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The Effects of Political Uncertainty on Dutch Stock Markets

A detailed analysis of Dutch stock market performance in the periods around General Elections, Cabinet Formations and Resignations in The Netherlands

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ABSTRACT

Political events can affect stock markets in several ways. Increased volatilities, excess returns in periods of political uncertainty, presidential election cycles and differences in returns between political parties have been observed in previous literature. This research focuses on the three Dutch stock indices: AEX, AMX and AScX, and examines their performance in the periods around general elections, cabinet formations and cabinet resignations. The first part of this event study looks for cumulative average abnormal returns (CAARs) over several event windows in politically uncertain periods. Most important significant results are found for the AEX. For all aggregated political events and separate event types, over the full period 1987-2017, a CAAR of -1.6% is observed for the AEX using the market model and -2.9% using the historical model. The overall effect of political uncertainty on Dutch index' performance is negative. The second part of the research concerns several CAR-regressions, which show more detailed effects of political uncertainty after an election, or cabinet formation. A positive coefficient is observed for the incumbent variable. In the third part, three trading strategies are developed to see whether they generate excess returns around election periods. The observed excessed returns are marginal, and the strategies become unprofitable after accounting for transaction costs. The results indicate a negative market reaction to uncertainty, which suggests the Dutch prefer the status quo.

Keywords: *Political Uncertainty; Dutch Stock Markets; Market Efficiency; Abnormal Returns; Event Study*

JEL Classification: G14, G18, H0

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CHAPTER 1 – Introduction

The 2017 Governing Agreement between the VVD, CDA, D66 and ChristenUnie lays out the foundation for their four-year governing term until 2021. A wide range of new or continued policies is included which affect citizens, companies and eventually stock markets. The following policy changes serve as a good example of policies with effects on financial markets (VVD, CDA, D66 & ChristenUnie, 2017):

- Proposed and later repealed termination of dividend withholding tax
- Changed calculation for taxes on savings, and an increase of tax-free capital from €25.225 to €30.000
- Increased "low" VAT rate from 6% to 9%. This lower rate applies to goods as agricultural goods, food products and medicines.

The termination of the dividend withholding tax could have increased investors interests in dividend paying stocks, like Royal Dutch Shell. The increase in tax free capital can attribute to extra flow from individual investors towards stock markets and the change in VAT rate can have an impact on companies in the affected sectors, examples of this are Koninklijke Ahold and Unilever. Besides taxes, governments decide on the rules by which investors, companies, institutions and all other players must act. For example, policies to achieve the Paris Climate Agreement by which companies must act, can potentially be against their profit maximizing interest. Another issue could be a change in the design of the Dutch Pension System, which is responsible for large investments in the Dutch indices. The policies and potential consequences given above show how politics affects stock markets.

Outside of the Netherlands, several major events have revived interest in the relation between political uncertainty and stock markets. The unexpected outcome of the Brexit-referendum and the election of Donald Trump as U.S. President, both in 2016 and the more recent government formation by the League and Five Star Movement in Italy, are the most prominent examples.

During election periods all political parties propose their future policies and as soon as the election results are known, or predicted by polls. Investors should create their own view on how this will affect individual companies and stock markets. In an efficient market these renewed expectations have an immediate effect on stocks and indices. Throughout the formation period, the potential governing parties should become clear and some information might "leak" about potential policies. These periods of unclear government policies lead to political uncertainty, which causes uncertainty in the Dutch stock markets. Finally, when parties come together to form a governing agreement, it should become clearer to investors what to expect for the coming years, bringing an end to political uncertainty for that moment.

This paper researches the adjustment of the Dutch stock indices as a result of political events. Thereby analysing the efficiency of Dutch stock markets, by its ability to react appropriately to news regarding elections, cabinet formations and cabinet resignations. This paper provides an answer to the following research question:

How does political uncertainty affect the three Dutch stock indices?

To answer the research question the following four hypotheses are tested:

- H1: There are no Cumulative Average Abnormal Returns (CAARs) for the Dutch indices in the periods around political events.
- H2: The CAARs for the three Dutch stock indices are equal.
- H3: The market reaction to elections or formations is more positive when the VVD is the largest party, compared to when the PvdA is the largest party.
- H4: The market reaction to the incumbent party being re-elected, or again forming a government is more positive than when a new party is elected, or forms a government.

The extensive research of not only periods around general elections, but also following cabinet formations and resignations adds to already existing literature on the relation between Dutch political uncertainty and stock indices. Furthermore, the analysis of the differences between Dutch indices is another contribution to the field of political uncertainty and abnormal returns. Since the indices can be distinguished on the market capitalization of the listed companies it will stretch out the relation to political uncertainty, abnormal returns and index characteristics, liquidity in particular. From Brunner (2009) it is clear that political uncertainty increases the volatility of Dutch stock markets. Since this is already known this research will focus on abnormal and excess returns during periods political uncertainty, while taking the changed volatility into account.

This research will first investigate whether the three Dutch stock indices are efficient during periods of political uncertainty, these being election periods, formation periods and the period around cabinet resignations. This is done by searching for Cumulative Average Abnormal Returns (CAARs). These CAARs show the reaction of the stock markets to political news and highlight the capability of markets to adjust. They will be calculated for the three different indices to find out whether there are differences in efficiency among them. The observed CAARs provide evidence to reject the H1 hypothesis and potential differences between them provide evidence against the H2 hypothesis.

Next is a further analysis of the relation between index returns and political factors, to test the H3 and H4 hypotheses. The performed regressions of the Cumulative Abnormal Returns (CARs) show what factors drive market reactions to political events. Abnormal behaviour of indices can be further

investigated with these regressions, to find out the effect of elections or formations when the incumbent party is re-elected for instance. Finally, the effect of different political parties being elected, or forming a government, is researched.

For investors it is interesting and important to see whether excess returns can be generated from periods of political uncertainty, especially around elections since their date is known beforehand. A possibility is that investors would prefer to avoid exposure to Dutch stock markets during these periods, or even want to have a short position. Political parties can also be interested in the markets' perception of their policies. The trading model tests three strategies to see whether they generate excess returns.

The results from the event study show underperformance of the Dutch indices both compared to their own historical performance and against their benchmark. Political uncertainty has the most significant effect on the AEX with a negative CAAR of -3.1% using the market model in event window (-15,+14) over the full period 1987-2017. The combined effect of the three event types remains negative, -1.6% for the AEX over the period 1987-2017 in event window (-15,+14). The results show CAARs are present in periods of political uncertainty, the effect however differs between the indices in both direction and significance. The CAR regressions show a positive market reaction to the incumbent variable, but no differences between political parties. Excess returns are negative for the Dutch indices around elections. Unfortunately, exploiting this is not profitable after the inclusion of transaction costs. The results indicate a Dutch preference for the status quo, with negative market reactions to political uncertainty.

The remainder of this paper is structured as follows: The following section focuses on previous research on stock prices and efficient markets and on the relationship between politics and stock prices. Using this information, the four hypotheses are derived. The third section explains the characteristics of the Dutch stock indices and political system, it also provides an overview of Dutch politics since 1986. The fourth section concerns the methodology used to conduct the research and the data of both the indices and political events. The fifth section shows the results of the event study, CAR regressions and trading model. The sixth and final section discusses several limitations of this research, draws several conclusions from the results sections and proposes some suggestions for future research.

CHAPTER 2 – Literature review

The literature review is split into three parts, the first concerning market efficiency and returns, the second politics and stock markets and the third politics and the Dutch economy. In the second part a meta-table provides an overview of previous research on stock markets and political uncertainty and several papers are discussed more thorough, based on this previous literature the four hypotheses are derived in the final part of this section.

2.1 Efficient markets and explaining returns

Fama, Fisher, Jensen & Roll (1969) write about the adjustment of stock prices to new information. They focus on stock splits and conclude there is no trading strategy to obtain higher expected returns, unless one possesses inside information. Results of the study provide considerable support to the conclusion that the stock market is "efficient" in the sense that stock prices adjust very rapidly to new information.

Next Fama (1970) argues that according to the Efficient Market Hypothesis (EMH) in its semi-strong form, markets reflect all publicly available information and should adjust efficiently to new public available information.

Summers (1986) finds evidence that stock market prices can deviate substantially from its fundamental value, which violates the EMH. To support this, he claims most research fails to reject the EMH mainly because of relatively powerless tests and that market inefficiencies are unlikely to be detected with the standard techniques.

Following the reasoning of the three papers mentioned above, it is expected that the Dutch stock indices quickly adjust to the new information after a political event. Summers (1986) does not agree with the EMH and opens the door for the Dutch stock markets to behave differently following political events than would be in line with the EMH.

Niederhoffer (1971) examines the relation between world events and movements in stock prices and concludes that world events have a large effect on stock prices. He also finds that prices tend to change by large amounts in the first two days following world events.

Chen, Roll & Ross (1986) explain movements in stock prices by certain economic forces. These forces are: industrial production, inflation, risk premia, term structure (interest), market indices, consumption and oil prices. The most significant factors explaining expected stock returns are: industrial production,

risk premia and the yield curve. They conclude that stocks are priced according to their exposure to the economic factors.

Cutler, Poterba & Summers (1988) analyse the impact of major events and political news on stock price changes. They first look at macroeconomic news and try to explain movements in stock prices. However, they cannot explain more than one third of the return variance by macroeconomic news. Secondly, they identify non-economic news, such as elections and international conflicts, and investigate how these events affect stock markets. Finally, they also examine the largest market movements and try to link these with news and/or events. They find relatively small changes on days with news, whether macroeconomic or non-economic, and large changes on days without any news. From this they conclude that neither type of news explains a large part of the movement in stock returns.

Brown, Harlow and Tinic (1988) compose an extension of the EMH, namely the Uncertain Information Hypothesis (UIH). They demonstrate that uncertainty has a negative effect on stock prices, due to the reaction of risk-averse investors. When this uncertainty is resolved, price changes tend to be positive.

It would be interesting to find out whether the national political events have the same effect on the indices as Niederhoffer (1971) found for world events and whether this is also observed in the two days following the event. Chen, Roll & Ross (1986) conclude that political events affecting economic forces should trigger a stock market reaction. This should be observable around elections and formations. Cutler, Poterba & Summers (1988) reduce expectations on effects of political events on stock markets, since they have only found small market reactions to non-economic news. Finally, the UIH from Brown, Harlow and Tinic (1988) predicts that the uncertainty before elections and during formations has a negative effect on returns, which turns positive after this is resolved. For resignations the period after the event should show negative returns due to the sudden uncertainty.

2.2 Politics and stock markets

Research on the relation between politics and stock markets can be separated in two broad categories. The first being the election cycle effect and the second the election effect. The election cycle effect refers to the pattern of stock prices having higher returns in the two years prior to an election, than in the two years after an election. The other research focuses on is the election effect. A major difference between the two categories of research is that the main focus of the election cycle is the stock price pattern and the relation between politics and stock markets. The others, this paper included, focus more on the relation between political uncertainty and stock markets. Therefore, the second category research

is more important for my research. To provide a complete overview of research on politics and stock markets, research on election cycles is still discussed.

Umstead (1977) researches stock price behaviour to further test the EMH. One of his findings is that stock prices in the U.S. follow a seasonal pattern of sixteen quarters. Umstead argues that this can probably be attributed to the four-year election cycle.

Allvine & O'Neill (1980) provide an alternative to the EMH, with their finding of the four-year election cycle in the U.S. In the two years prior to elections stock prices perform better than in the two following years. Their paper concludes from this that stock prices do not move randomly and are therefore to some extent predictable, however this does not apply to short periods.

Gärtner & Wellershof (1995) find the same election cycle in the U.S. looking at over 30-years of data (from 1961-1992) for several indices including the S&P500 and the Dow Jones Industrial Average. They compose several trading strategies where investors have a long position in the S&P500 for the two years prior to the election, and then either invest in Treasury bills or have a short position in the S&P500 for the two years after a presidential election. Both strategies significantly outperform a simple Buy-and-Hold strategy in the S&P500 for the entire period. This goes against the EMH in its semi-strong form, according to which this kind of above benchmark performance should not be possible and sustainable unless one possesses inside information. Finally, they suggest that the election cycle is deliberately created by governments, but they do not test this theory.

Santa-Clara & Valkanov (2003) also observe the election cycle in the U.S. and distinguish between stock market performance under Democrats and Republicans. They find excess returns under Democratic presidencies. Then they analyse the period around presidential elections to see whether there is a market adjustment after the election results are known, or more certain due to polls. They expect to see this effect, because of the observed difference in returns between the two parties. However, they barely find any market reaction in the period around presidential elections.

Döpke & Pierdzioch (2004) analyse the German stock market to find evidence for an election cycle. In contrast to previous studies in the U.S. where evidence for such a cycle was found, they do not observe any in Germany. Another difference between the previous studies is that in the U.S. liberal administrations (Democrats) showed excess returns over conservatives (Republicans) whereas in Germany this is the other way around.

The findings regarding the election cycle and stock index returns show that stock market behaviour can differ from what is predicted by the EMH and that there is a clear link between politics and stock returns.

However, the focus of the previous papers has not been on short term effects of political events. Another interesting finding is that the relation between stock markets and politics is not the same across countries, as shown be the different findings for the U.S. and Germany. Döpke & Pierdzioch (2004) attribute this difference to a different political system. Expected would be that the Dutch stock markets behave similar to the German market, since both countries have a comparable political system where governments are a coalition of several parties contrasting the two-party system in the U.S.

An overview of research on political uncertainty and stock markets is presented next. Several papers are discussed in depth, from which the four hypotheses are derived.

Table 1. Meta-table of research on political uncertainty and stock markets

Author(s)	Region	Topic	Method	Observed effect
Gwilym & Buckle (1994)	U.K.	Efficiency of stock and option markets	Several models testing the effect of increased probability of a Conservatives win (using poll-data) on stock and option prices	Stock market was semi-strong efficient, it reacted quickly to new information from polls
Pantzalis, Stangeland & Turtle (2000)	33 countries (the Netherlands included)	Stock market behaviour around national elections	Event study	Observe positive CARs in both windows especially for less-free countries
Leblang & Mukherjee (2004)	U.S.	Presidential elections and the stock market	GARCH and Markov-switching models	Anticipation on democratic victory decreases stock market volatility
Moore & Mukherjee (2006)	10 European democracies (the Netherlands included)	Government formations and foreign exchange markets	GARCH (1,1) model observing how mean and volatility of exchange rates are affected	Uncertainty with respect to government formations reduces exchange rate volatility
Bialkowski, Gottschalk & Wisniewski (2008)	27 OECD countries (the Netherlands included)	Volatility around elections	Volatility event study	Increased volatility after and around elections
Brunner (2009)	The Netherlands	Financial markets and political uncertainty	GARCH (1,1) model testing for effects of a left government and volatility changes	Higher volatility around elections and during formation periods. Left parties increase volatility, do not affect returns
Pastor & Veronesi (2012)	U.S.	Government policy uncertainty and stock prices	Brownian motion model to predict effects of policy changes on stock markets	Stock market returns should be negative at the announcement of policy changes. Returns become more volatile and correlated among stocks
Boutchkova, Doshi, Durney & Molchanov (2012)	50 Countries (the Netherlands included)	Political uncertainty and stock markets, separated by industry	Multiple panel regressions using weekly data	Domestic political uncertainty increases stock market volatility, especially for industries relying more on exports
Ramiah, Pham & Moosa (2017)	U.K.	Effect of Brexit on the British economy	Event study of sector returns after the referendum	CARs differ by sector. Majority of sectors have a negative reaction to Brexit
Wagner, Zeckhauser & Ziegler (2017)	U.S.	Company stock reactions to 2016 U.S. election	Event study of abnormal performance by company characteristics and at industry level	Investors require different amounts of time to incorporate the effects of various policies

Table 1. shows the most important findings on the relation between political uncertainty and stock markets by previous research. The observed volatility changes, by several papers including Brunner (2009) for the Dutch stock markets, need to be considered and controlled for in this research. Since stock markets should reflect all publicly available information (Fama, 1970), index prices are expected to already shift prior to the election due to the publication of the results of polls. After the election results are known the index prices should efficiently shift accordingly, if the result was not already anticipated on. The expectation is that the election results are incorporated in the stock prices within one trading day. To analyse whether the Dutch stock indices behave in line with Fama's efficient market hypothesis, the first two hypotheses are included.

The first hypothesis tests whether periods of political uncertainty are responsible for a market reaction of the Dutch indices.

- H1: There are no Cumulative Average Abnormal Returns (CAARs) for the Dutch indices in the periods around political events.

The second hypothesis tests whether the market efficiency is the same across the three indices.

- H2: The CAARs for the three Dutch stock indices are equal.

This tests whether there are different reactions to political events between the Dutch stock indices. This could show differences in market efficiency, since efficient markets adjust rapidly to new information.

Pantzalis, Stangeland & Turtle (2000) research the effects of elections on stock markets for 33 countries, from 1974 to 1995, looking at 133 elections in total. They find positive returns in the two weeks prior to an election, they conclude their findings are in line with the UIH. As previously mentioned, there is high uncertainty around elections and when this decreases there is a positive reaction in stock prices. This reaction can be prior to the election, since polls make the results more certain when the election approaches.

Jensen & Schmith (2005) search for the effect of the potential election of a left-wing candidate, Luiz Ignacio de Silva, on stock market returns and volatility. The 2002 Brazilian election was linked to a decline in the Brazilian stock market, and one of the explanations for this was the rise of Da Silva in the polls. Another explanation provided is that the uncertainty around the election led to a flight to safety by investors, thus pushing the Brazilian stock market down. In the end, Jensen & Schmith find no impact of any political variables on the mean Brazilian stock market return, which was mostly affected by the

world economy. However, they did find increased volatility when support for Da Silva's Lula party increased.

Brunner (2009) analyses reactions of the Dutch AEX to political events over the period 1965-2006 comparing performance to the German DAX. He examines both election and formation periods and finds that his models with simple dummies for political uncertainty and parties' ideology, PvdA being left for instance, perform better than more sophisticated models including parties' stance on several policies. Brunner finds higher volatility in periods of political uncertainty. Significant for this research is that there is higher volatility when the PvdA participates in a government. It is however not possible to confirm that the participation of the PvdA in government has a negative effect on returns. From Jensen & Schmidt (2005) and Brunner (2009) the third hypothesis is derived.

- H3: The market reaction to elections or formations is more positive when the VVD is the largest party, compared to when the PvdA is the largest party.

The third hypothesis examines potential differences between market reactions to political parties. In the CAR regression both dummies for VVD and PvdA are included and CDA omitted, because the first two differ most in ideology.

Ramiah, Pham & Moosa (2017) find an overall negative sector reaction to the Brexit-referendum. The final effect of the Brexit will depend on the future relation with European Union and other countries, which still remains uncertain to date. The Brexit resulted in higher uncertainty about the future of the U.K. regarding topics such as trade, foreign investments and the public sector, thus having an immediate effect on stock markets.

The findings of the Brexit effect on stock markets could indicate markets dislike uncertainty. To test this notion in the Netherlands the fourth hypothesis is derived, which focuses on the effect of the incumbent party being re-elected or forming a government.

- H4: The market reaction to the incumbent party being re-elected, or again forming a government is more positive than when a new party is elected, or forms a government.

The H4 highlights the effect of political stability. The incumbent party being re-elected or again forming a government is expected to bring less uncertainty to stock markets, which according to the UIH should have a positive effect.

Wagner, Zeckhauser & Ziegler (2017) analyse the stock market (Russell 3000 index) reaction to the 2016 presidential election in the United States at the sector and individual firm level. This research distinguishes firms on characteristics such as: taxes paid, interest costs and revenue from foreign sources. It identifies investors' expectations about Trumps policies and then observes the reaction following the election. Investors expected a large tax cut if Trump would be elected, so after the result high tax paying companies should have a positive market reaction. The research concluded that investors have diverse response times to different policies. The reaction related to the tax cut was very quick, compared to the reaction related to trade policies.

Pantzalis, Stangeland & Turtle (2000) observe a positive market reaction when uncertainty regarding the election outcome disappears. They do find significant CARs in the period around elections. Similar results would provide support to reject the H1 hypothesis. Jensen & Schmidt (2005) and Brunner (2009) do not find negative returns from either a left party (Lula) becoming more popular prior to al elections or participating in a government (PvdA). However, both do find a resulting change in volatility. In this research the effect of an election or formation of VVD or PvdA, relative to CDA, and the incumbent party is analysed. It is therefore an extension to the previous work of Brunner (2009). The negative market reaction to Brexit observed by Ramiah, Pham & Moosa (2017), suggests stock markets dislike uncertainty. For the Netherlands this preference would be in line with the H4 hypothesis showing a more positive reaction to the re-election of the incumbent party. Lastly, the market reactions to political events can differ not only in magnitude, but also in speed. As shown by Wagner, Zeckhauser & Ziegler (2017), investors might react sooner to one policy, then to another. This could be reflected in reactions to elections, formations and resignations in the Netherlands.

2.3 Economic effects of political uncertainty

Alesina, Özler, Roubine & Swagel (1994) relate political instability to economic growth, with political instability being defined as the propensity of a government collapse. Political uncertainty has a clear negative effect on growth. For developed countries, where political changes are regular and often known beforehand, the effect is less.

Darby & Muscatelli (2004) develop a model linking political uncertainty, public investments and economic growth to eachother for OECD countries. They conclude that political uncertainty leads to policy myopia and this results in the incumbent party reducing taxes and public investments. Leading to a less than optimal social outcome.

Julio & Yook (2012) research the relation between political uncertainty and corporate investments. They find a 4.8% decrease in corporate investments the year prior to elections compared to other years. Their

main explanation for this finding is what they refer to as the political uncertainty hypothesis. The increased uncertainty from the coming elections steer companies onto more cautious behaviour considering their investments. After the uncertainty is resolved, their behaviour with respect to investments goes back to normal.

Baker, Bloom & Davis (2016) find many effects of economic policy uncertainty (EPU). Besides the previously mentioned theory that, uncertainty increases stock market volatility, it also affects GDP, investments and employment. They construct an EPU index, based on newspaper coverage of certain keywords linked to economic policy and uncertainty, and find that when the index is elevated, unemployment levels tend to rise. For industrial production they observe a drop. Both these effects show the negative side of policy uncertainty.

Previous research shows there are direct effects of political uncertainty on economic growth, irrespective of whether this uncertainty arises from elections, news or a change of leadership. There are several mechanisms through which economies are affected, these being corporate investments, taxes, GDP growth and public spending.

Research on the economic effects of political uncertainty features several expressions for this political uncertainty, these being political instability, (economic) policy uncertainty and political uncertainty. Political instability as used by Alesina, Özler, Roubine & Swagel (1994) refers to the propensity of a government to collapse. Policy uncertainty and political uncertainty are harder to distinguish. The EPU index by Baker, Bloom & Davis (2016) features newspaper coverage of terms as economic policy and uncertainty. Political uncertainty in Darby & Muscatelli (2004) and Julio & Yook (2012) concerns uncertainty of election outcomes. Political uncertainty arises from a political event as an election or (potential) government collapse. Political uncertainty often leads to policy uncertainty as is the case during elections and formations. Policy uncertainty can also exist without political uncertainty, one example of this is central banks deciding on monetary policy. To conclude the policy uncertainty is a somewhat broader definition of uncertainty and can arise without or as a result of political uncertainty.

This paper focuses mainly on political uncertainty, arising from elections, formations and resignations. However, because of these political events policy uncertainty changes, together both affect the economy and thus result in stock market reactions.

CHAPTER 3 – Dutch elections and stock markets

Before researching the relation between political uncertainty and Dutch stock markets it is important to be able to distinguish the three Dutch indices and to understand the Dutch political system and its history. This chapter first discusses the indices and their characteristics. After which, it distinguishes the three types of political events included in this research. Finally, it provides an overview of Dutch political history since 1986.

3.1 Dutch stock indices

There are three major stock indices in the Netherlands: the Amsterdam Exchange Index (AEX) the Amsterdam Midkap Index (AMX) and the Amsterdam Small Cap Index (AScX).

All indices are price return indices and based on free float market capitalization (Euronext, 2016). The AEX consists of the 25 largest companies, the AMX of the 26th-50th largest and the AScX of the 51st-75th largest. The indices are revised four times a year and each index can only consist of maximum 25 companies. Meaning an inclusion of a new company to the AEX would result in a drop of the lowest ranked company to the AMX, if that already consisted of 25 the lowest would drop to the AScX and eventually a company could drop out of the AScX. Another important characteristic of the indices is that the weight of an individual stock cannot exceed 15% of the index.

3.2 General elections

Dutch general elections are usually held every 4 years. Sometimes it occurs that a cabinet does not finish its governing term of 4 years, in this occasion new elections are held sooner (Kiesraad, n.d.). In a general election, Dutch citizens vote for their 150 members of parliament. The members are representing several political parties. After the elections the parties negotiate to form a cabinet (not necessary with a majority of over 75 members in parliament) and divide the ministerial positions, including the appointment of the Prime-Minister. Generally, the party receiving most votes in the elections will deliver the Prime-Minister. The Prime-minister also has the lead in the process of cabinet formation, which is explained next.

3.3 Cabinet formations

After general elections a formation period starts in which a cabinet is formed. During this period parties negotiate with the purpose to form a coalition with a majority in parliament. During these negotiations the parties put together a so-called “Regeerakkoord” in which their policies for the governing period are laid out. This process can bring a lot of political uncertainty and as a result policy uncertainty. Several combinations of parties can try and fail to form a government before one finally succeeds. From Table 2 can be derived that the formation of the cabinet Rutte III took over seven months. A formation can also occur without an election, this occurred both with Kok II and Balkenende III, which is discussed later.

3.4 Resignation of a cabinet

At the end of the governing term, the prime minister resigns on behalf of the cabinet to the monarch. It can also happen that a cabinet resigns before the end of its term. When this is the case, new elections have to be scheduled. The active cabinet resigns when a new one is installed, before that they stay on as a “demissionairy” cabinet.

Table 2. shows the past twelve cabinets, including extra information on the cabinet formation and resignation. Important for this research are especially the start of the formation, the length of the formation and the reason of resignation. Abnormal returns are expected to be present around the start of the formation, which is in almost all cases an election date, during the formation period and at the date a cabinet fell. Two special cases presented above are the Kok II and the cabinet Balkenende III. The Kok II crisis resulted in the cabinet resigning at May 19th,1999, after which a new formation period of 18 days caused the withdrawal of this resignation. Balkenende III was formed after the resignation of Balkenende II when the two already governing parties CDA and VVD decided, after a formation of just eight days, to continue as a new minority government (Ministerie van Algemene Zaken, n.d.).

Table 2. Overview of Dutch cabinets, formations and resignations (Ministerie van Algemene Zaken, n.d.)

Name of cabinet	Start formation	Formation days	Start term	End term	Parties	Resignation
Rutte III	15-03-2017	225	26-10-2017		VVD, CDA, D66, ChristenUnie	
Rutte II	12-09-2012	54	05-11-2012	14-03-2017	VVD, PvdA	End of term
Rutte I*	09-06-2010	125	14-10-2010	23-04-2012	VVD, CDA	Fall of cabinet
Balkenende IV	22-11-2006	92	22-02-2007	20-02-2012	CDA, PvdA, ChristenUnie	Fall of cabinet
Balkenende III*	30-06-2006**	8	07-07-2006	21-11-2006	CDA, VVD	End of term
Balkenende II	22-01-2003	125	27-05-2003	30-06-2006	CDA, VVD, D66	Fall of cabinet
Balkenende I	15-05-2002	68	22-07-2002	16-10-2002	CDA, VVD, LPF	Fall of cabinet
Kok II crisis		18	19-05-1999	08-06-1999	PvdA, VVD, D66	Cabinet crisis
Kok II	06-05-1998	89	03-08-1998	16-04-2002	PvdA, VVD, D66	Fall of cabinet
Kok I	03-05-1994	111	22-08-1994	05-05-1998	PvdA, VVD, D66	End of term
Lubbers III	06-09-1989	62	07-11-1989	02-05-1994	CDA, PvdA	End of term
Lubbers II	21-05-1987	54	14-07-1986	03-05-1989	CDA, VVD	Fall of cabinet

*Minority government, **Redivision of cabinet

CHAPTER 4 – Data and methodology

This chapter discusses the data and methodology used to research the relation between political uncertainty and Dutch stock markets. First, the derivation of the estimation and testing period is discussed, including an overview of similar event studies of the election effect and their methodology. Secondly, is the determination of the abnormal and market return models, after this the methodology to aggregate the abnormal returns and test for their significance is treated. Thirdly, the several CAR regressions and the trading model are explained. Finally, all data for both political events and stock markets is presented and adjustments made are elaborated on.

4.1 Estimation and testing period

Table 3 presents an overview of several methods used in previous event studies, as well as the applied estimation and testing windows. The last column highlights some of the results, which can be compared to the results presented in the next chapter.

Table 3. Event studies of the election effect on stock markets

Author(s)	Region	Method	Findings
Pantzalis, Stangeland & Turtle (2000)	33 countries (including the Netherlands)	Estimation window: 100-week period prior to event window. Event windows (weeks): (-2,+4), (-2,0)	Observe positive CARs in both windows especially for less-free countries. CAR free countries: (-2,0):0.24% CAR less-free countries: (-2,0): 3.81% . CAR (-2,0): 1.12%
Wang, Lee & Lin (2008)	France, Japan, U.K. & U.S.	Estimation window (trading days):(-105,-16). Event window: (-15,+15)	CAR (-5,2): -0.6%, CAR (0,1): -0,2%
Opare (2012)	13 EU countries (including the Netherlands	Estimation window: (-250,-50). Event window (days): (-15,+15)	CAAR (-15,13): -0,5%. Other pooled-CAARs insignificant. CAAR NL (-15,15): -4.2%
Peiris (2012)	Sri Lanka	Estimation window (days): (-180,-31). Event window: (-15,-1) Pre-event window (-30,-16), Post-event window (+1,+15)	CAAR (-15,-1): 1.3% CAAR (1,15): -0.6%
Ramiah, Pham & Moosa (2017)	U.K.	Estimation window: (06/2010 – 07/2016) Event window: (+1, +10)	CAR (+1,+10): -15.4% for Banking sector. CAR (+1, +10): +5.2% for Tobacco sector
Osuala, Onoh & Nwansi (2018)	Nigeria	Estimation window: 24 days prior to event window. Event window: (-2,+3)	AAR 2011 (-2,3): -4.8%, AAR 2015 (-2,3): -0.8%

Based on Pantzalis, Stangeland & Turtle (2000) a 100-day period is selected as estimation window, this being (-115,-16). The full event window is (-15,14) and within this window there are the following event windows: (-15,-1), (-10,-1), (-5,-1), (-2,+2), (0,+1), (0,+4), (0,+14). The event study methodology is mainly based on the framework created by Bowman (1983).

4.2 Expected return models

From Schweitzer (1989) two approaches to calculate expected returns are derived:

Mean-adjusted return:

$$AR_{i,t} = R_{i,t} - \bar{R}_i \quad (1)$$

$AR_{i,t}$ is the abnormal return of index *i* at time *t*, $R_{i,t}$ the actual return of index *i* at time *t* and $\bar{R}_i$ is the average return of index *i*. In the remainder of this paper this approach is called the Historical Model (HM).

Risk adjusted market return:

$$AR_{i,t} = R_{i,t} - (a_i \cdot + \beta_i * R_{m,t} + \varepsilon) \quad (2)$$

Where $AR_{i,t}$ is the abnormal return of index *i*, on day *t*, $R_{i,t}$ is the actual return of index *i*, on day *t*, $R_{m,t}$ is the market return on day *t*, a_i and β_i are the constant and coefficient from a regression between index *i* and its benchmark market return and ε is the error term. In the remainder of this paper this approach is called the Market Model (MM).

Brown & Warner (1985) write about the use of daily data in event studies and find that the mean-adjusted/historical model often yields similar results as the more sophisticated market model. According to MacKinlay (1997) the market model can be an improvement to the mean-adjusted or historical model. As he states: "By removing the portion of the return that is related to variation in the market's return, the variance of the abnormal return is reduced." In this study both methods are used to be able to compare the Dutch index performance against both its historical and benchmark's performance.

4.3 Estimating market returns

Lyon, Barber and Tsai (1999) control for firm size to calculate abnormal returns. This is applied in this paper in a different way; the market returns of the Dutch indices will be based on a European Index with comparative firm sizes. For the AEX this will be the EURO STOXX 50 Index (SX5E), for the AMX the EURO STOXX Mid Index (MCXE) and for the AScX the EURO STOXX Small Index (SCXE).

By using the EURO STOXX indices as market returns global events affecting both the Dutch and European STOXX indices are excluded from the abnormal returns. This way the abnormal return should be explained by Dutch events. Since this research will focus on the abnormal returns from the short period before and after a political event, it is most likely these events have a significant impact and explain at least most of the observed abnormal performance.

Matching the Dutch index returns with its European STOXX benchmark index makes it possible to compare the reaction of 25 Dutch stocks against either 50 (EURO STOXX 50) or 200 (EURO STOXX 200 Mid and EURO STOXX 200 Small) companies. To assess the reactions of individual companies is a very time consuming and ineffective approach. First of all, because the index constituents have changed a lot over the past decades. Second, because the weightings of the individual companies in the index are often revised, as previously mentioned. Third and finally, because the operations of companies change over time. An example for this would be Philips, as described in Philips (2017), which has shifted the focus of its operations from lightning and consumer electronics to healthcare. In 2018, the lightning

division was even separated from the mother company and is now listed as the individual company Signify N.V. Therefore, observing the reaction of individual companies does not provide more useful information than observing the index reaction.

By comparing the indices to one another these problems are all overcome. The results display the summed reaction of the index constituents to the event compared to their benchmark index or historical returns.

Due to the replication of this event study (for the period 1987-2017 nine general elections, eleven cabinet formations and six cabinet resignations are observed) all factors affecting the index returns are likely to be different for all events, however the constant will be that there is an election/formation/resignation coming, or just occurred. This should make the findings robust to other factors influencing index returns. Due to this methodology, the results will include some noise, coming from the inclusion of Dutch companies in the benchmark indices. However, this inclusion is more likely to understate the results from decreasing the abnormal returns than the other way around.

4.4 Aggregating abnormal returns

From the abnormal returns (AR), the Average Abnormal Return (AAR) is derived. By taking the average from all ARs at day *t* the AAR is calculated for that day *t.*

$$AAR_t = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t} \tag{3}$$

For every event the Cumulative Abnormal Return (CAR) is calculated, by summing up all ARs of the event period for one specific event.

$$CAR_{t_1,t_2} = \sum_{t_2}^{t=t_1} AR_{i,t} \tag{4}$$

Finally, the Cumulative Average Abnormal Return is calculated by summing up the AARs. The CAAR for the entire event period is equal to the average of CARs for all events.

$$CAAR_T = \sum_{t=1}^{T} AAR_t \tag{5}$$

4.5 Significance tests

Both parametric and non-parametric significance tests are performed to test for the significance of the CAARs. All formulas are from Rani, Yadav & Jain (2016).

The standard parametric T-test by Brown & Warner (1980).

$$t = \frac{CAAR_t}{(T_1 - T_2 + 1)\frac{1}{2}\hat{\sigma}_{AAR}} \tag{6}$$

The second parametric test is the Patell-Z test from Patell (1976). The abnormal returns are standardized and corrected by the forecast error between event and estimation window.

$$Z_{Patell} = \frac{1}{\sqrt{N}}\sum_{j=1}^{N} z^{j}_{T_1,T_2} \tag{7}$$

The final parametric test is the standard cross-sectional test or BMP test. This test, introduced by Boehmer, Musumeci and Poulsen (1991), accounts for both event induced volatility and serial correlation and is therefore an improvement over the Patell-Z test as argued by Kolari & Pynnönen (2010).

$$Z_{BMP} = \frac{\sum_{i=1}^{N} SCAR_{T_1 j, T_2 j}}{N^{1/2}(\delta SCAR_{(T_1 j, T_2 j)})} \tag{8}$$

Brown & Warner (1985) explain the assumption of a normal distribution cannot be made for daily excess returns. The three parametric tests do make this assumption, for this reason two non-parametric tests are included.

The sign test by Cowan (1992) tests whether the number of positive CARs is higher or lower than what is expected from the amount of positive ARs in the estimation window. This way it tests the direction of the effect and that the observed effect will not be driven by a few extreme events. A negative aspect of the test is the assumption that 50% of returns is negative, where in fact returns are skewed to the right as argued by Boehmer, Musumeci and Poulsen (1991).

Sign test:

$$Z_{sign} = \frac{w - n\hat{p}}{\sqrt{n\hat{p}(1-\hat{p})}} \tag{9}$$

Finally, the Corrado rank test by Corrado (1989). This non-parametric test also standardizes the returns. The test combines event and estimation window daily returns and consequently ranks each of them.

$$Z_{rank} = (\mathrm{T}_2 - \mathrm{T}_1 + 1)^{\frac{1}{2}} \left\{ \frac{\overline{K_{T_1 T_2}} - \widetilde{K}}{\left[\sum_{t=1}^{D+E} (\overline{K}_t - \widetilde{K})^2 / D + E\right]^{\frac{1}{2}}} \right\} \quad (10)$$

To analyse the significance of returns most attention is paid to the BMP test and Corrado rank test. A significant test statistic from both tests implies the CAAR is significant after it has been controlled for serial correlation and event-induced volatility. The Corrado rank test is used to confirm the BMP test results, since it does not assume normally distributed returns.

4.6 CAR regression

To test which factors affect the Dutch stock indices in the periods around political events, a regression is performed with the CARs as dependent variable and several dummy variables as independent.

$$\mathrm{CAR}_{\mathrm{Event\ window}} = \alpha + \beta_1 * \mathrm{VVD} + \beta_2 * \mathrm{PvdA} + \beta_3 * \mathrm{Incumbent} + \varepsilon \quad (11)$$

VVD = Dummy variable for when the VVD is: the party with most votes in an election, the party with the prime-minister at formation date or the party with the prime-minister at resignation date.

PvdA = Dummy variable for when the PvdA is: the party with most votes in an election, the party with the prime-minister at formation date or the party with the prime-minister at resignation date.

ε = Error term

Dummy variables VVD and PvdA are respective to the CDA.

Incumbent = Dummy variable for when: the party with most votes in an election was the largest party before the elections, the party with the prime-minister at formation date already had the prime-minister before the elections.

In the regressions for resignations the variable incumbent is dropped. The CAR regression then becomes:

$$\mathrm{CAR}_{event\ window} = \alpha + \beta_1 * \mathrm{VVD} + \beta_2 * \mathrm{PvdA} + \varepsilon \quad (12)$$

Regressions for elections over the period 2000-2017 do not include the PvdA variable, resulting in the following regression:

$$\mathrm{CAR}_{event\ window} = \alpha + \beta 1 * \mathrm{VVD} + \beta 2 * \mathrm{Incumbent} \quad (13)$$

Every regression is performed with robust standard errors to control for heteroskedasticity and autocorrelation. The variance inflation factor (VIF) is analysed to check for multicollinearity which is not present among the included variables. The method would indicate multicollinearity among the variables if VIF >10, for none of the CAR regressions this is the case. To compare the explanatory power of the several regressions the adjusted r-squared is included.

4.7 Trading model

To see whether a positive alpha can be generated, from trading strategies based on the several event windows and only around elections. Three strategies are tested for all event windows:
(-15,14), (-15,-1), (-10,-1), (-5,-1), (-2,+2), (0,+1), (0,+4), (0,+14).
The first strategy is to invest in the Dutch index around elections, this strategy is referred to as "Long". The second strategy is the exact opposite, every period around elections the investor shorts the Dutch index, this strategy is referred to as "Short". The third and final model is when the investor shorts the Dutch index and invests in the European benchmark index, this is referred to as "LongShort". The strategies are tested using the Capital Asset Pricing Model (CAPM) and Fama-French 3 factor model (FF3).

For the CAPM, the portfolio return minus the risk-free rate is regressed against the benchmark return minus the risk-free rate. A significant constant/alpha means an excess return can be generated from the trading strategy.

$$\text{CAPM:} \qquad Rp - Rf = \alpha + \beta * (Rm - Rf) + \varepsilon \quad (14)$$

Rp = Portfolio return
Rf = Risk-free rate
Rm = Benchmark return
ε = Error term

Fama & French (1993) form several portfolios to calculate their risk factors. The SMB factor is the difference in returns between the small-firm and big-firm portfolios with the same BE/ME ratio. BE/ME is book value of equity / market value of equity and is positively related to returns. The HML factor is

the difference in returns between portfolios of high BE/ME and low BE/Me with comparable firm sizes. Thanks to this method they can add the factors firm size and firm value to their asset pricing model.

The regression formula is defined as follows:

$$\text{FF3:} \quad Rp - Rf = \alpha + \beta_1 * (Rm - Rf) + \beta_2 * SMB + \beta_3 * HML + \varepsilon \qquad (15)$$

Rp = Portfolio return
Rf = Risk-free rate
Rm = Benchmark return
SMB = Factor for firm size
HML= Factor for firm value
ε = Error term

4.8 Data

The data used for this research is all obtained from Datastream. To calculate the daily returns of the Dutch stock indices daily closing prices are used. The table below shows the start and end dates for the several indices. Table 4 shows data for the AScX starts from the year 2000. This research therefore focuses on two periods, one from 1987-2017 excluding the AScX, and one from 2000-2017 making it possible to compare all three indices.

Table 4. Index data

Index		**Start**	**End**
Amsterdam Exchange Index	AEX	1-1-1987	29-12-2017
Amsterdam Midkap Index	AMX	1-1-1987	29-12-2017
Amterdam Smallcap Index	AScX	30-6-2000	29-12-2017
EURO STOXX 50	SX5E	1-1-1987	29-12-2017
EURO STOXX 200 Mid	MCXE	1-1-1987	29-12-2017
EURO STOXX 200 Small	SCXE	1-1-1987	29-12-2017
Fama-French 3 factor		2-7-1990	29-12-2017

Data for the trading model is retrieved from Kenneth French's data library. This data includes the risk-free rate and the SML and HMB factors from the Fama/French European 3 (daily) dataset.

Table 5. Political event dates used in event study.

#	Elections	Formations	Resignations
1	07-09-1989	07-11-1989	03-05-1989
2	04-05-1994	22-08-1994	16-04-2002
3	07-05-1998	03-08-1998	16-10-2002
4	16-05-2002	19-05-1999	21-11-2006
5	23-01-2003	22-07-2002	22-02-2010
6	23-11-2006	27-05-2003	24-04-2012
7	10-06-2010	07-07-2006	
8	13-09-2012	22-02-2007	
9	16-03-2017	14-10-2010	
10		05-11-2012	
11		26-10-2017	

The dates above are the event dates used in the event studies. For elections this means the first trading day the elections results were known. For formations this means the date the new cabinet is sworn in. For resignations this is the day the prime-minister resigns with the monarch on behalf of the cabinet. Important to note is that there is a difference between the three types of political events. Formations and resignations occur during the day, possibly resulting in a market reaction. For elections however, the voting continues after markets close, therefore a market reaction is only possible when the election results are known. Finally, election day zero is the first trading day the election results are known, which is election date +1 (no elections were held on Friday).

CHAPTER 5 – Results

The first part of this event study focuses on the AEX and AMX, over the period 1987-2017 using both the historical model (HM) and market model (MM). The second part includes the AScX and for this reason only looks at the period 2000-2017. In the second part only the MM is used, since it yields most significant results for the AEX. Eventually these findings are also used for the trading strategy. The third part further analyses the election effect by performing a CAR regression, again only using the MM. The CAR regression first analyses differences between the event types for the AEX across all event windows. After which it compares the CARs of the AEX with that of the AMX and AScX. Finally, a trading model is developed to see whether trading on this information would have been profitable. The first and second part provide evidence for the H1 and H2 hypotheses. The third part does this for the H3 and H4 hypotheses. The fourth part examines whether the observed effects can be turned into profitable trading strategies.

5.1 CAARs 1987 – 2017 (HM & MM)

Table 6. CAARs and significance tests for the AEX over the period 1987-2017 using the Historical Model (HM).

Event type	Event window	CAAR	T-test	Patell-Z	BMP-test	Corrado rank	Sign test
Combined	(-15,+14)	-2.9%	-1.92*	-3.28***	-2.93***	-2.23**	-1.98**
	(-15.-1)	-1.5%	-1.43	-1.97**	-1.96*	-1.19	-1.20
	(-10,-1)	-1.9%	-2.19**	-2.94***	-2.68***	-2.27**	-2.37**
	(-5,-1)	-0.1%	-0.09	-0.60	-0.59	-0.51	-0.80
	(-2,+2)	-0.7%	-1.21	-1.69*	-1.25	-0.80	0.37
	(0,+1)	-0.1%	-0.21	-0.25	-0.18	0.54	-0.02
	(0,+4)	-0.8%	-1.28	-1.98**	-1.63	-1.14	-1.59
	(0,+14)	-1.4%	-1.29	-2.66***	-2.47**	-1.96**	-1.98**
Elections	(-15,+14)	-6.4%	-2.62***	-3.04***	-3.72***	-2.51**	-2.29**
	(-15.-1)	-2.8%	-1.59	-1.86*	-2.48**	-1.68*	-0.95
	(-10,-1)	-1.9%	-1.34	-1.41	-1.96*	-1.13	-0.95
	(-5,-1)	-0.7%	-0.71	-0.13	-0.15	-0.61	0.38
	(-2,+2)	-1.1%	-1.13	-0.85	-0.79	-0.64	0.38
	(0,+1)	-0.3%	-0.40	-0.33	-0.37*	-0.19	-0.29
	(0,+4)	-1.4%	-1.38	-1.62	-1.86	-1.38	-2.29**
	(0,+14)	-3.7%	-2.11**	-2.44**	-4.11***	-1.87*	-2.95***
Formations	(-15,+14)	-2.1%	-0.93	-1.36	-1.18	-0.65	-0.42
	(-15.-1)	-2.1%	-1.32	-1.01	-0.94	-0.41	-0.42
	(-10,-1)	-3.4%	-2.63***	-2.73***	-2.09**	-2.21**	-2.23**
	(-5,-1)	-1.1%	-1.13	-1.27	-1.37	-1.16	-1.63
	(-2,+2)	-1.7%	-1.85*	-1.92*	-1.14	-1.11	0.18
	(0,+1)	-0.3%	-0.53	-0.32	-0.17	0.78	0.18
	(0,+4)	-0.7%	-0.77	-1.13	-0.71	0.00	-0.42
	(0,+14)	0.0%	0.01	-0.91	-0.68	-0.50	0.18
Resignations	(-15,+14)	0.9%	0.26	-1.25	-0.86	-0.73	-0.75
	(-15.-1)	1.4%	0.57	-0.46	-0.35	0.20	-0.75
	(-10,-1)	0.9%	0.44	-0.69	-0.57	-0.33	-0.75
	(-5,-1)	2.7%	1.92*	0.62	0.44	1.48	0.07
	(-2,+2)	1.6%	1.13	0.13	0.11	0.73	0.07
	(0,+1)	0.6%	0.65	0.33	0.30	0.34	0.07
	(0,+4)	0.0%	-0.03	-0.61	-0.59	-0.75	0.07
	(0,+14)	-0.5%	-0.20	-1.31	-1.13	-1.23	-0.75

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 6 shows the CAARs for the AEX using the HM. We can observe the overall effect of the combined political effects being negative compared to the AEX' historical average. Most significant event windows are the full event window (-15,+14): -2.9%, the two weeks prior to events (-10,-1): -1.9% and the three weeks following the event (0,+14): -1.4%. These results are significant in both the parametric and non-parametric tests. Between the separate event types, the effects differ. No significant effect is

observed for resignations. For elections only in event windows (-15,+14): -6.4% and (0,+14):-3.7% and around formations only in the event window (-10,-1): -3.4%.

Table 7. CAARs and significance tests for the AEX over the period 1987-2017 using the Market Model (MM).

Event type	Event window	CAAR	T-test	Patell-Z	BMP-test	Corrado rank	Sign test
Combined	(-15,+14)	-1.6%	-2.95***	-3.47***	-2.99***	-2.52**	-1.95*
	(-15.-1)	-0.8%	-2.04**	-2.33**	-2.07**	-1.56	-0.77
	(-10,-1)	-0.9%	-2.95***	-3.39***	-2.84***	-2.59***	-1.55
	(-5,-1)	-0.3%	-1.41	-1.56	-1.51	-1.15	-1.55
	(-2,+2)	-0.3%	-1.47	-2.12**	-1.76*	-1.29	-1.55
	(0,+1)	-0.1%	-0.40	-0.87	-0.75	-0.51	-0.77
	(0,+4)	-0.4%	-1.94*	-2.26**	-2.25**	-1.92*	-2.34**
	(0,+14)	-0.8%	-2.13	-2.58***	-2.86***	-2.00**	-1.95*
Elections	(-15,+14)	-3.1%	-3.59***	-3.51***	-3.88***	-2.73***	-2.30**
	(-15.-1)	-2.0%	-3.17***	-2.88***	-2.54**	-2.37**	-0.97
	(-10,-1)	-1.6%	-3.10***	-3.19***	-2.43**	-2.61***	-1.63
	(-5,-1)	-0.5%	-1.42	-1.53	-1.30	-1.61	-1.63
	(-2,+2)	-0.4%	-1.14	-1.41	-1.90*	-1.15	-1.63
	(0,+1)	-0.1%	-0.57	-0.90	-1.25	-0.73	-0.97
	(0,+4)	-0.8%	-2.31**	-2.34**	-4.55***	-1.87*	-2.97***
	(0,+14)	-1.2%	-1.91*	-2.08**	-3.61***	-1.48	-2.30**
Formations	(-15,+14)	-0.4%	-0.49	-0.56	-0.46	-0.19	-0.35
	(-15.-1)	-0.2%	-0.32	-0.23	-0.22	0.13	-0.35
	(-10,-1)	-0.6%	-1.08	-0.80	-0.91	-0.51	-0.35
	(-5,-1)	-0.2%	-0.53	-0.08	-0.08	0.18	-0.35
	(-2,+2)	-0.3%	-0.85	-1.11	-0.70	-0.45	-0.35
	(0,+1)	0.1%	0.54	0.10	0.07	0.61	0.25
	(0,+4)	-0.4%	-1.01	-1.33	-1.02	-1.26	-0.35
	(0,+14)	-0.2%	-0.36	-0.56	-0.55	-0.40	0.25
Resignations	(-15,+14)	-1.5%	-1.35	-2.18**	-1.81*	-1.24	-0.76
	(-15.-1)	-0.1%	-0.14	-1.01	-0.86	-0.17	0.06
	(-10,-1)	-0.7%	-1.05	-2.06**	-1.42	-1.13	-0.76
	(-5,-1)	-0.3%	-0.57	-1.27	-1.21	-0.43	-0.76
	(-2,+2)	-0.3%	-0.55	-1.18	-1.03	-0.52	-0.76
	(0,+1)	-0.3%	-0.99	-0.85	-0.83	-0.85	-0.76
	(0,+4)	0.0%	0.06	-0.03	-0.04	0.20	-0.76
	(0,+14)	-1.4%	-1.76*	-2.07**	-2.02**	-1.58	-1.58

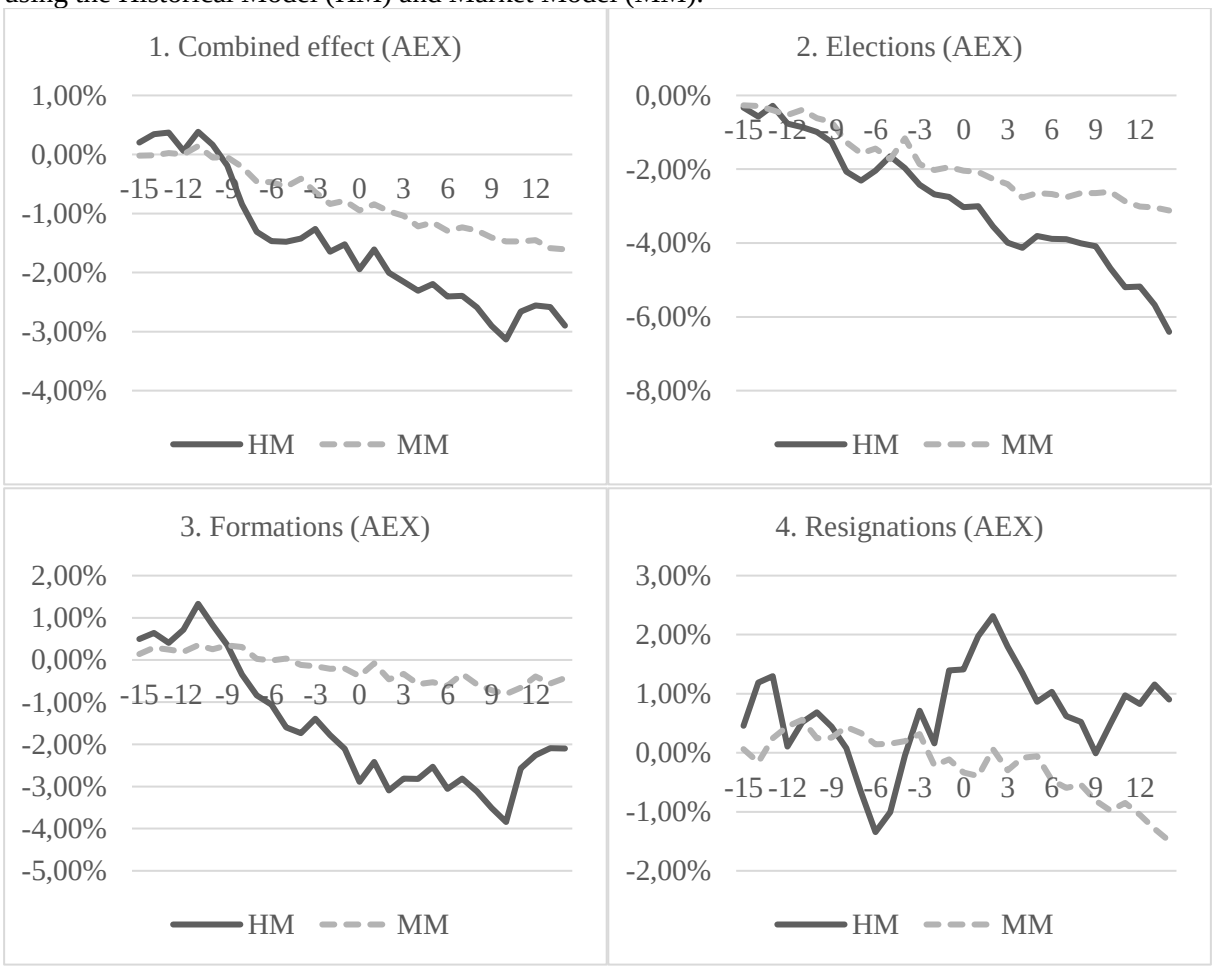
*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 7 shows the CAARs for the AEX using the MM. The results show that of all separate event types, elections are the only significant ones, having a negative effect on the AEX compared to the STOXX 50 index. The CAAR in event window (-10,-1) is -1.6%. This contrasts the findings of Pantzalis, Stangeland & Turtle (2000), who observe a positive average CAR over the two weeks prior to elections.

However, for free countries their results were marginal and not significant. The negative CAARs in both the periods prior to elections and the full period are in line with the results of Opare (2012), who also observes a negative reaction of the Dutch stock market to elections. For the event window (-15,-1) Opare observed a CAAR of -1.9% and for (-15,+14): -4.1%, both the direction and magnitude of these results are in line with those presented in Table 7.

Comparing Table 6 to Table 7 there are some important differences. Overall the market model yields more significant results than the historical model. Formations however are insignificant in all event windows, where this was not the case using the historical model. Elections on the other hand become more significant, especially the period prior to an election. Both models do show the same effects for the different event types with the overall combined effect being negative, both before and after the event. Figures 1,2,3 & 4 on the next page will make this clearer.

Figure 1. Combined effect (AEX). CAARs of all event types combined. For the AEX over the period 1987-2017, event window (-15,+14), using the Historical Model (HM) and Market Model (MM). Figure 2. Elections (AEX). CAARs of all event types combined. For the AEX over the period 1987-2017, event window (-15,+14), using the Historical Model (HM) and Market Model (MM). Figure 3. Formations (AEX). CAARs of all event types combined. For the AEX over the period 1987-2017, event window (-15,+14), using the Historical Model (HM) and Market Model (MM). Figure 4. Resignations (AEX). CAARs of all event types combined. For the AEX over the period 1987-2017, event window (-15,+14), using the Historical Model (HM) and Market Model (MM).



The four figures above all show a more extreme market reaction when the HM is used. From both Figures 3 and 4 can be observed that the effect differs over the full event window using the HM, with the direction of the effect changing over time. Using the market model, the direction of the effect is more consistent, this results in more significant CAARs.

Table 8. CAARs and significance tests for the AMX over the period 1987-2017 using the Historical Model (HM).

Event type	Event window	CAAR	T-test	Patell-Z	BMP-test	Corrado rank	Sign test
Combined	(-15,+14)	-2.5%	-2.10**	-2.98***	-2.11**	-1.69*	-2.10**
	(-15.-1)	-0.9%	-1.00	-1.37	-1.59	-0.60	-1.71*
	(-10,-1)	-1.0%	-1.36	-1.94*	-1.92*	-1.49	-2.10**
	(-5,-1)	0.1%	0.17	-0.21	-0.23	0.24	-0.93
	(-2,+2)	-0.3%	-0.63	-1.10	-0.73	0.00	-0.14
	(0,+1)	0.1%	0.28	-0.17	-0.13	0.26	-0.14
	(0,+4)	-0.7%	-1.38	-1.87*	-1.24	-1.04	-0.14
	(0,+14)	-1.7%	-1.98**	-2.83***	-1.96*	-1.79*	-1.32
Elections	(-15,+14)	-3.9%	-1.96*	-2.23**	-2.53**	-1.97**	-2.39**
	(-15.-1)	-1.1%	-0.74	-1.06	-1.95*	-0.67	-1.72*
	(-10,-1)	-0.2%	-0.13	-0.34	-0.47	-0.04	-1.05
	(-5,-1)	0.2%	0.30	0.41	0.55	0.66	0.28
	(-2,+2)	-0.4%	-0.49	-0.34	-0.29	-0.12	-0.39
	(0,+1)	-0.3%	-0.52	-0.54	-0.66	-0.85	-0.39
	(0,+4)	-1.2%	-1.44	-1.47	-1.36	-1.67*	-0.39
	(0,+14)	-2.9%	-2.02**	-2.10**	-2.25**	-2.12**	-1.05
Formations	(-15,+14)	-2.4%	-1.31	-1.92*	-1.26	-0.68	-0.49
	(-15.-1)	-0.6%	-0.49	-0.71	-0.69	-0.50	0.11
	(-10,-1)	-1.9%	-1.79*	-2.26**	-1.91*	-2.16**	-1.70*
	(-5,-1)	-0.5%	-0.68	-0.93	-1.17	-0.85	-1.09
	(-2,+2)	-1.1%	-1.42	-1.79*	-1.01	-0.59	0.72
	(0,+1)	-0.4%	-0.94	-1.21	-0.83	-0.17	-0.49
	(0,+4)	-1.0%	-1.40	-1.71*	-0.88	-0.02	0.11
	(0,+14)	-1.7%	-1.37	-2.01**	-1.22	-0.46	-0.49
Resignations	(-15,+14)	-0.8%	-0.30	-0.86	-0.43	-0.28	-0.79
	(-15.-1)	-1.0%	-0.50	-0.61	-0.56	0.24	-1.61
	(-10,-1)	-0.5%	-0.30	-0.56	-0.53	-0.08	-0.79
	(-5,-1)	0.9%	0.82	0.32	0.23	0.93	-0.79
	(-2,+2)	1.2%	1.05	0.55	0.36	1.01	-0.79
	(0,+1)	1.6%	2.24*	1.96*	1.84*	1.86*	0.84
	(0,+4)	0.7%	0.62	0.23	0.18	-0.17	0.02
	(0,+14)	0.2%	0.09	-0.60	-0.32	-0.63	-0.79

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 8 shows the CAARs for the AMX using the HM. Results are notably less significant than shown in Table 6 for the AEX. Only the full event window (-15,+14) is significant in all tests, both for elections and the combined effect. Tables 6 and 8 show that the indices react differently to resignations, the AEX positive and AMX negative, and both negative to elections and formations.

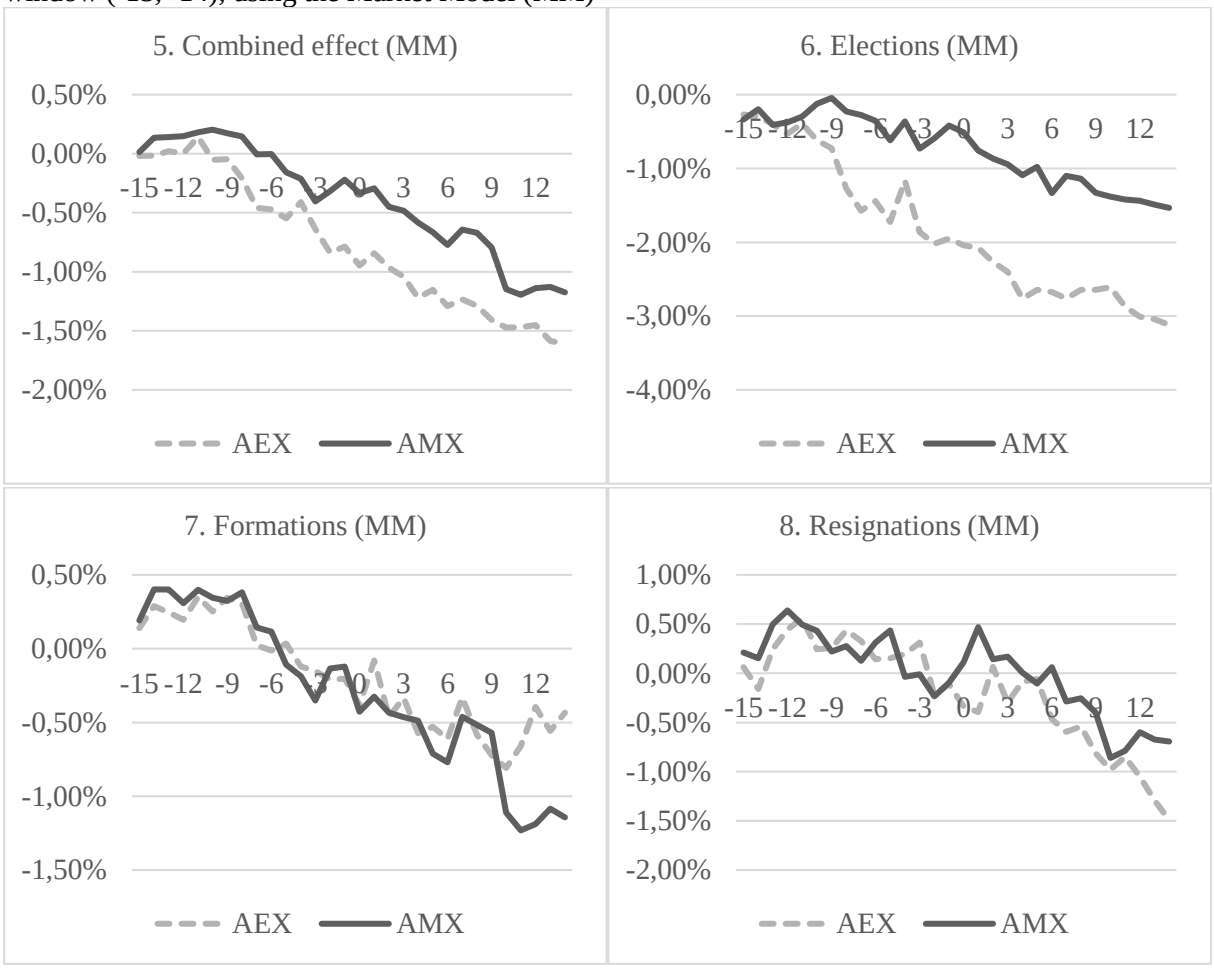
Table 9. CAARs and significance tests for the AMX over the period 1987-2017 using the Market Model (MM).

Event type	Event window	CAAR	T-test	Patell-Z	BMP-test	Corrado rank	Sign test
Combined	(-15,+14)	-1.2%	-1.71*	-1.79*	-1.77*	-1.04	-1.48
	(-15.-1)	-0.2%	-0.45	-0.31	-0.50	0.02	-1.09
	(-10,-1)	-0.4%	-1.00	-0.78	-1.02	-0.68	-0.69
	(-5,-1)	-0.2%	-0.77	-0.51	-0.74	0.01	-0.30
	(-2,+2)	-0.1%	-0.17	-0.44	-0.41	1.29	1.27
	(0,+1)	-0.1%	-0.41	-0.78	-0.64	0.13	0.48
	(0,+4)	-0.4%	-1.29	-1.60	-1.34	-0.61	0.48
	(0,+14)	-1.0%	-1.96**	-2.21**	-1.82*	-1.50	-1.09
Elections	(-15,+14)	-1.5%	-1.27	-1.24	-1.85*	-1.21	-1.67*
	(-15.-1)	-0.4%	-0.49	-0.46	-0.91	-0.42	-1.67*
	(-10,-1)	-0.1%	-0.18	-0.27	-0.37	-0.29	0.33
	(-5,-1)	-0.1%	-0.13	-0.24	-0.36	-0.23	-0.33
	(-2,+2)	-0.1%	-0.28	-0.35	-0.36	0.23	0.33
	(0,+1)	-0.3%	-1.09	-0.92	-1.01	-0.59	0.33
	(0,+4)	-0.7%	-1.36	-1.25	-1.20	-1.09	-0.33
	(0,+14)	-1.1%	-1.31	-1.30	-1.36	-1.29	-0.33
Formations	(-15,+14)	-1.1%	-1.12	-1.01	-0.90	-0.49	-0.26
	(-15.-1)	-0.1%	-0.17	0.01	0.01	-0.18	0.34
	(-10,-1)	-0.5%	-0.89	-0.49	-0.51	-0.78	-0.86
	(-5,-1)	-0.2%	-0.57	-0.28	-0.40	-0.16	-0.26
	(-2,+2)	-0.1%	-0.20	-0.18	-0.17	0.87	1.55
	(0,+1)	-0.2%	-0.77	-0.86	-0.83	-0.40	-0.26
	(0,+4)	-0.4%	-0.88	-0.93	-0.82	-0.08	0.95
	(0,+14)	-1.0%	-1.42	-1.44	-1.29	-0.51	-0.86
Resignations	(-15,+14)	-0.7%	-0.47	-0.82	-0.61	-0.04	-0.69
	(-15.-1)	-0.1%	-0.09	-0.11	-0.42	0.75	-0.69
	(-10,-1)	-0.6%	-0.69	-0.63	-1.54	0.07	-0.69
	(-5,-1)	-0.4%	-0.68	-0.40	-0.47	0.50	0.13
	(-2,+2)	0.2%	0.25	-0.24	-0.18	1.08	0.13
	(0,+1)	0.6%	1.48	0.67	0.35	1.45	0.95
	(0,+4)	0.1%	0.17	-0.56	-0.33	0.12	0.13
	(0,+14)	-0.6%	-0.58	-1.06	-0.57	-0.80	-0.69

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 9 shows the CAARs for the AMX using the MM. The results show that when the STOXX 200 Mid index is used as benchmark the AMX does not have significant CAARs. This applies to all event types and event windows and clearly contrasts the results of Table 7 of the AEX using the MM.

Figure 5. Combined effect (MM) for the AEX and AMX. CAARs of all event types combined over the period 1987-2017, event window (-15,+14), using the Market Model (MM). Figure 6. Elections (MM) for the AEX and AMX. CAARs for elections over the period 1987-2017, event window (-15,+14) using the Market Model (MM). Figure 7. Formations (MM) for the AEX and AMX. CAARs for formations over the period 1987-2017, event window (-15,+14), using the Market Model (MM). Figure 8. Resignations (MM) for the AEX and AMX. CAARs for resignations over the period 1987-2017, event window (-15,+14), using the Market Model (MM)



The figures above show that the general effect of a political event is negative and decreasing over time. Only for resignations the effect appears to be somewhat random. The results from Tables 8 and 9 confirm this, with no significant CAAR for resignations. It also becomes clear that for elections the AEX reacts more negative compared to its benchmark index than the AMX does.

Figure 5 shows the AEX and AMX had negative CAARs before the event date for all combined events. This can be explained by information leakage before the actual occurrence of the political events. This can be polls affecting elections, or news affecting formations and resignations. If the market anticipated on the event correctly there should be no further adjustment after the event date. All four figures show adjustments the days after the event. Either this is the result of new information even after the event date, or it might be opposing the efficient market hypothesis (EMH). The results for event window (0,+1) are not significant implying the findings do not contrast the EMH, and the indices are adjusting

quickly to new information. Another explanation for the insignificant results would be the lack of event dates.

5.2 CAARs 2000 – 2017 (MM)

Table 10. CAARs and significance tests for the AEX over the period 2000-2017 using the Market Model (MM).

Event type	Event window	CAAR	T-test	Patell-Z	BMP-test	Corrado rank	Sign test
Combined	(-15,+14)	-1.7%	-2.88***	-3.48***	-2.81***	-2.46**	-1.82*
	(-15.-1)	-0.7%	-1.79*	-2.29**	-2.04**	-1.60	-0.41
	(-10,-1)	-0.7%	-1.98**	-2.71***	-2.02**	-1.97**	-0.41
	(-5,-1)	-0.1%	-0.49	-0.80	-0.67	-0.34	-0.41
	(-2,+2)	-0.4%	-1.76*	-2.18**	-1.68*	-1.28	-1.35
	(0,+1)	-0.3%	-1.76*	-1.81*	-1.64	-1.32	-1.35
	(0,+4)	-0.5%	-2.25**	-2.37**	-2.12**	-1.68*	-2.29**
	(0,+14)	-0.9%	-2.27**	-2.63***	-2.78***	-1.88*	-2.29**
Elections	(-15,+14)	-3.0%	-3.18***	-3.23***	-4.21***	-2.54**	-2.41**
	(-15.-1)	-1.4%	-2.13**	-2.14**	-1.85*	-1.76*	-0.78
	(-10,-1)	-1.1%	-2.02**	-2.37**	-1.46	-1.91*	-0.78
	(-5,-1)	-0.4%	-1.05	-1.16	-0.79	-1.00	-0.78
	(-2,+2)	-0.5%	-1.31	-1.29	-2.84***	-0.98	-1.59
	(0,+1)	-0.3%	-1.07	-1.26	-1.91*	-0.97	-1.59
	(0,+4)	-0.8%	-2.18**	-2.08**	-4.91***	-1.38	-2.41**
	(0,+14)	-1.6%	-2.37**	-2.42**	-7.13***	-1.83*	-2.41**
Formations	(-15,+14)	-0.9%	-0.95	-0.96	-0.65	-0.27	-0.37
	(-15.-1)	-0.3%	-0.52	-0.51	-0.45	-0.07	0.39
	(-10,-1)	-0.3%	-0.54	-0.42	-0.48	0.03	0.39
	(-5,-1)	0.1%	0.37	0.71	0.74	1.12	0.39
	(-2,+2)	-0.7%	-1.73*	-1.67*	-0.88	-0.44	-0.37
	(0,+1)	-0.3%	-1.32	-1.29	-0.86	-0.59	-0.37
	(0,+4)	-0.7%	-1.91*	-1.96*	-1.29	-1.49	-1.13
	(0,+14)	-0.5%	-0.82	-0.85	-0.66	-0.31	-0.37
Resignations	(-15,+14)	-1.1%	-0.97	-1.93*	-1.44	-1.12	-0.38
	(-15.-1)	-0.4%	-0.55	-1.40	-1.19	-0.72	-0.38
	(-10,-1)	-0.6%	-0.95	-2.05**	-1.28	-1.29	-0.38
	(-5,-1)	-0.1%	-0.25	-1.08	-0.92	-0.77	-0.38
	(-2,+2)	0.0%	0.06	-0.75	-0.62	-0.61	-0.38
	(0,+1)	-0.2%	-0.62	-0.53	-0.48	-0.52	-0.38
	(0,+4)	0.1%	0.24	0.10	0.10	0.35	-0.38
	(0,+14)	-0.7%	-0.83	-1.34	-1.44	-0.86	-1.27

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 10 shows the CAARs for the AEX using the MM over the period 2000-2017. The results shown in Table 10 are similar to Table 7, CAARs for the AEX using the MM over the period 1987-2017, which implies that the overall observed effects are not purely driven by the period before 2000.

Table 11. CAARs and significance tests for the AMX over the period 2000-2017 using the Market Model (MM).

Event type	Event window	CAAR	T-test	Patell-Z	BMP-test	Corrado rank	Sign test
Combined	(-15,+14)	0.3%	0.36	0.38	0.56	0.07	0.42
	(-15.-1)	-0.1%	-0.20	-0.15	-0.28	-0.17	0.90
	(-10,-1)	0.0%	0.01	-0.18	-0.28	-0.09	-0.05
	(-5,-1)	0.1%	0.44	0.00	0.00	-0.05	-0.52
	(-2,+2)	0.0%	0.09	0.10	0.11	-0.73	-0.52
	(0,+1)	0.2%	1.01	1.43	1.00	0.54	0.90
	(0,+4)	0.2%	0.50	0.50	0.37	-0.20	-0.05
	(0,+14)	0.4%	0.71	0.68	0.57	0.27	0.42
Elections	(-15,+14)	0.5%	0.38	0.18	0.29	0.09	0.87
	(-15.-1)	0.0%	0.04	0.02	0.04	-0.01	0.87
	(-10,-1)	-0.1%	-0.12	-0.16	-0.26	-0.07	0.06
	(-5,-1)	0.0%	-0.01	-0.01	-0.03	0.15	-0.76
	(-2,+2)	0.4%	0.79	0.58	0.55	0.37	1.69*
	(0,+1)	0.7%	1.90*	1.55	1.35	1.65*	1.69*
	(0,+4)	0.6%	1.10	0.71	0.61	0.55	0.87
	(0,+14)	0.5%	0.49	0.24	0.23	0.14	0.06
Formations	(-15,+14)	0.4%	0.31	0.38	0.55	0.31	0.32
	(-15.-1)	-0.3%	-0.40	-0.19	-0.31	-0.10	0.32
	(-10,-1)	-0.2%	-0.31	-0.45	-0.69	-0.23	0.32
	(-5,-1)	-0.1%	-0.14	-0.43	-0.64	-0.53	-0.44
	(-2,+2)	-0.4%	-0.77	-0.65	-0.89	-1.07	-1.95*
	(0,+1)	0.0%	0.14	0.66	0.48	0.03	0.32
	(0,+4)	-0.1%	-0.29	-0.27	-0.20	-0.33	-0.44
	(0,+14)	0.7%	0.83	0.73	0.54	0.54	1.07
Resignations	(-15,+14)	-0.2%	-0.11	0.07	0.08	-0.32	-0.53
	(-15.-1)	0.0%	0.03	-0.07	-0.14	-0.17	0.37
	(-10,-1)	0.4%	0.53	0.36	0.49	0.16	-0.53
	(-5,-1)	0.6%	1.04	0.52	0.50	0.36	0.37
	(-2,+2)	0.1%	0.18	0.32	0.34	-0.41	-0.53
	(0,+1)	-0.1%	-0.39	0.23	0.12	-0.72	-0.53
	(0,+4)	0.0%	0.05	0.50	0.29	-0.51	-0.53
	(0,+14)	-0.2%	-0.18	0.17	0.12	-0.29	-0.53

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 11 shows the CAARs for the AMX using the MM over the period 2000-2017. Just as previously observed from Table 9 there are no significant CAARs for the AMX, for the separate and combined event types.

Table 12. CAARs and significance tests for the AScX over the period 2000-2017 using the Market Model (MM).

Event type	Event window	CAAR	T-test	Patell-Z	BMP-test	Corrado Rank	Sign test
Combined	(-15,+14)	0.1%	0.08	-0.27	-0.21	-0.42	-0.91
	(-15.-1)	0.8%	1.55	1.61	1.89*	1.26	0.98
	(-10,-1)	0.4%	0.98	1.04	1.26	0.47	0.98
	(-5,-1)	0.0%	-0.06	0.16	0.17	-0.34	-0.91
	(-2,+2)	-0.5%	-1.63	-1.87*	-1.43	-1.60	-0.44
	(0,+1)	0.0%	-0.05	-0.35	-0.34	-0.42	0.50
	(0,+4)	-0.3%	-1.19	-1.60	-1.23	-1.37	-1.85*
	(0,+14)	-0.7%	-1.43	-1.99**	-1.16	-1.85*	-0.44
Elections	(-15,+14)	-0.3%	-0.20	-0.10	-0.06	-0.48	0.01
	(-15.-1)	0.1%	0.10	0.22	0.23	-0.40	0.01
	(-10,-1)	0.1%	0.14	0.35	0.30	-0.43	0.01
	(-5,-1)	-0.3%	-0.50	-0.54	-0.48	-0.67	-1.62
	(-2,+2)	-1.2%	-2.43**	-2.47**	-2.20**	-2.53**	-1.62
	(0,+1)	-0.2%	-0.51	-0.56	-0.76	-0.63	0.01
	(0,+4)	-1.0%	-1.98**	-2.00**	-1.40	-1.48	-0.81
	(0,+14)	-0.3%	-0.38	-0.36	-0.24	-0.29	0.01
Formations	(-15,+14)	-0.5%	-0.49	-0.91	-0.79	-0.63	-1.13
	(-15.-1)	1.3%	1.68*	1.62	1.71*	1.91*	1.13
	(-10,-1)	0.4%	0.62	0.60	0.88	0.86	0.38
	(-5,-1)	-0.1%	-0.12	0.01	0.03	-0.16	0.38
	(-2,+2)	-0.7%	-1.55	-1.48	-1.00	-0.75	0.38
	(0,+1)	-0.2%	-0.81	-0.82	-0.65	-0.70	-0.38
	(0,+4)	-0.7%	-1.51	-1.61	-2.00**	-1.70*	-1.89*
	(0,+14)	-1.8%	-2.37**	-2.91***	-1.39	-2.80***	-1.13
Resignations	(-15,+14)	1.2%	0.87	0.68	0.52	0.40	-0.39
	(-15.-1)	0.9%	0.90	0.90	1.51	0.73	0.50
	(-10,-1)	0.8%	0.95	0.89	1.29	0.44	1.40
	(-5,-1)	0.3%	0.53	0.89	0.66	0.27	-0.39
	(-2,+2)	0.7%	1.24	0.90	0.87	0.66	0.50
	(0,+1)	0.5%	1.28	0.92	0.94	0.63	1.40
	(0,+4)	0.9%	1.51	1.06	0.69	0.87	-0.39
	(0,+14)	0.3%	0.33	0.06	0.04	-0.16	0.50

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level

Table 12 shows the CAARs for the AScX using the MM over the period 2000-2017. The AScX CAARs are slightly contradicting those found for the AMX, with results being more significant. Still no event window is significant in all tests, which is the case for the AEX.

Figure 9. Combined effect (MM) for the AEX, AMX and AScX. CAARs of all event types combined over the period 2000-2017, event window (-15,+14), using the Market Model (MM). Figure 10. Elections (MM) for the AEX, AMX and AScX. CAARs for elections over the period 2000-2017, event window (-15,+14), using the Market Model (MM). Figure 11. Formations (MM) for the AEX, AMX and AScX. CAARs for formations over the period 2000-2017, event window (-15,+14), using the Market Model (MM). Figure 12. Resignations (MM) for the AEX, AMX and AScX. CAARs for resignations over the period 2000-2017, event window (-15,+14), using the Market Model (MM)

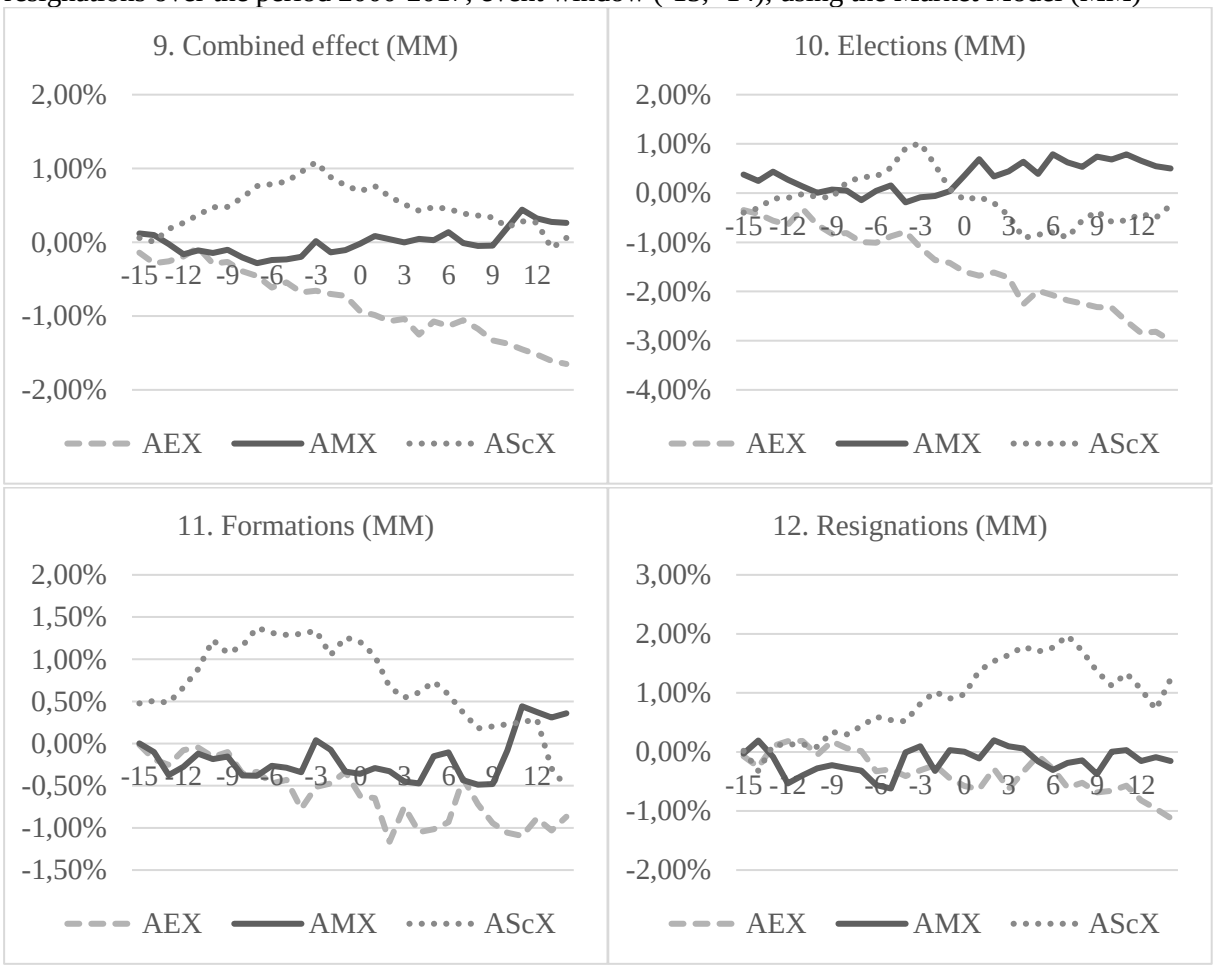


Figure 10 shows the reaction of the three stock indices in the six-week period surrounding an election. What would be expected is that the effect of a Dutch election would be the largest for the smallest index AScX and smallest for the AEX. Companies in the AEX are more globally operating firms, where the companies in the AMX and AScX have more exposure to the Netherlands and are therefore more heavily affected by government policies. Figure 10 does not support this prediction, since the AEX and AMX have opposing market reactions and the AScX being in between. Tables 10, 11 & 12 show that for the full event window (-15,+14) only the CAAR for the AEX, concerning elections, of -3.0% is significant. Other significant results are also for the AEX and concerning elections, event window (0,+4): -0.8% and event window (0,+14): -1.6%. The significant negative reaction of the AEX and insignificant, but positive, reactions of the AMX and AScX clearly indicates differences among the indices and provides support to reject the H2 hypothesis.

Based on the comparison of results between the three indices it is hard to draw conclusions. The directions of the observed effects vary among the indices and the results lack significance for the AMX and AScX. One potential reason for the difference in significance would be the index characteristics, for example, liquidity is highest for the AEX, compared to the AMX and AScX. More liquid markets should give a quick and accurate adjustment to new information, resulting in a lower variance which should trigger higher significance. Given the characteristics of the three indices this is a reasonable explanation, as the AEX yields most significant results. Overall the reactions of the AScX and AMX seem to be similar to each other than they are to the AEX. To support the liquidity explanation, Figures 9 and 10 show a consistent reaction of the AEX, where for the AMX and especially the AScX this is not the case. The AScX index seems to overreact to all event types and subsequently adjust. Results from Tables 10, 11 & 12 provide more evidence for this explanation. CAARs in the event windows after the election date become more negative for longer event windows for the AEX. For the AMX and AScX the CAARs for event window (0,+14) are less than for (0,+4). The AScX displays the strongest deviations after elections with CAARs (0,+1): -0.2%, (0,+4): -1.0% and (0,+14): -0.3%.

Besides liquidity, this can also be explained by the composition of the three indices. Since the AEX includes more globally operating companies like Shell and Unilever its response to Dutch political events will be different that from indices composed of more orientated to the Netherlands.

The results have shown significant CAARs for the AEX in multiple event studies, providing support for the rejection of the first hypothesis, stating CAARs would not be present. These CAARs also display differences between the three indices supporting the rejection of the second hypothesis.

5.3 CAR regression

For elections and resignations, the following CAR regression is performed for the AEX to observe the effects of the variables among different event windows:

$$\mathrm{CAR}_{\mathrm{Event\ window}} = \alpha + \beta_1 * \mathrm{VVD} + \beta_2 * \mathrm{PvdA} + \beta_3 * \mathrm{Incumbent} + \varepsilon \qquad (11)$$

In the regression for resignations the variable incumbent is dropped. The CAR regression then becomes:

$$\mathrm{CAR}_{event\ window} = \alpha + \beta_1 * \mathrm{VVD} + \beta_2 * \mathrm{PvdA} + \varepsilon \qquad (12)$$

Only regressions of event types and event windows with significant results are presented.

Table 13. CAR regression for the effect of elections and resignations on the AEX over the period 1987-2017 using the Market Model (MM). Each regression (column) presents the results of a specific event window and event type. The variable Incumbent is not included in the model for Resignations.

AEX	Elections	Elections	Resignations
VARIABLES	(0,+1)	(0,+14)	(0,+4)
VVD	-0.00481*	0.000852	0.00386*
	(0.00197)	(0.00497)	(0.00154)
PvdA	-0.000452	0.0183**	0.0203***
	(0.00179)	(0.00546)	(0.00154)
Incumbent	0.00745***	0.0112**	
	(0.00121)	(0.00399)	
Constant	-0.00454**	-0.0235***	-0.00375*
	(0.00141)	(0.00480)	(0.00154)
Observations	9	9	6
Adjusted R-squared	0.702	0.549	0.909

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13 shows that the election of an incumbent party has a positive effect on the AEX in both event windows (0,+1) and (0,+14). Another interesting effect is the positive CAR in the event window (0,+14) after the election of the PvdA. The regression of resignations, event window (0,+4) shows a positive CAR for the AEX after the resignation of the VVD (only significant at 10%) and PvdA compared to the CDA. The other event windows did now show a significant effect of the variables on the AEX CAR and are therefore excluded. Hence, no regression of formations is included.

The next regression includes only elections, again using the MM, and tries to find different effects between the three indices over the period 2000-2017. In this period the PvdA has not been elected as largest party. Therefore, the variable is dropped resulting in formula 13.

$$\mathrm{CAR}_{event\ window} = \alpha + \beta 1 * \mathrm{VVD} + \beta 2 * \mathrm{Incumbent} \quad (13)$$

For resignations the same formula 12 is used, with VVD and PvdA as variables. Again, only regressions of event types and event windows with significant results are presented.

Table 14. CAR regression of all event types in the period 2000-2017 on all three indices using the Market Model (MM). Each regression (column) presents the results of a specific event window and event type. The variable PvdA is not included for elections and formations.

	Elections		Formations			Resignations	
VARIABLES	AEX (0,+1)	AScX (0,+1)	AEX (-10,-1)	AMX (0,+1)	AScX (-10,-1)	AEX (0,+4)	AMX (0,+1)
VVD	-0.00354	0.00614*	0.00668	0.00398	-0.00602	0.00375	0.0265**
	(0.00178)	(0.00202)	(0.00457)	(0.00613)	(0.00491)	(0.00228)	(0.00380)
Incumbent	0.00617**	0.00601**	0.0193**	0.0132**	-0.0173**		
	(0.00180)	(0.00160)	(0.00595)	(0.00409)	(0.00473)		
PvdA						0.0202**	-0.00471
						(0.00228)	(0.00380)
Constant	-0.00495*	-0.00871***	-0.0196**	-0.0107**	0.0187**	-0.00364	-0.00577
	(0.00165)	(0.00117)	(0.00596)	(0.00307)	(0.00431)	(0.00228)	(0.00380)
Observations	6	6	7	7	7	5	5
Adjusted R-squared	0.717	0.752	0.719	0.397	0.600	0.885	0.847

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14 shows that the variable incumbent influencesn the CARs of the several indices. For the AEX and AScX this effect occurs in the event window (0,+1) around elections and the magnitude and significance is about the same. Around formations the AEX and AScX react differently. In the two weeks (-10,-1) prior to the government formation. The coefficient for the AEX is positive (0.0193) and for the AScX negative (-0.0173). The AMX also has a positive coefficient in the shorter event window (0,+1). An election or formation of the VVD does not seem to have an effect.

Santa-Clara & Valkonov (2003) and Döpke & Pierdzioch (2004) have found differences in returns between political parties in respectively the U.S. and Germany. Their findings were contrasting, with better performance observed under the Democratic presidencies (liberal) than under Republican (conservative) in the U.S. and higher stock market returns under conservative governments in Germany. Results for the Netherlands would be expected to be similar to Germany than the U.S. given the similarities in political system. However, Table 13 shows a positive reaction of the AEX to the PvdA variable, in the three weeks following an election of +1.8%. This would be in line the findings of Santa-Clara & Valkonov (2003).

The results in Tables 13 & 14 do not provide evidence to support the H3 hypothesis of a more positive market reaction to the VVD, than to the PvdA. For all three indices it is not possible to say they react differently to the political parties. This is in line with both Jensen & Schmith (2005) and Brunner (2009)

who find different market reactions to left political parties regarding volatility, but do not observe this for returns.

The Uncertain Information Hypothesis (UIH) from Brown, Harlow and Tinic (1988) is an extension of the Efficient Market Hypothesis (EMH) and states that uncertainty has a negative effect on stock prices, due to the risk-averse nature of investors. When this uncertainty is resolved, price changes tend to be positive. Table 14 shows the effect of the re-election or formation by the incumbent party. According to the UIH, the market reaction should be positive since an incumbent brings less uncertainty then a new party. The results are in line with this reasoning and thus provide evidence for the H4 hypothesis. The analysis of the market reaction to Brexit by Ramiah, Pham & Moosa (2017) also indicated the markets averseness to uncertainty. Other research mainly links increased uncertainty to higher volatility, for instance Bialkowski, Gottschalk & Wisniewski (2008) and Brunner (2009).

5.4 Trading model

To examine whether investors can make an excess return, also referred to as alpha (α), from political uncertainty around elections three trading strategies around these events are derived. The first strategy is every period around elections investing in the Dutch index, this strategy is referred to as "Long". The second strategy is the exact opposite, every period around elections the investor shorts the Dutch index, this is referred to as "Short". The third model is when the investor shorts the Dutch index and invests in the European benchmark index, this is referred to as "LongShort".

First the trading strategies are tested with the CAPM model. For this model the portfolio return minus the risk-free rate is regressed against the benchmark return minus the risk-free rate. A significant constant from the regression then means an alpha is found. Put differently excess returns can be generated from the trading strategy.

Table 15. Results from the CAPM for the AEX and S5XE trading strategies over the period 2000-2017. For the event windows (-15,+14) and (-10,-1).

AEX	(-15,+14)	(-10,-1)	(-10,-1)	(-15,+14)	(-10,-1)
VARIABLES	Long	Long	Short	LongShort	LongShort
SX5E	0.871***	0.839***	-0.839***	0.129***	0.161***
	(0.0239)	(0.0366)	(0.0364)	(0.0239)	(0.0365)
Constant	-0.000722**	-0.00111**	0.00101**	0.000672**	0.00106**
	(0.000325)	(0.000456)	(0.000453)	(0.000325)	(0.000455)
Observations	180	60	60	180	60
Adjusted R-squared	0.881	0.899	0.900	0.135	0.239

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The "Long" strategy shows negative alpha's or excess returns for the AEX over the event windows (-15,+14) and (-10,-1). The "Short" strategy would have resulted in a small positive excess return over the two weeks prior to elections. For the "LongShort" strategy the same holds for the event windows (-15,+14) and (-10,-1).

Table 16. Results from the CAPM for the AMX and MCXE trading strategies over the period 2000-2017. For the event windows (0,+1) and (0,+4).

AMX	(0,+1)	(0,+4)	(0,+1)	(0,+4)	(0,+1)	(0,+4)
VARIABLES	Long	Long	Short	Short	LongShort	LongShort
MCXE	0.846***	0.879***	-0.842***	-0.878***	0.156	0.121
	(0.189)	(0.0991)	(0.186)	(0.0985)	(0.187)	(0.0988)
Constant	0.00403**	0.00220**	-0.00413**	-0.00229**	-0.00408**	-0.00225**
	(0.00172)	(0.00105)	(0.00169)	(0.00104)	(0.00171)	(0.00104)
Observations	12	30	12	30	12	30
Adjusted R-squared	0.634	0.728	0.640	0.730	-0.028	0.017

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 16 shows the results for the three investing strategies applied to the AMX and its benchmark the MCXE for the event windows (0,+1 and (0,+4). In contrast to the previous findings for the AEX, now a positive alpha is found from the "Long" strategy. The "Short" and "LongShort" now generate negative excess returns. The difference is that the strategies for the AEX were significant in the six-week period surrounding an election and two weeks prior to an elections. For the AMX the significant results are the two days and one week following an election.

Table 17. Results from the CAPM for the AScX and SCXE trading strategies over the period 2000-2017. For the event windows (-2,+2) and (0,+4)

AScX	(-2,+2)	(0,+4)	(-2,+2)	(0,+4)	(-2,+2)	(0,+4)
VARIABLES	Long	Long	Short	Short	LongShort	LongShort
SCXE	0.618***	0.685***	-0.615***	-0.682***	0.384***	0.317***
	(0.0754)	(0.103)	(0.0757)	(0.103)	(0.0756)	(0.103)
Constant	-0.00300***	-0.00225**	0.00290***	0.00215**	0.00295***	0.00220**
	(0.000809)	(0.00103)	(0.000811)	(0.00103)	(0.000810)	(0.00103)
Observations	30	30	30	30	30	30
Adjusted R-squared	0.695	0.600	0.692	0.596	0.461	0.226

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The AScX results are somewhat in between the previously found AEX and AMX results. First of all, the excess returns generated by the strategies are more in line with what was found for the AEX. A negative alpha for the "Long" strategy and positive for the "Short" and "LongShort". The significant periods however are more like the AMX, the week surrounding an election and the week following an election. Finally, excess returns for the strategies in event window (-2,+2) are significant at the 1% level, excess returns for (0,+4) are significant at the 5% level.

The second model to test whether the investing strategies generate excess returns around elections is the Fama-French 3 factor model (FF3). This model includes factors for firm size and value in the model to explain the portfolio return. Again, a significant constant from the regression below means the strategy generates excess returns.

Table 18. Results from the Fama-French 3 factor model for the AScX and SCXE trading strategies over the period 2000-2017. For the event window (-2,+2).

AScX	(-2,+2)	(-2,+2)	(-2,+2)
VARIABLES	Long	Short	LongShort
SCXE	0.762***	-0.760***	0.239
	(0.142)	(0.142)	(0.142)
SMB	0.126	-0.127	-0.126
	(0.265)	(0.265)	(0.265)
HML	-0.425*	0.431*	0.428*
	(0.219)	(0.220)	(0.220)
Constant	-0.00250**	0.00239**	0.00245**
	(0.000922)	(0.000924)	(0.000923)
Observations	30	30	30
Adjusted R-squared	0.714	0.712	0.495

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

For the AEX and AMX the FF3 model does not yield significant results, for none of the strategies over all event windows. For the AScX it does, only at the event window (-2,+2) a small negative alpha from the "Long" strategy and positive for "Short" and "LongShort". The results for the AScX are similar to the excess returns from the CAPM.

For all three indices it was possible to make excess returns from strategies around elections, as shown by the CAPM model. However, the size of the excess returns is marginal. Next, investing according to the "Short" and "LongShort" strategy would require the investor the short the Dutch index. This is not difficult, since there are many short ETF's on the market, yet no excess return would be made after transaction costs. A final note from the trading model is that the three indices again show different behaviour around elections, again providing support to reject the H2 hypothesis.

In the first and second part of this results section CAARs were presented for all indices, providing strong support to reject the H1 hypothesis. Differences among the indices were present and later again observed in the results of the trading model, combined providing strong evidence against the H2 hypothesis. The CAR regressions did not show a positive reaction around elections of formations when the VVD was the largest party. Table 13, the CAR regression for the AEX shows a positive effect after a PvdA elections of 0.0183 opposing the H3 hypothesis. Lastly, the market does seem to react differently to elections and formations when the incumbent party is chosen. The general effect of the incumbent party is positive and supporting the H4 hypothesis, with only exception the AScX reaction two weeks prior to formations.

The negative relation between stock markets and political uncertainty might be explained by the effects on economic growth. As shown by previous research such as Baker, Bloom & Davis (2016) and Julio & Yook (2012), uncertainty negatively affects employment, economic growth and both public and corporate spending. Negative effects on economic growth affect companies and their stock prices.

CHAPTER 6 – Discussion and Conclusion

This final chapter first discusses the limitations of this research and the used methodology. Second, it draws conclusions from the previous result section. Finally, suggestions are made for future research, regarding political uncertainty and (Dutch) stock markets.

The main limitation of this study is the lack of event dates, due to the nature of the events they do not occur as much as desired for this type of research. An expansion of the study to other European countries testing their national stock indices' reaction against a European index could possibly help to further explain the relation between political uncertainty and stock index returns.

Another limitation is that the benchmark models used to estimate the abnormal returns from the Market Model are the corresponding EURO STOXX indices based on market capitalization. Even though I stand by this choice it could be possible to find benchmark indices with a higher correlation and thereby potentially improving the models. The chosen Dutch indices and European benchmarks are not completely differentiated, with a minority of the benchmark index' firms being Dutch. This overlap is more likely to understate the results from decreasing the abnormal returns than the other way around. Finally, the index data used in this research is price data. Meaning individual stocks paying dividend have a negative effect on index performance. Future research can see whether different results are found using net return indices, so including payed dividends in the index returns.

Despite the limitations several conclusions can be drawn from this research. First and foremost, the negative CAARs of the AEX in the three-week period around elections, with the most significant being -3.1% in the full event window of the six weeks around an election over the period 1987-2017. The negative reactions to political uncertainty can be a result of the consequential policy uncertainty, which can negatively affect factors such as employment and economic growth.

In contrast to the AEX no significant CAARs are found for the AMX and AScX. Indicating a different relation between political events and the three indices. The difference might be the results of a difference in market efficiency, resulting from a disparity in liquidity between the three indices. Another explanation is the exposure of the indices to the Netherlands. Firms in the AEX are more globally operating than those in the AMX and AScX, as a result the reaction of the indices to Dutch political events not be the same.

No significant effect is found for a VVD or PvdA election win on the CAR for all event windows. A positive effect is found when the incumbent party is re-elected for all three indices, showing the markets react positive to less uncertainty.

The results from the event study and CAR regression both suggest the market prefers the status quo and reacts negatively to an event which increases uncertainty. This is in line with the Uncertain Information Hypothesis from Brown, Harlow and Tinic (1988). Other research mainly links increased uncertainty to higher volatility, for instance Bialkowski, Gottschalk & Wisniewski (2008) and Brunner (2009). The analysis of the market reaction to Brexit by Ramiah, Pham & Moosa (2017) also indicated the markets averseness to uncertainty.

Even though the results show significant underperformance of the Dutch indices in periods around general elections, generating excess returns from this information is not possible when including transaction costs. The significant negative alphas for the "Long" strategy do show negative excess returns, however exploiting these with the "Short" or "LongShort" strategy is not profitable when accounting for transaction costs.

Future research could use different benchmark indices to estimate abnormal performance, for instance indices of other countries (DAX, CAC40), other composites (STOXX Europe, MSCI Europe), or compose a new benchmark. Another possibility is to explain the abnormal performance by changes in volatility. As explained before, volatility changes are observed in periods of political uncertainty, Brunner (2009) finds this for the Netherlands. To provide a better explanation of stock market returns during periods of political uncertainty, one could use a volatility index as benchmark. Examples of this are the VIX and VSTOXX.

This research focused on the general reaction of the Dutch stock markets to political uncertainty following elections, formations and resignations. Future research can analyse different market reactions between sectors or based on company characteristics. Another contribution would be to explain the negative reaction to political uncertainty, by analysing effects on economic factors as employment, economic growth and investments.

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