, returns were more inline with expectations, where domestic & foreign producers averaged a return of 2.09% & -0.35% respectively. This led me to believe that the news about the steel & tariff returns was released after U.S. stock exchanges closed for the day. This was researched further but the official announcement had no information on the time of the day it was released. Additionally, no news stories on any of the major news sites were found on the official announcement day, but all followed on the day after, when returns were consistent with my expectations. This does not provide conclusive evidence that the announcement was released after stock markets closed for the day, although it also does not provide evidence to be able to reject this explanation either. Regardless, none of the cumulative abnormal returns were significantly different from zero in either of the groups, except the Cumulative abnormal return over the 60 trading days after the announcement for domestic producers. This was estimated to be +0.33%. While not significantly different from zero, the foreign cumulative abnormal return over the same period was -0.15%. Over 60 trading days, this means that on average domestic producers stock prices rose ~22% *(1.0033^60=1.22)*, while foreign producer stock prices fell ~8.7% *((1-0.15%)^60=0.913)*. These results were not as convincing as those of the previous hypothesis, although still give us reason to believe that domestic producers of a protected product do outcompete foreign producers of the same product in the case of the U.S.. Regarding this event study, there was also the challenge of there not being many U.S. producers of Solar panels & Washing machines. For Washing Machines only two publicly traded companies exist and they produce home appliances rather than washing machines exclusively. The largest foreign producers of washing machines are Samsung & LG, but these were excluded from the research they produce primarily consumer electronics. When compared with the previous hypothesis were steel & aluminium manufactures have almost all of their operations affected by the tariff, in this case, only a minor portion of the companies products benefit from the tariff. This lowers the effect of the tariff on the studied companies, & accordingly lowers the abnormal returns.

Finally, we take an in-depth look into the tech companies being affected by the U.S. China trade war. As a side-note, this case was also used to measure which model would be used to predict expected returns which provided justification for using the market model. 18 major U.S. tech companies abnormal returns were calculated using event studies around 14 event days where

announcements were made by either the U.S. or China concerning tariffs aimed at the other. I found evidence that on average, the 18 tech firms performed significantly worse across the event days with an average return of -2.34%. To compare the Nasdaq composite index on average only dropped -1.47% on event days. Although when this phenomenon was inspected further, the cumulative average abnormal return over the 14 event days was equal to exactly 0.00%. In the news many articles about “stocks getting hit the hardest” have been released, covering how Tech stocks have been affected the most by the trade war with China due to their large dependence on the market for sales & production. Although as it seems, this has not been the reason for the lower returns because if it were the case, we would see negative abnormal returns & my research demonstrates that we do not. The reason for the stronger negative returns for the tech companies seems to be entirely due to the fact that tech stocks are on average more volatile than the Nasdaq composite index. We can see this through the average market beta of the 18 firms in question in the market model. For the 18 the average market beta was 1.54. Here we conclude that tech stocks are not significantly more affected by the trade war, but are simply more volatile and perform poorly when the market performs poorly, which is affected by the trade war.

While this research has produces interesting results which do make sense according to economic theory, there are areas for improvement & areas where further research could be conducted. Certain limitations were discussed throughout the paper, but here I would like to address which areas could be improved upon from insights which were derived during this work. Firstly, due to the presence and prediction accuracy of momentum, I believe that lagged returns could be added as control variables to account for a potential reversal effect. Hypothetically, it makes sense that firms which experienced positive returns the day before a tariff announcement would subsequently drop stronger the next day in the light of bad news as an overreaction from the market. I would like to explicitly state that this is an assumption, but if momentum plays such an important role and we make arguments for behavioural explanations to the negative returns which were observed around event days, the reversal effect could be interesting to look into.

Secondly, I would like to get a better understanding of how business to business (B2B) product companies and business to consumer (B2C) product companies have been affected by the tariffs and if they have been differently affected. Steel producers/consumers are primarily B2B organisations, whereas home appliances are primarily B2C organisations. In this thesis steel & aluminium producers experienced far larger event day abnormal returns. My thinking here is that B2B suppliers can shift the cost of the tariff easier onto other businesses & as such can profit better from the higher prices. B2C suppliers suffer from sales drops due to rising prices that the public does not want to pay, & therefore suffer due to rising prices in the market. From the demand side, Steel consumers have no choice but to buy steel at a higher cost if they want to continue their operations. This provides Domestic producers with even more revenue.

Thirdly, I acknowledge that for certain hypotheses in this research a lack of domestic data was available which lowered the prediction power of the tests and models in question. The unfortunate

issue here is that protective tariffs are traditionally placed on poorly performing industries that have been subject to shrinkage over the years. This limits the sample size of available companies, especially in the “winning" groups (domestic producers in protected industry). In this research the amount of firms in the “loosing" groups was limited to that of the winners to allow for equality tests of equal sample sizes, but this does not need to be the chosen method. Two sample equality tests such as the Welch’s t-test and the T-test for unequal sample sizes exist and could provide the tests with more data to effectively reject the hypotheses of interest.

Finally, the trade war with China is only escalating and at the start of August we saw the Chinese Yuan hit its lowest in over a decade against the U.S. dollar. This was an economic instrument used by the Chinese economists as a retaliation against the U.S. stocks. Further research could be conducted into the other instruments that have been used. Additionally, if or when the trade war concludes, all of the events over the 2+ year timeline could be studied in unison to provide a conclusive study on the topic.

To conclude this research paper, I’d like to re-address the aim of this research. When writing and analysis commenced in 2019, the aim was to conduct an intermediate study into the ongoing events and to provide a pragmatic guide for readers to have an understanding of what has happened and how the market has reacted according to the events overall. Additionally the aim was to provide some further context into how specific tariff implementations have affected specific subsets of the market (industries). Looking back, I believe this goal has been accomplished and overall I can say that while Donald Trump's strategy is bold, it does seem to be destroying hundreds of billions of dollars in value for the private sector in both the U.S. and abroad. If the aim of his policies are to exchange an "eye for an eye" then arguments could made in favour of the tariffs. This considered, Donald Trump has reiterated that his strategy is to "Put America First”, and my results show that this has not exactly been the case for the private sector. I think the phrase could be best rewritten as “Putting certain industries in America First”. I do not know the motives for doing so, but as the market as a whole has suffered except for certain industries who have greatly benefitted, it seems slightly more appropriate. I hope this research has provided you with some further clarity into the subject and that the findings have been fascinating. Further more, I hope this research provides you with some critical information that you can use to gain an advantage on the stock market in the months to come!

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7. Appendix

7.1 Hypothesis 2

Hypothesis Testing for WINNERS				Hypothesis Testing for LOSERS			
Sample: 1 10				Sample: 1 10			
Included observations: 10				Included observations: 10			
Test of Hypothesis: Mean = 0.000000				Test of Hypothesis: Mean = 0.000000			
Sample Mean = 0.054590				Sample Mean = -0.016640			
Sample Std. Dev. = 0.042354				Sample Std. Dev. = 0.015029			
Method		Value	Probability	Method		Value	Probability
t-statistic		4.075845	0.0028	t-statistic		-3.501297	0.0067

Table 11 - Hypothesis 2: T-Test AR = 0

Hypothesis Testing for WINNERS				Hypothesis Testing for LOSERS			
Sample: 1 10				Sample: 1 10			
Included observations: 10				Included observations: 10			
Test of Hypothesis: Mean = -0.013300				Test of Hypothesis: Mean = -0.013300			
Sample Mean = 0.035780				Sample Mean = -0.033760			
Sample Std. Dev. = 0.034632				Sample Std. Dev. = 0.018112			
Method		Value	Probability	Method		Value	Probability
t-statistic		4.481492	0.0015	t-statistic		-3.572263	0.006

Table 12 - Hypothesis 2: T-Test AR = SP500 Return

7.2 Hypothesis 3

Company	Industry	RT	AR T	AR T:T+1	AR T:T+2	AR T:T+5	AR T:T+10	AR T:T+30	AR T:T+60
Whirlpool	Home App.	-0.53%	-1.11%	1.00%	2.07%	1.34%	0.80%	0.07%	0.03%
General Electric Company	Home App.	-0.55%	-0.75%	1.98%	0.60%	0.29%	0.11%	0.20%	0.22%
First Solar	Solar	-1.53%	-0.66%	-0.46%	0.46%	-0.38%	0.09%	-0.08%	0.08%
SunPower Corporation	Solar	0.81%	1.60%	-2.18%	-1.69%	-0.82%	-0.75%	-0.34%	0.21%
Enphase Energy Inc	Solar	1.03%	0.16%	1.86%	0.39%	-0.45%	0.80%	1.25%	0.21%
SolarEdge	Solar	-1.28%	-1.30%	0.55%	0.13%	0.52%	-0.07%	1.03%	0.41%
SunRun Inc.	Solar	1.68%	2.54%	4.67%	3.41%	2.41%	0.46%	1.25%	1.17%
TerraFrom Power inc A	Solar	1.46%	1.76%	1.46%	1.06%	0.48%	-0.17%	0.45%	0.25%
Hannon Armstrong	Solar	-0.50%	-1.14%	-0.37%	-0.40%	-0.21%	-0.23%	-0.40%	-0.07%
Vivint Solar Inc	Solar	-4.05%	-2.88%	1.84%	1.75%	0.51%	-0.05%	0.04%	0.79%
Average Winning Companies:		**-0.35%**	**-0.18%**	**1.04%**	**0.78%**	**0.37%**	**0.10%**	**0.35%**	**0.33%**
Haier	Home App.	4.15%	4.29%	3.21%	1.08%	0.16%	0.28%	-0.06%	0.00%
Midea	Home App.	5.60%	5.45%	3.32%	1.30%	0.23%	-0.22%	-0.08%	-0.37%
Xinyi Solar Holdings	Solar	0.28%	0.32%	0.42%	0.40%	0.79%	0.21%	-0.34%	-0.19%
Sactec Solar ASA	Solar	1.93%	2.33%	1.51%	0.87%	-0.57%	0.21%	-0.58%	-0.03%
Canadian solar	Solar	-0.19%	0.70%	0.22%	0.41%	-0.36%	-1.65%	0.37%	0.20%
Atlantica Yield plc	Solar	0.28%	-0.28%	-0.01%	-0.58%	-0.36%	-0.01%	-0.02%	0.02%
Daqo New Energy Corp	Solar	3.69%	4.10%	1.48%	-0.71%	-0.53%	-1.52%	-1.18%	-0.67%
JinkoSolar	Solar	-3.31%	-2.26%	-4.72%	-3.52%	-0.17%	-0.11%	-0.46%	0.02%
GCL-Poly Energy Holdings Ltd.	Solar	0.00%	-0.19%	0.05%	-1.36%	-1.22%	-0.73%	-0.85%	-0.87%
SMA Solar Technology AG	Solar	-1.10%	-1.12%	-1.07%	0.21%	1.59%	1.21%	0.91%	0.40%
Average Loosing Companies:		**1.13%**	**1.33%**	**0.44%**	**-0.19%**	**-0.04%**	**-0.23%**	**-0.23%**	**-0.15%**

Table 13 - Hypothesis 3: Detailed Returns Hypothesis

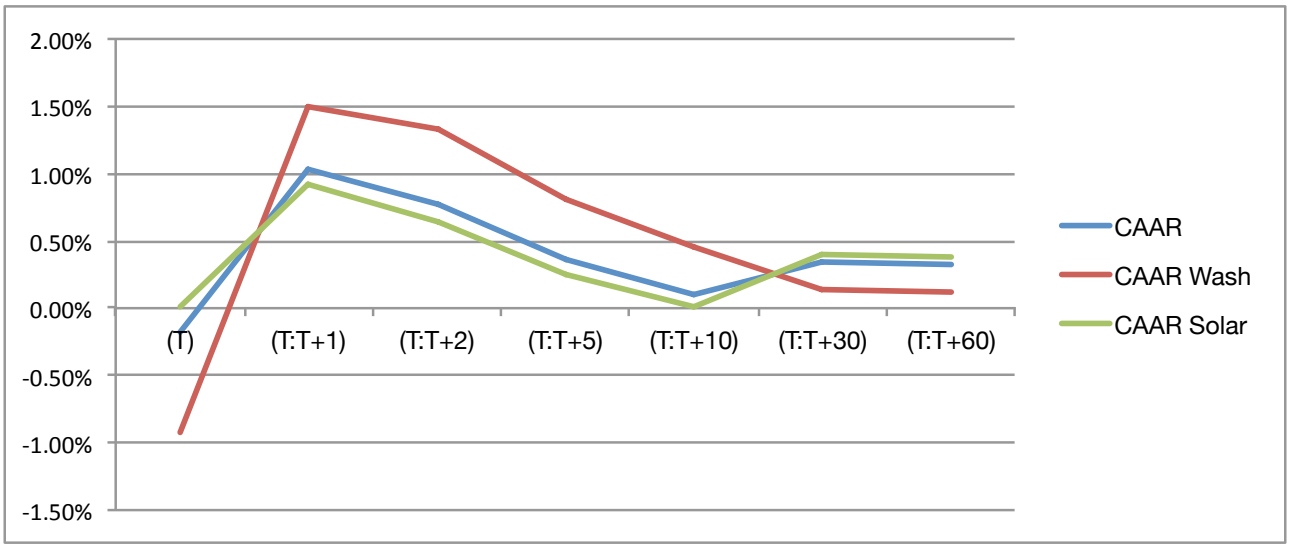

Figure 5 - Hypothesis 3: CAAR Domestic Producers

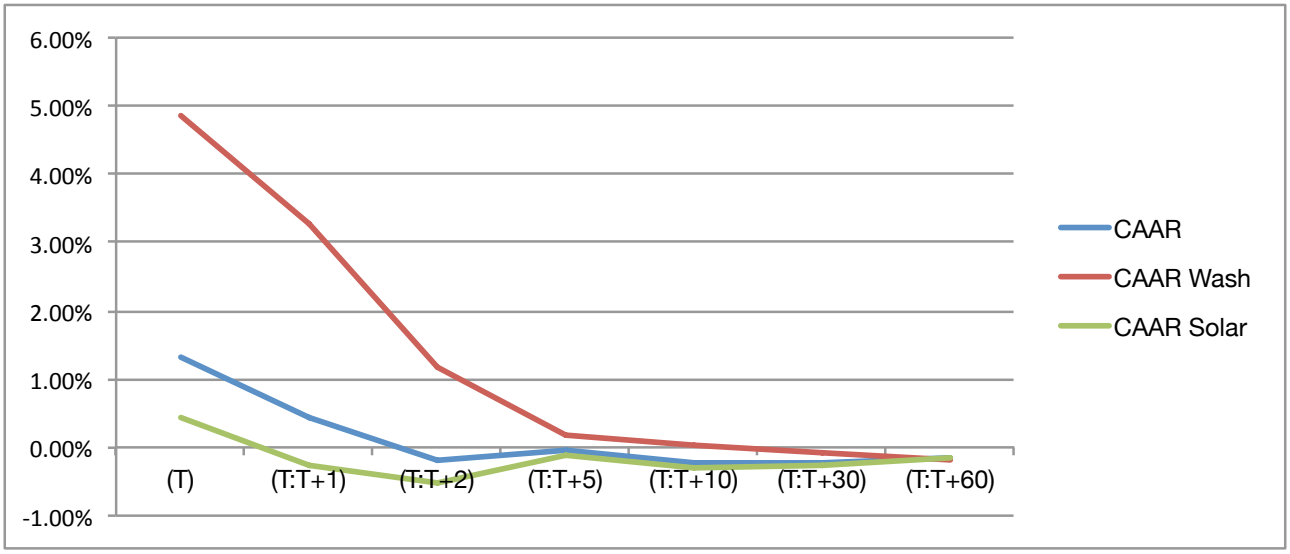

Figure 6 - Hypothesis 3: CAAR Foreign Producers

7.3 Hypothesis 4

Company	Exposure	C(2): (CAPM)	R2: (CAPM)	C(1): (MM)	C(2): (MM)	R2: (MM)	Av. R	Av. ER	Av. AR
Skyworks	84%	1.0964	0.3418	-0.0016	1.7357	0.4027	-2.71%	-2.71%	0.00%
Qorvo	71%	1.0072	0.1498	0.0001	1.3679	0.1618	-2.28%	-2.00%	-0.28%
Qualcomm	65%	0.9474	0.1600	0.0016	1.1337	0.1654	-2.07%	-1.51%	-0.57%
Micron	64%	1.0656	0.2134	-0.0002	1.9772	0.2790	-2.45%	-2.93%	0.49%
Broadcom	54%	1.0796	0.3535	-0.0014	1.4051	0.3754	-1.27%	-2.21%	0.94%
Nvidia	50%	1.0213	0.3836	0.0010	2.0850	0.5384	-2.55%	-2.96%	0.42%
TI	44%	1.0070	0.3713	0.0004	1.2785	0.3913	-2.22%	-1.85%	-0.38%
IPG	44%	0.9872	0.2913	0.0014	1.6304	0.3531	-2.79%	-2.26%	-0.53%
KLA	44%	1.0895	0.3394	-0.0015	1.5068	0.3704	-2.69%	-2.37%	-0.32%
Applied Mat.	42%	1.1262	0.4034	-0.0017	1.9109	0.4948	-2.42%	-2.99%	0.57%
Microchip	41%	1.1167	0.3880	-0.0021	1.5257	0.4202	-2.85%	-2.46%	-0.39%
Intel	40%	0.9927	0.2814	0.0008	1.4056	0.3113	-1.88%	-1.99%	0.11%
Western Dig	39%	1.0535	0.1613	-0.0015	1.0175	0.1623	-1.97%	-1.64%	-0.33%
LAM	39%	1.1439	0.3573	-0.0022	1.9298	0.4364	-2.75%	-3.06%	0.31%
AMD	33%	1.1580	0.1891	-0.0026	2.0116	0.2359	-2.71%	-3.22%	0.50%
Xilinx	26%	1.1034	0.4624	-0.0019	1.4799	0.4973	-2.48%	-2.37%	-0.11%
Apple	20%	1.0477	0.5434	-0.0008	1.2444	0.5583	-1.61%	-1.91%	0.30%
Analog Dev.	16%	1.0453	0.4090	-0.0010	1.0983	0.4094	-2.48%	-1.71%	-0.77%
	45%		**0.3221**		**1.5413**	**0.3646**	**-2.34%**	**-2.34%**	**0.00%**

Table 14 - Hypothesis 4: Detailed Returns per Company

Hypothesis Testing for AVERAGE RETURN				Hypothesis Testing for ABNORMALRETURN			
Sample: 1 18				Sample: 1 18			
Included observations: 18				Included observations: 18			
Test of Hypothesis: Mean = -0.014700				Test of Hypothesis: Mean = 0.000000			
Sample Mean = -0.023433				Sample Mean = -2.22e-05			
Sample Std. Dev. = 0.004370				Sample Std. Dev. = 0.004771			
Method		Value	Probability	Method		Value	Probability
t-statistic		-8.479688	0	t-statistic		-0.01976	0.9845

Table 15 - Hypothesis 4: T-Tests Hypothesis 4