Unified vs. Divided Government and its Impact on Financial Markets' Volatility: an Empirical Study for the U.S.

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Bibliographical Statement

Pedro Daniel Almeida Guimarães was born in 1991, in Póvoa de Varzim. His journey in the School of Economics and Management of the University of Porto (FEP) started in 2009 when he got enrolled in the Bachelor in Economics. To deepen his knowledge in the Corporate Finance and Financial Markets fields, he then joined the Master in Finance. During these years, he actively participated in two student's organizations: Tuna Académica da Faculdade de Economia do Porto and FEP Finance Club, and several other academic activities such as volunteering and sports.

He had his first professional experiences at Caixa Geral de Depósitos (CGD), firstly in the commercial arm of the bank and, later, within the Large Firms' Office. Both these experiences happened during his enrolment in the Master in Finance. Nowadays, he works as a Capex analyst, in the Corporate Planning and Control Department, at Galp Energia, in Lisbon.

Abstract

An undeniable fact is that, as it happens in every country of the world, the United States' (U.S.) government, mainly through its policies, plays a major role in the way the American economy, as a whole, evolves. This study intends to shed some light on this effect by assessing whether the status of the government (Divided vs Unified) can be considered an additional source of Political Risk. The main rationale is that the repartition of executive and legislative powers affects the probability of policy change, which will ultimately lead to different levels of political risk. Notwithstanding, the direction in which this repartition is expected to affect the aforementioned relationship is not clear among the existent literature and has never been empirically tested. Thus, through an extensive comparison between the U.S. government's status, from 1950 until 2007, and the stock market volatility we will determine how this relationship works for the biggest and most relevant stock market in the world. We find that having a divided government (Congress and President, controlled by different parties) leads to an increase of stock market volatility. Thus, for the United States, we can say that we found evidence that the gridlock theory does not hold. Furthermore, the conclusions are quite robust, remaining congruent after the inclusion of several control variables and a demanding set of econometric tests.

Key-words: Divided Government; Political Risk; Stock Market Volatility; United States.

JEL-Codes: G10; P16

Resumo

Os governos têm um inegável impacto na economia e, tal como em qualquer país do mundo, através das suas políticas, o Governo dos Estados Unidos da América desempenha um papel fulcral na economia americana. Este trabalho, ao estudar a influência que o *status* de governo (Dividido ou Unificado) tem no *risco político*, propõe a clarificação deste efeito. Assim, este estudo alicerça-se numa ideia muito simples: a repartição de poderes, legislativo e executivo, afeta a probabilidade de ocorrência de uma mudança das políticas seguidas até então, o que se poderá traduzir numa alteração do risco político. No entanto, na literatura existente, este efeito (aumento vs diminuição do risco) não é claro, nem tão pouco, consensual. Além disso, o caso americano, embora seja um dos mais importantes países tanto a nível económico como político, nunca foi estudado, a nível empírico. Assim, através de uma extensa comparação (desde 1950 a 2007) entre o *status* do governo americano (Dividido vs Unificado) e a volatilidade do mercado acionista, propusemo-nos a estudar esta relação, para o mercado acionista mais relevante do mundo. Os resultados sugerem que uma repartição dos poderes, isto é quando Congresso e Presidência são controlados por diferentes partidos, resulta num aumento da volatilidade do mercado acionista. Podemos, portanto, afirmar que, no que respeita ao caso americano, a evidência sugere que a *teoria do bloqueio* não se verifica. As conclusões são robustas e continuam a sê-lo com após exigentes testes econométricos e a introdução de várias variáveis de controlo.

Palavras-chave: Estados Unidos da América; Governo Dividido; Risco Político; Volatilidade do Mercado Acionista.

Códigos JEL: G10; P16

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1. Introduction

As it is widely accepted in the economic literature, governments throughout the world play a very important role in the way their domestic economies evolve. The U.S. government is obviously no exception. Through conducting economic policies, implementing laws and regulations, among other actions, they end up shaping the economic environment in which businesses operate on. Through these mechanisms we can see that government's actions will ultimately have an impact in terms of the risk the firms face.

In the field of Finance, since it is in the root of every investment decision, risk is a very important subject but also extremely difficult to understand. This is one of the reasons why it is very important to understand every single aspect of it, and thus, in this dissertation, my focus will be the Political Risk (or Policy Risk) i.e. "uncertainty about the impact of an administration's future policies" (Kim et al, 2012, pp. 196). The importance of this topic is undeniable and stems primarily from two aspects. First, even though it is consensual that governments have, all over the world, an impact in the economy, it is also true that there are a lot of specificities that remain to be understood. One is clearly the one at hand: Does divided governments affect the probability of economic change and consequently the political risk levels in the financial markets? Second, and to the best of my knowledge, this dissertation fills a gap in the literature since there is no such study for the most important market in the world (the U.S.).

More specifically we will empirically assess whether having a divided government (as opposed to a unified government) has a significant impact in the Political Risk at which the United States' firms (and thus, stock market investors) are exposed. We will use political and stock market data from 1950 until 2007, and will take advantage from the fact that return volatility is one of the most widely accepted measures of risk. Results strongly indicate that times of divided government are associated with higher stock market volatility, challenging thus, the gridlock theory, at least for the American case.

Regarding this dissertation's structure, we will start by presenting a review of the literature so we can gather a deeper understanding of the origins of this discussion. In the third chapter, the data, both political and financial, will be presented, as well as the main descriptive stats, the variables and the models used. Chapter 4 presents the results of the econometric models, that are further discussed in the fifth chapter. Chapter 6 presents a set of robustness tests to assess the strength and reliability of the results. Chapter 7 concludes the dissertation, summarizing the main insights, discussing some results and bringing up some suggestions for further research in the topic.

2. Literature Review

As we will see in this section, given its importance, Divided Government has received widespread attention from the academics, which tackled the topic in a wide array of manners. Thus, firstly, this section will contain some definitions and clarifications that are crucial to understand the topic in discussion. Later, the most relevant theories and studies will be shown, always giving special attention to the specific contribution each study has brought to this topic and what is its impact for my investigation.

2.1. Relevant definitions for the topic

Firstly, it is important to provide an overview about the U.S. political system and clarify some terms that may not be familiar, since the American political system has its own specificities which are, sometimes, quite different from the majority of the western systems.

The American system of government began in 1776. Even though it is often categorized as a democracy, it can be more accurately defined as a constitutional federal republic. "Constitutional" because the government is based on a Constitution ratified in 1788 (with only 27 amendments ever since) that defines three separate branches of government (legislative, executive and judicial), their powers and the way positions in each of them are to be filled (usually known as a "system of checks and balances"). "Federal" because there is both national government and governments in each of the 50 states that make up the United States of America. And "republic" due to the fact that it is a form in which the people hold the power but elect representatives to exercise it.

Regarding the Legislative Branch, The Congress, it is comprised of two chambers: The Senate (also known as "Upper Chamber") and the House of Representatives (also, known as "The House of the People"). The one hundred senators, two from each state, serve for six-year terms, but since they are divided in three classes (and one of the classes stands for elections every two

years), the Senate changes every two years. The House of Representatives, in which all the 435 representatives, apportioned according to the population (each representative is elected for each congressional district), serve a two-year term. These chambers share broad legislative powers and it is very important to understand that legislation must pass both houses before it is presented to the President to be signed into law. Therefore, we can only consider that the government is unified in cases in which the totality of the Congress (both chambers) is dominated by the party of the President.

The Executive Branch, headed by The President, serves a four-year term and has a set of constitutional (such as the appointment of Supreme Court justices, of its Cabinet, command the military forces, negotiate international treaties, etc.) and informal (such as establishing innovative programs, offices and commissions to carry out the President's agenda, etc.) powers.

The Judicial Branch (Supreme Court and the lower federal courts) is responsible for judging cases that require interpretation of acts of Congress as well as other cases in which the defendant is accused of violation the federal law. They have extensive jurisdiction powers over state laws, and cases involving more than one state or foreign parties.

Notwithstanding, for this dissertation whenever "government" is mentioned, it will only be referring to two of the three branches: Legislative (the Congress) and Executive (the President). Thus, in this dissertation whether a government is divided or not is defined in a simple binomial system, in which the Congress, as mentioned before, is considered dominated by one party when both Houses are controlled by the same party.

Another aspect that is obviously relevant to define, is the concept of "divided and unified government". Thus, according to D. Menefee-Libey (1991, pp. 643), divided government "is where a partisan conflict exists between the executive and legislative branches". Obviously, a unified government is where such conflict does not exist. In this study, as mentioned before, the Divided or Unified feature may be systematized through a binomial system. The reason is twofold: First, we are only taking into account two of the three government branches, Executive and

Legislative; secondly, even though the Legislative branch is comprised of two chambers, they both have its mechanisms to prevent legislation from being signed into law from the President, and so the unified government is only achieved in case both chambers are controlled by the same party. Thus, the Congress must be treated as a single entity. Notwithstanding, along this study we propose two different classifications of the government status, depending on the party and on the number of chambers controlled by the president. These specifications are thoroughly explained later, on the section concerning the empirical estimation itself.

2.2. Main theories

This work intends to verify or negate empirically whether divided government (as opposed to a unified one) may be responsible for a different level of political risk, in the United States of America. Thus, it is crucial to discuss what is the current state of the art and if there is a consensus, at a theoretical level. So, in this subsection, we will start by succinctly enumerate some studies showing that Politics and Financial Markets are intrinsically connected. We will resume by giving an overview of the ancestral discussion that led to the current antagonism between Divided and Unified government, discuss the antagonism itself and then, given its importance, analyze how the governments' status may lead to different levels of markets' volatility.

2.2.1. Politics and stock markets – A hand in hand relation

There is extensive literature showing that politics and stock markets go hand in hand. Be it a specific event, such as election, or any other kind of uncertainty, political information tends to spill over to financial markets, across all the asset classes. In a general fashion, several authors show that political factors, may affect both the returns and the risk of financial assets (Gemmil, 1992; Pantzalis et al, 2000). Yet, the most common kind of study targets the financial consequences of political events, usually elections. Riley and Luksetich (1980) and Herbst and Slinkman (1984) show that "price changes have generally been found to be negative before presidential elections, and positive following elections" suggesting that

"elections are an important source of uncertainty to the market". Nippani and Medlin (2002), Nippani and Arize (2005) and Goodell and Bodey (2012) among others study the impact of U.S. presidential elections on the stock market and support that "the uncertainty (…) is reflected on stock prices". There are even some authors suggesting that, in the last decades, "US stock prices closely followed the 4-year Presidential Election Cycle" (Wong and McAleer, 2009).

2.2.2. Government status – The discussion and its roots

According to Coleman (1999), the dispute over the impacts of unified and divided government in the United States stems from a discussion that has been taking place in the literature since the World War II, which tries to understand the production of public policy in the United States. As stated by the author, along the way, the discussion has evolved, shifting its focus from a subject to another. While in the 1940s and 1950s, the academics believed that the constitutional structure and the natural decentralization of parties (Schattschneider, 1942), were the major cause of the inconsistent and fragmented policymaking process, in the 1960s the focus was in topics such as "interest group liberalism" and limited democratic access. Following the developments of the sixties, the seventies brought up concern, not only in the American case but also across most of the Western democracies, that the interest groups may have become so important, that led to a "governability crisis" that could only be solved imposing restrictions to the policymaking system (Huntington, 1975). Yet, in the 1980s, given the increasingly common occurrence of divided governments, the emergence of the government status as an important factor to explain policy production happened naturally, by the hand of authors such as Cutler (1980) and Sundquist (1988).

Regarding the specific discussion on Divided Government and its expected impact on the market's volatility, at a theoretical level, the literature provides no consensus. Thus, according to Kim et al. (pp. 197), "the balancing model (Fiorina, 1991) assumes that divided government leads political actors to compromise on moderate policies and predicts that it greatly enlarges the set of policy alternatives and, consequently, increases policy risk, comparing to a unified government where one party determines policy". On the other hand, as defended by Brady (1993) and

Fowler (2006) “the gridlock theory predicts that divided governments are susceptible to stalemate and gridlock” which substantially restricts the range of possible policies, leading then to a decrease in terms of policy risk and consequently stock market volatility. This is because, under a divided government, the *status quo* is more likely to prevail.

2.2.3. From the government status to the stock market volatility

To understand how the relation goes from government status to the market, it is important to understand what could be the main drivers that cause a different level of political risk as a consequence of having a divided government. Those drivers, according to the way through which they have an impact, may be divided in two main segments: economic and political. Both have been attracting the attention of several researchers and thus, in this subsection, we will be addressing the most important studies in each of the segments.

Regarding the economic consequences of divided government, we may say that there is a consensus that divided governments have, at least, a different economic outcome towards the economy when compared to unified governments. Karol (2000) studied the impact of divided governments on the liberalization of the U.S. trade policy and concluded that divided governments may have an influence on trade, even though “the key is the strength of protectionist forces in Congress, and not the divided government itself”. Also, regarding budget policies for the case of the United States, Alt and Lowry (1994, pp.823) show that “divided government matters, institutions matter, and party control matter”, because “states with split legislatures adjust less, regardless of the legal situation, in large part because divided legislatures do not appear to adjust revenues in response to surpluses and deficits”. Poterba (1994, pp. 815) reinforces this and, additionally, states that unified governments “adjust more quickly to unexpected deficit shocks than do divided governments and unified governments make most of their adjustment with tax changes and do so to a greater extent than split government”, and thus “deficit reduction in the U.S. is lower under divided government”. Accordingly, Roubini and Sachs (1989) found that unified governments tend to respond more quickly to income shocks and thus, divided governments “have been less effective in reducing

the budget deficit than have stable and majority-party governments". Lohmann and O'Halloran (1994, pp. 627-28), studied the "effect of domestic conflicts and political institutions on trade policy" and concluded that "domestic political divisions and the institutions they foster have significant impact on international trade policy". Also in terms of inflation there are studies showing that the inflation risk tends to be lower in times when the president does not have control on the Congress (Fowler, 2006).

In what concerns the second set of factors (political factors) through which divided government may result in a different level of political risk, there is a lower level of consensus: while some, such as Mayhew (1991) and Baumgartner et al. (2014), advocate that there is no relevant difference between law production between divided and unified government ("On average, about as many major laws passed per Congress under divided control as under unified control"), there are some others that disagree. In fact, there are some authors that believe that analyzing successful legislation could lead to biased inferences. For instance, Edwards et al. (1997) suggest that the probability of important legislation failing to pass increases about 45% under divided Government. Moreover, authors such as Bond and Fleisher (1990) and Edwards (1989) argue that the number of members in Congress who share the president's partisanship is the best predictor of whether presidents pass their programs or not.

An additional way that could boost the relationship between government status and the market's volatility is the presidential attitude, which is, naturally, expected to be different under divided and unified government. According to Nicholson et al (2002, pp. 702-05) "a divided government context has the effect of increasing presidential approval relative to periods of unified government", since it is an opportunity for presidents to help themselves in the public arena. This is due to two aspects: first, when it comes to presidential evaluations "blame is more critical than credit" which is congruent with the definition of Negativity Bias: "greater weight given to negative information, relative to equally extreme and equally likely positive information in a variety of information-processing tasks" (Lau, 1985); and second, divided government "muddies the informational waters by offering citizens two potential targets of blame for policies". On the other hand, in an unified

government context “the president bears the full weight of negative evaluations”, leading then to an asymmetric environment in which presidents “benefit far more from sharing blame than they lose by sharing credit”. This could induce presidents to take higher risks under divided government comparatively to when there is no split party control of the executive and legislative branches. Below it is presented a table that recaps some of the most relevant views discussed in this section.

Table 1 – Main theories summary

Authors	Insight/ Conclusion
Brady (1993), Fowler (2006), among others	Divided governments decrease policy risk because they are prone to “stalemate and gridlock” (Gridlock’s Perspective), reducing the uncertainty in the economy and thus the Political Risk.
Fiorina (1991) among others	Divided government greatly enlarges the set of possible policy alternatives, increasing then political risk (Balancing Model).
Poterba (1994)	Unified governments “adjust more quickly to unexpected deficit shocks”. Also, deficit reduction is lower under divided governments.
Roubini and Sachs (1989)	Unified governments tend to respond more quickly to income shocks.
Fowler (2006), among others	Inflation risk tends to be higher under divided government.
Mayhew (1991), among others	There is no relevant difference between law production between divided and unified government.
Edwards et al (1997)	The probability of important legislation failing to pass increases about 45% under divided Government.

2.3. Similar studies

Even though the subject is very relevant and widely discussed in the literature, not only recently but mainly from the 1990 onwards, there are not many studies that can be defined as similar to the study we propose. Yet, there are three studies worth mentioning and explaining, since they provide the basis and highlight the relevance of conducting this study.

The first one was conducted by Bechtel and Füss (2008, pp. 288-89), for the German case. They "empirically evaluate whether divided government reduces policy risk on financial markets using daily German stock market data from 1970to 2005". The authors originally assumed the gridlock theory as their hypothesis and managed to prove it correct for the German case. Thus, their conclusion was that, "divided government has a volatility reducing effect on the German stock market".

Another study that must be mentioned, is the one conducted by Kim et al. (2012), for the American case. Even though this study tackles a slightly different topic, we can consider it to be strictly related to the topic of the present study. The authors studied the impact of the alignment of each state governor and the federal government in the firms' stock returns. They concluded that "the political geography has a pervasive effect on the cross section of stock returns" suggesting that proximity to political power has a significant effect on stock returns, both in terms of raw returns and on a risk-adjusted basis. According to the authors, this is due to the fact that political proximity brings higher uncertainty regarding future policies, exposing then those firms to higher policy risk. This highly enforces the relevance of the present study by demonstrating the importance of geographical and political proximity between firms and political power. Thus, this clarifies the necessity of a deeper understanding of this phenomenon and what are the mechanisms behind how divided government impacts the business world.

Additionally, there is a third study for the French case conducted by Lebbos, T. J. (2016). The author studied the impact of divided government in the French stock market from 1967 until 2015, and contrarily to what Bechtel and Füss (2008) found for the German case, he concluded that "having a divided government contributes to an increase in the stock market volatility" thus refuting the gridlock theory and

supporting Fiorina's (1992) Balancing Model. In the following table, for the sake of an easier reading, it is provided a succinct summary of the abovementioned comparable studies.

Table 2 – Similar studies summary

Authors	Insight/ Conclusion
Bechtel and Fuss (2008)	Divided Government has a volatility reducing effect on the German stock market.
Kim, Pantzalis and Park (2008)	The political geography has a pervasive effect on the cross section of stock returns. Proximity to political power has a significant effect on the stock returns.
Lebbos, T. (2016)	Having a divided government contributes to an increase in the stock market volatility.

3. Data

In order to evaluate whether the status of the government is systematically associated with a different level of policy risk, we use data from 1950 until 2007. Comparing to similar studies, such as the already mentioned Füss and Bechtel (2008), who covers 35 years, and Lebbos (2016), who covers 48 years, this can be considered a long-time span. Notwithstanding, in terms of explanatory and control variables, this study will follow, in general, the two studies mentioned above.

3.1. Stock market prices and volatility data

First, the stock market index used to perform this analysis was the S&P 500. This is due to the fact that this index is widely regarded as the best single gauge of large-cap equities for the United States, providing thus an accurate overview of the U.S. economy. Given the nature of this analysis, this is clearly the best alternative. Even though this index was created in the 4th of March of 1957, given its extensive use and clear selection criteria, there is available the computation of its performance prior to 1957, which enables my analysis to start in 1950. The data was retrieved from Thomson Reuters DataStream (DataStream, 2016) and from Quandl. In this study we collected close prices, which were afterwards converted to a return series through the following formula:

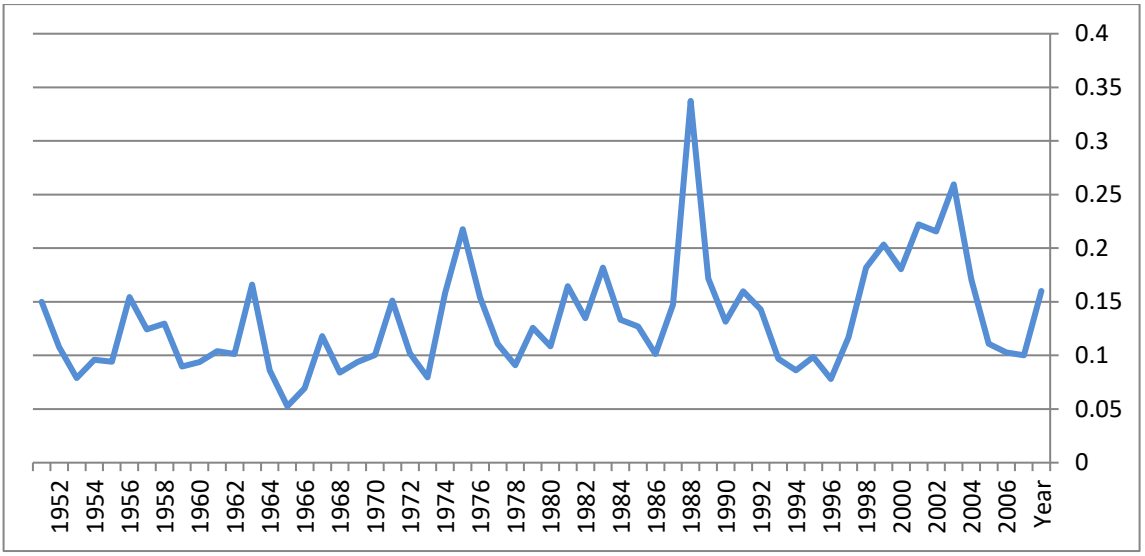
$$r_t = ln\ P_t - lnP_{t-1},$$

Then, since the relevant market variable for my study is the volatility and not returns, the daily standard deviation was computed for each of the years that compose the sample. This approach was chosen because the other standard measure used in the literature, the 20-day standard deviation, has a smoothing effect which would not be, naturally, advantageous. Additionally, since volatilities are normally quoted in annualized terms, we annualized it through the application of the following formula:

$$Annualized\ Std.Dev. = Daily\ Std.Dev. * \sqrt{252}$$

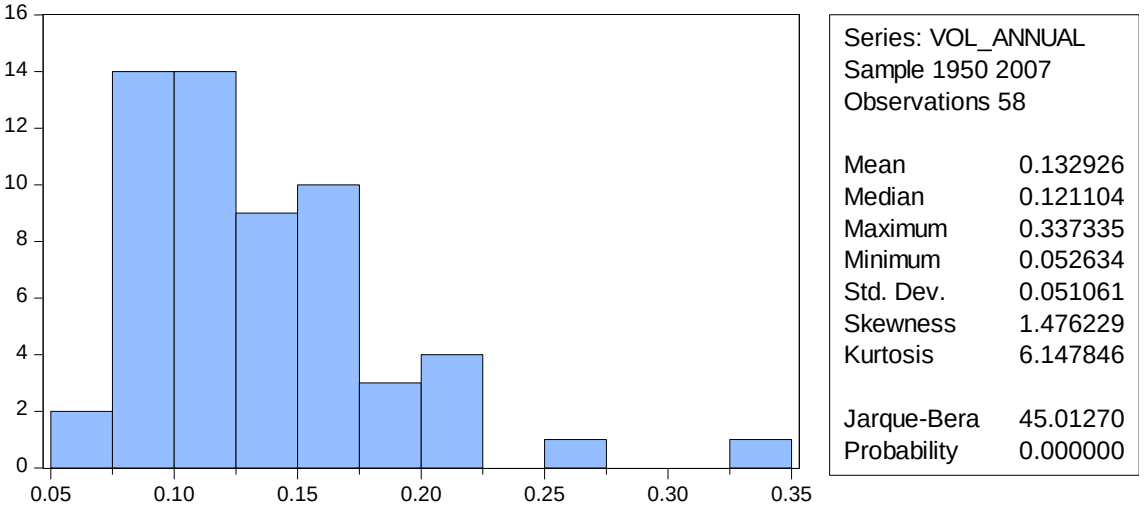
The following graph provides an overview of the historical evolution of the S&P 500 in terms of volatility:

Figure 1 – S&P 500 volatility (annualized standard deviation)



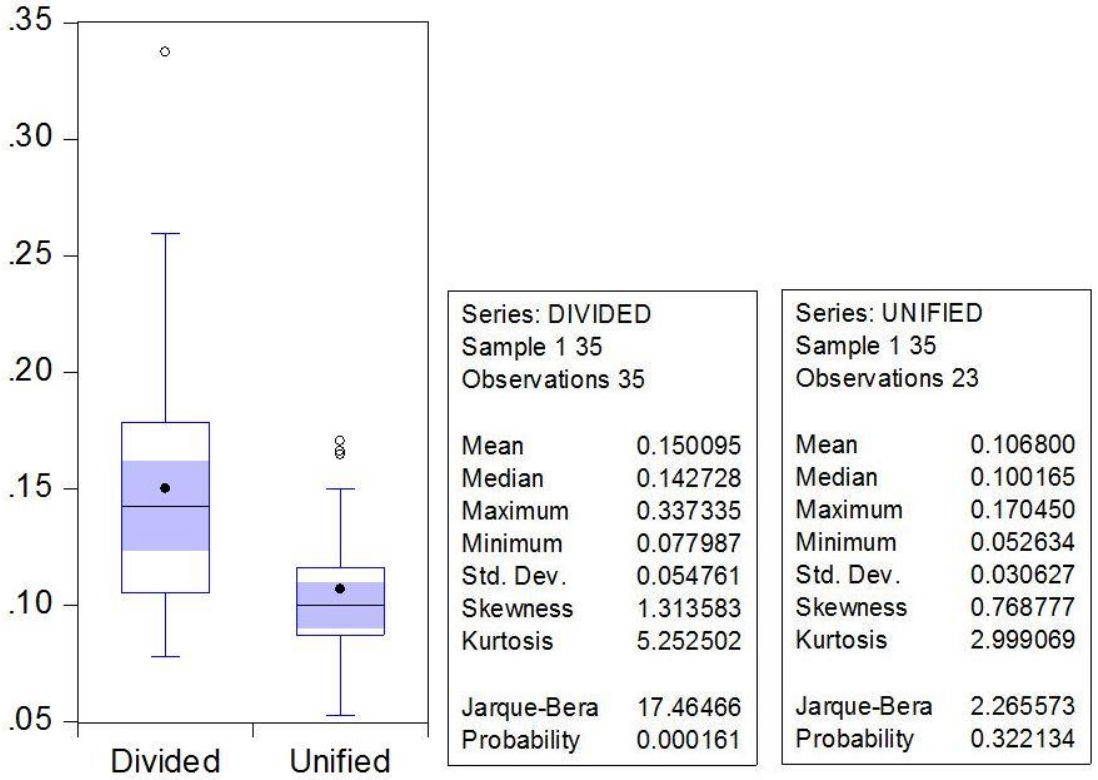
The volatility data set has a mean of 0.1329 and a standard deviation of 0.0511. The maximum shown in the figure below, 0.3373, and the minimum, 0.0526, concern to the years of 1987 and 1964, respectively. Additionally, the most relevant descriptive stats are also provided below.

Figure 2 – Volatility's histogram and descriptive stats



Yet, as already explained before the main explanatory variable in this study is a dummy variable, which is set to 1 in the case of a divided government (cases in which the political party of the President does not control both the Senate and the House of Representatives), and 0 otherwise. So, to gather a first graphical impression of how different the volatility is under both status, we use the following box-plot complemented with the most relevant descriptive stats. It is also important to point out that, from 1950 until 2007 divided government is the predominant status of government (35 years, against 23 years of unified governments) as it is clear in the descriptive stats provided below.

Figure 3 – S&P 500's volatility according to government status



At the naked eye, it looks like, from 1950 to 2007, the volatility has been clearly higher in times of divided government, which is statistically confirmed by an Welch's unequal variances t-test (to the mean, $p < 0.00031$) and by an Wilcoxon rank-sum test (to the median, $p < 0.0008$).

Obviously, understanding the relationship between the government status and the stock market volatility requires a more sophisticated model, in which we consider

several other variables that may, by itself, have an impact on the relationship we are studying.

3.2. Political data on the U.S. government status

Regarding the data related to the status of the U.S. government, from 1950 until 2007, we used a database that was constructed by Baumgartner et al (2014), and double checked it against the institutional information provided by the website of each of the American governmental branches (https://www.senate.gov, http://www.house.gov and https://www.whitehouse.gov). In this database, there is not only information on who controls each branch, from the 82nd until the 109th Congress, but also the extent of that control (number of seats per party in both the Senate and the House) among other variables that are discussed in the subsection relative to the control variables. Shortly, as it was already explained before, from this data we build a dummy variable, equaling 1 in case of divided government and 0 otherwise. This variable is the main explanatory variable.

3.3. Control variables

As mentioned before, to examine if there is a systematic influence of the government status on the volatility we must develop an appropriate model including a set of control variables allowing us to mitigate the effects of other variables, and thus, better understand the relationship between our dependent variable, volatility, and the explanatory variable, government status. In this regard, the set of control variables use in this study may naturally be divided in two groups: political and economic/ financial. While some are straightforward and obvious, since they are standard in financial literature, others may not be that much familiar, but they are, notwithstanding, of extreme importance to this topic. Therefore, in this subsection, we will present and explain the rationale for each of the control variables.

Firstly, in what concerns the set of economic/ financial variables, in this study we control for the United States' GDP growth rate. This data was retrieved from the Bureau of Economic Analysis – Department of Commerce (https://www.bea.gov). Secondly, we account for inflation and the federal deficit (as a % of GDP). Both data sets were retrieved from the Federal Reserve Bank of St. Louis (https://www.stlouisfed.org), which is one of the twelve Reserve Banks that make

up the FED, the American central bank. As mentioned before, these variables are standard control variables in the fields of political and financial economics, since by itself they represent the overall performance of an economy and thus, their impact on financial markets' volatility is undeniable. The last control variable is a financial one and intends to pick up effects from major events in the financial markets. This is due to the existence of huge peaks in terms of volatility, that are, naturally, not accountable to the political situation of the United States. Thus, we create a dummy that equals 1 in the top decile of annual volatility. This allows to control for years such as 1974 (first oil shock), 1987 (Black Monday) and 2002 (dot com bubble), in which financial markets witnessed distress situations not necessarily related to the status of the U.S. government.

Included in the second set, abovementioned as political variables, there are two control variables that are related to the political situation, trying thus to assess the depth of the union or division of the government, from two different angles:

1. Distance

This feature refers to the ideological distance between the majority and the opposition during divided government, in the House of Representatives. It can be seen as a deeper concept of divided government, in order to reach to a higher level of understanding of the magnitude of certain government control circumstances by assessing how far, in terms of ideology, the government and the opposition are (Baumgartner et al, 2014).

2. Cohesiveness

Cohesiveness, on the other hand, is a feature that refers to the ideological distance within the majority in times of unified government, within the House of Representatives. In other words, cohesiveness assesses the intra-majority ideological distance. Mathematically, it is the standard deviation from the weighted mean of the ideological position of the governing party. The weighted mean is computed as follows:

$$Weighted\ Mean\ (WM) = \frac{\sum_{i=1}^{n} I_{pi} * M_{pi}}{\sum_{i=1}^{n} M_{pi}}$$

Where:

- $I_{pi}$is the ideological position of the party;
- $M_{pi}$is the number of seats held by the party i.

So, cohesiveness is calculated as follows:

$$Cohesiveness = \sqrt{\frac{1}{\sum_{i=1}^{n} M_{pi}} \sum_{i=1}^{n} (I_{pi} - WM)^2}$$

Both these variables were built by Baumgartner et al (2014), based on Bailey's (2007) ideal point estimates. Unfortunately, these variables are only available up until 1999, and thus, from 2000 onwards we will not be able to control for these effects. It is important to understand the reason why we control for both the distance and cohesiveness. Both distance and cohesiveness, allow us to mitigate the effects of different degrees of unified and divided government, that may be, naturally, very distinct. Thus, given that we are trying to assess whether the government status in itself has an impact in the market's volatility or not, we find it advantageous to control for these political aspects.

Moreover, it is also standard in political studies to control for election years. This is supported by the literature, since pre-election periods are associated with higher policy uncertainty (Pantzalis et. Al, 2000). In the American case, as it was already mentioned there are two kinds of elections: Presidential elections, every four years, and Congress elections, every two years. It is worth mentioning that even though the totality of representatives stands for that election, only one third of the senators change from two to two since they serve 6-year mandates. Thus, we use two dummy variables to account for both elections.

3.4. Empirical estimation

In order to empirically test whether the government status has a relevant influence in the stock market volatility, we use a standard OLS model. As it has already been

mentioned before, this methodology is also used by Bechtel and Fuss and Lebbos. Regarding the estimation itself, we try to explain annual volatility, using the variables presented before, in a standard OLS model with a HAC (heteroskedasticity and autocorrelation consistent) Newey-West estimator to prevent any issues related to the existence of heteroskedasticity and autocorrelation among the residuals. That would diminish the quality or even prevent us from a meaningful statistical inference.

We start with a basic approach, in which we do not apply any control variables. Along the way, the specification is improved by the introduction of additional variables, allowing us to gather a better understanding of the phenomena at hand. It is important to mention that, regarding the two control variables presented above, Distance and Cohesiveness, we only have data until 1999. Therefore, to complete the more sophisticated estimations (using all the control variables) we had to divide the sample in two: the first, from 1950 to 1999, and the second, from 2000 to 2007. The models are presented below:

1. Annual Volatility = $\alpha + \beta_1 DividedGovernmentDummy$
2. Annual Volatility = $\alpha + \beta_1 DividedGovernmentDummy + \beta_2 Inflation + \beta_3 GDPGrowth + \beta_4 Deficit + \beta_5 Crash\_Dummy + \beta_6 PresidentialElection + \beta_7 CongressElection$

We were able to apply these models to the entire sample, from 1950 to 2007, given that both Cohesiveness and Distance are not used.

The third model is as follows, and it is applied to the subsample that includes the years between 1950 and 1999.

3. Annual Volatility = $\alpha + \beta_1 DividedGovernment + \beta_2 Inflation + \beta_3 GDPGrowth + \beta_4 Deficit + \beta_5 Crash\_Dummy + \beta_6 PresidentialElections + \beta_7 CongressElections + \beta_8 Distance + \beta_9 Cohesiveness$

Additionally, the model 1 (the simplest), was applied to the second subsample (from 2000 to 2007).

We also develop a different specification of divided and unified government. Thus, three possibilities of government status were considered: unified government (President plus both chambers), weak divided (President plus one chamber against the other chamber) and strong divided (President against both chambers). In these models, we do not control for the existence of crash years since the dummy variable abovementioned raised concerns of multicollinearity, decreasing then the quality of the second of the following models. This specification origins two models, model 4 a) and b), specified in the following manner:

4.
    a. Annual Volatility = $\alpha + \beta_1 StrongDividedDummy + \beta_2 WeakDividedDummy$
    b. Annual Volatility = $\alpha + \beta_1 StrongDividedDummy + \beta_2 WeakDividedDummy + \beta_3 Inflation + \beta_4 GDPGrowth + \beta_5 Deficit + \beta_7 PresidentialElection + \beta_8 CongressElection$

Additionally, to enhance the quality of the analysis, we develop two additional models. With these models, we intend to discover whether the feature "political party" is of high relevance in the question at hand or not. It could be the case that, times of higher (or lower) volatility are intrinsically related to a specific President's party, and not necessarily related to the government status. In the first model, since we only intend to understand if there is any relationship between annual volatility and the president's party, the government status is not considered as a variable. In the second one, we study if there is any relevant difference in cases of democratic and republican unified governments. So, we take both aspects into account: presidential party and government status. The models are as follows:

5. Annual Volatility = $\alpha + \beta_1 DummyDemocratPresident + \beta_2 Inflation + \beta_3 DummyCrash + \beta_4 GDPGrowth + \beta_5 Deficit + \beta_7 PresidentialElection + \beta_8 CongressElection$

6.

a. Annual Volatility = $\alpha + \beta_1 DUnifiedDemocrat + \beta_2 UnifiedRepublican$
b. Annual Volatility = $\alpha + \beta_1 DUnifiedDemocrat + \beta_2 UnifiedRepublican + \beta_3 Inflation + \beta_4 GDPGrowth + \beta_5 Deficit + \beta_7 PresidentialElection + \beta_8 CongressElection$

Shortly, and for the sake of clarity, using these models we intend to answer the following questions:

1. Does the status of the United States government have an impact in the stock's market volatility?
2. If so, does stock market volatility increase or decrease in times of divided government?

4. Empirical Results

In this section, we present and explain all the relevant results concerning the abovementioned models. The first two models, as mentioned before, concern the whole sample (1950 to 2007). The remaining models are applied to the subsamples (1950-99 and 2000-07).

4.1. Main models' results

Firstly, regarding the simplest model, its main results are displayed in the table 3, below. We can see that the model is globally significant at a 99.5% of significance (F-statistic p-value < 0.002). Also, the explanatory variable is significantly different from zero at virtually any confidence level, and indicates that under divided government, the stock market's volatility (annualized) is expected to be about 4.3% higher than in times of unified government.

In what concerns to the second model (Model 2, in the previous section), the results are in line with the previous ones, but now controlled for the set of economic and political variables already explained. Again, the model is globally significant (F-statistic p-value < 0.0000) as well as the explanatory variable (t-statistic p-value < 0.009). In this model, we can see that divided governments are, again, expected to bring additional volatility to the stock market (about 2.5% higher, comparing to times of unified government).

Table 3 – Model 1 and 2 results

Variables	Model 1	Model 2
Constant	0.106800***	0.092557***
	(0.006279)	(0.012067)
Divided Government (Dummy)	**0.043295*** (0.011920)**	**0.024993** (0.009155)**
Inflation		0.194019 (0.127324)
GDP growth rate		**0.081115 (0.181166)**
Deficit		0.263278 (0.261664)
Crash Year		**0.113130*** (0.025232)**
Presidential Election		-0.022789 (0.011986)
Congress Election		**0.008733 (0.011422)**
N	58	58
R-squared	0.175062	0.638123
Adjusted R-squared	0.160331	0.587460
F-statistic	11.88392	12.59549
Prob (F-statistic)	0.001081	0.000000
Prob (Wald F-statistic)	0.000611	0.000000

Note: Dependent variable is annual volatility (measured by the annualized standard deviation of the S&P500's daily returns, from 1950 to 2007). Estimates are OLS estimates (standard errors, with a HAC Newey-West estimator, in parenthesis). Divided Government, the explanatory variable, is a dummy variable that takes the value 1 if the presidential party does not control both congressional chambers. Inflation, GDP growth, Deficit and Crash Year are variables to control the economic environment. Presidential Election and Congress Election are dummy variables to control for election years. ***P<0.001; **P<0.01; *P<0.05

The third model concerns the subsample from 1950-1999, and, again, provides further indication that times of divided government are associated with higher stock market volatility. In this model, divided government are associated with an increase of 2.8% of volatility. It is worth to mention that in this case the procedure followed was slightly different: it was not used a HAC consistent Newey-West estimator, but a White heteroskedasticity-consistent estimator. This is because, with the HAC estimator there were some signs of multicollinearity. Moreover, since we can reject the existence of serial correlation but not the existence of heteroskedasticity, this procedure allows us to solve the multicollinearity issue without losing the ability to proceed with a meaningful statistical inference.

Table 4 – Model 3 results

Variables	Model 3
Constant	0.098161**
	(0.028243)
Divided Government (Dummy)	**0.028632****
	(0.009581)
Inflation	0.253839
	(0.191745)
GDP growth rate	**0.155790**
	(0.190675)
Deficit	0.112331
	(0.252259)
Crash Year	**0.109287****
	(0.047313)
Presidential Election	-0.025132
	(0.015110)
Congress Election	**0.013102**
	(0.014305)
Distance	-0.000228
	(0.010243)
Cohesiveness	**-0.014630**
	(0.026691)
N	50
R-squared	0.579089
Adjusted R-squared	0.484384
F-statistic	6.114655
Prob (F-statistic)	0.000023
Prob(Wald F-statistic)	0.000027

Note: Dependent variable is annual volatility (measured by the annualized standard deviation of the S&P500's daily returns, from 1950 to 2007). Estimates are OLS estimates (standard errors, with a HC White estimator, in parenthesis). Divided Government, the explanatory variable, is a dummy variable that takes the value 1 if the presidential party does not control both congressional chambers. Inflation, GDP growth, Deficit and Crash Year are variables to control for the economic environment. Presidential Election, Congress Election, Distance and Cohesiveness are variables to control for the political environment, and already explained in the previous section. ***P<0.001; **P<0.01; *P<0.05

The model presented below, is the first model (Model 1) but now applied to the second subsample (2000-2007). Even though this subsample is rather small, the results are in line with the ones already mentioned. Times of divided government are associated with higher volatility. In this case, the coefficient, which is statistically significant at a 99% confidence level, is higher, predicting that divided

government is expected to increase annual volatility by 9.33%. Yet given that the sample is extremely small, it would not be wise to yield that much importance to these results.

Table 5 – Model 1 (2000-2007) results

Variables	Model 1
Constant	0.121094***
	(0.015654)
Divided Government (Dummy)	**0.093332****
	(0.016892)
N	8
Rsquared	0.675891
Adjusted Rsquared	0.621873
F-statistic	12.51230
Prob (F-statistic)	0.012259
Prob(Wald F-statistic)	0.001480

Note: Dependent variable is annual volatility (measured by the annualized standard deviation of the S&P500's daily returns, from 2000 to 2007). OLS estimates (standard errors, with a HAC Newey-West estimator, in parenthesis). Divided Government is a dummy variable that takes the value 1 if the presidential party does not control both congressional chambers. ***P<0.001; **P<0.01; *P<0.05

Regarding the fourth models presented below, in which we use a different specification of divided government, the results are also strong and congruent to the previous results. Differently, in these models we have two explanatory variables (Strong Divided and Weak Divided). Both are positive and significant at a 95% confidence level, being the status "weak divided" expected to increase annual volatility by 5.5% and 5.8% and "strong divided" by 3.9% and 4.1%, in model a) and b) respectively. Note that it would probably be expected that, in line with the previous results, a strong division would yield higher uncertainty than a weak division. Yet, the classification of "strong" and "weak" is rather ambiguous. In this case the classification is assumed from the standpoint of the President (President against the chambers). If a distinct perspective was assumed the results would, naturally, be switched. Once again, the models are globally significant at a 99.5% confidence level, which highly enforces the validity of its results. Note that the

dummy that account for crash years is not presented in these two models because it raised concerns of multicollinearity.

Table 6 – Model 4a) and 4b) results

Variables	Model 4 a)	Model 4 b)
Constant	0.106800	0.101290***
	(0.006336)	(0.020993)
Strong Divided Government	**0.039592****	**0.041207***
	(0.013861)	**(0.015723)**
Weak Divided Government	0.055793*	0.058647*
	(0.023372)	(0.024009)
Inflation		**0.245608**
		(0.164908)
GDP growth		-0.042936
		(0.242908)
Deficit		**-0.398692**
		(0.466084)
Presidential Election		-0.034010*
		(0.013003)
Congress Election		**0.022639***
		(0.010374)
N	58	58
R-squared	0.185962	0.284224
Adjusted R-squared	0.156361	0.184015
F-statistic	6.282224	2.836320
Prob (F-statistic)	0.003489	0.014333
Prob (Wald F-statistic)	0.002083	0. 000116

Note: Dependent variable is annual volatility (measured by the annualized standard deviation of the S&P500's daily returns, from 1950 to 2007). Estimates are OLS estimates (standard errors, with a HAC Newey-West estimator, in parenthesis). Strong Divided Government is a dummy variable that takes the value 1 if the presidential party does not control any of the congressional chambers. Weak Divided Government takes the value 1 if the presidential party controls one, and only one, of the congressional chambers. In the case both variables are equal to zero, we are in a situation of Unified Government. Inflation, GDP growth and Deficit are variables to control the economic environment. Presidential Election and Congress Election are dummy variables to control for election years.
***P<0.001; **P<0.01; *P<0.05

4.2. Support models' results

The "support models", as explained before, are developed to understand if the party of the president may be, by itself, responsible for a different level of volatility. In the first model, not taking the government status into account, we can conclude that

the president's party does not seem to be, by itself, a driver of market volatility. This is because the variable "Democratic President" is not statistically significant, so we cannot reject the possibility of the effect being null.

Table 7 – Model 5 results

Variables	Support Model 5
Constant	0.113456***
	(0.011827)
Democratic President	**-0.016137**
	(0.009718)
Inflation	0.214075
	(0.120304)
GDP growth	**0.086891**
	(0.203763)
Deficit	0.205621
	(0.253765)
Crash Year	**0.123027*** **
	(0.022356)
Presidential Election	-0.018302
	(0.011800)
Congress Election	**0.005660**
	(0.012198)
N	58
R-squared	0.607602
Adjusted R-squared	0. 552666
F-statistic	11.06022
Prob (F-statistic)	0.000000
Prob (Wald F-statistic)	0. 000000

Note: Dependent variable is annual volatility (measured by the annualized standard deviation of the S&P500's daily returns, from 1950 to 2007). Estimates are OLS estimates (standard errors, with a HAC Newey-West estimator, in parenthesis). Democratic President, the explanatory variable, is a dummy variable that takes the value 1 if the president is democrat. Inflation, GDP growth, Deficit and Crash Year are variables to control the economic environment. Presidential Election and Congress Election are dummy variables to control for election years. ***P<0.001;**P<0.01;*P<0.05

Yet, in the second set of support models, both features are considered: government status and president's party. This is accomplished through the construction of a new dummy variable that considers three possible states of nature: Divided government, unified democratic government and unified republican government. For the sake of

congruency, we follow the same approach: we estimate a simple model, in which only the explanatory variables are used and then, evolve to a more sophisticated model considering the control variables. The models are as follows in table 8:

Table 8 – Model 6a) and 6b) results

Variables	Support Model 6 a)	Support Model 6 b)
Constant	0.150095	0.114887
	(0.011501)	(0.012320)
Unified Democrat	**-0.045269****	**-0.028656****
	(0.013493)	**(0.009673)**
Unified Republican	-0.037701**	-0.016996
	(0.013008)	(0.013748)
Inflation		**0.232749**
		(0.130604)
GDP growth		0.131065
		(0.193484)
Deficit		**0.233760**
		(0.254958)
Crash Year		0.112784**
		(0.025660)
Presidential Election		**-0.023140**
		(0.012003)
Congress Election		0.009268
		(0.011423)
N	58	58
R-squared	0.176772	0.641465
Adjusted R-squared	0.146836	0.582929
F-statistic	5.905073	10.95841
Prob (F-statistic)	0.004751	0.000000
Prob (Wald F-statistic)	0.003093	0.000000

Note: Dependent variable is annual volatility (measured by the annualized standard deviation of the S&P500's daily returns, from 1950 to 2007). Estimates are OLS estimates (standard errors, with a HAC Newey-West estimator, in parenthesis). The explanatory variables, Unified Democrat and Unified Republican, are dummy variables that take the value 1 if both the president and the Congress are democrats or republican, respectively. In the case both variables are equal to zero, we are in a situation of Divided Government. Inflation, GDP growth, Deficit and Crash Year are variables to control the economic environment. Presidential Election and Congress Election are dummy variables to control for election years. ***P<0.001; **P<0.01; *P<0.05

Results remain, in general, in line with the previous results. Unified governments are clearly associated with times of lower volatility in the stock market. Moreover,

in this case we can see the difference between unified democrat and republican. In the simplest model, both the variables are statistically significant at a 99% level of confidence. Democratic unified governments seem to be associated with the times of lowest volatility, with a decrease of 4.5% while republican unified government are responsible for a decrease of only 3.7%. Yet, in the case of republican unified governments the results are not statistically significant when all the control variables are considered. This may be due to the fact that, along the whole sample, we only have 6 years of such status, which naturally increases the exigency of the t-test. Notwithstanding, the dummy "democratic unified government" is still significant at a 99% level, allowing us to conclude that, even considering the complete set of control variables, we are able to conclude that times of unified democratic government are responsible for a decline in market volatility, by 2.87%.

Overall, the abovementioned set of models show, on a consistent basis, that divided governments in the United States are associated with more stock market volatility. In the main models, the effect goes from 2.5% to 4.8%. Moreover, the later models also show that we can exclude the possibility of such result being driven by the difference in the presidential party.

5. Discussion

As we could see, the results from this study are quite strong in the way they support the argument that times of divided government are associated with higher volatility in the stock market. Yet, when we compare to the abovementioned studies, this study is in line with the results found in the French (Lebbos, 2016) case but conflicting with the conclusions of the study for the German case (Bechtel and Füss, 2008). So, shortly, the present study does not validate the gridlock hypothesis, at least for the American case.

A possible explanation for this set of results is the fact that, under divided governments, investors are less capable of comprehending the overall political agenda, since there are two different agents trying to set the tone in political terms. This is in line with the views of Baumgartner et al (2014), when they state that the rate at which laws are made and implemented does not vary by government status. Thus, in cases of divided government, ceteris paribus, we will have a wider range (in a left-right spectrum) of policies being crafted.

Another way of explaining these results is based on the research of Nicholson et al. (2002), that relates the President approval rating with the government status. According to the authors, divided government "provides ambiguous and conflicting information about which branch of government to hold accountable for government performance". Moreover, their study proofs that the "presidents are punished more heavily for negative outcomes than they are rewarded for favourable ones"[1] and so their approval ratings tend to be higher under divided governments. Thus, under divided government president should "benefit far more from sharing blame than they lose by sharing credit". This argument, in the case that presidents are aware of this asymmetry, could lead presidents under divided government to take additional risks in terms of policy, which would materialize in higher levels of market volatility.

[1] This is congruent with the concept of "negativity bias", which was defined by Lau (1985) as the "greater weight given to negative information relative to equally extreme and equally likely information".

6. Robustness Tests

To gather an understanding on the robustness of the abovementioned models, and consequently on the validity of the results themselves, we subject the models to econometric tests. For the sake of simplicity, in this chapter, we present the validity tests to the main models. Thus, to clarify, in this section we will present tests concerning the following models: Model 1 and 2; Model 4a) and 4b); and Model 6a) and 6b). Regarding the additional models, whenever needed, we will present the tests in the appendix. Firstly, we follow the standard procedure in similar literature. Yet, we also try to build up on that and adapt the available tools to this specific work. Shortly, we run tests on topics such as omitted variables, autocorrelation and multicollinearity.

6.1. Omitted variables

The first step to understand whether the model used is well specified or not, for the topic at hand, we start by applying a standard Ramsey Regression Equation Specification Error Test (RESET). The results are as follows:

Table 9 – Ramsey's RESET results

	Prob > F	Result
Model 1	N/A	N/A
Model 2	0.6935	Cannot reject H_0
Model 4a)	N/A	N/A
Model 4b)	0.5427	Cannot reject H_0
Model 6a)	N/A	N/A
Model 6b)	0.5556	Cannot reject H_0

Note: In Models 1, 4a) and 6a) Ramsey's RESET Test cannot be performed since the only explanatory variables are dummy variables. H_0: Model has no omitted variables.

From these results, we can say that none of the abovementioned models suffers from functional misspecification, with a high degree of confidence.

6.2.Autocorrelation

Even though all the models were estimated with a HAC Newey-West that enables the statistical inference in the presence of heteroskedasticity and autocorrelation, it is important to understand whether we have a high degree of serial correlation in the main models, as it sometimes happens with time series data, or not.

We first use a standard Durbin-Watson test, to assess if there is autocorrelation of first order (following AR1 processes), and the results are as follows:

Table 10 – Durbin-Watson test's results

	DW Stat	Critical Stat		Result
		dL	dU	
Model 1	1.2534	1.356	1.428	Reject H_0
Model 2	1.8766	1.134	1.685	Cannot Reject H_0
Model 4a)	1.3262	1.320	1.466	Inconclusive
Model 4b)	1.3950	1.134	1.685	Inconclusive
Model 6a)	1.2713	1.320	1.466	Reject H_0
Model 6b)	1.9238	1.095	1.734	Cannot reject H_0

Note: H_0: Residuals are not autocorrelated. Critical intervals are at a 1% significance level.

Firstly, it is important to reinforce that all the models were estimated using a Newey-West HAC estimator that allows statistical inference even in cases of serial correlation. Notwithstanding, it is also important to point out that only in the simplest models we reject the null hypothesis. Those models have only one dummy or a pair of dummies as explanatory variables. In the core models [Models 2, 4b) and 6b)], the ones with all the control variables, we either reject the autocorrelation hypothesis or the test is inconclusive. So, to better assess the issue, we perform a more sophisticated test. So, since the Breusch-Godfrey test only has asymptotical validity (its results are not valid for relatively small samples, as it is this case), we run a Ljung-Box Test, with two lags, for all the six abovementioned models. The results are as follows:

Table 11 – Ljung-Box test's results

	Prob > F (1^{st} lag)	Result (x=1)	Prob > F (2^{nd} Lag)	Result (x=2)
Model 1	0.004	Reject H_0	0.017	Reject H_0
Model 2	0.77	Accept H_0	0.924	Accept H_0
Model 4a)	0.01	Accept H_0	0.04	Accept H_0
Model 4b)	0.007	Reject H_0	0.022	Accept H_0
Model 6a)	0.005	Reject H_0	0.021	Accept H_0
Model 6b)	0.92	Accept H_0	0.94	Accept H_0

Note: H_0: There is no autocorrelation of x^{th} order, being x 1 and 2. Results are drawn upon a 1% significance level.

So, as we can see, most of the models do not suffer from autocorrelation issues. Only Model 1, has the issue for both the lag 1 and lag 2. In the other models, 4b) and 6a), the problem is concerning the first lag only.

6.3.Multicollinearity

Regarding the multicollinearity, we resort on Variance Inflation Factors (VIF). Yet, it is important to mention that, along the dissertation we have already dealt with multicollinearity issues, and thus the most problematic variables were already excluded from the specific models, as mentioned in the proper chapter. Notwithstanding, the multicollinearity tests are as follows:

Table 12 – Variance Inflated Factors test's results

	VIF β_1	VIF β_2	VIF β_3	VIF β_4	VIF β_5	VIF β_6	VIF β_7	VIF β_8	Result
Model 1	-	-	-	-	-	-	-	-	-
Model 2	1.65	1.95	3.21	3.38	4.24	4.27	1.66	-	Cannot reject H_0
Model 4a)	-	-	-	-	-	-	-	-	-
Model 4b)	1.33	2.56	1.66	3.06	2.29	2.31	1.87	-	Cannot reject H_0
Model 6a)	-	-	-	-	-	-	-	-	-
Model 6b)	2.18	3.54	1.81	2.14	1.35	3.35	4.69	4.50	Cannot reject H_0

Note: The threshold used in this test is the standard value in the literature: as it is usually considered, multicollinearity issues are raised when VIF stats are above 5 for one or more variables. Also, in the simplest models, since they are composed by one (or two) dummy variables, it would be meaningless to test for multicollinearity.

As it can be seen in the table above, there are no extreme multicollinearity issues in the models. There are no signs of collinearity between variables that would decrease the meaning of the coefficient estimated.

Overall, the models are robust enough so we can draw strong conclusions regarding the topic. Nevertheless, we need to be cautious when it comes to drawing conclusions with some models. This is because, as we have seen, there are some signs of autocorrelation. Yet, the fact that the models were estimated under the HAC estimator lets us prosecute a meaningful and strong statistical inference.

7. Conclusion

To sum up, this work intends to shed some light on an interesting problematic that have caught some, but not extreme, attention of the literature. As it was shown in the literature review, there are innumerous ways through which the government status may have an impact in the economy and, consequently, the financial markets. Moreover, as we have two conflicting views this study is imperative to understand what is the prevailing effect in the American case.

In this study, we find that having a divided government (Congress and President, controlled by different parties) leads to an increase of stock market volatility. Thus, for the United States, we can say that we found evidence that the gridlock theory does not hold. Taking this insight into consideration, helps gathering a deeper understanding of the stock market and its patterns, as well as in the decision-making process of investors and voters.

We believe our findings carry implications to the future research on the field. Thus, given the robustness of these results, we believe that the government status should, from now on, be considered as a relevant factor when it comes to study capital markets related topics.

Moreover, bearing in mind the results of this study, further research in the field of Politics and Financial Markets must try to further comprehend this phenomenon. Firstly, given that different results are reached for different countries, it is important to understand what are the underlying drivers of a different level of volatility due to the government status. Is it a matter of investors' perception, and thus impacted by the culture of the country, or is it a matter of the specific political framework in which the country operates on? Secondly, for the specific case of the United States it would also be interesting to decompose this relationship in distinct categories to understand what is the impact of the government status in different industries, across different decades and in the recent years. Also, given the strength of these results, it would be interesting to ascertain whether *government status-oriented* asset allocations are able to yield abnormal returns or not.

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Annexes

Annex 1: Model 1 and Model 2 output

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 04/27/17 Time: 15:51
Sample: 1950 2007
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.106800	0.006279	17.00857	0.0000
DIV_DUMMY	0.043295	0.011920	3.632113	0.0006

R-squared	0.175062	Mean dependent var	0.132926
Adjusted R-squared	0.160331	S.D. dependent var	0.051061
S.E. of regression	0.046789	Akaike info criterion	-3.252482
Sum squared resid	0.122594	Schwarz criterion	-3.181432
Log likelihood	96.32197	Hannan-Quinn criter.	-3.224806
F-statistic	11.88392	Durbin-Watson stat	1.253396
Prob(F-statistic)	0.001081	Wald F-statistic	13.19225
Prob(Wald F-statistic)	0.000611		

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 05/03/17 Time: 17:00
Sample: 1950 2007
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.092557	0.012067	7.670377	0.0000
DIV_DUMMY	0.024993	0.009155	2.729832	0.0087
INFLATION	0.194019	0.127324	1.523822	0.1339
DUMMY_YEAR_CRASH	0.113130	0.025232	4.483552	0.0000
DEFICIT	0.263278	0.261664	1.006171	0.3192
PRESELEC_DUMMY	-0.022789	0.011986	-1.901265	0.0630
CONGELEC_DUMMY	0.008733	0.011422	0.764587	0.4481
GDP_GR	0.081115	0.181166	0.447739	0.6563

R-squared	0.638123	Mean dependent var	0.132926
Adjusted R-squared	0.587460	S.D. dependent var	0.051061
S.E. of regression	0.032796	Akaike info criterion	-3.869588
Sum squared resid	0.053778	Schwarz criterion	-3.585389
Log likelihood	120.2181	Hannan-Quinn criter.	-3.758887
F-statistic	12.59549	Durbin-Watson stat	1.876628
Prob(F-statistic)	0.000000	Wald F-statistic	11.11614
Prob(Wald F-statistic)	0.000000		

Annex 2: Model 3 output

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 06/10/17 Time: 18:27
Sample: 1950 1999
Included observations: 50
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.098161	0.029078	3.375797	0.0016
DIV_DUMMY	0.028632	0.009464	3.025220	0.0043
COHESION	-0.014630	0.026105	-0.560431	0.5783
DISTANCE	-0.000228	0.010062	-0.022634	0.9821
INFLATION	0.253839	0.164899	1.539355	0.1316
DUMMY_YEAR_CRASH	0.109287	0.047409	2.305190	0.0264
DEFICIT	0.112331	0.252051	0.445666	0.6582
PRESELEC_DUMMY	-0.025132	0.016145	-1.556567	0.1275
CONGELEC_DUMMY	0.013102	0.014303	0.916012	0.3652
GDP_GR	0.155790	0.178743	0.871586	0.3886

R-squared	0.579089	Mean dependent var	0.127353
Adjusted R-squared	0.484384	S.D. dependent var	0.047718
S.E. of regression	0.034265	Akaike info criterion	-3.732550
Sum squared resid	0.046963	Schwarz criterion	-3.350146
Log likelihood	103.3138	Hannan-Quinn criter.	-3.586928
F-statistic	6.114655	Durbin-Watson stat	1.934390
Prob(F-statistic)	0.000023	Wald F-statistic	8.367573
Prob(Wald F-statistic)	0.000001		

Annex 3: Model 1 (2000-07) output

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 05/01/17 Time: 15:58
Sample: 2000 2007
Included observations: 8
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.121094	0.015654	7.735889	0.0002
DIV_DUMMY	0.093332	0.016892	5.525088	0.0015

R-squared	0.675891	Mean dependent var	0.167760
Adjusted R-squared	0.621873	S.D. dependent var	0.060682
S.E. of regression	0.037314	Akaike info criterion	-3.526559
Sum squared resid	0.008354	Schwarz criterion	-3.506699
Log likelihood	16.10624	Hannan-Quinn criter.	-3.660509
F-statistic	12.51230	Durbin-Watson stat	0.804385
Prob(F-statistic)	0.012259	Wald F-statistic	30.52660
Prob(Wald F-statistic)	0.001480		

Annex 4: Model 4 a) and 4 b) output

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 05/03/17 Time: 17:00
Sample: 1950 2007
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.106800	0.006336	16.85603	0.0000
STRONGDIVIDED	0.039592	0.013861	2.856273	0.0060
WEAKDIVIDED	0.055793	0.023372	2.387160	0.0204

R-squared	0.185962	Mean dependent var	0.132926
Adjusted R-squared	0.156361	S.D. dependent var	0.051061
S.E. of regression	0.046899	Akaike info criterion	-3.231300
Sum squared resid	0.120974	Schwarz criterion	-3.124726
Log likelihood	96.70770	Hannan-Quinn criter.	-3.189787
F-statistic	6.282224	Durbin-Watson stat	1.326231
Prob(F-statistic)	0.003489	Wald F-statistic	6.921989
Prob(Wald F-statistic)	0.002083		

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 05/24/17 Time: 15:08
Sample: 1950 2007
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.101290	0.020993	4.824915	0.0000
STRONGDIVIDED	0.041207	0.015723	2.620874	0.0116
WEAKDIVIDED	0.058647	0.024009	2.442672	0.0182
INFLATION	0.245608	0.164908	1.489365	0.1427
DEFICIT	-0.398692	0.466084	-0.855409	0.3964
PRESELEC_DUMMY	-0.034010	0.013003	-2.615585	0.0117
CONGELEC_DUMMY	0.022639	0.010374	2.182292	0.0338
GDP_GR	-0.042936	0.242908	-0.176756	0.8604

R-squared	0.284224	Mean dependent var	0.132926
Adjusted R-squared	0.184015	S.D. dependent var	0.051061
S.E. of regression	0.046124	Akaike info criterion	-3.187525
Sum squared resid	0.106371	Schwarz criterion	-2.903326
Log likelihood	100.4382	Hannan-Quinn criter.	-3.076824
F-statistic	2.836320	Durbin-Watson stat	1.305064
Prob(F-statistic)	0.014333	Wald F-statistic	5.414840
Prob(Wald F-statistic)	0.000116		

Annex 5: Model 5 output

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 06/10/17 Time: 18:33
Sample: 1950 2007
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.113456	0.011827	9.593128	0.0000
DUMMYDEMOCRATPRES	-0.016137	0.009718	-1.660493	0.1031
INFLATION	0.214075	0.120304	1.779452	0.0812
DEFICIT	0.205621	0.253765	0.810282	0.4216
PRESELEC_DUMMY	-0.018302	0.011800	-1.551034	0.1272
CONGELEC_DUMMY	0.005660	0.012198	0.463985	0.6447
GDP_GR	0.086891	0.203763	0.426430	0.6716
DUMMY_YEAR_CRASH	0.123027	0.022356	5.503211	0.0000

R-squared	0.607602	Mean dependent var	0.132926
Adjusted R-squared	0.552666	S.D. dependent var	0.051061
S.E. of regression	0.034151	Akaike info criterion	-3.788616
Sum squared resid	0.058314	Schwarz criterion	-3.504417
Log likelihood	117.8699	Hannan-Quinn criter.	-3.677914
F-statistic	11.06022	Durbin-Watson stat	1.870613
Prob(F-statistic)	0.000000	Wald F-statistic	11.90834
Prob(Wald F-statistic)	0.000000		

Annex 6: Model 6 a) and 6 b) output

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 05/29/17 Time: 16:59
Sample: 1950 2007
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.150095	0.011501	13.05105	0.0000
UNIFIED_DEMOCRAT	-0.045269	0.013493	-3.354968	0.0014
UNIFIED_REPUBLICAN	-0.037701	0.013008	-2.898233	0.0054

R-squared	0.176772	Mean dependent var	0.132926
Adjusted R-squared	0.146836	S.D. dependent var	0.051061
S.E. of regression	0.047163	Akaike info criterion	-3.220073
Sum squared resid	0.122339	Schwarz criterion	-3.113499
Log likelihood	96.38212	Hannan-Quinn criter.	-3.178560
F-statistic	5.905073	Durbin-Watson stat	1.271328
Prob(F-statistic)	0.004751	Wald F-statistic	6.431079
Prob(Wald F-statistic)	0.003092		

Dependent Variable: VOL_ANNUAL
Method: Least Squares
Date: 06/05/17 Time: 15:01
Sample: 1950 2007
Included observations: 58
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.114887	0.012320	9.324903	0.0000
INFLATION	0.232749	0.130604	1.782099	0.0809
DEFICIT	0.233760	0.254958	0.916858	0.3637
GDP_GR	0.131065	0.193484	0.677392	0.5013
UNIFIED_DEMOCRAT	-0.028656	0.009673	-2.962527	0.0047
UNIFIED_REPUBLICAN	-0.016996	0.013748	-1.236253	0.2223
DUMMY_YEAR_CRASH	0.112784	0.025660	4.395355	0.0001
PRESELEC_DUMMY	-0.023140	0.012003	-1.927776	0.0597
CONGELEC_DUMMY	0.009268	0.011423	0.811370	0.4211

R-squared	0.641465	Mean dependent var	0.132926
Adjusted R-squared	0.582929	S.D. dependent var	0.051061
S.E. of regression	0.032975	Akaike info criterion	-3.844384
Sum squared resid	0.053282	Schwarz criterion	-3.524660
Log likelihood	120.4871	Hannan-Quinn criter.	-3.719845
F-statistic	10.95841	Durbin-Watson stat	1.923791
Prob(F-statistic)	0.000000	Wald F-statistic	9.998431
Prob(Wald F-statistic)	0.000000		

Annex 7: Ramsey RESET Test (all models) output

Ramsey RESET Test Model 2
Equation: MOD2TESE
Specification: VOL_ANNUAL C DIV_DUMMY INFLATION DUMMY_YEAR_CRASH DEFICIT PRESELEC_DUMMY CONGELEC_DUMMY GDP_GR
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.396456	49	0.6935
F-statistic	0.157177	(1, 49)	0.6935
Likelihood ratio	0.185749	1	0.6665

Ramsey RESET Test Model 4 b)
Equation: MOD4B
Specification: VOL_ANNUAL C STRONGDIVIDED WEAKDIVIDED INFLATION DEFICIT PRESELEC_DUMMY CONGELEC_DUMMY GDP_GR
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.613078	49	0.5427
F-statistic	0.375865	(1, 49)	0.5427
Likelihood ratio	0.443204	1	0.5056

Ramsey RESET Test Model 6 b)
Equation: MOD6B
Specification: VOL_ANNUAL C INFLATION DEFICIT GDP_GR UNIFIED_DEMOCRAT UNIFIED_REPUBLICAN DUMMY_YEAR_CRASH PRESELEC_DUMMY CONGELEC_DUMMY
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.593483	48	0.5556
F-statistic	0.352222	(1, 48)	0.5556
Likelihood ratio	0.424048	1	0.5149

Annex 8: Variance Inflation Factors (all models) output

Variance Inflation Factors Model 2
Date: 09/11/17 Time: 23:28
Sample: 1950 2007
Included observations: 58

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000146	10.20360	NA
DIV_DUMMY	8.38E-05	3.193603	1.648468
INFLATION	0.016211	3.934973	1.949988
DUMMY_YEAR_CRASH	0.000637	3.639934	3.211437
DEFICIT	0.068468	4.009231	3.384367
PRESELEC_DUMMY	0.000144	4.641298	4.424186
CONGELEC_DUMMY	0.000130	6.554556	4.273691
GDP_GR	0.032821	4.627955	1.658961

Variance Inflation Factors Model 4 b)
Date: 09/11/17 Time: 23:29
Sample: 1950 2007
Included observations: 58

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000441	23.28378	NA
STRONGDIVIDED	0.000247	1.977842	1.322452
WEAKDIVIDED	0.000576	2.910012	2.556634
INFLATION	0.027195	6.372586	1.662288
DEFICIT	0.217234	7.382382	3.057684
PRESELEC_DUMMY	0.000169	2.847372	2.287373
CONGELEC_DUMMY	0.000108	4.871286	2.309035
GDP_GR	0.059004	7.995003	1.867164

Variance Inflation Factors
Date: 09/11/17 Time: 23:30
Sample: 1950 2007
Included observations: 58

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.000152	11.49059	NA
INFLATION	0.017057	4.143457	2.177921
DEFICIT	0.065004	4.122985	3.541246
GDP_GR	0.037436	5.512524	1.808631
UNIFIED_DEMOCRAT	9.36E-05	2.978814	2.136349
UNIFIED_REPUBLICAN	0.000189	1.729076	1.352295
DUMMY_YEAR_CRASH	0.000658	3.781836	3.351985
PRESELEC_DUMMY	0.000144	5.048542	4.688544
CONGELEC_DUMMY	0.000130	6.958671	4.503807