Empirical Analysis of the Link between Politics and Stock Market Behaviour

Thesis submitted for the degree of

Doctor of Philosophy

at the

University of Leicester

By

Xun LEI

School of Business

University of Leicester

March 2018
Empirical Analysis of the Link between Politics and Stock Market Behaviour

Xun Lei

Abstract

Political risk factors have become an important source of systematic and non-systematic risk in capital markets. From a micro perspective, policy risk and political connections are widespread in different countries. Therefore, how to effectively manage the political risks has become an increasing concern for researchers and investors. Politics is a broad and complex subject, and financial scholars have studied it from many perspectives. This thesis consists of three empirical studies that focus on three specific political aspects and investigate how these aspects affect stock market performance. The first empirical chapter examines how economic policy uncertainty (EPU) is related to stock market performance in the U.S. I find that an increase in the EPU index negatively affects S&P500 returns and increases its implied volatility. Furthermore, the component of the EPU index that has the strongest explanatory power is that based on newspaper coverage of policy uncertainty, while the other three lack statistical significance. Governments should try to maintain policy stability and sustainability, so that investors can make reasonable predictions about policy changes and arrange their investment planning accordingly. Moreover, investors should also pay attention to expectations of policy change and adjust their portfolios based on policy uncertainty exposure.

The second empirical chapter examines the impacts of democracy improvement on stock markets from an international perspective. The empirical results suggest that increases in political rights lead to higher stock returns. Investors might seek investment opportunities in democratic countries’ markets. For policy makers, improving economic institutions is not the only way to attract foreign investment and promote capital market development, reforming the political regime is also worth thinking about.

The third empirical chapter conducts a textual analysis on U.S. presidential speeches to examine the influence of political communications on stock market. Presidential speeches reflect the president’s and advisers’ views on the country's future economy, and may also contain new information related to future policy directions. This study employs content analysis techniques and an event study method to analyse the market response to the linguistic characteristics of the presidents’ addresses. The results show a significant and positive association between the level of commonality expressed in a president’s speech and abnormal returns on the DJIA around the speech date. This implies that peaceful speeches are associated with a statistically significant increase in abnormal returns. These findings suggest that as well as analysing the specific content of public political information, its linguistic features and emotional tendencies are also worthy of investors’ attention.
Acknowledgments

My sincere thanks must go to many people without whose help this thesis would not have been completed.

First of all, my special gratitude goes to my supervisors, Dr Tomasz Piotr Wisniewski and Professor Emmanuel Haven. I particularly express my deepest and sincere gratitude to my first supervisor Dr Wisniewski for his inspiring guidance and consistent encouragement, constructive and enlightening suggestions without which this thesis would not be materialized. The quality of this work would have been undermined without his kind perusal. I am intellectually indebted to Dr Wisniewski who was always ready to discuss matters relating to this study and provided valuable comments and suggestions on how to improve the content of my research. His comments on chapter drafts are themselves a course in critical thought upon which I will always draw. His serious scholarship and academic practise, and above all, his agreeable personality, have influenced me immensely. Further, I would like to offer my sincere thanks and appreciation to the staff of School of Business, University of Leicester for their various supports.

My heartfelt thanks should go to my schoolmates, whose warm encouragement and caring comfort gave me confidence in fulfilling this thesis. I also wish to thank to the whole Chinese community in Leicester. My country mates have always been supporting and encouraging to me. They helped me a lot in making my life easier and comfortable in Leicester.

Last but not least, I am deeply indebted to my dear parents for their endless support. They have always been a source of encouragement and strength for me. Without their consistent support and inspiration, I might not have been able to accomplish this task.
Table of Contents

ABSTRACT ................................................................................................................................. I

ACKNOWLEDGMENTS ............................................................................................................. II

LIST OF FIGURES .................................................................................................................. VI

LIST OF TABLES ..................................................................................................................... VII

I. INTRODUCTION .................................................................................................................. 1
   1.1 INTRODUCTION ............................................................................................................ 1
   1.2 THE RESEARCH QUESTIONS ....................................................................................... 3
   1.3 SUMMARY OF MOTIVATIONS AND CONTRIBUTIONS ............................................... 4
   1.4 STRUCTURE OF THE THESIS ..................................................................................... 9

II. THEORETICAL BACKGROUND AND LITERATURE REVIEW ....................................... 10
   2.1 THEORIES OF POLITICAL BUSINESS CYCLES ......................................................... 10
      2.1.1 Introduction .......................................................................................................... 10
      2.1.2 Basic theories ...................................................................................................... 12
      2.1.3 Models with rational agents ................................................................................ 15
      2.1.4 Summary ............................................................................................................. 19
   2.2 FROM MACROECONOMICS TO FINANCIAL MARKETS ........................................ 22
      2.2.1 Fiscal policy ......................................................................................................... 22
      2.2.2 Political cycles in financial markets ................................................................... 24

III. ESSAY ONE: POLICY UNCERTAINTY AND STOCK MARKET .................................. 27
   3.1 INTRODUCTION .......................................................................................................... 27
   3.2 POLITICS, UNCERTAINTY AND FINANCIAL MARKETS ......................................... 30
      3.2.1 Political uncertainties and financial markets ......................................................... 31
      3.2.2 Policy uncertainty and financial markets .............................................................. 38
   3.3 THEORETICAL ANALYSIS ......................................................................................... 42
   3.4 HYPOTHESES DEVELOPMENT .................................................................................. 44
   3.5 DATA ............................................................................................................................ 45
      3.5.1 Sample .................................................................................................................. 45
      3.5.2 Variable definitions .............................................................................................. 47
      3.5.3 Summary statistics and correlation matrix ............................................................. 52
      3.5.4 Test of stationarity ............................................................................................... 56
   3.6 EMPIRICAL ANALYSIS ............................................................................................... 56
      3.6.1 Modelling stock market returns .............................................................................. 57
      3.6.2 Modelling stock market implied volatility .............................................................. 62
   3.7 FURTHER DISCUSSION ............................................................................................... 66
      3.7.1 Analysing characteristics portfolio ........................................................................ 66
      3.7.2 Influence on cash flow and discount rate ............................................................... 70
   3.8 ROBUSTNESS CHECKS ............................................................................................... 72
      3.8.1 Changes in the specification .................................................................................. 73
      3.8.2 Controlling for endogeneity ................................................................................ 76
IV. ESSAY TWO: POLITICAL REGIME AND STOCK MARKET ........................................ 81

4.1 INTRODUCTION .................................................................................................... 81
4.2 POLITICS, ECONOMY AND FINANCE ............................................................. 82
   4.2.1 Definition: political institutions and democracy........................................... 83
   4.2.2 Political institutions, democracy and economics .......................................... 84
   4.2.3 Political institutions, democracy and finance .............................................. 90
4.3 HYPOTHESES DEVELOPMENT ...................................................................... 93
4.4 DATA .................................................................................................................. 94
   4.4.1 Sample ......................................................................................................... 94
   4.4.2 Variable definitions ..................................................................................... 96
   4.4.3 Summary statistics and correlation matrix .................................................. 100
4.5 EMPIRICAL ANALYSIS .................................................................................... 104
   4.5.1 Econometric models and specifications ...................................................... 104
      4.5.1.1 Pooled OLS model ............................................................................. 106
      4.5.1.2 Fixed effects model .......................................................................... 107
      4.5.1.3 Random effects model ...................................................................... 108
   4.5.2 Test of stationarity ....................................................................................... 109
   4.5.3 Regression results and discussion ............................................................... 110
   4.5.4 Model selection .......................................................................................... 120
      4.5.4.1 Test for fixed effects .......................................................................... 120
      4.5.4.2 Test for random effects ...................................................................... 121
      4.5.4.3 Test for time effects .......................................................................... 122
      4.5.4.4 Summary ............................................................................................ 123
   4.5.5 Heteroskedasticity and autocorrelation ...................................................... 125
      4.5.5.1 Groupwise heteroskedasticity ............................................................. 126
      4.5.5.2 Time-series dependence .................................................................... 128
      4.5.5.3 Cross-sectional dependence ................................................................ 129
      4.5.5.4 Summary ............................................................................................ 132
   4.5.6 Further discussion ....................................................................................... 136
4.6 ROBUSTNESS CHECKS .................................................................................. 139
   4.6.1 Controlling for endogeneity ...................................................................... 139
   4.6.2 Levels and changes .................................................................................... 145
   4.6.3 Alternative democracy measure ................................................................. 146
4.7 CONCLUSIONS ................................................................................................. 149
4.8 APPENDIX ......................................................................................................... 151

V. ESSAY THREE: THE VALUE OF POLITICAL RHETORIC TO STOCK MARKET .... 152

5.1 INTRODUCTION ................................................................................................ 152
5.2 POLITICAL COMMUNICATIONS AND FINANCIAL MARKETS ..................... 154
   5.2.1 American political speeches ....................................................................... 154
   5.2.2 Political information and asset pricing ....................................................... 157
   5.2.3 The effect of conflict on stock returns ....................................................... 158
List of Figures

FIGURE I THE TIME SERIES PLOTS OF ECONOMIC POLICY UNCERTAINTY INDEX ........................................ 47
List of Tables

<table>
<thead>
<tr>
<th>Table I</th>
<th>Variable Definitions</th>
<th>51</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table II</td>
<td>Summary Statistics</td>
<td>53</td>
</tr>
<tr>
<td>Table III</td>
<td>Matrix of Correlations</td>
<td>55</td>
</tr>
<tr>
<td>Table IV</td>
<td>Regression of S&amp;P500 return on first difference of EPU components and controls</td>
<td>60</td>
</tr>
<tr>
<td>Table V</td>
<td>Regression of S&amp;P500 implied volatility (VIX) on first difference of EPU components and controls</td>
<td>64</td>
</tr>
<tr>
<td>Table VI</td>
<td>Predictability of EPU component for size and book-to-market portfolios</td>
<td>69</td>
</tr>
<tr>
<td>Table VII</td>
<td>Regressions of S&amp;P500 dividend growth rate and dividend price ratio on EPU component</td>
<td>72</td>
</tr>
<tr>
<td>Table VIII</td>
<td>Changes in the specification</td>
<td>75</td>
</tr>
<tr>
<td>Table IX</td>
<td>Two-stage least squares (2SLS) regressions</td>
<td>78</td>
</tr>
<tr>
<td>Table X</td>
<td>Variable Definitions</td>
<td>99</td>
</tr>
<tr>
<td>Table XI</td>
<td>Summary Statistics</td>
<td>101</td>
</tr>
<tr>
<td>Table XII</td>
<td>Matrix of Correlations</td>
<td>103</td>
</tr>
<tr>
<td>Table XIII</td>
<td>Regressions of MSCI market cap indexes returns on democracy level and relevant controls</td>
<td>113</td>
</tr>
<tr>
<td>Table XIV</td>
<td>Regressions of MSCI market cap indexes returns on democracy level and relevant controls: Correction for heteroskedasticity and cross-sectional correlation</td>
<td>134</td>
</tr>
<tr>
<td>Table XV</td>
<td>Regressions of MSCI market cap indexes volatility on democracy level and relevant controls</td>
<td>137</td>
</tr>
<tr>
<td>Table XVI</td>
<td>Robustness and sensitivity test</td>
<td>148</td>
</tr>
<tr>
<td>Table XVII</td>
<td>Variable Definitions</td>
<td>185</td>
</tr>
<tr>
<td>Table XVIII</td>
<td>Summary Statistics</td>
<td>186</td>
</tr>
<tr>
<td>Table XIX</td>
<td>Matrix of Correlations</td>
<td>187</td>
</tr>
<tr>
<td>Table XX</td>
<td>Regression of DJIA CARs on DICTION’s variables and controls</td>
<td>191</td>
</tr>
<tr>
<td>Table XXI</td>
<td>Regression of S&amp;P500 CARs on DICTION’s variables</td>
<td>197</td>
</tr>
</tbody>
</table>
“In our age there is no such thing as ‘keeping out politics’ and all issues are political issues.”

- “Politics and the English Language”, George Orwell, 1946

I. Introduction

This chapter presents an overview of the three empirical studies contained in this thesis. In particular, it outlines the motivations for and the significance of studying the impact of politics on stock market behaviour from an international perspective. The chapter finishes by outlining a structure of the remainder of the thesis.

1.1 Introduction

One of the most important research questions in the financial sector is how assets are priced. Previous studies have identified many factors that lead to stock price movements. These include fundamental information about companies, micro and macroeconomic issues, and many other factors. In the 18th century, Adam Smith recorded that economics and politics have a significant impact on each other. However, whether politics and stock markets can interact and influence each other is an interesting question that many researchers have tried to answer. There is certainly little or no doubt that politicians - sometimes intentionally and sometimes unintentionally - affect stock markets. The recent financial crisis is a good example of politicians trying to send signals to financial markets through specially designed policies. However, their ability to systematically influence the stock market is even more doubtful. After all, the effective market hypothesis (EMH) is one of the cornerstones of modern finance, which means that such behaviour, when repeated several times, should be expected by investors and priced accordingly. This thesis focuses on the impact of three specific political aspects on stock returns from an international perspective.

In the wake of Trump’s election victory, the Brexit referendum outcome, the elections in France and the upcoming referendum in Italy, political uncertainty seems omnipresent and its economic relevance cannot be ignored by investors, firms and
regulators. As mentioned by Pástor and Veronesi (2012): “Governments set the rules of the game”. Political institutions shape the economic environment and their decisions unavoidably impact financial markets. Therefore, an investigation of the relationship between political factors and stock market behaviour has not only theoretical ramifications but also empirical significance. Furthermore, researchers have been interested in studying this association for a long time and several early studies argue that politics affects stock price movements (see, for instance, Niederhoffer et al., 1970; Agmon and Findlay, 1982; Herbst and Slinkman, 1984; Billingsley et al., 1987). The theory of a political cycle is popular in macroeconomics and traditionally distinguishes between two methods which are followed by this thesis. The electoral cycle is driven by the opportunism of incumbent politicians who are keen to stay in office and have an incentive to manipulate the economy in order to achieve better election results. On the other hand, the partisan theory is based on differences in the ideologies of policymakers whose policies could have different effects on the stock market. Moreover, we shall analyse the relationship between observed political factors and stock returns volatility as a basic indicator of risk to assess market efficiency. The analysis of political influences on stock market returns should not only be seen as proof of market efficiency but may also be beneficial to investors who want to benefit from political developments or avoid political risks.

Many scholars have conducted a variety of empirical studies on the relation between politics and stock markets, focusing mainly on developed stock markets. For example, Gemmill (1992) found that in the 1987 British election, the pre-election opinion polls showed a very close relationship with the FTSE100 stock index. When the polls’ results tend to show that the Labour Party will win the election, the FTSE100 index will fall, and vice versa (Manning, 1989; Brander, 1991; Gwilym and Buckle, 1994; Shum, 1996; Herron, 2000). Santa-Clara and Valkanov (2003) as well as Booth and Booth (2003) provide evidence for the existence of the electoral and partisan cycle in the U.S. In addition, many subsequent studies examined the effects of various types of political behaviour or events on the stock market (see, for instance, Bachman, 1992;
Chan and Wei, 1996; Bittlingmayer, 1998; Kim and Mei, 2001; Perotti and Oijen, 2001; Nippani and Medlin, 2002; Hassan et al., 2003). However, few studies have paid attention to developing stock markets due to different political institutions. Only a small number of scholars such as Bohl and Gottschalk (2006), have included them in their international comparative studies. In other words, whether the results of these studies can be applied to all markets is controversial, because the domestic and international political environments are very different. In particular, at the international level, some markets may be more sensitive to political factors than others due to institutional reasons, even if they are located in the same geographical area. In addition, developing markets generally have less mature political systems than developed markets. Consequently, the political situation in developing markets is often not as stable as that in developed markets. Given the important role of politics in emerging markets, this thesis (especially the second study) will focus on markets across the entire spectrum of development. Specifically, the purpose of this thesis is to analyse the importance of three different political factors for the stock market and conduct this examination by using different empirical methods.

The remainder of this chapter provides an overview of each of the three studies and highlights the important contribution of each study to the existing literature. Section 1.2 presents a brief introduction to the three research questions. Section 1.3 provides an overview of the motivations, significance, and contributions. Finally, section 1.4 outlines the research procedure and the structure as well as providing details on how the thesis is organised.

1.2 The Research Questions

The purpose of this thesis is to enhance our knowledge about the relationship between political factors and stock returns. Therefore, this thesis has been carried out using a multi-level analysis employed in three interrelated studies. Each study examines the impact of one of the three selected political aspects on stock returns based on the U.S. and other countries. The three political aspects include (1) political and policy
uncertainty; (2) the political regime; and, (3) political communications, especially presidential speeches. The three studies aim to address the following three research questions. First, does policy uncertainty play as an important role in determining U.S. stock returns, and if that is the case, which component of policy uncertainty has the greatest influence? Second, is there a significant difference in stock returns under democratic and non-democratic governance from an international perspective? Third, does the information contained in U.S. presidential speeches affects stock returns?

The first study in this thesis answers the first research question by investigating the relationship between economic policy uncertainty and stock returns. In particular, this study looks at the changes in an aggregated policy uncertainty index called Economic Policy Uncertainty (Baker et al., 2013) and examines its impact on stock returns in the U.S. In doing so, it highlights the importance of the news component. The second study addresses the second research question by examining whether different types of political regimes are a factor that affects stock pricing in international markets. Specifically, this study analyses whether there is a difference in the stock returns of 74 markets around the world depending on whether a democratic as opposed to an authoritarian government is in power in a country. Finally, in order to answer the third research question, the third study of this thesis examines the linguistic characteristics of the presidential speeches and their corresponding effects on the stock returns in the U.S. Specifically, this study examines different types of words that were used in political communications (speeches) by using a content analysis approach and tries to find out what kind of words are more favourable for stock returns.

1.3 Summary of Motivations and Contributions

Political factors are increasingly becoming a source of systematic and non-systematic risk in capital markets, and have gradually become the focus of asset pricing research. At present, the academic research on political risk mainly focuses on the following aspects: the uncertainty caused by major political events; policy risks and uncertainty; international political risks and the transfer of risks between different countries; and
business and political connections. The studies so far have not covered all of the political risk factors. Politics is a very complex and extensive subject, so it is of great practical and theoretical significance to reveal the influence of politics on capital markets from different perspectives. Therefore, this thesis hopes to understand the role of political risk factors in capital markets from three distinct viewpoints.

The first study focuses on the interaction between policy uncertainty and stock returns. Specifically, this study examines whether Baker et al.’s (2013) economic policy uncertainty index can serve as an explanatory variable for U.S. stock market movements. Baker et al. (2013) argue that policy uncertainty can be seen as a financial risk where markets and investors are uncertain about the future policy direction of the government, which leads to an increase in risk premiums. Firms and individuals will postpone investment and consumption until the uncertainty has been alleviated. Policy uncertainty is multidimensional, and includes economic uncertainty in monetary, fiscal, and taxation policy, as well as political uncertainty related to major political events like an uncertain election. The first study of this thesis uses the Economic Policy Uncertainty Index from Baker et al. (2013) as a proxy variable for policy uncertainty.

Given the fact that the government can intervene in financial markets, a certain degree of policy risk is unavoidable. When making investment decisions, rational investors consider the risk of policy intervention and whether there is a need to require a higher return on their investment to compensate for taking such a risk.

Since policy uncertainty is unobservable, but obtaining an appropriate measure for it is not straightforward. Some studies on the impact of policy uncertainty on asset pricing focus on an election-based approach. Empirical studies have shown that stock markets tend to show abnormal returns around elections (Pantzalis et al., 2000) and elections produce higher market volatility (Bialkowski et al., 2008). This result is consistent with the well-known uncertain information hypothesis (Brown et al., 1988), which predicts that risk and expected returns increase as uncertainty increases. However, using elections as a proxy of uncertainty may raise several questions. Most
importantly, elections can only be used to measure the hypothetical changes at the time of the election, so the long periods of policy uncertainty between elections remain unexamined (Gulen and Ion, 2015). Second, the electoral dataset is not able to quantify the level of uncertainty, but rather relies on the assumption that an election resolves political uncertainty. Furthermore, the political decision-making process almost always requires compromise and negotiation, making predictions based on ideology and prior statements virtually impossible. To form a better, continuous measure of policy uncertainty, Baker et al. (2013) have developed a novel indicator of policy uncertainty based on the newspaper coverage of key policy-related terms. Their news-based index seems to have gained tremendous popularity in various applications in macroeconomics and finance (Strobel, 2015). In addition, the aggregate measure of uncertainty by Baker et al. (2013) is divided into different components, which are related to various sources of policy uncertainty. It is not unlikely that different economic policies will affect the stock market differently. Therefore, it is also interesting for me to investigate which component has the greatest explanatory power in terms of stock market behaviour. This study can be considered as an extension of Bekiros et al.’s (2016) work, which used Nishiyama et al.’s (2011) to analyse the impact of aggregate uncertainty on U.S. stock returns and volatility. Moreover, the first study adds to the literature by looking not only at aggregate policy uncertainty, but also at components of policy uncertainty. This is more informative because it tells us what form of uncertainty is most important in evaluating stock returns and volatility, and which component drives the overall policy uncertainty in an indirect way.

The second study investigates the impact of political regimes on stock returns based on an international comparative perspective. Specifically, this study examines whether stock returns are significantly different between authoritarian and democratic countries. Economic openness and freedom is often considered to be suppressed by a “authoritarian” institution or government. Moreover, “authoritarian” countries are often considered to have a higher level of political risk than “democratic” countries. Furthermore, authoritarianism political institutions may be one of the political risk
characteristics that raise the risk level of a given country, diminishing local and foreign investors' confidence in financial markets and causing them to delay or suspend investment due to perceived risks and uncertainties. Despite such a traditional political and economic view, there is no direct evidence of the impact of “authoritarian” rule on stock returns. It is believed that developing markets can provide an appropriate environment for conducting such research because political intervention in the economy can be seen more frequent lies due to the higher frequencies of political turmoil. Therefore, this study will make a comparison based on 74 countries, including developing and developed markets.

This study provides an important contribution to the current political and finance literature for two reasons. First, to the best of my knowledge, this study is the first to use the level of democratic development as a key explanatory variable to examine the changes in stock returns. Therefore, this article is the first to provide evidence to explain whether there is some truth in the conventional understanding regarding the relationship between stock returns and authoritarian regimes. Most importantly, the evidence suggests that authoritarian regimes might be a factor that affects stock returns in financial markets. In other words, political democratisation will have a positive impact on the capital market. Second, this study focuses on an international perspective. An international comparative investigation can give investors a better understanding of how to analyse and avoid specific political risks, thus contributing to investment decision-making. Given the fact that the stock market may become more volatile during periods of political intervention and political uncertainty, this may affect investors’ portfolio formation and allocations of investments. This is the reason why such a study is essential as it can provide information on whether different political regimes can affect the stock market and investors’ portfolio returns.

The third study of this thesis investigates whether information contained in U.S. presidential speeches influences stock returns. Specifically, this study uses a dataset of U.S. presidents’ speeches over the period 1897 to 2010 to illustrate the importance of
the linguistic information included in these speeches for the stock market in the U.S. political communications, such as speeches and statements, change investors’ expectations about future government policies and can directly affect equity market volatility. Pástor and Veronesi (2012) argues that political news, that is signals about what the government may do, can affect stock prices, especially in times of economic weakness. The linguistics features and emotional tendencies in political speech texts may reveal politicians' perceptions of the country's economic outlook. On the other hand, political rhetoric may simply be a cheap talk designed for political influence without economic content. Therefore, this study aims to answer this question and find out whether political speeches contain valuable and useful information for investors. Only a few empirical studies have paid attention to the influence of political rhetoric on stock market behaviour.

This study therefore aims to fill this gap in the current literature by investigating the effect of U.S. presidential speeches on stock market movements. Specifically, the study uses a unique sample of 524 U.S. presidential speeches given between 1897 and 2010 to examine the response of investors and markets. The study follows a content analysis framework and utilises a computer-aided package to identify the linguistic features and emotional tendencies of U.S. presidential speeches, and categorises the speeches’ text into different word groups.¹ The study uses the method of event study and examines the abnormal returns around the dates of the speeches to investigate whether investors can get valuable information from political speeches. Through such an analysis, the study can provide important evidence about these political speeches and assess whether they are informative in explaining stock returns in the U.S. This study will contribute to the growing literature on pricing politics. To the best of my knowledge, this is the first study to show that politicians can convey valuable information through their speeches, and analyse the impact of political rhetoric on investor responses and market behaviour.

¹ See the Appendix of Chapter 5 for details.
1.4 Structure of the Thesis

In order to deeply understand the three research questions and each research methodology, the research was first conducted by reviewing the related theories and previous studies. When the identification of the research objectives has been completed, the hypotheses and the conceptual framework were created. Then, the data were collected, interpreted and analysed. Subsequently, the empirical results were presented and discussed. Finally, the conclusion, limitations, and recommendations were reported based on the results of the study.

The remainder of this thesis is structured as follows. Chapter 2 presents the theoretical basis that underpins the research analysis. This chapter contains a literature review related to the political business cycle as well as an overview of relevant empirical studies. Chapter 3 presents the first study, which is on the relationship between policy uncertainty and stock returns in the U.S. Chapter 4 presents the second study, which focuses on the effects of political regimes on stock returns based on a cross-country comparison. Chapter 5 presents the third study which investigates the impact of different content within U.S. presidential speeches on stock returns. Chapter 6 contains the conclusions. It outlines the main findings of the three studies and the contributions to investment applications. It also provides suggestions for future research and lists the limitations.
II. Theoretical Background and Literature Review

This chapter provides a brief overview of theory development and relevant literature which could be the foundation of the studies on the link between political factors and capital markets. A more detailed discussion and reviews relating each specific political aspect is provided in corresponding chapters.

2.1 Theories of Political Business Cycles

With the development of public choice theory, economists began to analyse political behaviour in the same way as economic behaviour and regard government behaviour as an endogenous variable in the economic system. The use of this method caused the political business cycle (PBC) theory to develop rapidly and it has become a very active field of macroeconomic research. Some scholars have tried to apply this theoretical framework in financial research. This thesis focuses on the relationship between political factors and stock market behaviour. The current research in this area is mainly empirical, and therefore, reviewing the PBC theory will help us to comprehensively and profoundly understand the research topic. This section introduces several basic models of this theory and makes a brief analysis.

2.1.1 Introduction

From the mid-1920s, Keynes lost confidence in the laissez-faire philosophy of classical economics. Keynesianism, which evolved from the Great Depression, is the belief that instability is an inherent feature of the market economy. This instability can lead to fluctuations in output and employment and reduce social welfare. Therefore, the Keynesians insist that the government can and should adopt appropriate monetary and fiscal policies to correct this instability. The implication of this view is that the government hopes that the economy is stable. However, Kalecki (1943) challenges the hypothesis of the Keynesian model. Based on the situation of the “New Deal” of President Roosevelt in the 1930s, Kalecki proposed that the capitalist market economy make it difficult to avoid the “political business cycle”. In his model, a government
would deliberately create a recession to reduce workers' bargaining power for the sake of capitalist interests. He argued that because of the dominance of capitalists, the policies of the capitalist countries always represent the interests of large enterprises, and he predicted that the business cycle after World War II would not be eliminated by the prescription of Keynes.

In the early days of Keynesian economics, Schumpeter (1939) realized that economic policy would inevitably be affected in a democratic system in which there was a competitive electorate. From the perspective of public choice theory, the analysis of political behaviour and the analysis of economic behaviour should be the same. Just as a consumer's goal is to maximize his or her utility, a politician's goal is to maximize the possibility of re-election. Therefore, government behaviour should be regarded as an endogenous variable in the economic system. In a democratic country, the economic situation affects the election result by influencing the voting orientation. In order to ensure that they are elected, politicians manipulate macroeconomic policies, and thus form a certain economic cycle. Partial ideology also affects economic fluctuations. In order to get the support from the party or voters, politicians may manipulate macroeconomic policies to benefit their core voters, so that the macroeconomic will show a certain periodicity. Downs (1957) argued that incumbent political parties may try to deliberately manipulate the economy in their own interests, namely to secure re-election. He points out opportunistic motives in the behaviour of politicians: “parties formulate policies in order to win elections, rather than win elections in order to formulate policies”. These ideas characterize one area of political cycles theories, which try to address whether it is actually possible for politicians to systematically affect the economy and, if so, how this can happen.

Over the past half century, economists have built a number of political and economic models and done a lot of research on the relationship between politics and the economy. Here, I am going to introduce some of the most influential basic theoretical models in this field. Although these models are mainly used in macroeconomic research and are
rather obsolete, they also provide useful ideas in regard to the analysis of the relationship between politics and finance.

In general, we can divide the basic model of the modern political business cycle theory that has developed since the mid-1970s into two broad categories: the opportunistic model and the partisan model. They can be further divided into two stages based on the rational expectations revolution. In 1975, Nordhaus established an opportunistic model of the political business cycle, which emphasized the tendency of politicians to manipulate economic policies in order to achieve their electoral purposes, and this drew scholars’ attention to this field. Subsequently, Hibbs (1977, 1992) formalized a partisan model of the political business cycle, which emphasized politicians’ ideological tendencies. As the rational expectations revolution dominated macroeconomic research, the theories of Nordhaus and Hibbs were neglected. From the mid-1980s, due to the theory of rational expectations, the political and economic cycle theory began its second stage of development. The assumption of rational agents was incorporated into some new models. However, these studies still mainly followed two lines: the rational opportunist model of Rogoff and Sibert (1988) and Rogoff (1990); and the rational partisan model of Alesina (1987).

Here I first describe the first-generation models of the political cycle developed in macroeconomic research from the 1970s. Then I continue with the second generation of models, which reflect the ongoing rational expectations revolution.

2.1.2 Basic theories

The theory of opportunistic behaviour of political parties was formalized by Nordhaus (1975). His model of the Political Business Cycle (PBC) describes how an opportunistic government manipulates the economy in order to win (exogenously timed) elections. Under certain assumptions, the ruling party will tend to choose economic policies that will maximize the possibility of being re-elected. This model predicts that the government will immediately implement tightening policies after the
election so that it can catch up with an economic boom before the next election. In this model, the structure of the economy is summarized by an expectations-augmented Phillips curve:

\[ u_t = \bar{u}_t - (\pi_t - \pi_t^e) \]  

(2.1)

where \( u_t \) is unemployment, \( \bar{u}_t \) is a natural rate of unemployment\(^2\), \( \pi_t \) is inflation and \( \pi_t^e \) is inflation expected for the period \( t \). The equation 2.1 can also be expressed in terms of output according to the Okun’s law, which describe the relationship between the unemployment rate and the output, so the empirical study can analysis the pre-election output or unemployment rate to determine whether this theory holds. Additionally, suppose we have a standard formulation of adaptive determination of the expected rate of inflation:

\[ \pi_t^e = \pi_{t-1} + \alpha(\pi_{t-1}^e - \pi_{t-1}), 0 < \alpha < 1 \]  

(2.2)

where \( \alpha \) represents the speed with which expected inflation adapts to past expectational errors.

Moreover, Nordhaus made a number of assumptions: the political system contains two parties and these two parties pursue identical policies; the election time is fixed; the two parties are concerned about the maximization of their interests rather than ideology, and therefore the importance is the result of the election; voters make political choices based on politicians’ performance while they are myopic and not strictly rational; the macroeconomic system can be described by an expectations-augmented Phillips curve; and, policymakers can influence the level of unemployment by manipulating aggregate demand through a combination of fiscal and monetary policies so that it can achieve any desirable point on the Phillips curve.

According to this theory, Nordhaus drew the conclusion that the government can benefit from opportunistic behaviour that deliberately destabilizes the economy. This result is clearly contrary to Keynesian theory because it holds that one of the main

\(^2\) It is the rate of unemployment which can be reached with stable inflation.
purposes of the government is to make the economy stable. Nordhaus’s model clearly predicts unemployment and inflation patterns in an election cycle. In the first half of the election cycle, the unemployment rate will rise and inflation will decline, and the unemployment rate will decline and inflation will rise before the start of the election, that is, in the second half of the election cycle. The best example of this story is during the administration of President Nixon, when the government caused a recession in the period 1970-1971 and then reversed it before the election in 1972 by using expansionary policies.

The second basic political cycle theory, the so-called Partisan Theory (PT) of the political cycle, was pioneered by Hibbs (1977, 1992). In Nordhaus’s (1975) theory, all governments exhibit the same opportunistic behaviour because the election results are much more important than ideology. In contrast, Hibbs emphasizes politicians’ political ideology and argues that winning an election is a means of putting the political creed into practice. The argument behind this is that constituents of individual political parties differ in what economic conditions they consider favourable for themselves. In this model, obviously, different governments may pursue different policies as long as they have different ideologies. A party’s ideological preferences will lead to economic fluctuations since policy moves along the Phillips curve. In the partisan model, the key role is no longer a political candidate, but a voter. Each voter will choose a candidate who better meets his or her personal preferences based on the political preferences of the party.

In order to test whether the left-wing and the right-wing government have different preferences in terms of the trade-off between unemployment and inflation, Hibbs (1977) studied the post-war capitalist countries. He found that, compared to right-wing governments, left-wing governments are more willing to choose a lower unemployment rate and a higher inflation rate. Therefore, he argues that different unemployment and inflation outcomes are important and have class-related effects on the national income distribution. The preferences shown by policymakers reflect the
interests of the various social groups that usually support different political parties, thus denying Nordhaus's (1975) assumption about identical policy. Hibbs insists that empirical facts support the ideological view of macroeconomic policy formulation. Comparatively speaking, the macroeconomic structure of a low unemployment rate and high inflation is primarily linked to the improvement of poor people’s economic well-being. The different interests of professional groups are mainly reflected in the policy preferences of the left-wing and right-wing parties. Through a study of 12 Western countries in 1945-1969, Hibbs found strong support for this speculation, that is, the higher the average inflation and the lower the average unemployment rate, the greater the likelihood that the Labour Party (left-wing) will be in power. Hibbs (1977) is not explicit about the movements of the short-run Phillips curve as expectations adjust.³ He argues that there may be some lag between policy implementation and its real impact on the economy. To briefly conclude, the partisan theory model suggests that there is a cyclical behaviour between unemployment rate and inflation, which reflects the rotation of the two different parties. As long as the right-wing party is in power, the unemployment rate will be higher and the inflation will be lower, while the situation will be the opposite when the left-wing party is in power. This is because the different parties pursue different macroeconomic targets, and the cyclical nature of these economic outcomes also reflects that the different parties have been taking turns on government.

2.1.3 Models with rational agents

The second generation of political cycle models, which emerged from the late 1980s onwards, reflects the influential research on the rational formation of expectations. The application of rational expectations has crucial implications for political business cycle models. These models emphasize how politicians can use the information asymmetry to create the political business cycle where agents do not have to be myopic or backward-looking. Moreover, these models are also divided into two categories:

³ Hibbs' work is in fact rather empirical and the theoretical assumptions are inferred from his empirical models.
opportunistic and partisan models.

The study of Rogoff and Sibert (1988) shows that some of the connotations of Nordhaus’s model can be preserved even in a rationally expected pattern, as long as there is information asymmetry between the voter and the policymaker. In other words, it is not only when the voters are myopic and irrational that politicians can create political business cycles. The optimal policy is only possible in a political environment where there is information symmetry among the economic agents, voters and politicians are information symmetry. As this condition can hardly be met, politicians have the opportunity to implement non-optimal policies. Namely, due to the existence of information asymmetry factors, forward-looking voters can hardly get important information about the political and economic environment, so the authorities have the opportunity to create temporary prosperity.

Rogoff and Sibert (1988) and Rogoff (1990) were the first to describe a model of an opportunistically induced cycle with rational agents. They modified the adaptive expectations of inflation in Nordhaus’s (1975) model to rational expectations:

\[ \pi_e^t = E(\pi_t | I_{t-1}) \] (2.3)

where \( E(\cdot) \) is the expectations operator, and \( I_{t-1} \) is the voters’ information set at time \( t-1 \) that includes all the relevant information but does not include information about the competency of the incumbent and candidates. In their model, the election cycle is caused by government expenditure, taxation and money supply growth, and because the economic agent is rational, temporary information asymmetry becomes the source of such cycles. Even though rational voters aim to choose politicians who can provide maximum utility, they lack information on the competency of different politicians. Therefore, candidates may manipulate the “signal transmission process” to induce the voters to believe they have enough capacity before the election. Rogoff and Sibert (1988) define this competency as a way to reduce the waste of the budget process; that is, a capable government can use a certain tax revenue to produce more public goods and transfer payments. Politicians have the potential to create temporary fiscal revenue
growth, which is what voters welcome. Because of the complexity and lack of information on the budget process, even a rational voter may not realize that the tax will inevitably increase after the election due to the fiscal expenditure growth before the election. Unlike the cycle characteristics of inflation and unemployment generated by Nordhaus’s (1975) model, the rational opportunistic political business cycle theory predicts the manipulation of various policy instruments by politicians before and after the elections. In order to show their ability, there is a temptation to reduce taxes and increase spending before the election, which clearly leads to deviations from the optimal policy. Thus, although the rational model has different empirical predictions compared to Nordhaus’s (1975) model, there are still opportunistic behaviours. More importantly, there is only one type of policymaker, the competent one, who creates a pre-electoral boom. Consequently, in contrast with the traditional model, we can foresee that any cycle resulting from the manipulation of fiscal and monetary policy will be more irregular and less sustainable due to the rational expectations. This is the empirical implication of rational political business cycle theory.

Hibbs's (1977) partisan theory predicts that the left-wing party and the right-wing party will choose a different combination of unemployment and inflation. With the rational expectations revolution, economists questioned the ability of policymakers to use aggregate demand management policies to influence actual economic variables. For this reason, partisan theory was adjusted for rational expectations and forward-looking voters in the rational partisan theory model of Alesina (1987). The rational partisan theory model suggests that if voters’ information on the result of the election is incomplete and the labour contracts that were signed during different periods can continue to be fulfilled after the election (for example, the nominal wage growth rate equals the information of inflation expectation when the contract was signed), then the political business cycle can still exist.

In Alesina’s (1987) political business cycle model, he refuses to adopt the traditional view that politicians who seek to maximize voters’ support will select identical policies.
He argues that politicians have different ideologies and will adopt different policies in their administration. Hence, he argues that it is hard to imagine that in a multiparty regime, self-serving politicians choose identical policies. This partly reflects the fact that in order to win an election, presidential candidates first have to appeal to the neutral voters in their party. Alesina (1987) emphasizes politicians will adopt ideological preferences that may benefit their supporters’ income redistribution policies. Therefore, different macroeconomic policies have different income redistribution consequences, and rational partisan theory shows how different political parties choose different macroeconomic policies. This theory assumes that the rational voters are fully aware of the ideological differences between the parties. Under this framework, macroeconomic policies can cause short-term fluctuations in the overall economy since rational voters cannot predict the outcome of an election. When the right-wing party is elected, the economy will face a tightening shock after the election, that is, inflation will be lower than the expectation. If the left-wing party is elected, the opposite result will occur, inflation will higher than the “unexpected inflation”.

The macroeconomic framework adopted by Alesina (1987) is based on Fischer's (1977) well-known rational expectations model. Fischer proved the main conclusion (such as policy inefficiency) for neoclassical macroeconomics, and its key assumption was instantaneous market-clearing. In the case of a nominal wage contract, if the sticky prices factor is introduced into the model, the effectiveness of the policy will be restored even if the economic agents have rational expectations (under the condition of non-market-clearing), and the monetary policy will have a real impact on output and employment. In this case, a rational partisan business cycle will be produced due to the politicians’ ideological orientations.

In the rational partisan model, politicians have the ability to use monetary policy to control inflation. As parties are different in terms of inflation - for example, it can be assumed that the right-wing party hate inflation more than the left-wing party - hence an election that changes the government will lead to unexpected inflation. Although
the economic agent has rational expectations, its information on the election result is incomplete. Since the economic agent signed a nominal wage contract before they were informed of the election result, the inflation rate following the election may be different from the rational expectations of the inflation rate, which were created by the pre-election wage negotiators. More specifically, assuming the current government belongs to a left-wing party and has a tendency to reduce the unemployment rate, and if wage negotiators believe that the current government will be re-elected, so they will sign a nominal wage contract based on a higher expected inflation rate. Even if the right-wing party is more likely to win the election, the risk-averse wage negotiators may sign a nominal wage contract based on an inflation rate that is higher than the expected inflation rate at which the economic agent is sure to know the right-wing party will win. But if the right-wing government replaces the left-wing government, they will tighten the money supply to reduce inflation, thus creating an unforeseen accident in the wage contract.

Alesina’s (1987) rational partisan model predicts that when a right-wing party is elected, output growth will decline with inflation, and the unemployment rate will increase. Meanwhile when the right-wing government is replaced by the left-wing government, a series of opposite events will take place. During the post-election period, the left-wing government will try to expand its economy and reduce the unemployment rate. The final result is that when inflation expectations are adapted to the new conditions, output growth will return to its natural level, but the economy will be locked in a higher inflation equilibrium. According to Alesina’s (1987) model, the cycle characteristics of the left-wing government are the opposite of those predicted by Nordhaus’s (1975) model. Regardless of how the government’s political orientation changes, Alesina’s (1987) model argues that inflation is expected to be adjusted to the level of actual inflation in the second half of each term, and the output will remain at its natural level.

2.1.4 Summary
The traditional opportunistic model assumes adaptive expectations and backward-looking behaviour, thus implying that the opportunistic behaviour of the incumbent leads to the generation of business cycles (Nordhaus, 1975). This theoretical framework has three major flaws. The first one is that it assumes that voters are irrational in forming inflation expectations and evaluating candidates' abilities. The second is that it assumes that the incumbent controls the monetary policy tools, which contradicts the independence of the central bank in a mature economy. The third is that it does not discuss transfer payments in policy analysis, which play an important role in policy-making before elections.

On the other hand, the rational expectations opportunistic model considers the formation of economic cycles because of asymmetric information resulting from the assumption of rational inflation expectations and forward-looking voters (Rogoff and Sibert, 1988). Rational expectations require voters to use all possible information to form expectations, resulting in forward-looking behaviour. The reason for generating business cycles under rational expectations is information asymmetry. Rational expectations assume that the incumbent cannot easily control the economy because he or she must let the voters believe in his or her abilities. One of the shortcomings of this theoretical framework is how these events are carried out. Its assumption about the period does not seem perfectly reasonable, but researchers always test it based on an assumption that policy-makers can directly control inflation. This assumption makes it difficult for voters to observe inflation because the money signal is not being used. They believe that growth and unemployment are more likely to be observed than inflation. Another flaw in the model is that it relies on its period assumption to obtain the information asymmetry, and the information asymmetry is considered to be the underlying cause of business cycles.

Hibbs’ (1977) also assumes adaptive inflation expectations and backward-looking behaviour. Adaptive expectations allow the incumbent to raise and maintain a high level of inflation during his or her term of office. Furthermore, adaptive expectations
mean that the adjustment takes time, so this model leads to a long cycle. On the contrary, the rational expectations partisan model assumes that inflation expectations are rational, and that voting is forward-looking (Alesina, 1987). After the wage contracts are renewed, the adjustment is expected to be rapid, resulting in a short cycle. The rational model argues that the emergence of business cycles is due to the uncertainty about the election results, while the traditional model argues that it is because of the different preferences of the parties.

There are two issues that matter when evaluating the rational model. The first is that the wage contract assumes that workers are allowed to adjust their wages after the election according to changes in inflation. Just like a rational opportunist model, the period assumption considers that sudden inflation may occur even under rational expectations. The hypothetical changes in the period may change the likelihood of generating business cycles (Drazen, 2000). The second relates to the electoral period. This factor is the driving force behind the political business cycle, but it is exogenous. Thus, a better microstructure of the model would be to include these decisive factors as endogenous variables.

From the empirical perspective, the current studies of political business cycle cannot reach a consensus conclusion (Hibbs, 1987; Alesina, 1988; Alesina and Roubini, 1992). The main reasons are that there is a delay effect of policy implementation, and it is difficult to distinguish the actual economic performance is due to the politicians’ manipulation or the market operation mechanism. Therefore, many studies on political business cycle were not limited to the analysis of macroeconomic indicators, and turned to observe whether the incumbents had economic policy manipulation behaviour based on election or ideological considerations, that is, political budget cycle and political monetary cycle. For the studies of the budget cycle, the government's fiscal expenditure, taxation, fiscal deficit and other fiscal policy tools were the focus of their research (see, for instance, Schultz, 1995; Berger and Woitek, 1997; Eccleston, 1998; Ergun, 2000; Bräuninger, 2005). The studies for the monetary
cycle mainly examined the money supply, interest rate, reserve-deposit ratio and rediscount rate (see, for instance, Keil, 1988; Davidson et al., 1990, 1992; Alesina and Roubini, 1992).

2.2 From Macroeconomics to Financial Markets

Although the political cycle theory revolves around macroeconomic variables such as unemployment rate and inflation, the interest of researchers has soon broadened.

2.2.1 Fiscal policy

The models discussed in the previous section are mainly based on monetary policy analysis and attempt to explain the generation of business cycles through the substitution of inflation and unemployment. The use of the Phillips curve means that even if empirical evidence suggests that the pre-election monetary policy is neither austerity nor expansion, an incumbent can still control the economy through it (Alesina et al., 1997; Drazen, 2000). However, these models do not take into account the independence of the central bank, a highly independent central bank will weaken the effects of macro-control (Maloney et al., 2003). That is, explain political business cycles from a perspective of monetary policy does not seem entirely reasonable. Therefore, an alternative to solving the above shortcomings of the PBC theory is to use fiscal policy as a key factor in the relevant analysis.

Concerning the empirical side, there is some empirical evidence on this. Tufte (1980) discussed a series of clear opportunistic control actions in fiscal transfer payments before elections. Similarly, Alesina (1988) also found that there were election cycles associated with transfer payments between 1961 and 1985. Moreover, Alesina et al. (1992) found evidence of opportunistic behaviour relating to transfer payments. A more recent study of Alesina et al. (1997) comes to a similar result also for a sample of industrial countries. On the other hand, Andrikopoulos et al. (2004) generally find neither opportunistic nor partisan effects on fiscal variables in a sample of 14 developed EU countries.
Some studies have shown that there are also obvious fiscal cycles in developing countries. For example, Ben-Porath (1975) convincingly revealed the existence of opportunistic policy behaviour in Israel between 1952 and 1973, specifically, tax cuts before the election and increases when the election was over. Krueger and Turan (1993) found that Turkey had pre-electoral fiscal controls between 1950 and 1980, and this was also prominent in Latin America. As well as country studies coming to the above conclusions, some cross-country studies have also achieved similar results. Ames’ (1990) study on 17 countries in Latin America shows that pre-election government spending grew by an average of 6.3 percent and declined by an average of 7.6 percent after the elections between 1947 and 1982. Schuknecht’s (1996) comprehensive study on 35 countries between 1970 and 1992 shows that there is more room for economic control in developing countries. Because of the lack of checks and balances, the incumbents in developing countries tend to have more power in regard to monetary and fiscal policy and government spending policies are more likely to affect voters than tax cuts. Block’s (2002) study on 44 countries in sub-Saharan Africa provides evidence for the existence of political cycles in monetary and fiscal policy. Shi and Svensson (2006) extended Rogoff’s (1990) political budget cycle model and analysed the impact of democratic development on the control of the fiscal cycle by including a test of political transparency. Their findings also suggest that there are clear fiscal cycles in developing countries.

These findings indicate that the political business cycle model based on fiscal policy seems to be better than that based on monetary policy, which solves some of the issues that have been criticized. Even if the fiscal policy is expected, it will still have a real effect on economic and voting behaviour. However, for a political business cycle model, or at least the opportunistic political business cycle model, the control of fiscal policy raises two key issues. The first is how to observe the synergy between political business cycles caused by monetary and fiscal policy. The second is why a rational voter will react to pre-election economic control. These are worthy of further research.
2.2.2 Political cycles in financial markets

Nevertheless, the purpose of this thesis is to study the impacts that government may have on the stock market. There is not much doubt that both fiscal and monetary policy may affect stock market significantly. On the fiscal side, the government can influence the security prices through various channels (see, for instance, Tavares and Valkanov, 2001; Arin et al., 2009; Afonso and Sousa, 2011). For example, tax deduction can reduce the financial burden of enterprises, thereby enhancing the profits and stock returns. Tax policy can also control the flow of investors' capital and influence investment incentives through the opportunity costs (e.g., interest tax) and transaction costs of stock investment. Government spending programs can lead the economy out of the recessions. The improvement of the macroeconomic environment will increase enterprises’ profitability and raise the stock prices. Meanwhile, it will also change the investors’ expectations of future income growth, and stimulate the purchase of securities to raise the prices. Similarly, transfer payments can also stimulate consumption and investment by increasing the ability of investors to resist risk. Fiscal policy may matter also in a sense of implying future monetary actions (Jansen et al., 2008). On the monetary side, expansionary monetary policy will increase money supply, and this may lead investors to buy more stocks and then raise the stock prices (see, for instance, Thorbecke, 1997; Bernanke and Kuttner, 2005; Basistha and Kurov, 2008). The rise in stock prices can also increase the public's holdings of wealth, thereby increasing consumption and spending. Whether it is the expansion of investment or the increase in consumption, it will eventually lead to increased output (Mishkin, 1995). Overall, political factors affect macroeconomic situation, which consequently affect the financial market. The transmission mechanism between politics and financial markets is very complex in any case.

Given this complexity, there is, unfortunately, not much of a theory on how exactly political factors may influence stock market. Here I present findings of several papers, which I think try to at least partially reveal the nature of the politics - stock markets relationship. The empirical literature on political cycles in capital markets has grown
substantially. The studies presented here mainly in a sense of using empirical econometric techniques rather than theoretical analysis. Part of them are no longer only focus on the United States, but the evidence is still relatively small and less supportive. Here, I briefly present research on both types of political business cycles since the current studies did not reach a consensus conclusion.

The studies on the relationship between financial markets and politics usually make use of United States stock market data. The U.S. market is traditionally one of the most developed stock markets in the world with a long history of trading. The other common characteristic of these studies is that they are usually based on a comparison of average returns in different periods of a political cycle. Some of the studies focused on the presence of the electoral cycle in the U.S. stock market and found that the observed cycle is consistent with the U.S. presidential elections. Specifically, they found that there were some excess returns in the third and fourth year of the presidential election cycle, while the second year general had average negative returns (see, for instance, Niederhoffer et al., 1970; Herbst and Slinkman, 1984; Foerster, 1994; Gartner and Wellershoff, 1995; Forester and Schmitz, 1997; Booth and Booth, 2003). This is in line with the Nordhaus’s (1975) view that the incumbent will gradually implement expansionary policies before the election in order to win it. There are also some studies that have enriched the existing literature by providing international evidence on the electoral cycle in stock returns (see, for instance, Cahan et al., 2005; Bohl and Gottschalk, 2006; Döpke and Pierdzioch, 2006).

Allvine and O'Neill (1980) and Huang (1985) found that, on average, the U.S. stock market returns at the time of the Democratic government were higher than the Republican government. Wong and McAleer (2009) showed that the cyclical volatility of stock prices along with the presidential election cycle were more clear and significant under the Republican presidencies, which means that the Republican Party may be more likely to engage in active policy manipulation to create economic prosperity scene and win re-election than the Democratic Party. In addition, some other
studies have also confirmed the existence of partisan cycles in stock markets (see, for instance, Hensel and Ziemba, 1995; Lobo, 1999; Johnson et al., 1999; Pantzalis et al., 2000; Lin and Wang, 2005; Bohl and Gottschalk, 2006; Białkowski et al., 2007; Worthington, 2009; Belo et al., 2013).

A seminal paper of Santa-Clara and Valkanov (2003) presents a general framework to studying political or partisan cycles. They find that stock market volatility under Republicans is higher than that of Democrats while the risk level is the same. The authors further point out that the difference is not derived from the political business cycle associated with the expected return, and it is not concentrated near the election day. Given the results presented above, they argue that this difference is not caused by the risk of the stock maker under different ruling parties, hence it is derived from the relatively high actual stock returns and low real interest rates of the Democratic government. This difference in stock returns is puzzling because in an efficient market such a profit opportunity, as the Democratic premium proved to be, should quickly evaporate. However, investors are weakly to respond to election results as if they do not know what the new government would bring.
III. Essay One: Policy Uncertainty and Stock Market

This chapter presents the first empirical study which investigates the impact of policy uncertainty on asset pricing in the U.S. stock market. This empirical chapter is organized as under. Section 1 provides a brief overview of the effect of policy uncertainty on financial markets as well as motivation for this study. Section 2 and 3 outline reviews of the related literature in different direction and theoretical background. Section 4 proposes the research objectives and the hypotheses. Section 5 describes the collection of data, samples and variables. Section 6, 7, and 8 present the techniques, models or methods used in the empirical analysis, and explains results and robustness tests. Section 9 summarize the findings, conclusions and recommendations.

3.1 Introduction
The policy uncertainty refers to the market cannot accurately predict whether, when and how the government change the current policy environment in the future (Gulen and Ion, 2015). Policy uncertainty includes many aspects, in which the economic policy uncertainty and its impact on financial markets is the focus of this study. This effect has been especially relevant during the recent financial crisis and recession. Economic outlook uncertainty in general and economic policy uncertainty in particular have caught policy makers’, investors’ and academia’s attention. In fact, changes in economic policy can be relatively frequent, such as the political events that caused the debate over the U.S. debt ceiling. These changes have a significant impact on both the real economy and the financial market (Pástor and Veronesi, 2013). It can be said that the uncertainty regarding to fiscal, monetary and regulatory policy can come from government’s and central bank’s policymakers. In addition, the ubiquity of government policy makes diversified investment very difficult. Therefore, financial markets may be influenced by the economic policy uncertainty. The main research objective of this study is to find out the empirical relationship between policy uncertainty and stock market movement.
Many of the literature in the field of accounting and finance research show that economic policy uncertainty not only affects the price of financial assets (see, for instance, Pástor and Veronesi, 2012, 2013), but also affects business decisions by influencing the future cash flow of firms (see, for instance, Julio and Yook, 2012; Gulen and Ion, 2015; Huang et al., 2013; Bradley et al., 2016). Brogaard and Detzel (2015) divided the empirical approach for analysing the impact of economic policy uncertainty on asset prices into two categories. The first type of the method utilises an event study framework and many studies have chosen electoral events as a representative indicator of policy uncertainty (see, for instance, Boutchkova, et al., 2011; Belo et al., 2013). The second type of the method records a series of events which relevant to changes in policy environment, but the definition of event does not mean the beginning or the end of policy uncertainty. For example, the passing of a bill does not necessarily indicate the elimination of future uncertainty. Policy uncertainty often has a persistent impact on the real economy. More recently, Baker et al. (2013) proposed a new construction of policy uncertainty named Economic Policy Uncertainty Index (EPU) followed this method. This index is a weighted average of four components, each of them measures the newspaper reports discussing policy-related uncertainty, expiring tax provisions, and disagreement about government purchases and inflation expectations, respectively. The underlying identification assumption is that increased newspaper coverage on uncertain policy indicates that the public perceives more uncertainty about government actions. One of the biggest advantages of this kind of policy uncertainty measurement is that it offers a real-time continuous tracking of policy risk, with the merits of being forward-looking, model-free and comprehensive enough to reflect rich information regarding policy uncertainty.

Brogaard and Detzel (2015) argue that a continuous measure based on news reports has advantages over electoral events in investigating the effects of policy uncertainty.

---

4 The economic policy uncertainty index was compiled by Baker et al. at least in 2009, where 2013 refers to the time of the paper “Measuring Economic Policy Uncertainty” rather than the time of the index (the same below). Therefore, the study of this chapter and some of the existing literature are before 2016.
A policy uncertainty index is obtained on a dynamic basis, while election events do not occur frequently, so it can only capture uncertainty of short intervals. Moreover, the decision of economic policy is usually changed over time, and it is not entirely accurate to use current elections as a measure of future policy uncertainty (Brogaard and Detzel, 2015). Since the Baker et al.’s measure was proposed, many scholars have utilised it in their studies (see, for instance, Pástor and Veronesi, 2013; Antonakakis et al., 2013; Brogaard and Detzel, 2015). As far as the impact of EPU on the financial market is concerned, recent studies have only considered the aggregated index as a variable, disregarding the fact that it includes four components (see, for instance, Kang and Ratti, 2013; Antonakakis et al., 2015). One may also wish to examine which of these components has the strongest impact. Hence, the central idea of this study is to examine whether the news component of EPU has the most powerful influence on a financial market because news reports are one of the most convenient channels for individual investors to obtain information about government policies.

This study firstly investigates whether the EPU helps to explain stock market returns in the time series. I find a negative and significant contemporaneous correlation between changes in EPU, especially the news component, and S&P500 index returns. Moreover, I also find evidence of a positive relationship between current changes in EPU and S&P500 implied volatility, with the news component still having the most significant influence. Notably, since economic policy decisions may involve systematic responses to macroeconomic stress, it is possible for EPU to be endogenously linked to state variables that reflect economic and market conditions. Therefore, I also examine whether the introduction of standard economic and market uncertainty variables affects the regression results. These variables include industrial production growth, change in narrow money supply, inflation, change in T-bill rate, stock market volatility, a set of political dummies and stock market anomaly indicators. The results reveal that the explanatory power contained in EPU is not embedded in any of economic and market uncertainty variables, and that adding EPU as an additional explanatory factor could improve asset pricing in stock market.
To further explore whether the predictive power of EPU differs across stocks with different characteristics, I use Kenneth R. French’s data library to sort individual stocks into 10 size and 10 book to market decile portfolios and examine their returns predictability by EPU. This study finds that the negative predictability of the EPU is ubiquitous in size and book to market component portfolios, confirming my findings on the aggregate market portfolio. Moreover, the EPU has the strongest predictive power for the small cap and value stocks, and the estimated slope coefficients are relatively large on these two kind shares. These results indicate that different stocks have different sensitivities and risk exposures to policy uncertainty.

According to the basic stock pricing theory, the observed negative effect of policy uncertainty on stock returns could be due decreases in expected future cash flows or increases in the discount rate. In other words, policy uncertainty can through two channels to affect asset prices. Thus, this analysis then examines whether policy uncertainty has any significant relationship with stock cash flow or discount rate. There is no significant evidence to support the hypothesis about the aggregate dividend price ratio (a standard discount rate proxy). This may imply that the negative association between stock prices and EPU establishes itself through the cash flow rate. This study then finds that the EPU is negatively and significantly associated with the aggregate dividend growth rate (a proxy of the future cash flows), supporting the notion that the cash flow rate channel is the source for EPU’s predictability on stock returns.

Several robustness tests confirm my findings. In particular, I run different measures of the U.S. stock market performance and get similar results. Moreover, I employ an instrumental variable method to control the issue of endogeneity.

3.2 Politics, Uncertainty and Financial Markets

Stock market is one of the most important pillars supporting economic activity, and its relationship with politics has been of interest to many researchers. Economists and
financial analysts have remarked that stock markets are often subject to serious
government intervention and are driven by politics, rather than economics. The
widely-held belief is that the U.S. government does not interfere with companies and
that the investment income arising from the U.S. stock market reflects a powerful force
of the capitalist economy. But these attractive investment returns also mirror the
delicate political balance, especially with regard to the tax rates, which affect stock
market performance and constantly change in accordance with political forces. In fact,
the political factors affecting the stock market are not limited to taxation, as almost
every government activity will have an impact on stock valuations (Shiller, 2005).

The price of the company's stock reflects the investors' expectation for the company's
future. In general, stock price volatility is affected by many factors, and stock price
volatility itself will also has a series of effects. As stocks are very liquid financial
instruments, investors will often choose to “vote with their feet” when they believe the
uncertainty of capital markets has increased. This is why political uncertainty,
instability, or other unexpected events can have an impact on stock prices by increasing
the volatility of future stock returns. Researchers mainly use two methods to examine
this issue, that is, major political events like elections and constructed uncertainty
indices (Krol, 2014). Research on the interplay between the political environment and
capital market performance in the United States may have great significance for the
accurate prediction of the stock markets trends in this country. The findings of this
study will hopefully provide useful information related to investment and risk
management in capital markets.

3.2.1 Political uncertainties and financial markets

The institutional environment of a country or region has an important impact on its
macroeconomic and micro-foundations. Following North and Thomas (1973), more
and more scholars began to focus on the impact of political institutional arrangements
on economic entity decision-making (Julio and Yook, 2012). The political institutional
arrangements mainly affect an economic entity's decision-making behaviour through
an uncertainty channel (Julio and Yook, 2012). One of the important sources of uncertainty is caused by political arrangements and policies, and it usually manifested as political leaders’ changes, policy adjustments and the occurrence of various types of conflict events. Since the 2008 financial crisis, the global economy has shown a long-term downturn, and political uncertainty has increased significantly. Compared with developed countries, developing countries have a higher degree of political uncertainty (Bloom, 2014).

Political uncertainty is considered to be the most influential one among the sources of uncertainty. The political institution and its arrangements are the process of collective decision-making of various power subjects in the superstructure, and reflect the specific behaviour of the rulers to safeguard their own interests. Interest groups play the game for their own interests, through moderate means, such as elections, legal amendments and demonstrations, as well as radical, such as armed conflicts and wars. These events are the reflection of the interests of different groups, which will lead to a variety of political shocks, and then further show relevant institutional arrangements or policy adjustments. However, these changes are often accompanied by uncertainty. A change of government can naturally lead to policy change. The most representative and common alternation of political power is an election. Acrimonious political debates and conflicts mean that a close election may significantly change the government’s attitude towards important components of the economic environment. Elevated political uncertainty, therefore, increases the risk of any economic action. So, how significant are the economic and financial costs of political uncertainty?

In democracies, political leaders are replaced mainly through electoral procedures. There are several reasons which prove that elections can measure political uncertainty well. First of all, elections mainly solve the problem of power, involving political agents’ replacement and who will take over, which in itself is a political uncertainty. Second, the standard policy model usually assumes that policymakers make policy choices based on maximizing the benefits for the economy but leaders face limited
tenure and may be replaced by other candidates who have different policy preferences. Therefore, uncertainty in elections and their results is closely related to the uncertainty of future policies. On the one hand, elections mean that political leaders may change; on the other hand, even if different candidates of the same party come to power, it is likely that there is uncertainty due to individual heterogeneity of preferences. And there is also a big difference of political uncertainty due to the different characteristics of the election, such as whether the election is fiercely competitive. Elections shape the future institutional arrangements and economic policies full of uncertainty, which will affect the psychological expectations of various stakeholders. Consequently, elections can effectively measure the political uncertainty.

Theoretically, since Nordhaus proposed the argument that presidential elections affect the economy in 1975, the relationship between presidential elections and the economy has gradually become of more interest to scholars in political science, finance and economics (Herbst and Slinkman, 1984; Foerster, 1994; Herron, 2000; Nippani and Medlin, 2002; Chiu et al., 2005; Lin and Wang, 2005, etc.). Nordhaus (1975) was the first to propose a well-known opportunistic political business cycle theory to explain the relationship between economy and politics. His argument relies conceptually on the relationship between inflation and the unemployment rate in the form of the short-run Phillips curve. More specifically, incumbents engineer a pre-election expansion through fiscal and/or monetary policies (such as an increase in public expenditure, money supply, transfer payment, etc.) to reduce the unemployment rate and stimulate economic growth. In doing so, they hope to win popular support and the election. However, this artificial economic prosperity stimulates inflation, so immediately after the victory, leaders are forced to implement tight monetary and fiscal policies to curb inflationary pressures during the first half of their term. Nordhaus’s theory focuses on the relationship between election and economy, and in particular discusses how leaders can use pre-election economic manipulation to achieve the purpose of reappointment. After Nordhaus articulated his ideas, many scholars began to study the relationship between political elections and capital markets.
In the field of accounting and finance, most of the relevant studies believe that presidential elections will affect stock market performance and that the degree of impact will be determined by investors’ expectations, future uncertainty and other factors (see, for instance, Julio and Yook, 2012; Goodell and Vähämäa, 2013; Jens, 2017). Moreover, these studies mainly analyse this issue from the following viewpoints: first, whether there is a long-term presidential election cycle in stock markets? Second, whether the uncertainty that is caused by the election will lead to short-term fluctuations in stock markets? Third, whether candidates’ party attributes and political orientation will impact on stock valuations? Empirically, evidence from the U.S. supports that the presidential election cycle does exist in the stock return data (see, for instance, Umstead, 1977; Allvine and O’Neill, 1980; Huang, 1985; Gärtner and Wellershoff, 1999; Wong and McAleer, 2009). Gemmill (1992) and Gwilym and Buckle (1994) further point out that when the election results become known, financial market participants will adjust their asset allocation because of the expected economic policy shifts and the increasing uncertainty. This will unavoidably affect the level of stock market prices. However, if the election results cannot give enough information to investors to immediately assess the future influence, then the stock market will remain in a state of uncertainty (Brown et al., 1988). For instance, the result of the U.S. presidential election in 2000 was delayed and the stock market reacted negatively, but only in the next four trading days (Nippani and Medlin, 2002). This argument supports that the uncertainty of election results or the uncertainty of future policies will affect the short-term volatility of stock prices, and when the election results are determined, the stock price volatility may shrink gradually return to the normal level. Furthermore, Chiu et al. (2005) analysed the impact of South Korea’s presidential elections on the KOSPI 200 index and believe that these events increase financial market uncertainty.

In addition, a number of scholars have analysed the impact of different ruling parties on stock market returns in a bipartisan system based on Hibbs’ (1977) viewpoint. The Hibbs’s (1977) partisan model assumes the existence of a bipartisan system and each party has its own policy preferences. The right-wing party opposes inflation, while the
left-wing party is more concerned about unemployment and growth. Hence, right-wing governments are often accompanied by lower growth and employment rate. His opportunistic partisan model argues that the election cycle will not affect this lower growth rate. Alesina (1992, 1995) extended the traditional partisan theory and proposed a rational hypothesis, which argues that growth varies across the term but there is no pre-election contraction. Another important difference is that the key role in the partisan model is played by voters, rather than political candidates. Each voter will choose a candidate who can better represent his or her personal preferences. Since policies move along the Phillips curve, political preference can lead to specific fluctuations in economic indicators. Several studies have tried to analyse whether stock market returns are related to the ideology of the leadership. Hensel and Ziemba (1995) point out that the returns on small-cap shares were significantly higher under Democratic administrations than under Republicans between 1928 and 1993. However, the returns on large-cap shares did not differ significantly. Santa-Clara and Valkanov (2003) show that the excess returns under a Democratic administration are higher than under a Republican one. In addition to studying the U.S. stock market, Cahan et al. (2005) evaluated the New Zealand stock market and describe the opposite situation there compared to that in the United States, where the stock returns prove to be lower under the left-wing Labor party than under National Party governments. However, another study in Germany from Döpke and Pierdziuch (2006) show that there is no significant impact of political orientations on the stock market. An international investigate on 24 stock markets from Bialkowski et al. (2007) confirmed this statement that left-wing and right-wing executive not significantly produce different stock performance. Some studies suggest that the impact of major events on the stock market may depend on different economic and political systems. For instance, Pantzalis et al. (2000) used an event study to examine the impact of elections in 33 countries between 1974 and 1995. They found that if a country’s political, economic and press freedom are at a relatively low level, the stock market in the country at the time of the election will show significant positive excess returns.
Literature concerned with the relationship between political events (elections) and stock market volatility is fairly scarce. The reason might be that it may be seen primarily as a supportive tool to assess market efficiency. The analysis in itself, however, may provide useful insights on how the investors react on political changes. I have already presented the results of volatility analysis of Santa-Clara and Valkanov (2003) who argue that returns higher under Democrats in the U.S. are not associated with higher volatility. In contrast, Worthington (2009) finds the volatility to be significantly higher under left-wing government whereas the returns in most cases do not differ significantly and if so they are higher under right-wing government.

A comprehensive study of Bialkowski et al. (2008) investigates the direct effect of elections on stock market volatility. Their dataset comprises 134 elections from 27 OECD countries in between 1980 and 2004. They use event study methodology to quantify the impact that elections may have on the volatility. Stock returns 500 days prior to an event window (the studied period around elections) are fitted to a GARCH process based on which forecasts for the event window are consequently made. Cumulative Abnormal Volatility (CAV) then captures the differences between the forecasted and actually realized variation in the event window. Under the null hypothesis of no effect of elections on volatility, the magnitude of CAV should be equal to zero. The results suggest that there is apparent increase in volatility just prior the elections which stops around 15 days after them. The authors particularly find that volatility may more than double in the week after the elections. The results suggest investors are being surprised by elections and need some time to adjust. In the consequent part of their study, authors show the magnitude of volatility shock is driven by increasing uncertainty caused mainly by tight political competition, change in government orientation and parliamentary minority of the new government. By using simple measure for abnormal returns\(^5\), authors further argue that reward for risks taken during election periods is rather insufficient and a risk-averse investor should diversify.

\(^5\) They are measured as the difference between country stock market index and global stock index. See Pantzalis et al. (2000) for a more detailed study on abnormal returns around elections.
her portfolio internationally. Siokis and Kapopoulos (2007), in contrast, study stock market volatility in the framework of a small open economy. Employing an example of daily data of Greek stock market between the years 1987 and 2004, they show that volatility may differ as the government orientation changes. With use of EGARCH methodology they find both partisan and electoral patterns in (conditional) variance, that is, the variance is higher before elections and under right-wing governments. The data also suggest that an increase in the volatility should lead to higher returns.

In addition to elections, there are also some scholars used major events to measure political uncertainty. The occurrence of major events and their consequences are often unpredictable. For example, Kim and Kung (2016) used the first Gulf War and the “9-11” incident to measure political uncertainty and test how reset ability can affect the impact of political uncertainty on corporate investment. Chau et al. (2014) used civil wars or armed conflicts which broke out in the Arab world (the “Arab Spring”) to measure and examine their impact on the volatility of stock markets. Huang et al. (2015) used international political crises to measure and test their impact on corporate dividend policies. Those industries that are more dependent on trade, contract enforcement and labour will show higher volatility due to local and global political uncertainty (Boutchkova et al., 2011).

Although many scholars believe that the election dummy variable is a good indicator in empirical analysis, the drawback is that it can only capture political uncertainty of the election years compared to the non-election years, and it cannot provide a continuous risk assessment (Gulen and Ion, 2015). Similarly, there is an issue with the major event measurement method, which struggles to capture political uncertainty when these events do not occur. Therefore, the relevant research is likely to produce bias. There is a need for an indicator of political uncertainty that can be considered for non-election years and non-event years. Baker et al. (2013) developed an uncertainty index based on the frequency of quotation of economic policy uncertainty in news reports, the value of tax code provisions about to expire, and the degree of analysts’
disagreement on the predictors of federal, state and local government purchases and CPI forecasts. This index is a continuous measurement on the monthly basis and can be a good way to avoid the shortcomings of the election or major event indicator. They found that this index makes purchasing stocks riskier and is a good measure of political uncertainty. The authors also link some significant fluctuations in the S&P500 index and policy-related events. There are already some scholars using this index to carry out relevant research in the field of accounting and finance (see, for instance, Gulen and Iony, 2015; Karnizova and Li, 2014; Wisniewski and Lambe, 2015).

3.2.2 Policy uncertainty and financial markets

In recent years, scholars have gradually realized that policy uncertainty, such as policy development and changes, plays a key role in asset price fluctuations on capital markets. Capital market reflects the overall economic situation of the economy, so it has been used as an important basis for judging economic trends and decision-making by policy makers. Therefore, study on the relationship between policy uncertainty and stock markets can not only comprehensively understand the reasons of market volatility and suggest a new theoretical perspective for financial anomalies, but also can provide important information for investors’ investment decision-making and policy makers’ macro-control.

Generally speaking, uncertainty can be divided into economic and political (Baker et al., 2013). There are many studies on the impact of economic uncertainty, focusing particularly on investment, consumption and economic growth. Analysis of the impact of economic uncertainty on investment can be summarized as the effect of investment irreversibility (Dixit and Pindyck, 1994), an increase in risk aversion (Panousi and Papanikolaou, 2012) and the existence of adjustment costs (Bloom, 2009). When subjected to a great impact of economic uncertainty, companies’ behaviour will become more cautious, thereby reducing investment and employment (Bernanke, 1983). Economic uncertainty can also be linked to stock market performance. Bansal and Yaron (2002) as well as Bansal et al. (2005) show that increased economic risk
lowers asset prices. Dzielinski (2012) argues that economic uncertainty negatively affects aggregate stock returns, but this trend is reversed in a couple of weeks.

As one type of hazard, policy uncertainty has a significant influence on economic performance. The main research difficulty in the context of policy uncertainty is that many political changes cannot be easily modelled by a standard stochastic process and the “events” that represented major institutional changes occur infrequently (Handley and Limao, 2015). Regarding policy uncertainty, scholars’ studies have focused on its impact on economic growth, inflation, trading, and investment (see for instance, Jones and Olson, 2013; Pástor and Veronesi, 2013). When the effectiveness of macroeconomic policies involves policy uncertainty, rational economic agents will curb their investment spending (considering that all or part of these investments are irreversible), until the elimination of policy uncertainty. Therefore, policy uncertainty can raise expected costs and cut down long-term investment and output. Handley and Limao (2015) show that policy uncertainty can delay the entry of enterprises and Gulen and Ion (2015) find that policy uncertainty will reduce companies’ investment. Bernanke (1983) built a micro-level model and also found that companies will be more cautious and tighten investment when there is doubt about policies. Similarly, Rodrik’s (1991) model which is based on macro-level considerations, demonstrates that policy instability will lead to a lower level of local investment. Pástor and Veronesi (2012, 2013) provide a general equilibrium theory model, which shows that the fall in stock prices can be large when there is greater uncertainty about government policy. Julio and Yook (2012) report a decline in investment activities by firms when elections are approaching, while Brogaard and Detzel (2015) show that political uncertainty reduces capital return.

However, the current literature has struggled to find a reliable method to accurately measure policy uncertainty and proxy variables cannot accurately and fully describe it (Jones and Olson, 2013). As mentioned in the previous subsection, policy uncertainty was usually measured by major political events, such as uncertainty caused by
elections. Recently, Baker et al. (2013) have constructed an index of economic policy uncertainty for the United States and other countries. This alternative index approach provides a continuous measure of policy uncertainty and it can combine time series framework in investigating the effects of policy uncertainty.

Some researchers have examined the effect of policy uncertainty on stock market performance by using this index. For instance, Sum (2012a) provided evidence that stock market returns are negatively associated with increased changes in economic policy uncertainty in the U.S. by analysing monthly data from 1985 to 2011. He also found that policy uncertainty helps to predict stock returns. This negative relationship has also been confirmed in India (Bhagat, et al. 2013). Another study by Sum (2015) shows that similar effects are observable from seven European countries, with the notable exception of Croatia. Brogaard and Detzel (2015) point out that uncertainty will lead to a decline in current stock returns and an increase in future returns. Antonakakis et al. (2013) used the DCC-GARCH model to examine the extent of time-varying correlations between stock markets returns and the EPU index, and found these correlations to be consistently negative. Moreover, they found one leads to the other in the U.S. That is, an increased policy uncertainty can lead to poor stock returns, and an increase in return volatility can also increase policy uncertainty. However, the causal relationship is different in different countries. An International analysis on 7 OECD countries found this causal relationship in the United Kingdom and the United States while not in other countries (Chang et al., 2015). Li et al.’s (2016) study investigated the Granger causality relationship between policy uncertainty and stock market movements in China and India and they found that there is a two-way Granger causality in China’s stock market during 1995 to 2013 and in Indian stock market from 2003 to 2013, but in general, this relationship is weak in these two markets. Pástor and Veronesi (2013) associate the EPU index with the excess returns on the stock market and find that when the policy uncertainty is greater, stock returns also become more unstable, especially in a harsh economic environment. Karnizova and Li (2014) show that policy uncertainty is able to predict the U.S. recession and argue that the policy
uncertainty index based on news reporting is one of the best predictions of the U.S. economy compared to financial indicators such as interest rate differentials, stock returns and implied volatility.

In addition, scholars have used the EPU index to examine the transnational impact of policy uncertainty on economy and finance. Colombo (2013) used the SVAR model to study the spillover effects of U.S. policy uncertainty on the Eurozone economy. He found that an increase in U.S. policy uncertainty would significantly reduce Eurozone industrial output and the impact of U.S. policy uncertainty on Eurozone total output is greater than the EU policy uncertainty. Sum (2012b) argues that an increase in the U.S. policy uncertainty could have a negative impact on the performance of the Canadian and Mexican stock markets. He further indicates that the U.S. policy uncertainty will have a similar negative impact on the stock markets of Asian countries such as Indonesia, Singapore, Philippines, Malaysia and Thailand. Arouri et al. (2014) investigate the impact of policy uncertainty in the U.S., Europe and China (oil-importing countries) on the Gulf countries’ (oil-exporting countries) stock markets. Their results find that the policy uncertainties of these oil-importing countries had a negative impact on the Gulf stock markets and this effect is persistent and interacts with changes in oil prices. Klößner and Sekkel (2014) analysed the spillover effects of policy uncertainty between six developed countries (Canada, Germany, France, Italy, the United States and the United Kingdom) and found that during and beyond the financial crisis, the other four countries except the United States and the United Kingdom are net recipients of the spillover effects. On the macroeconomic level, Krol (2014) examines the correlation between exchange rate fluctuations and the domestic and the U.S. policy uncertainties in 10 emerging industrial countries since 1990. His results show that an increase either in the domestic or the U.S. policy uncertainty will raise the volatility of exchange rates.

The economic policy uncertainty index (EPU) has also been applied to commodity market research. For example, Kang and Ratti (2014) used the SVAR model to study
the relationship between China's policy uncertainty and the world's oil market as well as the China's stock market, and they found that China’s policy uncertainty had a negative impact on both the world's oil production and prices. Furthermore, the impact of oil demand significantly increased the China's policy uncertainty and reduced the real returns of Chinese stocks. Antonakakis et al. (2014) used a spillover index method to explore the spillover relationship between the oil market and the policy uncertainty for oil exporters and importers. They found a significant increase in total spillovers during the financial crisis. Jones and Sackley (2016) looked at the impact of policy uncertainty on gold prices, arguing that the increase in policy uncertainty helped push gold prices as gold has the effect of hedging inflation. The above-mentioned studies use the aggregated index as a variable, disregarding the fact that it includes different components. One may also wish to examine which of the components of U.S. economic policy uncertainty has the strongest impact and this is precisely what this study endeavours to do.

The downside of the index approach is that the policy uncertainty index is more likely to be associated with the current economic situation, and therefore exhibit endogeneity problems (Hatzius et al., 2012). I will utilise the Hausman test, as developed by Spencer and Berk (1981), to determine whether there is an endogeneity issue in this study. In an effort to better understand return behaviour in capital markets, many economists have empirically examined whether various macroeconomic variables can predict returns of stocks and other financial assets (Lettau and Ludvigson, 2001; Menzly et al., 2004; Cooper and Priestley, 2005; Ratanapakorn and Sharma, 2007). Hence this study will also introduce controls in the form of macroeconomic variables, political dummies and seasonal anomalies in the empirical models.

3.3 Theoretical Analysis

Based on the literature review of the previous section, this section combines the mainstream financial theories with the realities of stock markets and summarizes the influence of policy uncertainty on the stock market from a theoretical point of view.
This section is to lay the groundwork for the following empirical analysis.

Policy uncertainty can be classified as one type of uncertainties. Therefore, theories of the impact mechanism of uncertainty on stock market can, to some extent, be used to explain the influence of policy uncertainty on stock market. I think the impact mechanism of uncertainty on stock market at least can be interpreted from a perspective of capital costs.

Cost of capital theory can provide a theoretical interpretation on the impact of uncertainty on stock market based on the relationship between corporate financing and uncertainty. In 1958, Tobin studied the relationship between corporate financing and uncertainty, and he pointed out that the increase in risk will increase the financing costs of enterprises, resulting in reduced investment. This conclusion has also been supported by many recent studies (see, for instance, Durnev, 2010; Bradley et al., 2016; Stokey, 2016; Jens, 2017). Based on the cost of capital theory, when the uncertainty increases, it means that there is an increase in risk. For enterprises, this will increase the financing costs, and will further reduce the corporate investment, which will lead to a reduction in future cash flow, and thus a corresponding decline in stock prices and returns. This is one of the reasons why many empirical studies have found that uncertainty can have a negative impact on stock returns. For consumers, the rise in uncertainty risk will induce reduction in current consumption, further reducing the profits and future cash flows for enterprises. For investors, the rise in uncertainty risk will push them to adjust their portfolios (increase the proportion of fixed-income securities) and reduce the demand for equity assets.

In addition to indirectly affecting the cost of corporate financing, policy uncertainty can directly affect the profitability and stochastic discount factors of firm investment. Policy changes not only change the external environment of business operations but also through the tax or loan policy directly affect the cost of business and income levels. Meanwhile, policy uncertainty is irreversible to its negative effects on the capital
market, and investors are bound to demand compensation for this risk, thereby increasing the discount rate accordingly. When the risk of policy changes increases, it means that the volatility of company's future rate of return and discount rate will be increased. According to the dividend discount model, the stock price depends on the company's future dividends and discount rate. The volatility of these two factors will inevitably lead to fluctuations in stock prices and an increase in the stock risk premium. The theoretical analysis based on this principle is mainly from Pástor and Veronesi (2012, 2013). Their model constructs a stochastic process of policy factors that affect the profitability of firms, and introduces the policy uncertainty into the share price through discount factors, proving that policy uncertainty can increase stock volatility and risk premium. This mode is the most representative theoretical model for studying policy uncertainty and equity asset prices.

3.4 Hypotheses Development

The main objective of this study is to examine the impact of policy uncertainty on the U.S. stock market through the help of Baker et al.’s Economic Policy Uncertainty Index. Specifically, the study examines whether policy uncertainty plays an important role in stock returns and volatility for the U.S. market. Three hypotheses under elevated policy uncertainty are developed for testing. First, inspired by the previous literature, I hypothesize that U.S. equity returns are likely to be influenced by policy uncertainty.

Hypothesis 1: Returns on financial assets have a negative association with economic policy uncertainty.

Supposing that this statement is tenable, then it will indicate that the degree to which policy uncertainty is important for stock returns. The results from testing this hypothesis will provide significant knowledge regarding whether the degree of policy uncertainty plays an important role in asset pricing. Moreover, the results will help us to understand which component of EPU has the most explanatory power. Second, I
shift my attention to the volatility of financial assets. That is, I will test the hypothesis that policy uncertainty plays an important role in the U.S. stock market volatility changes.

*Hypothesis 2: An increase in economic policy uncertainty positively affects financial assets volatility.*

Supposing that this statement is tenable, it will signify that increases in policy uncertainty leads to higher stock market volatility. Hypothesis 2 is an extension of hypothesis 1 which examines the influence of policy uncertainty on the stock market from a more comprehensive perspective. Third, I would like to ask whether the predictive power of policy uncertainty comes from a cash flow channel or a discount rate channel. Hence, I hypothesize that policy uncertainty significantly forecasts future dividend growth and/or the future dividend price ratio.

*Hypothesis 3: Policy uncertainty affects future dividend growth rate and/or future dividend price ratio.*

Supposing that this statement is tenable, it will indicate that policy uncertainty affects stock market through cash flow or discount rate channel or both. The findings from this hypothesis will provide important information in regard to identifying the mechanism of influence of policy uncertainty.

### 3.5 Data

In this section, I provide information regarding the sample selection, the variables used in the empirical analysis, and the data sources. Furthermore, this section presents the descriptive statistics and the correlation matrix.

#### 3.5.1 Sample

To better understand the effects of economic policy uncertainty (EPU), this study uses
a sample of U.S. stock market data, which includes the S&P500 returns, implied volatility (VIX) and dividend. The EPU date was obtained from the Economic Policy Uncertainty Index website\textsuperscript{6} containing Baker et al.’s (2013) measure of policy-related economic uncertainty in the United States. Due to the data availability, the sample of EPU ranges from January 1985 to August 2014 (356 monthly observations). The financial and economic data were obtained from the Bloomberg and Thomson Reuters Datastream. In order to maintain a consistent sample interval, the sample ranges from January 1985 to August 2014 (356 observations) for the S&P500 returns series and from January 1990 to August 2014 (296 observations) for the VIX data. Figure I plots the U.S. economic policy uncertainty index (EPU) together with the S&P500 returns and VIX. As we can see that the figure exhibits a negative relationship between the U.S. EPU and the S&P500 returns and a positive association between the EPU and the S&P500 stock market volatility. According to this figure, we can observe the effects of major regional and global political and economic events in the figure. For example, one can see the impact of the financial crisis over 2007 - 2009 and the pressure of European debt crisis over 2009 - 2011. Generally, these events are often accompanied by rises in policy uncertainty and declines in the stock assets prices as well as increases in market volatility. In addition, the policy uncertainty index has been somewhat elevated since the outbreak of the 2008 financial crisis.

\textsuperscript{6} For more details, please refer to the policy uncertainty website developed by Baker et al. (2013) at www.policyuncertainty.com.
Figure I The time series plots of economic policy uncertainty index

This figure presents two sub-figures of the time series aggregate patterns of the Baker et al. (2013) Economic Policy Uncertainty (EPU) index with S&P500 Returns and with S&P500 Implied Volatility Index (VIX). The EPU index are downloaded the Economic Policy Uncertainty Index website. The S&P500 Returns and Implied Volatility Index (VIX) are the monthly scores and obtained from Bloomberg. Sample spans over the period of January 1985 to August 2014.

3.5.2 Variable definitions

Following Sum’s (2012a) logic, I use returns on the S&P500 index, changes in the CBOE volatility index (VIX) and S&P500 dividend-related variables as the dependent variables in the linear regressions. Although a more complex regression model is indeed possible, the linear regression model is a widely-used baseline in economic and financial research, and is a natural starting point for modelling expectations regarding policy uncertainty. The explanatory variable of primary interest is the economic policy uncertainty index and its components. At the same time, I also considered the impact of macroeconomic factors on the stock market in the analysis. Therefore, four
macroeconomic control variables were selected, specifically, growth in the industrial production index, consumer price index inflation, growth in the narrowly defined money supply and change in the U.S. 3-month Treasury bill rate. These macroeconomic indicators represent the money market and the goods market. In order to isolate the effect of some major political events and seasonal anomalies, three political dummies and two seasonal dummies have been introduced.

For the stock market data, I first chose S&P500 returns, and its relevant variables as a measure of the overall U.S. stock market performance and its anticipated risk. The S&P500 index is one of the most authoritative indices of the U.S. stock market, as it includes a very wide range of stocks. The S&P Index Committee selects the most powerful listed companies from every major industry and the market performance of these index constituents reflects the actual situation and trend of the U.S. economy and capital market. The total market capitalization of all 500 stocks in the S&P500 index approximately accounts for 90% of the New York Stock Exchange listed companies’ total market value. Compared to the Dow Jones Industrial Average, which is only composed of 30 large blue chips, the S&P500 is able to more accurately reflect and measure the overall market trend. The Chicago Board of Options 30-day volatility index (VIX) is widely used to measure the implied volatility of S&P500 index options. The VIX expresses the investors’ expectations about future stock market volatility and is also known as “the investors’ fear gauge”. After nearly 20 years of development and improvement, the VIX has become a benchmark for measuring the anticipated volatility of the U.S. stock market. In addition, in order to make a comprehensive understand of the effects of policy uncertainty, I further analysis the explanatory power of policy uncertainty comes from a cash flow channel or a discount rate channel or both on the basis of traditional stock pricing theory. To test whether the explanation of policy uncertainty is from either or both channels, proxies of the channels are needed. Follow the logic from Cochrane (2008, 2011), the dividend price ratio has been selected to be a proxy of discount rate since a lower dividend price ratio can predict a higher discount rate. Then the dividend growth ratio has been chosen to be a proxy of
future cash flow since steady cash flow on equity investment comes mainly from dividends. Moreover, the return on S&P500 is measured using continuous compounding, and first difference is used in the VIX and log dividend growth to represent the change.

This study adopts the monthly U.S. economic policy uncertainty index developed by Baker et al. (2013) to be a proxy of policy uncertainty. It is a composite index that is constructed as a weighted average of four uncertainty components. The first and most heavily weighted component is NEWS, which quantifies news reports related to economic policy uncertainty. The second component reflects the value of tax code expirations in the following years (TAXEXP). The third one is FEDDIS which uses the disagreement among economic forecasters about government purchases. The last one is CPIDIS, which captures the disagreement about future inflation between forecasters.

A set of macroeconomic indicators have been collected (from the Federal Reserve Economic Data archive) and set as control variables to improve the validity and rationality of regression analysis. The 3-month Treasury bill rate (TBR) is first used as the short-term interest rate proxy. The narrow money supply (M1) is second used to reflect the impact of Fed’s actions and that of the banking system. The real inflation rate is measured by the growth rate of the consumer price index (CPI). It is believed that, market participants respond to consumer prices, which in turn affects the actual stock returns (Abdullah and Hayworth, 1993). Industrial production (IP) is used as the indicator of real economic activity because it is available with monthly frequency compared to GDP. The last three variables have been taken as a first difference of the logarithm to represent the natural growth rate and the first one has been taken as a first difference to indicate the rate of change.

In order to introduce the analysis of the impact of political forces and seasonal factors on stock market performance, I add several dummies into the model. Previous studies
tell us that political forces can have an impact on the stock market (see for instance, Santa-Clara and Valkanov, 2003). We can examine this effect by capturing the different political orientations of the presidents and the timing of the presidential elections. Furthermore, the U.S. often launches military operations to maintain its global interests and I also want to consider the impact of wars on the stock market because some studies suggest that war causes stock price declines and volatility increases (see for instance, Rigobon and Sack, 2005; Schneider and Troeger, 2006). Moreover, stock markets observe evidence of different seasonal effects and market anomalies such as the January effect and Halloween effect (Haug and Hirschey, 2006). Szakmary and Kiefer (2004) report a diminishing January effect for both the S&P Mid-cap 400 and Russell 2000 futures markets for the period from 1982 to 2002. Halloween strategy, or what is known as “Sell in May and go away until Halloween day” is an anonymous stock market maxim. These market anomalies have been confirmed by many studies (see, for instance, Bouman and Jacobsen, 2002; Riepe, 2003). Hence, here I use other dummy variables to control these two seasonal anomalies.

Taken together, these dummies include: DEMOCRAT, ruling party (Democratic President equals 1 and Republican President equals 0); ELECTION (if the year has a presidential election then the variable is equal to 1, and it is 0 otherwise); WAR, (if the United States has important military actions (details can be found in 3.10 Appendix), then the dummy equals 1); JANUARY, a dummy to capture the January effect (January equal to 1 and 0 for the other months); HALLOWEEN, a dummy for the Halloween effect (November to April next year equal to 1 and the other months equal to 0).

I also introduce further measures of general uncertainty variables in some of the specifications. Referring to the existing literature (Krol, 2014), I accomplish this by creating a stock market variance proxy by computing the sum of squared daily S&P500 index returns at a monthly frequency. I additionally create the realized monthly stock market volatility (VOL) as the square root of VAR. Note the VIX series starts in 1990 but the VOL and VAR go back to 1985. More information and sources can be seen in
Table I Variable definitions
This table describes the variables which have been used in the main empirical analysis. They are widely used stock return predictors documented in the literature and directly linked to economic fundamentals and risk aversion.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>Logarithm yields of S&amp;P500 index.</td>
<td>Bloomberg</td>
</tr>
<tr>
<td>ΔVIX</td>
<td>Change in the CBOE volatility index.</td>
<td>Bloomberg</td>
</tr>
<tr>
<td>DG</td>
<td>Dividend growth (log) of S&amp;P500 index</td>
<td>Robert Shiller’s online data</td>
</tr>
<tr>
<td>D/P</td>
<td>Dividend price ratio (log) of S&amp;P500 index</td>
<td>Robert Shiller’s online data</td>
</tr>
<tr>
<td>ΔNews</td>
<td>Change in the news component.</td>
<td>Baker et al. (2013)</td>
</tr>
<tr>
<td>ΔFeddis</td>
<td>Change in the government purchases disagreements.</td>
<td>Baker et al. (2013)</td>
</tr>
<tr>
<td>ΔCPI</td>
<td>Change in the inflation disagreements.</td>
<td>Baker et al. (2013)</td>
</tr>
<tr>
<td>ΔTaxexp</td>
<td>Change in the tax component.</td>
<td>Baker et al. (2013)</td>
</tr>
<tr>
<td>ΔlnIP</td>
<td>Growth rate of the industrial production.</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>ΔlnM1</td>
<td>Growth rate of the narrow money supply.</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>ΔlnCPI</td>
<td>Change in the consumer price index (Realized Inflation Rate).</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>ΔTBR</td>
<td>Change in US 3-month Treasury bill rate.</td>
<td>Board of Governors of the Federal Reserve System</td>
</tr>
<tr>
<td>Democrat</td>
<td>A dummy represents which political party is in power</td>
<td>Manual collection</td>
</tr>
<tr>
<td>Election</td>
<td>A dummy indicates the time to hold presidential elections</td>
<td>Manual collection</td>
</tr>
<tr>
<td>War</td>
<td>A dummy indicates the time to launch major military actions</td>
<td>Manual collection</td>
</tr>
<tr>
<td>January</td>
<td>A dummy represents the January effect</td>
<td>Manual collection</td>
</tr>
<tr>
<td>Halloween</td>
<td>A dummy represents the Halloween effect</td>
<td>Manual collection</td>
</tr>
<tr>
<td>ΔVAR</td>
<td>Change in the sum of squared daily S&amp;P500 index returns at monthly frequency (realized variance)</td>
<td>Bloomberg</td>
</tr>
<tr>
<td>ΔVOL</td>
<td>Change in the squared root of VAR (realized volatility)</td>
<td>Bloomberg</td>
</tr>
</tbody>
</table>
3.5.3 Summary statistics and correlation matrix

In order to get an intuitive understanding of the statistical characteristics of the dependent and independent variables, Table II shows some descriptive statistics. Besides the level of EPU, which provides information on the degree of economic policy uncertainty, this study more interested in the change in EPU (ΔEPU), which assesses the innovation in economic policy uncertainty. Also, I take the first difference of VIX to present the rate of change and eliminate any trends. It can be seen from Panel A that the return on the S&P500 is 0.7% per month on average, but can be as high as 3.5% at 75th percentile. The average change in VIX is -0.05%. Regarding the controls, the mean (median) value of the growth rate of industrial production is 0.18% (0.23%) per month. The average growth rate of M1 is 0.46%. The sample also experiences diverse realized inflation rates, with a 25th percentile of 0.12% and a 75th percentile of 0.36%. The change in U.S. 3-month Treasury bill rates has a mean of -0.0002. In short, the averages of the macroeconomic controls are positive (such as ΔlnIP, ΔlnM1 and ΔlnCPI), except for the ΔTBR factor at -0.02% per month. The Democrat dummy has a mean of 0.4579, implying that the Republican Party was longer in power than the Democratic Party, while the dummy of war has a mean of 0.4607.
Table II Summary statistics

This table presents the summary statistics of the variables used in this study from such as mean median, standard deviation, 25th percentile and 75th percentile. All returns are measured in U.S. Dollars. Panel A reports the dependent variables used in this study. Equity returns are the S&P500 returns and the U.S. S&P500 implied volatility is measured as the VIX index. DG is expressed as the dividend growth of S&P500 and D/P is expressed as the dividend price ratio. Panel B reports the index of economic policy uncertainty and its components. Economic policy uncertainty is proxied by the U.S. monthly index of policy uncertainty calculated by Baker et al. (2013). Specifically, the NEWS variable is quantified news reports which related to economic policy uncertainty. The FEDDIS variable uses the disagreement among economic forecasters about government purchases. The CPIDIS variable captures the disagreement about future inflation between forecasters. The TAXEXP reflects the value of tax code expirations in the next years. Panel C reports the control variables and political dummies used in this study. Specifically, the industrial production (IP) is used as the indicator of the real economic activity. The narrow money supply (M1) is taken to measure the money supply. The real inflation rate is measured by the growth rate of consumer price index (CPI). The 3-month Treasury bill rate (TBR) is firstly used as the short-term interest rate proxies. Political dummies include: DEMOCRAT, ruling party; ELECTION, whether one year is an election year; WAR, military actions; JANUARY, a dummy to capture the January effect; HALLOWEEN, is a dummy for the Halloween effect. We also create the sum of squared daily S&P500 index returns at monthly frequency as the realized variance (VAR) and calculate its squared root as the realized volatility (VOL). Δ denotes the change in each variable. Sample spans over the period of January 1985 to August 2014.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>25th Percentile</th>
<th>Median</th>
<th>75th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>0.0070</td>
<td>0.0447</td>
<td>-0.0172</td>
<td>0.0052</td>
<td>0.0350</td>
</tr>
<tr>
<td>ΔVIX</td>
<td>-0.0005</td>
<td>0.0416</td>
<td>-0.1153</td>
<td>-0.1900</td>
<td>0.0915</td>
</tr>
<tr>
<td>DG</td>
<td>0.0046</td>
<td>0.0068</td>
<td>0.0019</td>
<td>0.0051</td>
<td>0.0093</td>
</tr>
<tr>
<td>D/P</td>
<td>0.0232</td>
<td>0.0079</td>
<td>0.0174</td>
<td>0.0207</td>
<td>0.0296</td>
</tr>
<tr>
<td>EPU</td>
<td>107.8697</td>
<td>32.7634</td>
<td>83.6567</td>
<td>100.4227</td>
<td>125.6647</td>
</tr>
<tr>
<td>ΔNews</td>
<td>-0.1123</td>
<td>30.3432</td>
<td>-15.9807</td>
<td>-2.3781</td>
<td>14.7095</td>
</tr>
<tr>
<td>ΔFeddis</td>
<td>-0.0098</td>
<td>20.4161</td>
<td>-0.4566</td>
<td>-0.04574</td>
<td>0.3709</td>
</tr>
<tr>
<td>ΔCPIdis</td>
<td>-0.3357</td>
<td>16.2881</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>ΔTaxexp</td>
<td>0.0153</td>
<td>82.8233</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>ΔlnIP</td>
<td>0.0018</td>
<td>0.0062</td>
<td>-0.0013</td>
<td>0.0023</td>
<td>0.0056</td>
</tr>
<tr>
<td>ΔlnM1</td>
<td>0.0046</td>
<td>0.0107</td>
<td>-0.0009</td>
<td>0.0044</td>
<td>0.0096</td>
</tr>
<tr>
<td>ΔlnCPI</td>
<td>0.0023</td>
<td>0.0026</td>
<td>0.0012</td>
<td>0.0023</td>
<td>0.0036</td>
</tr>
<tr>
<td>ΔTBR</td>
<td>-0.0002</td>
<td>0.0024</td>
<td>-0.0008</td>
<td>0.0000</td>
<td>0.0010</td>
</tr>
<tr>
<td>Democrat</td>
<td>0.4579</td>
<td>0.4989</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>Election</td>
<td>0.2360</td>
<td>0.4252</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>War</td>
<td>0.4607</td>
<td>0.4992</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>January</td>
<td>0.0843</td>
<td>0.2782</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>Halloween</td>
<td>0.5000</td>
<td>0.5007</td>
<td>0.0000</td>
<td>0.5000</td>
<td>1.0000</td>
</tr>
<tr>
<td>ΔVAR</td>
<td>-0.00003</td>
<td>0.0067</td>
<td>-0.0007</td>
<td>-0.00002</td>
<td>0.0005</td>
</tr>
<tr>
<td>ΔVOL</td>
<td>-0.00004</td>
<td>0.0247</td>
<td>-0.0092</td>
<td>-0.0003</td>
<td>0.0075</td>
</tr>
</tbody>
</table>
Table III reports the unconditional correlation coefficients matrix among the variables that are critical to the empirical investigation. First, I examine the correlations with all of the policy uncertainty components in the EPU index. The highest correlation coefficient is only 0.2132, between the ΔCPIdis and the ΔFed. The other correlation coefficients are all very small. These relatively low correlation coefficients suggest that the components of EPU are likely to be four distinct sources. Then, I examine the correlations between the policy uncertainty measures and stock market variables. It can be seen that except for the relatively strong correlation between return on S&P500 and ΔNews (-0.2188) and between the change in VIX and ΔNews (0.2504), the other correlation coefficients between the EPU components and securities market variables are relatively small in their absolute values. The return on S&P500 exhibits negative correlations with ΔNews, ΔCPIdis and ΔTaxexp, while it is positively correlated with ΔFeddis. Regarding the change in VIX, it shows a negative relationship with the ΔFeddis, while it is positively correlated with the other three components. Next, I examine the correlations between the macroeconomic controls and policy uncertainty measures. The ΔTBR factor is mostly correlated with the ΔNews factor (-0.2302). The correlation coefficients between the other macroeconomic controls (such as ΔlnIP, ΔlnM1 and ΔlnCPI) and policy uncertainty components are generally small with less statistical significance. In multiple linear regression analysis, one possible problem that can cause concern is multicollinearity. To address this issue, I used the Variance Inflation Factor (VIF) to test whether multicollinearity is a problem in the regression analysis and the highest VIF turned out to be about 2 (which is < 10), indicating that multicollinearity is not an issue in the model.
**Table III Matrix of correlations**

This table reports the correlation coefficients of the key equity market and policy uncertainty factors. The *p*-values of the correlation coefficients are reported on the row under the correlation coefficients in []. The significant *p*-values that are below 0.1 are highlighted in italics.

<table>
<thead>
<tr>
<th>Correlation</th>
<th>S&amp;P500 Returns</th>
<th>ΔVIX</th>
<th>ΔNews</th>
<th>ΔFed</th>
<th>ΔCPIdis</th>
<th>ΔTax</th>
<th>ΔlnIP</th>
<th>ΔlnM1</th>
<th>ΔlnCPI</th>
<th>ΔTBR</th>
</tr>
</thead>
<tbody>
<tr>
<td>S&amp;P500 Returns</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔVIX</td>
<td>-0.7014 [0.0000]</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔNews</td>
<td>-0.2188 [0.0002]</td>
<td>0.2504</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔFeddis</td>
<td>0.0578 [0.3243]</td>
<td>-0.1015</td>
<td>-0.1181</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔCPIdis</td>
<td>-0.0181 [0.7572]</td>
<td>0.0858</td>
<td>-0.0009</td>
<td>0.2132</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔTaxexp</td>
<td>-0.0881 [0.1328]</td>
<td>0.0516</td>
<td>0.0546</td>
<td>0.0022</td>
<td>0.0000</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔlnIP</td>
<td>0.0111 [0.7494]</td>
<td>0.0930</td>
<td>-0.0446</td>
<td>-0.0659</td>
<td>-0.0269</td>
<td>-0.0149</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔlnM1</td>
<td>-0.0685 [0.2652]</td>
<td>0.0302</td>
<td>0.1350</td>
<td>0.0068</td>
<td>-0.0421</td>
<td>-0.0567</td>
<td>-0.2636</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔlnCPI</td>
<td>-0.0132 [0.6094]</td>
<td>0.0965</td>
<td>0.1529</td>
<td>-0.0779</td>
<td>-0.0596</td>
<td>0.0279</td>
<td>0.0597</td>
<td>-0.0715</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>ΔTBR</td>
<td>0.1087 [0.0806]</td>
<td>-0.1199</td>
<td>-0.2302</td>
<td>-0.0071</td>
<td>-0.0010</td>
<td>-0.0169</td>
<td>0.2127</td>
<td>-0.1782</td>
<td>0.0702</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
3.5.4 Test of stationarity

Before performing this analysis, I first use a unit root test to check whether the dependent variable and control variables are stationary. There are numerous unit root tests for checking whether a time series is stationary. For example, the Augmented Dickey-Fuller (ADF) test (Said and Dickey, 1984) is the most common one. This unit root test is used in this study to check the stationarity of data.

In selecting appropriate time series econometric methods, it is essential to consider the underlying data generating process of the time series variable. If a model contains a non-stationary time series, then applying the usual OLS estimation will often lead to an issue of spurious regression. Therefore, it is essential to determine whether the variables are stationary or non-stationary as well as order of integration. In the application of OLS estimation often implies that certain variables are co-integrated. However, test often fail to reject the null hypothesis of no co-integration for these variables. A non-stationary error in one variable lead to a situation in which no linear combination of the variable is unit root non-stationary. The outcome of the ADF test includes the $t$-statistics on the coefficient of the lagged test variable and critical values of the test of a zero coefficient.

The results of the ADF test show that the return series ($R_t$) is stationary (the ADF test statistic is -17.5692 and is lower than the 1% critical value -3.4486). The other dependent variable changes in the VIX index ($\Delta$VIX) is also stationary (the ADF test statistic is -8.4814 and is also lower than the 1% critical value -3.4486). All the other macroeconomic controls except the 3-month Treasury bill are non-stationary series but their rates of change, which I use in the regressions, are stationary. The remaining control variables are dummies, so there is no need to do the unit root test.

3.6 Empirical Analysis

In this study, S&P500 returns, implied volatility and dividend growth are taken to be dependent variables in the regression. A higher level of economic policy uncertainty
forces investors to adjust the policy and economic expectations, resulting in stock market fluctuations (Obstfeld and Rogoff, 1996). This analysis investigates whether economic policy uncertainty in the U.S. affects S&P500 returns and their implied volatility. Specifically, this study examines the effects of policy uncertainty on the U.S. stock market and chooses the S&P500 index to represent the market portfolio. Increasing economic policy uncertainty in the U.S. will lead to risk-averse investors reducing their holdings of equity assets, thereby leading to stock market declines.

3.6.1 Modelling stock market returns
Here I establish a multivariate regression equation to examine the relationship between policy uncertainty and stock returns. Independent variables include the lagged return, a set of economic policy uncertainty variables, a set of macroeconomic control variables and a set of policy dummies and seasonal factors. The main equation is specified as:

\[
R_t = \alpha + \beta' R_{t-1} + \phi' \Delta EPU_t + \gamma' \Delta EPU_{t-1} + \phi' \Delta CTRL_{t-1} + \theta' DUMMY_t + \epsilon_t
\]

where \( R_t \) denotes the continuously compounded return on the S&P500 in month \( t \) and is computed using this formula: \( R_t = \ln(P_t/P_{t-1}) \), where \( P_t \) is the value of the S&P500 index in the U.S. at the end of month \( t \). \( R_{t-j} \) denotes the lagged continuously compounded return on the S&P500 and \( j \) is the lag order. \( EPU \), \( CTRL \) and \( DUMMY \) represent a vector of EPU constituents, macroeconomic control variables and political and seasonal dummies, respectively. Since macroeconomic variables are reported with a delay, I lag them by one period. This model is carried out to test whether the increase (decrease) in the changes in policy uncertainty corresponds to the decrease (increase) in the S&P500 returns. Because higher economic policy uncertainty is expected to decrease stock market returns, the estimated coefficient \( \phi \) and \( \gamma \) are expected to be negative.

Table IV reports the estimated coefficients with corresponding standard errors, significance levels and adjusted R-squares obtained from each individual regression. Consistent with theory, policy uncertainty is a negative return predictor. The LM test
(p-value higher than 10%) and correlogram tell us that the equation residuals do not have serial correlation and the estimation results are valid.

Specifically, I first add the current and lagged policy uncertainty components and label them as columns (1) and (2). Column (1) shows that past returns are not successful predictors of the current ones and this result is consistent with the correlogram. More interestingly, among all of the EPU constituents, only the news component is negative and significantly significant. I examine both the contemporaneous EPU variables and the one-lagged EPU variables in column (2). The results suggest that both the current and the one-lagged news variable are statistically significant. However, the other three constituents of the U.S. economic policy uncertainty index are non-significant again, indicating that only the news variable exhibits some predictability with regard to market returns.

Next, I add the macroeconomic controls, political dummies, seasonal anomalies and general uncertainty proxy and label them as columns (3)-(5). In column (3), I include macroeconomic factors that have been shown to be related to stock market performance which include industrial production changes, real inflation rates, narrow money supply changes and U.S. 3-month Treasury bill rate changes. Variations in the U.S. stock market have been associated with changes in the U.S. economic situation (see for instance, Henry et al., 2004; Ratanapakorna and Sharmab, 2007). Hence, there is a need to control for these macroeconomic factors when analysing the relationship between U.S. economic policy uncertainty and the U.S. stock market. As expected, the results show that a rise in industrial production significantly increases S&P500 returns. This makes sense since investors have more optimistic expectations when the economy is doing well. But all of the other macroeconomic variables have no statistical significant impact on returns for the S&P500 index. Schwert (1989) provided similar evidence which indicates that U.S. macroeconomic variables (inflation, money supply, industrial production, etc.) cannot be a good predictors of stock returns. The conclusions with regard to components of the EPU index are unaltered in this extended
specification: the effect of news is negative and persistent. In column (4), I perform the same analysis but introduce several dummy variables to represent the effects of political influence and seasonal factors. These dummies also provide some explanatory power. Specifically, the variable of democrat has a positive coefficient and is statistically significant at the 5 percent level, which means that the S&P500 tends to be higher under Democratic administrations. This result is consistent with Santa-Clara and Valkanov’s (2003) findings. But the other dummies of election, war, and the January and Halloween effects are not significant, suggesting that there is not a clear impact on S&P500 returns. In column (5), the VAR variable, which measures general economic uncertainty, is significant and negative.

Lastly, I add all of the variables simultaneously and label it as column (6). I gather the variables that have been tested in the previous specifications into one regression and find similar results. Most importantly, the results with regard to the effect of the NEWS variable remain unchanged. Apart from the NEWS variable, the other three variables in the EPU index consistently show a non-significant relationship with the S&P500 returns. Consequently, I decide to drop these three variables from the regression hereafter for parsimony. Columns (7)-(11) repeat the same analysis process and include different controls that have been shown to be potentially associated with the U.S. stock market. Not surprisingly, change in the NEWS variable still significantly and negatively correlates with the S&P500 index returns and all of the other results are similar to columns (3)-(6). According to the final regression in column (11), we can see that if I remove those three EPU components and only introduce the NEWS variable, the parameter estimates and significance levels are similar, indicating that the variable of news in U.S. economic policy uncertainty has the strongest explanatory power among the four variables and could be a good predictor for S&P500 returns. Virtually none of the variation can be explained by macroeconomic state variables. Additionally, it should be noticed that the regression in column (11) has the highest adjusted R-squared (0.1456).
Table IV Regression of S&P500 return on first difference of EPU components and controls

This table presents analysis of the impact of economic policy uncertainty on S&P500 returns. All independent variables are one-period lagged except the current values of EPU components, dummy variables and VAR. I progressively add different control variables in the regressions. Δ denotes the change in each variable. Newey and West (1987) standard errors are reported into parentheses. Returns, volatility changes, and macroeconomic indicators are set as a percentage form. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of January 1985 to August 2014.

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.6462***</td>
<td>0.6740***</td>
<td>0.3488</td>
<td>0.3472</td>
<td>0.6743***</td>
<td>0.0406</td>
<td>0.3419</td>
<td>0.3355</td>
<td>0.6752***</td>
<td>0.0149</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.2603)</td>
<td>(0.2279)</td>
<td>(0.4228)</td>
<td>(0.4325)</td>
<td>(0.2250)</td>
<td>(0.5547)</td>
<td>(0.2263)</td>
<td>(0.4240)</td>
<td>(0.4190)</td>
<td>(0.2238)</td>
<td>(0.5471)</td>
</tr>
<tr>
<td>( R_{t-1} )</td>
<td>0.0384</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0785)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{News}_t )</td>
<td>-0.0350***</td>
<td>-0.0411***</td>
<td>-0.0404***</td>
<td>-0.0322***</td>
<td>-0.0330***</td>
<td>-0.0423***</td>
<td>-0.0416***</td>
<td>-0.0414***</td>
<td>-0.0344***</td>
<td>-0.0340***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0112)</td>
<td>(0.0115)</td>
<td>(0.0116)</td>
<td>(0.0118)</td>
<td>(0.0110)</td>
<td>(0.0112)</td>
<td>(0.0110)</td>
<td>(0.0111)</td>
<td>(0.0113)</td>
<td>(0.0106)</td>
<td>(0.0109)</td>
</tr>
<tr>
<td>( \Delta \text{Feddis}_t )</td>
<td>0.0036</td>
<td>0.0064</td>
<td>0.0077</td>
<td>0.0062</td>
<td>0.0044</td>
<td>0.0051</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0114)</td>
<td>(0.0109)</td>
<td>(0.0116)</td>
<td>(0.0110)</td>
<td>(0.0113)</td>
<td>(0.0120)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{Cpidis}_t )</td>
<td>-0.0084</td>
<td>-0.0093</td>
<td>-0.0126</td>
<td>-0.0079</td>
<td>-0.0084</td>
<td>-0.0090</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0139)</td>
<td>(0.0136)</td>
<td>(0.0138)</td>
<td>(0.0140)</td>
<td>(0.0135)</td>
<td>(0.0143)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{Taxexp}_t )</td>
<td>-0.0035</td>
<td>-0.0033</td>
<td>-0.0026</td>
<td>-0.0029</td>
<td>-0.0037</td>
<td>-0.0028</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0018)</td>
<td>(0.0017)</td>
<td>(0.0018)</td>
<td>(0.0020)</td>
<td>(0.0014)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{News}_{t-1} )</td>
<td>-0.0310***</td>
<td>-0.0323***</td>
<td>-0.0295***</td>
<td>-0.0312***</td>
<td>-0.0308***</td>
<td>-0.0305***</td>
<td>-0.0316***</td>
<td>-0.0289***</td>
<td>-0.0309***</td>
<td>-0.0303***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0102)</td>
<td>(0.0100)</td>
<td>(0.0100)</td>
<td>(0.0100)</td>
<td>(0.0097)</td>
<td>(0.0101)</td>
<td>(0.0100)</td>
<td>(0.0100)</td>
<td>(0.0098)</td>
<td>(0.0099)</td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{Feddis}_{t-1} )</td>
<td>-0.0062</td>
<td>-0.0054</td>
<td>-0.0060</td>
<td>-0.0067</td>
<td>-0.0047</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0092)</td>
<td>(0.0095)</td>
<td>(0.0091)</td>
<td>(0.0090)</td>
<td>(0.0093)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{CPIdis}_{t-1} )</td>
<td>-0.0008</td>
<td>0.0001</td>
<td>0.0004</td>
<td>-0.0003</td>
<td>0.0020</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0099)</td>
<td>(0.0099)</td>
<td>(0.0098)</td>
<td>(0.0098)</td>
<td>(0.0100)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta \text{Taxexp}_{t-1} )</td>
<td>-0.0007</td>
<td>-0.0006</td>
<td>-0.0005</td>
<td>-0.0010</td>
<td>-0.0008</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0030)</td>
<td>(0.0025)</td>
<td>(0.0032)</td>
<td>(0.0030)</td>
<td>(0.0028)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>( \Delta \ln \text{IP}_{t-1} )</td>
<td>1.1394***</td>
<td>0.7024</td>
<td>1.1333***</td>
<td>0.7064</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.5033)</td>
<td>(0.5013)</td>
<td>(0.5135)</td>
<td>(0.5180)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(\Delta \ln M_{t-1} )</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.0091</td>
<td>0.0186</td>
<td>0.0182</td>
<td>-0.0211</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.2948)</td>
<td>(0.3006)</td>
<td>(0.2849)</td>
<td>(0.2929)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta \ln CPI_{t-1} )</td>
<td>0.4706</td>
<td>1.0356</td>
<td>0.5333</td>
<td>1.0948</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.0426)</td>
<td>(1.1813)</td>
<td>(1.0336)</td>
<td>(1.1703)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta TBR_{t-1} )</td>
<td>-0.5153</td>
<td>0.1862</td>
<td>-0.4586</td>
<td>0.2154</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.0089)</td>
<td>(1.2193)</td>
<td>(1.0166)</td>
<td>(1.2289)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democrat</td>
<td>0.9199**</td>
<td>0.8047**</td>
<td>0.9503**</td>
<td>0.8351**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.3826)</td>
<td>(0.4028)</td>
<td>(0.3852)</td>
<td>(0.3989)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Election</td>
<td>-0.3677</td>
<td>-0.3495</td>
<td>-0.3988</td>
<td>-0.3857</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.5077)</td>
<td>(0.4749)</td>
<td>(0.5029)</td>
<td>(0.4680)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>War</td>
<td>-0.5292</td>
<td>-0.3493</td>
<td>-0.5324</td>
<td>-0.3476</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.4507)</td>
<td>(0.4172)</td>
<td>(0.4465)</td>
<td>(0.4092)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>0.2567</td>
<td>0.3574</td>
<td>0.2552</td>
<td>0.3604</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.8871)</td>
<td>(0.8701)</td>
<td>(0.8850)</td>
<td>(0.8703)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halloween</td>
<td>0.4333</td>
<td>0.2530</td>
<td>0.4473</td>
<td>0.2664</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.3828)</td>
<td>(0.3934)</td>
<td>(0.3806)</td>
<td>(0.3927)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\Delta VAR_{t} )</td>
<td>-1.3454**</td>
<td>-1.2789**</td>
<td>-1.3316**</td>
<td>-1.2742**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.5436)</td>
<td>(0.4962)</td>
<td>(0.5395)</td>
<td>(0.4974)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>354</td>
<td>354</td>
<td>354</td>
<td>354</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj-R(^2)</td>
<td>0.0559</td>
<td>0.0901</td>
<td>0.1059</td>
<td>0.1456</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The above results indicate that there is a significant negative association between the returns on the S&P500 index and the NEWS variable in economic policy uncertainty. Additionally, it is interesting to note that news about political uncertainty explains more variation in the stock market than actual political events that are captured by the variables. As Brogaard and Detzel (2015) point out, a continuous measurement of policy uncertainty based on the news may be more appropriate than focusing on particular political events (such as an election). The policy uncertainty series is obtained on the basis of the dynamic evolution of circumstances and is available on an ongoing basis. Elections are rare events, so they can only capture uncertainty in short intervals of uncertainty resolution.

3.6.2 Modelling stock market implied volatility

The second hypothesis that this study aims to test is whether higher economic policy uncertainty is associated with higher stock market volatility. To do this, I estimate different regression specifications coming from the following form:

\[ \Delta VIX_t = \alpha + \beta' \Delta VIX_{t-1} + \phi' \Delta EPU_t + \gamma' \Delta EPU_{t-1} + \varphi' \Delta CTRL_{t-1} + \theta' \text{DUMMY}_t + \epsilon_t \]  

(3.2)

\( \Delta VIX_t \) is simply measured by the first difference of the VIX index in month \( t \). VIX is quoted as a percentage so I divide the original data by 100. The other setting of the regression is the same as in equation (3.1) in the previous section. I first look at the correlogram of \( \Delta VIX_t \) and it shows that the partial coefficients have been truncated at the third order; hence I include three lags of \( \Delta VIX_t \) as control variables in the equation. The LM test (\( p \)-value higher than 10%) and correlogram tell us that the equation residuals do not have serial correlation.

The empirical findings are summarized in Table V. Specifically, change in VIX is an autoregressive process and the NEWS variable is the strongest predictor in the regressions. The other EPU components have no significant predictive power. In order to be consistent with the previous regressions, I decided to focus only on the NEWS variable in some of the specifications (columns (4)-(6)) and consider the impact of lagged policy uncertainty variables. Column (3) shows a significant positive effect of
the one-lagged NEWS variable on changes in the VIX, reflecting the delayed response of implied volatility. In column (5), the effect of the lagged changes of VIX, and the current and lagged NEWS variable remain significant after the introduction of macroeconomic control variables. However, there is no evidence that the macroeconomic control variables have a significant effect on the changes of VIX. Next, I consider all of the dummies that represent political impact and seasonal factors but do not find strong statistical relationship with the change in VIX. Column (6) includes all of the independent variables in one equation and the prior results are confirmed. A relatively high adjusted R-squared is also obtained from this regression model (0.1719).
Table V Regression of S&P500 implied volatility (VIX) on first difference of EPU components and controls

This table presents analysis of the impact of economic policy uncertainty on S&P500 implied volatility (VIX). This table presents estimates from the equation (3.2). All independent variables are one-period lagged except the dummy variables. I progressively add different control variables in our equation from column (1) to column (5) and the equation in column (6) is the final one. Δ denotes the change in each variable. Newey and West (1987) standard errors are reported into parentheses. Volatility change and macroeconomic indicators are set as a percentage form. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of January 1985 to August 2014.

<table>
<thead>
<tr>
<th>Variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.0394</td>
<td>-0.0395</td>
<td>-0.0365</td>
<td>-0.0327</td>
<td>-0.0535</td>
<td>0.8025</td>
</tr>
<tr>
<td></td>
<td>(0.0024)</td>
<td>(0.2043)</td>
<td>(0.0022)</td>
<td>(0.1944)</td>
<td>(0.0032)</td>
<td>(0.5206)</td>
</tr>
<tr>
<td>ΔVIXt−1</td>
<td>-0.0485</td>
<td>-0.0581</td>
<td>-0.1358*</td>
<td>-0.1493**</td>
<td>-0.1326*</td>
<td>-0.1424*</td>
</tr>
<tr>
<td></td>
<td>(0.0831)</td>
<td>(0.0934)</td>
<td>(0.0713)</td>
<td>(0.0687)</td>
<td>(0.0776)</td>
<td>(0.0782)</td>
</tr>
<tr>
<td>ΔVIXt−2</td>
<td>-0.1824**</td>
<td>-0.1524**</td>
<td>-0.1884**</td>
<td>-0.1843**</td>
<td>-0.1555**</td>
<td>-0.1672**</td>
</tr>
<tr>
<td></td>
<td>(0.0778)</td>
<td>(0.0750)</td>
<td>(0.0745)</td>
<td>(0.0715)</td>
<td>(0.0713)</td>
<td>(0.0709)</td>
</tr>
<tr>
<td>ΔVIXt−3</td>
<td>-0.1385***</td>
<td>-0.1276***</td>
<td>-0.1133***</td>
<td>-0.1191***</td>
<td>-0.1135***</td>
<td>-0.1194***</td>
</tr>
<tr>
<td></td>
<td>(0.0487)</td>
<td>(0.0458)</td>
<td>(0.0427)</td>
<td>(0.0436)</td>
<td>(0.0431)</td>
<td>(0.0413)</td>
</tr>
<tr>
<td>ΔNewsₜ</td>
<td>0.0301***</td>
<td>0.0393***</td>
<td>0.0397***</td>
<td>0.0387***</td>
<td>0.0371***</td>
<td>0.0097</td>
</tr>
<tr>
<td></td>
<td>(0.0108)</td>
<td>(0.0110)</td>
<td>(0.0108)</td>
<td>(0.0098)</td>
<td>(0.0097)</td>
<td></td>
</tr>
<tr>
<td>ΔFeddisₜ</td>
<td>-0.0279</td>
<td>-0.0256</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0183)</td>
<td>(0.0173)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔCPIdisₜ</td>
<td>0.0219</td>
<td>0.0204</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0128)</td>
<td>(0.0119)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔTaxexpₜ</td>
<td>0.0016</td>
<td>0.0009</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0016)</td>
<td>(0.0017)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔNewsₜ−1</td>
<td></td>
<td>0.0398***</td>
<td>0.0393***</td>
<td>0.0381***</td>
<td>0.0372***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0152)</td>
<td>(0.0115)</td>
<td>(0.0102)</td>
<td>(0.0103)</td>
<td></td>
</tr>
<tr>
<td>ΔFeddisₜ−1</td>
<td>0.0085</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0188)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔCPIdisₜ−1</td>
<td>0.0064</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>$\Delta \text{Taxexp}_{t-1}$</td>
<td>-0.0041</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta \ln \Pi_{t-1}$</td>
<td></td>
<td>-0.6923</td>
<td>-0.6579</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta \ln M_{1t-1}$</td>
<td></td>
<td>0.0555</td>
<td>0.0738</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta \ln \text{CPI}_{t-1}$</td>
<td></td>
<td>0.7033</td>
<td>0.3949</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\Delta TBR_{t-1}$</td>
<td></td>
<td>1.0517</td>
<td>1.1526</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Democrat</td>
<td></td>
<td>-0.3654</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Election</td>
<td></td>
<td>0.0294</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>War</td>
<td></td>
<td>-0.3988</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>January</td>
<td></td>
<td>-0.6200</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Halloween</td>
<td></td>
<td>-0.0068</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>292</td>
<td>292</td>
<td>292</td>
<td>292</td>
<td>292</td>
<td>292</td>
</tr>
<tr>
<td>Adj-R$^2$</td>
<td>0.0411</td>
<td>0.0961</td>
<td>0.1707</td>
<td>0.1714</td>
<td>0.1735</td>
<td>0.1719</td>
</tr>
</tbody>
</table>
Overall, these results indicate that the NEWS variable from U.S. economic policy uncertainty has the greatest impact on stock market performance. The VIX indicator reflects the option market participants’ view about future stock market volatility. Specifically, the change in VIX has a significant positive relationship with the change in the NEWS variable of the EPU index; that is, when news reports about policy uncertainty intensify, the VIX index tends to rise. The rising uncertainty makes investors scared, which results in an increase in the VIX index, indicating that option market participants expect the volatility of the spot market to be higher in the future. Maybe the heterogeneous market hypothesis that attempts to explain this positive correlation between the volatility and the market activity (Corsi, 2009) can provide some justification for the results. In a classical market framework, all traders are homogeneous. The more traders there are, the faster price converges to the intrinsic value, showing the negative correlation between market volatility and trading activities. In contrast, under heterogeneous market conditions, different market participants execute trading at different prices under different market conditions, producing and exacerbating market volatility. We can understand why the news is one of the most common and fastest ways to get policy information. Hence, if news reports contain a lot of content about policy instability, investors will become more nervous, generating more trading activities and increasing stock market volatility. During a politically stable period, investors’ mood will be more relaxed and they will tend to hold on to their financial assets.

3.7 Further Discussion

3.7.1 Analysing characteristics portfolio

The preceding section suggests that higher EPU tends to have negative effects on stock returns. Several behavioural finance studies demonstrate that overpriced (underpriced) stocks/portfolios tend to have lower (higher) expected returns (Chang, et al., 2013). In addition, certain stock characteristics (such as size and book-to-market ratio) may affect the valuation uncertainty and arbitrage process for some stocks. For this reason, an interesting question would be whether the impact of policy uncertainty depends on
different companies’ characteristics. In other words, should American investors pay attention to stock characteristics when considering policy uncertainty to make investment decisions?

I hypothesise that small and value companies are more sensitive to policy change. To conduct the investigation, I utilise the monthly returns of Fama/French decile portfolios formed on size and book to market ratio, which are obtained from the French’s data library. The sample period goes from January 1985 to August 2014. In particular, here I run the following univariate predictive regression:

\[ R_t^c = \alpha + \beta' \Delta EPU_{t-1} + \varepsilon_t, c \in (\text{size}, b/m) \]  

(3.3)

where \( R_t^c, c \in (\text{size}, b/m) \) is the monthly return on 10 size and 10 book to market sorted component portfolios in the U.S. stock market. Compared with model (3.1), here I use the returns on size and book-to-market decile portfolios instead of the aggregate market returns as the dependent variable, and I focus on analysing the forecasting ability of policy uncertainty, hence I use the lagged NEWS component as the independent variable. The essence of this investigation is to find out whether the NEWS component in the EPU index has different impacts on stocks with different features. The previous analysis did not reveal that controls are significant in the regressions. Therefore, I do not include other control variables in this specification. Model (3.1) provides a general understanding of the relationship between stock returns and economic policy uncertainty, while the current specification can help us to enhance our understanding of the economic sources of return predictability and make better investment decisions. For example, small capitalisation stocks might have more negative EPU betas and tend to be more sensitive to policy risks, so risk-averse investors might reduce their investment in small firms when the degree of economic policy uncertainty is high.

Table VI reports the relevant estimation results. As shown in the Panel A, the NEWS variable in the EPU index significantly predicts negatively future returns for all size decile portfolios (most of them significant at 5% level), affirming previous findings on
the aggregate market portfolio (S&P500). We can find that the estimated slope coefficient on the lagged NEWS variable generally decreases from small cap to large cap decile. The adjusted R-squared also exhibits a decreasing pattern, indicating that the small cap companies are more sensitive to policy uncertainty than the large cap ones and are more vulnerable to the impact of policy risks. The reason may be that, small-stock companies tend to have less international-diversified earnings streams and have more difficulty in raising financing, particularly during recessions (policy uncertainty is relatively high). They will thus be less able to take political risks. If this is true, then other things being equal, one might expect investors to demand a higher equity premium on policy risk on small stocks relative to large stocks. Furthermore, as smaller stocks are more difficult to price and are more likely to be affected by speculation (Baker and Wurgler, 2007). The reported strong predictability on small size portfolios are consistent with the speculative over-valuation channel.
**Table VI Predictability of EPU component for size and book-to-market portfolios**

This table presents the regressions results of NEWS components of EPU on the monthly log return of 10 size and 10 book-to-market deciles component portfolios. This table presents estimates from the equation (3.3). The first column records the decile of the size sorted component portfolio and the fourth column records the book to market ones. The rest of the columns reports the estimated slope coefficients on NEWS component in EPU index, along with the Newey and West (1987) standard errors in parentheses, and the adjusted R-squared values. Portfolio return is set as a percentage form. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of January 1985 to August 2014.

<table>
<thead>
<tr>
<th>Panel A: 10 size portfolios</th>
<th>Panel B: 10 book-to-market portfolios</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>ΔNews_{t-1}</td>
</tr>
<tr>
<td>Small</td>
<td>1.0081*** (0.3487)</td>
</tr>
<tr>
<td>2</td>
<td>1.0205*** (0.3243)</td>
</tr>
<tr>
<td>3</td>
<td>1.1044*** (0.2962)</td>
</tr>
<tr>
<td>4</td>
<td>1.0217*** (0.2816)</td>
</tr>
<tr>
<td>5</td>
<td>1.1123*** (0.2895)</td>
</tr>
<tr>
<td>6</td>
<td>1.1153*** (0.2634)</td>
</tr>
<tr>
<td>7</td>
<td>1.1630*** (0.2709)</td>
</tr>
<tr>
<td>8</td>
<td>1.1025*** (0.2644)</td>
</tr>
<tr>
<td>9</td>
<td>1.1070*** (0.2531)</td>
</tr>
<tr>
<td>Large</td>
<td>0.9539*** (0.2376)</td>
</tr>
</tbody>
</table>

Similarly, as displayed in Panel B, the negative predictive power of the NEWS variable is pervasive across book-to-market sorted component portfolios. Yet, the estimated slop coefficients are all on average lower for growth (low book-to-market ratio) than the value (high book-to-market ratio) companies. Moreover, the adjusted R-squared displays an increasing patter from growth to value companies. These patterns could help improve our understanding of the predictability of the NEWS variable in stock returns from an economic perspective.
3.7.2 Influence on cash flow and discount rate

Section 3.6 shows that contemporaneous stock returns decline and volatility increases with increases in changes in economic policy uncertainty. This section explores the source of predictability by EPU components and analyse the mechanism by which EPU influences asset prices. Traditional stock pricing theory indicates that stock prices are determined jointly by expectations on future cash flows and discount rates. Hence, the explanatory power on EPU may come from either the cash flow channel or the discount rate channel or both (Campbell, 1991; Ang and Bekaert, 2007, etc). Table IV shows the negative correlation between the current S&P500 returns and changes in the NEWS component in the EPU index. Under the cash flow channel, this negative relationship may due to high policy uncertainty leads to low future dividends. On the other hand, the discount rate channel indicates that high policy uncertainty may result in high required rate of return, that is, high future discount rate, thus leads to low stock returns. To investigate whether the predictability of EPU is from either or both channels, proxies of the cash flow and discount rate channels are needed. Here, aggregate dividend growth $DG_t$ and aggregate dividend price ratio $D/P_t$ represent separately cash flow and discount rate in the model setting, the explanatory power of policy uncertainty for $DG_t$ and $D/P_t$ will represent the cash flow channel and discount rate channel, respectively, following the literature (see, for instance, Fama and French, 2000; Cochrane, 2008, 2011; Binsbergen et al, 2010; Koijen and Van Nieuwerburgh, 2011; Garrett and Priestley, 2012).


$$R_t = k + DG_t - \rho D/P_t + D/P_{t-1}$$ (3.4)

where $R_t$ is the monthly log excess return of aggregate stock market from $t-1$ to $t$, $DG_t$ is the log aggregate dividend growth rate, $D/P_t$ is the log aggregate dividend price ratio, $k$ and $\rho$ are constants of the approximation. Equation (3.4) implies that policy uncertainty may through $DG_t$ or $D/P_t$ or both to affect stock returns. Moreover, this equation also implies that when the dividend price ratio is relatively
high, the expected dividend growth would be low and the expected future returns would be high, or some combination of these two. Therefore, I test the hypothesis that NEWS component in EPU index affects future dividend growth and dividend price ratio. In short, this study estimates the following bivariate predictive regressions:

\[ DG_t = \alpha + \beta' D/P_{t-1} + \gamma'EPU_{t-1} + \epsilon_t \]  \hspace{1cm} (3.5)
\[ D/P_t = \alpha + \beta' D/P_{t-1} + \gamma'EPU_{t-1} + \epsilon_t \]  \hspace{1cm} (3.6)

where \( DG_t \) is the log aggregate dividend growth on the S&P500 index from month \( t-1 \) to month \( t \) \( (DG_t = \ln(D_t) - \ln(D_{t-1})) \), and \( D/P_t \) is the log aggregate dividend price ratio on the S&P500 index at the end of month \( t \). I construct \( DG_t \) and \( D/P_t \) according to Cochrane (2008, 2011) based on total market returns and total dividends pay-out data. I follow Cornell (2014) and the equation (3.4) to include the lagged dividend price ratio \( D/P_{t-1} \) in analysing dividend growth rate \( DG_t \), and I use the levels instead of the changes in NEWS component in EPU index as the independent variable based on Chen et al.’s (2016) study. Here I focus on the NEWS component rather than the overall EPU index since previous analysis shows that other components do not have a significant explanation power on stock returns.

The results are summarized in Table VII. The first column reports the result for the dividend growth rate \( DG_t \), and we can find that the one-period lagged NEWS component in EPU index is statistically significant at 5% level \((p\text{-value}=0.0191)\) and has a negative estimated slope coefficient, indicating that higher policy uncertainty tends to lead a lower dividend expectation. Therefore, this result shows that the decreased stock return associated with high policy uncertainty is due to the decrease in future dividend payments. This is make sense since the price of a stock can be determined by its future dividends. The second column presents the result for the dividend price ratio \( D/P_t \), and we can see that one-period lagged NEWS component in EPU index is statistically insignificant and has a negative estimated slope coefficient. This is a reasonable sign although it is not significant. A lower dividend price ratio (dividend yield) which will raise the required rate of return on equity based on the “Bird in the Hand” argument (Gordon, 1963), then a higher required rate of return will
cause a higher discount rate, and thus result in a lower expected stock return. These results along with the equation (3.4) jointly indicate that policy uncertainty has a negative predict power on stock market returns, which is in consistent with my previous analysis.

In short, the significant negative predictability of policy uncertainty for dividend growth rate and insignificant negative predictability for dividend price ratio in Table VII indicate that the negative impact of policy uncertainty on stock returns is coming from the cash flow channel. Thus, these results suggest that a higher economic policy uncertainty will exert downward pressure on the future cash flows (dividends), the overvaluation will be eliminated, and the share price will fall, resulting in a lower future average stock return.

### Table VII Regressions of S&P500 dividend growth rate and dividend price ratio on EPU component

This table presents analysis of the impact of economic policy uncertainty on S&P500 dividend growth rate and dividend price ratio based on the equation (3.5) and equation (3.6). The first Column is for the dividend growth rate and the second column is for the dividend price ratio. Dividend growth rate and dividend price rate have a percentage form. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of January 1985 to August 2014.

<table>
<thead>
<tr>
<th>Variable</th>
<th>S&amp;P500 dividend growth rate</th>
<th>S&amp;P500 dividend price ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>D/P_{t-1}</td>
<td>-0.0460</td>
<td>0.9816***</td>
</tr>
<tr>
<td></td>
<td>(0.0456)</td>
<td>(0.0077)</td>
</tr>
<tr>
<td>News_{t-1}</td>
<td>-0.0021**</td>
<td>-0.0001</td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td>(0.0153)</td>
</tr>
<tr>
<td>Intercept</td>
<td>0.7935***</td>
<td>-0.0359</td>
</tr>
<tr>
<td></td>
<td>(0.1436)</td>
<td>(0.0242)</td>
</tr>
<tr>
<td>Observations</td>
<td>355</td>
<td>355</td>
</tr>
<tr>
<td>Adj-R^2</td>
<td>0.0138</td>
<td>0.9788</td>
</tr>
</tbody>
</table>

### 3.8 Robustness checks

The robustness test examines the reliable of evaluation methods and the explanatory power of indicators, that is, whether the evaluation methods and indicators still maintain a consistent and stable explanation of the results when changing certain parameters. Here I want to perform two types of robustness tests.
3.8.1 Changes in the specification

I first perform robustness tests to examine and analyse the influence and level effect of the changes in the NEWS component of EPU on the Dow Jones index by using the linear regression and the same related procedures. I use the Dow Jones index as an alternative because this index can be used as another indicator of the overall U.S. stock market. The data for the Dow Jones index were sourced from Thomson Reuters Datastream and I use monthly series over the period January 1985-August 2014. The results are similar to the previous findings, which show that changes in the NEWS component in the EPU index have a significant negative and strong effect on the Dow Jones index returns (see Table VIII and column (1)). By comparing the effect of the changes in the NEWS component in the EPU index to the S&P500 index and the Dow Jones index in each period of time, it can be seen that economic policy uncertainty has a similar effect. The return series of the Dow Jones index is a white noise series and the LM test indicates that the estimation results do not have serial correlations (p-value higher than 10%).

The VIX index used in the previous analysis is one kind of implied volatility. So now I would like to see if there is a different result if I use realized volatility. Realized volatility refers to the volatility of the return series of one financial asset over a period of time. Here I simply use an approach which is based on the sum of squared daily returns of the S&P500 index at a monthly frequency as an unbiased estimate of monthly stock market realized volatility. That is, $VAR_t = \sum_{i=1}^{N_t} R_{i,t}^2$, where $N_t$ is the number of trading days during month $t$, and $R_{i,t}$ is the daily return for the S&P500 index on the $i^{th}$ trading day of month $t$ (Paye, 2012). Empirical studies confirm that $R_t^2$ can be an unbiased estimator of $\sigma_t^2$ (see, for instance, Lopez, 2001; Patton, 2011). Then we can get the realized volatility (VOL) by computing the squared root of VAR ($VOL_t = \sqrt{VAR_t}$) as an alternative backward-looking estimate of volatility that is used by some for forecasting purpose. Even though it is a static volatility estimate, assuming the actual volatility remains unchanged in a certain period, the variance still has some
explanatory power as an estimator of future volatility (Tse and Tung, 1992). Since stock market volatility is highly persistent, I first observe the correlogram of $\Delta \text{VOL}$. The autocorrelation coefficients show a fluctuating decreasing and the partial correlation coefficients are all close to zero except for the first and second order. Hence, this study includes lagged volatility as an additional control variable in the analysis based on the logic of Andersen et al. (2001), the other independent variables are the same as in equation (3.2). Unsurprisingly, I obtain a similar result, i.e. that the changes in the NEWS component in the EPU index have a significant positive influence on the changes in the S&P500 monthly realized volatility (see Table VIII and column (2)). Finally, the LM test indicates that the equation residuals do not have serial correlation after the introduction of lagged dependent variables as independent variables. The VIX index represents the options market expectations of future volatility in the spot market, while the VOL is the historical volatility, which can be a proxy of realized volatility. That is, similar results show that whether the option market or the stock market itself believes that policy uncertainty positively forecasts future market volatility. This attests to the fact that the results are robust to alternative measures.
Table VIII Changes in the specification

I set different dependent variables as alternative measures for U.S. stock market and this table reports the results. In column (1), I use the Dow Jones index returns as the dependent variable and regress the equation (3.1). In column (2), I use the S&P500 monthly realized volatility as the dependent variable and regress the equation (3.2). Δ denotes the change in each variable. Newey and West (1987) standard errors are reported into parentheses. Stock return, volatility change and growth rate are set as a percentage form. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Dow Jones index return</th>
<th>Change in S&amp;P500 monthly realized volatility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-0.0515</td>
<td>0.2222</td>
</tr>
<tr>
<td></td>
<td>(0.5370)</td>
<td>(0.3233)</td>
</tr>
<tr>
<td>ΔS&amp;P500 monthly realized volatility&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-0.4076***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.1231)</td>
<td></td>
</tr>
<tr>
<td>ΔS&amp;P500 monthly realized volatility&lt;sub&gt;t-2&lt;/sub&gt;</td>
<td>-0.1696**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0726)</td>
<td></td>
</tr>
<tr>
<td>ΔNews&lt;sub&gt;t&lt;/sub&gt;</td>
<td>-0.0362***</td>
<td>0.0288***</td>
</tr>
<tr>
<td></td>
<td>(0.0113)</td>
<td>(0.0078)</td>
</tr>
<tr>
<td>ΔNews&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-0.0285***</td>
<td>0.0093**</td>
</tr>
<tr>
<td></td>
<td>(0.0095)</td>
<td>(0.0045)</td>
</tr>
<tr>
<td>ΔlnIP&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>0.7605</td>
<td>-0.3123</td>
</tr>
<tr>
<td></td>
<td>(0.4923)</td>
<td>(0.3798)</td>
</tr>
<tr>
<td>ΔlnM1&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>0.0379</td>
<td>-0.0327</td>
</tr>
<tr>
<td></td>
<td>(0.2907)</td>
<td>(0.1004)</td>
</tr>
<tr>
<td>ΔlnCPI&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>1.3659</td>
<td>0.5411</td>
</tr>
<tr>
<td></td>
<td>(1.0759)</td>
<td>(0.4979)</td>
</tr>
<tr>
<td>ΔTBR&lt;sub&gt;t-1&lt;/sub&gt;</td>
<td>-0.6954</td>
<td>1.1945</td>
</tr>
<tr>
<td></td>
<td>(1.2253)</td>
<td>(0.9982)</td>
</tr>
<tr>
<td>Democrat</td>
<td>0.7119*</td>
<td>-0.0660</td>
</tr>
<tr>
<td></td>
<td>(0.3901)</td>
<td>(0.1888)</td>
</tr>
<tr>
<td>Election</td>
<td>-0.4744</td>
<td>-0.1494</td>
</tr>
<tr>
<td></td>
<td>(0.4150)</td>
<td>(0.3313)</td>
</tr>
<tr>
<td>War</td>
<td>-0.5076</td>
<td>-0.0123</td>
</tr>
<tr>
<td></td>
<td>(0.4008)</td>
<td>(0.1611)</td>
</tr>
<tr>
<td>January</td>
<td>0.0414</td>
<td>-0.0308</td>
</tr>
<tr>
<td></td>
<td>(0.8399)</td>
<td>(0.2945)</td>
</tr>
<tr>
<td>Halloween</td>
<td>0.6227</td>
<td>-0.3423</td>
</tr>
<tr>
<td></td>
<td>(0.3906)</td>
<td>(0.2477)</td>
</tr>
<tr>
<td>ΔVAR&lt;sub&gt;t&lt;/sub&gt;</td>
<td>-1.1267**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.5146)</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>354</td>
<td>353</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.1495</td>
<td>0.2815</td>
</tr>
</tbody>
</table>
3.8.2 Controlling for endogeneity

Taking into account that economic policy uncertainty may not be a strictly exogenous variable, I decided to perform instrumentation on the NEWS variable. I use the exogenous variables and the changes in Canadian economic policy uncertainty as instruments. The data on Canadian economic policy uncertainty comes from Baker et al.’s economic policy uncertainty website and the sample ranges from January 1985 to August 2014 (356 observations). Since the North American Free Trade Agreement (NAFTA) came into force in 1994, the U.S. has been Canada’s largest trading partner (Fergusson, 2011) due to their similar geography, culture and language. For example, in 2014, Canada’s exports to the U.S. accounted for 75.68% of the country’s total exports, and 66.84% of Canada’s total imports came from the United States (Statistics Canada, 2014). Hence, we can easily find that there is a very high economic interdependence between Canada and the United States, and consequently the economic policy uncertainty of these two countries may be related. Moreover, Canadian economic policy uncertainty could be a suitable instrumental variable because it only affects the dependent variable (S&P500 returns and changes in VIX) through the independent variable of U.S. economic policy uncertainty.\(^7\)

Here I introduce a Hausman test (Hausman, 1978) to evaluate whether or not the news variable in U.S. economic policy uncertainty is exogenous with respect to S&P500 returns and changes in the VIX. I also test whether Canadian economic policy uncertainty is an appropriate instrumental variable. This augmented regression test can easily be formed by including the residuals of each endogenous right-hand side variable, as a function of all exogenous variables, in a regression of the original model. First, in order to perform the instrumentation, I establish an OLS-regression where the NEWS variable in U.S. EPU index has been set as the dependent variable, and the changes in the Canadian economic policy uncertainty and all other exogenous variables are being set as the independent variables. The reduced-form equation for

\(^7\) The simple unconditional correlation between U.S. economic policy uncertainty and Canadian economic policy uncertainty is approximately 41%.
the news variable in U.S. economic policy uncertainty becomes (Hausman equation):

$$\Delta NEWS_t = \alpha + \beta \Delta EPU(CAN)_t + \gamma \Delta EPU(CAN)_{t-1} + \varphi \Delta CTRL_t + \theta DUMMY_t + \varepsilon_t \quad (3.7)$$

The results presented in column (1) of Table IX show that the coefficient of $\Delta EPU(CAN)$ is positive and has a $p$-value of less than 1%, indicating the presence of a statistically significant positive correlation between U.S. economic policy uncertainty and Canadian economic policy uncertainty. Second, I collect the residuals of equation (3.7) and include these residuals in the original structural model (equation (3.1)) to perform an augmented regression. I then, use the OLS estimation method to test the significance of this residual term. The estimation result indicates that the coefficient of this residual term is 0.0004 and has a $p$-value of less than 5% (0.0403), suggesting that the news variable in U.S. economic policy uncertainty is endogenous to some extent and the OLS regression may not consistent. Therefore, I use Canadian economic policy uncertainty and its first order lag as instrumental variables for the news variable in U.S. economic policy uncertainty and apply the Two-Stage Least Squares (2SLS) method to re-estimate equation (3.1). The models in columns (2)-(3) (Table IX) present the second stage of the 2SLS regression where I regress the S&P500 returns on the instrumental variable from the first stage. Consistent with the original results from Table IV, the coefficient on $\Delta NEWS$ being negative and significant. Thus, considering the direct impact of economic policy uncertainty on S&P500 returns and the possible endogeneity problem, I obtain consistent results that increased uncertainty in economic policy will lead to decreasing S&P500 returns. In short, the relation between S&P500 returns and U.S. economic policy uncertainty is robust to controlling for endogeneity using a two-stage least squares specification.
Table IX Two-Stage Least Squares (2SLS) regressions

This table presents analysis of the impact of economic policy uncertainty on S&P500 returns (instrumental variable). Column (1) reports the estimates of Hausman equation and column (2) and (3) report estimates from the equation (3.1) with instrumental variable. All independent variables are one-period lagged except the dummy variables and VAR. Δ denotes the change in each variable. Newey and West (1987) standard errors are reported into parentheses. Returns, volatility changes and macroeconomic indicators are set as a percentage form. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of January 1985 to August 2014.

<table>
<thead>
<tr>
<th>Variable</th>
<th>1st Stage (EPU)</th>
<th>2nd Stage (S&amp;P500 returns)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Intercept</td>
<td>4.0234</td>
<td>0.0067***</td>
</tr>
<tr>
<td></td>
<td>(2.8157)</td>
<td>(0.0022)</td>
</tr>
<tr>
<td>ΔEPUCAN_𝑡</td>
<td>0.3038***</td>
<td>-0.0766***</td>
</tr>
<tr>
<td></td>
<td>(0.0524)</td>
<td>(0.0213)</td>
</tr>
<tr>
<td>ΔEPUCAN_𝑡-1</td>
<td>0.0742*</td>
<td>-0.0401*</td>
</tr>
<tr>
<td></td>
<td>(0.0517)</td>
<td>(0.0243)</td>
</tr>
<tr>
<td>ΔNews_𝑡</td>
<td></td>
<td>-0.0766***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0213)</td>
</tr>
<tr>
<td>ΔNews_𝑡-1</td>
<td>-0.0401*</td>
<td>-0.0380*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0243)</td>
</tr>
<tr>
<td>ΔlnIP_𝑡-1</td>
<td>0.4063</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.2922)</td>
<td></td>
</tr>
<tr>
<td>ΔlnM1_𝑡-1</td>
<td>-0.4294</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(1.7931)</td>
<td></td>
</tr>
<tr>
<td>ΔlnCPI_𝑡-1</td>
<td>-6.2322</td>
<td>1.1508</td>
</tr>
<tr>
<td></td>
<td>(4.5419)</td>
<td></td>
</tr>
<tr>
<td>ΔTBR_𝑡-1</td>
<td>7.9354</td>
<td>-0.0438</td>
</tr>
<tr>
<td></td>
<td>(7.9916)</td>
<td></td>
</tr>
<tr>
<td>Democrat</td>
<td>-1.2639</td>
<td>0.0083*</td>
</tr>
<tr>
<td></td>
<td>(1.8220)</td>
<td></td>
</tr>
<tr>
<td>Election</td>
<td>0.5325</td>
<td>-0.0033</td>
</tr>
<tr>
<td></td>
<td>(2.4124)</td>
<td></td>
</tr>
<tr>
<td>War</td>
<td>-2.3932</td>
<td>-0.0041</td>
</tr>
<tr>
<td></td>
<td>(2.0724)</td>
<td></td>
</tr>
<tr>
<td>January</td>
<td>9.0236</td>
<td>0.0072</td>
</tr>
<tr>
<td></td>
<td>(5.1577)</td>
<td></td>
</tr>
<tr>
<td>Halloween</td>
<td>-3.1186</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>(2.4211)</td>
<td></td>
</tr>
<tr>
<td>ΔVAR_𝑡</td>
<td>7.6483***</td>
<td>-0.9182*</td>
</tr>
<tr>
<td></td>
<td>(2.7840)</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>354</td>
<td>354</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.1928</td>
<td>0.0455</td>
</tr>
</tbody>
</table>
For the regression on the S&P500 implied volatility (VIX), I did the same Hausman test procedure as mentioned before. The test result shows that the coefficient of the residual term is -0.0004 and has a p-value higher than 10% (0.1142), indicating that the NEWS variable coming from U.S. economic policy uncertainty does not demonstrate a serious endogenous issue in the regression on VIX and using an instrumental variable approach may not be necessary.

3.9 Conclusions

Economic policy uncertainty has been closely associated with economic development. Governments can intervene and regulate resource allocation and economic situation through the introduction of fiscal, monetary, regulatory and other macroeconomic policies. These uncertainties are likely to affect the investment and consumption behaviour of economic agents and have an impact on macroeconomic volatility.

This study uses the Baker et al. (2013) measure to study the impact of policy uncertainty on the stock market in the United States. I test different hypotheses using different regression specifications. The findings indicate that an increase in policy uncertainty significantly reduces short run returns in the S&P500 index. And changes in policy uncertainty are negatively correlated with the S&P500’s implied volatility. Moreover, policy uncertainty has no statistically discernible effect on dividend price ratio. However, policy uncertainty has a negative relationship with dividend growth rate, which means that the negative predictability of policy uncertainty on stock returns comes from the cash flow channel. Higher policy uncertainty would lead to lower dividend payments and lower stock prices. Looking at the cross section, this study finds that EPU predictability is stronger for small cap and value stocks. Most importantly, I respectively regress the four components in Baker et al.’s (2013) index and the findings show that the NEWS component has the strongest explanatory power while the other three components do not exhibit statistical significance in terms of affecting the above-mentioned financial variables. Several robustness tests have been done to verify the validity of my finding.
### 3.10 Appendix

#### U.S. major military actions after 1985

<table>
<thead>
<tr>
<th>Time periods</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 December 1989 – 31 January 1990</td>
<td>Invasion of Panama</td>
</tr>
<tr>
<td>2 August 1990 – 28 February 1991</td>
<td>Gulf War</td>
</tr>
<tr>
<td>24 March 1999 – 10 June 1999</td>
<td>NATO bombing of Yugoslavia</td>
</tr>
<tr>
<td>7 October 2001 – 29 December 2014</td>
<td>War in Afghanistan</td>
</tr>
<tr>
<td>20 March 2003 – 18 December 2011</td>
<td>Iraq War</td>
</tr>
<tr>
<td>19 March 2011 – 31 October 2011</td>
<td>Military intervention in Libya</td>
</tr>
</tbody>
</table>
IV. Essay Two: Political Regime and Stock Market

This chapter presents the second empirical study which investigates the impacts of democracy development on stock markets for a set of countries. The remainder of the chapter is organized as follows. A brief overview of the important of political regimes for stock markets is provided in Section 1 of the chapter. Section 2 presents a brief introduction to the relevant literature on democracy, economy and finance. Section 3 proposes research objectives and hypotheses. Section 4 presents data and summary statistics. Section 5 provides the estimation methods and reports the empirical results, while section 6 outlines a series of robustness checks. Section 7 discusses the results and concludes.

4.1 Introduction

Do political institutions matter for stock markets? Do the laws and regulations of so-called true ‘democracies’ and democratic institutions have any effect on the stability and valuations in the stock market? These questions are not often debated among investors or scholars in the finance area. The relationship between political regimes and financial markets remains largely unexplored.

Stock markets have been established in many countries with different political systems: democratic, authoritarian, and semi-democratic. Hence, it would be of interest to find out whether stock market performance is different under various political regimes. Generally, people believe that democratic institutions are associated with better investor protection, for the most part, under the rule of law (Lehkonen and Heimonen, 2015). As long as this is the case, and assuming that market-oriented free trade exists, then those stock markets may thrive over time. Democracy is also usually linked to the free market capitalist system. If markets (rather than politicians or governments) decide where capital will be employed, this can help in an efficient allocation of capital, and may result in greater profits for the private owners of that capital (stockholders). Democracy seems to be preferred from the point of view of stock markets. However,
since only anecdotal evidence is available, this study aims to empirically investigate the effects of democracy on stock market performance.

Although the degree of democracy has been used as a political risk component in some studies (see, for instance, Diamonte et al., 1996; Erb et al., 1996; Perotti and Van Oijen, 2001), to my knowledge there are virtually no studies have examined whether democracy development can influence the behaviour of the stock markets. Therefore, this investigation contributes to the literature related to the influence of political institutions on financial markets. This study utilises a widely-used source for measuring democracy - the political right index from Freedom House. With regards to the financial sample, annual return data on 74 stock markets for the years 1975 to 2015 is studied. Using a set of control variables for both macroeconomic and political factors, I aim to capture the effects of democracy by performing different panel techniques such as pooled OLS, fixed effects and a random effects model. The results confirm the expectation that there is a consistent and statistically significant relationship between democracy and stock returns across the 74 markets. A positive relationship between political institutions quality and returns is reported, indicating that increases in democracy level are related to higher returns. Of the control variables, GDP growth and inflation affect stock market returns to some extent. In addition to using different panel estimation methods, this study also tests the robustness of the results including different measures of democracy and alternative estimation methods. The effects of democracy remain consistent in the estimations.

4.2 Politics, Economy and Finance

Although there is voluminous literature in the field of economics, political science and public policy that considers the relationship between political regime and economic growth, we currently know very little about how political regime affects financial

---

8 However, some studies tested the relationship between political institutions and financial markets. The influence of democratic election and its financial outcomes has been analysed by Foerster and Schimitz (1997); Panzalis et al. (2000); and Bialkowski et al. (2008), for instance.
markets. This section reviews relevant political economy and financial literature and provides some empirical studies related to the research question.

4.2.1 Definition: political institutions and democracy

Building on the definition of institutions stated by North (1981) as “a set of rules, compliance procedures, and moral and ethical behavioural norms designed to constrain the behaviour of individuals in the interests of maximizing the wealth or utility of principals”, Glaeser et al. (2004) argue that a good measure of political institutions should capture ex-ante constraints on the government behaviour rather than ex-post government policy choice or performance. This study compares three measures usually employed by literature as proxies of political institutions: government effectiveness⁹, risk of expropriation by the government¹⁰ and constraints on executive¹¹. They argue that first two measures, by construction, do not represent political institutions but they are actually government outcomes or performance. And they further suggest third one as suitable measure of political institutions. Consistent with above argument, a good measure of political institutions comes from Henisz (2000) who measures political institutions by evaluating the constraints that a policy change decision by any one branch of government can face from other branches of the government.

Democracy is accepted or pursued by many countries in the world as an organizational form of power. Democracy is the top design of political regimes and political institutions, and it is also a way to make up a state. With the practice of democratization beginning in the early 19th century, politicians and economists have gradually defined the exact meaning of democracy. Schumpeter (1942) points out that democracy is a political system that people can elect the national rulers in regular competitive

---

⁹ From World Governance Indicators of Kaufmann et al. (2011) measuring the quality of civil and public services and extent of independence of these services from political pressures, and quality of policy formulation and government’s commitment to implementation of these policies.


¹¹ From Polity IV project dataset measuring the extent of institutionalized constraints on the decisions of the executive (individual or collectivities).
elections. Dahl (1982) believes that democracy is a representative government system that runs under legal rules, and most citizens can participate in politics and can be effectively represented in the process of government decision-making, that is, the allocation of scarce resources. Tavares and Wacziarg (2001) argue that democracy is a political system which adds a lot of poor voice to the voice of a few rich people and changes the composition of citizens who can effectively influence the policy-making process. Rivera-Batiz’s (2002) definition of democracy includes the following characteristics: checks and balances mechanism of administrative power, constitutional process and protection, freedom of news media, no news review mechanism, clear and effective legislature and judiciary, limited term of office, and transparency, openness and democratic participation in the policy-making process. To summarize, democracy generally has the following traits: universal suffrage, guaranteed political rights and freedoms, government policy-making process can be widely involved and supervised.

4.2.2 Political institutions, democracy and economics

There is no doubt that the stock market is seen as a very important part of the overall economy and it not only changes with the economic cycle but also predicts the economic cycle. However, there are still some theoretical and empirical differences among economists in the relationship between the stock market and the economy, while it is undeniable that the long-term trend of the stock market performance is determined by the economic development. Many factors can temporarily affect the short-term trend of the stock market, but the long-term trend of the stock market to be based on the economic conditions, and in countries with mature stock markets, the role of economy on the stock market is more obvious and significant. A large number of scholars link political regimes and institutions with economic indicators, such as growth, income, and consumption. Therefore, a review of the relevant literature will help us to establish a preliminary understanding of potential interplays between democracy and financial markets.
Scholars cannot reach a consensus on whether political democratisation can speed up economic growth due to divergent conclusions. This section uses the literature review of Sirowy and Inkeles (1990) as the main line, and divides scholars’ views on the relationship between political democracy and economic development into three perspectives - compatibility, conflict and sceptical, and makes a brief introduction.

Some scholars hold a compatibility hypothesis which suggests that democracy promote economic growth and vitality. This point of view represents the classical theory based on individualism and defences the traditional views about economic and political freedom (Hayek, 1944; Friedman, 1962). Many studies provided empirical evidence and concluded that democracy has a positive impact to economic growth (see, for instance, Clague et al, 1996; Kurzman et al., 2002). Recently, Cuberes and Jerzmanowski (2009) argue that enterprises under democratic institutions face lower barriers to entry and more diversified industry; they also have stronger risk resilience and reduce economic volatility, thus contributing to long-term economic growth. The findings of Pastor and Sung (1995) indicate that a democratic regime has a better protection system of property rights, so private sectors are more willing to invest, which results in a positive correlation between democracy and investment rate. Lohmann (1999) believe that the electoral arrangement under democratic institutions can cause more capable candidates to be elected, hence promoting economic growth in the long run. This statement has been confirmed by Comeau (2003). The study by Persson and Tabellini (2007) illustrates that the transition from autocracy to democracy can accelerate economic growth on average by about 1% per year, and per capita income can be increased by around 13% after the end of the transition period. On the other hand, the subversion of democracy to pursue autocracy will lead to an economic decline on average of about 2% annually, and a decrease of around 45% in per capita income when the transition has finished. Fidrmuc (2003) documents that political democratization can have a positive impact on economic growth by promoting economic liberalization and that they supplement each other. Baum and Lake (2003) emphasize that democracy has an indirect effect of promoting economic growth. They
argue that a democratic government will tend to publish public policies that contribute to national health and education to please voters, thereby contributing to the accumulation of human capital, and indirectly promote economic growth. Moreover, some studies suggest that because voters dislike risky policies, democratic institutions can reduce the volatility of economic growth. On the other hand, an authoritarian regime may hinder economic growth due to the internal factionalism, corruption, rent-seeking, ethnic conflict and other contradictions (Quinn and Woolley, 2001). The reason of this belief is that democracy and political freedom enhance personal freedom and market competition, strengthen and protect property rights (Gupta et al. 1998), and thus promoting investment (Friedman, 1962; Riker and Weimer, 1993).

Certainly, there are some studies that take a different view. The “conflict school” argues that democracy hampers economic growth (see, for instance, Landau, 1986; Tavares and Wacziarg, 2001; Wood, 2007). Some scholars argued that democracy is either unrelated to growth, or has a mild to moderate negative effect. For example, Przeworski et al. (2000) conducted a detailed analysis of 135 countries over the period 1950-1990 period and found that economic development will not necessarily raise the level of democratization and the type of regime will not have an impact on a country’s income growth, but since authoritarian institutions are linked to higher population growth, the per capital income of democratic countries will grow faster. Acemoglu et al. (2008) used a fixed effects model and instrumental variables to robustly estimate and rigorously analyse the relationship between income and democracy in 136 countries over the past 500 years, but their results show no significant causal relationship among them. They argue that an increased income will not necessarily promote democracy and democracy is not a necessary condition for income.

Economic growth depends on a large amount of investment caused by the accumulation of capital, while the investment capacity is determined by the national savings rate. Sirowy and Inkeles (1990) cited the views of Nelson (1987) and Hewlett (1979) and argue that since the marginal propensity to save of the rich people is higher
than the poor people, then the authoritarian leaders can use various types of fiscal or financial policies to reward industrial investment without interference and constraints of democratic procedure, and direct the social wealth to the enterprise-based rich class and promote investment.\textsuperscript{12} On the contrary, the elected governments have pressure to win the election, so they must introduce all kinds of social welfare measures and bring resources to the poverty class with higher propensity to consume, and thus democratic politics will misplace limited economic resources to increase consumption, which is not conducive to capital accumulation and long-term economic growth. In order to support the above discussion, Sirowy and Inkeles (1990) further cited Kuznets’s (1955) study on the European economic development during the post-industrial revolution period, proving that the authoritarian regime contributes to economic growth. This argument especially emphasizes the economic success of the East Asian countries such as Singapore, South Korea and China under the authoritarian system in the 1970s and the 1990s, so that the view of conflict was gradually valued and affirmed by academics.

Additionally, the proponents of sceptical view argue that there is no systematic relevance between political democratization and economic development (see, for instance, Pye, 1966; McKinlay and Cohan, 1975; Rodrik, 1997). Pye’s (1966) point of view argues that the impact of democracy on economic development is negligible and the factors can really affect economic growth is still the country’s basic institutional environment and national quality such as government administrative efficiency, economic policy quality, civil service cleanliness, public scrutiny, rule of law and political stability, etc (Sirowy and Inkeles, 1990). Bardhan (1993) pointed out that a good political system must be flexible, that is, it must be able to adapt to technological, institutional and economic development environment changes, and quickly adjust the directions of authoritarian or democracy, so as to be conducive to economic growth. Recently, Doucouliagos and Ulubaşoğlu (2008) produced a detailed comparative study

\textsuperscript{12} O'Donnell (1973) pointed out that only the authoritarian government can freeze the private consumption under the premise of "unswerving", then concentrate the state's limited resources on industrial investment and technological progress, and effectively carry out industrial policies such as import substitution and export expansion.
of 84 empirical papers examining the relationship between democracy and growth by using Meta-Analysis. Their results indicate that half of the empirical studies did not find a direct significant relationship between democracy and economic growth, and the influence of democracy primarily operates through human capital, inflation, political stability, economic freedom and other indirect factors. Kisangani (2006) adopted country democracy and development data for Africa and found no significant causal relationship between democracy and economic prosperity. Furthermore, a decrease in economic growth after an improvement in democracy has happened in many countries with a regime change. Tang and Yung (2008) provide an analysis of the long-term relationship between economic growth and democratization in eight Asian economies and find that economic growth does not show any positive impact on democracy improvement. On the contrary, democracy significantly affects economic growth while this effect has both positive and negative aspects.

Several researchers have pointed out that the key institutional comparison may not be autocratic v. democratic at all (see, for instance, Alesina and Perotti, 1994; Knack and Keefer, 1995; Rodrik, 2000). Instead, the key may be the extent to which there is a reliable independent judiciary and a police force that rejects corruption. If policies that allow citizens, industry, and organized interests to solve collective action problems through reliable and cheaply enforced agreements are in place, then either democracy or autocracy can produce steady growth. And without these kinds of policies, neither system can promote growth. Thus, the problem is not a choice of institutional form, a problem that could be solved simply by adopting a new constitution, but an entirely separate set of equilibria and political culture, with no obvious path for moving from one to another. Therefore, Glaeser et al. (2004) argue that no political system is applicable to the whole world, and countries could develop their political and economic system that is most suitable for their own characteristics.

At the same time, there is a great deal of literature, theoretical exploration and empirical research that is focused on the relationship between political regimes and
foreign direct investment (FDI) flows. But there is little consensus. For example, Olson (1993), Henisz (2000) and Jensen (2003, 2006) state that by improving the protection of property rights and reducing the political risk of cross-border investment, political liberalization will make the host countries more attractive to foreign capital, thereby increasing foreign investment. Putman (1998) and Oneal (1994) hold the opposite view; they believe that democratization has a negative impact on FDI because cross-border cooperation with authoritarian regimes can gain more privileges, and democratic systems will lead to the loss of these privileges. Empirical studies that have emerged since the theoretical argument have sought to examine which of these views hold true in reality. With the theoretical disputes in the above discussion unresolved, the empirical studies are also plagued by conflicting results. In a study of the U.S. manufacturing investment inflows in the 1960s, Rodrik (1996) found that democracy is positively related to FDI. Jensen (2003) confirmed this statement by using a panel regression analysis of 144 countries from 1970-1997. Nonetheless, Resnick’s (2001) empirical study shows that democratic transition is inversely related to FDI inflows. Busse (2004) empirically analysed institutional types and direct investment and found that FDI inflows in the 1970s and 1980s were mainly concentrated in dictatorship countries, but from the 1990s, democratic countries were more attractive to industrial capital inflows. Li and Resnick (2003) analysed the relationship between democratization and capital inflows based on a panel regression of 53 developing countries from 1982 to 1995, and they indicate that FDI was affected by political changes in the process of democratization through so-called “competing avenues”. They argue that democratization, on the one hand, encourages more foreign investment by increasing the security of property rights in foreign assets. On the other hand, more restrictions and constraints on foreign capital imposed by the host governments may drive foreign investors away. A further study from Li (2006) extends this idea and interprets foreign investments because of the size of the “wining coalition”. He asserts that democratic countries have greater political openness and can make the losers of capital inflows face pressure due to reasonable protectionist policies. This is not possible under authoritarian regimes, which are dominated by ruling elites. His
research emphasizes that the type of government mediates distributional conflicts and leads to different policy outcomes.

In short, the existing research on the impact of political institutions on economic activities has not reached a consensus. Some scholars argue that democracy and economic growth complement each other, while others believe that authoritarianism can better promote economic growth. There are also those that aver that there is no direct causal relationship between them. In spite of that, most studies do not deny the existence of an interaction between the political regimes and economic factors, although this effect may be indirect. However, regardless of this connection and its form, it is possible that democracy might continue to influence financial markets.

4.2.3 Political institutions, democracy and finance

According to North’s (1981) definition of the institution, we can argue that the institution is the sum of a country’s formal rules, informal rules and the implementation characteristics of these rules. The institution referred to this review mainly refers to the “formal rules”, including political and legal institutions that provide rules and order in business activities. There is little literature directly focus on the relationship between political regimes and financial markets performance. Some relevant studies argue that institutional arrangements are an important condition for a country’s financial development, that is, good institutional design can promote the development of the financial industry and the prosperity of financial markets. For example, Bhattacharyya (2013) points out that political institutions not only determine the degree of financial development of a country, but also have an important influence on the formation of the structure of the financial system. The greater the degree of democracy, the more likely it is that there will be a market-based financial architecture, because a complete and efficient democratic system is generally associated with better institutions (Lehkonen and Heimonen, 2015).

De Tocqueville (2003) has a well-known argument: the democratic government has a
disadvantage in dealing with foreign affairs. This argument seems to be confirmed in the 1930’s Second World War and had a strong influence during the Cold War. Democracy was once considered to be a system with features of lacks decisiveness, slow behaviour, ambiguous goals, not easy to use force and policy oriented to public opinion. However, the end of the Cold War prompted scholars to re-think traditional ideas, and they found systematic evidence by examining the results of many wars in history. For example, Siverson (1995), Reiter and Stam (2002) find that countries that implement democratic institutions are more likely to win their wars and bear lower costs. Schultz and Weingast (2003) show that the free political institution can enhance the country’s ability in international competition and they argue that the advantages of the representative democracy provide the conditions for democratic countries to win in a series of conflicts and wars.

Theoretically, Stulz (2005) develops a “twin agency” to stress how state is important for finance. He argues that state is important in finance because finance is severely affected by twin agency problems. First type of agency problem, which he names as “the agency problem of corporate insider discretion”, is due to those who control a firm and can use their controlling power for their own benefits. While second type of agency problem, which he names as “the agency problem of state ruler discretion”, is due to those who control the state and can use their political power for their own benefits. He further argues that the government are more likely to affect firm operations through outright expropriation of firm assets, over-regulation, confiscatory taxation and solicitation of bribes in countries having weak political institutions (for example, autocratic regimes, executives with fewer checks and balances).

In an international sample of firms, Durnev and Fauver (2011) supports the arguments of Stulz (2005). They show that government predatory policies such as higher bribes extractions and profits expropriation interact with managerial incentives in shaping firms’ policies. More specifically, their findings suggest that firms in industries that are subject to greater risks of government expropriation manage earnings more,
practice worse governance, and disclose less information. Further, in this direction, recent studies relate political institutions to other corporate practices such as firms’ cash and liquid assets holdings (see for instance, Caprio et al., 2013; Chen et al., 2014), cost of corporate bond issuance (Qi et al., 2010) and implied cost of equity capital (Boubakri et al., 2014). Findings of these studies suggest that firms hold more liquid assets and face lower debt and equity costs in countries having better political institutions. Boubakri et al. (2013) argue that firms take less corporate risk in countries where political institutions are sound.

The democratic political regime provides a political system for the development of financial power. This is because the constraints on democratic governments have increased the likelihood that these countries respect their debts, thereby making them often superior to those who do not have a democratic institution in obtaining credit support. The advantage of easy access to credit support has greatly increased the availability of funds for these democratic countries without causing a sudden increase in their taxes, and then reduce economic risks. Political constraints play an important role in the relationship between political institutions and financial markets. The essence of democracy is that all state power belongs to the people, the power of government comes from the people’s mandate. The most important function of democracy is the eradication of unaccountable leadership and the establishment of a limited government which can be strictly restricted by law and society in power, in terms of its size and its functions. And this constraint on power is favourable to financial markets. Therefore, it is not surprising that authoritarian governments are often related to financial backwardness including underdeveloped financial markets. Unstable political regimes fail or are unwilling to protect investors (Roe and Siegel, 2011). Democracy helps to improve the level of social credit, which translates into strengthening the general confidence among investors contributing to the development of financial markets.

The development and prosperity of financial market requires a credit base, and credit
needs to be built on the constraints of power and the establishment of property rights institution. A mature and healthy financial market contributes to the rise of the country. Countries that are genuinely able to develop healthy financial markets are mostly democracies. The rise of the financial market in London benefited from the constrained and supervised power of the British government, and any financial action required approval by the parliament, hence the government has a good credit. Wall Street's prosperity also benefited from the political system of separation of powers in the United States. Therefore, even in the face of a severe global financial crisis, the U.S. can still keep the low interest rate of national debt under a heavy debt, and make the national debt a “safe haven” for world’s investment funds. The mature financial market and the special status of the U.S. dollar makes the global investors still have a strong confidence on the U.S. assets even during the 2008 financial crisis.

Taken together, the formation of a financial system is linked to the institutional infrastructure and cultural roots. Some studies provide interesting views that are related to the relationship between political institutions and financial markets. Whether or not community general trust or investor protection are associated with a free institution, a liberal and democratic social system is often easier in regard to breeding a prosperous and developed financial market conducive to securities investment. However, there is no commonly accepted theory relating democracy to financial markets performance. Thus, this relationship is mainly an empirical issue.

4.3 Hypotheses Development

This study aims to investigate whether democracy has an effect on stock market performance or whether the markets are immune to the political environment. Specifically, this study tests if there are higher stock returns during periods of democratic government. Given that political instability is typically lower among such countries, investors may expect a higher rate of returns. Additionally, this study tries to identify several determinants in terms of the effect of political factors on stock market returns. Therefore, this study’s main hypothesis is that stock market returns
across different countries are likely to be influenced by democracy improvement:

*Hypothesis 1: Ceteris paribus, improvement in degree of democracy is likely to be positively correlated with higher stock market returns.*

Supposing that this statement is tenable, it will indicate that the degree of political freedom positively influences stock market returns. That is, aggregate stock returns under democratic regimes are higher than under authoritarian regimes.

### 4.4 Data

In this section, I provide information regarding the sample selection, the variables used in the empirical analysis as well as the data sources, and relevant descriptive statistics.

#### 4.4.1 Sample

In order to carry out the analysis on the impact of democracy improvement on stock market performance, information on the degree of democracy as well as stock market data is required. Moreover, various control variables related to the macroeconomic and political environment also need to be introduced.

Firstly, as a proxy for the market portfolio in each country, the Morgan Stanley Capital International (MSCI) market cap indexes have been used. The MSCI market cap weighted indexes are among the most respected and widely used benchmarks in the global financial industry because this index family focuses on countries or regions across developed, emerging and frontier markets, representing almost all the investable opportunity sets in the world. The sample includes data from 74 countries or regions over the period 1975-2015. The stock market data have been obtained from the Thomson DataStream for the selected countries and periods. All of the returns are measured in U.S. dollars and make the data comparable (Bilson et al., 2002). I use data

---

13 The list of countries and regions in the sample is provided in Appendix.
going back to 1975 because of data availability and Huang (2010) points out that 40 years’ annual data is sufficient for a panel data study.

Secondly, democracy improvement is a qualitative measure and as such it needs to be quantified before the implementation of an empirical study. A number of resources, such as Freedom House, the Polity IV Project, and the World Bank Development Research Group offer country by country analysis. This study employs the democracy improvement index developed by Freedom House. This organization has provided annual reports on the democracy and human rights situation in 192 countries and 14 disputed religions in the world since 1972. According to the Freedom House standards, this index is determined by two separate time series, one ranking political rights and the other ranking civil liberties. Each is measured using an ordinal seven-point scale with group one standing for the highest level of rights, and group seven representing the lowest level of democracy. The interval 1 to 2.5 indicates a free democracy regime; the interval 3.5 to 5 indicates a partly free regime; and the interval 5.5 to 7 means an authoritarian regime. The classification was made by Freedom House on the basis of an array of published and unpublished information about each country. The definition of political rights from Freedom House is that people can freely participate in the political process, including having the right to select a particular candidate in a legitimate election, to participate in political parties or organizations and to elect a representative who has a decisive influence on public policy-making and is responsible for the electorate. The definition of civil liberties is that people enjoy freedom of speech and belief, assembly and association, and that the state will not interfere with their personal decisions and the implementation of the rule of law. Otherwise, the subjective approach is the same as that used for the political rights indicator. In practice, Inkeles (1991) found that the correlation coefficient between the civil liberties indicator and the political rights indicator is 0.97. These two indicators are usually used separately or in combination. Independently acclaimed and sourced

14 For more details, please refer to the Freedom House website: https://freedomhouse.org/.
by researchers, the World Bank and the Freedom House datasets have become one of the world's most frequently used resources for evaluating political rights and civil liberties (see, for instance, Farr et al., 1998; Haan and Sturm, 2003; Heid et al., 2012). However, we need to be aware of the challenges mentioned by Bollen (1986), who argues that this democracy index tends to support pro-American countries by assigning them a better value. In addition, the calculation method of this index is relatively subjective, and it has changed its evaluation criteria in order to meet the new development in understanding political freedom and civil liberties, which affects the continuity of time series data.

Finally, several political variables have also been considered in order to assess the impact of the political and institutional environment. The source of the political and institutional data is the Database of Political Institutions (Cruz, et al., 2015). The use of these data combined with the democracy measurement might provide more accurate and comprehensive estimations of the relationship between the stock market and the political environment. To test the impact of good economic policies on stock returns, I include some macroeconomic indicators, which refer to economic aspects of good governance. The macroeconomic data were collected from the World Bank’s World Development Indicators (WDI) and Global Development Network Growth Database (GDN).

4.4.2 Variable definitions

To assess the relationship between democracy level and stock market performance, I first use the annual returns MSCI country indexes as the dependent variables in the linear regressions. The variable RETURN represents the MSCI index movements in the following empirical analysis. The returns have been calculated as the logarithmic rate of return for each country index, \[ \text{RETURN}_{i,t} = \ln(\text{Index prices}_{i,t}/\text{Index prices}_{i,t-1}) \] (4.1) where \( \text{Return}_{i,t} \) is the rate of return of the MSCI country index in country \( i \) at time \( t \). However, due to the limited stock market history in some countries, the dataset in
this study is an unbalanced panel dataset.

The main independent variable is the indicator of political rights from Freedom House. This is because the underlying concept for the civil liberties variable is more about freedom and human rights than democracy. I also consider other measurements of democracy, such as the Polity IV index, as an alternative proxy for democracy in the robustness checks. Here I use an abbreviation PR (political rights) to represent the explanatory variable of democracy in the analysis that follows. I take the natural log of this political rights indicator. Next, guided by the previous political economy literature, I select more political indicators as additional explanatory variables from the Database of Political Institutions (Cruz, et al., 2015)\(^\text{15}\). The Database of Political Institutions (DPI) is mainly used to measure a country's political system and election rules. This database presents institutional and electoral results data such as the electoral system, identification of the ruling party’s affiliation and ideology, the legislative system, and the checks and balances mechanism, among others. Researchers at the World Bank Development Research Group compiled the database in 2001 for the first time (Beck et al., 2001). The current version (2015) is hosted by the Inter-American Development Bank (IDB) and it has expanded its coverage to about 180 countries for the 40 years, 1975-2015. This database has a wide range of applicability. It can be used in related studies focusing on political and institutional economics, such as those examining the issue of democratic stability and corruption (see, for instance, Bodea and Hicks, 2015; Gupta, et al., 2016; Campos and Giovannoni, 2017). It has become one of the most commonly cited databases in comparative political economy and comparative political institutions; almost 3,000 studies have used this database so far as a source of institutional and political data in their empirical analysis (Cruz, et al., 2015). Hence, here we apply this database to analyse the influence of the political regime on the stock market.

\(^{15}\) For more details, please refer to the IDB web page: https://www.iadb.org/en/research-and-data/publication-details,3169.html?pub_id=IDB-DB-121.
Next, I introduce the DPI variables that I use in this study, the variable SYSTEM is a dummy variable that is equal to zero for a presidential system and one for a parliamentary one. Different government systems might have different degrees of influence on the financial market. The variables RIGHT_WING and LEFT_WING are dummy variables representing the ruling party’s orientation with respect to economic policy, and are defined as right-wing and left-wing, respectively. A value of 1 denotes right-wing parties in RIGHT_WING and left-wing parties in LEFT_WING. A centrist orientation serves as a benchmark here. Party orientation with respect to economic policy also has a certain influence on stock market movements (see, for instance, Santa-Clara and Valkanov, 2003; Cahan et al., 2005; Döpke and Pierdzioch, 2006). The variable RELIGION is a dummy variable that is equal to 1 if the ruling party has an ideology rooted in religion (Christian, Catholic, Islamic, Hindu, Buddhist and Jewish); otherwise it is equal to 0. Since some researchers have noted differential market behaviour around national elections (see, for instance, Gartner and Wellershoff, 1995; Bialkowski, et al., 2008; Wong and McAleer, 2009), I include a dummy variable ELECTION_EXE, which records whether in a particular year an executive election took place, and another, ELECTION_LEG, which has a value of unity when legislative elections occur. These indicators are different from the political rights index of Freedom House which was obtained through subjective rather than objective evaluation. The data collection for the Database of Political Institutions was more objective, which is its advantage. There are also some shortcomings of the DPI database, such as the issue of data integration over time. This is because its data integrates two sources, namely the Europa Year Book and the Political Handbook of the World. In addition, two online sources are credited: the PARLINE database from the International Parliamentary Union and the IFES Election Guide. The accurate measurement of the indicators of the political system is of great significance for studying the impact of politics on the economy. At present, academia has not found a measurement method that is suitable for all empirical analysis, and there are some advantages and disadvantages of different indicators. When we study the impact of political institutions on economic variables, we should select and compare appropriate
indicators according to various research purposes and contexts. For this reason, to verify the robustness of my findings based on the Freedom House measure, I introduce an alternative democracy index from the Polity IV database in section 4.6.3.

Furthermore, I control for other time varying controls that have been identified as important determinants in the literature. Here I introduce two macroeconomic variables as controls for economic shocks. The variable GDP_GROWTH is the annual percentage growth rate of gross domestic product (GDP) at market prices based on constant local currency, and is a proxy for the overall macroeconomic health of an economy. A higher economic growth rates may stimulate credit and asset booms. Hence, I consider GDP growth as a potential determinant of stock returns. A significant number of studies have tested the association between financial market performance and economic growth (see, for example, Honohan, 2004; Demetriades and Andrianova, 2004). The variable INFLATION reflects the annual percentage change in the consumer price index (CPI). The reason why the level of inflation has been included in the model is that hyperinflation signals government mismanagement and is a good proxy for general macroeconomic policy instability. Inflation has also been shown to negatively impact financial sector performance in some studies (Boyd et al., 2001). A summary and detailed description of the variables is provided in Table X.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETURN</td>
<td>Annual logarithm yields of MSCI county index</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>PR</td>
<td>Political right indicator represents democracy level</td>
<td>Freedom House</td>
</tr>
<tr>
<td>GDP_GROWTH</td>
<td>Annual GDP growth rate</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>INFLATION</td>
<td>Change in the annual CPI</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>A dummy variable defines whether a country has a parliamentary or presidential system</td>
<td>Database of Political Institutions</td>
</tr>
<tr>
<td>RIGHT_WING</td>
<td>A dummy variable defines a right-wing party</td>
<td>Database of Political Institutions</td>
</tr>
</tbody>
</table>
Institutions

| LEFT_WING | A dummy variable defines a left-wing party |
| RELIGION | A dummy variable defines whether a government is a religious government |
| ELECTION_EXE | A dummy show whether an executive election took place in a specific year |
| ELECTION_LEG | A dummy show whether a legislative election took place in a specific year |

Database of Political Institutions

4.4.3 Summary statistics and correlation matrix

In order to obtain an intuitive understanding of the statistical characteristics of the dependent and independent variables, Table XI shows descriptive statistics based on all observations. It can clearly be seen that the average return on MSCI country indexes is 4.34% and has a standard deviation of 0.3527, indicating that fluctuation of the stock market is relatively severe in the world and is quite different in different countries. Regarding the democracy indicator, it is noteworthy that this variable is 0.5409 on average, indicating that the average level of democracy in the world has been 1.7176 (PR has been taken as a natural log and here a low value means a higher degree of democracy) over the past 40 years. This value implies that most of the political systems in the world are relatively democratic. Nonetheless, the standard deviation for this variable is also quite high (0.6775). Next, it can be seen from Table XI that the average growth rate of GDP is 3.31% per year and the average annual inflation is 15.57%, indicating that the world economy has been in a healthy growth state to some extent, but simultaneously it should be noted that the standard deviation of inflation changes is high. The SYSTEM dummy has a mean of 0.6120, implying that parliamentary systems are more common than presidential systems. The averages of both of the political orientation dummies are around 0.30, indicating that most of the ruling parties implement centrist policies. The variable that denotes government religious inclinations also has a very low average value (0.1204), implying that most of the government do not associate themselves with any particular religion.
This table presents the summary statistics of the variables used in this study from such as mean median, standard deviation, 25th percentile and 75th percentile. All stock prices are measured in U.S. Dollars. RETURN is the main dependent variable and indicates the returns on MSCI country index. The improvement of democracy is our main independent variable and proxies by the political right index from the Freedom House. I use the PR to represent the degree of democracy and it is the natural logarithm of ordinary level data. I additionally introduce some macroeconomic and political indicators as control variables in our specifications. Specifically, variable GDP is used as the indicator of the real economic activity. Variable INFLATION denotes the real inflation which is measured by the growth rate of consumer price index (CPI). Additional political indicators were selected from the Database of Political Institutions, including: SYSTEM, RIGHT_WING, LEFT_WING, RELIGION, ELECTION_EXE and ELECTION_LEG. Sample spans over the period of 1975 to 2015.

Table XI Summary statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>25th Percentile</th>
<th>Medium</th>
<th>75th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETURN</td>
<td>0.0434</td>
<td>0.3527</td>
<td>-0.1467</td>
<td>0.0684</td>
<td>0.2552</td>
</tr>
<tr>
<td>PR</td>
<td>0.5409</td>
<td>0.6774</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0986</td>
</tr>
<tr>
<td>GDP_GROWTH</td>
<td>0.0331</td>
<td>0.0368</td>
<td>0.0149</td>
<td>0.0322</td>
<td>0.0520</td>
</tr>
<tr>
<td>INFLATION</td>
<td>0.1558</td>
<td>1.4462</td>
<td>0.0180</td>
<td>0.0352</td>
<td>0.0713</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>0.6120</td>
<td>0.4874</td>
<td>0.0000</td>
<td>1.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RIGHT_WING</td>
<td>0.3518</td>
<td>0.4710</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>LEFT_WING</td>
<td>0.3017</td>
<td>0.4591</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>RELIGION</td>
<td>0.1204</td>
<td>0.3256</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td>ELECTION_EXE</td>
<td>0.0782</td>
<td>0.2685</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
<tr>
<td>ELECTION_LEG</td>
<td>0.2658</td>
<td>0.4419</td>
<td>0.0000</td>
<td>0.0000</td>
<td>1.0000</td>
</tr>
</tbody>
</table>

Table XI reports the unconditional correlation coefficients matrix among the core variables used in the empirical investigation. First, I examine the correlation between the democracy measure and stock market returns and find that the correlation coefficient is -0.0675 at the 1% significance level. This is a preliminary indication of a positive relationship between democracy improvement and stock movements (note that democracy is measured on an inverted scale). Then, I investigate the correlations between stock returns and macroeconomic indicators. It can be seen that GDP growth has a significant positive impact on stock returns (0.0919) and that inflation change also has a positive effect (0.0158) while it is not significant at a reasonable level. Notably, these two correlation coefficients are both relatively small (lower than 10%). The remaining political variables are dummy variables with binary values, hence the values of their correlation coefficients have no meanings and we can only focus on the signs. Generally, these remaining political factors do not show a significant relationship at a reasonable significance level with stock returns while their correlation
coefficients have positive signs. Correlation analysis can provide an initial impression of the relationships between the variables. However, caution needs to be exercised because, unlike the regression analysis, it is not able to take the context into account.
Table XII Matrix of correlations
This table reports the correlation coefficients of the country-specific equity market and democracy improvement factors. The \( p \)-values of the correlation coefficients are reported on the row under the correlation coefficients in [ ]. The significant \( p \)-values that are below 0.05 are highlighted in italics.

<table>
<thead>
<tr>
<th>Correlation</th>
<th>RETURN</th>
<th>PR</th>
<th>GDP_GROWTH</th>
<th>INFLATION</th>
<th>SYSTEM</th>
<th>RIGHT_WING</th>
<th>LEFT_WING</th>
<th>RELIGION</th>
<th>ELECTION_EXE</th>
<th>ELECTION_LEG</th>
</tr>
</thead>
<tbody>
<tr>
<td>RETURN</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td>-0.0675 [0.0050]</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GDP_GROWTH</td>
<td>0.0919 [0.0001]</td>
<td>0.3210 [0.0000]</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFLATION</td>
<td>0.0158 [0.5185]</td>
<td>0.0108 [0.6581]</td>
<td>-0.0740 [0.0025]</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SYSTEM</td>
<td>0.0241 [0.3173]</td>
<td>-0.4877 [0.0000]</td>
<td>-0.1947 [0.0000]</td>
<td>-0.0908 [0.0002]</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RIGHT_WING</td>
<td>0.0202 [0.4016]</td>
<td>-0.2462 [0.0000]</td>
<td>-0.0887 [0.0000]</td>
<td>0.0644 [0.0002]</td>
<td>0.1749 [0.0000]</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LEFT_WING</td>
<td>0.0217 [0.3666]</td>
<td>-0.2000 [0.0000]</td>
<td>-0.0270 [0.2629]</td>
<td>-0.0457 [0.0002]</td>
<td>0.0987 [0.0000]</td>
<td>-0.4631 [0.0000]</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RELIGION</td>
<td>0.0166 [0.4898]</td>
<td>-0.0404 [0.0931]</td>
<td>-0.0303 [0.2085]</td>
<td>-0.0267 [0.2761]</td>
<td>0.0987 [0.0000]</td>
<td>-0.2078 [0.0000]</td>
<td>-0.2083 [0.0000]</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ELECTION_EXE</td>
<td>-0.0066 [0.7847]</td>
<td>-0.0147 [0.5417]</td>
<td>0.0007 [0.9774]</td>
<td>0.0826 [0.0007]</td>
<td>-0.2197 [0.0000]</td>
<td>0.0239 [0.0000]</td>
<td>-0.0316 [0.1891]</td>
<td>-0.0879 [0.0003]</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>ELECTION_LEG</td>
<td>0.0047 [0.8455]</td>
<td>-0.0716 [0.0002]</td>
<td>-0.0301 [0.2117]</td>
<td>0.0167 [0.4962]</td>
<td>0.0136 [0.5710]</td>
<td>0.0437 [0.0692]</td>
<td>-0.0071 [0.7695]</td>
<td>0.0069 [0.7739]</td>
<td>0.2545 [0.0000]</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
4.5 Empirical analysis

Econometric methods are applied to study the effect of democracy improvement based on Freedom House’s political rights index on stock market movements. In the following section, I describe the specifications and give brief background information about the panel data models. The empirical results and an interpretation are also provided. An overview of the empirical results is presented in Table XIII. Other results are presented in additional tables.

4.5.1 Econometric models and specifications

The dataset for this study is a panel dataset that combines time-series and cross-sectional data. One of the biggest advantages in a panel data study is that the unobserved time-invariant variables can be controlled, such as cultural factors or geographic differences. In other words, it accounts for individual heterogeneity. Therefore, the dataset is appropriate for using panel data models. According to Hsiao (2003) and Baltagi (2005), panel data models can be divided into distinct variants like one-way, two-way, variable intercept and variable coefficient, and can further include fixed effects or random effects depending on the situations. The main research objective of the empirical study is to examine the political, institutional and economic determinants of stock returns across countries and time. Here I first consider a variable intercept model, that is, each individual regression equation is supposed to have the same vector of slope but different intercepts. Consider the following general econometric model for stock returns, which will be the basis of this study:

\[
y_{i,t} = \gamma + \alpha x_{i,t} + \sum_{j=1}^{n} \beta_j z_{j,i,t} + u_{i,t} + \varepsilon_{i,t}, i = 1, \ldots, N, t = 1, \ldots, T \quad (4.2)
\]

where \( \gamma \) is the common mean term for all individual heterogeneity, whether time-serial or cross-sectional, \( y_{i,t} \) is the dependent variable RETURN, indicating the returns on MSCI country indexes for country \( i \) at year \( t \), \( x_{i,t} \) is main explanatory variable \( PR \) which represents the level of democracy for country \( i \) at year \( t \), \( z_{j,i,t} \) is a vector of institutional and macroeconomic control variables including \( SYSTEM \), \( RIGHT\_WING \), \( LEFT\_WING \), \( RELIGION \), \( ELECTION\_EXE \), \( ELECTION\_LEG \),
GDP_GROWTH and INFLATION. $\alpha$ and $\beta_j$ are the corresponding parameters to be estimated and $\beta_j$ is a coefficients vector, $(\beta_1, \ldots, \beta_j)'$. $u_{i,t}$ denotes individual effect (cross-sectional and/or time specific effect). $\varepsilon_{i,t}$ is an error term, capturing all other omitted factors. $y_{i,t}$ and components of $x_{i,t}$ and $z_{i,t}^j$ are both time-varying and varying across individuals. Cross-sectional units (countries) are indicated by $i$ and time-series individuals (year) are indicated by $t$. $N$ represents the number of countries contained in the panel, which here is 74, and $T$ denotes the length of the time series, and runs from 1975 to 2015. The component of the dependent variable that is unexplained by $x_{i,t}$ and $z_{i,t}^j$ (individual effect) can be decomposed into three parts:

$$u_{i,t} = \mu_i + \lambda_t + \nu_{i,t}$$  \hfill (4.3)

where $\mu_i$ is an unobserved time-invariant country-specific individual effect and can be regarded as capturing the combined effect of all omitted time-invariant variables. Note that $\lambda_t$ is individual-invariant and accounts for any time-specific effect that is not included in the regression. $\lambda_t$ denotes a full set of time effects which captures common shocks to returns for all countries. The error term $\nu_{i,t}$ is an independent identically distributed (i.i.d.) idiosyncratic component. In order to get the optimal estimators of equation (4.2), we need to set the following assumption: $Eu_{i,t} = E\mu_i = E\lambda_t = 0$. When $\lambda_t = 0$ for all $t$, that is, $\nu_{i,t} = \mu_i + u_{i,t}$, then equation (4.2) becomes a one-way panel model and only considers the heterogeneity of cross-section individuals, it ignores the individual differences on a time level. When $\lambda_t \neq 0, \mu_i \neq 0$, that is, $u_{i,t} = \mu_i + \lambda_t + \varepsilon_{i,t}$, then equation (4.2) is a two-way panel model.

Specifications are always two-way and include country- and time-dummies. This is because stock markets movements tend to co-vary across countries due to cross-border capital flows. Therefore, year dummies allow for extracting the global trend and focus only on country-specific variation in stock return. Country-dummies allow for disentangling the effect of unobservable variables such as history and country-specific characteristics that are correlated with stock markets.

Operationally, I will utilise a variety of different specifications that build on the general
equation (4.2). Here I consider a variable intercept model but not a variable slope model. Broadly, they can be arranged as pooled OLS, fixed effects, and random effects models. The panel data framework offers the opportunity to examine group (individual) effects, time effects, and/or both in order to deal with heterogeneity that may or may not be observed. These group or time specific effects are either fixed or random.

4.5.1.1 Pooled OLS model

The pooled OLS estimator assumes that all cross-sectional units have the same regression equation. This model produces efficient and consistent parameter estimates, if the individual effect $u_{i,t}$ (cross-sectional or time specific) in equation (4.2) does not exist ($u_{i,t} = 0$). Hence, the following is the adjusted equation (4.2) using the pooled OLS method.

$$y_{i,t} = \gamma + \alpha x_{i,t} + \sum_{j=1}^{n} \beta_j z^j_{i,t} + \epsilon_{i,t}, i = 1, \ldots, N, t = 1, \ldots, T \quad (4.4)$$

This pooled OLS estimate is simply pooling of the data assuming a constant coefficient, referring to both intercept and slopes regardless of unit (country) and time period. We can pool all of the $N*T$ data and run an ordinary least squares (OLS) regression to estimate $\gamma$, $\alpha$ and $\beta_j$ in an event that there are neither significant country nor temporal effects. If individual effect $u_{i,t}$ exists and it is not zero in longitudinal data, heterogeneity (individual effects are not captured by regressors) may affect exogeneity, homoscedasticity and non-autocorrelation assumption of ordinary least squares (OLS).

In this case, disturbance terms may not have same variance anymore and vary across individual units and may correlate with each other. The former is called heteroskedasticity (violation of homoscedasticity assumption) while the latter is known as autocorrelation (violation of non-autocorrelation assumption). This particular issue is recognized as non-spherical variance covariance matrix of disturbances. The violation of exogeneity as assumption leads to random effects estimation bias. Thus, the ordinary least squares (OLS) is no longer best linear unbiased estimator (BLUE). These problems can be dealt well in a panel data framework.
4.5.1.2 Fixed effects model

The fixed effects model works under the assumption that the individual-specific effect $\mu_i$ is a random variable and unobserved, but correlated with the explanatory variables, then the least squares estimator of $\alpha$ and $\beta$ is biased and inconsistent as a consequence of an omitted variable. Therefore, it examines differences in individual intercepts, assuming the same slopes and constant variance across individuals (cross-sectional units). The term “fixed” as used here signifies the correlation of $\mu_i$ and explanatory variables, not that $\mu_i$ is non-stochastic. Similarly, if we set the same conditions for time-specific $\lambda_t$, then we can get a fixed time effects model or two-way fixed effects model, which includes $\mu_i$ and $\lambda_t$ at the same time. The functional form of the two-way fixed effects model is:

$$y_{i,t} = \gamma + \mu_i + \lambda_t + \alpha x_{i,t} + \sum_{j=1}^{n} \beta_j z^j_{i,t} + v_{i,t}, i = 1, \ldots, N, t = 1, \ldots, T$$  (4.5)

where $\mu_i$ captures any time-invariant country characteristics that affect the stock returns. $\mu_i$ can be set as $T-1$ country specific dummy variables. As $\mu_i$ is considered as a part of the intercept, therefore, $\mu_i$ is allowed to be correlated with any of the regressors. Hence, the ordinary least squares (OLS) assumption of exogeneity is not violated. Their inclusion means that each country has its own intercept to allow for aggregate effects. $\lambda_t$ has been included to define fixed effects specific to the time period that impacts all entities but varies by year. Equation (4.5) then becomes a two-way fixed effects model. This model examines individual and time differences in intercepts, assuming the same slopes and constant variance across individuals (entities).

Since individual and time specific effects are considered a part of the intercept, $\mu_i$ and/or $\lambda_t$ are allowed to be correlated with other regressors. A two-way fixed effects model has been used here because I want to think of the data as varying across nations and time. $v_{i,t}$ represents idiosyncratic errors. Generally speaking, there are several strategies for estimating a fixed effects model, including Least Squares Dummy Variables (LSDV) regression and the “within” effect estimation (within transformation model) method.
4.5.1.3 Random effects model

The rationale behind the random effects model is that the individual-specific effect $\mu_i$ across entities is assumed to be random and uncorrelated with any independent variables and correlated with disturbance term only and then estimate the error variance specific to groups (or times). Because the two-way random effects model cannot be used on an unbalanced panel dataset and I want to consider time effects in the analysis, the random effects model that I implement here is a time fixed and individual random model:

$$ y_{i,t} = \gamma + \lambda_t + \alpha x_{i,t} + \sum_{j=1}^{m} \beta_j z_{i,t}^j + (\mu_i + v_{i,t}), i = 1, \ldots, N, t = 1, \ldots, T \quad (4.6) $$

where $\mu_i$ is a random individual specific (heterogeneity) or a component of the composite error term. The random individual specific effects $\mu_i$ is a part of specific errors, not a part of intercepts. In other words, the random effects model sets the individual effects $\mu_i$ as a part of error term, so it is required that the explanatory variable is not correlated to the individual effects $\mu_i$. The random effects model estimates error variance specific to individual groups (or times). Hence $\mu_i$ is an individual specific effect (heterogeneity) randomly distributed along with error term and considered as component of the composite error term. The random effects model is also called as error components model due to the same assumption the intercept and slopes of regressors remain the same across individual units (or time). $\lambda_t$ can be added as a time effects term in equation (4.6) to indicate common shocks, then the intercepts are still different across countries. The random effects model is estimated by Generalized Lease Squares (GLS) estimator. The random effects model decreases the number of parameters to be estimated, however, it produces inconsistent estimates when individual effects are correlated with regressors (Greene, 2012).

Essentially, the fixed effects model uses different intercepts to reflect the differences between individual characteristics, and the random effects model treats the different intercepts as the sum of unique random disturbances. The biggest difference between the fixed effects model and the random effects model is its basic assumption, that is,
whether the individual-specific effect $\mu_i$ is correlated with the regressors or independent variables. Although different model structures will be estimated, only the individual effect will be set to be random or fixed. I always suspect that the time-specific effect $\mu_t$ will affect all markets in the same way. In other words, a random time effects model has not been considered in this study. We can estimate this model by having one dummy variable for each country and time period at the same time.

The MSCI market cap indexes data for some countries do not completely cover the entire sample period because of the availability of historical data. Hence it should be mentioned here that this study has an unbalanced panel across the time period because of missing values. If we extract a balanced panel from an unbalanced panel, the sample size will be diminished and the estimation efficiency will be reduced regardless of whether we maximize the number of markets or maximize the time length. Furthermore, artificially excluding observations in a non-random manner destroys the reliability of the sample. Therefore, I keep the dataset as unbalanced and this does not affect the calculation of the within estimator on a differencing form (Greene, 2012). Hence, the general fixed effects model can be estimated as usual. For the random effects model, an unbalanced panel data set does not have a substantial influence and the usual feasible generalized least squares (FGLS) can be used (Greene, 2012). Jennrich and Sampson (1976) aver that the maximum likelihood estimation (MLE) is also capable of estimating the random effects model based on an unbalanced panel. Indeed, I agree that this is a limitation of the study and the results are based on less than the desired number of observations. Yet, this problem is faced by many studies considering a multi-country type of empirical analysis.

4.5.2 Test of stationarity

First of all, I implement unit root tests to check whether the dependent and independent variables are stationary before moving on to the regression analysis stage. We know that some non-stationary time series tend to show a common trend, and there are no direct relationships among these sequences. There is no practical significance if we
perform a regression for this kind of data. We should examine the stationarity of each variable to avoid spurious regression. One of the most widely used methods to accomplish this is to implement the unit root test. We can use several different methods to run the unit root test in a panel dataset such as the Levin-Lin-Chu test (Levin, et al., 2002), the Im-Pesaran-Shin test (Im, et al., 2003), the Hadri LM test (Hadri, 2000) and the Choi Fisher-type test (Choi, 2001). The panel dataset in this study is unbalanced, hence the LLC test, the IPS test and the Hadri test cannot be used because they require the test data to have corresponding lags, which means that they are only suitable for a balanced panel dataset. However, the Choi Fisher-type test has no such restriction. This test involves conducting unit root tests for each cross-sectional unit individually, and then combining the \( p \)-values for these tests to a Fisher-type statistic as follows and producing an overall test.

\[
p = -2 \sum_{i=1}^{n} \ln p_i \rightarrow \chi^2(2n) \quad \text{as } T_i \rightarrow \infty
\]

where \( T_i \) is the time dimension for individual \( i \), and can vary from individual to individual. This test assumes that \( T \) tends towards infinity. Hence, stationary test for an unbalanced panel data can use this approach, and the individual series can have gaps. According to the panel unit root test, dependent and independent variables PR, GDP_GROWTH and INFLATION are stationary (all \( p \)-values equal to zero). The remaining political variables are dummy variables, so there is no need to perform such unit root tests for them.

4.5.3 Regression results and discussion

The panel data modelling usually begins with pooled OLS. The pooled OLS provides critical thinking about the potential problems of observed and unobserved heterogeneity, due to missing relevant variable bias. According to above consideration, the analysis includes pooled OLS, fixed effects, and random effects estimation. Table XIII presents the various fixed and random effects estimates and compares them to those obtained from the pooled OLS specification. For every estimate, the first column is the baseline specification in which only the democracy measurement PR is present, while the second column controls for the macroeconomic indicators, GDP growth rate
and inflation. The third column includes the remaining political indicators. For each regression, I report the point estimates of the included explanatory variable, the adjusted $R$-square if available and, in parentheses, the standard errors. The variance inflation factor (VIF) for all of the explanatory variables in all cases is lower than 10, which means that there is no multicollinearity issue in the specifications.

The fixed or random effects models focus on considering the unobserved individual effects. According to the same idea, we can consider the unobserved time effects in a panel data analysis. This is make sense since external shocks such as the rise in global oil prices and the outbreak of the financial crisis would have an impact on the performance of all capital markets in a specific time period. These factors have common effects on all individuals in the sample at specific times, and this enlightens we can reflect these time effects by introducing time dummy variables. Therefore, I include $T-1$ time dummies (year) in all of the regressions except for the regressions estimated by pooled OLS to control the time effects $\lambda_t$. If external shocks may result in a systemic change in the dependent variable for a given time period, and this change would occur in almost every market worldwide, then time effects should be considered. This may be the case in the financial area because a common shock such as a financial crisis will cause large valuation changes in the global equity market. For example, the financial crisis in 2008 led to the major global stock markets experiencing the worst crash in history since the Great Depression. (Meric, et al., 2012). In addition, several relevant statistical tests also prove the importance of time effects. The results of the estimated coefficients and standard deviations for year dummies are not reported, but almost all of them are consistently different from zero at reasonable significance levels. Moreover, I use a Wald test to check whether time effects over 1975 to 2015 are statistically significant as a whole in all of the regressions which include the year dummy variables.\textsuperscript{16} The result indicates the statistical significance of time effects $\lambda_t$ ($p$-value=0.0000) in all of the regressions and further joint significance with the

\textsuperscript{16} In Stata, we can use \texttt{testparm} command with year dummy variables and/or country dummy variables to apply this Wald test.
individual effect $\mu_i$ in the fixed effects regressions ($p$-value=0.0000). A likelihood-ratio test also confirms the significance of time effects $\lambda_t$ and shows that a two-way model may be better than a one-way model ($p$-value=0.0000).\textsuperscript{17}

With regard to the results in Table XIII, in the first place, I find consistent evidence of a positive relationship between stock returns and democracy level as the estimates coefficients are statistically significant in both cases for the period 1975-2015, indicating that less political rights results in a decrease in stock returns. As the reader may recall, a higher value in the variable of PR means a lower degree of democracy, that is, an improvement to a higher level of democracy level is a stimulus that improves stock market performance. It is worth noting that we find that this relationship remains stable in all specifications regardless of the introduction of control variables. The regressions in columns 3, 6, 9 and 10 include the democracy variable, macroeconomic indicators and remaining political factors, as well as a full set of time dummies. The fixed effect estimator in column 6 shows that the democracy variable PR is significant at the 5% level. The random effects estimate provides very similar evidence in column 9 and PR is significant at a lower (1%) level. Let us consider the quantitative impact of democracy. For example, the coefficient of -0.0701 (standard error = 0.0299) in column 6 suggests that for a one percentage point increase in the political right index, the stock return of the MSCI index is expected to decrease by 0.0701 percentage points, holding all other variables constant. In other words, if the PR score were to be halved, the returns would be 3.51% per annum higher (PR has been taken as the natural log here, so a proportion expression is more accurate). Column 11 provides the result for the same regression in column 10 while here I used the original democracy indicator (PR) data as a comparison since I took a logarithm version on it in the previous regressions. We can find that the results are similar and believe that a logarithm version did not change the nature of the variable.

\textsuperscript{17} In Stata, we can get the result for this likelihood-ratio test by a \textit{lrtest} command after the estimation with/without time effects (year dummy variables).
Table XIII Regressions of MSCI market cap indexes returns on democracy level and relevant controls

Analysis on the influence of democracy development MSCI returns. This table presents estimates from the equation (4.2). This model has been estimated by three different panel regressions: pooled OLS, fixed effects and random effects. All regressions include a full set of time dummies to represent and control the time effect. Individual effect denotes the country-specific characteristic $\mu_i$ and time effect denotes the time-specific characteristic $\lambda_t$. The results for time dummies not include in this table. I progressively add different control variables in our regressions. Standard errors are reported into parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of 1975 to 2015.

<table>
<thead>
<tr>
<th>Model</th>
<th>Pooled OLS</th>
<th>Fixed effects (within estimator)</th>
<th>Random effects (GLS)</th>
<th>Time effects</th>
<th>Time effects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>Independent variables</td>
<td>Dependent variable is MSCI market cap indexes returns for 74 countries over 1975-2015</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR</td>
<td>-0.0352***</td>
<td>-0.0563***</td>
<td>-0.0556***</td>
<td>-0.0643**</td>
<td>-0.0671**</td>
</tr>
<tr>
<td></td>
<td>(0.0125)</td>
<td>(0.0135)</td>
<td>(0.0162)</td>
<td>(0.0294)</td>
<td>(0.0292)</td>
</tr>
<tr>
<td>GDP_GROWTH</td>
<td>1.2576***</td>
<td>1.2491***</td>
<td>1.2744***</td>
<td>1.2466***</td>
<td>1.1336***</td>
</tr>
<tr>
<td></td>
<td>(0.2553)</td>
<td>(0.2475)</td>
<td>(0.2255)</td>
<td>(0.2267)</td>
<td>(0.1991)</td>
</tr>
<tr>
<td>INFLATION</td>
<td>0.0697***</td>
<td>0.0705***</td>
<td>0.0654***</td>
<td>0.0679***</td>
<td>0.0657***</td>
</tr>
<tr>
<td></td>
<td>(0.0230)</td>
<td>(0.0233)</td>
<td>(0.0186)</td>
<td>(0.0188)</td>
<td>(0.0170)</td>
</tr>
<tr>
<td>INFLATION(^2)</td>
<td>-0.0025***</td>
<td>-0.0026***</td>
<td>-0.0024***</td>
<td>-0.0025***</td>
<td>-0.0024***</td>
</tr>
<tr>
<td></td>
<td>(0.0009)</td>
<td>(0.0009)</td>
<td>(0.0007)</td>
<td>(0.0007)</td>
<td>(0.0007)</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>-0.0035</td>
<td>-0.1083</td>
<td>-0.0095</td>
<td>-0.0095</td>
<td>-0.0095</td>
</tr>
<tr>
<td></td>
<td>(0.0210)</td>
<td>(0.0736)</td>
<td>(0.0155)</td>
<td>(0.0155)</td>
<td>(0.0155)</td>
</tr>
<tr>
<td>RIGHT_WING</td>
<td>0.0008</td>
<td>-0.0008</td>
<td>-0.0156</td>
<td>-0.0156</td>
<td>-0.0156</td>
</tr>
<tr>
<td></td>
<td>(0.0225)</td>
<td>(0.0253)</td>
<td>(0.0165)</td>
<td>(0.0165)</td>
<td>(0.0165)</td>
</tr>
<tr>
<td>LEFT_WING</td>
<td>0.0068</td>
<td>0.0254</td>
<td>0.0019</td>
<td>0.0019</td>
<td>0.0019</td>
</tr>
<tr>
<td></td>
<td>(0.0229)</td>
<td>(0.0266)</td>
<td>(0.0169)</td>
<td>(0.0169)</td>
<td>(0.0169)</td>
</tr>
<tr>
<td>RELIGION</td>
<td>0.0203</td>
<td>0.0232</td>
<td>0.0128</td>
<td>0.0128</td>
<td>0.0128</td>
</tr>
<tr>
<td></td>
<td>(0.0277)</td>
<td>(0.0300)</td>
<td>(0.0202)</td>
<td>(0.0202)</td>
<td>(0.0202)</td>
</tr>
<tr>
<td>ELECTION_EXE</td>
<td>-0.0097</td>
<td>0.0001</td>
<td>0.0103</td>
<td>0.0103</td>
<td>0.0103</td>
</tr>
<tr>
<td></td>
<td>(0.0343)</td>
<td>(0.0265)</td>
<td>(0.0254)</td>
<td>(0.0254)</td>
<td>(0.0254)</td>
</tr>
<tr>
<td>----------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
</tr>
<tr>
<td>ELECTION_LEG</td>
<td>0.0081</td>
<td>-0.0047</td>
<td>-0.0050</td>
<td>-0.0050</td>
<td>-0.0057</td>
</tr>
<tr>
<td></td>
<td>(0.0202)</td>
<td>(0.0151)</td>
<td>(0.0149)</td>
<td>(0.0149)</td>
<td>(0.0149)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.0624***</td>
<td>0.0258*</td>
<td>0.0220</td>
<td>0.2191***</td>
<td>0.1910**</td>
</tr>
<tr>
<td></td>
<td>(0.0108)</td>
<td>(0.0125)</td>
<td>(0.0265)</td>
<td>(0.0664)</td>
<td>(0.0721)</td>
</tr>
<tr>
<td>Individual effect</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Time effect</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.0040</td>
<td>0.0217</td>
<td>0.0182</td>
<td>0.4708</td>
<td>0.4941</td>
</tr>
<tr>
<td>Observations</td>
<td>1733</td>
<td>1670</td>
<td>1663</td>
<td>1733</td>
<td>1670</td>
</tr>
</tbody>
</table>
This relationship can be explained in several ways. First, the appointment system for local and national officials under a democratic institution is election. Voters will choose the party and candidates that they believe can bring them the greatest happiness (utility), and such happiness (utility) can be represented by the redistribution of wealth and greater economic opportunities (Acemoglu and Robinson, 2006). In a democratic system, people exercising their right to vote is not a simple matter. On the surface, the ballot represents equality, but in fact, it is polarized. For example, the U.S. electoral system is not a simple “one man one vote” system because each party empowers their own electorate. The game produced is a compromise. The U.S. does not cancel the eligibility to vote of certain citizens with some simple and crude standards, but instead sets a number of obstacles for ordinary people to overcome. For instance, in accordance with the relevant legislation in Texas, voters must provide photo documentation for voting registration. Due to this legislation, voting enthusiasm for some specific demographic groups has been suppressed, especially for low-income people. The U.S. election asks voters to have a relatively stable income, fixed abode, and sustained attention to local and national affairs and to actively participate in political life. Because of this, the dominance of U.S. political life is still in the hands of the middle class. This class will favour capital markets development and financial innovation because it gives them the opportunities of wealth appreciation and diversification, and the increase in competition is conducive to lower capital costs. (Hoffman et al., 2009). According to the results of the Federal Reserve’s Consumer Finance Survey (CFS) over many years, in the U.S., stock holdings and household income show a significant positive relationship, and stock holdings are directly affected by the level of family education. In other words, the middle class has more direct stock investment. Such demand will promote the development of the financial market and release more consumption and investment opportunities (Galor and Moav, 2004). The majority of voters also desire strong asset markets (Menaldo and Yoo, 2015). Meanwhile, this demand also needs the support of government policy. Hence, only though a commitment to implementing economic and fiscal policies that will bring the majority of voters’ happiness (utility), which can guild parties and candidates
to be elected. Parties and candidates must also fulfill their promises after election, because this is a repeated game and delivering on promises is the best choice. Therefore, it is not surprising that a democratic state tends to have higher stock returns.

Democratic regimes, to some extent, also help low-income people to invest in securities and increase their wealth. This is because people under a democratic system prefer economic and fiscal policies that can promote equality (Downs, 1957). If under such a fiscal policy or income distribution system, the disposable income of low-income people is relatively increased, then their securities investment capacity will be increased accordingly. Second, Hewlett (1979) argues that compared with democracy a government under an authoritarian regime will be less constrained, and this freedom will bring instability in regard to the government environment and policies. Instability is one of the biggest concerns among stock market investors, as well as the financial industry. Furthermore, authoritarian governments do not have the advantage in terms of financial liberalization and the degree of capital market openness.

In the real world, a natural concern is that stock market movement might be influenced by many considerations, such as economic and political factors. The focus of this study is to find out the correlation between stock market performance and democracy, and in order to test whether this relationship is independent of other variables, it is necessary to include additional control variables in the regressions. For an individual stock, macro and micro factors can affect the price changes, while if we look at the overall trend of the stock market index, macroeconomic and political variables are the primary determinants of price movements. Due to the availability of data (many macroeconomic indicators cannot cover the sample interval), I select two variables as a proxy of economic activity: GDP growth rate and inflation in consumer prices. In principle, one would like to employ unemployment rates as well. Nonetheless, they are not available for some countries. I find that the GDP growth rates show a consistent and significant positive relationship with stock returns in all of the regressions. For example, in column 6, whenever GDP growth increases by one percentage point, the
stock return will increase by 1.2466 percentage point, holding all other variables constant. This result is in line with theoretical expectations and is also supported by many previous studies (see, for instance, Asprem, 1989; Flannery and Protopapadakis, 2002; Humpe and Macmillan, 2009). The results make sense since sustained and stable GDP growth shows that the national economy is in good condition, which encourages investors to have more optimistic expectations about the real economy, and the profits of listed companies. Consequently, investors will be optimistic about the stock market performance and maintain stock trading activities, which will eventually push the stock index to a higher level. A sustained and stable growth in GDP will also stimulate consumption and investment demand, ultimately boosting stock prices.

Next, let us look at estimates for inflation. The results in all of the columns regardless of the estimation model, indicate a positive relationship between stock returns and changes in inflation. From a theoretical perspective, the Fisher’s hypothesis argues that there is a positive relationship between real assets returns and expected inflation. However, scholars did not reach a consensus on this issue. For example, Fama’s (1981) proxy hypothesis suggests a negative relationship between stock returns and inflation, but this relationship is not a direct causal relationship because stock returns and inflation are affected by macroeconomic factors on an opposite direction, leading to this negative relationship. Therefore, in order to get a more complete understanding of the effects of inflation, I introduce the squared term of on inflation in regressions as an explanatory variable. This enables us to observe turning points in the relationship between stock returns and inflation growth. We can observe such possible turning points through this calculation: Turning point equals to -((inflation coefficient) / (2*(inflation-squared coefficient))). I find that this squared term has a negative sign and is significant, indicating that there might be a U-curve relationship between inflation and stock returns. In other words, higher inflation countries have higher stock returns, but when inflation reaches a certain threshold, this relationship will be reversed. Using the result in column 6 as an example, this turning point is 13.58% according to (-0.0679)/(2*0.0025)), which means if the CPI inflation reaches this point then its
positive effect on stock returns will be reversed. This result is in line with the literature (see, for instance, Fama and Schwert, 1977; Fama, 1981; Balduzzi, 1995). The impact of inflation on stock prices is relatively complex (Flannery and Protopapadakis, 2002). When inflation reaches a certain level, the government will tend to tighten fiscal and monetary policy and investors’ expectations in regard to a rising interest rate will increase accordingly. Thus, stock market funds will be reduced, and listed companies’ future profits will also be affected. Furthermore, serious inflation will accelerate currency depreciation, and then people will not be optimistic about the prospects for economic development.

Lastly, I include other political factors in the regressions. When examining the coefficient estimates of these variables, the most important finding to note is that the results with respect to the effect of the democracy variable (PR) remain unchanged. Generally speaking, all other political variables are not significant at any reasonable significance level. Specifically, the estimated coefficients of the SYSTEM variable in all of regressions have a negative sign (insignificant), indicating that presidential systems seem to have a higher stock return than the parliamentary ones to some extent. I think this may be because under the presidential system, an elected president organizes the government and has the highest administrative power, which has a relatively high administrative efficiency due to the concentration of power. In contrast, under the parliamentary system, voters elect the parliament and the parliament elects the prime minister, then the prime minister selects the cabinet members and forms the government. The government is composed of political party (coalition) that occupies the majority of parliamentary seats. Therefore, parliamentary politics is essentially party politics, which inevitably delays the policy negotiation and implementation efficiency. The variables RIGHT_WING and LEFT_WING, which measure party orientation with respect to economic policy have different signs under the pooled OLS and fixed/random effects specifications hence it seems that the influence of orientation is mixed and these two variables cannot provide a consistent interpretation. This result does not conflict with existing studies. Several researchers have tried to analyse
whether stock market returns are related to the ideology of the leadership, some believe that right-wing parties can bring higher stock returns while others argue that left-wing parties have a positive effect, so overall, they have not reached a unanimous conclusion (see, for instance, Santa-Clara and Valkanov, 2003; Cahan et al., 2005; Bialkowski et al., 2007). It is possible that the impact of policies on the stock market is very complex, and cannot be fully explained by a simple left-wing or right-wing dummy variable. Notably, the different empirical results are largely due to the different sample countries used by researchers. The variable RELIGION, which controls for the religious convictions of governments, has a positive coefficient but is not significant at reasonable levels. The role of religion, beliefs and social norms has not been extensively analysed in the financial literature. Markets do not make decisions, but people do and interactions among social norms are unavoidable. Callen and Fang (2015) provide evidence that religiosity is negatively associated with future stock price crash risk. Elections, both for executives (ELECTION_EXE) and legislative (ELECTION_LEG) bodies, are not significant at a reasonable level, suggesting that there is not a clear impact on stock returns. According to the signs of the estimated coefficients, executive elections seem to increase stock returns while legislative elections seem to reduce them. This is not surprising since elections are often accompanied by political uncertainty and thus stock markets may react differently (Li and Born, 2006). In general, these six political variables are less important than the democracy development indicator in this study.

To conclude, the above results indicate that there is a significant positive association between stock returns and democracy improvement across different countries, which is consistent with the hypothesis. In all of the specifications, the coefficient of the democracy measurement PR is relatively stable and around -0.05. Moreover, these results also show that general economic uncertainty influences stock returns even though I jointly consider them with institutional and political variables. Additionally, it is interesting to note that time effects are highly significant in all of the specifications, which indicates that common shocks have an important influence on stock markets.
worldwide. This phenomenon is discussed in the following sections.

4.5.4 Model selection
Panel data models, which I discussed in the previous section, examine fixed and/or random effects of individual markets and time periods. This study temporarily does not consider the variable coefficient model. So, the slopes remain the same across group or time period for both fixed and random effects models. Here I compare different models and their estimated parameters in section 4.5.3. Then we need to decide which of them can best fit the panel dataset we have. In order to get the exact form and appropriate parameter estimates from the original equation (4.2), I discuss relevant panel model specification tests in the following sub-sections.

4.5.4.1 Test for fixed effects
A redundant fixed effects F-test can be applied to determine whether there is a need for fixed effects in a model. In a regression of equation (4.2), the null hypothesis is that all of the dummy parameters are zero, \( H_0: \mu_i = 0, i = 1, \ldots, N \). I test for the existence of individual effects in the regression in column 6 in Table XIII. This hypothesis is based on loss of goodness-of-fit. This test contrasts the fixed effects model (robust) with the pooled OLS (efficient model) and examines the extent to which goodness-of-fit measures (SSE) changes. Here I use the LSDV method instead of the within estimator to estimate the fixed effects model and only consider the country fixed effect (one-way). An F-statistic according to the construction principle is considered (Baltagi, 2005):

\[
F = \frac{(RRSS - URSS)/(N - 1)}{URSS/N(T - 1) - K} \tag{4.8}
\]

where \( RRSS \) (Restricted RSS) denotes the residual sum of squares under the null hypothesis, \( URSS \) (Unrestricted RSS) denotes the residual sum of squares under the alternative. \( N \) is the number of countries, \( T \) is the number of years, and \( K \) is the number of independent variables. This \( F \)-statistic is distributed as a central \( F \)-distribution with \((N-1, (N(T-1)-K) \) degrees of freedom. The null hypothesis is that the fixed effects are redundant and thus unnecessary. The two sums of squares can be viewed as
intermediate results from the pooled OLS and from the one-way fixed effects estimation. I use Stata to apply this test\textsuperscript{18} and the $F$-statistic, which is equal to 0.86 ($p$-value=0.7787), seems not large enough to reject the null hypothesis. The result indicates that the pooled OLS regression is favoured. This result is a little unexpected because the assumption of a fixed effects model is more in line with economic theory in general.

4.5.4.2 Test for random effects

According to the result in the previous section, we cannot reject the null hypothesis in the $F$-test for fixed effects, indicating that the dataset may not have the presence of an individual fixed effect (country-specific effect). This being the case, we need to consider whether the random effects model (column 9 in Table XIII) can fit the dataset well. Random effects can be examined using the Lagrange Multiplier (LM) test (Breusch and Pagan, 1980). This LM test examines whether the individual specific variance components are zero ($H_0: \sigma^2_{\mu} = 0$). Baltagi and Li (1990) extended the B-P LM test into unbalanced panels. The functional LM statistic is:

$$LM_{\mu} = \frac{NT}{2(T-1)} \left( \frac{T^2 \bar{\varepsilon}' \bar{\varepsilon}}{RRSS} - 1 \right)^2 \sim \chi^2(1)$$  \hspace{1cm} (4.9)

where $\bar{\varepsilon}$ is the n*1 vector of the group means of the pooled regression residuals, and $RRSS$ is the residual sum of squares of the pooled OLS regression. This LM statistic follows a chi-squared distribution with one degree of freedom. I also employ Stata to perform this LM test\textsuperscript{19} and the result cannot reject the null hypothesis, implying that compared to the random effects model, the pooled OLS model might be preferable on statistical grounds. Even though the coefficient estimates of democracy variable exhibit expected signs and have statistical significance at the 1% level with time dummies (columns 7 to 9 in Table XIII), while it seems that the individual effects do not follow a random effect form. The result additionally indicates that the fraction of variance due to individual effects is zero. It seems that the random effects regression

\textsuperscript{18} In Stata, if we run the xtreg command with the fe option, then we can obtain the output a $F$-test that all $\mu_i = 0$.

\textsuperscript{19} In Stata, we can use command xtest0 to apply the B-P LM test after we get the estimation result of a random effects model.
does not learn that much in favor of a relevant individual effect. In other words, the random effects estimator degenerates to the pooled estimator in this case (as indicated by Theta=0.0000, see Baltagi, 2005). The random effects estimator implemented is a two-step estimator in which the error components are estimated in the first step, and GLS is implemented in the second step. It can sometimes happen that the estimates of one of the variance components is so small that it is actually negative (Baltagi, 2005).

In that case, $\sigma^2_\mu = 0$, and the result is equivalent to the pooled OLS. This is the reason why the regression result in column 10 looks the same as the one in column 9 in Table XIII hence it has the same result compared with the pooled OLS regression with a set of time dummies). One study by Maddala and Mount (1973) suggests that negative estimates of variance components occur only when the true $\sigma^2_\mu$ is small and close to zero. OLS is still a viable estimator in this case (Baltagi, 2005). Another possible reason might be that the independent variable PR in the model is an infrequently changing variable, that is, it remains unchanged over some time periods in some countries. In short, the random effects test recommends the pooled OLS model.

4.5.4.3 Test for time effects

The tests for fixed and random effects indicate that the pooled OLS might be the most appropriate model for the panel dataset in this study. However, a general pooled OLS model ignores time effects and this effect has been proved statistically significant in section 4.5.3. Therefore, we need to find out whether time effects $\lambda_t$ is independently significant with the country fixed effect $\mu_i$.

First, like the one-way individual fixed effects model case in section 4.5.1, we can use an analogous procedure to test time effects, that is, testing for $H_0: \lambda_t = 0, t = 1, \ldots, T$.

In this case the resulting $F$-statistic is (Baltagi, 2005)

$$F = \frac{(RRSS - URSS)/(T - 1)}{URSS/T(N - 1) - K} \quad (4.10)$$

In Stata, we can reset the year dummies as the group variable and get the $F$-test result.\(^{20}\)

\(^{20}\) In Stata, if we execute a normal `xtreg` command with the `fe` and `i(year)` option, we obtain at the bottom of the
Not surprisingly, the $F$-statistic for time effects equals 37.86 ($p$-value=0.0000), which is highly significant and indicates that the year dummy variables should not be excluded from the model. In other words, this result indicates that the dependent variable undergoes systematic changes at some years. Second, we can further test whether there is an individual (country) fixed effect $\mu_i$ in the presence of a time (year) fixed effect $\lambda_t$. That is,

$$H_0 = \mu_1 = \cdots = \mu_{N-1} = 0 \text{ given } \lambda_t \neq 0, \ t \leq T - 1$$

Here the RRSS is the residual sum of squares collected from the regression with time dummies only and the URSS is the residual sum of squares obtained from the two-way fixed effects model with the within estimator. In this case (Baltagi, 2005),

$$F = \frac{[(RRSS - URSS)/(N + T - 2)]/[URSS/(N - 1)(T - 1) - K]}{}$$

(4.11)

Under the null hypothesis, the $F$-statistic is distributed as $F((N+T-2), (N-1)(T-1)-K)$. I still apply Stata to get the test result$^{21}$ and the $F$-statistic can be calculated manually. The $F$-statistic equals 0.9055 ($p$-value=0.6867), which means that the individual fixed effect $\mu_i$ does not exist on the premise of time effects $\lambda_t$ from a statistical perspective. However, it is worth noting that the $F$-statistic has a no small increase and the $p$-value also decreases when compared with the ones under the one-way fixed effect model in section 4.5.1.1, indicating that the model tends to satisfy the assumption of fixed effects after the introduction of year dummy variables. Therefore, it can be concluded that time fixed effect plays a more important role than the individual fixed effect in this case.

4.5.4.4 Summary

The statistical hypothesis testing in the above sub-sections suggests that time (year) effect $\lambda_t$ can be treated as a fixed parameter while the individual (country) effect $\mu_i$ cannot. In other words, the most suitable fitted model for the dataset seems to be the fixed time effects regression or a pooled OLS regression with a full set of time

---

$^{21}$ In Stata, we can get the RRSS by running `reg` command with time dummies `i.year` and URSS by using `reg` command with country dummies `i.country` and time dummies `i.year`. 

output the $F$-test that all $\lambda_t = 0$. 

123
dummies (a model including time effects only). This regression has been produced in column 10 of Table XIII and we can see that the democracy variable is significant and bears a negative coefficient, which is consistent with the hypothesis. Time effects $\lambda_t$ only change with time periods and not with the cross-sectional units. They capture common shocks and contain all impacts not included in the explanatory variables that occurred in a specific year. This is not a rare phenomenon. For example, oil embargo undermines the global oil supply and affects its price, which is a common external shock to all oil-importing countries. (Baltagi, 2005). Despite that, there are still a few differences with the existing theories and literature because the unobserved individual effects are significant in most economic empirical studies and time-invariant country-specific factors are also reasonable in many cases. Nevertheless, most of the empirical panel studies have focused on an economic level, while the micro data such as the financial ones tend to have different features.

The international capital market gradually gets rid of barriers, cross-border capital flow accelerates, and globalization is increasingly evident. Additionally, technological advances have made it possible for large amounts of information to be transmitted quickly to different markets. Therefore, the linkage between international stock markets has become a widely-recognized fact (see, for instance, King and Wadhwani, 1990; Longin and Solnik, 2001; Ang and Bekaert, 2002). Moreover, the U.S. market plays a leading role in the global market, particularly in times of financial crisis (see, for instance, Ng, 2000; Miyakoshi, 2003; Chiang, et al., 2007). To some extent, the U.S. stock market volatility is not just a local issue, but also a global concern. Previous results tend to argue that compared to the internal factors within a country, the financial market is also vulnerable to external shocks or common trends, particularly the impact of the U.S., because of the international capital market linkages. The difference between time periods is more obvious than the difference between countries in this study. Econometrically, a panel dataset contains two dimensions of information: cross-section and time series. But that does not mean the panel regression results necessarily need to come from two dimensions at the same time (Liu and Chen, 2011). Namely,
information on a particular dimension may play a leading role in some cases. The essence of the fixed effects model is separately doing time series regressions within each individual (county) and applying a linear constraint of the same regression coefficients (this is why we can have different intercepts but the same slopes). And the essence of the time effects model is separately running cross-section regression for each time periods (year) and applying a linear constraint of the same regression coefficients. Going back to the results, the unobserved heterogeneity (different intercepts) is only for different time periods (year) and not for different countries in this case. In other words, all omitted variables (not included or unobserved) are only related to different years, they are not related to different countries in this study.

4.5.5 Heteroskedasticity and autocorrelation

In order to obtain the best linear unbiased estimated parameters in the regression model, we generally assume that there is no serial correlation and heteroskedasticity in the error terms. Gauss-Markov hypothesis is the model’s setting condition in an ideal state, while in reality, most of the variance in the error term is not constant, and the error sequence may also be auto correlated. In the previous model specification in section 4.5.1, we assumed that the error term $v_{i,t}$ is independent and identically distributed. This assumption appears to be too strict in many cases. For example, if a panel dataset has a large $N$ (cross-sectional unit) and small $T$ (time-series unit), then heteroskedasticity should be a key consideration since this kind of panel dataset mainly shows a cross-sectional characteristic. If a panel dataset has a large $T$ and small $N$ (common in macroeconomic data), then the time-series feature within the cross-sectional entities is often the focus of analysis, and a careful consideration of autocorrelation will be required in this case. In addition, cross-sectional dependence is also a relevant issue that cannot be ignored. If there is heteroskedasticity and/or autocorrelation in the model specification, the least squares estimators that we get are still linear unbiased and consistent, but not effective, not even progressively effective. In other words, the existence of heteroskedasticity and/or autocorrelation makes the statistics and confidence intervals constructed under the Gauss-Markov hypothesis no
longer valid. Ignoring these problems will result in failure of the parameter estimation and hypothesis test. In the field of financial research, the application of panel data models is more and more common, although most scholars use White’s (1980) method to calculate heteroskedasticity robust standard errors, even if many of them do not pay enough attention to serial correlation within a group and cross-sectional dependence. Petersen (2009) collected 207 papers published in the *Journal of Finance, Journal of Financial Economics* and *Review of Financial Studies* from 2001 to 2004 and found that 42% of them did not adjust standard errors for potential serial correlation and cross-section dependence. According to Petersen’s theoretical and simulation analysis, this neglect may lead to serious errors in statistical inference. At this point, a discussion about the potential impacts of these three biases on the empirical results will be presented and relevant tests to examine whether the structure of the error term is adequately captured will be performed.

### 4.5.5.1 Groupwise heteroskedasticity

We assume the error term $v_{i,t}$ is an independent identically distributed (i.i.d.) in the equation (4.3), but this assumption may be somewhat too strict in many cases. Many issues can lead to heteroskedasticity, for example, the deletion of some important explanatory variables, an inaccurate model specification form, or a difference between cross-sectional units. The heteroskedasticity mainly comes from the error term $v_{i,t}$ (the individual effects $\mu_i$ is a part of intercept) in a fixed effects model. For a random effects model, both the $v_{i,t}$ and $\mu_i$ can lead to heteroskedasticity since the error term contains these two parts (see more details in Baltagi, 2005).

A modified Wald statistic (Greene, 2012) can be used to examine the groupwise heteroskedasticity in the residuals of a fixed effects regression. It tests the null hypothesis that $\sigma_i^2 = \sigma^2, i = 1, \cdots, N$, where $N$ is the number of cross-sectional units (country). The modified Wald statistic can be expressed as follows (Greene, 2012):

$$ W' = \sum_{i=1}^{N} \left( \frac{\bar{\sigma}_i^2 - \sigma^2}{V_i} \right)^2 $$
\[ V_i = \frac{1}{T-1} \sum_{t=1}^{T} (e_{i,t}^2 - \hat{\sigma}_i^2)^2, \quad \hat{\sigma}_i^2 = \frac{1}{N} \sum_{t=1}^{N} \sigma_i^2 \] (4.12)

The resulting test statistic progressively distribute at a Chi-squared \( (N) \) distribution under the null hypothesis of homoscedasticity \( (H_0; \sigma_i^2 = \sigma^2) \). Greene (2012) argues that this test is more efficient than the Lagrange multiplier, likelihood ratio and standard Wald test because it is still workable when the assumption of normality in errors is violated. Heteroskedasticity is less important in a random effects regression because the GLS estimation method has already considered this issue to a large extent.

I use Stata to perform this test in the dataset.\(^{22}\) The result shows that the modified Wald statistic is large enough to reject the null hypothesis \( (p\text{-value}=0.0000) \). This makes sense since varying variance is a common phenomenon in the financial area. For example, the variance of stock returns is often greater in markets belonging to emerging or developing countries than among developed countries. Therefore, groupwise heteroskedasticity robust standard errors are necessary in this study.

I summarize the adjusted results in Table XIV. The estimated regression is the fixed time effects model - the original estimation is presented in column 10 in Table XIII. I follow the general approach, which uses the Huber-White robust standard errors\(^{23}\) (Huber, 1967; White, 1980) and exhibit the result in column 1 (Table XIV). It can be seen that the coefficient estimates are consistent with the ones in column 10 (Table XIII) while the estimated standard deviations of the core variables increase by varying degrees. In addition, I use an alternative method called a two-step GLS (Parks, 1967) to get the heteroskedasticity robust standard errors for the purposes of comparison. Briefly, this procedure first uses OLS to estimate the regression without the consideration of heteroskedasticity, it then uses the estimated residuals to compute \( \hat{\sigma}_i^2 \) and finally obtain the FGLS estimators. The result for this approach is shown in column 2.\(^{24}\) The coefficient estimates obtained by using this FGLS method are slightly

\(^{22}\) In Stata, we can use the `xttest3` command to execute this modified Wald statistic after a fixed effect estimation.

\(^{23}\) In Stata, we can add the `robust` or `vce(robust)` option after the `reg` or `xtreg` command to get the robust standard errors.

\(^{24}\) In Stata, we can run the `xtgls` command to perform this FGLS estimation procedure. The command will estimate a fixed effects model if we include country/year dummies; otherwise it will estimate a random effects model.
different because of the different estimation procedure. Most importantly, the positive relationship between democracy improvement and stock returns is still significant at the 1% level. Nevertheless, the standard errors are slightly smaller when compared with the corresponding ones in column 10 (Table XIII). This is possible because Beck and Katz (1995) proves that the standard error generated by the FGLS approach is too small. Hence, this regression result is only provided as a comparison.

4.5.5.2 Time-series dependence

Time-series dependence, otherwise known as serial correlation, is a very common phenomenon in time-series analysis, and it may also exist in a panel dataset. In the previous model discussion, we assume that the individual effects \( \mu_i \) can effectively capture the cross-sectional correlation within units, and then assume that the error term \( v_{i,t} \) is i.i.d. That is, \( v_{i,t} \) is independent across different individuals as well as across different time points within a specific group. This is obviously an overly rigorous assumption in many cases. There are many causes for serial correlation, such as economic momentum, the hysteresis effect, and model specification bias. Serial correlation underestimates the standard errors and causes the estimation results to be less efficient. For a panel data set with a large \( T \), \( \mu_i \) often cannot fully reflect the serial correlation, then the error term \( v_{i,t} \) may be serial correlated, and it is set as an AR(1) process in the most cases. Therefore, it is necessary to diagnose whether serial correlation in the idiosyncratic error term in a linear panel-data model exists.

Scholars have proposed a number of test methods for serial correlation in panel data study (see, for instance, Baltagi and Li, 1995; Li and Hsiao, 1998; Karlsson and Skoglund, 2004; Inoue and Solon, 2006). Here I focus on a test proposed by Wooldridge (2002). Drukker (2003) indicates that the serial correlation test given by Wooldridge (2002) is proposed in the case of a weaker constraint, which has a wider scope of application and the statistical nature is more robust. Wooldridge’s method uses the residuals from a regression in first-differences. For a general fixed effect model, its first differencing form is as follows:
\[ \Delta y_{i,t} = \Delta x_{i,t} \beta + \Delta \epsilon_{i,t} \]  

(4.13)

If we set \( \epsilon_{i,t} = \rho \epsilon_{i,t-1} + u_{i,t} \), then we can have \( \Delta \epsilon_{i,t} = \rho \Delta \epsilon_{i,t-1} + \Delta u_{i,t} \). So, the null hypothesis for serial correlation is \( H_0: \rho = 0 \ v.s. \ \rho \neq 0 \). The following relationship can be proved if the null hypothesis is true:

\[ Corr(\Delta \epsilon_{i,t}, \Delta \epsilon_{i,t-1}) = -0.5 \]  

(4.14)

The OLS estimator of equation (4.13) is consistent even if there is serial correlation. Assume that the residual estimate is \( \hat{\epsilon}_{i,t} \), then we can regress \( \hat{\epsilon}_{i,t} \) on \( \hat{\epsilon}_{i,t-1} \) on a OLS framework and define the estimated coefficient value as \( \hat{\theta} \). Then the above serial correlation test is transformed into a test to check whether \( \hat{\theta} \) is significantly different from -0.5, which can be done using the general t-test (Wooldridge, 2002; Drukker, 2003). We do not need to implement it manually because we can use a \textit{xtserial} command from Drukker (2003). This command performs a Wald test, where under the null hypothesis there is no first order autocorrelation.\(^{25}\) Here I test the regression without the time effects indicator and dummy variables because I want to know whether the stock returns series has autocorrelation over the time period 1975-2015 within each county. The result shows that the \textit{F}-statistic equals 0.022 (\textit{p}-value=0.8817), which means that we cannot reject the null hypothesis and there is no serial correlation. Therefore, the relevant test result demonstrates that we do not need to adjust the standard errors for time-series dependence in this study. Serial correlation test for a random effects model is relatively more complicated (see more details in Baltagi, 2005), but we do not introduce and run the serial correlation test for the random effects model since the discussion in section 4.5.4 reveals that the random effects model may not be appropriate for this case.

4.5.5.3 Cross-sectional dependence

It is not only the serial correlation that may be a problem in a panel dataset; correlation across different cross-sectional units may also exist and this is, called cross-sectional dependence. This issue may be more important than groupwise heteroskedasticity and

\(^{25}\) In Stata, we can use the \textit{xtserial} command to carry out this Wooldridge test for serial correlation in the panel-data models.
time-series dependence in a financial study because there is a strong correlation between financial markets in different countries due to cross-border capital flows and economic globalization. This linkage has been confirmed in the literature (see, for instance, King and Wadhwani, 1990; Longin and Solnik, 2001; Ang and Bekaert, 2002). External shocks such as financial crises, commodity price fluctuations, and major political events further strengthen such links. Therefore, consideration of the correlation across different cross-sectional units in the panel data is necessary.

Next, I perform several tests to examine whether the error terms are independent across cross-sections in the panel data model. The Breusch-Pagan LM test is only valid for a small $N$ and large $T$ panel dataset which is not suitable here (Hoyos and Sarafidis, 2006). Hence, here I check the cross-sectional independence by implement two semi-parametric tests which proposed by Friedman (1937) and Frees (1995, 2004), as well as a parametric test which proposed by Pesaran (2004). Pesaran's (2004) test is able to handle balanced and unbalanced panels. Pesaran’s statistic can be calculated by averaging the residuals’ correlation coefficients from the individual OLS regression and it is expressed as:

$$ CD = \sqrt{\frac{2T}{N(N-1)}} \left( \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{\rho}_{i,j} \right) \quad (4.15) $$

This statistic progressively follows a standard normal distribution under the null hypothesis for cross-sectional independence. Friedman (1939) proposed a test based on Spearman’s rank correlation coefficient and the statistic is asymptotically chi-squared distributed with $T-I$ degrees of freedom and is given by:

$$ R_{AVE} = \frac{2}{N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} \hat{r}_{i,j} \quad (4.16) $$

Frees (1995, 2004) proposed another test based on the sum of the squared rank correlation coefficients and the relevant statistic equals:

$$ R_{AVE}^2 = \frac{2}{N(N-1)} \sum_{i=1}^{N-1} \sum_{j=i+1}^{N} t_{i,j}^2 \quad (4.17) $$

This statistic follows Frees' Q distribution (T-asymptotically distributed). I use a Stata
command to test for the presence of cross-sectional dependence. All three tests reject the null hypothesis and confirm the existence of cross-sectional dependence (p-value=0.0000). This is possible in a financial study because some phenomena, such as financial crises, do not affect stock markets individually, but instead impact on global markets uniformly within a certain time period. Therefore, we need to correct standard errors for cross-sectional dependence to get the unbiased and efficient estimation. Beck and Katz (1995) suggest using a pooled OLS to estimate the parameters while adopting panel-corrected standard errors (PCSE) as the adjusted standard errors. In a panel data set with large T and N, PCSE can simultaneously correct the issues of heteroskedasticity and autocorrelation and get robust results (PCSE is progressively effective when $T \to \infty$). The regression results by using PCSE can be found in column 3 (Table XIV). The regression has the same coefficient estimates as in my favoured regression in column 10 (Table XIII), while the standard errors estimates are apparently larger.

Moreover, clustered standard error estimates can also be used to deal with the cross-sectional dependence. A cluster means that observations are related with each other within certain groups. I confirm the presence of cross-sectional dependence in the dataset, which means that stock returns belonging to the same time unit (year) will be correlated across different countries. Hence, we can set standard errors adjusted for clusters in year, which means that we are assuming independence across different years but correlation within one specific year (which accounts for the cross-sectional dependence). The regression results with the adjusted standard errors clustered by year and robust to heteroskedasticity can be found in column 4 (Table XIV). Unsurprisingly, clustered robust standard errors increase confidence intervals because we are allowing for a correlation between stock returns within each year. The final

---

26 In Stata, we can use the `xtcsd` command with option `pesaran, friedman and frees` to run the three tests. This command is suitable for both fixed effects and random effects models.

27 In Stata, we can use the `xtpcse` command to replicate the regression in column 10 (Table XIII) with the introduction of time dummies.

28 In Stata, we can use the `reg` command and add `i.year` term to control time effect, as well as `robust and cluster (year)` option to get the coefficient estimates and adjusted standard errors which robust to heteroskedasticity and cross-sectional dependence.
statistical inference becomes more conservative than before (the significance level of PR variable increases from 1% to 5%). The most important thing is that the positive correlation between democracy improvement and stock returns remains significant, regardless of the estimation method.

4.5.5.4 Summary

In the above analysis, I measured the specific forms of heteroskedasticity and autocorrelation through different statistical tests. The results reveal the presence of groupwise heteroskedasticity and cross-sectional dependence among the estimated regression residuals. Subsequently, I followed the logic of White (1980) and Newey and West (1987), who suggest utilizing pooled OLS, fixed effects or random effects to get the parameter estimates and adjusting the standard errors according to the corresponding heteroskedasticity, time-series or cross-sectional correlation. Furthermore, two important studies from Petersen (2009) and Gow et al. (2010) compare various different standard error adjustment methods. Their Monte Carlo simulation results document that clustered robust standard errors have a very high degree of robustness and are close to the actual values. Their rejection rates are also close to nominal levels. Moreover, I introduce a nonparametric covariance matrix estimator, proposed by Discoll and Kraay (1998), to make the analysis more complete and robust. This method further controls the effects of cross-sectional dependence on the basis of the Newey and West (1987) serial correlation robust estimator. The advantage of obtaining robust standard errors using this approach is that the variance-covariance matrix estimators do not depend on the numbers of cross-sectional units - $N$. This means that it can effectively overcome the shortcomings of the aforementioned Parks (1967), Kimenta (1986) and Beck and Katz (1995) estimators (asymptotic efficient only when $T$ tends to infinity and not precise enough when $T/N$ is relatively small). Specifically, Discoll and Kraay (1998) average the moments of all of the individuals in the same time period ($t$), so that the heteroscedasticity and serial

29 Arellano (2003, 19) also made a more detailed discussion of this estimation method.
correlation robust variance estimator based on time series (Newey and West, 1987) can be applied to panel data. Hoechle (2007) extends this approach and makes it possible to estimate the unbalanced panel. It should be noted that I am not claiming that this method can provide a better result, and use it only for comparison. The relevant result is shown in column 5 (Table XIV). It can be seen that this procedure provides similar standard errors to the clustered robust adjustment and the influence of the PR variable remains stable and significant at the 5% level.

30 In Stata, command `xtscctc` estimates the pooled OLS and fixed effects (within) regression models with Discoll and Kraay (1998) standard errors.
### Table XIV Regressions of MSCI market cap indexes returns on democracy level and relevant controls: Correction for heteroskedasticity and cross-sectional correlation

Analysis on the influence of democracy development on MSCI returns with robust standard errors. This table presents estimates from the fixed time effect model (consistent with the OLS regression with time dummies in column 10 in Table XIII). Regressions in column 1 to 5 use several different adjustments to correct standard errors robust to the groupwise heteroskedasticity and cross-sectional correlation. Column 1 exhibits the Huber-White robust standard errors. Column 2 uses a two-stage FGLS estimation with heteroscedasticity robust standard errors. Column 3 shows the panel-corrected standard errors. Column 4 displays the clustered robust standard errors which robust to groupwise heteroscedasticity and cross-sectional correlation at the same time (cluster by year). Column 5 uses the Discoll and Kraay estimator (1998) which robust to heteroscedasticity, time-series dependence and cross-sectional dependence. Both regressions except the regression in column 2 use the pooled OLS estimation method with a full set of time dummies to control time effects. Above mentioned standard errors are reported into parentheses. *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of 1975 to 2015.

<table>
<thead>
<tr>
<th>Model</th>
<th>Independent variable</th>
<th>OLS (White)</th>
<th>FGLS</th>
<th>PCSE</th>
<th>OLS (Cluster)</th>
<th>OLS (D.K.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
<td>(5)</td>
</tr>
<tr>
<td>PR</td>
<td></td>
<td>-0.0464***</td>
<td>-0.0435***</td>
<td>-0.0464***</td>
<td>-0.0464**</td>
<td>-0.0464**</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0137)</td>
<td>(0.0103)</td>
<td>(0.0156)</td>
<td>(0.0191)</td>
<td>(0.0189)</td>
</tr>
<tr>
<td>GDP_GROWTH</td>
<td></td>
<td>1.1140***</td>
<td>0.9192***</td>
<td>1.1140***</td>
<td>1.1140***</td>
<td>1.140***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.2863)</td>
<td>(0.1885)</td>
<td>(0.2547)</td>
<td>(0.2368)</td>
<td>(0.1667)</td>
</tr>
<tr>
<td>INFLATION</td>
<td></td>
<td>0.0661**</td>
<td>0.0656***</td>
<td>0.0661***</td>
<td>0.0660*</td>
<td>0.0660***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0277)</td>
<td>(0.0208)</td>
<td>(0.0207)</td>
<td>(0.0383)</td>
<td>(0.0198)</td>
</tr>
<tr>
<td>INFLATION²</td>
<td></td>
<td>-0.0024*</td>
<td>-0.0025***</td>
<td>-0.0024***</td>
<td>-0.0024</td>
<td>-0.0024***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0013)</td>
<td>(0.0008)</td>
<td>(0.0009)</td>
<td>(0.0017)</td>
<td>(0.0009)</td>
</tr>
<tr>
<td>SYSTEM</td>
<td></td>
<td>-0.0095</td>
<td>-0.0022</td>
<td>-0.0095</td>
<td>-0.0095</td>
<td>-0.0095</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0158)</td>
<td>(0.0130)</td>
<td>(0.0166)</td>
<td>(0.0161)</td>
<td>(0.0142)</td>
</tr>
<tr>
<td>RIGHT_WING</td>
<td></td>
<td>-0.0156</td>
<td>-0.0152</td>
<td>-0.0156</td>
<td>-0.0156</td>
<td>-0.0156</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0167)</td>
<td>(0.0133)</td>
<td>(0.0148)</td>
<td>(0.0168)</td>
<td>(0.0155)</td>
</tr>
<tr>
<td>LEFT_WING</td>
<td></td>
<td>0.0019</td>
<td>-0.0042</td>
<td>0.0019</td>
<td>0.0019</td>
<td>-0.0022</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0166)</td>
<td>(0.0133)</td>
<td>(0.0107)</td>
<td>(0.0168)</td>
<td>(0.0146)</td>
</tr>
<tr>
<td>RELIGION</td>
<td></td>
<td>0.0128</td>
<td>0.0097</td>
<td>0.0128</td>
<td>0.0128</td>
<td>0.0128</td>
</tr>
<tr>
<td></td>
<td>1st Sample</td>
<td>2nd Sample</td>
<td>3rd Sample</td>
<td>4th Sample</td>
<td>5th Sample</td>
<td></td>
</tr>
<tr>
<td>---------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>ELECTION_EXE</td>
<td>0.0103</td>
<td>0.0085</td>
<td>0.0103</td>
<td>0.0103</td>
<td>0.0103</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0265)</td>
<td>(0.0222)</td>
<td>(0.0217)</td>
<td>(0.0262)</td>
<td>(0.0218)</td>
<td></td>
</tr>
<tr>
<td>ELECTION_LEG</td>
<td>-0.0050</td>
<td>-0.0087</td>
<td>-0.0050</td>
<td>-0.0050</td>
<td>-0.0050</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0151)</td>
<td>(0.0113)</td>
<td>(0.0104)</td>
<td>(0.0160)</td>
<td>(0.0141)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.1430**</td>
<td>0.1832***</td>
<td>0.1430**</td>
<td>0.1430***</td>
<td>0.1430***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0558)</td>
<td>(0.0464)</td>
<td>(0.0700)</td>
<td>(0.0167)</td>
<td>(0.0198)</td>
<td></td>
</tr>
<tr>
<td>Individual effect</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Time effect</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.4812</td>
<td>0.4812</td>
<td>0.4812</td>
<td>0.4812</td>
<td>0.4812</td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>1663</td>
<td>1663</td>
<td>1663</td>
<td>1663</td>
<td>1663</td>
<td></td>
</tr>
</tbody>
</table>
4.5.6 Further discussion

The analysis in the previous sub-sections revealed that there is a positive relationship between stock market returns and the degree of democracy. Cahan et al. (2005) argue that it is possible that the difference in stock returns between political regimes may have a simple explanation, such as the financial market volatility risk. I endeavour to investigate whether this is indeed the case. More specifically, this study uses a dynamic panel data estimation method (system GMM), where the annualized MSCI return volatility is regressed against its lag, the PR variable and other controls:

\[ \text{Vol}_{i,t} = \gamma + \lambda \text{Vol}_{i,t-1} + \alpha \text{PR}_{i,t} + \sum_{j=1}^{9} \beta_j \text{Control}^j_{i,t} + u_t + \varepsilon_{i,t} \]  

(4.18)

where \( \text{Vol}_{i,t} \) is the annualized MSCI return volatility for country \( i \) at year \( t \). I include the lags of Vol as independent variables on the right-hand-side of the equation since the financial literature indicates that the volatility of financial asset shows an autoregressive process (cite ARCH, GARCH – Engle Bollerslev). The other settings of this specification are similar to the previous return model. System GMM is a method based on the work of Arellano and Bond (1991) and was further developed by Arellano and Bover (1995) and by Blundell and Bond (1998). System GMM combines the difference GMM and level GMM as an integrated system to perform the parameter estimation. Its advantage is that it can improve the efficiency of the estimation and can estimate time-invariant variables. \(^{32}\) This procedure aims to find out whether the democratic government returns premium is the result of higher volatility risk, as higher uncertainty leads investors to require higher compensation on their investment. Regression (4.18) explores this issue and is estimated through both static and dynamic panel data methods. \(^{33}\)

---

\(^{31}\) The annualized MSCI return volatility was calculated as standard deviations of monthly MSCI country returns multiplied by the square root of 12, annual from 1975-2015. MSCI country returns are measured in U.S. dollars.

\(^{32}\) A regular fixed effects model is inconsistent in a dynamic panel, and it has been called as “dynamic panel bias” (Anderson and Hsiao, 1981).

\(^{33}\) In Stata, we can use command “xtdpdsys” or “xtabond2” to do the system GMM estimation.
Table XV Regressions of MSCI market cap indexes volatility on democracy level and relevant controls

Estimation results of equation (4.18) with annualized MSCI country index returns volatility as dependent variable. The estimations are performed with the following two methods: pooled OLS (column (1)), system GMM by Blundell and Bond (1998) (column (2)). The base sample is an unbalanced yearly panel from 1975 to 2015 for 74 stock markets. ***, ** and * denote statistical significance at 1, 5 and 10% levels, respectively. In the Sargan test, the null hypothesis is that the instruments are valid, whereas in the AR(2) test, the null hypothesis is that the errors in the first difference regression exhibit no second order serial correction. Heteroskedasticity robust standard errors are in parenthesis.

<table>
<thead>
<tr>
<th>Model</th>
<th>Static (pooled OLS)</th>
<th>Dynamic (system GMM)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dependent variable is MSCI market cap indexes volatility for 74 countries over 1975-2015</td>
<td></td>
</tr>
<tr>
<td>Independent variables</td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>( V_{\text{ol}}_{t-1} )</td>
<td>0.2932***</td>
<td>0.2065***</td>
</tr>
<tr>
<td></td>
<td>(0.03609)</td>
<td>(0.0759)</td>
</tr>
<tr>
<td>PR</td>
<td>0.1634***</td>
<td>0.2065***</td>
</tr>
<tr>
<td></td>
<td>(0.0200)</td>
<td>(0.0464)</td>
</tr>
<tr>
<td>GDP_GROWTH</td>
<td>-0.9193**</td>
<td>-2.7545***</td>
</tr>
<tr>
<td></td>
<td>(0.3891)</td>
<td>(0.4335)</td>
</tr>
<tr>
<td>INFLATION</td>
<td>0.1667***</td>
<td>-0.01142</td>
</tr>
<tr>
<td></td>
<td>(0.0464)</td>
<td>(0.1104)</td>
</tr>
<tr>
<td>INFLATION²</td>
<td>-0.0048***</td>
<td>0.0005</td>
</tr>
<tr>
<td></td>
<td>(0.0018)</td>
<td>(0.0032)</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>0.0066</td>
<td>-0.2412</td>
</tr>
<tr>
<td></td>
<td>(0.0252)</td>
<td>(0.1115)</td>
</tr>
<tr>
<td>RIGHT_WING</td>
<td>-0.0204</td>
<td>0.0265</td>
</tr>
<tr>
<td></td>
<td>(0.0247)</td>
<td>(0.0777)</td>
</tr>
<tr>
<td>LEFT_WING</td>
<td>-0.0064</td>
<td>0.0106</td>
</tr>
<tr>
<td></td>
<td>(0.0257)</td>
<td>(0.0995)</td>
</tr>
<tr>
<td>RELIGION</td>
<td>-0.0655</td>
<td>0.0495</td>
</tr>
<tr>
<td></td>
<td>(0.0301)</td>
<td>(0.1266)</td>
</tr>
<tr>
<td>ELECTION_EXE</td>
<td>0.1435</td>
<td>0.0136</td>
</tr>
<tr>
<td></td>
<td>(0.0417)</td>
<td>(0.0547)</td>
</tr>
<tr>
<td>ELECTION_LEG</td>
<td>-0.0049</td>
<td>0.0181</td>
</tr>
<tr>
<td></td>
<td>(0.0242)</td>
<td>(0.0244)</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.5748***</td>
<td>-0.9572***</td>
</tr>
<tr>
<td></td>
<td>(0.0953)</td>
<td>(0.1266)</td>
</tr>
<tr>
<td>Observations</td>
<td>1663</td>
<td>1595</td>
</tr>
<tr>
<td>AR(2) test</td>
<td>[0.4755]</td>
<td>[0.9998]</td>
</tr>
<tr>
<td>Sargan test</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The results reported in Table XV show that stock returns volatility is in fact higher for autocratic countries since the coefficient of the PR variable is positive and significant in both the static and dynamic specifications. Apparently, market participants in democracies benefit from profitable stock investment opportunities at a relatively low level of volatility. Such outcomes are rather puzzling and raise the intriguing questions of why the stock returns of democratic countries cannot be explained by their risk levels.

Next, I will try to offer some explanations regarding these results which depart from the standard risk-return nexus. First, some behavioural finance scholars suggest that stock prices can also reflect “psychological” factors, such as investors’ sentiments, in addition to the general financial risk factors (see, for instance, Statman, 1999; Thaler, 1999). Investors’ sentiment refers to beliefs that are not rooted in facts. Due to asymmetric information and other uncertainties, it is very difficult for investors to price assets accurately, so they can only form imprecise expectations to guide their investment behaviours.

In the context of our investigation, the general attitude of investors towards democratic governments may be excessively positive compared to that in regard to autocratic governments due to the negative portrayal of dictators in international media. Investors’ sentiments are easily influenced by media reportage, which further affects financial market behaviours (Tetlock, 2007). Due to ideology, culture, historical prejudices, international politics and other reasons, Western media who hold the power of international discourse often hold negative views on autocratic governments. Such negative reports and impressions evoked may indirectly affect the general confidence of investors in the financial markets of autocracies, which may provoke international capital outflows and falls in stock prices. Some studies argue that negative reports can have negative effects on companies’ stock prices and returns (see, for instance, Tetlock, et al. 2008; Wisniewski and Lambe 2013; Ahern and Sosyura, 2014). I think that this
mechanism could be extended to a more general perspective, that is, the negative media coverage of autocratic governments may reduce the interest of international investors in making financial investments in those countries.

Second, an autocratic political system may face more unexpected protests, conflicts and rebellions and a higher level of political instability. Such developments are undoubtedly not welcomed by financial markets and may cause the realized returns to be substantially lower than the expected returns. The extent to which investors fail to anticipate negative developments in autocratic countries could contribute to the lower observed returns.

4.6 Robustness Checks
Robustness tests are performed to assess the stability of the model and the explanatory power of the variables. In other words, when changing some parameters or settings, the model and relevant variables should provide a relatively consistent and stable interpretation of the result. The original estimation strategy included robustness checks by utilizing different specifications of panel models and results with and without robust standard errors. In this section, I will provide further robustness checks to support my results. An overview of the results of the robustness tests is presented in Table XVI.

4.6.1 Controlling for endogeneity
From the perspective of econometrics, the key explanatory variable – democracy in the preceding analysis may be endogenous in nature. The relationship shown by the regression equations is only a correlation/partial correlation, rather than the causal relationship. Therefore, the endogeneity issue is whether capital market performance can accelerate democratisation? In other words, one needs to check whether the democratic indicator is an exogenous variable relative to financial variables such as stock returns.
Based on the economic literature, Lipset (1959) argues that democracy must be based on economic development because the middle class is the backbone of democracy, and only when the middle class has grown and consolidated, then the community can have the ability to counter dictatorship, and democratic politics can be formed. This is so-called the Lipset hypothesis. This point of view is also supported by studies such as Huber et al. (1993) and Putnam et al. (1994). Barro (1999) further provides empirical evidence to prove that economic growth does guarantee democracy, and democratic system without the economic support is absolutely impossible to sustain.

On the other hand, new institutional economists such as Acemoglu et al. (2003; 2005; 2008) and Rodrik (2003) do not agree with this point of view. They believe that the reason why some studies have found that economic growth promotes democracy development, is related to model bias issues like omitted variables. They argue that there is no absolute two-way causal relationship between economic growth and democracy. While some scholars in finance have emphasized that good institutional arrangement is an important condition for financial development and prosperity, few researchers were directly concerned with the role of financial development in a country’s democratic development. Oppenheim (2007) talked about the importance of monetary policy in the rise of European democratic countries. He emphasises that the monetary economy developed in synchronism with urbanization and the capital (merchant class) gradually replaced the aristocracy, and became the centre of life throughout the country. This change completely destroyed the natural economy and feudal countries, and promoted the development of capitalism and democratic politics. In addition, there may be a positive relationship between financial development and legal system. Coffee (2001) put forward a point of view on the relationship between financial development and law. The primary market developed first, and then it was possible to have legal changes based on the “stockholder centralism”, thus further promoting and deepening the market. While the stock exchange has appeared in the middle of the 17th century, fostering the phenomenon of ownership dispersion, the
decentralized equity and minority shareholders lacked effective legal protection at that time. The legal system for the protection of securities investors was established gradually after the 20th century. Coffee (2001) further explains that legal changes may only take place in the pursuit of interest groups when they believe that these changes can protect their interests. In this sense, financial development will precede the legal development in the early stages of market development, and then the legal changes can further promote financial deepening. In short, there is currently little research on the relationship between political regimes and financial markets, hence this study mainly analyses this issue from an empirical perspective.

Econometrically speaking, one way to address potential endogeneity issues is to use the instrumental variable method to estimate the model. The prerequisite for instrumental variable estimation is to find valid instrumental variables, and these instrumental variables must meet the several criteria. First, it should only through the possible endogenous independent variables (here is the democracy variable) to influence the dependent variables (here is the stock returns). Second, the instrumental variables must be exogenous and have significant effects on the endogenous explanatory variables (Wooldridge, 2002). If the instrumental variable is valid and the key explanatory variable is endogenous, then we should use a two-stage estimation (2SLS) because the OLS estimation is inconsistent (Wooldridge, 2002). On the other hand, if the instrumental variable is valid but the key explanatory variable does not have endogeneity, then the result of non-instrumental analysis should be accepted because the instrument variable estimation will lose the estimation efficiency in this case. In short, it is only in the case that the endogenous issue is adequately addressed, that we can be more confident that the empirical results are valid and robust.

In order to solve the possible endogeneity issue, we need to find a suitable instrumental variable for the democracy indicator in the analysis, and use the relevant statistical techniques to verify the validity of the instrumental variable and the existence of
endogenous issue. Specifically, here I introduce the infant mortality rate and life expectancy as instrumental variables for the Freedom House democracy indicator. A majority of studies that analyse the impact of political regimes on national health outcomes suggest that political democratisation can improve national health indicators such as life expectancy, infant mortality rate, or maternal mortality rate. (see, for instance, Zweifel and Navia, 2000; Franco et al., 2004; Besley and Kudamatsu, 2006; Gerring et al., 2012). National health indicators may be suitable exogenous variables for financial variables because they do not have an economic link and as far as I know there is no study mentioned similar relationships. Therefore, this study will use life expectancy at birth and infant mortality rate as instrumental variables. Data of these two variables are derived from the World Bank database, and the life expectancy has a logarithmic form and the infant mortality rate is measured as per 100 live births. Next, a series of statistical analyses and tests will be used to validate the validity of this instrumental variable.

First, a LM version of the Anderson (1951) canonical correlations test is performed to check whether there is an underidentification issue. This underidentification test checks whether the equation is underidentified, that is, the included instrumental variables are not “relevant”, meaning not correlated with the endogenous variables. The null hypothesis for this test is that the equation is underidentified, and the statistic is distributed as chi-squared under the null. A rejection of the null indicates that the equation is identified. Here I re-estimate the favoured time-fixed regression which excluded dummy variables and include the life expectancy and infant mortality rate as instruments for the Freedom House democracy indicator (PR). The statistic of Anderson LM statistic is 346.497\(^{34}\), which shows that we can reject the null hypothesis and the instruments do not have the underidentification issue (\(p\)-value=0.0000). However, even if there is no underidentification issue, the instrumental estimation may

\(^{34}\) In Stata, we can use unofficial commands \texttt{ivreg2} (Baum et al., 2010) or \texttt{xtivreg2} (Schaffer, 2010) to estimate equations based on instrumental OLS or panel model estimations. And these two commands automatically report results for a LM version of the Anderson canonical correlations test.
still have an issue of weak instruments. In other words, although the instrumental variable is correlated to the endogenous explanatory variable, this correlation is not strong. Estimators will perform poorly when instruments are weak. The Cragg-Donald (1993) Wald F-test can be used to test this issue and Stock and Yogo (2005) provided critical values for this Cragg-Donald F-statistic for several different estimators and a range of configurations. The Cragg-Donald F-statistic for my equation is 213.434, which is higher than any Stock-Yogo critical values (5.53 - 16.38) and thus can reject the null hypothesis of weak instruments at all given acceptable “true significance levels” (10% - 25%). Therefore, the instrumental approach I selected does not suffer from an issue of weak instruments. In addition, I introduced the heteroscedastic and cluster robust standard errors in my previous analysis, that is, the i.i.d. assumption is dropped. In this case, we should look at the correspondingly-robust Kleibergen-Paap (2006) rk LM or Wald F-statistic instead of the Anderson LM and Cragg-Donald Wald statistics because they are no longer valid. These two statistics are 258.383 and 138.141 (p-values=0.0000), respectively. We can still reject the null hypothesis and the instrumental variables are also valid. There may be another issue of overidentification with instrumental variables. If there is only one instrumental variable (exactly identified), then it is currently accepted that it is not possible to statistically test whether the instrumental variable is correlated with the error terms. Here, we have two instrumental variables, hence we can use the overidentification test. The Sargan-Hansen test can be employed to examine this issue and the basic of this test is to test the rationality of the instrumental variable, that is, whether it is correlated with the endogenous variables, but is uncorrelated with the error terms (Hayashi, 2000). The null hypothesis of this test is that all the instrumental variables are exogenous. The Sargan-Hansen statistic is 0.023 (p-value=0.8799), indicating that we cannot reject the

35 In Stata, the *ivreg2* and *xtivreg2* commands can automatically report an F version of the Cragg-Donald Wald statistic and the Stock-Yogo critical values.

36 Kleibergen-Paap rk LM statistic is used to test the underidentification issue and Kleibergen-Paap rk Wald F statistic is for the issue of weak instruments.

37 In Stata, if command *ivreg2* or *xtivreg2* is invoked with the *robust*, *bw* and/or *cluster* option, the Kleibergen-Paap rk statistic will be automatically reported.
null hypothesis and these two instruments are valid.\textsuperscript{38} If we consider the presence of heteroskedasticity and autocorrelation, then the Hansen's J statistic will be used instead of the Sargan-Hansen statistic since it is still consistent (Hayashi, 2000). The Hansen's J statistic is 0.015 ($p$-value=0.9018), which also shows that the instruments are valid.\textsuperscript{39} In short, the life expectancy and the infant mortality rate can be used as instruments for the democratic variable to check the endogeneity issue according to the results of a series of econometric tests.

The use of instrumental variable estimation method assumes the presence of some endogenous explanatory variables in the specification, which is needed to test. Since the error term is unobservable, we cannot directly test the correlation between explanatory variables and error terms. We have shown that national health indicators can be seen as valid instruments for the Freedom House democratic variable, then we can use these instruments to test the endogeneity of democratic variable. If all explanatory variables are exogenous, the OLS estimation is more efficient than the instrumental variable estimation.\textsuperscript{40} Conversely, if the key explanatory variable is endogenous, then the OLS estimation is inconsistent and the instrumental variable estimation is consistent. The Durbin-Wu-Hausman test (Durbin, 1954; Wu, 1974; Hausman, 1978) can be used to explain the existence of endogeneity, and it is a commonly used test by researchers. Specifically, I re-estimate the pooled OLS model with time dummies and include the life expectancy and the infant mortality rate as instruments for the Freedom House democratic variable. The test statistic is 0.0617 ($p$-value=0.8039) if we consider the heteroscedastic robust standard errors.\textsuperscript{41} This result indicates that we fail to reject the null hypothesis that the Freedom House democratic

\textsuperscript{38} In Stata, command \texttt{ivreg2} or \texttt{xtivreg2} automatically report the result of Sargan-Hansen overidentification test for all instrumental variables.
\textsuperscript{39} In Stata, if we add \texttt{robust}, \texttt{bw} and/or \texttt{cluster} option after the command \texttt{ivreg2} or \texttt{xtivreg2}, Hansen's J statistic is reported.
\textsuperscript{40} The OLS estimation is “BLUE” when the spherical disturbance assumption is satisfied while the instrumental variable estimation is not. When all explanatory variables are exogenous, 2SLS estimation is the same as OLS estimation and 2SLS is progressively effective.
\textsuperscript{41} In Stata, we can use command \texttt{estat endogenous} after the \texttt{ivregress} estimation, then we will get the Durbin-Wu-Hausman statistics or the Wooldridge's (1995) robust score statistic if we add \texttt{robust} or \texttt{cluster} option.
variable is exogenous. In other words, the endogeneity issue can be ignored and we would go with the OLS estimation because OLS is efficient under the null.

To sum up, we have not only found that the instrumental variables (national health indicators) have good effectiveness through a series of econometric analysis and related tests, but more importantly, the possibility of endogeneity of the key explanatory variable (democracy) can be excluded, which means that estimates without instrumental variable is credible and has a higher statistical efficiency. This is not surprising since we did not find evidence to support the two-way causal relationship between democracy development and stock market performance in the literature.

4.6.2 Levels and changes

Suppose we include changes in the democracy measurement PR as an explanatory variable instead of the levels. This would entail a presumption that changes in the democracy level induce effects on stock returns. If the level of democracy is not changing there is no effect on stock returns, implying that a change has only temporary effects on stock market performance. If the stock returns are regressed against levels of the democracy variables, then a higher level of political freedom is assumed to have a permanent effect on stock market performance. These two interpretations may both hold, political freedom has a positive effect on stock movements, which increase securities investments but the marginal return will not far beyond the initial value, so this effect may be temporary. On the other hand, political freedom may have permanent effects since it comes from institutional environment and many factors affect stock market participation.

Therefore, using the change in democracy measurement PR seems to be an appropriate specification. I further include the changes of democracy level in the regression to see what happens. The other settings of the equation remain unchanged, and the only
difference is that I use the changes in democracy as the core explanatory variable. The relevant results are exhibited in column 1 of Table XVI. It can be seen that the changes in democracy is highly significant (1% level) and an improvement in democracy has a positive effect on stock returns. Quantitatively, the coefficient estimate of delta PR is -0.1421 (standard error=0.0524), indicating that if democracy improvement accelerates by one unit, then stock returns can be expected to increase by 0.1421 percentage points. The coefficient estimates for the remaining independent variables are similar to the level regression. Specifically, macroeconomic indicators can provide some explanatory power while other political factors cannot. This result provides more evidence to support my findings from another perspective.

4.6.3 Alternative democracy measure

Democracy is a complex political and social concept, so it is difficult for us to use quantitative methods for accurate measurement. Although different scholars have already considered the trade-off between coherence and operability when building their political indicators, there are still many similar indicators and the correlation between them is large (Casper and Tufis, 2003). Choosing what kind of measure as the data source might be a potential issue. There has been some criticism of the measures of democracy that are typically used (see, for instance, Munck and Verkuilen, 2002), and we understand that neither of the democracy measures is perfect. Therefore, in order to make the study more comprehensive and robust, I introduce an alternative democracy measure – the Polity IV index. This variable is obtained from the Polity IV project and available for the entire sample period for all of the countries studied.42 This dataset is also one of the most widely used measures in political research (Munck and Verkuilen, 2002) and it is highly correlated with the Freedom House dataset (Casper and Tufis, 2003). Although the Polity IV and Freedom House have different definitions of political freedom and democracy, the high correlation between these two indices still shows that there are some common features among them.

42 The data of Polity IV project is available for free. For more details please see http://www.systemicpeace.org/.
The Polity IV index gives 21 ratings from -10 to +10 to political freedom based on the constraints of the power of governments. If a country is assigned a value of -10, it means that this country is completely authoritarian or dictatorship. While a country with a value of 10 indicates that this country has fully mature democratic regime. The score is computed by subtracting the autocracy score (-10 to 0) from the democracy score (0 to +10). This democracy measure has many advantages, for example, it has a relative stable grading standard and criteria, and it can comprehensively describe the democratic characteristics of political regimes. Furthermore, this indicator does not reflect the policy choices of rulers, but the state of the country’s political environment. There are also some shortcomings in this index, such as the relatively large fluctuations, this is because the index is more likely to reflect the results of recent elections. For example, the democratic election in 1990 made Haiti’s score rise directly from -9 to 7, and similar cases also took place in other countries like Argentina.

Here, I define the Polity IV data as the variable POLITY in the empirical study. This variable did not transform into a natural logarithm version because it has negative values. I then use the POLITY variable instead of the PR variable as the core explanatory variable and also estimate a fixed time effect regression. The results are presented in column 2 of Table XVI. It is a remarkable that the POLITY variable has a positive sign and is significant at the 1% level, implying that the positive relationship between democracy and stock returns has been confirmed by an alternative measure. The estimated coefficient for the POLITY variable is 0.0058 (robust standard error=0.0020), which means that a one percentage point increase in the democracy variable would lead to a 0.0058 percentage point increase in stock returns. This effect is less than the one measured by the Freedom House political rights index quantitatively. The signs of the coefficient estimate and significance tests for the control variables are similar to the previous regression in section 4.5.3. This test, with a different democracy measure, shows that the results are robust.
### Table XVI Robustness and sensitivity test

Analysis on the influence of democracy development on MSCI returns with robust standard errors. This table presents estimates from the fixed time effect model while we use changes in PR variable and another democracy measure POLITY variable instead the PR variable as our core explanatory variable. All regressions use the pooled OLS estimation method with a full set of time dummies to control time effects. $\Delta$ denotes the differencing operator. Clustered robust standard errors are reported into parentheses (cluster by year). *, ** and *** denote statistical significance at the 10%, 5% and 1% level, respectively. Sample spans over the period of 1975 to 2015.

<table>
<thead>
<tr>
<th>Model</th>
<th>Time fixed effects (Pooled OLS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent variable</td>
<td>Dependent variable is MSCI market cap indexes returns for 75 countries over 1973-2015</td>
</tr>
<tr>
<td>$\Delta$PR</td>
<td>-0.1421*** (0.0524)</td>
</tr>
<tr>
<td>POLITY</td>
<td>0.0058*** (0.020)</td>
</tr>
<tr>
<td>GDP_GROWTH</td>
<td>1.0197*** (0.2176)</td>
</tr>
<tr>
<td>INFLATION</td>
<td>0.0575 (0.0403)</td>
</tr>
<tr>
<td>INFLATION$^2$</td>
<td>-0.0021 (0.0018)</td>
</tr>
<tr>
<td>SYSTEM</td>
<td>0.0105 (0.0181)</td>
</tr>
<tr>
<td>RIGHT_WING</td>
<td>0.0035 (0.0166)</td>
</tr>
<tr>
<td>LEFT_WING</td>
<td>0.0213 (0.0194)</td>
</tr>
<tr>
<td>RELIGION</td>
<td>0.0206 (0.0159)</td>
</tr>
<tr>
<td>ELECTION_EXE</td>
<td>0.0070 (0.0268)</td>
</tr>
<tr>
<td>ELECTION_LEG</td>
<td>-0.0066 (0.0157)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.1040*** (0.0208)</td>
</tr>
<tr>
<td>Individual effect</td>
<td>No</td>
</tr>
<tr>
<td>Time effect</td>
<td>Yes</td>
</tr>
<tr>
<td>Adjusted R$^2$</td>
<td>0.5093</td>
</tr>
<tr>
<td>Observations</td>
<td>1596</td>
</tr>
</tbody>
</table>
4.7 Conclusions

This chapter examined whether there is a linkage between democracy improvement and stock returns in an international sample. Better political institutions create investor friendly environments with secured property rights, lower risks of expropriation by the government and well-developed capital markets. I use the democracy measure from Freedom House and utilise several different panel data methods including pooled OLS, fixed effects and random effects to capture the direct effects of democracy on country-specific stock returns between 1975 and 2015. Specifically, this study examines 74 financial markets to discover whether their performance is related to their country’s democracy level and other political indicators. I find evidence that there is a consistent and significant positive association between political institutions and stock market performance. The stock returns under democratic governments are significantly higher than under autarchic ones. That is, a higher level of democracy helps to increase the country’s annual stock returns. Furthermore, my work suggests that the fixed time effects model fits the sample data best. In other words, the empirical results and relevant tests indicate that individual effects (country) are less important than time effects (year) and the favoured regression is the pooled OLS with a full set of time dummies controlling for time effects. The close linkage between international capital markets and progressing integration most likely caused country-specific time-invariant factors to become less relevant in the asset pricing. Despite the fact that a highly profitable trading strategy based on the prediction of the occurrence of a democratic revolution is almost impossible to be designed due to the unpredictability of its occurrence, the findings show that holding or investing in democratic countries have more opportunities for higher returns. The results are robust to various sensitivity analyses and the estimations highlight the important of using several different democracy measures for estimations that include democracy because the results might differ among them.

The relationship between democratic rule and asset pricing has attracted very little
attention from finance researchers. This work extends the literature on political and financial studies by examining the effect of the degree of country’s democracy level - a topic that is under-researched by scholars. It also contributes by providing a better understanding of the role of political regimes and institutions in stock market movements. These findings have important investment implications as any insights into how political risks affect capital return will be useful for prospective investors who are attempting to invest in different financial markets.
4.8 Appendix

List of countries in the sample

<table>
<thead>
<tr>
<th>Argentina</th>
<th>Czech Republic</th>
<th>Japan</th>
<th>Norway</th>
<th>Spain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>Denmark</td>
<td>Jordan</td>
<td>Oman</td>
<td>Sri Lanka</td>
</tr>
<tr>
<td>Austria</td>
<td>Estonia</td>
<td>Kazakhstan</td>
<td>Pakistan</td>
<td>Sweden</td>
</tr>
<tr>
<td>Bahrain</td>
<td>Finland</td>
<td>Kenya</td>
<td>Peru</td>
<td>Switzerland</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>France</td>
<td>Korea (ROK)</td>
<td>Philippines</td>
<td>Taiwan</td>
</tr>
<tr>
<td>Belgium</td>
<td>Germany(^{43})</td>
<td>Kuwait</td>
<td>Poland</td>
<td>Thailand</td>
</tr>
<tr>
<td>Bosnia and Herzegovina</td>
<td>Ghana</td>
<td>Lebanon</td>
<td>Portugal</td>
<td>Trinidad and Tobago</td>
</tr>
<tr>
<td>Botswana</td>
<td>Greece</td>
<td>Lithuania</td>
<td>Qatar</td>
<td>Tunisia</td>
</tr>
<tr>
<td>Brazil</td>
<td>Hungary</td>
<td>Malaysia</td>
<td>Romania</td>
<td>Turkey</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>India</td>
<td>Mauritius</td>
<td>Russia</td>
<td>Ukraine</td>
</tr>
<tr>
<td>Canada</td>
<td>Indonesia</td>
<td>Mexico</td>
<td>Saudi Arabia</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>Chile</td>
<td>Ireland</td>
<td>Morocco</td>
<td>Serbia</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>China</td>
<td>Israel</td>
<td>Netherlands</td>
<td>Singapore</td>
<td>United States</td>
</tr>
<tr>
<td>Colombia</td>
<td>Italy</td>
<td>New Zealand</td>
<td>Slovenia</td>
<td>Vietnam</td>
</tr>
<tr>
<td>Croatia</td>
<td>Jamaica</td>
<td>Nigeria</td>
<td>South Africa</td>
<td></td>
</tr>
</tbody>
</table>

\(^{43}\) The data before 1990 came from West Germany.
V. Essay Three: The Value of Political Rhetoric to Stock Market

This chapter presents the third empirical study which conducts a textual analysis of 524 presidential speeches given between 1897 and 2010 in the U.S. in order to examine whether they convey valuable information to investors. This chapter is arranged as follows. Section 1 of this chapter briefly introduces the notion of the impact of political communications on the stock market. Section 2 discusses relevant literature that explores the link between political information, communications, events and stock markets from an international perspective. Section 3 proposes the research questions and hypotheses. Section 4 presents a brief introduction of content analysis and DICTION software as well as data and sample. Section 5 presents the test models and empirical results. Section 6 outlines robustness checks. Section 7 discusses the results and draws the conclusion of this chapter.

5.1 Introduction

Are political speeches being simply uninformative cheap talk that can be ignored, or do they contain additional information that may be valuable to investors? To answer this question, one can draw inferences from the reactions of the capital market. For example, after President Bill Clinton announced to relax drug price control on January 28, 2000, large pharmaceutical companies’ share price rose accordingly, despite the DJIA falling by 2.6% on that day. Chilton and Schäffner (2011) points out that rhetoric can be viewed as the art of verbal persuasion. The tone and emotional tendency of a speech may reveal the politician’s views on the country’s economy prospects, and provide information relating government policies that may affect capital markets. The objective of this study is to investigate whether presidential speeches have an effect on the stock market, that is, whether they are informative to investors through a content analysis framework.

Using data from the United States between 1897 and 2010, this study examines the reactions of stock markets to the speeches given by presidents. I employ content
analysis software (DICTION) to quantify the linguistic characteristics of the speech, paying particular attention to expressions of Certainty, Optimism, Activity, Realism, and Commonality. In order to capture the aggregate U.S. stock market movement, I use daily returns on the Dow Jones Industrial Average (DJIA) index between 1897 and 2010 as representative of the U.S. capital market since it has the longest history and aggregates the movements of the most important “industrial” companies. To evaluate whether presidential speeches are informative for investors, I use an event study approach and examine the 2-day, 3-day and 7-day abnormal returns on the DJIA around the speech date.

The results show that there is a significant relationship between language characteristic of presidential speeches and stock market returns. Specifically, a positive association can be observed between the level of commonality expressed in U.S. president’s speech and abnormal returns on the DJIA. Moreover, when investigating the composition of the Diction variable of Commonality, this study finds that speeches characterized by frequent expressions of Rapport are associated with an increase in abnormal returns. On the other hand, the vocalization of vocabulary related to Liberation leads to a decrease in abnormal returns. These results are robust to controlling for differences in macroeconomic variables – industrial production growth, CPI inflation, and unemployment at a monthly frequency. I also replace the daily returns on the S&P500 index as the dependent variable in the regression to conduct robustness tests. The results derived from this analysis confirm the findings’ robustness.

This study contributes to a growing amount of literature on the relationship between politics and finance. For instance, some studies on political communications shows that such communications influence the stock market (e.g., Wisniewski and Moro, 2014). This study examines the impact of presidential speeches on stock returns and

44 The word set of “commonality” has been constructed by several different sub-dictionaries. The formula for “commonality” is [Centrality + Cooperation + Rapport] – [Diversity + Exclusion + Liberation]. Details will be given in the following sections.
shows that presidential speeches have valuable information, which is useful and valuable for investors to explain stock market behaviour. To the best of my knowledge there is no other study that investigates the influence of presidential speeches on the stock returns.

5.2 Political Communications and Financial Markets

Over the past decade, a large body of research on the application of content analysis in finance and accounting has been published. Current research in this area has revealed interesting trends in the use and presentation of language, and how it affects the interactions between firms and investors. Most of the current studies focus on the narrative in public disclosures such as annual reports, letters to the shareholders, managers’ reports, and chairmen’s statements. In this section, I briefly review the academic literature related to informational influence, textual analysis, and the application of content analysis in finance.

5.2.1 American political speeches

It was accepted that language plays an important role in creating political reality. And it is also assumed that the purpose of analysing political discourse is to unfold the rhetorical techniques which are used by politicians in order to create as well as manipulated a particular view of the world. As a matter of fact, political speech is considered as one of the identified types of the classical rhetoric. A speech is usually considered as a unified strategy aiming to achieve specific effects, whether it is informative or persuasive (Wilson, 1994). When delivering speeches, politicians do their utmost to convey their explicit standpoint and express charm through their words to an extreme degree with the aim of voicing political ideas and gaining people’s support. The aim of political speeches is to have a great influence on audiences.

Political speeches include campaign speeches, inaugural speeches, speeches about administration, speeches to publicize guidelines, policies and administrative plans of
leaders of all levels, speeches delivered by people representing certain social classes, political parties, or individuals at the political assembly and so on. When delivering speeches, politicians do their utmost to convey their explicit standpoints and express the charm of words in an extreme degree with the aim to voice political ideas, strive for people’s supports and gain their votes.

American politics is characterized by broad civil participation and the political speeches are looked upon as a core instrument to attract public attention. The term “political speeches” was introduced by pioneers of both publicity research and the social sciences who defined them as important instruments that political leaders utilise to communicate with the public. Therefore, American political speeches not only provide an opportunity to obtain knowledge about the American political system and thoughts, but are also helpful to fully understand the information contained within them and the impact they exert on the society.

In a speech, the aim of presidents is, for the most part, to enhance the inspiration of audience and persuade them to win their support as well as sympathy. Therefore, the main purpose in presidential speeches is to persuade the audience, and the persuasive power consolidates not only the president’s role but builds up a good foundation for further political action. Many scholars devote the research of American presidential speeches from different perspectives. For example, Hart (1984) firstly applies a quantitative approach to study political speech with the support of computers, and it provides an objective insight into the research of political language. Swales (1990) discusses that a communicative event plays both a significant and an indispensable role with language. Presidential speech is a verbal transmission of messages from the president to American people who are assembled. Therefore, with its special purposes, presidential speech is a type of communication event. Trosborg (2000), who committed to a genre analysis, makes a case study on Bill Clinton’s address. The study shows that communicative functions and rhetorical strategies are used in this address.
Language is used to make people join in communicative acts with themselves, to maintain and establish relations, or to elicit or change people’s viewpoints and behaviours. These are some reasons why presidential speech should be chosen as the example for the analysis. Allen (2007) studied political speeches in the federal election campaign from the pragmatic perspective. The research focuses on the utilization of pronouns in the campaign speeches, and it points out that changing pronominal choices for getting closer to audience could help to gain the support. The politicians use various pronouns to cater to the sense of identity of audience, speak to them like family members or good friend, and finally make themselves in a positive light. Kulo (2009) combines the rhetorical strategies with political speech. He chooses two political speeches of American presidential election campaign in 2008 to study the relationship between rhetorical strategies and political speeches. The research figures out that both of the president candidates choose different rhetoric strategies for expressing their values and political opinions.

Overall, most of the prior studies on political speech focus on the linguistic area. In the field of accounting and finance, to the best of my knowledge, there are two papers showing that political communications contain valuable information that will engender a market reaction and that they are useful for investors. A study by Durnev et al. (2014) analysed “state of the state” speeches to examine whether political rhetoric matter for firms and investors. Their results show that the abnormal returns of firms are significantly positively linked with the level of optimism expressed in a Governor’s speech. My study uses U.S. presidents’ speeches instead of Governors’ speeches and focuses on the overall stock market performance instead of that of individual companies. Another study conducted by Wisniewski and Moro (2014) used characteristics of the European Council communications to explain variations in stock returns around the meeting dates. They found that the positive tone of these communications and statements expressing a position of moral rectitude were positively related to stock market returns. On the other hand, abstract vocabulary and
a preoccupation with issues of merely local importance decreased stock market valuations.

5.2.2 Political information and asset pricing

Stock prices are often considered to reflect fundamental information related to companies. Consequently, stock prices should be affected by events surrounding a company. The financial theory of market efficiency provides a solid theoretical foundation to analyse the impact of information on financial markets. Fama (1970) is a vigorous proponent of efficient markets; his hypothesis assumed that the price of a security would reflect all of the information available. From the tenets of efficient market hypothesis (EMH), it is believed that if the stock price fully reflects all of the available information in a stock market, then this market is effective. Unless there is market manipulation, investors cannot obtain excess profits by analysing previous prices. Intending to test the EMH, Pearce and Roley (1985) argue that stock prices should respond only to the unanticipated portion of news announcements by examining the response of daily stock prices to macroeconomic announcements. To isolate the unanticipated portion of announcements, survey data on market participants’ expectations were used for some news. Their results support the EMH, showing that stock prices only respond to the surprise and unexpected portions of announcements. Ciccotello and Grant (1996) examine information pricing using a large sample of equity mutual funds. They show that investors should assess whether the benefits of getting information exceed the cost of acquiring such information. The article argues that stock funds that charge higher fees generally do not have significantly different returns from funds charging lower fees. Their findings are consistent with an efficient market under the conditions of costly information.

Stock price forecasting has three main sources of information: analysts’ predictions, financial statements information, and information appearing in news and public communications (Tetlock et al., 2008). Admittedly, analysts’ forecasts differ
significantly from one another, and empirical studies not always support the linkage between accounting variables and stock prices. Therefore, a vast amount of information contained in news and public communications may become an important source that helps investors and markets to understand stock market behaviour.

Stock markets generally respond to new information from government regarding political decisions that may affect domestic and foreign policy. It is a reason that investors keep a watch on the evolution of politics. Hence, several studies have focused on the impact of political information on stock market performance. Hong Kong stock market is one of the most interesting fields to examine political impacts on stock markets. Hong Kong’s political and economic status changed after it reverted back to Chinese rule on 1997 after 156 years of British rule. Chan and Wei (1996) investigated the impact of political news on Hong Kong’s stock market volatility. They used two indices: blue-chip shares represented by Hang Send index, and China-related stocks represented by the red-chip index. They found that political news increases the stock volatility of both blue-chip and red-chip shares. In addition, their results show that political news does not affect the returns of China-related stocks. Chan et al. (2001) studied the impact of political and economic news on Hong Kong’s market transactions and their results indicate that economic news has a more pronounced impact on trading activity than political news. They concluded that economic activities are more directly linked to economic news than political news. In this study, I attempt to explain the performance of the stock market by analysing political communications. The approach relies on extracting useful information from political speeches.

5.2.3 The effect of conflict on stock returns

The analysis reveals that the use of peaceful language by the U.S. President carries value to stock market investors. Expressions of commonality and rapport increase stock prices, while language related to liberation, which is often used as a justification for interventions abroad, seems to be harmful to the markets. In other words, investors
seem to recognize the destructive effects of conflicts and react accordingly. At this stage, it should be noted, that this study is not the first to document the negative effects of military conflicts. This section provides a review of the literature that has provided evidence of such negative effects.

Some studies have shown that major social emergencies such as war, terrorist attacks and aircraft crash events have an impact on capital markets and asset prices (see, for instance, Choudhry, 1995; Frey and Kucher, 2001; Amihud and Wohl, 2004; Schneider and Troeger, 2006; La Ferrara and Guidolin, 2007). Studies of the impact of social emergencies on the capital market are mainly focused on the stock price effects of terrorist attacks and armed conflicts. Violence involving different countries generally arises from political issues and terrorist attacks have a deep negative impact on the economy (Berrebi and Kolr, 2005). The reason may be that some serious terrorist attacks and violent conflict events occurred in some western countries at the beginning of the 21-century due to the instability of the local or international political situation, which provides a good material for this research.

For example, study from Caplan (2002) suggest that most of the time, war will bring long-term damage to the economy. Carter and Simkins (2002) found that the "9-11" incident had a significant negative impact on the airline stock prices. Chen and Siems (2004) used event study approach to investigate the impact of 14 terrorist or military attacks on the U.S. and global stock markets since 1915. Their results show that the market resistance of the U.S. stock market to the sudden social and political events has increased, which is partly because the U.S. has continuously improved its banking and financial systems since 20-century to provide sufficient liquidity for the capital market to maintain the stability of the capital market and alleviate the market panic caused by unexpected events to some extent. In addition to investigating the overall stock market, there are also scholars focused on the company level. For example, Abadie and Gardeazabal (2003) used the ceasefire announcement of Euskadi Ta Askatasuna (ETA)
as their main study event to examine the effect of armed conflicts in the Basque region and they found only stocks that have business activities in the Basque region were affected by the ceasefire and had a significant positive response. Schneider and Troeger (2006) used GARCH-type models and found that only unexpected conflicts lead to the flight of investors. These negative effects are larger for countries that are highly integrated into the world economy and financial market. La Ferrara and Guidolin (2007) studied the end of the Angolan civil war and its effects on stock markets. Their results indicate that there is a significant negative reaction to the diamond mining companies’ stocks that have preferential treatment in Angolan. They argue the reason may be that the rent seeking is common in the diamond mining industry in Angola and the end of the civil war has improved the political environment, so the excess profits that these companies obtained relied on rent seeking had disappeared with the end of war. In general, when a country and another have political disputes and even armed conflicts, the nationals of the injured country will spontaneously organise boycotts of foreign goods to protest. Some empirical studies on commodity boycotting show that these boycotts have a negative impact on the target company’s share price (e.g., Pruitt et al., 1988). While there are also some studies suggest that these boycotts have no significant economic effects (e.g., Koku et al., 1997).

5.2.4 Content analysis in accounting and finance research

This study follows the framework of content analysis, so here I provide a literature review on the content analysis applications in accounting and finance research. The analysis of narrative and textual data is not new in the field of accounting and finance and this type of scientific inquiry has become relatively prominent. As early as 1984, Frazier et al. pointed out that more information useful to investors’ decision-making can be revealed if we introduce narrative data into accounting research. Content analysis is an effective way to examine whether the narrative disclosure has additional information content. The use of content analysis in the field of accounting and finance
research can be divided into two categories, namely, thematic content analysis and syntactic structure analysis (Jones and Shoemaker, 1994). In what follows, I define both mode of analysis and elaborate on the relevant literature.

Thematic analysis mainly focuses on specific topic identification, word frequency calculation, and argument or point of view classification under the specific language category. It is implemented manually or by a computer program, in order to define the level of narrative strength or tone in a textual data. For example, Abrahamson and Amir (1996) tested the relationship between the proportions of negatively changed words in the president’s letters and indicated that high negativity is accompanied by poor performance. In Smith and Taffler’s (2000) UK study, they built a successful model to analyse corporate failure on the basis of chairman’s statements incorporated into the annual reports. Clatworthy and Jones (2003) sorted UK listed companies according to the pre-tax income growth rate and took the top 50 and bottom 50 into their sample. They used a content analysis approach to analyse the sample company annual reports and tried to find out whether the narrative had the ability to forecast the company’s profitability. They found that the model could effectively classify the profitability of a company on the basis of the amount of positive and negative words in the company annual reports. The results also show that companies with good profit tend to report more good news. However, companies with low profit do not usually explain their poor performance. Davis et al. (2012) examined the relationship between earnings, returns, and qualitative information from corporate quarterly reports and, by examining the linguistic style, they focused on whether the narrative could provide additional information beyond financial figures. In their research, they used computer software called DICTION to quantify the writing style of companies’ quarterly reports. Their results reveal that companies’ share prices show a significant reaction to the linguistic style of the quarterly report. Wisniewski and Yekini (2014) also used the DICTION software to analyse the qualitative information of the annual reports of UK listed companies and found that the use of a positive language is linked to positive
price reaction around disclosure dates.

Some studies have divided the vocabulary used in information disclosure into positive and negative (e.g., Sadique et al., 2008; Hanley, 2010; Aerts and Cheng, 2011). Loughran and McDonald (2011) argue that positive and negative vocabulary in financial texts should be distinguished from that used in other areas. They found about 3/4 of the words defined as negative in the “Harvard IV-4 Psychosocial Dictionary” do not have a negative meaning in the financial sector. The ratio of words between hard and soft information was used as a measure of ambiguity by Arnold et al. (2010). They found that there is a significant relationship between the use of soft language, IPO under-pricing and future performance. Ferris et al. (2013) examined the relative conservativeness of the content of prospectuses and found that more conservative statements result in higher IPO under-pricing. Second, the optimistic disclosure of risk information can reduce the risk of IPO, hence the more positive tone, the lower IPO under-pricing (Jegadeesh and Wu, 2013). In addition to the IPO anomaly, a large number of existing research results have proved that the tone of accounting texts has a significant impact on the equity market from many aspects. For example, Feldman et al. (2010), Price et al. (2012) studied annual reports and quarterly teleconference reports, respectively, and they found that there is valuable information in the text tone, which can lead to short-term changes in stock prices. Moreover, their studies find that the accounting text tone will also cause changes in stock trading volume. These studies often used computer-aided software, but there is also some research based on manual analysis. For example, Schleicher and Walker (2010) artificially classified tone into positive, neutral and negative in their research on managers’ statements about companies’ future earnings. They found that if a company shows signs of a declining performance, the tone of the outlook section tends to be more certain, and if a company’s performance has declined, then the tone becomes more negative.

Another application of content analysis in the field of accounting and finance research
is syntactic analysis. Syntactic analysis is also known as readability analysis, namely, it is an analysis of the structure of content and the difficulty of understanding. It uses quantitative indicators, such as sentence length, grammatical structure and word length (Jones and Shoemaker, 1994). For example, Subramanian et al. (1993) used messages from Chairmen in 60 U.S. listed companies’ annual reports to study the relationship between the company’s performance and the annual report readability. By using a computer style analyser, they found that a company’s performance was closely related to the annual report readability, that is, the better the performance, the better the readability. Courtis (1998) selected the letters to shareholders of Hong Kong listed companies, and used the Flesch Reading Ease Formula to gauge the readability and test the hypothesis of management obfuscation. This hypothesis asserts that companies with poor earnings tend to release incomprehensible information. However, this hypothesis is not supported in Courtis’ chosen sample. Lehavy et al. (2011) found that the readability of the 10-K file from listed companies is negatively correlated with analysts’ earnings forecasts accuracy.

Financial researchers can use any kind of communication, such as interview narratives, letters to shareholders, chairmen’s speeches, or minutes or transcripts from meetings to fulfil the data requirement of an effective content analysis. In the finance and accounting area, content analysis has primarily drawn from textual communications of company’s public disclosure, particularly press releases, annual report narratives and CEO letters (Patelli and Pedrini, 2014). In addition, content analysis has also been used in studies on news media coverage. Advances in computer technology make automatic text analysis possible because a lot of social media information is in a textual format, including news, blogs, magazines and other social media communications. An analysis of publicly disclosed textual information may help to explain the performance and behaviour of companies and the markets.

Klein and Prestbo (1974) for the first time systematically investigated the influence of
textual information on financial markets. Their analysis was conducted by comparing the Dow Jones Industrial Average with the general news from 1966 to 1972. Their research is reasonable, but the critical potential problem is that the daily news sample is relatively small. Notably, they still found that news report and stock price movements tend to move together in 80% of sample period even under such simplified research assumptions. Berry and Howe (1994) argue that news information was significantly correlated with stock trading volume but was not related to stock volatility by analysing news that was published by Reuters News Service. In another study, Mitchell and Mulherin (1994) use daily news reports to test the links between news and stock prices. Their results show that news information affects trading volume importantly, but has small effect on stock returns. Additionally, some recent studies identified the relationship between stock trading volume and measures of the Internet media activity. Due to the development of network technology, Internet forums and social media have become an electronic place to share securities information and personal views. Investors often publish a lot of stock-related information on such online media, which may include investors' own analysis of the stock or some irrational emotions. Antweiler and Frank (2004) used computer-aided content analysis tool to analyse millions of investors’ messages, and found that investors’ views on the market can predict the volatility of stocks. A higher degree of divergence of investors’ views will lead to a greater stock trading volume. Chen et al. (2014) further explored the research into the corporate level, and found that both articles and comments, which were published by investors in social media, can predict the company's future stock returns and unanticipated accounting surplus. Therefore, Internet has become a source of stock information. Investors’ views not only contain valuable information, but also can measure the emotions of themselves, although the two mechanisms of action are different, but also can predict the market and the company's stock price trends.

Casual observation implies that the textual contents of the news media about the stock market might link with the psychology of the financial market participants (especially
Seminal studies come from Tetlock and his collaborators. His 2007 study focused on news articles from the economy and business column of the Wall Street Journal, and pessimistic words were used to observe the association between news content and the stock market. The author found that the proportions of pessimistic words in prior news were negatively related to the current stock returns, indicating that the stock market underreacts to narrative information. However, the results also showed that the proportions of pessimistic words in later news were positively associated with the current stock returns, a reversal effect consistent with Campbell et al. (1993). His study also revealed that when there is a relative high or low proportion of pessimistic words, a higher trading volume can usually be expected. Furthermore, Tetlock et al. (2008) turned the perspective from the aggregate market level to the individual company level. Their study found that the tone of the media coverage of the company can predict the company's future accounting earnings and stock returns; the more negative the tone, the lower the future surplus. Especially when the news content focused on the value of the company, the negative tone has the strongest predictive ability. However, the company's share prices were underreacting to the news tone. They argue the reason is that although the media reports contain soft information which is relevant to the company's value, investors cannot quickly integrate the information into the stock prices. They also point out that news reports on company fundamentals have a better ability to predict future stock prices. Furthermore, Tetlock’s (2011) study confirms that investors were overreacting to old news, which leads to short-term fluctuations in stock prices. He used the text similarity between news as a measure of old news, and found that market reaction that was caused by dated news is not strong, although it shows a negative correlation. Individual investors exhibit a more pronounced transaction behaviour that is triggered by old news and then the accompanying stock price reversal phenomenon because of the weak ability to identify information from the old news. To sum up, the emotions of media reports will affect the volatility of stock market, while the reports on company-level contain truly valuable information, and investors are experiencing underreaction and overreaction.
Kothari et al.’s (2009) study is different from general studies that only focus on a homogenous type of report, in that they analysed the information that comes from companies’ management, news reporters and analysts, and examined the impact on the cost of capital, earnings volatility, and analysts forecast errors. They used content analysis to divide information into two kinds, namely favourable and unfavourable. The results show that in terms of management communications, reporting good news does not affect the cost of capital, but the bad news will increase earnings volatility and analysts forecast errors. With regard to analysts, the impact of good or bad news is very small, demonstrating that the market distrusts analysts’ reports. As for news reporters, both good and bad news have a significant influence, indicating that news coverage has relatively high market credibility.

As can be seen from the literature above, content analysis has mostly been used in the examination of companies’ disclosure and public information. However, following the logic of Wisniewski and Moro (2014) and Durnev et al. (2014), this study attempts to employ content analysis and computer-aided software to study how politicians’ speeches influence stock market movements.

### 5.3 Theoretical Analysis

Before engaging in an empirical study, trying to explain the impact of presidential speeches on the excess returns of stocks, considering financial theories can help us to understand this research objective more comprehensively. Fluctuations in asset prices are subject to a wide range of factors and all asset prices should respond to publicly available information in a timely manner, based on the efficient market hypothesis. The asset prices already include all the information that is currently available, and the information needs a process to influence asset prices. According to the literature review above, we can summarize this process as follows: information – investor
psychology – asset prices. Content and emotional tendencies of the information will affect the investors’ psychology, which leads investors to make different investment decisions, and ultimately affect asset prices. A brief introduction and discussion of these theoretical points of view is provided in this section.

5.3.1 Behaviour finance

Financial market is a very complex system, so the classic efficient market theory is incapable to fully explain this market due to a variety of anomalies. This is especially due to the assumption of fully rational individuals with seems to be inconsistent with reality. In fact, investors are not as rational as predicted in the theoretical model but are influenced by sentiment. Behaviour finance emerged in the 1980s and developed rapidly in this context. It attempts to explain market anomalies by studying individuals, through the impact of their psychological characteristics on economic decision-making process. The psychological characteristics of investors in capital markets are complicated by the influence of many factors, and their decision-making behaviour is closely related to their psychological characteristics. The existence of various anomalies in capital markets can get a certain degree of interpretation from the perspective of investor psychology.

Behaviour finance has not had a recognized basic theoretical system in academia, but scholars have reached a consensus that the behaviour finance should be composed of two theoretical bases: one is “analysis of mentality and behaviour of investors based on psychological research related to personal cognition and decision-making” and the other one is “limited arbitrage and the inefficient market”. Behaviour finance begins with the bounded rationality of investors and focuses on the possible impact of the various bounded rationality characteristics of market participants on the market. A large number of studies have shown that the bounded rationality of market participants is the cause of some anomalies. In the attitude of dealing with the risk, the prospect theory (Kahneman and Tversky, 1979) holds that the bounded rationality shows loss
aversion and income preference, and the utility function of investors is a concave function while the utility function of losses is a convex function.

Early behavioural finance focuses on the study of human psychological cognition, and thus has little effect on the efficient market hypothesis. In the 1980s, scholars such as Thaler (1987, 1999a) and Shiller (1990a, 1990b) promoted the development of behavioural finance. Shefrin and Statman (2000) believes that the subject of behavioural finance research can be divided into two parts, psychological research and inefficient market. In the 1990s, behavioural finance was further valued and developed, and empirical methods were introduced to its studies, hence the efficient market hypothesis had been further questioned. On the basis of the prospect theory, the behavioural finance combined with the findings of psychological studies on investors’ behaviour to challenge the three hypotheses of efficient market theory: irrational behaviour; investors’ irrational behaviour is not random; arbitrage cannot play the desired role because of some limited conditions.

The efficient market hypothesis argues that people know all of the information, while the bounded rationality believes that part of the information is noise. There are many anomalies in the financial market due to the existence of noise trading behaviour. Bondt and Thaler (1985) provided evidence which support the overreaction of financial asset prices. They divided the sample stock into the winner stock portfolio and the loser portfolio based on the first three years’ performance, and then compared the performance of these two portfolios in the next five years. Their results found that loser portfolio received a very high rate of return, while the winners get a very low rate of return, and this phenomenon cannot be explained by the risks of the loser portfolio. They argue that a relatively reasonable explanation is that there is an overreaction in financial markets. Thaler’s studies (1987, 1999a) focus on the time pattern of stock returns and the investors’ mental accounting. Shiller (1990a, 1990b) mainly analyse the abnormal fluctuations in stock prices, herd behaviour in markets, speculative prices,
and the collective mind of the crowd. In addition to these two representatives, there are also a number of other important studies after the 1990s, such as Odean’s (1998) analysis on the disposition effect, Ritter’s (1991) analysis on the underpricing of IPO, and Daniel et al.’s (1998) study on the switching mechanism of overreaction and underreaction. These studies received extensive attention and played an important role in promoting the development of the behavioural finance.

5.3.2 Emotional tendency and investor psychology

The presidential speeches studied in this study can be classified as a public political message, and this kind of information tends to have a unique emotional tendency. These emotional tendencies can be expressed in various forms, such as different language expressions and word styles. For example, a politician may use more positive and motivated words in the speech to inspire people's confidence in the economy. When investors are getting, and thinking about information, their psychology is inevitably affected by emotional tendencies of the information. In content analysis methodology, vocabulary is the most important part of emotional analysis. However, because the text language is different from the standardized data, the unstructured form of the text language leads to the quantitative analysis of the language is very complex.

Investors' psychological changes can be expressed in many ways. Modern finance theory holds that investors will get a lot of information. Each time the information is received it will affect Bayesian estimates by adjusting the prior probability, and then forming a posterior probability, so the final distribution should be unbiased. Since the 1970s, the assumption of investor rationality in traditional financial theory has been more and more questioned and challenged. People often violate the Bayesian law and other standard theories to make a biased decision or prediction based on their limited information processing capacity. The resulting psychological bias and behavioural anomalies have become the research interest of behavioural finance. The related studies on investor psychology are often investigate the factors that affect investor
sentiment. In the framework of traditional financial theory, investors are regarded as the rational economic optimisers, their behaviour will comply with expected utility maximization and Bayesian rule. In real life, people in investment activities always show "bounded rationality", rather than "perfect rationality" characteristic. Based on behavioural finance theory, the study on investor behaviour can reveal some hidden economic laws that cannot be found under the traditional “complete rationality” assumption. Investors’ expectation has a systematic bias, and this kind of expectation with bias has been known as the investor sentiment. It is an important factor in reflecting the investor psychology and is a market sentiment indicator which reflects investors’ investment willingness and expectation (Baker and Wurgler, 2007).

Behavioural finance argues that the asset prices interact with the investor sentiment. When investor sentiment is high, the attractiveness of financial assets to those optimistic investors is great. At this point, investors who are affected by the impact of confirmation bias, will only focus on the information that benefit the asset prices, and ignore the fundamentals and the company’s operating conditions. Such behaviour may further push the asset prices, which also promote investor sentiment rise. When investors are depressed, the asset prices will fall or reverse, and further promote the decline in investor sentiment (Baker et al., 2003).

Investor sentiment can also learn from the interpretation of general psychology on emotional connotation. General psychology argues that sentiment refers to the individual’s attitude towards the outside world, which is accompanied by the process of cognition and consciousness. It is a response to the relationship between objective thing and subjective demand. It is a kind of psychological activity which is based on individual desire and need, and has relatively large situational, agitated and temporary characteristics. According to this explanation, investor sentiment can be understood as an “emotional judgment” in investment activities, which is an intrinsic attitude and psychological activity that investors want to obtain higher asset returns and avoid risks,
along with the process of cognition and awareness of investment activities (Lee et al., 1991).

In his book “The General Theory of Employment, Interest, and Money” (1936), Keynes calls this irrationality as “Animal Spirits”. American economists Akerlof and Shiller conducted a series of analysis on investors’ irrational behaviour in their book “Animal Spirits” (2010) and “Irrational Exuberance” (2015). Their research found that information has a very important psychological impact on investors, and the narrative style of the story plays an important role in the investment decision-making. Many empirical studies also support their point of view, especially in stock markets (see, for instance, Mehra and Sah, 2003; Yu and Yuan, 2011; Fisher and Staman, 2003; Baker and Wurgler, 2006). Therefore, we have reason to believe that public information like political speeches may affect the investor sentiment, thus affecting asset prices.

5.3.3 Investor psychology and asset pricing

The influence of investors’ psychological factors on asset price has been one of the main research directions of behaviour finance (Qiu and Welch, 2004), but there is still a lot of controversy about its specific definition. At present, the academic research on investor psychology is mainly follows two paths. The first one argues that investor sentiment depends on assets’ future cash flows and risks while not on the belief of asset’s current fundamentals (Shleifer and Summers, 1990). The second path regards investor sentiment as “Animal Spirits” or “Psychological Attitude” (Shiller, 1999, 2003, 2015). This study treats investor sentiment from Shiller’s point of view because it works well with the vocabulary analysis in texts and is consistent with the research objectives of this study.

Based on the hypothesis of bounded rationality, investor’s investment decision-making is not always a rational economic behaviour, and this “Animal Spirits” plays an important role in the asset pricing process. Some of the concepts in behavioural finance,
such as limited attention, ambiguity aversion, overconfidence, mental accounting, have explained some financial anomalies. Traditional financial studies ignore the human factor. For example, the asset pricing theory holds that the asset price is the present value of its future cash flows, but different individuals have different psychological expectations in the assessment of the future cash flows, and these different expectations together lead to fluctuations in asset prices.

Psychological research argue that people do not follow “perfect rationality” but “bounded rationality”, and people’s decision-making will systematically biased due to beliefs and preferences. With the creation of the prospect theory (Kahneman and Tversky, 1979), financial scholars began to seek the breakthrough in traditional asset pricing theory through investor psychology (Hirshleifer, 2001; Shefrin, 2002). Prospect theory is a decision-making model of descriptive paradigm, which assumes that the decision-making process is divided into two parts: editing and evaluating. During the editing phase, individual collects and processes information rely on framework or reference, and then in the evaluation phase depends on the value function and the weight function of subjective probability to judge the information (Kahneman and Tversky, 1979). Investor’s decision-making process is the process of psychological choice of the investor. How to deal with the information will have a substantial impact on the investment decision. Human behaviour during this process is “bounded rationality” rather than “perfect rationality”. This complex psychological behaviour profoundly affects the investor's decision-making, thus affecting asset price volatility. There are many empirical studies on investor psychology and asset pricing. The quantification of investor psychology can be done by means of questionnaires or experimental methods, while the measurement of investor sentiment is more based on the establishment of emotional index and uses empirical methods to test its impact on capital markets (see, for instance, Neal and Wheatley, 1998; Brown and Cliff, 2005; Kumar and Lee, 2006; Schmeling, 2009; Garcia, 2013).
5.3.4 Emotional tendency and asset pricing

In the previous two sub-sections, we have discussed that the emotional tendency of information will affect investor psychology, and investor psychology will affect investment decision-making, which will further affect asset prices. That is to say, there is a link between the emotional tendency of information and asset prices. The study will use empirical methods to analyse the significance and direction of this relationship.

Investor psychology plays an important role in the mechanism of “information - investor psychology - asset prices”. In the part of information and investor, the psychological vocabulary transmits the optimistic, pessimistic and other emotional tendencies to the investor through a “paraphrase” process when the investor gets the information, then the investor’s future expectation changes accordingly. In the part of investor and asset prices, changes in investors’ expectation can affect investors’ investment decisions and transactions, eventually causing changes in asset prices. This transmission mechanism has corresponded to Shiller’s (2015) conjecture that media can lead mood swings. More importantly, we note the important role of vocabulary in the process of information quantification. As Thaler (1999b) points out, behavioural finance is an “agnostic approach” to look at financial markets, and is a re-examination of traditional financial theories. Therefore, perhaps this transmission mechanism is far from perfect, but it provides us a new way to think about capital market volatility.

Presidential speech is a channel for investors to easily access political information, and these political texts may contain information that has a significant impact on the country's economy, capital markets and policy direction. While many of the previous studies focused on what politicians have said, this study wants to focus on how they said. At present, there is little research on the emotional tendencies of political texts and capital markets performance. This is largely due to the difficulty of text analysis. With the advancement of computer technology, the application of vocabulary statistics based on method dictionaries and machine learning method provides powerful analysis
tools for the emotional analysis of text content. But studies focused on these computer
technologies, have not yet been fully integrated with the study of finance. The asset
pricing process is affected by many factors, such as economic environment,
government policy, corporate fundamentals or investment decisions, and there has
been a lot of research in these fields. This study tries to explore hidden operating
mechanism behind the fluctuation of asset prices from a novel perspective: content
analysis on political texts.

5.4 Hypotheses Development
This study attempts to find out whether political speeches have an impact on the stock
market. Specifically, I examine the response of the stock market and investors to
speeches given by presidents of the U.S. through an analysis on linguistic features and
emotional tendencies of the speech texts. Thus, a hypothesis has been developed to
test the market response to presidential speeches.

Hypothesis 1: The U.S. stock market has a significant reaction to the linguistic
characteristics and emotional tendencies of presidential speeches.

Supposing this statement, is equivalent to finding a statistically significant relationship
between the frequency of specific words expressed in a president’s speech and the
abnormal returns of the stock market. This research exercise will be helpful and
meaningful for investors since they will be able to understand that political speeches
are informative and linguistic features influence short-term stock market movements
significantly.

5.5 Method and Data
This study relies on quantitative computerized textual analysis, which is becoming one
of the most popular content analysis methods. This method is implemented to examine
the linguistic features of U.S. presidents’ speeches and measure their influence on the
stock market. Berelson defined content analysis as “a research technique for the objective, systematic and quantitative description of manifest content of communications” (Berelson, 1952, 74). The following subsection initially provides a brief introduction of content analysis, the research methodology embraced in this study, and then a detailed account is given of the DICTION software, which is a content analysis package that plays a dominant role in this research. Furthermore, the sample selection and data analysis will be explained.

5.5.1 An introduction to content analysis

The definition of content analysis varies from one scholar to another. Holsti (1969, 14) gave a broad definition of content analysis as “any technique for making inferences by objectively and systematically identifying specified characteristics of messages.” Berelson’s (1952) more general discussion of content analysis is more often cited by scholars: “content analysis is to make an objective, systematic, quantitative description on the content of communication”. Specifically, objectivity requires that each step of the research process must be based on the implementation of clear rules and standards; systematic approach to the adoption and abandonment of content must conform to a consistent rule; quantitativity refers to fact that the word counts can be measured by statistical tools under certain rules to meet the requirement accuracy. Manning and Cullum-Swan (1994) also define content analysis approach as a quantitative research technique. They argue that this approach is intended to highlight or compare characteristics of texts through standardized measurement. The American sociologist Babbie (2015) classifies content analysis is an analysis based on existing statistical data and historical comparison analysis in the same category, which is named “Unobtrusive Research”, and he points out that the content analysis method is that the researcher analyses various forms of communication, such as books, magazines, newspapers, songs, speeches, letters, and so on.

The basic practice of content analysis is to convert non-quantitative messages such as
speeches or written text into quantitative data. The employment of content analysis methodology emerged in 1940s, and since then it has become a popular research method especially in the field of communication. During the period from the 1950s to 1960s, when computers gradually developed into powerful research tools for content analysis, a prominent breakthrough was made in the usage of content analysis. By having the content of communication available in the form of machine readable text, the output could be analysed by certain software package (such as SAS and SPSS) for means and frequencies, and statistical inferences could therefore be made. By the late 1960s, computer-aided content analysis had already been recognized as a very effective approach to the study of communications (Gerbner, 1969).

Content analysis is a popular research methodology widely adopted in the analysis of public content and language. It has long been recognized as an effective approach to the investigation of communication messages. Content analysis is employed to ascertain the presence of certain words, characters, phrases, sentences, or themes and to quantify these kinds of data in an objective manner (Berelson, 1952). Counting word frequencies is the best choice to avoid inevitable subjective judgment. Moreover, Duriau, et al. (2007) point out that flexibility is one of the advantage of content analysis. From a quantitative perspective, content analysis provides researchers with the possibility to analyse large amounts of textual information and systematically identify their attributes through key words in context routines to detect important structures within them. This analysis methodology can also be designed from a qualitative point of view. For example, any research involves content classification can use a content analysis framework.

The content is free and rich in expression, providing a natural carrier for diverse information. At the same time, the value of the information of the content is hidden between the lines, which is not easy to directly observe and measure. Thus, there is a need to use specialized technical means to extract, and then quantify as a variable of
numeric type. With the advance of the computing technology, computer-based methods of analysis have made such conversion process easy and accurate with the assistance of certain computer software. Compared with the manual identification method used in the early content analysis, the current text analysis method is based on the computer’s help, which not only reduces the labour intensity, but also greatly improves the research efficiency. According to Bao and Datta’s (2014) classification, content analysis methods include dictionary and machine learning algorithms. The dictionary method is essentially a word frequency method, which is based on the default dictionaries and rules to map words one by one to various word sets, and then through statistical calculations to obtain the quantitative characteristics of a specific text (Li, 2010). Many existing computer programs, such as General Inquirer, DICTION and LIWC, support this research process. The method has also been applied in many empirical studies (see, for instance, Li, 2008; Kothari, et al., 2009; Feldman et al., 2010; Hoberg and Phillips, 2010; Loughran and Mcdonald, 2011; Li, et al., 2013).

The nature of the machine learning method is a statistical algorithm that has an automatic learning ability similar to that of artificial intelligence. The learning process is the use of research samples for repeated training, so as to obtain a mathematical model that has textual processing ability. Researchers can enter the target text into the mathematical model to output the quantified characteristics. If the research data has been defined by the classification of labels, it is the supervised learning, otherwise it is the unsupervised learning. This method also assumes that words are independent of each other as the dictionary method; although this assumption is sometimes unrealistic, the algorithm has high accuracy and is significantly better than the LIWC dictionaries (Huang et al., 2013). Empirically, this method is widely used in the accounting and financial fields to measure texts’ tone, readability and repeatability (see, for instance, Antweiler and Frank, 2004; Cecchini, et al., 2010; Humpherys et al., 2011; Purda and Skillicorn, 2015). Unsupervised learning algorithm belongs to a clustering algorithm, which does not need a given classification rules and research samples. It is completely through the algorithm of self-learning to sum up a certain kind of rules and then to
achieve the automatic classification of texts. At present, unsupervised learning algorithms are still in the early stages of application, and only a small amount of studies applied it to risk research in the field of accounting and finance (e.g., Campbell, et al., 2014; Bao and Datta, 2014). My study in this chapter is based on a dictionary method with the help of DICTION software.

To employ content analysis methodology in this study, the text of a presidential speech will be considered as a unit of analysis to identify special linguistic features of American presidents’ special language use, to research important information disclosed on the speeches. The results are then used to make inferences about the relationship between political rhetoric and stock market behaviour.

5.5.2 Analysis with DICTION
DICTION was developed by a communications researcher, Dr. Roderick P. Hart to analyse political speeches and rhetoric (see, for instance, Hart, 1984; Hart and Jarvis, 1997; Hart, 2000; Hart and Childers, 2005). As a dictionary-based package that examines a text for its verbal tones, the DICTION software (Hart and Carroll, 2012) contains 31 built-in dictionaries, containing more than 10,000 search words that can be used to analyse any given text.

The build-in dictionaries search for language that can be categorised into the following characteristics: tenacity, levelling, collectives, numerical terms, ambivalence, self-reference, praise, satisfaction, inspiration, blame, hardship, denial, aggression, accomplishment, communication, motion, cognitive terms, passivity, familiarity, spatial awareness, temporal awareness, present concern, human interest, concreteness, past concern, centrality, cooperation, rapport, diversity, exclusion, and liberation. These 31 dictionaries have been selected to identify frequently encountered words that are used in public discourse. The dictionaries can relate to words characteristic of praise, concreteness, embellishment, etc. For example, the dictionary for “ambivalence”
examines and codes “words expressing hesitation or uncertainty, implying a speaker’s inability or unwillingness to commit to the verbalization being made” (Hart and Carroll, 2012, 5). DICTION supports analyses oriented towards the form and meaning of words (Sydserff and Weetman, 2002). The function of the software is to compute the frequencies with which the words from the 31 Diction dictionaries appear in a given text. The frequencies are computed as per an average 500 words segment. The dictionaries are rooted in semantic theory and avoid inter-rater reliability problems arising from the use of subjective coding (Short and Palmer, 2008; Davis et al., 2012).

At the heart of this program are five major semantic components (master variables). DICTION produces 31 individual language scores, which it then aggregates with the use of standardization procedures into five master variables – Certainty, Activity, Optimism, Realism and Commonality. According to Hart and Carroll (2012), the master variables are calculated by converting the raw word frequency from a given dictionary into Z-scores, then combining this Z-scores via addition and subtraction according to a master variable’s particular definition. This process produces a master variable that can signal the overall emotional tendency of the text. The five master variables are chosen intentionally, assuming that only five questions can be asked of a given passage, these five master variables would provide the most robust understanding of the sample test (Hart and Carroll, 2012). Prior studies conducted in different fields also indicate this robust empirical validity (e.g., Alexa and Zuell, 2000; Short and Palmer, 2008). Therefore, we can believe that DICTION is appropriate for the analysis of U.S. presidents’ speeches since its dictionaries were constructed following the examination of U.S. texts.

DICTION also has many applications in the field of accounting and finance. For example, behavioural researchers have pointed out its potential in terms of leadership studies (Bligh et al., 2004), and accounting researchers have applied it as an aid to study image management (Roger et al., 2005). Cho et al. (2010) examined the
environmental disclosure section in the annual reports of 190 firms and limited their analysis to the Optimism and Certainty variables. Davis et al. (2012) calculated a modified version of Optimism based on a corpus comprising the earnings releases of U.S. listed firms. With the help of DICTION, we can easily understand the emotional tendencies and main tone features which are contained in a text. The question is how does this information implied in the text affect asset prices? In general, the psychological state of investors has many dimensions, and the psychological vocabulary also has many dimensions, such as optimism, pessimism, prudence, peaceful, panic and so on. Obviously, psychological vocabulary and psychological state can match each other. This match reveals why the emotional tendencies of texts can cause investor sentiment changes. That is, investors first obtain the necessary information, and think and analyse it with their own knowledge and experience, sometimes also learn from others, then finally make investment decisions, thus the information has been brought into asset prices.

Using DICTION is rather a straightforward process. What is needed to do is just to put the target texts into this DICTION package and analyse it in a fairly automatic way. After a text is processed, report files are automatically written on the screen and our task is just to choose and record the values that are relevant to our current study. But as with other language analysis programs there is one point that needs to be noticed, namely that all target passages must be converted into text format in order to be well processed. The employment of DICTION can ensure the research to be scientific and accurate. In short, this study followed a three-part methodological approach. First, U.S. presidential speech documents were identified and collected manually from a database complied by the University of Virginia. Second, DICTION 6.0 was used to derive a set of lexical scores for each president speech. Third, after all of the documents had been analysed using DICTION, the output was exported into E-views for statistical analyses.
5.5.3 Sample

Online archive of the most important U.S. presidential speeches that is available from the Miller Centre at the University of Virginia\(^{45}\) has been the primary source of textual data used in this study. I collected the text of presidents’ speeches between 1796 and 2010, and obtained a sample of 889 text files. However, in order to be consistent with the stock market data interval, I dropped the first 365 observations because I could not find valid stock market data in the early years. Therefore, the sample runs from 1897 to 2010 and includes 524 observations after adjustment. An average speech is 3,896 words in length. These speeches contain regular inaugural addresses or annual messages as well as irregular addresses to Congress or remarks on some major domestic and international events. I observed an average of about 5 speeches per year, with the maximum number of speeches being 23, and the minimum number being 1.

To understand the effects of U.S. presidential speeches, I employ the Dow Jones Industrial Average as a proxy of the U.S. stock market. Compared to the S&P500 index, the DJIA has the longest history (it can be traced back to 1896) and it contains the largest blue-chip listed companies in the U.S. I collected the daily closing price of the Dow Jones Industrial Average from May 26, 1896 to August 3, 2015, and obtained a sample of 29936 daily observations. This financial series was sourced from Bloomberg and the index returns calculated in this study were measured using continuous compounding.

5.5.4 Event study method and variable definitions

This part of dissertation will make a brief of event study methodology and deal with the variables which are used in the study. Further details about the hypothesis and use of these variables are discussed in relevant sections.

The event study has been used in this study to examine the impact of different words

\(^{45}\) This archive can be accessed at http://millercenter.org/president/speeches
used in presidential speeches on the stock market performance in the U.S. There are several useful references that cover the traditional event study methodology presented by Fama et al. (1969). Besides the original Fama et al.’s (1969) paper, Brown and Warner (1985) and particularly Mackinlay (1997) give in depth presentation to the traditional event study analysis. Basically, there is no universally accepted structure of an event study. Normally this technique follows a setup of tasks. First step is to define an event of interest, then to define the period of event window over which the security prices are examined, and then the construction of sample is made. After these initial steps, the impact of event is examined. This is done by observing the abnormal returns (AR). Abnormal return is the residual between the observed return and expected return. Following the logic of Durnev et al. (2014), I use abnormal returns on the Dow Jones Industrial Average index. Presidential speeches are individual events and occur irregularly, therefore an event study is appropriate to study the question of whether the linguistic characteristics of the speeches impacted on the stock market.

There are different ways to compute the expected returns. This study will use the constant mean model, which calculates abnormal returns for each speech individually. This model assumes that the return in the absence of the event is fixed and equal to the average returns in the estimation window. After the model selection, the next stage is estimation and testing stage. First step is to choose the estimation window or estimation period. This is that time period which is used to estimate the value of returns and different variables. Normally this window is set before the event window. This study will use the average return $\mu$ in the estimation window $(t_{-1}, t_0)$ of 150 trading days as the expected return in the event window $(t_1, t_2)$. Where $t_{-1}$ represent the first day in estimation window and $t_0$ show the last day of estimation. Then under the null, for a speech $i$, we have the followings:

$$ R_t = E(R_t|X_t) + \varepsilon_t, t \in (t_1, t_2) $$
$$ E(R_t|X_t) = \mu_i, t \in (t_1, t_2) $$
$$ E(\varepsilon_t) = 0, \text{Var}(\varepsilon_t) = \sigma_{\varepsilon_i}^2 $$

\[ (5.1) \]
\[ \mu_i = \frac{1}{150} \sum_{t_0}^{t_0} R_t \]

The constant mean model is suitable for a study of the impact that events have on the market index fluctuations\(^{46}\). Although it is the simplest method but is often yields results similar to those of more sophisticated models (Brown and Warner, 1985). More complex model such like the market adjusted model is more suitable for analysis on individual stock and not a stock market index.

For each speech, the benchmark for expected returns is calculated in a 150 trading days’ estimation window and is subsequently deducted from the observed returns in the event window to create abnormal returns\(^{47}\). Cumulative abnormal returns have also been calculated. Daily abnormal returns are calculated as the difference between the raw return for DJIA on day \( t \) and the mean return of the estimation window:

\[ AR_{t,i} = R_t - E(R_t|X_t), t \in (t_1, t_2) \]

\[ CAR_i(t_1, t_2) = \sum_{t_1}^{t_2} AR_t \]  \hspace{1cm} (5.2)

where \( AR_{t,i} \) is the abnormal return for speech \( i \) on day \( t \), \( R_t \) is the return for speech \( i \) on day \( t \), and \( E(R_t|X_t) \) is the mean return from the estimation window for the DJIA. \( t_1 \) show the first day in event window and \( t_2 \) show the last day in event window. The cumulative abnormal returns have three different windows, days minus one through to one, days zero through to one and days minus one through to five, where day zero is the date of the presidential speech. Whenever a speech occurred at a weekend or on a public holiday, day 0 is defined as the first trading day following the speech. The effect of presidents’ speeches characteristics on the contemporaneous stock price reaction can be analysed by CARs from the initial 2 and 3 days periods, while the CARs from

\(^{46}\) Dyckman et al. (1984) indicate that there are three main ways to determine normal returns: the first is called the market model which use linear relationship between the underlying asset returns and the market returns as the forecasts of the normal returns in the event windows; the second is called the mean model which uses the average returns of underlying asset over a period as the forecasts of the normal returns in the event windows; the third directly uses the market returns or sector returns as the normal returns forecasts of underlying asset. The use of these three methods depends primarily on the characteristics of the events studied.

\(^{47}\) The implicit assumption of abnormal return on an event study approach is we assume the changes in the return level of underlying asset which are caused by factors other than the events studied continuously keep constant from the beginning of the estimation window to the end of event window. That is, the abnormal returns which caused by events studied could be determined by subtracting the returns in event window from the average return of estimation window.
a longer time period allow us to investigate the lagged effects of information. Thus, I used three cumulative abnormal returns measures for DJIA returns associated with each presidential speech \( i \).

The intention here is to determine how the sentiment and other linguistic characteristics of presidential speeches influence market returns. To capture these linguistic characteristics, I use the DICTION 6.0 software, a computer-aided textual analysis program that uses a series of dictionaries to analysis texts for five semantic features – Certainty, Optimism, Activity, Realism and Commonality. Each master variable has its own formula. The detailed definitions are described in 5.10 Appendix. I focus on these five predefined master variables in the empirical analysis. Specifically, according to the definitions of Hart and Carroll (2012, 5), Certainty refers to “the resoluteness, inflexibility, and completeness words.” Certainty suggests that the speakers are discussing specific policy objectives and are making strong arguments or obligations. Verbal certainty represents the ideal and the possible, and points to the line in politics where “dreams and realities collide” (Hart and Childers, 2005). The second variable, Optimism refers to “language that supports or emphasizes the positive factors of an individual, group, concept or event, or highlighting their positive entailments” (Hart and Carroll, 2012, 6). Optimism may additionally exhibit that speakers have a more positive viewpoint with respect to the economy or policy agenda. The third, Activity refers to “the type of language featuring movement, change and the implementation of idea” (Hart and Carroll, 2012, 7). The use of Activity in political communication may demonstrates that speakers are more willing to be centred on achieving political decision that can be implemented. Realism examines “the use of language describing tangible, immediate, and identifiable matters that affect people’s daily lives” (Hart and Carroll, 2012, 8). Finally, Commonality describes “the type of language that emphasizes common values of a group” (Hart and Carroll, 2012, 9). Table XVII summarise the main variables that have been used in the empirical analysis.
Table XVII Variable definitions

This table describes the predictor and outcome variables which have been used in the main empirical analysis. This table defines the names of these variables, the meanings and sources.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR (-1,1)</td>
<td>Cumulative abnormal returns from event day -1 to day 1.</td>
<td>Daily returns from Bloomberg.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAR, manual calculation.</td>
</tr>
<tr>
<td>CAR (0,1)</td>
<td>Cumulative abnormal returns from event day 0 to day 1.</td>
<td>Daily returns from Bloomberg.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAR, manual calculation.</td>
</tr>
<tr>
<td>CAR (-1,5)</td>
<td>Cumulative abnormal returns from event day -1 to day 5.</td>
<td>Daily returns from Bloomberg.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CAR, manual calculation.</td>
</tr>
<tr>
<td>Certainty</td>
<td>DICTION’s master variable</td>
<td>DICTION 6.0 program</td>
</tr>
<tr>
<td>Optimism</td>
<td>DICTION’s master variable</td>
<td>DICTION 6.0 program</td>
</tr>
<tr>
<td>Activity</td>
<td>DICTION’s master variable</td>
<td>DICTION 6.0 program</td>
</tr>
<tr>
<td>Realism</td>
<td>DICTION’s master variable</td>
<td>DICTION 6.0 program</td>
</tr>
<tr>
<td>Commonality</td>
<td>DICTION’s master variable</td>
<td>DICTION 6.0 program</td>
</tr>
<tr>
<td>Speech Length</td>
<td>The total words of each U.S. presidential speech texts</td>
<td>DICTION 6.0 program</td>
</tr>
<tr>
<td>IP_Growth</td>
<td>Growth rate of the industrial production</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>ΔCPI</td>
<td>Growth rate of the consumer price index (Realized Inflation Rate).</td>
<td>Thomson Reuters Datastream</td>
</tr>
<tr>
<td>ΔUnemployment</td>
<td>Change in unemployment rate</td>
<td>Thomson Reuters Datastream</td>
</tr>
</tbody>
</table>

5.5.5 Summary statistics and correlation matrix

In order to get an intuitive understanding of the statistical characteristics of the variables, Table XVIII shows some descriptive statistics. It can be seen from the table that all of the means of the CARs are negative, no matter how long the event window.

The negative average CARs show that the president’s speech had either a negative impact on the stock market, or it was timed to coincide with adverse episodes. Most of the observations of the CARs for the initial event window (-1, 1) have a 25th percentile of -1.09% and a 75th percentile of 1.12%. The longer event window interquartile CARs (-1, 5) range is more pronounced with the 25th percentile at -1.63% and the 75th percentile at 1.64%, which implies that there are more extreme values. However, regardless of whether we look at the full range or the interquartile range, the CAR (-1, 5) is roughly 1.5 times the levels we see with CAR (-1, 1), suggesting that the information content of the presidential speech may not be immediately and fully reflected on stock prices.
Table XVIII Summary statistics
This table presents the summary statistics of the dependent variables used in this study from such as mean, median, standard deviation, 25th percentile and 75th percentile. All returns are measured in U.S. Dollars. The first three lines report the dependent variables used in this study. CAR denotes the cumulative abnormal returns of Dow Jones Industrial Average around each president speech date for both a 2-day, 3-day and a 7-day event window. Sample spans over the period 1897 to 2010.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std.Dev.</th>
<th>25th Percentile</th>
<th>Median</th>
<th>75th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR (-1,1)</td>
<td>-0.0011</td>
<td>0.0361</td>
<td>-0.0109</td>
<td>0.0005</td>
<td>0.0112</td>
</tr>
<tr>
<td>CAR (0,1)</td>
<td>-0.0007</td>
<td>0.0291</td>
<td>-0.0085</td>
<td>0.0003</td>
<td>0.0083</td>
</tr>
<tr>
<td>CAR (-1,5)</td>
<td>-0.0020</td>
<td>0.0455</td>
<td>-0.0163</td>
<td>0.0008</td>
<td>0.0164</td>
</tr>
</tbody>
</table>

Table XIX reports the unconditional correlation coefficients matrix among the main variables in the empirical investigation together with their significance levels. First, I examined the correlations between the CARs and DICTION master variables. It can be seen that the *Optimism* variable exhibits a negative correlation with CARs, a result that differs from some prior studies. However, this negative relationship seems to be statistically insignificant at the 5% level. Regarding other DICTION variables, we can see that there is a significant positive relationship between *Commonality* and all of the CARs with different event windows. I introduce a multiple regression framework in the next section to analyse this question in more depth. There is a relatively high significant negative correlation between the variable *Optimism* and the variable *Activity* (lower than -0.4), indicating that if one speech has lots of words about *Activity*, then it seems to have a pessimistic theme or content.
### Table XIX Matrix of correlations

This table reports the correlation coefficients of the equity market and DICTION variables. The *p*-values of the correlation coefficients are reported on the row under the correlation coefficients in [ ]. The significant *p*-values that are below 0.01 are highlighted in italics.

<table>
<thead>
<tr>
<th>Correlation</th>
<th>CAR (-1,1)</th>
<th>CAR (0,1)</th>
<th>CAR (-1,5)</th>
<th>Certainty</th>
<th>Optimism</th>
<th>Activity</th>
<th>Realism</th>
<th>Commonality</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR (-1,1)</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAR (0,1)</td>
<td>0.9374</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAR (-1,5)</td>
<td>0.8158</td>
<td>0.7491</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certainty</td>
<td>0.0405</td>
<td>0.0366</td>
<td>0.0523</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimism</td>
<td>-0.0505</td>
<td>-0.0796</td>
<td>-0.0278</td>
<td>-0.2248</td>
<td>1.0000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>0.0370</td>
<td>0.0518</td>
<td>0.0560</td>
<td>0.1535</td>
<td>-0.4417</td>
<td>1.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Realism</td>
<td>0.0053</td>
<td>0.0100</td>
<td>0.0155</td>
<td>0.0890</td>
<td>0.0895</td>
<td>0.0235</td>
<td>1.0000</td>
<td></td>
</tr>
<tr>
<td>Commonality</td>
<td>0.1298</td>
<td>0.1492</td>
<td>0.1198</td>
<td>0.0527</td>
<td>0.0193</td>
<td>0.0254</td>
<td>0.0007</td>
<td>1.0000</td>
</tr>
</tbody>
</table>
5.6 Empirical Analysis

In this section, I examine the association between presidents’ speeches rhetorical properties and stock market performance. The results of a multivariate analysis where cumulative abnormal returns around the speech date are regressed on the five rhetorical features measured by DICTION is provided. Specifically, I estimate the following multiple linear regressions to test the relationship between narrative political disclosures and their influence on the stock market in an event window \((t_1, t_2)\) including the presidential speech \(i\):

\[
CAR_i(t_1, t_2) = \alpha + \sum_{j=1}^{5} \beta_j \text{MasterVariable}_{j,i} + \gamma' \text{CONTROL}_{i} + \epsilon_i \tag{5.3}
\]

where \(CAR\) measures cumulative abnormal returns using the constant mean model for presidential speech \(i\) defined above and is calculated as the difference between the DJIA returns during the event window and the average DIJA returns during the estimation window. I provide results for both 2-day, 3-day and 7-day event windows. Here I multiply the \(CARs\) by 100 to express the form of a percentage and to avoid the problem of small coefficients that cannot be reported within four decimal places. Depending on the value of \(j\), the Master-Variable could be Certainty, Optimism, Activity, Realism or Commonality, which were defined in the previous section and 5.10 Appendix. \(\text{CONTROL}_i\) includes measures of speech length, industrial production growth, CPI inflation and unemployment rate. Speech length provides an indication of the quantity of information contained in a particular presidential speech and is measured as its word count in thousands of words. Industrial production is expressed as growth rate and is used as an indicator of real economic activity. Fama (1990) argues that industrial production may have more variation than other actual economic activity measures (such as GNP) and it is available with monthly frequency. The real inflation rate is measured by the growth rate of the consumer price index (CPI). It is believed that market participants respond to consumer prices, which in turn affects actual stock returns (Abdullah and Hayworth, 1993). Brooks and Tsolacos (1999) argue that the monthly unemployment rate can be used to represent general business conditions and cycle factors. The CPI inflation and unemployment rate have been taken as a first
difference of the logarithm in the monthly data on the annual rate to represent the natural growth. The specific data for these variables were obtained from Thomson Reuters Datastream. Because of the data limitations, the sample intervals for the regressions that contain macroeconomic controls have been reduced to 1948 and 2010. If valuable information was disclosed during the presidential speeches, then it could expect that the linguistic measures to be both significantly related to the initial event window CARs due to the efficient markets hypothesis, which suggests that the impact of new information should be immediately reflected on stock prices. However, the coefficients of the linguistic measures may be significant over a longer horizon ($t=-1$ to $t=5$). Quantitative information may be more quickly reflected on the market than qualitative information because quantitative information may be more deterministic and easier to analyse. Thus, soft information may predict stock returns more accurate over a longer period of time (Demers and Vega, 2008).

Following Wisniewski and Moro (2014) and Durnev et al. (2014), if the results show that the rhetoric measures of presidential speeches are significantly related to abnormal returns, then it indicates that we have found the influence of political communications on capital markets. Table XX reports the results of an ordinary least squares (OLS) regression model testing the significance of the rhetorical tone of presidential speeches in explaining CARs. From the results reported in columns (1)-(3), it should be noted that there are some differences in contrast to prior studies conducted in a different context (e.g., Wisniewski and Moro, 2014; Durnev et al., 2014). There is no evidence to support the claim that the cumulative abnormal returns are significantly higher when the presidential speech uses more optimistic words. The hypothesis that Optimism is irrelevant cannot be rejected at conventional significance levels. Perhaps market participants simply perceive the optimistic language of the President as political spin. Regarding other DICTION master variables, Table XX reports that the only statistically significant and positive coefficient is that for Commonality. High Commonality scores may indicate that president seek commonality on major issues to
ensure continued good relationship with their citizens or foreign nations. This master variable is composed of dictionaries concerned with various aspects of social life. The results show that speeches that draw people together by referring to commonality are important and indicate the value of collective consensus and collaboration. Lohmann (1992, 320) extolled the virtue of commonality in producing “desirable or preferred outcomes that are uncovered, that are associated with shared purposes and pooled resources, and that engender a sense of mutuality (we often say a sense of community) and fairness (or justice)”. Overall, *Commonality* reflects a public awareness language. We can easily understand that presidential speeches generally serve various social classes by providing responses to domestic and international major events. Hence, creating a sense of commonality through well-constructed presidential speeches is particularly important for the government, which works for diverse people. The significant and positive relationship means that when a president focused on the public and concerns for the public’s welfare, the stock market responded positively. And this concern for the common interest also reflects the financial market’s confidence in the future of the U.S. economy.
Table XX Regression of DJIA CARs on DICTION’s variables and controls

Analysis of the impact of linguistics characteristics of U.S. president speech on Dow Jones Industrial Average abnormal returns around the speech date. This table presents estimates from the equation (5.3). I progressively introduce independent variables in our equation from column (1) to column (12). CAR denotes the cumulative abnormal returns for a 2-day or a 3-day or a 7-day event window. CARs have been set as a percentage version. Standard errors are reported into parentheses. *, ** and *** denote statistically significant at the 10%, 5% and 1% level, respectively. Sample spans over the period 1897 to 2010 without macroeconomic controls and 1948 to 2010 with macroeconomic controls.

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>-10.1823**</td>
<td>-7.6066**</td>
<td>-17.2702**</td>
<td>0.1326</td>
<td>0.1811</td>
<td>-0.4995</td>
<td>-4.5041</td>
<td>-3.4662</td>
<td>-7.8102</td>
<td>0.0666</td>
<td>0.0170</td>
<td>0.0377</td>
</tr>
<tr>
<td></td>
<td>(6.0906)</td>
<td>(4.8980)</td>
<td>(7.6962)</td>
<td>(0.4753)</td>
<td>(0.3834)</td>
<td>(0.6022)</td>
<td>(3.7974)</td>
<td>(3.0499)</td>
<td>(6.0492)</td>
<td>(0.3377)</td>
<td>(0.2721)</td>
<td>(0.5342)</td>
</tr>
<tr>
<td>Certainty</td>
<td>0.0225</td>
<td>0.0078</td>
<td>0.0496</td>
<td>-0.0509*</td>
<td>-0.0408*</td>
<td>-0.0334</td>
<td>(0.0472)</td>
<td>(0.0380)</td>
<td>(0.0596)</td>
<td>(0.0279)</td>
<td>(0.0224)</td>
<td>(0.0444)</td>
</tr>
<tr>
<td></td>
<td>(0.0466)</td>
<td>(0.0466)</td>
<td>(0.0731)</td>
<td></td>
<td></td>
<td></td>
<td>(0.0337)</td>
<td>(0.0271)</td>
<td>(0.0537)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimism</td>
<td>-0.0513</td>
<td>-0.0707</td>
<td>-0.0038</td>
<td></td>
<td></td>
<td></td>
<td>-0.0068</td>
<td>-0.0030</td>
<td>0.0003</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0579)</td>
<td>(0.0466)</td>
<td>(0.0731)</td>
<td></td>
<td></td>
<td></td>
<td>(0.0337)</td>
<td>(0.0271)</td>
<td>(0.0537)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>0.0053</td>
<td>0.0052</td>
<td>0.0285</td>
<td>0.0081</td>
<td>0.0164</td>
<td>0.0065</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0238)</td>
<td>(0.0191)</td>
<td>(0.0301)</td>
<td>(0.0138)</td>
<td>(0.0111)</td>
<td>(0.0220)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Realism</td>
<td>0.0093</td>
<td>0.0070</td>
<td>0.0167</td>
<td>0.0445</td>
<td>0.0131</td>
<td>0.0267</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0590)</td>
<td>(0.0474)</td>
<td>(0.0745)</td>
<td>(0.0447)</td>
<td>(0.0359)</td>
<td>(0.0712)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonality</td>
<td>0.2171***</td>
<td>0.2033***</td>
<td>0.2513***</td>
<td>0.0970**</td>
<td>0.0822**</td>
<td>0.160**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0733)</td>
<td>(0.0589)</td>
<td>(0.0926)</td>
<td>(0.0465)</td>
<td>(0.0374)</td>
<td>(0.0741)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centrality</td>
<td></td>
<td></td>
<td></td>
<td>-0.0407</td>
<td>-0.0165</td>
<td>-0.0302</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.0601)</td>
<td>(0.0485)</td>
<td>(0.0762)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperation</td>
<td>0.0295</td>
<td>0.0230</td>
<td>0.0939</td>
<td></td>
<td></td>
<td></td>
<td>0.0423</td>
<td>0.0467</td>
<td>0.0472</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0465)</td>
<td>(0.0375)</td>
<td>(0.0590)</td>
<td></td>
<td></td>
<td></td>
<td>(0.0493)</td>
<td>(0.0397)</td>
<td>(0.0779)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapport</td>
<td>0.1948**</td>
<td>0.1645**</td>
<td>0.2291**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0433</td>
<td>0.0268</td>
<td>0.0177</td>
</tr>
<tr>
<td></td>
<td>(0.0851)</td>
<td>(0.0686)</td>
<td>(0.1078)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(0.0533)</td>
<td>(0.0429)</td>
<td>(0.0842)</td>
</tr>
<tr>
<td>Diversity</td>
<td>-0.1411</td>
<td>-0.1495</td>
<td>-0.2139</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-0.0209</td>
<td>-0.0769</td>
<td>-0.1733</td>
</tr>
</tbody>
</table>

191
<table>
<thead>
<tr>
<th></th>
<th>(0.1293)</th>
<th>(0.1042)</th>
<th>(0.1637)</th>
<th>(0.0881)</th>
<th>(0.0710)</th>
<th>(0.1394)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exclusion</td>
<td>-0.0358</td>
<td>-0.0626</td>
<td>-0.0308</td>
<td>0.0375</td>
<td>0.0089</td>
<td>0.1172</td>
</tr>
<tr>
<td></td>
<td>(0.0994)</td>
<td>(0.0801)</td>
<td>(0.1259)</td>
<td>(0.0781)</td>
<td>(0.0629)</td>
<td>(0.1235)</td>
</tr>
<tr>
<td>Liberation</td>
<td>-0.1487***</td>
<td>-0.1267***</td>
<td>-0.0834**</td>
<td>-0.0667*</td>
<td>-0.0508*</td>
<td>-0.0657*</td>
</tr>
<tr>
<td></td>
<td>(0.0568)</td>
<td>(0.0458)</td>
<td>(0.0720)</td>
<td>(0.0347)</td>
<td>(0.0280)</td>
<td>(0.0549)</td>
</tr>
<tr>
<td>Speech Length</td>
<td>-0.0270</td>
<td>0.0098</td>
<td>0.0040</td>
<td>-0.0218</td>
<td>0.0070</td>
<td>0.0064</td>
</tr>
<tr>
<td></td>
<td>(0.0336)</td>
<td>(0.0270)</td>
<td>(0.0535)</td>
<td>(0.0331)</td>
<td>(0.0267)</td>
<td>(0.0524)</td>
</tr>
<tr>
<td>IP_Growth</td>
<td>-0.0345</td>
<td>0.0698</td>
<td>-0.0503</td>
<td>-0.0608</td>
<td>0.0485</td>
<td>-0.1087</td>
</tr>
<tr>
<td></td>
<td>(0.1284)</td>
<td>(0.1031)</td>
<td>(0.2046)</td>
<td>(0.1297)</td>
<td>(0.1045)</td>
<td>(0.2052)</td>
</tr>
<tr>
<td>ΔCPI</td>
<td>-0.0401</td>
<td>0.0419</td>
<td>-0.2193</td>
<td>-0.0517</td>
<td>0.0369</td>
<td>-0.2752</td>
</tr>
<tr>
<td></td>
<td>(0.2736)</td>
<td>(0.2197)</td>
<td>(0.4358)</td>
<td>(0.2736)</td>
<td>(0.2204)</td>
<td>(0.4327)</td>
</tr>
<tr>
<td>ΔUnemployment</td>
<td>0.0267</td>
<td>0.0213</td>
<td>0.0231</td>
<td>0.0237</td>
<td>0.0199</td>
<td>0.0139</td>
</tr>
<tr>
<td></td>
<td>(0.0286)</td>
<td>(0.0230)</td>
<td>(0.0456)</td>
<td>(0.0289)</td>
<td>(0.0233)</td>
<td>(0.0457)</td>
</tr>
<tr>
<td>Observations</td>
<td>524</td>
<td>524</td>
<td>524</td>
<td>524</td>
<td>524</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>330</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>330</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>330</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.0108</td>
<td>0.0110</td>
<td>0.0093</td>
<td>0.0170</td>
<td>0.0209</td>
<td>0.0111</td>
</tr>
<tr>
<td></td>
<td>0.0059</td>
<td>0.0090</td>
<td>0.0085</td>
<td>0.0023</td>
<td>0.0055</td>
<td>0.0025</td>
</tr>
</tbody>
</table>
I can also find some interesting evidence from the perspective of party-based communication. Prior studies (e.g., Painter, 2009) have demonstrated, using DICTION, that there is an obvious difference with regard to commonality between U.S. Republican and Democratic politicians’ speeches. Specifically, Painter (2009) found that Democratic candidates’ scores were significantly higher than Republican candidates’ scores on the commonality master variable. His findings suggest that Democrats are more inclined to use the language of groups, reflecting the common commitment and the spirit of solidarity (such as words in the Commonality and Rapport dictionaries). On the contrary, he argues that Republicans are considered to be more concerned with moral and commercial matters, and tend to use a style that respects for the order, efficiency and unity (such as words in the Liberation and Denial dictionaries). Interestingly, some studies in finance show that the excess stock market returns under Democratic administrations are higher than under Republicans (e.g., Santa-Clara and Valkanov, 2003). That is, the stock market and investors favour the Democrats.

In order to further analyse the impact of Commonality, I decided to introduce the components of this DICTION master variables into the regression. According to the help manual for DICTION, the Commonality master variable consists of six sub-variables and is calculated as follows:

\[ \text{Centrality + Cooperation + Rapport} - \text{Diversity + Exclusion + Liberation} \]

Hence I created another set of specifications and report the results in columns (4)-(6). The results are similar for the different event windows. As we can see, the components of Rapport and Liberation can provide some statistical significant explanatory power in regard to abnormal returns. Rapport is positively associated with CARs while Liberation is negatively correlated with CARs. Rapport is one of the positive components of the Commonality master variable. Terms describing “attitudinal similarities among groups of people” such as “family”, “equal”, and “agreement”, are located in the Rapport dictionary (Hart and Carroll, 2012). I think this kind of words
represents a spirit of cooperation, commonly shared values, and an expectation of common values in the future. This category may also capture peaceful political relations with other nations and effective international collaboration, which contribute to global stability. As argued in the literature review section, warmongering can have a detrimental effect on stock markets. Consequently, whenever Presidents signal peaceful intentions, the market reacts positively. The positive link between Rapport and stock returns is therefore not surprising, as these kinds of words boost investors’ confidence to some extent. Liberation is one of the dictionary classifications that is negatively related to commonality scores. Words describing “the maximization of individual choice and the rejection of social conventions” fall into the Liberation category (Hart and Carroll, 2012). Such language gives an impression on how to maximize individual choice and reject government regulations. If this liberation style is seen throughout a presidential speech, it will inevitably bring the possibility of political instability. Liberation-linked rhetoric can also arise in the context of the U.S. military interventions abroad. Such language could provide a justification for such interventions. Whichever perspective we adopt, the political uncertainty will unavoidably hurt the capital market. Consequently, the negative and significant coefficient on the Liberation variable appears to be justified.

Columns (7)-(12) represent the full regressions including all of the macroeconomic control variables used in this study. Industrial production growth seems to have no significant impact on the DJIA returns. Similarly, the inflation factor also shows no significant relationship with stock return. In an inflationary economic environment, investors may tend to invest in less risky assets. I find that the coefficient of the unemployment rate is positive, but insignificant. The unemployment rate is one of the most important indicators to influence the Fed’s interest rate policy. Rising unemployment will postpone the Fed’s potential decision to raise the interest rate and maintain an accommodative monetary policy. Hence, from this perspective, stock prices may increase with a rising unemployment rate, since the economy is in an
expansion phase (Boyd et al., 2005). I include the speech length as a readability indicator in the equation, but the findings do not support a significant linear association between stock performance and this indicator. This lack of evidence suggests that other factors could be essential in determining the readability of presidential speeches, such as communication skills. The insignificance of readability for evaluating stock performance could also be due to features of the empirical design.

In addition to the coefficient estimation of macroeconomic control variables, we can also find some other differences between the regressions from columns (1)-(6) and columns (7)-(12). When I reduce the sample because of data availability, we find that Commonality maintains a significant and positive relation with stock market returns but the statistical significance somewhat deteriorates. Furthermore, the master variable Certainty shows some explanatory power. Certainty here refers to words that indicate resoluteness, inflexibility, and completeness. The use of these kinds of words during a political communication may reflect a clearer view about the politician’s stated goals and objectives. A more certain rhetoric implies less risks, which further means that investors will ask a relatively lower compensation for risk. This may be due to the sample period. The global situation tended to be more stable and peaceful and politicians could describe a more certain future, hence the risks for the economy and financial market were reduced. Regarding the further analysis of the components of Commonality, I find that the variable of Rapport lost its significance compared to the previous regressions. Rapport illustrates a peaceful point of view while attempting to depict the U.S. policy tends to be centrist, cooperative, and looking towards common values in the future. I think one possible reason why these changes happened is the difference in the period covered. When I regress the specifications with macroeconomic controls, the sample has been reduced and reset from 1948 to 2010 because of the macroeconomic data availability. Obviously, the years that have been removed from the sample cover a period full of conflicts, wars and dramatic changes in the geopolitical environment (1897-1948). This was a turbulent era, and hence the
financial markets during those years preferred the sound of peace, reconciliation, and cooperation because intense changes in the political and economic environment would have resulted in huge uncertainty and unavoidably damaged market confidence.

The study sample is a collection of unrelated and independent events and not a continuous time series, hence the issues of serial correlation is not important here. The variance inflation factors are lower than 2, which implies no multicollinearity problem. In summary, I find that the stock market reacts significantly to some content and the linguistics features of speeches given by U.S. presidents, indicating that political speeches do contain some new information that can affect financial market behaviour. Specifically, the market reaction is more positive for speeches that mention matters of relevance to Commonality in general, and Rapport in particular language related to Liberation seems to depress stock prices.

5.7 Robustness Checks
I have carried out further tests in order to verify that the low R-squared has an economic rather than statistical basis. I selected a different stock index to replace dependent variable. I first performed robustness tests to examine and analyse the impact of presidential speech rhetoric on the S&P500 index by using the same linear regression equation (5.3). Here I used the S&P500 index as an alternative because this measurement can also be used by investors to understand the U.S. stock market performance. The data for these two indexes were sourced from Bloomberg. However, the available time series are not as long. I used daily observations over the period 1928-2010 for the S&P500. Table XXI shows that results for the S&P500 are similar to my previous findings which show that the master variable Commonality has a significant positive impact on abnormal returns.
Table XXI Regression of S&P500 CARs on DICTION’s variables

Robustness analysis of the impact of linguistics characteristics of U.S. president speech on S&P500 abnormal returns around the speech date. This table presents estimates from the equation (5.3) while adjust the dependent variable to the S&P500 abnormal returns. We progressively introduce independent variables in our equation from column (1) to column (6). CAR denotes the cumulative abnormal returns for a 2-day or a 3-day or a 7-day event window. Standard errors are reported into parentheses. *, ** and *** denote statistically significant at the 10%, 5% and 1% level, respectively.

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-8.3275</td>
<td>-6.6157</td>
<td>-13.7252*</td>
<td>-0.3758</td>
<td>-0.3012</td>
<td>-0.6739</td>
</tr>
<tr>
<td></td>
<td>(5.6471)</td>
<td>(4.58560)</td>
<td>(7.5809)</td>
<td>(0.4310)</td>
<td>(0.3502)</td>
<td>(0.5803)</td>
</tr>
<tr>
<td>Certainty</td>
<td>0.0054</td>
<td>-0.0044</td>
<td>0.0223</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0413)</td>
<td>(0.0335)</td>
<td>(0.0554)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Optimism</td>
<td>-0.0121</td>
<td>-0.0270</td>
<td>0.0189</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0507)</td>
<td>(0.0412)</td>
<td>(0.0681)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>-0.0001</td>
<td>0.0047</td>
<td>0.0114</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0216)</td>
<td>(0.0176)</td>
<td>(0.0290)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Realism</td>
<td>-0.0045</td>
<td>0.0064</td>
<td>0.0013</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0587)</td>
<td>(0.0477)</td>
<td>(0.0788)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonality</td>
<td>0.1801***</td>
<td>0.1545***</td>
<td>0.2221***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0672)</td>
<td>(0.0546)</td>
<td>(0.0902)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centrality</td>
<td>0.1146**</td>
<td>0.1177**</td>
<td>0.0978</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0576)</td>
<td>(0.0468)</td>
<td>(0.0776)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cooperation</td>
<td>0.0025</td>
<td>-0.0032</td>
<td>0.0714</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0427)</td>
<td>(0.0347)</td>
<td>(0.0575)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapport</td>
<td>0.1656**</td>
<td>0.1237**</td>
<td>0.1851*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0779)</td>
<td>(0.0633)</td>
<td>(0.1049)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td>0.0681</td>
<td>0.0073</td>
<td>-0.1734</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.1294)</td>
<td>(0.1052)</td>
<td>(0.1743)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exclusion</td>
<td>Liberation</td>
<td>Observations</td>
<td>Adj-R²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>--------------</td>
<td>------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.1418</td>
<td>-0.0755</td>
<td>415</td>
<td>0.0056</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.1066)</td>
<td>(0.0515)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.1058</td>
<td>-0.0599</td>
<td>415</td>
<td>0.0093</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0866)</td>
<td>(0.0419)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>-0.0902</td>
<td>-0.0054</td>
<td>415</td>
<td>0.0038</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.1435)</td>
<td>(0.0694)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observations</td>
<td>415</td>
<td>415</td>
<td>415</td>
<td>415</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj-R²</td>
<td>0.0056</td>
<td>0.0093</td>
<td>0.0038</td>
<td>0.0136</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0157</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0056</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
5.8 Conclusions

The American presidential speeches have been analysed from many perspectives and by a great number of authors (see, for instance, Trosborg, 2000; Druckman and Holmes, 2004; Slatcher et al., 2007). But there are no studies that examine the relationship between the presidential speech rhetoric and the capital market response. Hence, this study aims to fill this gap and contributes to the political and financial literature.

Another reason why I chose presidential speeches as the object of analysis rather than the public statements of other influential people (such as the chair of the Federal Reserve Board) is because presidential speeches contain information that extends beyond straightforward elaboration on macroeconomic performance and therefore it is not clear whether presidential rhetoric will directly affect the financial market on a priori grounds. There could also be an indirect impact and such an influence may not only come from the content of the speech, but also from the emotional tendency of the speech. I aim to provide some evidence that how presidents express themselves is also important to investors and financial markets.

The results suggest that presidents’ speeches may contain some useful information that is of concern to investors. To explore the usefulness of this kind of information, this study empirically investigates the relationship between stock market performance and rhetorical tone in a large sample of political speeches given by presidents of the U.S. I analysed the statistical association of five master variables (Certainty, Optimism, Activity, Realism and Commonality) computed by the lexical analysis software DICTION and the stock market returns around the time of the speeches. The results are based on a regression model containing several macroeconomic control variables. The findings show the existence of a significant association between Commonality and stock index movements. The regression analyses strengthen this statement, indicating that speeches that refer to commonality and peacefulness are associated with higher short run abnormal returns, while controlling for other rhetorical features and macroeconomic indicators. More specifically, further analysis of the components of
Commonality reveals that the stock market responds more to speeches that use words related to *Rapport*, while more words associated with *Liberation* lead to a decrease in abnormal returns. These results controlling for macroeconomic influence, and to using other indexes as alternative measurements of the U.S. stock market.

Based on the empirical findings, this study draws conclusions that can contribute to the development of a framework to examine the valuable information content of political communication. Since American presidential speeches are important events, they could be viewed as information sources in the U.S. The findings contribute to the financial research by examining the effect of U.S. presidents’ speeches rhetorical tone on financial evaluation and asset pricing. The results show that U.S. presidential speeches are important political communication vehicles that contain information that is relevant to stock market investors.

This study also has some limitations. First, there is a lack of theoretical analysis on the economic implications behind vocabularies. Although this study classifies the words and phrases of political texts through the method of dictionary, it basically derives from an empirical viewpoint and rather than theoretical analysis. In the mechanism of “information - investor psychology - asset prices”, one side is linguistics and the other side is finance. They are combined by the informational effects, however, there is still a lack of a strong theoretical connection between them. The theory of how the emotional sentiment of the text changes the expectations of investors and ultimately affects the asset prices is not yet mature. Future research needs to focus on the interdisciplinary development, for example, from the linguistic perspective to understand the concepts of economics, or from the perspective of economics to describe the meaning of vocabularies.

Second, we must recognize that the meaning of vocabularies can change over a long period of time and this may have some potential impact on our research. The images aroused by words or the meanings given by people constantly changed. Vocabulary
only has a temporary meaning, which varies with time and context. Our analysis in section 5.6 shows that the words set in the Rapport was significant during the WWI and WWII, but its significance disappeared in the post-war period. Rapport is quite proper to test the required linguistic features of cooperation and accommodation. Cooperation designates the behavioural interactions among people that often result in a group product while rapport describes the attitudinal similarities among a group of people. The fact that the market prefers political language that demonstrates a higher level of cooperative and accommodating during a turbulent period is not surprising. When the war was over, and the world returned to peace, people may have either changed their understanding or assigned lower priority to the Rapport words set, which would explain why Rapport lost its significance. In other words, people may like or dislike the images evoked by certain words because of political turmoil or changes in the external environment, and the time could be a major factor that contributes to the change in this understanding. Therefore, future research could try different emotional dictionaries to examine the evolution of language and enhance robustness.

Third, although the focus of this study is presidential speeches, future research could extend to other important communications such as public statements issued by the IMF, World Bank, and UN. However, this was not within the scope of this study.
5.9 Appendix
Definitions and formulas for the master variables
(Source: Diction 6.0 User’s Manual (Hart and Carroll, 2012, p.4-9))

Certainty: Certainty refers to “words that indicate resoluteness, inflexibility, and completeness”. It is calculated as an amalgamation of the Z-scores of individual categories according to the following formula: \[\text{Tenacity} + \text{Levelling} + \text{Collectives} + \text{Insistence} - \text{Numerical Terms} + \text{Ambivalence} + \text{Self Reference} + \text{Variety}\] +50.

Optimism: Optimism is “language that endorses or highlights the positive entailments of a person, group, concept, or event”. It is constructed from the Z-scores of individual categories as follows: \[\text{Praise} + \text{Satisfaction} + \text{Inspiration} - \text{Blame} + \text{Hardship} + \text{Denial}\] +50.

Activity: Activity refers to “language that features movement, change, or the implementation of ideas”. It is calculated from the Z-scores of specific categories according to the following formula: \[\text{Aggression} + \text{Accomplishment} + \text{Communication} + \text{Motion} - \text{Cognitive Terms} + \text{Passivity} + \text{Embellishment}\] +50.

Realism: Realism was created “in an attempt to tap into John Dewey’s pragmatism and examines the use of language describing tangible, immediate, recognizable matters that affect people’s everyday lives”. It is calculated using the Z-scores of the categories in accordance with the following formula: \[\text{Familiarity} + \text{Spatial Awareness} + \text{Temporal Awareness} + \text{Present Concern} + \text{Human Interest} + \text{Concreteness} - \text{Past Concern} + \text{Complexity}\] +50.

Commonality: Commonality provides “an approximation of the communication concepts and refers to language that highlights agreed-upon values of a group and rejects idiosyncratic modes of communication”. It is calculated from the Z-scores as follows: \[\text{Centrality} + \text{Cooperation} + \text{Rapport} - \text{Diversity} + \text{Exclusion} + \text{Liberation}\] +50.

Note: Each of the master variables was subjected to a statistical correction by referencing the normative databank embedded in DICTION. Consequently, the means of the master variables can differ from 50.
<table>
<thead>
<tr>
<th>Dictionary</th>
<th>Description</th>
<th>Sample words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accomplishment</td>
<td>Accomplishment signals works that express task-completion such as establish, finish, etc.</td>
<td>Establish, finish, influence, proceed, motivated, influence, leader, manage, strengthen, succeed, agenda, enacted</td>
</tr>
<tr>
<td>Aggression</td>
<td>Aggression is a measure of the use of words that are associated with competition and forceful action, including physical energy, social domination, and goal-directedness.</td>
<td>Blast, crash, explode, collide, conquest, attacking, violation, commanded, challenging, overcome, mastered</td>
</tr>
<tr>
<td>Ambivalence</td>
<td>Ambivalence refers to those words expressing hesitation or uncertainty, the communicator’s inability and unwillingness to commit.</td>
<td>Allegedly, perhaps, might, almost, approximate, vague, baffled, puzzling, hesitate, could, would, guess, suppose</td>
</tr>
<tr>
<td>Blame</td>
<td>Blame is a measure of the use of adjectives that describe social inappropriateness or unfortunate circumstances. It also contains outright denigrations.</td>
<td>adverse, bad, bleak, careless, costly, grim, hard, mediocre, struggling, troubled, unstable, upsetting</td>
</tr>
<tr>
<td>Centrality</td>
<td>Centrality is a measure of the use of words that imply institutional regularities and/or essential agreement on core values.</td>
<td>native, basic, decorum, constitutional, bureaucratic, ritualistic, standardized, mandate, unanimous, perennial</td>
</tr>
<tr>
<td>Cognitive Terms</td>
<td>Cognitive Terms is a measure of the use of words that refer to cerebral processes.</td>
<td>learn, deliberate, consider, psychology, logic, forget, re-examine, paradoxes, teaching, interpret, analyse, diagnose</td>
</tr>
<tr>
<td>Collectives</td>
<td>Collectives is a measure of the use of singular nouns that imply plurality, thus reduced specificity.</td>
<td>Crowd, choir, team, humanity, army, congress, legislature, staff, county, world, kingdom, republic</td>
</tr>
<tr>
<td>Communication</td>
<td>Communication refers to words indicating social interaction.</td>
<td>listen, interview, read, speak, videotape, telephone, e-mail, broadcast, reporter, spokesperson, advocates</td>
</tr>
<tr>
<td>Complexity</td>
<td>Complexity is a measure of the average number of characters per word.</td>
<td></td>
</tr>
<tr>
<td>Concreteness</td>
<td>Concreteness is a measure of words denoting tangibility and materiality, including physical structures, modes of transportation, articles of clothing, household animals, etc.</td>
<td>Airplane, ship, bicycle, stomach, eyes, lips, slacks, pants, shirt, cat, insects, horse, wine grain, sugar, oil, silk, sand, courthouse, temple, store</td>
</tr>
<tr>
<td>Cooperation</td>
<td>Cooperation designates behavioural interactions among people that often unions, schoolmates, caucus, partner, friendship, comrade,</td>
<td></td>
</tr>
<tr>
<td>Measure</td>
<td>Description</td>
<td>Examples</td>
</tr>
<tr>
<td>---------</td>
<td>-------------</td>
<td>----------</td>
</tr>
<tr>
<td>Denial</td>
<td>Denial consists of standard negative contractions, negative function words, and terms designating null sets.</td>
<td>aren’t, cannot, didn’t, shouldn’t, don’t, nor, not, nothing</td>
</tr>
<tr>
<td>Diversity</td>
<td>Diversity is a measure of the use of words that describe how individuals or groups differ from the norm.</td>
<td>inconsistent, exceptional, illegitimate, far-flung, dispersed, diffuse, deviancy, quirky</td>
</tr>
<tr>
<td>Exclusion</td>
<td>Exclusion is a measure of the use of words that describe the sources and effects of social isolation.</td>
<td>displaced, self-sufficient, outlaws, secede, forsake, discriminate, loneliness, nihilism, ostracize</td>
</tr>
<tr>
<td>Familiarity</td>
<td>Familiarity is a measure of the use of common English words.</td>
<td>Over, across, though, this, that, who, what, a, for, so</td>
</tr>
<tr>
<td>Hardship</td>
<td>Hardship refers to words that contain natural disasters, hostile actions and censurable human behaviour. It is also including unsavoury political outcomes as well as normal human fears.</td>
<td>Earthquake, starvation, tornado, killers, bankruptcy, enemies, infidelity, betrayal, grief, unemployment, died.</td>
</tr>
<tr>
<td>Human Interest</td>
<td>Human Interest is a measure of the use of personal pronouns and other words concentrating on people.</td>
<td>He, his, ourselves, them, cousin, wife, grandchild, uncle, friend, baby, human, persons</td>
</tr>
<tr>
<td>Inspiration</td>
<td>Abstract virtues deserving of universal respect. Most of the terms are nouns describing desirable moral qualities as well as attractive personal qualities. Social and political ideals are also included.</td>
<td>commitment, dedication, enrichment, improvement, loyalty, productivity, progress, promise, quality</td>
</tr>
<tr>
<td>Levelling</td>
<td>Levelling refers to those words used to ignore individual differences and to build up a sense of completeness and assurance.</td>
<td>Everybody, anyone, each, fully, always, completely, inevitably, consistently, unconditional, consummate, absolute, open-and-shut</td>
</tr>
<tr>
<td>Liberation</td>
<td>Liberation is a measure of the use of words that describe maximizing individual choice and the rejection of social conventions.</td>
<td>autonomous, unencumbered, impetuous, liberty, freedom, exodus, riotous, disentangle</td>
</tr>
<tr>
<td>Motion</td>
<td>Motion is a measure of the use of words that suggest human movement, physical process, journeys, speed and modes of transit.</td>
<td>bustle, job, lurch, leap, circulate, momentum, barnstorm, jaunt, nimble, zip, glide, swim, ride, fly</td>
</tr>
<tr>
<td>Numerical Terms</td>
<td>Numerical Terms is a measure of the use of numbers such as sum, date, or product.</td>
<td>one, tenfold, hundred, zero, subtract, divide, multiply, percentage, digitize, tally, mathematics</td>
</tr>
<tr>
<td>Passivity</td>
<td>Passivity is a measure of the use of words that suggest a range from neutrality to inactivity, including terms for compliance, docility, and cessation.</td>
<td>Allow, tame, appeasement, submit, contented, sluggish, arrested, capitulate, yielding, immobile, nonchalant</td>
</tr>
<tr>
<td>Present Concern</td>
<td>Present-tense verbs denoting an emphasis on the here and now.</td>
<td>Cough, tastes, sing, take, canvass, touch, govern, meet,</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>Example Words</td>
</tr>
<tr>
<td>---------------</td>
<td>--------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Past Concern</td>
<td>The past-tense forms of the verbs in the Present concern dictionary.</td>
<td>Coughed, tasted, sang, took, canvassed, touched, governed, met, made, cooked,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>printed, painted</td>
</tr>
<tr>
<td>Praise</td>
<td>Affirmations of a person, group or abstract entity. Included are terms isolating important social</td>
<td>best, better, capable, favourable, good, great, important, positive, profitable,</td>
</tr>
<tr>
<td></td>
<td>qualities, physical qualities, intellectual qualities, entrepreneurial qualities, and moral</td>
<td>strong, successful</td>
</tr>
<tr>
<td></td>
<td>qualities. All terms in this dictionary are adjectives.</td>
<td></td>
</tr>
<tr>
<td>Rapport</td>
<td>Rapport describes attitudinal similarities among group of people.</td>
<td>congenial, camaraderie, companion, approve, vouched, warrants, tolerant,</td>
</tr>
<tr>
<td></td>
<td></td>
<td>willing, resemble, consensus</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>Satisfaction is associated with positive affective states, with moments of undiminished joy</td>
<td>applauded, attracts, celebrate, comfortable, confident, delighted, enjoy,</td>
</tr>
<tr>
<td></td>
<td>and pleasurable diversion, or with moments of triumph.</td>
<td>enthusiasm, excited, pleased, satisfied</td>
</tr>
<tr>
<td>Self-Reference</td>
<td>Self-Reference gives a signal that the locus of action appears to reside in the speaker and not</td>
<td>I, I’d, I’ll, I’m, I’ve, me, mine, my, myself</td>
</tr>
<tr>
<td></td>
<td>in the world at larger.</td>
<td></td>
</tr>
<tr>
<td>Spatial</td>
<td>Spatial Awareness is a measure of the use of words that refer to geographical locations and</td>
<td>abroad, elbow-room, locale, Poland, fatherland, municipality, southwest,</td>
</tr>
<tr>
<td>Awareness</td>
<td>physical distances as well as modes of measurement.</td>
<td>border, snowbelt, map, spacious</td>
</tr>
<tr>
<td>Temporal</td>
<td>Temporal Awareness is a measure of the use of words that refer to fixed events within a specific</td>
<td>century, instant, lingering, seniority, nowadays, year-round, postpone,</td>
</tr>
<tr>
<td>Awareness</td>
<td>time-interval.</td>
<td>transitional, obsolete</td>
</tr>
<tr>
<td>Tenacity</td>
<td>Tenacity refers to the uses of verbs such as “be verb”, three definitive verb forms and their</td>
<td>is, am, will, shall, has, must, do, he'll, they've, ain't</td>
</tr>
<tr>
<td></td>
<td>variants, as well as associated contractions and these verbs connote confidence and totality.</td>
<td></td>
</tr>
</tbody>
</table>
VI. Conclusions

This thesis contributes to the literature of politics and capital markets by carrying out three empirical analysis that policy uncertainty, political regime and political communication on stock markets behaviour. A summary of the key findings of each empirical chapter as well as suggesting potential implications and further research directions are concluded in the following sections.

6.1 Key Findings, Discussion and Implications
6.1.1 Essay one

Financial experts and academic researchers continue to seek relevant information to improve the predictability of stock returns. Evaluating stock market movements is important for asset allocation, investment performance analysis, and market efficiency testing.

In this regard, the first study of this thesis focuses on the relationship between policy uncertainty indicators and stock returns in the U.S. capital market by using a dataset which covers the period of 1985 to 2014. In the post-financial crisis era, governments frequently introduced fiscal, regulatory and other macroeconomic policies to intervene and regulate resource allocation and economic operation. Investors make economic or investment decisions according to their expectations about the future policy environment. Policy uncertainty is likely to be an input variable which could affect financial asset pricing. Therefore, the objective of this study is to find out if policy uncertainty could be used as an explanatory variable for stock markets. However, the challenge is that policy uncertainty can hardly be measured correctly and precisely, and many previous studies use political events such like election to represent this kind of uncertainty. Unlike them, this dissertation adopts a continuous policy uncertainty measurement, namely the Economic Policy Uncertainty Index (Baker, et al., 2013), to be a proxy of policy uncertainty in the U.S. Specifically, this study applies a variety of different specifications under a linear regression framework to explore the impact of
policy uncertainty on stock returns and volatility. The empirical analysis reveals a negative relationship between economic policy uncertainty index, EPU, and stock returns in U.S. at various horizons. The results show that a higher economic policy uncertainty in U.S. would lead to a lower aggregate stock market return. This negative association is statistically significant, even after controlling for economic and political variables. Moreover, analysis on the U.S. stock market implied volatility show that higher policy uncertainty will lead to higher stock volatility. This conclusion is consistent with the earlier research (such as Sum 2012a and 2012b). Despite this, it is found that a strong negative relationship between policy uncertainty and dividend growth rate and a weak explanatory power for dividend price ratio imply that the negative return association of policy uncertainty for the U.S. stock market movement is coming from the cash flow channel. Most importantly, I regress the four components in EPU index and the findings show that the news component has the strongest explanatory power while the other three do not exhibit statistical significance in term of affecting the above mentioned financial variables. The results of my study provide evidence that not only the aggregate policy uncertainty but also its components can influence stock market returns as well as its volatility in the U.S.

This study provides a contribution to the existing literature by making a comprehensive analysis of various components of policy uncertainty. At this stage, it is important to point out that there no much empirical studies focus on the impact of policy uncertainty on stock returns and volatility. Results of this study indicate that the news component is one of the most important and significant variable which affect the stock returns in the U.S. and most of the EPU influence on stock market comes from the news component. This is more informative, since it will tell us what forms of policy uncertainty matters the most in evaluating stock returns and volatility, and also, in an indirect way, which components drive aggregate policy uncertainty.

In conclusion, this study finds that policy uncertainty is negatively correlated to stock
market performance in the U.S. The findings of this study prove an important implication for practitioners, regulators and policy makers. Practitioners can use information about the current policy uncertainty to gauge and assess the future stock market performance, and even to build specific portfolios to eliminate or hedge the risk from policy uncertainty. Regulators can recognize the sensitivity of financial markets to policy uncertainty, thereby improving regulatory efficiency and setting more targeted regulatory objectives. Policy makers can influence the performance of stock market by easing market investors’ perception of current and future policy uncertainty.

6.1.2 Essay Two

The second empirical chapter of this thesis includes a study on the relationship between political regimes and stock market behaviour. Specifically, it uses a panel set of stock markets data in 74 countries for the years 1975-2015 to investigate whether the country’s democratic development can have an effect on the stock market performance. Theoretically, a liberal political system is prone to have an investor-friendly environment because it often has a more comprehensive protection of personal property, a more developed financial market, less restrictions and lower expropriation risks. Hence, the main research question that this study aims to answer is: whether a country’s degree of democracy will influence its stock market performance?

This study uses measure for democracy from the Freedom House and three panel data methods, pooled OLS, fixed effects and random effects, to analyse the effects of democratic development on the MSCI country’s annual returns. Accordingly, the empirical findings from the panel data analysis indicate that the level of democracy of a country affects its stock market returns and this influence is positive. That is, authoritarianism may be associated with lower stock returns. Moreover, the results are robust to the control of key macroeconomic indicators, different democracy measurement and to the test of democracy changes. Consequently, this study provides
investors with important implications for portfolio construction and investment allocation. Furthermore, evidence suggests that if investors are seeking to invest in a country with less political freedom, then they may face a lower rate of return in comparison with more democratic countries.

Little is currently known about how political regimes affect the performance of stock markets because this relationship has received only limited scholarly attention. One of the reasons may be the lack of relevant data since the democracy can hardly be quantified. Moreover, the growing financial markets in emerging countries provide an interesting opportunity to assess the role of the political regime in its evolution since many of them are still in an early stage of democratic development. Hence, this study fills this literature gap by assessing the effect of democracy development on stock returns. Democracy and good governance through different channels to direct and indirectly increase the stock market development. For example, reduced transaction and agency costs, improved corporate governance and investor protection, better understanding of agency issues between shareholders and managers, and fairness in conflict management can contribute to a healthy investment environment. Democracy has an important influence on the degree of public competition and the quality of the public sector that is conducive to the development of the stock market. In an effectively functioning democratic society, the government should be aware that the capital market is beneficial to the majority, although this interest is indirect and not always clear.

6.1.3 Essay Three
The third empirical chapter of this thesis provides a study on the effects of political communications on stock returns in the U.S. by using a dataset which contains 524 presidential speeches observed over the period from 1897 to 2010. This study employs a content analysis methodology by using a computer-aided package DICTION to identify and capture the linguistic features and emotional tendencies of the U.S.
presidential speech texts. Specifically, this software categorises a speech’s language into five word groups, “Certainty”, “Optimism”, “Activity”, “Realism” and “Commonality”, based on 31 default sentiment dictionaries. Next, this study uses an event study approach and examine the 2-day, 3-day and 7-day abnormal returns around the speech date to examine whether U.S. presidential speeches contains valuable information for investors. Empirical analysis is based on a regression model containing several macroeconomic control variables.

The empirical results suggest a significant market response to the tone of the political speech. There is a statistically significant and positive relationship between the level of commonality expressed in a presidential speech and the abnormal returns of U.S. stock market. For example, if a president uses more words that are classified as commonality and peacefulness, the abnormal returns around this speech would be higher than others. In contrast, investors do not appear to respond to a speech characterized by more optimistic language. More specifically, this study also find that speeches characterized by using more words related to rapport are associated with an increase in abnormal returns. Despite this, speeches with more words associated with liberation lead a decrease in abnormal returns. These results are robust to controlling for several important macroeconomic indicators.

To the best of my knowledge, there is no much studies that pay attention to the impact of politicians’ communications and disclosure on stock market reactions. This study contributes to fill this gap in the current literature and shows that not only the content of a political speech but also its tone and words used are of significance and valuable to capital markets. Most existing studies focus on the specific content of politicians’ speeches, that is, what did politicians said, rather than how politicians said. This study suggests that the linguistic features, the vocabulary and emotional tendencies of political speeches may useful and valuable for financial markets, analyst, and investors. In other words, this study may provide useful knowledge for financial evaluation and
asset pricing. The result suggests that linguistic analysis on political communications helps to improve the portfolio benefits.

6.2 Suggestions for Future Research
The first empirical chapter finds evidence that policy uncertainty is one of the important determinant of stock returns and volatility in the U.S. This study highlights the importance to better understanding policies and predicting their impacts. For a more comprehensive analysis of this problem and in order to obtain a more robust conclusion, further research should include the use of more measures of economic policy uncertainty. Moreover, further analysis could use high-frequency stock market data to consider whether policy uncertainty index would have any impact on the higher moments of stock returns in the market.

The second empirical chapter shows that one country’s democratic development level could be useful for the country’s stock market performance. This could be a contribution to the existing political economy research. However, this study is subject to a number of limitations. This study uses Freedom House data in the main analysis as well as the Polity IV data in robustness test. Although these are used very commonly, the lack of objectivity is a congenital defect of these two measures. For example, the political right index is calculated by analysts’ ratings for 25 specified questions, while one-third of the analysts are Freedom House employees. Therefore, this index is characterised by subjective evaluations. Despite being widely used, this index still cannot fundamentally avoid generating empirical biases because of prejudice against different ideologies. Democracy is a complex and qualitative issue, hence the objectivity of democracy measurement constraints the investigation. Additionally, my current analysis is mainly empirical. However, only empirical tests are inadequate and incomplete, and further study on the research question of democracy, political institutions and capital markets requires more supports from basic theories. This study could be a good starting point for the analysis on this topic. The basic idea contained
here can be extended to other asset classes and phenomena, such as bond markets.

The third empirical chapter draws a conclusion that political speeches contain some valuable information for investors. Future research can include the study on the style of political communications in different economic conditions. Despite their relevance, my conclusion is a product of the assumptions and methodology adopted. Firstly, this study used a quantitative research technique to analysis qualitative information, thereby assuming language is quantifiable. Hence maybe some more qualitative approaches, such as case studies and longitudinal analyses, could also provide useful information from another side. Secondly, computer-aided software like DICTION has its own shortcomings that compared with manual analysis. Especially the problem of synonyms, DICTION cannot accurately define the meaning of the vocabulary according to the context (Henry, 2008). In addition, the natural language vocabulary and sentence are closely related with the logic, which shows that understanding the content of texts should not only consider the meaning of the word itself, but also consider the logical relationship between vocabulary and sentence. However, it is unrealistic to let the computer understand the complex language logic like the human brain, which is one of the shortcomings of the vocabulary statistics based on default dictionaries. Although content analysis packages such as the DICTION brings great convenience to our research, we should also see that there are studies argue that the content of such programs lack a professional financial background and results could be somewhat misleading (Loughran and McDonald, 2015). In short, as the goal of this study was to identify the differences in political communication, the benefits of DICTION and content analysis as an approach were determined to outweigh any disadvantages.
Bibliography


Chan, Y. and Wei, K. C. J. (1996) Political risk and stock price volatility: The case of


Kulo, L. (2009). Linguistic features in political speeches: How language can be used to impose certain moral or ethical values on people. Lulea: Lulea University of Technology.


