Determinants of abnormal returns influenced by government policies

Effect on Dow Jones Industrial Average - Event Study

International Bachelor in Economics and Business Economics
Major Financial Economics

Alonso de la Mata [467363]
467373ad@student.eur.nl
Supervisor: dr. Ruben de Bliek
April 2020

Abstract

Government policies, economic and non-economic, are constantly released to improve a social or economic state of a country. For a policy to be economic, the main goal is to improve the economic situation of the country, whereas a non-economic policy's main goal may be to improve issues such as health, labor or immigration. This paper runs an event study to measure whether these lead to excess returns in stock prices, and the determinants of these. This research focuses on the Dow Jones Industrial Average, and the United States market of securities. The determinants potentially influencing abnormal returns, which are analyzed in this paper, are market and stock returns, market and stock volatilities, market capitalization, book to market ratio, and employment. By means of the market model, the findings suggest negative abnormal returns for economic policies. Through multivariate regressions, using the general to specific procedure, abnormal returns decrease through an increase in stock returns and book to market ratio, and increase by an increase in market volatility and market capitalization.

Contents

1 Introduction

As a result of the financial crisis in 2008, the government of the United States (U.S.) started developing policies to re-emerge the economy. For example, the U.S. treasury developed the Troubled Asset Relief Program (TARP) to restore economic growth, as stated by Segal (2020). In this way, government policies are continuously released to solve a country's issues. These consist of legal regulations that aim to promote actions in a specific field. As stated by Brogaard and Detzel (2015), government economic policy is important due to the high investment and expenditure by the government; in 2009 the expenditures equalled 42.45% of the gross domestic product in the United States. Fuhrmann (2019) explains that democratic parties rely heavily on the government to regulate the economy while republican parties support limited government involvement. Moreover, the announcement of government policies, may result in an influence in stock returns, and thus affect investors. In the Fortune newspaper, Sherman (2019) describes this by comparing the stock markets between Barack Obama's and Donald Trump's administrations, mentioning that market growth was stronger under Obama's administration. A representation of stock returns affected by government policy can be the Dow Jones Industrial Average, as Rosevear (2017) mentions that the companies in this index are considered major players in their own industries. Furthermore, government policies are categorized into two fields, being economic and non-economic. The difference between these is that the main purpose of an economic policy aims to impact a country's economy, e.g. a 10 percent tariff on imports from China into the U.S. (Li (2019)), while a non-economic policy's main purpose does not. However, non-economic policies can, directly or indirectly impact the country's economy, e.g. the implementation of the Medicare program providing healthcare supported by taxes (Amadeo (2020)). Therefore, economic policies consist of monetary or fiscal policies, while non-economic policies consist of health, social, environmental, labor and immigration issues.

There are many articles discussing the influence of a government policy's uncertainty in the stock prices. Baker, Bloom, and Davis (2016) develop an index of economic policy uncertainty (EPU) based on newspaper articles. Pastor and Veronesi (2012) develop a theoretical study regarding economic and non-economically motivated policies, concluding that stock prices should fall on the announcement date of a policy change. Brogaard and Detzel (2015) make use of Pastor and Veronesi (2012)'s models to describe economic policy uncertainty and its implications, finding that EPU leads to abnormal returns. Ko and Lee (2015) and Ferguson and Lam (2016) make use of the two previous papers. Ko and Lee (2015) develop a wavelet analysis on how economic policy uncertainty affects stock prices, revealing a general negative relationship. Ferguson and Lam (2016) focus on the uranium industry to show there are significant stock price reactions to uranium-related policy events, concluding that uranium-related policy events result in significant stock price reactions. Overall, these papers aim to find whether the uncertainty of an economic policy affects stock prices. Other papers such as Su, Yip, and Wong (2002) focus on different aspects in which governments impact share prices. They develop an analysis on how an investment of the government in the stock market flips the downward trend and reduces the volatility of the market.

Most of this literature focuses specifically on the uncertainty of economic government policies, and their impact on stock prices. However, for this interesting topic to be more applicable to real life, we need to take a step back, and research this topic on a more general perspective,

i.e. the effect of implementation of government policies on stock prices, regardless of uncertainty. Instead, it is interesting to classify the policies as economic and non-economic to identify how their effect on stock prices differs. In fact, Pastor and Veronesi (2012), as opposed to most literature focus on economic and non-economic policies, but do not distinguish them from one another when developing conclusions. To cover this gap, this study will distinguish between economic and non-economic government policies and measure their different effects on stock prices. Due to the large amount of available data in the United States, this will be the unit of analysis of the study, and will use the Dow Jones Industrial Average (DJIA) to extract the data from, as it is a representative index of the largest companies involved in industrial activities. The research question of this study therefore is:

Do the introduction of economic and non-economic government policies in the United States result in abnormal returns to the Dow Jones Industrial Average?

Examining these issues is important as this will provide further knowledge on the topic, and investors will understand how the stock market will react to different types of policies, thus being able to act in advance and avoid any negative abnormal returns. This will also have academic significance as further studies, theoretical or empirical, can derive different approaches to examine abnormal returns and compare it to my paper, discussing what theory obtains better results. The research question is interpreted and analysed using an event study. Following the above-mentioned literature review, this study extracts 5 to 10 economically motivated policies and 5 to 10 non-economic policies in the United States from January 20, 2009 up to and including January 20, 2017, as this time period consists of Barack Obama's administration. This period is preferred over others as it is the most recent period where a democratic party was elected, as a democratic party applies more government policies than a republican party as mentioned by Fuhrmann (2019).

Although researchers limit themselves to articles related to economic policy-related uncertainty, I expand on this and select articles related to economic and non-economic policies, regardless of uncertainty. On top of this, I use governmental websites which provide thorough information on these policies. The announcement dates for each of these policies are represented as the official signing date. Out of these announcement dates, an event study is created. To do this I extract the DJIA stock prices from the Yahoo Finance database from 170 days before to 10 days after the announcement date. The control period is set from 170 days to 71 days before the announcement date. Using the market model these dates are used to calculate the normal and abnormal returns from 10 days before to 10 days after the announcement date. Microsoft excel is used to construct these returns and find their significance, by means of a t-test. Again, using Microsoft excel, from 70 to 11 days before the announcement date the market returns, stock returns, market volatility and stock volatility are determined. On top of calculating the abnormal returns, I analyse the reason of these returns by using several determinants. These determinants are the four mentioned variables (market returns, stock returns, market volatility and stock volatility), the size (measured as market capitalization), book to market ratio, and employment. To find out the significance of these variables, multivariate regressions are run in STATA.

I expect to find that the implementation of government policies during 2008 to 2017 result in abnormal returns. It is hard to identify if the abnormal returns in the stock exchange have been caused by the specific policies. That is why I examine several policies for each group (economic and non-economic) and see if the average of these abnormal returns is significantly different from

zero.

2 Theoretical Framework

2.1 Government policies affecting stock prices

Earlier literature has developed studies on how government policies influence stock prices. Most of this literature measures how the uncertainty of economic policies affects stock prices in general, while other papers focus on specific industries. Moreover, there are papers that decide to measure the uncertainty of policies, both economic and non-economic, although the studies do not distinguish between these two categories.

To begin with, Baker, Bloom, and Davis (2013) construct an index of economic policy uncertainty using the frequency of appearance of specific keywords in newspaper articles, federal tax code expirations, and the forecaster disagreement over inflation and government purchases. The authors analyse the leading newspapers of the United States and other major economies including Germany and the United Kingdom to construct the indices, using keywords such as 'uncertainty' and 'economy' to select the articles. The newspapers used for the U.S. indices are: *USA Today, Miami Herald, Chicago Tribune, Washington Post, Los Angeles Times, Boston Globe, San Francisco Chronicle, Dallas Morning News, New York Times, and Wall Street Journal.* They then obtain a yearly value for tax code expirations. To compute the forecaster disagreement, the authors make use of the Survey of Professional Forecasters. These three types of information are then weighed accordingly to construct the overall index. They also compute indices for Germany, Spain, Italy, France and the United Kingdom. In these, they base 50% of the weight on newspaper articles and 50% on forecaster disagreements, as the researchers only considered tax code expirations relevant for the U.S. The authors apply different methods to determine whether their EPU (Economic Policy Uncertainty) indices are valid. These instruments show that their index is an accurate representation of real economic policy uncertainty.

Furthermore, Baker et al. (2013) analyze the sources and the potential effects of economic policy uncertainty. To find the sources they create indices for specific policies, as can be monetary policies, using the keywords method. The analysis suggests that the U.S. newspapers are more concerned with policy uncertainty regarding taxes, government spending, healthcare and entitlement reform. To investigate the potential effects, the authors use micro data and value at risk measures. Regarding the micro data, they analyze the impact of policy uncertainty on firm-level indicators such as investment and hiring. They use data from Compustat and the Federal Registry of Contracts to obtain a measure of government intensity. The results show that policy uncertainty leads to negative effects on firms that are more exposed to government contracting. Then they use value at risk (VAR) estimates which show negative effects on employment and production, influenced by an increase in policy uncertainty. Their paper is relevant for this study as they take many different approaches to evaluate the validity of economic policy uncertainty measurements, as well as its potential effects. This paper is helpful in order to gain a more in-depth understanding on how economic policy uncertainty affect micro and macro factors.

Baker et al. (2016) develop a monthly index based uniquely on the frequency of newspaper articles containing three keywords such as 'uncertainty', 'economic' and 'Congress'. The authors use the same major newspapers as Baker et al. (2013) to construct the U.S. index, taking articles

from 1985 onward. Moreover, they create indices for policy categories, using the same method as in the general index, showing that fiscal matters (tax policy) influence policy uncertainty the most. They then construct indices for India, Canada, South Korea, France, Germany, Italy, Japan, Spain, the United Kingdom, China and Russia. As Baker et al. (2013), they run an audit to assess the reliability of their index, and use Gentzkow and Shapiro (2010)'s media slant index, showing that political slant does not significantly affect the index. The authors again compare their index to the Beige Books and analyze factors causing high volatilities. These measures show that the index contains useful information regarding economic policy uncertainty.

Baker et al. (2016) then analyze the effect of policy uncertainty on economic outcomes on microeconomic and macroeconomic levels. To measure the firm effect, the authors use option-implied stock price volatility as a measure for firm-level uncertainty and employment growth as real activity. As in 2013, the authors compute a government intensity variable to see how the log(EPU) * intensity affects the implied stock price volatility. The results imply that policy uncertainty drives firm-level stock price volatility. Moreover, the authors run different regressions including the ratio of federal purchases to GDP, to show that an increase in policy uncertainty leads are associated with decreases in investment rates and employment growth rates. To measure the macro effect, the authors run VAR models which provide evidence to an increase in policy uncertainty harming macroeconomic performance.

Pastor and Veronesi (2012) develop a theoretical asset pricing model on how changes in government policy should affect stock prices. The model makes three assumptions: that the government acts in a kind way, there is uncertainty about its actions and their impact, and the impacts of all policy choices seem identical. Due to the first assumption, investors can anticipate policy changes that increase stock prices, but cannot anticipate policy changes that decrease stock prices. This then results in the negative returns being larger than the positive returns. Therefore,the model predicts average negative stock market returns at the announcement date of a policy change, where the greater the uncertainty about the government policy, the greater the stock returns. They also conclude that a change in policy should increase stock volatility, and increase the correlation across firms of stock returns.

The authors later on develop their model and decide to write a paper on political uncertainty and risk premia (Pástor and Veronesi (2013)). In this model, the government usually changes a policy if the economy is in a weak period, which provides put protection to the market. However, political uncertainty reduces the protection, increases stock volatility and risk premia. Therefore, the risk premium and stock volatility are higher when the economy is weak. Moreover, a greater difference in the announced policies leads to an increase in stock volatilities and risk premia.

Brogaard and Detzel (2015) use the same measure as Baker et al. (2013) to construct their index and identify the effect of EPU in asset prices. To test this they use the ICAPM by Merton (1973), and the causal mechanisms by Pastor and Veronesi (2012) and Pástor and Veronesi (2013). The authors use CRSP to obtain the value-weighted index (representing stock market performance), stock returns, share prices, and the number of shares outstanding for all common stocks. Then, they obtain the Fama and French (1992) and Fama and French (1993) three factors (i.e. market capitalization, book to market ratio, and excess market returns), the Carhart (1997) momentum factor and the Pástor and Stambaugh (2003) liquidity factor. The authors use the volatility of market returns as a measure of general economic uncertainty to find out there is a positive correlation with EPU. By means of several regressions, including the above-mentioned factors as

independent variables and the return on the portfolio as dependent, the authors find that an increase in EPU leads to negative market returns and positive abnormal returns, however, EPU has no effect on cash flows. The paper overall concludes that EPU is an economically important risk factor.

Ko and Lee (2015) use the EPU index developed by Baker et al. (2013) and stock prices from Yahoo Finance to determine the relationship between EPU and stock prices using a wavelet analysis. They analyse this relationship in the U.S., Canada, France, Germany, Italy, the U.K., China, Japan and Russia from 1998 to 2014. The same relationship is analyzed in Spain from 2001 and in India from 2003. The stock prices represent the broad market indexes from each country, for example the S&P 500 for the U.S. The authors have three different findings. First, that economic policy uncertainty and stock prices have a negative relationship in the early and late 2000s. Second, the wavelets show four to eight year cycles, regardless of periods with economic crises. Third, the economic policy uncertainty of a country affects that of another, making it impossible for agents to diversify the uncertainty. They find that on average, an increase in EPU leads to a decrease in stock prices. In the early 2000s this occurs in cycles of four to eight years, but in cycles of two to four years in the late 2000s.

Ferguson and Lam (2016) develop a longitudinal analysis, an event study and examine a cross-sectional variation in market reactions to determine the effect of policy uncertainty on the Australian uranium industry. The authors obtain the daily stock prices from the Securities Industry Research Corporation Asia Pacific, and use Datastream to obtain daily data on the market and mining sector indices. With this, they obtain firm-level variables, those being market capitalization, uranium focus, number of projects by location, average proportion of projects by location, and project milestone. For the longitudinal analysis, they construct an index of government policy uncertainty (GPU) with the frequency of the keyword 'uranium' in 19 Australian newspapers, based on Baker et al. (2013)'s measure. The authors run a regression with the biweekly returns of the sample firms as dependent variable. The biweekly returns of the All Ordinaries market index, the S&P/ASX 300 Metals & Mining index and uranium spot prices represent the independent variables, and the Fama and French (1992) and Fama and French (1993) factors (market capitalization and book to market ratio) and the momentum factor by Carhart (1997) as control variables. Ferguson and Lam (2016) conclude that GPU has significant effects in stock prices. Regarding the event study, the authors examine specific events such as the 'Three Mines Policy', which consists of restricting production to three existing mines. They run a regression with the daily returns of uranium stocks as dependent variable, and All Ordinaries market index, the S&P/ASX 300 Metals & Mining index, and uranium spot prices as independent variables. Moreover, the authors include dummy variables and their interaction effect with abnormal returns in days 0 and -1. The results show significant stock prices reactions due to specific policy events, positive to policies restricting the 'Three Mines Policy'. In the cross-sectional variation, the authors analyse how cumulative abnormal returns change with firm level attributes, such as the market capitalisation, the operational focus, the advanced explorers and potential producers (included as a unique variable), anti-uranium state and overseas locations. Their results show that firms with higher operational focus exhibit positive returns with favourable policy events. On the other hand, firms with high proportions of their location in states where uranium is not positively regarded or overseas, experience negative stock prices to good news. Furthermore, the authors prove that stock price reactions are not driven by confounding events by running additional tests that show price reversals in cumulative

abnormal returns in response to related but opposing events.

Belo, Gala, and Li (2013) investigate how political cycles, regarding government spending, affect the cross section of US stock returns. They compare the stock prices of firms in industries with heterogeneous government spending to analyse their performance in each presidential partisan cycle. To do this, they measure the industry exposure to government spending, with the data from the Benchmark Input-Output Accounts. They then obtain monthly stock returns and market capitalization from CRSP. Belo et al. (2013) run several regressions, including size, book to market ratio, momentum, beta, the interaction effect between democratic government and industry exposure, the interaction effect between republican government and industry exposure, the political contribution and the interaction effects between government exposure and geographical location. The authors find out that firms with high exposure to government spending outperform firms with low exposure during Democratic presidencies, but under-perform during Republican presidencies. Moreover, the stock market puzzle pointed out by Santa-Clara and Valkanov (2003) (abnormal returns in the US are higher under Democratic than under Republican presidencies) is high in industries with high exposure. They also identify that the pattern in the returns of the government exposure portfolios is not due to business cycle effects such as firm characteristics (e.g. size, book-to-market ratio, momentum and market beta). Furthermore, high government exposure firms have higher profitability than low government exposure firms during Democratic presidential terms. During Republican presidential terms the reverse occurs. Additionally, they find a positive relationship between exposure to government spending and volatility of profitability.

Tirtiroglu, Bhabra, and Lel (2004) develop an event study to measure how political risk affects stock prices, using business relocations in Canada. This paper estimates the market model by using returns from -75 to -11. The results are calculated using both the equally weighted and value weighted indices as market portfolios, by means of a t-test. Moreover, they run a Chi-square test of independence to show that political uncertainty is likely to explain the difference in results regarding the city of relocation of firms. The authors find a significant positive stock price reaction for firms relocating from Quebec, while responses are insignificant for firms relocating from Toronto. On the other hand, firms moving to Quebec experience negative excess returns, being positive for firms moving to Toronto.

Mills, Coutts, and Roberts (1996) examine the consequences of regression misspecification of the market model when running an event study. The authors indicate that using ordinary least squares (OLS) to estimate the parameters is extremely unreliable. Therefore, mention that using robust estimators is more precise as the data sets exhibit excess fat tails. Moreover, OLS estimates larger betas, estimating a higher risk for securities. Also, using a robust method is important when estimating abnormal returns as the behavior of the intercepts is extremely sensitive to the estimation technique.

These papers do not distinguish between economic and non-economic policies. Therefore, the effect that different types of policies, regardless of uncertainty, have on stock prices may differ. This paper researches if government policies lead to any abnormal returns in the stock prices of the companies in the Dow Jones Industrial Average. As past literature indicates, an increase in economic policy uncertainty leads to negative excess returns. Economic policies are generally announced in order to recover from financial issues, that present uncertainty in the market. On the other hand, non-economic policies have more certainty relative to economic policies, as these are not released to recover from financial issues. Instead, these are implemented in more stable

periods, where their influence in stock prices can be better predicted. This assumption leads to the first hypothesis:

H_1: *Economic (non-economic) government policy announcements lead to negative (positive) abnormal returns*

2.2 Determinants of abnormal returns

To derive the variables that influence excess returns, 7 hypotheses are formulated. These are all based on past literature. Since past literature refers to economic policy uncertainty, their conclusions are assumed to be in correspondence with this paper's economic policies, as these are regarded with higher uncertainty relative to non-economic. Therefore, the opposite effect is expected regarding non-economic policies.

2.2.1 Returns

Brogaard and Detzel (2015) mention that an increase in EPU leads to negative market returns. Moreover, Pastor and Veronesi (2012) use a model that predicts negative market returns at the announcement date. An increase in market returns shows that the overall market in a country, which can more broadly be defined as the economy, increases. The implementation of an economic policy would lead the market returns to increase, therefore leading to negative abnormal returns, to keep the portfolio returns more stable. Therefore, the second hypothesis predicts that:

H_2: *Market returns lead to negative (positive) abnormal returns in economic (non-economic) policies*

Baker et al. (2013), Baker et al. (2016) and Ko and Lee (2015) conclude that an increase in EPU leads to negative stock prices. Similar to market returns, the implementation of an economic policy would produce an increase in stock returns. This would then motivate market returns to increase, reaching equilibrium, and thus leading to negative abnormal returns. This would lead to the third hypothesis:

H_3: *Stock returns lead to negative (positive) abnormal returns in economic (non-economic) policies*

2.2.2 Volatility

Brogaard and Detzel (2015) find a positive correlation between market volatility and EPU. During the introduction of an economic policy, the uncertainty on what effect the policy might have in the market is high, therefore causing investors to act very differently. The effect of investors leads to an increase in market volatility. Since the effect that market returns may have on portfolio returns, this leads to an increase in abnormal returns. The fourth hypothesis therefore states that:

H_4: *Market volatility leads to positive (negative) abnormal returns in economic (non-economic) policies*

Baker et al. (2016) indicate that policy uncertainty has significant effects in stock volatility. Pastor and Veronesi (2012) derive a conclusion which states that policy changes increase stock

volatility. Later on, Pástor and Veronesi (2013) give evidence that a weaker economy leads to a higher stock volatility. This variable works alike market volatility, therefore the high uncertainty causes an increase in stock volatility, which causes positive abnormal returns. The fifth hypothesis predicts that:

H_5: *Stock volatility leads to positive (negative) abnormal returns in economic (non-economic) policies*

2.2.3 Firm characteristics

Belo et al. (2013) find that the returns of government exposure portfolios are not due to size, measured by market capitalization. However, Ferguson and Lam (2016) still control for this factor and see how it affects portfolio returns. On average, size affects portfolio returns positively. Due to the higher uncertainty of economic policies, a portfolio with a greater market capitalization, may lead to positive portfolio returns, on average. On the other hand, when the effect on the market can be better predicted, smaller companies might take this advantage to overcome bigger firms and thus cause firms with greater market capitalization to decrease their portfolio returns. The sixth hypothesis therefore predicts that:

H_6: *Size leads to positive (negative) abnormal returns in economic (non-economic) policies*

Ferguson and Lam (2016) find insignificant effects of book to market ratio, however obtain a negative insignificant value. A greater book to market ratio implies that the potrfolio's value increases relative to the market. When the effect on the market is more certain, investors act upon this and sell (buy) the stock when the stock price will decrease (increase). The book to market ratio increases as the market value (and abnormal returns) decreases. The seventh hypothesis predicts that:

H_7: *Book to market ratio leads to negative (positive) abnormal returns in economic (non-economic) policies*

2.2.4 Macroeconomic

Baker et al. (2016) find that policy uncertainty has significant negative effects on employment growth. A higher number of employees leads to higher amount of spending, and therefore higher amount of portfolio returns (as caused by abnormal returns). However, this only occurs when non-economic policies are implemented, as the certainty of the effect leads to a greater amount of investors. This leads to the last, eighth, hypothesis which states that:

H_8: *Employment growth leads to negative (positive) abnormal returns in economic (non-economic) policies*

3 Data and Methodology

3.1 Data

The data obtained for this paper consists of important policy events, data used to calculate abnormal returns and data for the different variables.

The main policies from Obama's administration are obtained from Miller Center (2019). These make 11 economic policies[1] and 34 non-economic policies[2]. For example, the Dodd-Frank Wall Street Reform and Consumer Protection Act U.S. Government (2010), is an example of an economic policy. This policy was released as a response to the 2008 financial crisis. The main goal of this policy is to restore the financial system by establishing certain conditions to be met by financial intermediaries, such as banks. This way, these entities have to act under certain standards as could be increasing the liquidity or not providing loans to a person with low probabilities of paying back. The Lilly Ledbetter Fair Pay Act of 2009 U.S. Government (2009), is an example of a non-economic policy. This policy's main goal was to establish equal treatment of employees regardless of a person's age, religion, sex, origin, or disability. Even though this policy has economic influences as the wages of certain people could change after its implementation, it is considered as a social policy due to its main purpose. Moreover, the given date in the University of Virginia (which corresponds to the date where the policy was approved) is taken into account as the announcement date.

The stock prices, measured in U.S. dollars, for the Dow Jones Industrial Average are extracted from Yahoo Finance (2020). The values examined are the adjusted close price for dividends and splits from 16 May 2008 until and including February 6th 2017. These are the dates included in the data since Obama's administration started January 20th 2009 and ended on January 20th 2017, but for the event study, the period examined is 170 days before to 10 days after the event. Therefore, covering for an event occurring on the 20th of January 2009 or on the 20th of January 2017. The market price values, in U.S. dollars, correspond to the CRSP Stock Market indices extracted from Wharton Research Data Services (2020), again, from 16 May 2008 up to and including 6 February 2017. These include the NYSE, AMEX, Nasdaq, and ARCA stock exchange values. These two sets of data, along with the dates of the policies are used to identify abnormal returns (the process is explained in depth in the next section).

The independent variables, or potential determinants of abnormal returns are shown in table 1. These include four variables that are calculated using the price of the DJIA index from Yahoo Finance (2020) and the market prices from Wharton Research Data Services (2020); market returns, stock returns, market volatility and stock volatility. The variables size and book to market ratio are obtained from Refinitiv Eikon (2020), using the market value as size, and the price index divided by the market value as the book to market ratio. The last variable, employment, is obtained from U.S. Bureau of Labor Statistics (2020), which shows a monthly average of all employees (in thousands) in the U.S.

[1]The economic policies in chronological order are: Cap on top executive pay, Auto bailout, Volcker Rule, Wall Street reform, Two-year pay freeze proposal 'Tax Relief, Unemployment Insurance Reauthorization, and Job Creation Act', Budget Control Act, American Jobs Act, Against insider trading, Taxpayer relief, and Minimum wage.

[2]The non-economic policies are, in chronological order: Close Guantánamo Bay, Lilly Ledbetter Fair Pay Act, American Recovery and Reinvestment Act, Stem cell research, HIV travel ban, Hate Crimes Prevention Act, Haiti aid, Nuclear reactor loans, School grants, Affordable Care Act, East Coast drilling, Reduction of nuclear arms, Budget funding for NASA, Veteran education reform, 'Equal access, opportunity, and respect', Healthy kids, "Don't Ask, Don't Tell" policy, New START treaty, Military trials for detainees, Iranian sanctions, Immigration reform 2013, Violence against women, Climate plan, Student loans, Climate change and its effects, Agriculture Act, LGBT discrimination, Child Care grant, Immigration reform 2014, Free community college, Veteran suicide epidemic, Gay marriage, Clean Power Plan, and Deal with Iran

Table 1: *Descriptive statistics of independent variables*

Variable	Economic			Non-economic		
	Observations	Mean	Standard deviation	Observations	Mean	Standard deviation
Market returns	231	-.0023371	.099277	714	.0380793	.0713849
Stock returns	231	.0056785	.0638428	714	.0229994	.0702058
Market volatility	231	.0147533	.0096593	714	.0119893	.0089008
Stock volatility	231	.0132674	.0086007	714	.0109	.0079468
Size	231	3542862	674231.2	714	3974728	835929.4
Book to market ratio	231	.0032069	.0001643	714	.0032011	.0001914
Employment	231	132945.7	2947.363	714	134348.9	4379.588

3.2 Methodology

3.2.1 Abnormal returns and Cumulative abnormal returns

To obtain abnormal returns, only the first three mentioned databases are necessary. The data from Yahoo Finance (2020) in this paper is selected from the 16th of May 2008 to the 7th of February 2017, otherwise the database would not give a value for February 6, 2017. This is then arranged in a column in excel, with its corresponding dates. On a separate column, arranging the rows with the same dates, are the market values from Wharton Research Data Services (2020). These are extracted by selecting May 2008 to February 2017, as a 'day' option is not available. Then, on a separate sheet I have arranged the policies with their corresponding dates from 171 days before the announcement date to 10 days after the announcement date, as stated in Miller Center (2019). This is then used to obtain the stock and market prices for those specific days. Then,

$$\frac{P_1 - P_0}{P_0} = R_1 \tag{1}$$

is used to obtain returns, from 170 days before to 10 days after the announcement date for each policy, where P_0 is the price at time t=0, P_1 is the price at time t=1 and R_1 represents the returns at time t=1. Having the returns, the goal is to identify the error term (U_{it}) in the following equation:

$$R_{it} = \alpha_i + \beta_i R_{mt} + U_{it} \tag{2}$$

where R_{mt} is the market return, R_{it} is the return of the portfolio (DJIA), α is the constant term (the return on the portfolio not explained by the market) and β represents the slope (the return on the portfolio explained by the market). To identify the error term, we first have to find α and β. This is done by performing a linear regression in Excel, using the control period [-170, -71]. Using α and β, the normal returns are calculated for the test period [-10, +10]. The final step is to subtract the daily normal returns from the actual returns (from the DJIA) in the test period, obtaining daily abnormal returns for the test period, as shown in equation 3.

$$ar_{it} = R_{it} - E(R_{it}) \tag{3}$$

After calculating abnormal returns, to answer the first hypothesis, a t-test is conducted to analyse the null hypothesis, which states there are no abnormal returns ($H_0 : \mu = 0$) against the alternative hypothesis, stating that there are abnormal returns ($H_\alpha : \mu \neq 0$). The formula used to calculate the t-statistic is

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}}, \tag{4}$$

where $\bar{x}$ is the sample mean, μ is the population mean, s is the sample standard deviation and n is the number of policies. The sample mean is calculated by averaging the abnormal returns of all policies on a single day (AR_t). The population mean is 0, since the null hypothesis states so. Then, the sample standard deviation is calculated using the following equation:

$$s = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}, \tag{5}$$

where x_i is the abnormal return on a single day of a single policy. Finally, n equals the number of policies. The abnormal return is then significant at a 10%, 5% and 1% level if the t-value is greater than or equal to 1.645, 1.96 and 2.576 respectively.

Moreover, the cumulative abnormal returns (car_{it}) are also calculated to answer the first hypothesis. These are computed by adding the values for each policy on consecutive days where there are significant average abnormal returns (e.g., if AR_t is significant for days -2 to 2, then car_{it}[-2, +2] is computed by adding the values of each policy on days -2 to +2). Then, the different car_{it} are averaged to obtain the cumulative average abnormal returns (CAR_t). The same method as for average abnormal returns is used to test for its significance.

In case no two consecutive days are significant, it is still possible that cumulative average abnormal returns (CAR_t) are significant, so a different approach is taken. First a standard error for each policy is calculated using the returns of both the stock and the market from 170 days to 71 days before the announcement date (the same dates used to calculated α and β). Then the daily abnormal returns (ar_{it}) for each policy are divided by the standard error from the specific policy to obtain the t-value. The t-values greater than or equal to 1.645 (10% significance) are then shown in a separate sheet in order to see how many significant values are per day. If two or more consecutive days have at least a significant policy per day, then the abnormal returns (ar_{it}) of those days are added to calculate cumulative abnormal returns (car_{it}), which are then averaged to obtain the cumulative average abnormal returns (CAR_t).

3.2.2 Determinants of abnormal returns

The goal of hypotheses 2 to 8 is to determine which variables affect abnormal returns (the dependent variable). This paper runs two analyses to conclude these hypotheses. In both, all variables used in this paper are analyzed as independent.

In the first analysis, four different sets of multivariate regressions take place. These are the regressions where the dependent variable corresponds to the average abnormal returns (AR_t) from economic policies, average abnormal returns (AR_t) from non-economic policies, cumulative average abnormal returns (CAR_t) from economic policies, and cumulative average abnormal returns (CAR_t) from non-economic policies.

First, market and stock returns, and market and stock volatilities are calculated on Excel using only data from 70 days before the announcement date to the current date. Market and stock

returns consist on the total return from day -70 to the current date. For example, the returns on day 3 are calculated as expressed in equation 6.

$$\frac{P_3 - P_{-70}}{P_{-70}} = R \tag{6}$$

Market and stock volatility represent the standard deviation from day -70 to the current date. These four are calculated using the prices from the market and DJIA (stock) as extracted from Wharton Research Data Services (2020) and Yahoo Finance (2020) respectively.

The size and book to market ratio variables are obtained from Refinitiv Eikon (2020). More specifically, the data obtained is the price index and the market value from the Dow Jones Industrial Average (with the code name DJINDUS in the database), from the 16th of May 2008 up to and including 6th of February 2017. Even though the price index is already given in yahoo finance, I wanted to make sure these values correspond, so the book to market ratio is calculated using values from the same database. The market value represents the size variable. The book to market ratio variable is calculated by dividing the price index over the market value. Refinitiv Eikon (2020) has more dates than those in Yahoo Finance (2020) and Wharton Research Data Services (2020). However, these extra dates are not trading days and therefore have the same value as the last trading day before them. Therefore, the extra days are deleted in order to arrange all variables with the same dates as the abnormal returns. Moreover, a daily average of all the policies is computed to add these variables to the regression.

Finally, the employment variable is obtained from U.S. Bureau of Labor Statistics (2020). There, the data used corresponds to the specific database named Employment, Hours, and Earnings - National (Current Employment Statistics - CES). The data obtained corresponds to the employment in the U.S. of every sector. The database provides monthly data, therefore in the Excel file, the same value is included in different days of a same month. Again, the average of all policies per day is computed and these values included in the regression.

These variables are then arranged in a way in which STATA can recognize them (see Appendix C, table 14). Hypotheses 2 to 8 are therefore all tested in STATA, by means of linear regression analysis. The dependent variables correspond to the average abnormal returns (AR_t) and cumulative average abnormal returns (CAR_t). The independent variables are all of the variables included in table 1. These independent variables are analysed as they could have an influence on the stock prices and help explain why there are abnormal returns.

In the cumulative average abnormal returns (CAR_t) regressions, the rest of the variables are also cumulative, that is, adding the values of the days before for each value (this is shown in Appendix C in table 15). In each of the four sets, the general to specific (GETS) procedure is used. First, a general model is provided, but due to insignificance of some results, this model is simplified to a more specific model that "adequately characterizes the empirical evidence within his or her theoretical framework" (Campos, Ericsson, and Hendry (2005)). Therefore several regressions are processed, each with one less variable (the variable removed is the one with the highest p-value, regardless of the constant) until all variables are significant. Furthermore, robust standard errors are used as Mills et al. (1996) indicate these are more precise than OLS. Moreover, robust standard errors correct for multicollinearity, thus making the data more reliable.

The second analysis includes the abnormal returns (ar_{it}) and cumulative abnormal returns (car_{it}) as dependent variables. In this analysis another four sets of multivariate regressions are

run, referring to abnormal and cumulative abnormal returns each for economic and non-economic policies. However, in this test, the regressions implement the random effects model. Then, the GETS procedure, and robust standard errors are used. The same independent variables as in the other method are used, although in this they are not averaged. Moreover, stock and market returns, and stock and market volatilities are calculated differently. These are calculated on Excel using only data from 70 days to 11 days before the announcement date ([-70, -11]). Market and stock returns consist on the total return from day -70 to -11, as seen in equation 7.

$$\frac{P_{-11} - P_{-70}}{P_{-70}} = R \tag{7}$$

Market and stock volatility represent the standard deviation from day -70 to -11. Therefore, these variables provide a constant result for each day in the test period for each policy. An example of the data, as implemented into STATA, for abnormal returns can be seen in Appendix D, table 20 and 21 for cumulative abnormal returns.

4 Results

4.1 Abnormal returns

The descriptive statistics regarding abnormal and cumulative abnormal returns are shown in table 2.

Table 2: *Descriptive statistics of dependent variable*

Variable	Economic			Non-economic		
	Observations	Mean	Standard deviation	Observations	Mean	Standard deviation
Abnormal returns	231*	-.0004168	.0029743	714*	-.0001939	.0028976

*observations correspond to the number of trade days times the number of policies ($21 * 11$ for economic and $21 * 34$ for non-economic)

To analyze hypothesis 1, I derive the average abnormal returns and cumulative average abnormal returns. The results are then displayed in tables 3 and 4.

Table 3: *Average abnormal returns on days [-10, +10]*

Day	Economic		Non-economic	
	AR_t	T-value	AR_t	T-value
-10	0,000833	0,798074	0,000182	0,333794
-9	0,000386	0,462996	-0,000847	-1,513797
-8	-0,002107*	-1,900704	-0,000252	-0,524325
-7	-0,000241	-0,274779	0,000383	0,637771
-6	-0,000227	-0,252769	-0,000087	-0,197884
-5	-0,001744**	-2,179483	0,000261	0,573099
-4	0,000774	1,445861	-0,000388	-0,729853
-3	-0,000505	-0,952214	0,000102	0,319923
-2	-0,001096	-1,160093	0,000030	0,054038
-1	-0,000250	-0,317362	-0,000586	-1,216340
0	-0,002224**	-2,117338	0,000798	1,606813
1	-0,002019***	-4,084613	-0,000381	-0,774496
2	0,000292	0,445919	-0,000535	-1,133091
3	0,000306	0,268834	-0,000732	-1,330671
4	0,000087	0,129376	-0,001120**	-2,251702
5	-0,000058	-0,073715	0,000482	1,019785
6	-0,001345	-0,933453	0,000116	0,224304
7	-0,000006	-0,006659	-0,000603	-1,035778
8	0,001774**	2,111466	0,000040	0,087289
9	0,000310	0,518503	-0,000572	-1,234083
10	-0,001694**	-2,042417	-0,000363	-0,963278

*significance level of 10%, **significance level of 5%, ***significance level of 1%

Table 3 shows the test period (from 10 days before to 10 days after the announcement period), for both economic and non-economic policies. It shows the values for each day, which represent the error term (U_{it}) in the above-mentioned equation ($R_{it} = \alpha_i + \beta_i R_{mt} + U_{it}$), with the corresponding t-values, which show the significance of this value. For economic policies, days -8, -5, 0, 1, 8 and 10 (6 out of 21 days) are significant, while for non-economic policies only day 4 is significant. This means that there are abnormal returns in these days, with more reliability on some days than others (as a 1% significance level shows a lower risk than a 5% or a 10% significance level). Moreover, 5 out of the 6 economic policy significant days show negative values, as does the only significant day in non-economic policies.

As already mentioned in the methodology, the data from this table is then used to calculate the cumulative average abnormal returns (CAR_t). For economic policies, the only consecutive significant days are 0 and 1. Therefore the CAR_t for economic policies is calculated using these days. On the right side of the table, there is only one significant day for non-economic policies, which means that the CAR_t cannot be computed using this method. Instead, the cumulative average abnormal returns are computed using the alternative method mentioned in the methodology (an example is shown in Appendix B, table 13. This gives result to a calculation of these using days -10 to -4 and -2 to 10. As this is an equally valid way to calculate the cumulative average abnormal returns, the same is done with economic policies, where the returns are calculated using days -10 to -6, -3 to 3 and 0 to 1. Moreover, it is interesting to measure the effect on all 21 days, therefore the CAR_t are also computed from days -10 to 10 for both economic and non-economic. Furthermore, to see the overall effect a policy has 10 days before and 10 days after it is announced, I run two CAR_t regressions per group, being from days -10 to 0 and 0 to 10. The results of this analysis are shown

in table 4.

Table 4: *Cumulative average abnormal returns*

Economic			Non-economic		
Days	CAR_t	T-value	Days	CAR_t	T-value
[-10, -6]	-0.001356	0.528099	[-10, -4]	-0.000749	0.513684
[-10, 0]	-0.006400*	1.726668	[-10, 0]	-0.000404	0.210992
[-10, 10]	-0.008753*	1.752482	[-10, 10]	-0.004071	1.339450
[-3, 3]	-0.005496***	2.989381	[-2, 10]	-0.003425	1.498162
[0, 1]	-0.004243***	3.303054	[0, 10]	0.002869	1.426024
[0, 10]	-0.004577*	1.676792			

*significance level of 10%, **significance level of 5%, ***significance level of 1%

As seen in the left side of table 4, regarding economic policies, a policy has an effect 10 days before and after the announcement and therefore an overall effect in the 21 days of the test period. Moreover, the method involving the AR_t, the period of days 0 to 1, provides significant results to a 1% significance level. 5 out of the 6 different periods for the economic policies are significant, showing that, on average, there are cumulative average abnormal returns. These results show negative values, which are consistent with the average abnormal returns. On the other hand, all of the periods involving cumulative average abnormal returns for non-economic policies do not result significant, meaning that there are no cumulative average abnormal returns when non-economic policies are announced

The results from tables 3 and 4 provide the necessary information to conclude the first hypothesis, which stated that economic (non-economic) government policy announcements lead to negative (positive) abnormal returns. Since there are several significant days that exhibit abnormal returns in economic policies, and the majority of periods in the cumulative average abnormal returns provide significant results, it can be concluded that economic policies show abnormal returns. Moreover, these abnormal returns are on average negative. Regarding the non-economic policies, only one day shows significant excess returns, while the cumulative average abnormal returns do not. Due to the insignificance of non-economic policies, there is evidence to reject the first hypothesis.

4.2 Determinants of abnormal returns

4.2.1 Average abnormal returns

Hypotheses 2 to 8 are analyzed by means of several multivariate regressions. These include average and cumulative average abnormal returns as dependent variables. The independent variables are also the average of all policies per day, as shown in tables 14 and 15. Furthermore, the GETS procedure is used, ending up with a regression with only the significant values. The general regression for abnormal returns is as follows:

$$AR_t = \beta_0 + \beta_1 * Marketret_t + \beta_2 * Stockret_t + \beta_3 * Marketvol_t + \beta_4 * Stockvol_t + \beta_5 * Size_t + \beta_6 * Bmratio_t + \beta_7 * Employment_t + e_t$$

The p-values for the multivariate AR_t regressions are shown in tables 5 and 6, where regression number 1 is the general equation.

Table 5: *Multivariate AR_t regressions for economic policies using robust standard errors. The table shows the p-values as calculated in STATA using regressions including the stated variables. The different regressions show the GETS procedure, as the variable with the highest p-value is not included in the next regression. At the bottom the R^2 and the total number of observations are shown.*

Variables	Regression			
	1	2	3	4
Constant	0.159	0.153	0.093*	0.017**
Market returns	0.023**	0.023**	0.014**	0.018**
Market volatility	0.883	0.063*	0.050**	0.047**
Size	0.223	0.210	0.012**	0.014**
Book to market ratio	0.043**	0.038**	0.015**	0.027**
Employment	0.554	0.545	0.536	
Stock returns	0.974	0.975		
Stock volatility	0.980			
R^2	0.345	0.345	0.345	0.332
N	21			

*significance level of 10%, **significance level of 5%, ***significance level of 1%

Table 5 shows that the specific (significant) AR_t regression for economic policies includes all variables except employment, stock returns and stock volatility. The constant term, market returns, market volatility, size, and book to market ratio have p-values of 0.017, 0.018, 0.047, 0.014 and 0.027 respectively, meaning they are significant to a 5% significance level. Table 16 then displays the values of these variables. The R^2 in these regressions is very low, with the final outcome being 0.332, showing a low correlation between the variables.

Table 6: *Multivariate AR_t regressions for non-economic policies using robust standard errors. The table shows the p-values as calculated in STATA using regressions including the stated variables. The different regressions show the GETS procedure, as the variable with the highest p-value is not included in the next regression. At the bottom the R^2 and the total number of observations are shown.*

Variables	Regression				
	1	2	3	4	5
Constant	0.429	0.416	0.178	0.032**	0.001***
Market returns	0.020**	0.034**	0.010***	0.008***	0.000***
Size	0.334	0.314	0.308	0.308	0.003***
Book to market ratio	0.030**	0.018**	0.003***	0.004***	0.001***
Stock returns	0.466	0.521	0.453	0.430	
Employment	0.754	0.773	0.669		
Stock volatility	0.764	0.923			
Market volatility	0.771				
R^2	0.502	0.499	0.499	0.493	0.476
N	21				

*significance level of 10%, **significance level of 5%, ***significance level of 1%

As seen in table 6, the specific (final) AR_t regression for non-economic policies includes the constant term, market returns, size and book to market ratio, with p-values of 0.001, 0.000, 0.003 and 0.001 respectively. These p-values show that they are significant at a 1% level, which shows a very low risk of these variables not being significant. Table 17 shows the values of these. As in the AR_t economic regressions, the R^2 is low, showing a low correlation.

Tables 7 and 8 show the p-values for the multivariate CAR_t regressions.

Table 7: *Multivariate CAR_t regressions for economic policies using robust standard errors. The table shows the p-values as calculated in STATA using regressions including the stated variables. The different regressions show the GETS procedure, as the variable with the highest p-value is not included in the next regression. At the bottom the R^2 and the total number of observations are shown.*

Variables	Regression				
	1	2	3	4	5
Constant	0.407	0.375	0.371	0.337	0.168
Stock returns	0.694	0.699	0.663	0.653	0.014**
Market volatility	0.907	0.035**	0.013**	0.003***	0.000***
Size	0.710	0.707	0.694	0.692	0.000***
Employment	0.883	0.876	0.775	0.786	
Market returns	0.904	0.900	0.893		
Book to market ratio	0.976	0.975			
Stock volatility	0.990				
R^2	0.950	0.950	0.950	0.950	0.950
N	21				

*significance level of 10%, **significance level of 5%, ***significance level of 1%

Table 7 shows that only stock returns, market volatility and size are significant in the specific equation. As in the AR_t regression for economic policies, the market volatility and size variables are significant. However, they are more significant (1% level instead of 5%) in this new regression, reducing the risk of insignificance. In these regressions, the R^2 is very high, showing a high correlation.

Table 8: *Multivariate CAR_t regressions for non-economic policies using robust standard errors. The table shows the p-values as calculated in STATA using regressions including the stated variables. The different regressions show the GETS procedure, as the variable with the highest p-value is not included in the next regression. At the bottom the R^2 and the total number of observations are shown.*

Variables	Regression			
	1	2	3	4
Constant	0.708	0.921	0.841	0.822
Market returns	0.199	0.023**	0.017**	0.009***
Stock returns	0.338	0.161	0.062*	0.016**
Size	0.431	0.533	0.201	0.008***
Book to market ratio	0.018**	0.021**	0.011**	0.007***
Employment	0.292	0.342	0.232	
Stock volatility	0.553	0.783		
Market volatility	0.563			
R^2	0.952	0.951	0.951	0.949
N	21			

*significance level of 10%, **significance level of 5%, ***significance level of 1%

As table 8 shows, market returns, stock returns, size and book to market ratio affect cumulative abnormal returns in non-economic policies, with respective p-values of 0.009, 0.016, 0.008 and 0.007. These regressions, as the CAR_t economic regressions, show a high correlation due to the high value of the R^2.

These four regressions provide an overview of the determinants of abnormal returns. An increase of a value of 1 by any of the stated variables leads to abnormal returns or cumulative abnormal returns to increase by the coefficient of the specific variable (the number it is multiplied by). Regarding the AR_t and CAR_t regressions for economic policies, we can observe that both include market volatility and size as determinants. Moreover, the AR_t regression includes the constant term, market returns and book to market ratio while the CAR_t regression contains the stock returns variable. Since each method consists of a different, but equally valid, approach to the same question, even if the determinant is only significant in one equation, it is regarded as significant in general. The AR_t and CAR_t regressions for non-economic policies both contain market returns, size and book to market ratio as determinants of abnormal returns. Furthermore, the AR_t regression contains the constant term while the CAR_t regression contains stock returns. Hypothesis 1 was rejected, meaning that non-economic policies do not have an effect on abnormal returns, therefore the significance of the determinants in the two non-economic policy regressions may be insignificant unless hypothesis 1 is not rejected by means of a different analysis.

On top of providing significant variables, these regressions also provide the values of these variables, giving results to the hypotheses.

Hypothesis 2 states that market returns lead to negative (positive) abnormal returns in economic (non-economic) policies. Market returns is included as significant in the economic AR_t regression and both non-economic regressions. The results show a negative value of 0.519 for the economic AR_t regression, showing similar results to Brogaard and Detzel (2015) and Pastor and Veronesi (2012). The results then provide a value of -0.403 for the non-economic AR_t regression and a value of -0.497 for the non-economic CAR_t regression. These provide evidence to reject this hypothesis as in the non-economic policies, market returns were expected to positively influence positive abnormal returns.

Stock returns is included in both CAR_t regressions, providing a positive values of 0.041 and 0.786 for economic and non-economic policies respectively. The latter point is in line with Baker et al. (2013), Baker et al. (2016) and Ko and Lee (2015). Hypothesis 3 states that stock returns lead to negative (positive) abnormal returns in economic (non-economic) policies. As the stock returns in the economic regression leads to positive abnormal returns, this hypothesis is rejected.

Market volatility is only significant in the regressions regarding economic policies. Furthermore, this variable provides positive values of 2.795 and 2.090 for AR_t and CAR_t regressions, respectively, which is line with the results by Brogaard and Detzel (2015). This complies with what was predicted in hypothesis 4, however this hypothesis also states that market volatility leads to negative returns in non-economic policies. Therefore, hypothesis 4 is rejected.

Hypothesis 5 predicts that in economic policies, stock volatility leads to positive abnormal returns, and negative in non-economic policies. In this analysis, stock volatility is not significant in any of the four regressions, therefore the hypothesis is rejected.

Size is the only variable included in all four equations. The 6th hypothesis predicts an increase in abnormal returns due to size when economic policies are implemented, and a decrease when non-economic policies are implemented. However, this analysis shows that market capitalization leads to positive abnormal returns in AR_t regressions in economic and non-economic policies, and negative in CAR_t regressions in economic and non-economic policies. Nothing can be derived from these results as they are contradictory, therefore hypothesis 6 is rejected.

Hypothesis 7 predicts that in economic policies, book to market ratio leads to negative abnormal

returns, and positive in non-economic. In both AR_t and CAR_t regressions this variable leads to positive abnormal returns in non-economic policies, with values 269.652 and 112.560 respectively. However, this hypothesis is rejected as in economic policies, the AR_t regression leads to positive abnormal returns with a value of 396.165.

Then, the last hypothesis (8th) is also rejected as employment has no effect in any of the four regressions.

4.2.2 Random-effects abnormal returns

Hypotheses 2 to 8 are also analyzed by means of random effects regressions. The aim of these is to identify if the variables have any influence on the dependent variable, regardless of the influence they might have on the independent variables. Furthermore, since the data is distributed as shown in tables 10 and 11, it is necessary to cluster by policy, as shown in Appendix D.1.1 and D.2.1. Otherwise the analysis wouldn't measure each policy, but instead each day of each policy. Moreover, the GETS procedure is used, ending up with a regression with only the significant values. The general regression for abnormal returns is as follows:

$$ar_{it} = \beta_0 + \beta_1 * Marketret_{it} + \beta_2 * Stockret_{it} + \beta_3 * Marketvol_{it} + \beta_4 * Stockvol_{it} + \beta_5 * Size_{it} + \beta_6 * Bmratio_{it} + \beta_7 * Employment_{it} + e_{it}$$

The p-values for the multivariate random effects ar_{it} regressions are shown in tables 9 and 10, where regression number 1 is the general equation.

Table 9: *Multivariate random-effects ar_{it} regressions. The table shows the p-values using the GETS procedure for economic policies. The R^2 and the total number of observations are shown.*

Variables	Regression		
	1	2	3
Constant	0.560	0.134	0.000***
Stock returns	0.124	0.000***	0.000***
Market volatility	0.007***	0.002***	0.001***
Stock volatility	0.003***	0.000***	0.000***
Size	0.026**	0.001***	0.000***
Book to market ratio	0.000***	0.000***	0.000***
Employment	0.552	0.477	
Market returns	0.833		
R^2	0.059	0.059	0.059
N	231		

*significance level of 10%, **significance level of 5%, ***significance level of 1%

Table 9 shows that the specific ar_{it} regression for economic policies includes all variables except employment and market returns. The greatest p-value for the significant variables is 0.001 (market volatility), therefore significant at a 1% level, which shows a very low risk of this variable not being significant. Table 22 then displays the values of these variables.

Table 10: *Multivariate random-effects ar_{it} regressions. The table shows the p-values using the GETS procedure for non-economic policies. The R^2 and the total number of observations are shown.*

Variables	Regression					
	1	2	3	4	5	6
Constant	0.282	0.307	0.374	0.454	0.406	0.952
Stock returns	0.014**	0.014**	0.023**	0.084*	0.067*	0.068*
Market volatility	0.358	0.389	0.132	0.178	0.210	0.086*
Employment	0.237	0.272	0.362	0.472	0.403	
Size	0.247	0.252	0.372	0.564		
Market returns	0.327	0.330	0.411			
Stock volatility	0.474	0.499				
Book to market ratio	0.577					
R^2	0.036	0.036	0.036	0.034	0.034	0.033
N	714					

*significance level of 10%, **significance level of 5%, ***significance level of 1%

As seen in table 10, the specific (final) ar_{it} regression for non-economic policies includes only the stock returns and market volatility variables, with p-values of 0.068 and 0.086, which make them significant at a 10% level. Table 23 shows the values of these.

Tables 11 and 12 show the p-values for the multivariate car_{it} regressions.

Table 11: *Multivariate random-effects car_{it} regressions. The table shows the p-values using the GETS procedure for economic policies. The R^2 and the total number of observations are shown.*

Variables	Regression	
	1	2
Constant	0.812	0.812
Stock returns	0.001***	0.000***
Market volatility	0.003***	0.001***
Stock volatility	0.000***	0.000***
Size	0.000***	0.000***
Book to market ratio	0.000***	0.000***
Employment	0.000***	0.000***
Market returns	0.788	
R^2	0.808	0.810
N	231	

*significance level of 10%, **significance level of 5%, ***significance level of 1%

Table 11 shows that only market returns and the constant are not significant in the specific equation. As in the ar_{it} regression for economic policies, the highest p-value is of 0.001 for market volatility. Therefore, the final car_{it} regression for economic policies, using the values from table 24, contains stock returns, market volatility, stock volatility, size, book to market ratio and employment as significant variables.

Table 12: *Multivariate random-effects car_{it} regressions. The table shows the p-values using the GETS procedure for non-economic policies. The R^2 and the total number of observations are shown.*

Variables	Regression					
	1	2	3	4	5	6
Constant	0.656	0.656	0.657	0.647	0.768	0.788
Stock returns	0.026**	0.027**	0.021**	0.018**	0.008***	0.011**
Market volatility	0.941	0.487	0.274	0.419	0.036**	0.003***
Market returns	0.370	0.316	0.224	0.233	0.225	
Employment	0.597	0.587	0.572	0.843		
Book to market ratio	0.559	0.558	0.573			
Size	0.951	0.932				
Stock volatility	0.990					
R^2	0.277	0.278	0.277	0.282	0.282	0.299
N	714					

*significance level of 10%, **significance level of 5%, ***significance level of 1%

As table 12 shows, only the stock returns and market volatility affect cumulative abnormal returns in non-economic policies, with respective p-values of 0.011 and 0.003. The specific car_{it} regression for non-economic policies, with the values from table 25, contains only stock returns and market volatility.

These four regressions provide an overview of the determinants of abnormal returns. An increase of a value of 1 by any of the stated variables leads to abnormal returns or cumulative abnormal returns to increase by the coefficient of the specific variable (the number it is multiplied by). Regarding the ar_{it} and car_{it} regressions for economic policies, we can observe that both include stock returns, market volatility, stock volatility, size and book to market ratio as determinants. Moreover, the ar_{it} regression includes the constant term, while the car_{it} regression contains the employment variable. The ar_{it} and car_{it} regressions for non-economic policies both contain stock returns and market volatility as determinants of abnormal returns, making these significant. However, hypothesis 1 was rejected, meaning that non-economic policies do not lead to abnormal returns, therefore the significance of these may be insignificant unless hypothesis 1 is not rejected by means of a different analysis.

On top of providing significant variables, these regressions also provide the values of these variables, giving results to the hypotheses. Market returns is not included as significant in any regression, therefore hypothesis 2 can be rejected.

Stock returns is included in all four regressions, providing positive values of 0.005 for non-economic policies, and negative values of 0.008 for economic. These results are in line with hypothesis 3, therefore it is not rejected. This is also proven in Baker et al. (2013), Baker et al. (2016) and Ko and Lee (2015).

Market volatility is the only other variable (other than stock returns) that is included in all four equations. Furthermore, this variable provides positive values of 0.453 and 0.470 for ar_{it} and car_{it} regressions, respectively, for economic policies, and negative values of 0.025 for non-economic policies. These results are also predicted by Brogaard and Detzel (2015). This complies with what was predicted in hypothesis 4, which is therefore not rejected.

Hypothesis 5 predicts that in economic policies, stock volatility leads to positive abnormal

returns. Instead, in this analysis, stock volatility leads to negative abnormal returns in economic policies. Moreover, stock volatility has no effect on abnormal returns in non-economic policies. These two points provide evidence to reject the 5th hypothesis.

As predicted in the sixth hypothesis, the size variable leads to positive abnormal returns in economic policies in both ar_{it} and car_{it} regressions, with respective values of 1.580e-09 and 9.970e-08. This is also shown in the analysis by Ferguson and Lam (2016). However, as the market capitalization is insignificant for non-economic policies, the hypothesis is rejected.

The book to market ratio variable creates a similar scenario to the size variable. Hypothesis 7 predicts that economic policies lead to negative abnormal returns, as insignificantly identified by Ferguson and Lam (2016). In both ar_{it} and car_{it} regressions this variable leads to negative abnormal returns in economic policies, with values 4.403 and 5.299 respectively. However, as it is insignificant for non-economic policies, the hypothesis is rejected.

Then, the last hypothesis (8th) is also rejected as employment has no effect in the ar_{it} regression for economic policies or in any of the regressions for the non-economic policies. Nonetheless, the prediction was partly accurate as the employment did have a negative effect on economic policies, with a value of 9.970e-08, according to the car_{it} regression.

5 Discussion and Conclusion

5.1 Conclusion

The main goal of this paper was to analyze and observe whether the implementation of a government policy would have an effect on stock prices, and what specifically could affect this change. Focusing the data on a democratic government, taking Barack Obama's administration as reference, this paper has analyzed the effect of the policies on an index with the largest industrial companies in the United States, known as the Dow Jones Industrial Average. By means of an event study and the use of the market model, this study has provided some results that are in line with past papers. Since, this paper focuses more on a real life perspective, where the only measure to take into account is whether the policy implemented is economic or non-economic, regardless of the uncertainty, this research could be used in the future by individual and institutional investors.

This paper's first part measures whether government policies lead to significant abnormal returns, or changes in stock prices. The analysis has provided enough evidence to reject hypothesis 1, stating that economic policies have a negative effect on abnormal returns, but non-economic policies do not have an effect in abnormal returns. Regarding the economic policies, past literature had similar results, however stating that economic policy uncertainty leads to negative abnormal returns. Even though the authors referred to them as economic policies, they do also include non-economic policies, therefore it is the greater uncertainty that leads to lower abnormal returns, and not the type of policy. The fact that economic policies influence negative excess returns shows that indeed economic policies are more uncertain than non-economic policies. This opens a path to further research that could analyze the reason to why economic policies may be more uncertain than non-economic. Nonetheless, there appear to be no significant abnormal returns influenced by the introduction of non-economic policies. As this type of policies could be considered to have lower uncertainty, the effect on the market is better predicted by investors and therefore the abnormal returns become insignificant.

The second part of the analysis aims at finding the determinants of abnormal returns, which refers to the variables that affect these. Using the average abnormal returns method, all hypotheses (from 2 to 8) were rejected, as the sign of the results for both groups (economic and non-economic) was the same for each variable. The only change in the sign is seen in the size variable, however changing from average abnormal returns (AR_t) to cumulative average abnormal returns (CAR_t) within a same group. Then, in the random effects regression, there are 2 hypotheses which are not rejected. Due to non-economic policies not having many significant variables, many of the hypotheses were rejected. Hypothesis 3, stating that stock returns lead to negative (positive) abnormal returns in economic (non-economic) policies, is not rejected. This result is in line with Baker et al. (2013), Baker et al. (2016) and Ko and Lee (2015), who mention that an increase in economic policy uncertainty leads to negative stock prices. Hypothesis 4 states that market volatility leads to positive (negative) abnormal returns in economic (non-economic) policies. This hypothesis is also not rejected, therefore complying with past literature, being Brogaard and Detzel (2015). In summary, stock returns and market volatility have an effect on abnormal returns, and therefore on stock prices.

Since hypothesis 1 was rejected, non-economic policies do not lead to abnormal returns, and therefore there would be no determinants of abnormal returns. If this is taken into account, hypotheses 2 to 8 would be modified including only an effect of the variables in economic policies. This would then lead to different results in terms of rejecting less hypotheses. Taking this into account, the first analysis provides evidence to not reject hypotheses 2, and 4. Hypothesis 2 would then predict that market returns provide negative abnormal returns in economic policies, which is in line with the results in Brogaard and Detzel (2015). The fourth hypothesis would predict that market volatility leads to positive abnormal returns, showing similar results as Brogaard and Detzel (2015). The second analysis (random-effects regressions) would show that hypotheses 6 and 7 would also not be rejected. Hypothesis 6 would state that size leads to positive abnormal returns in economic policies, providing results similar to Ferguson and Lam (2016). Hypothesis 7 would state that book to market ratio leads to negative abnormal returns in economic policies, as identified (insignificantly) in Ferguson and Lam (2016)'s results.

The answer to the research question, being 'Do the introduction of economic and non-economic government policies in the United States lead to abnormal returns to the Dow Jones Industrial Average?', is no to some extent. The introduction of economic policies in the U.S. lead to abnormal returns to the DJIA. These abnormal returns are decreased by stock returns and book to market ratio, and increased by market volatility and market capitalization.

5.2 Limitations

This paper faced several limitations which may have influenced the results. First, to obtain the policies, past literature used the databases from different newspapers. When trying to access those, I was asked to make a subscription, or some of them would directly not offer access to their database. For this reason I used key events as regarded by Miller Center (2019). Therefore, the announcement dates may not have been quite accurate, as the dates used have been the signing dates. This is an issue as investors might already know that a policy would be introduced and thus anticipated the reaction long before the completion date. Moreover, using Miller Center (2019) resulted in a low number of policies, which is not ideal in order to create an unbiased study.

Another limitation concerning the dates was that the 'announcement dates' were non-trading days. Therefore I decided to choose the next trading day as the announcement date, which may lead to a different effect in stock prices. A third limitation was that some variables mentioned in past literature, such as the profitability, couldn't be analyzed due to lack of access to this data. The issue with this is that these variables could also affect the dependent variable, and not including them could lead to omitted variable bias. Then, a fourth limitation was that the data obtained for employment growth was only available monthly, which gives a less detailed explanation of the effect of this variable. These limitations leave area for further studies, which can implement more determinants of abnormal returns, with data on a daily basis. They can also include a greater number of policies to obtain a more accurate representation of the sample. Furthermore, these studies can analyze the proper announcement date and not the completion date to provide a proper reaction in stock prices to the announcement of the policy.

References

Amadeo, K. (2020). *Obama's health care reform plan.* The Balance. Retrieved from https://www.thebalance.com/obama-s-health-care-reform-plan-3305753

Baker, S. R., Bloom, N., & Davis, S. J. (2013). Measuring economic policy uncertainty. *Working paper, Stanford University, Stanford, CA*.

Baker, S. R., Bloom, N., & Davis, S. J. (2016). Measuring economic policy uncertainty. *The quarterly journal of economics*, *131*(4), 1593–1636.

Belo, F., Gala, V. D., & Li, J. (2013). Government spending, political cycles, and the cross section of stock returns. *Journal of Financial Economics*, *107*(2), 305–324.

Brogaard, J., & Detzel, A. (2015). The asset-pricing implications of government economic policy uncertainty. *Management Science*, *61*(1), 3–18.

Campos, J., Ericsson, N. R., & Hendry, D. F. (2005). General-to-specific modeling: an overview and selected bibliography. *FRB International Finance Discussion Paper*(838).

Carhart, M. M. (1997). On persistence in mutual fund performance. *The Journal of finance*, *52*(1), 57–82.

Chappelow, J. (2020). *American recovery and reinvestment act.* Investopedia. Retrieved from https://www.investopedia.com/terms/a/american-recovery-and-reinvestment-act.asp

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *the Journal of Finance*, *47*(2), 427–465.

Fama, E. F., & French, K. R. (1993). Common risk factors in the returns on stocks and bonds. *Journal of*.

Ferguson, A., & Lam, P. (2016). Government policy uncertainty and stock prices: The case of australia's uranium industry. *Energy Economics*, *60*, 97–111.

Fuhrmann, R. (2019). *Republican and democratic approaches to regulating the economy.* Investopedia. Retrieved from https://www.investopedia.com/ask/answers/regulating-economy.asp

Gentzkow, M., & Shapiro, J. (2010). What drives media slant? evidence from us daily newspapers. *Econometrica*, *78*(1), 351–71.

Hayes, A. (2020). *Dodd-frank wall street reform and consumer protection act.* Investopedia. Retrieved from https://www.investopedia.com/terms/d/dodd-frank-financial-regulatory-reform-bill.asp

Ko, J.-H., & Lee, C.-M. (2015). International economic policy uncertainty and stock prices: Wavelet approach. *Economics Letters*, *134*, 118–122.

Li, Y. (2019). *Trump says us will impose 10% tariffs on another $300 billion of chinese goods starting sept. 1.* CNBC. Retrieved from https://www.cnbc.com/2019/08/01/trump-says-us-will-impose-10percent-tariffs-on-300-billion-of-chinese-goods-starting-september-1.html

Merton, R. (1973). An intertemporal capital asset pricing model. *Econometrica*, *41*(5), 867–887.

Miller Center. (2019). *Barack obama - key events.* Retrieved from https://millercenter.org/president/barack-obama/key-events

Mills, T. C., Coutts, J. A., & Roberts, J. (1996). Misspecification testing and robust estimation of the market model and their implications for event studies. *Applied Economics*, *28*(5),

559–566.

Pástor, L., & Stambaugh, R. F. (2003). Liquidity risk and expected stock returns. *Journal of Political economy*, *111*(3), 642–685.

Pastor, L., & Veronesi, P. (2012). Uncertainty about government policy and stock prices. *The journal of Finance*, *67*(4), 1219–1264.

Pástor, L., & Veronesi, P. (2013). Political uncertainty and risk premia. *Journal of financial Economics*, *110*(3), 520–545.

Refinitiv Eikon. (2020). *Dow jones industrials.* Retrieved from `http://product.datastream.com/browse/search.aspx?dsid=ZERA002&AppGroup=DSAddin&q=DJIA&prev=99_DJIA&s=S&nav_category=3&page=-1`

Rosevear, J. (2017). *The 30 dow jones stocks.* The Motley Fool. Retrieved from `https://www.fool.com/investing/2017/11/21/the-30-dow-jones-stocks.aspx`

Santa-Clara, P., & Valkanov, R. (2003). The presidential puzzle: Political cycles and the stock market. *The Journal of Finance*, *58*(5), 1841–1872.

Segal, T. (2020). *Did the troubled asset relief program (tarp) save the economy?* Investopedia. Retrieved from `https://www.investopedia.com/terms/t/troubled-asset-relief-program-tarp.asp`

Sherman, E. (2019). *The s&p 500 is at an all time high-but it still performed far better under obama than trump.* Fortune. Retrieved from `https://fortune.com/2019/11/01/trump-obama-markets-comparison-s-and-p-500-dow-nasdaq-economy/`

Su, Y., Yip, Y., & Wong, R. W. (2002). The impact of government intervention on stock returns: Evidence from hong kong. *International Review of Economics & Finance*, *11*(3), 277–297.

Tirtiroglu, D., Bhabra, H. S., & Lel, U. (2004). Political uncertainty and asset valuation: Evidence from business relocations in canada. *Journal of banking & finance*, *28*(9), 2237–2258.

U.S. Bureau of Labor Statistics. (2020). *Employment, hours, and earnings from the current employment statistics survey (national).* Retrieved from `https://data.bls.gov/pdq/SurveyOutputServlet`

U.S. Government. (2009). *Lilly ledbetter fair pay act of 2009.* Congress.gov. Retrieved from `https://www.congress.gov/111/plaws/publ2/PLAW-111publ2.pdf`

U.S. Government. (2010). *Dodd-frank wall street reform and consumer protection act.* Congress.gov. Retrieved from `https://www.congress.gov/bill/111th-congress/house-bill/4173/text`

Wharton Research Data Services. (2020). *Crsp stock market indexes (NYSE/AMEX/NASDAQ/ARCA).* Retrieved from `https://wrds-web-wharton-upenn-edu.eur.idm.oclc.org/wrds/ds/crsp/stock_a/stkmktix.cfm?navId=128`

Yahoo Finance. (2020). *Dow jones industrial average (DJI).* Retrieved from `https://finance.yahoo.com/quote/%5EDJI/history?p=%5EDJI`

A Policies

A.1 Economic

Dodd-Frank Wall Street Reform and Consumer Protection Act

Hayes (2020) provides key points of information from this policy.

The policy states that the Financial Stability Oversight Council and Orderly Liquidation Authority have to monitor the financial stability of major financial firms. Moreover, the Federal Insurance Office has to monitor major insurance companies. The term 'major' refers to companies that could create an important impact on the economy.

The Consumer Financial Protection Bureau has to prevent predatory mortgage lending (mortgages to consumers that might not be able to pay them back) and make sure consumers understand the terms before agreeing to them.

Since investment ratings were misleading during the crisis, the policy establishes a Securities and Exchange Commission office of credit ratings to provide reliable credit ratings.

A.2 Non-economic

American Recovery and Reinvestment Act

Chappelow (2020) provide a brief summary of the purpose of this policy.

This policy was implemented mainly to create new jobs and recover lost jobs from the financial crisis.

Some of the regulations of this policy are: tax relief for families, infrastructure spending, and health care and education expansions. Tax relief provides a reduction of the fixed tax taken from salary of up to $800 per family, and the government spent $70 billion regarding the alternative minimum tax. More than $80 billion were spent on new infrastructure projects. The health care system was then expanded, for example $87 billion were spent to recover from Medicaid costs due to the recession. The government also spent $100 billion in education.

B Hypothesis 1

Table 13: *Example for economic policies on how to choose the number of days with the alternative method for the CAR_t. The table shows a number 1 if the policy is significant in that specific day.*

t	Policy											Total
	1	2	3	4	5	6	7	8	9	10	11	
-10											1	1
-9				1							1	2
-8	1											1
-7							1				1	2
-6			1								1	2
-5												0
-4												0
-3						1						1
-2										1		1
-1										1		1
0	1		1									2
1								1				1
2					1							1
3							1	1				2
4												0
5												0
6							1					1
7												0
8							1					1
9												0
10								1				1

C Average abnormal returns regressions

C.1 Excel

Table 14: *Example of AR_t data for economic policies arranged to directly input in STATA*

Day	AR_t	Market returns	Stock returns	Market volatility	Stock volatility	Size	Book to market ratio	Employment
-10	0,000833	0,002485	-0,002753	0,014838	0,013224	3568864,000000	0,003202	132970,181818
-9	0,000386	-0,000577	-0,005087	0,014771	0,013172	3556609,454545	0,003205	132970,181818
-8	-0,002107	0,001752	-0,004838	0,014728	0,013135	3561489,818182	0,003204	132994,818182
-7	-0,000241	0,007126	-0,000241	0,014685	0,013105	3582965,090909	0,003203	132994,818182
-6	-0,000227	0,005739	-0,001543	0,014666	0,013079	3578572,454545	0,003203	132994,818182
-5	-0,001744	0,013629	0,004125	0,014636	0,013049	3595874,909091	0,003203	132994,818182
-4	0,000774	0,006113	-0,001601	0,014593	0,012996	3576964,454545	0,003203	133016,000000
-3	-0,000505	-0,003743	-0,010449	0,014574	0,012986	3545315,545455	0,003204	133016,000000
-2	-0,001096	-0,003338	-0,011074	0,014521	0,012944	3541357,090909	0,003207	132955,909091
-1	-0,000250	-0,003284	-0,011302	0,014565	0,012969	3542758,181818	0,003207	132894,636364
0	-0,002224	-0,008043	-0,017344	0,014613	0,013024	3524330,818182	0,003208	132912,000000
1	-0,002019	-0,006448	-0,017463	0,014608	0,013032	3518672,727273	0,003211	132912,000000
2	0,000292	-0,007805	-0,018231	0,014754	0,013176	3515887,000000	0,003210	132918,545455
3	0,000306	-0,007132	-0,017262	0,014707	0,013133	3519077,181818	0,003209	132918,545455
4	0,000087	-0,015802	-0,024865	0,014887	0,013274	3492872,272727	0,003210	132918,545455
5	-0,000058	-0,004814	-0,014925	0,015035	0,013405	3525777,727273	0,003211	132918,545455
6	-0,001345	-0,008912	-0,019380	0,015018	0,013431	3509420,454545	0,003211	132918,545455
7	-0,000006	-0,001858	-0,012942	0,015058	0,013463	3531300,818182	0,003211	132910,181818
8	0,001774	-0,000472	-0,010260	0,015039	0,013454	3544020,818182	0,003210	132909,727273
9	0,000310	-0,002173	-0,011421	0,014995	0,013411	3541946,454545	0,003208	132909,727273
10	-0,001694	-0,006039	-0,016050	0,015024	0,013437	3526022,545455	0,003206	132911,454545

Table 15: *Example of CAR_t data for economic policies arranged to directly input in STATA*

Day	CAR_t	Market returns	Stock returns	Market volatility	Stock volatility	Size	Book to market ratio	Employment
-10	0,000833	0,002485	-0,002753	0,014838	0,013224	3568864,000000	0,003202	132970,181818
-9	0,001219	0,001907	-0,007840	0,029609	0,026396	7125473,454545	0,006407	265940,363636
-8	-0,000888	0,003659	-0,012678	0,044337	0,039531	10686963,272727	0,009612	398935,181818
-7	-0,001129	0,010785	-0,012919	0,059022	0,052636	14269928,363636	0,012814	531930,000000
-6	-0,001356	0,016524	-0,014462	0,073687	0,065715	17848500,818182	0,016017	664924,818182
-5	-0,003100	0,030153	-0,010337	0,088323	0,078765	21444375,727273	0,019220	797919,636364
-4	-0,002326	0,036266	-0,011938	0,102916	0,091761	25021340,181818	0,022423	930935,636364
-3	-0,002831	0,032523	-0,022387	0,117490	0,104747	28566655,727273	0,025627	1063951,636364
-2	-0,003926	0,029184	-0,033460	0,132011	0,117691	32108012,818182	0,028833	1196907,545455
-1	-0,004176	0,025900	-0,044763	0,146575	0,130660	35650771,000000	0,032041	1329802,181818
0	-0,006400	0,017857	-0,062107	0,161188	0,143684	39175101,818182	0,035248	1462714,181818
1	-0,008419	0,011409	-0,079570	0,175796	0,156716	42693774,545455	0,038459	1595626,181818
2	-0,008127	0,003604	-0,097800	0,190550	0,169892	46209661,545455	0,041669	1728544,727273
3	-0,007821	-0,003528	-0,115062	0,205257	0,183025	49728738,727273	0,044878	1861463,272727
4	-0,007735	-0,019330	-0,139927	0,220144	0,196298	53221611,000000	0,048088	1994381,818182
5	-0,007793	-0,024145	-0,154852	0,235180	0,209703	56747388,727273	0,051299	2127300,363636
6	-0,009137	-0,033057	-0,174233	0,250198	0,223134	60256809,181818	0,054509	2260218,909091
7	-0,009143	-0,034914	-0,187175	0,265256	0,236596	63788110,000000	0,057720	2393129,090909
8	-0,007369	-0,035387	-0,197435	0,280295	0,250050	67332130,818182	0,060930	2526038,818182
9	-0,007059	-0,037560	-0,208856	0,295290	0,263461	70874077,272727	0,064138	2658948,545455
10	-0,008753	-0,043599	-0,224906	0,310314	0,276898	74400099,818182	0,067344	2791860,000000

C.2 Abnormal returns

C.2.1 Code

```
gen t = _n
tsset t
reg abnormal marketret stockret marketvol stockvol size bmratio employment, robust
reg abnormal marketret stockret marketvol size bmratio employment, robust
reg abnormal marketret marketvol size bmratio employment, robust
reg abnormal marketret marketvol size bmratio, robust
```

C.2.2 Economic policies

Table 16: *Multivariate AR_t regressions using the GETS procedure for economic policies (coefficients (robust standard errors))*

Variables	Regression			
	1	2	3	4
Constant	-2.900451	-2.895901	-2.933662*	-1.929914**
	(1.940434)	(1.914056)	(1.636434)	(0.723010)
Market returns	-0.539263**	-0.5373455**	-0.538396**	-0.519053**
	(0.210093)	(0.210246)	(0.193561)	(0.197655)
Market volatility	2.543629	2.965145*	2.984354**	2.794604**
	(17.014840)	(1.467160)	(1.397135)	(1.296616)
Size	1.75e-07	1.75e-07	1.78e-07**	1.74e-07**
	(1.37e-07)	(1.33e-07)	(6.20e-08)	(6.29e-08)
Book to market ratio	454.574500**	454.043000**	456.575300**	396.164900**
	(203.051400)	(198.268500)	(165.650600)	(162.473100)
Employment	5.85e-06	5.83e-06	5.96e-06	
	(9.65e-06)	(9.41e-06)	(9.40e-06)	
Stock returns	0.012010	0.010389		
	(0.367057)	(0.321444)		
Stock volatility	0.438719			
	(17.257080)			

*significance level of 10%, **significance level of 5%, ***significance level of 1%

C.2.3 Non-economic policies

Table 17: *Multivariate AR_t regressions using the GETS procedure for non-economic policies (coefficients (robust standard errors))*

Variables	Regression				
	1	2	3	4	5
Constant	-1.610586	-1.561193	-1.404741	-1.104616**	-1.348264***
	(1.973481)	(1.863157)	(0.994521)	(0.469590)	(0.325761)
Market returns	-0.554363**	-0.527598**	-0.537655***	-0.531839***	-0.402922***
	(0.208263)	(0.224220)	(0.181016)	(0.173901)	(0.082322)
Size	8.53e-08	8.18e-08	8.06e-08	7.77e-08	1.26e-07***
	(8.51e-08)	(7.84e-08)	(7.64e-08)	(7.38e-08)	(3.64e-08)
Book to market ratio	241.676600**	248.985000**	243.324700***	252.061400***	269.651500***
	(98.946610)	(92.689690)	(69.766110)	(75.339640)	(70.748530)
Stock returns	0.333028	0.306618	0.320963	0.328925	
	(0.443159)	(0.466085)	(0.416551)	(0.406399)	
Employment	3.80e-06	3.32e-06	2.36e-06		
	(0.000012)	(0.000011)	(5.42e-06)		
Stock volatility	4.742411	0.427207			
	(15.482290)	(4.349920)			
Market volatility	-4.339827				
	(14.584310)				

*significance level of 10%, **significance level of 5%, ***significance level of 1%

C.3 Cumulative abnormal returns

C.3.1 Code

```
gen t = _n
tsset t
reg abnormal marketret stockret marketvol stockvol size bmratio employment, robust
reg abnormal marketret stockret marketvol size bmratio employment, robust
reg abnormal marketret stockret marketvol size employment, robust
reg abnormal stockret marketvol size employment, robust
reg abnormal stockret marketvol size, robust
```

C.3.2 Economic policies

Table 18: *Multivariate CAR_t regressions using the GETS procedure for economic policies (coefficients (robust standard errors))*

Variables	Regression				
	1	2	3	4	5
Constant	0.000708	0.000706	0.000699	0.000624	0.000759
	(0.000826)	(0.000770)	(0.000757)	(0.000630)	(0.000527)
Stock returns	0.101081	0.100015	0.104746	0.105914	0.041443**
	(0.251436)	(0.253482)	(0.235633)	(0.231477)	(0.015074)
Market volatility	1.763752	1.947125**	1.929776**	1.993804***	2.090483***
	(14.788860)	(0.834228)	(0.689422)	(0.563708)	(0.432837)
Size	-3.22e-08	-3.19e-08	-3.17e-08	-2.75e-08	-8.71e-09***
	(8.49e-08)	(8.31e-08)	(7.91e-08)	(6.83e-08)	(1.76e-09)
Employment	7.73e-07	7.54e-07	6.37e-07	5.18e-07	
	(5.17e-06)	(4.73e-06)	(2.18e-06)	(1.88e-06)	
Market returns	0.021391	0.021486	0.018050		
	(0.174326)	(0.168025)	(0.131320)		
Book to market ratio	-5.120374	-4.811695			
	(164.8653)	(152.802900)			
Stock volatility	0.187776				
	(15.440180)				

*significance level of 10%, **significance level of 5%, ***significance level of 1%

C.3.3 Non-economic policies

Table 19: *Multivariate CAR_t regressions using the GETS procedure for non-economic policies (coefficients (robust standard errors))*

Variables	Regression			
	1	2	3	4
Constant	-0.000163	-0.000031	-0.000059	0.000060
	(0.000425)	(0.000303)	(0.000289)	(0.000261)
Market returns	-0.365139	-0.459034**	-0.464744**	-0.497058***
	(0.269716)	(0.180090)	(0.172625)	(0.165856)
Stock returns	0.473650	0.581009	0.637471*	0.785883**
	(0.476313)	(0.392587)	(0.316611)	(0.291139)
Size	-5.20e-08	-3.96e-08	-5.25e-08	-9.18e-08***
	(6.41e-08)	(6.18e-08)	(3.92e-08)	(3.01e-08)
Book to market ratio	181.969100**	154.0857**	147.534200**	112.559600***
	(67.070460)	(59.011370)	(50.629510)	(36.679340)
Employment	-2.89e-06	-2.47e-06	-1.97e-06	
	(2.64e-06)	(2.51e-06)	(1.58e-06)	
Stock volatility	-10.190570	-0.354047		
	(16.723700)	(1.259775)		
Market volatility	10.363770			
	(17.474800)			

*significance level of 10%, **significance level of 5%, ***significance level of 1%

D Random-effects regressions

D.1 Excel

Table 20: *Example of ar_{it} data arranged to directly input in STATA (containing only the first two economic policies)*

Policy	Day	ar_{it}	Market returns	Stock returns	Market volatility	Stock volatility	Size	Book to market ratio	Employment
1	-10	-0,005673	-0,108022	-0,018004	0,036231	0,033284	2695183	0,003053	134055
1	-9	0,003850	-0,108022	-0,018004	0,036231	0,033284	2649489	0,003066	134055
1	-8	-0,012409	-0,108022	-0,018004	0,036231	0,033284	2640642	0,003059	134055
1	-7	-0,001336	-0,108022	-0,018004	0,036231	0,033284	2654510	0,003057	134055
1	-6	-0,003795	-0,108022	-0,018004	0,036231	0,033284	2676381	0,003054	134055
1	-5	-0,007340	-0,108022	-0,018004	0,036231	0,033284	2736785	0,003060	134055
1	-4	0,003297	-0,108022	-0,018004	0,036231	0,033284	2654791	0,003070	134055
1	-3	-0,000416	-0,108022	-0,018004	0,036231	0,033284	2602476	0,003074	134055
1	-2	-0,007365	-0,108022	-0,018004	0,036231	0,033284	2597729	0,003055	133312
1	-1	0,003995	-0,108022	-0,018004	0,036231	0,033284	2636714	0,003064	133312
1	0	-0,010790	-0,108022	-0,018004	0,036231	0,033284	2595800	0,003065	133312
1	1	-0,001505	-0,108022	-0,018004	0,036231	0,033284	2632714	0,003063	133312
1	2	0,000654	-0,108022	-0,018004	0,036231	0,033284	2709326	0,003056	133312
1	3	-0,002454	-0,108022	-0,018004	0,036231	0,033284	2711676	0,003050	133312
1	4	-0,003558	-0,108022	-0,018004	0,036231	0,033284	2582025	0,003055	133312
1	5	-0,000594	-0,108022	-0,018004	0,036231	0,033284	2601475	0,003052	133312
1	6	-0,003585	-0,108022	-0,018004	0,036231	0,033284	2604435	0,003046	133312
1	7	-0,002460	-0,108022	-0,018004	0,036231	0,033284	2571619	0,003053	133312
1	8	0,004100	-0,108022	-0,018004	0,036231	0,033284	2473815	0,003053	133312
1	9	0,003590	-0,108022	-0,018004	0,036231	0,033284	2480099	0,003047	133312
1	10	-0,001523	-0,108022	-0,018004	0,036231	0,033284	2449450	0,003048	133312
2	-10	0,004149	-0,013257	-0,055604	0,030648	0,026524	2473815	0,003053	133312
2	-9	0,003020	-0,013257	-0,055604	0,030648	0,026524	2480099	0,003047	133312
2	-8	-0,001979	-0,013257	-0,055604	0,030648	0,026524	2449450	0,003048	133312
2	-7	-0,003145	-0,013257	-0,055604	0,030648	0,026524	2415823	0,003049	133312
2	-6	-0,000704	-0,013257	-0,055604	0,030648	0,026524	2338725	0,003042	133312
2	-5	-0,004585	-0,013257	-0,055604	0,030648	0,026524	2414458	0,003045	133312
2	-4	-0,001616	-0,013257	-0,055604	0,030648	0,026524	2400690	0,003029	133312
2	-3	-0,001560	-0,013257	-0,055604	0,030648	0,026524	2373443	0,003026	133312
2	-2	0,001959	-0,013257	-0,055604	0,030648	0,026524	2314989	0,003051	133312
2	-1	0,003898	-0,013257	-0,055604	0,030648	0,026524	2218392	0,003049	132512
2	0	-0,000587	-0,013257	-0,055604	0,030648	0,026524	2200330	0,003057	132512
2	1	-0,003171	-0,013257	-0,055604	0,030648	0,026524	2237025	0,003074	132512
2	2	-0,002212	-0,013257	-0,055604	0,030648	0,026524	2154559	0,003061	132512
2	3	0,002497	-0,013257	-0,055604	0,030648	0,026524	2170051	0,003054	132512
2	4	-0,001216	-0,013257	-0,055604	0,030648	0,026524	2145646	0,003051	132512
2	5	-0,003308	-0,013257	-0,055604	0,030648	0,026524	2280188	0,003038	132512
2	6	-0,004023	-0,013257	-0,055604	0,030648	0,026524	2276149	0,003045	132512
2	7	-0,006190	-0,013257	-0,055604	0,030648	0,026524	2366298	0,003030	132512
2	8	0,000629	-0,013257	-0,055604	0,030648	0,026524	2385962	0,003028	132512
2	9	0,002451	-0,013257	-0,055604	0,030648	0,026524	2379909	0,003032	132512
2	10	-0,005706	-0,013257	-0,055604	0,030648	0,026524	2446951	0,003022	132512

Table 21: Example of car_{it} data arranged to directly input in STATA (containing only the first two economic policies)

Policy	Day	car_{it}	Market returns	Stock returns	Market volatility	Stock volatility	Size	Book to market ratio	Employment
1	-10	-0,005673	-0,108022	-0,018004	0,036231	0,033284	2695183	0,003053	134055
1	-9	-0,001823	-0,216045	-0,036007	0,072462	0,066569	5344672	0,006119	268110
1	-8	-0,014232	-0,324067	-0,054011	0,108694	0,099853	7985314	0,009178	402165
1	-7	-0,015568	-0,432090	-0,072014	0,144925	0,133137	10639824	0,012235	536220
1	-6	-0,019363	-0,540112	-0,090018	0,181156	0,166421	13316205	0,015289	670275
1	-5	-0,026703	-0,648135	-0,108021	0,217387	0,199706	16052990	0,018350	804330
1	-4	-0,023406	-0,756157	-0,126025	0,253618	0,232990	18707781	0,021419	938385
1	-3	-0,023823	-0,864180	-0,144028	0,289849	0,266274	21310257	0,024494	1072440
1	-2	-0,031188	-0,972202	-0,162032	0,326081	0,299559	23907986	0,027549	1205752
1	-1	-0,027193	-1,080224	-0,180035	0,362312	0,332843	26544700	0,030613	1339064
1	0	-0,037983	-1,188247	-0,198039	0,398543	0,366127	29140500	0,033678	1472376
1	1	-0,039488	-1,296269	-0,216042	0,434774	0,399411	31773214	0,036741	1605688
1	2	-0,038834	-1,404292	-0,234046	0,471005	0,432696	34482540	0,039797	1739000
1	3	-0,041287	-1,512314	-0,252049	0,507236	0,465980	37194216	0,042847	1872312
1	4	-0,044845	-1,620337	-0,270053	0,543468	0,499264	39776241	0,045902	2005624
1	5	-0,045439	-1,728359	-0,288056	0,579699	0,532548	42377716	0,048954	2138936
1	6	-0,049024	-1,836382	-0,306060	0,615930	0,565833	44982151	0,052000	2272248
1	7	-0,051483	-1,944404	-0,324063	0,652161	0,599117	47553770	0,055053	2405560
1	8	-0,047384	-2,052427	-0,342067	0,688392	0,632401	50027585	0,058106	2538872
1	9	-0,043794	-2,160449	-0,360070	0,724623	0,665686	52507684	0,061152	2672184
1	10	-0,045317	-2,268471	-0,378074	0,760855	0,698970	54957134	0,064200	2805496
2	-10	0,004149	-0,013257	-0,055604	0,030648	0,026524	2473815	0,003053	133312
2	-9	0,007170	-0,026513	-0,111208	0,061295	0,053048	4953914	0,006100	266624
2	-8	0,005191	-0,039770	-0,166812	0,091943	0,079573	7403364	0,009148	399936
2	-7	0,002045	-0,053026	-0,222415	0,122590	0,106097	9819187	0,012196	533248
2	-6	0,001341	-0,066283	-0,278019	0,153238	0,132621	12157912	0,015239	666560
2	-5	-0,003244	-0,079539	-0,333623	0,183885	0,159145	14572370	0,018283	799872
2	-4	-0,004860	-0,092796	-0,389227	0,214533	0,185669	16973060	0,021312	933184
2	-3	-0,006420	-0,106052	-0,444831	0,245180	0,212194	19346503	0,024338	1066496
2	-2	-0,004461	-0,119309	-0,500435	0,275828	0,238718	21661492	0,027389	1199808
2	-1	-0,000563	-0,132565	-0,556039	0,306475	0,265242	23879884	0,030438	1332320
2	0	-0,001149	-0,145822	-0,611643	0,337123	0,291766	26080214	0,033494	1464832
2	1	-0,004321	-0,159078	-0,667246	0,367770	0,318291	28317239	0,036568	1597344
2	2	-0,006533	-0,172335	-0,722850	0,398418	0,344815	30471798	0,039629	1729856
2	3	-0,004036	-0,185591	-0,778454	0,429065	0,371339	32641849	0,042683	1862368
2	4	-0,005252	-0,198848	-0,834058	0,459713	0,397863	34787495	0,045734	1994880
2	5	-0,008560	-0,212104	-0,889662	0,490360	0,424387	37067683	0,048772	2127392
2	6	-0,012583	-0,225361	-0,945266	0,521008	0,450912	39343832	0,051816	2259904
2	7	-0,018773	-0,238617	-1,000870	0,551656	0,477436	41710130	0,054846	2392416
2	8	-0,018144	-0,251874	-1,056473	0,582303	0,503960	44096092	0,057874	2524928
2	9	-0,015693	-0,265130	-1,112077	0,612951	0,530484	46476001	0,060907	2657440
2	10	-0,021399	-0,278387	-1,167681	0,643598	0,557008	48922952	0,063929	2789952

D.2 Abnormal returns

D.2.1 Code

xtset policy day

xtreg ar marketret stockret marketvol stockvol size bmratio employment, vce(cluster policy)

xtreg ar stockret marketvol stockvol size bmratio employment, vce(cluster policy)
xtreg ar stockret marketvol stockvol size bmratio, vce(cluster policy)

D.2.2 Economic policies

Table 22: *Multivariate random-effects ar_{it} regressions using the GETS procedure for economic policies (coefficients (robust standard errors))*

Variables	Regression		
	1	2	3
Constant	0.004857	0.006143	0.0086383***
	(0.008335)	(0.004104)	(0.002197)
Stock returns	-0.007182	-0.008099***	-0.007935***
	(0.004673)	(0.001481)	(0.001407)
Market volatility	0.478578***	0.455782***	0.453478***
	(0.177560)	(0.148354)	(0.137822)
Stock volatility	-0.583281***	-0.552791***	-0.541388***
	(0.198794)	(0.138041)	(0.137991)
Size	0.000000**	0.000000***	0.000000***
	(0.000000)[1]	(0.000000)[3]	(0.000000)[5]
Book to market ratio	-4.888126***	-4.797697***	-4.402743***
	(0.801812)	(1.074812)	(1.025737)
Employment	0.000000	0.000000	
	(0.000000)[2]	(0.000000)[4]	
Market returns	-0.000670		
	(0.003310)		

*significance level of 10%, **significance level of 5%, ***significance level of 1%
[1]1.44e-09 (6.49e-10), [2]4.52e-08 (7.61e-08), [3]1.50e-09 (4.70e-10), [4]3.14e-08 (4.42e-08), [5]1.58e-09 (4.09e-10)

D.2.3 Non-economic policies

Table 23: *Multivariate random-effects ar_{it} regressions using the GETS procedure for non-economic policies (coefficients (robust standard errors))*

Variables	Regression					
	1	2	3	4	5	6
Constant	-0.0107726	-0.0096207	-0.0084751	-0.0081481	-0.0028972	-0.0000152
	(0.0100106)	(0.009415)	(0.0095327)	(0.0108884)	(0.003488)	(0.0002535)
Stock returns	0.010143**	0.009915**	0.009104**	0.005859*	0.005602*	0.005020*
	(0.004138)	(0.004027)	(0.004007)	(0.003390)	(0.003054)	(0.002754)
Market volatility	-0.185921	-0.175671	-0.041451	-0.038051	-0.019437	-0.024535*
	(0.202332)	(0.203965)	(0.027539)	(0.028275)	(0.015495)	(0.014304)
Employment	0.000000	0.000000	0.000000	0.000000	0.000000	
	(0.000000)[1]	(0.000000)[3]	(0.000000)[5]	(0.000000)[7]	(0.000000)[9]	
Size	0.000000	0.000000	0.000000	0.000000		
	(0.000000)[2]	(0.000000)[4]	(0.000000)[6]	(0.000000)[8]		
Market returns	-0.004420	-0.004328	-0.003394			
	(0.004512)	(0.004445)	(0.004126)			
Stock volatility	0.141862	0.134934				
	(0.198150)	(0.199520)				
Book to market ratio	-0.592023					
	(1.062797)					

*significance level of 10%, **significance level of 5%, ***significance level of 1%
[1]1.20e-07 (1.02e-07), [2]-7.67e-10 (6.62e-10), [3]9.60e-08 (8.74e-08), [4]-7.31e-10 (6.38e-10), [5]7.90e-08 (8.67e-08), [6]-4.82e-10 (5.40e-10), [7]7.29e-08 (1.01e-07), [8]-3.82e-10 (6.63e-10), [9]2.09e-08 (2.50e-08)

D.3 Cumulative abnormal returns

D.3.1 Code

xtset policy day
xtreg car marketret stockret marketvol stockvol size bmratio employment, vce(cluster policy)
xtreg car marketret stockret marketvol size bmratio employment, vce(cluster policy)
xtreg car marketret stockret marketvol bmratio employment, vce(cluster policy)
xtreg car marketret stockret marketvol employment, vce(cluster policy)
xtreg car marketret stockret marketvol, vce(cluster policy)
xtreg car stockret marketvol, vce(cluster policy)

D.3.2 Economic policies

Table 24: *Multivariate random-effects car_{it} regressions using the GETS procedure for economic policies (coefficients (robust standard errors))*

Variables	Regression	
	1	2
Constant	0.000341	0.0003414
	(0.001437)	(0.001437)
Stock returns	-0.007610***	-0.008053***
	(0.002388)	(0.001651)
Market volatility	0.479531***	0.469853***
	(0.161033)	(0.143551)
Stock volatility	-0.603405***	-0.591903***
	(0.167337)	(0.144658)
Size	0.000000***	0.000000***
	(0.000000)[1]	(0.000000)[3]
Book to market ratio	-5.288166***	-5.298739***
	(0.957140)	(0.954547)
Employment	0.000000***	0.000000***
	(0.000000)[2]	(0.000000)[4]
Market returns	-0.000333	
	(0.001239)	

*significance level of 10%, **significance level of 5%, ***significance level of 1%
[1]1.18e-09 (2.01e-10), [2]9.97e-08 (2.30e-08), [3]1.18e-09 (2.29e-10), [4]9.97e-08 (2.25e-08)

D.3.3 Non-economic policies

Table 25: *Multivariate random-effects car_{it} regressions using the GETS procedure for non-economic policies (coefficients (robust standard errors))*

Variables	Regression					
	1	2	3	4	5	6
Constant	0.000463	0.000463	0.000461	0.000475	0.000345	0.000314
	(0.001040)	(0.001039)	(0.001038)	(0.001036)	(0.001170)	(0.001170)
Stock returns	0.010538**	0.010556**	0.010597**	0.010390**	0.010053***	0.005512**
	(0.004736)	(0.004788)	(0.004579)	(0.004392)	(0.003797)	(0.002156)
Market volatility	-0.016015	-0.018578	-0.020087	-0.016225	-0.019732**	-0.024953***
	(0.215624)	(0.026735)	(0.018345)	(0.020057)	(0.009398)	(0.008298)
Market returns	-0.004586	-0.004608	-0.004705	-0.004444	-0.004461	
	(0.005120)	(0.004592)	(0.003865)	(0.003725)	(0.003677)	
Employment	0.000000	0.000000	0.000000	0.000000		
	(0.000000)[1]	(0.000000)[3]	(0.000000)[5]	(0.000000)[6]		
Book to market ratio	-0.671646	-0.672031	-0.646695			
	(1.149531)	(1.147605)	(1.146503)			
Size	0.000000	0.000000				
	(0.000000)[2]	(0.000000)[4]				
Stock volatility	-0.002622					
	(0.213901)					

*significance level of 10%, **significance level of 5%, ***significance level of 1%
[1]1.50e-08 (2.83e-08), [2]2.67e-11 (4.32e-10), [3]1.51e-08 (2.78e-08), [4]2.31e-11 (2.69e-10), [5]1.53e-08 (2.71e-08), [6]-4.63e-10 (2.33e-09)