2014

The Politics of U.S. Government Debt Accumulation

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THE POLITICS OF U.S. GOVERNMENT DEBT ACCUMULATION

A Thesis

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

in

The Department of Political Science

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May 2015

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at Louisiana State University and Agricultural and Mechanical College. In one way or another, they have accompanied me on the embarked intellectual journey in graduate school and have directly contributed to my appreciation of postgraduate education and the pursuit of knowledge for the benefit of every living creature of this world.

ACKNOWLEDGEMENTS

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ABSTRACT

The political factors influencing the observed patterns of federal government debt accumulation of The United States of America are investigated. Previous research has found that the political context may condition fiscal policy and macroeconomic fluctuations; however, it remains unclear as to what political components have effects on the government debt accumulation process, and how it is impacted by these factors. Thus, this research proposes a set of questions and hypotheses that aim to understand such process, and specifically how it may be affected by partisan control of political institutions, electoral considerations, Congressional ideology and political polarization, in conjunction with economic factors. The assembled multi-source dataset consisted of quarterly observations in the post-World War II period, from 1953 until 2010. The results from statistical models indicated that debt accumulation by the U. S. federal government is the consequence of not only prevailing economic conditions but also political driving forces being primarily conditioned by electoral outcomes in the midterm and presidential elections. This study demonstrates that partisan control of political institutions is very important, and most startling, the direction of the partisan effects depended upon the political institution being controlled. Consistently, government's reliance on debt changed meaningfully with shifts in ideology. Likewise, split partisan control of Congress significantly altered the patterns of government debt growth. However, it appeared as if divided government and polarization have not influenced the necessary cooperation for reaching negotiation agreements on debt accumulation. Overall, this research project has advanced the comprehensive understanding about the influence of politics on fiscal policy outcomes.

CHAPTER 1. INTRODUCTION

In 2011, the federal government of The United States of America was caught-up in the middle of an internal political fiscal crisis for raising the debt ceiling. On the one hand, Republican legislators were not enthusiastic about raising it. On the other side of the aisle, Democrats were not only in favor of increasing the debt ceiling but also were pushing for higher spending and taxation to limit future deficits. Eventually, a compromise was achieved—and the debt ceiling was raised under the condition of reducing government spending by compromise during future negotiations or by automatic budget sequestration mechanisms. Thus, in the end, from these negotiations it appears that political parties and political institutions are in favor of greater reliance on debt to finance federal government spending. And this spending financed with debt is not supported by current tax policies (Hacker and Pierson 2005).

The total debt accumulated by the U.S. federal government has increased progressively, from $329 billion in 1966 to $14 trillion by 2010. In recent times, the debt has decreased in 2000 alone, by only 1.97%, and this reduction occurred during the second term of President William J. Clinton (Figure 1). At the same time that government debt has fluctuated, the partisan control of political institutions has shifted as well. For instance, in the 1953-2010 period, eleven presidents have occupied the White House, six Republicans and five Democrats; as for Congress, the control has rotated between Democrats and Republicans, with more turning in the U.S. Senate than in the U.S. House of Representatives. Hence, despite the political rhetoric towards a significant deleverage, government debt has increased regardless of the partisan control of political institutions that has been exercised by the two major political parties in the last 60 years; as a consequence, it appears as though parties, bureaucracy and candidates have a strong preference for debt. And even if they don't, Congress and the Executive branch have successfully cooperated in maintaining a fiscal policy whereby the use of debt has been

persistently of paramount importance for maintaining spending with recurrent budget deficits

and off-budget programs (Hacker and Pierson 2005).
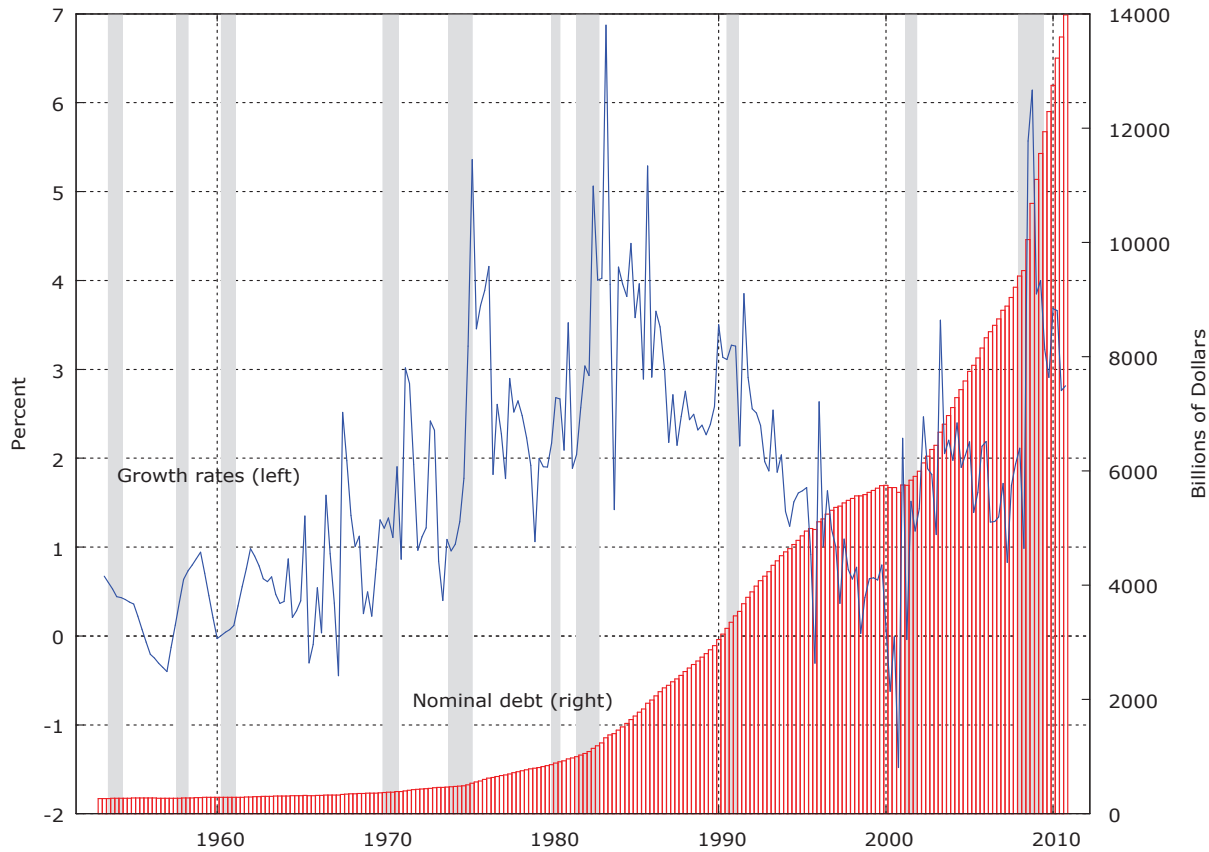
Figure 1. Federal Government Debt of The United States of America, 1953:1-2010:4.
Note: Percentage growth rates represent the quarterly changes in the stock of nominal
government debt. The shaded areas indicate recession periods as suggested by the National
Bureau of Economic Research from the Business Cycle Expansions and Contractions reports
<http://www.nber.org/cycles.html>. Original data was obtained from the U.S. Department of the
Treasury and Federal Reserve Economic Data.

Notwithstanding the continuous approval of debt ceiling increases by Congress and the

Executive branch, presidential candidates, legislators, and elected officials have expressed strong

opinions towards the national debt issue in the last seven years (2008-2014). But, such tough

stands and their corresponding positions of political parties may lack some credibility—as

pointed out by Lee, Moretti, and Butler (2004) in reference to House members "*Politicians'*

inability to credibly commit to a compromise appears to dominate any competition-induced

convergence in policy." Similarly, Wood and Lee (2009) suggest that U.S. Presidents tend not to be swayed by mass political preferences, and during election years, instead of approaching the median voter, they instead become even more partisan.

Particularly, the negotiations for raising the debt ceiling are expected to be intense in divided governments, split partisan control of Congress or merely when partisan positions are very strong and polarized by economic views about the functions of government in society. More tellingly, debt may increase to even higher levels when the President is in the second term in office. In such contexts, public policy choices are less reserved since re-election motives don't constrain the Executive branch as much as during campaign-years. However, spending policies are a recurrent concern for legislators in the House of Representatives, especially during midterm election years.

These initial arguments leads to the belief that the accumulation patterns of government debt are highly influenced by significant political forces observed in the partisan control of political institutions, resulting configuration, political ideology and political polarization in Congress. Consequently, the fundamental research question to be addressed in this study is: what are the main political factors influencing the observed patterns of debt accumulation by the federal government of The United States of America?

Subsequently, a cluster of important questions emerge about the process of debt accumulation: Does partisan control of political institutions have influence in the growth rates of debt accumulation? Does the political party affiliation of the majority in control of the House of Representatives or the Senate have an effect on these rates? Does the political party affiliation of the President have an effect? Are the partisan effects of the majorities in Congress significantly different than the President? Are presidents under their second term more likely to use debt to

finance spending? Is this effect contingent upon partisan control? Do partisan controls interact with economic factors for influencing the growth patterns of debt accumulation? Are the growth rates of the debt higher in midterm and presidential elections-years than non-election years? To what extent does political ideology and polarization in Congress affect the growth patterns of debt? Is split partisan control of Congress conditioning the growth rates of debt accumulation? Or is it divided government driving this process?

As a consequence of all these research questions, the main goal of this research project is to understand and empirically evaluate the political factors having influence on debt accumulation by the federal government of The United States of America; in the same way, this will increase the understanding of the most important political factors that are involved during the formulation and execution of fiscal policy. In this study, the partisan control effects come from three political institutions, the House of Representatives, the Senate, and the Presidency.

As for political ideology and political polarization, the focus is Congress through the roll-call votes, since Senators and Representatives are more concerned with the pressing issues of their local jurisdictions and constituencies which then affect the policy choices made at the national level during legislation. Ultimately, the purpose is to contribute to the development of a political economy theory of government debt accumulation based on principles elicited from the empirical evidence. In the following chapter, a literature review is layout with the objective of providing a theoretical and empirical foundation for vindicating the tested hypotheses involving politics and the government debt accumulation process, and also for guiding the estimation of parameters and specification of statistical models.

CHAPTER 2. THE POLITICS OF DEBT ACCUMULATION

Although the economic and financial motives may be intuitively associated with the use or disuse of government debt, the political and institutional factors are not straightforwardly understood. Unlike corporations, government debt accumulation not only soars due to purely financial-economic reasons but also it may be affected by political driving forces during the processes of policy formulation and implementation. Clingermayer and Wood (1995) have analyzed the change in per capita stock of debt in the states for the 1961-1989 years. They find that government debt tends to decline in states that had elections with a resulting divided form of government, but the effect was statistically significant only when the governor is Democrat serving along with a Republican legislature. It was also shown that if a state was classified as ideologically liberal, then, the stock of debt was more likely to increase. However, paradoxically, constitutional limitations on spending and taxation were factors associated with higher growth rates of debt per capita. Then, it remains to determine how these findings apply at the national level, since there is not a constitutional rule that restricts deficits, off budget spending or caps in interest payments; additionally, in the last 50 years, partisan control of Congress and the Executive branch has rotated under multiple Democratic-Republican configurations.

In line with the previous results, Cusack (2001) found in OECD countries in the 1961-1994 period, that political ideology of the government has effects on the preference to rely on budget deficits for reaching higher economic activity (budget deficits increase the size of the stock of debt). Cusack (2001) found that liberal governments tend to use deficits to spur economic growth when unemployment is high. However, Cusack also documented that over the years, the partisan effects have declined; this last result is in accordance with most recent findings on tax policy for the United Kingdom (Osterloh and Debus 2012). Cusack (2001) concludes that "*while the left continues to take a more conservative stance under conditions of full or near-full employment,*

the size of its counter-cyclical response to conditions of moderate to high levels of unemployment has attenuated appreciably." This suggests that political parties may have changed their ideological preferences for deficits and thus for the use debt to finance spending. If parties converge in the same solution to economic circumstances, then, any partisan effect would not be observed on the patterns of government debt accumulation, assuming that parties would reliably have the same influence across political institutions. Subsequently, one needs to remember that governments, in democratic systems at least, are to a greater extent responsive to their constituencies.

2.1 The Role of Constituency and Electoral Outcomes

Even though government ideology and divided partisan control of government have effects on fiscal policy, it is important to point out that such factors and results are partly a response of politicians to the constituency. Government officials make fiscal promises during elections which may alter the path of previous administrations or exacerbate problems if financial prudence is not realized. Burden and Sanberg (2003) have analyzed budget rhetoric in presidential candidates' speeches, finding that incumbent Democratic candidates tend to emphasize the budget when it is in surplus whereas challenger Republicans refer to the budget more often when is in deficits. So, political stands on the budget are utilized strategically during electoral campaigns, eventually those policy positions are materialized if the candidate is able to sway voters and in due course win elections for carrying the will of the constituency and own policy preferences.

However, depending upon the economic conditions, as illustrated by Calcagno and Lopez (2012), voters may choose a unified government under more economic distress and a divided government under favorable economic situations. Perhaps, this occurs because voters are able to internalize that strong partisanship leads to more conflictive views about policy solutions and

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less chances for resolute policies to issues; in turn, given a central issue being experienced by a country, voters may choose unified party control of political institutions according to their perceptions about which party is more able to manage it.

Once legislators are elected, depending upon the constituency's public opinion, they have the incentive to cooperate or work against the policies of the President. In the same manner, the President has the incentive to collaborate with legislators, exerting his influence for accommodating policy in both chambers of Congress. However, the empirical evidence appears to contradict such expectation. Bond and Fleisher (1984), through the analysis of roll call votes, find that popularity of the President does not have an influence in Congress. As explained by Bond and Fleisher (1984) "*public opinion normally cannot directly affect support for the President's preferences in Congress, it can exert significant indirect effects*." Specially, after midterm elections, when change in the balance of power is more likely to occur, legislators may choose to support or undermine the policy preferences of the President.

Levitt and Snyder (1997) argue that weak incumbent legislators are more likely to seek policies that increase spending in their districts, they found that increasing spending significantly increased their voting share in reelections. Lazarus and Reilly (2010) also found that relationship, but their study shows that Democrat legislators are consistently more favored by greater spending than Republicans who are favored by greater spending programs supported with contingent liabilities (student loans, small business loans, and guarantees to federally insured banks, crop insurance, flood insurance). Most recently, Berry et al. (2010) have concluded that presidential effects, through either party affiliation or voting share favoring the president, have an effect on the distribution of spending too.

Hence, both legislators and the Executive have the incentive to increase spending. Thus, if constituents are in favor of greater spending while elected officials are against, then, it would be expected in the next election either a President or a Legislature that has a strong preference for greater spending, assuming that voters have neither strong partisanship nor strong preferences for changes in the debt stock or tax rates. Berry et al. (2010) argued that the partisan effect between Representatives and the President changes with elections; as such, partisan realignment may occur during the formulation of the budget (ex-ante) and during the allocation of approved expenditures (ex-post). This is important because presidents exercise their rights to propose and veto a budget, and they also influence the management of authorized expenditures. Thereby, it can be argued that the observed fiscal outcomes are the result of previous fiscal negotiations between the President and Congress due to the established policy making process that regulates the planning and execution of the government's budget. Also, it can be said that configurations of partisan control among political institutions are important in the approval of the necessary and unexpected spending levels which may be financed with debt; especially, for financing the recovery from economic crises or supporting the military endeavors of the state.

Hodler (2011) presents a theoretical model under complete information whereby incumbent presidents can use fiscal policy with the goal of advancing reelection for a second term. Based on preferences for consumption and government spending, it was inferred that conservatives may decide to increase spending financed with deficits when facing a challenger with high preference for higher spending. However, still, those who control the government may differ in policy preferences, and break ranks with their respective parties and political bases. Ultimately, this exercised partisan control of political institutions would eventually have effects on macroeconomic conditions. Hibbs (1977) explains that the party's preferences for economic

outcomes produces the cycle of policies across liberal and conservative presidents; while the former group is more concerned with full employment and economic expansion the latter group would tend to focus on price stability and balanced budgets. But, still remains to be determined the effects of partisan control of political institutions on the debt accumulation process (Krause 2000). One can speculate that conservative and liberal incumbents may increase the stock of government debt as a response to economic conditions, with the purpose of winning the reelection and also to restraint the policy space of potential challengers; this effect may be stronger if non-conservative candidates have greater chance of success. Furthermore, the President may need to cooperate with members of Congress by advancing their policy goals through greater spending. And still, legislators can benefit from participating in the coalition with the majority party in the House, and even those who don't, can receive benefits in the form of "pork barrel spending" (Carroll and Kim 2010).

2.2 Economic Policy Preferences

In democratic governments, elections produce the partisan control of political institutions as well as the resulting configurations of partisan control across those institutions. And depending upon which political party has more influence at a given point in time, the reaction to economic conditions through legislation and policy making will be in direct association (i.e. to say that elections result on partisan controls that conditions legislation and subsequently fiscal outcomes). Lowry et al. (1998) aimed to disentangle the fiscal and partisan effects on elections of governors and legislators in the states; their study was particularly focused on voters' response to spending, fiscal balance, and divided government. They found that state legislators tend to be punished by voters if fiscal imbalances occur while governors seemed to receive less pressure even under unified governments. But, Democrats appeared to be rewarded by greater spending whereas Republicans are hold accountable; this effect is even stronger when unified Republican state

governments increased spending. Lowry et al. (1998) suggested that Republicans tend to strive for smaller government, and they may be hold accountable if surpluses are not returned to the constituency; it was also found that regardless of which political party is in control of legislatures or governorships, citizens can neither reward nor punish divided governments because it is presumed that voters find difficult to assign responsibility for fiscal management.

And regardless of voter accountability and the partisan configurations that may condition policy making and fiscal management, for as long as governments are able to increase their spending levels, governments expand the size of such organizations (Garand 1989; Krutz, Fleisher, and Jon 1998; Lowry, Alt, and Ferree 1998). As the government expands its size, the use of debt can be expanded for facilitating greater spending on the activities that are performed by the government's bureaucracies; as such, it's worth to briefly document the literature that aims to explain the growth of government size. Garand (1989) asserts that the size of the government can change upon two forces, government activity and costs of the goods and services. As such, the first force refers to changes in expenditure levels by the government and the second force refers to changes in the price level of those measures. Garand (1989) describes five models of government growth. The model of Wagner which basically states that government may increase by previous economic and demographic conditions as denoted by the Gross Domestic Product (GDP) and population. The fiscal illusion model assumes that the size of government changes due to previous taxation (personal and corporate, and complexity of the tax system. The bureau voting model simply assumes that government grows due to the previous number of government employees as proportion of the population. Finally, the intergovernmental grant model assumes that the size of the government would change due to the amount of federal grants previously received. Garand (1989) also documents the party control model which

assumes that government size changes due to past levels of government size, and party control of the executive and legislative branches of the government, plus an interaction term of the last two variables. The expectation for this model is that, in general, a liberal party will tend to increase the size of government regardless of whether they control the legislature or the executive office (Garand 1989).

In the states, Alt and Lowry (1994) find that non-Southern unified governments with restrictive laws to carry deficits react very fast to declines in income in comparison with those not subject to those laws. In split legislatures, regardless of the presence of the constraints to carry deficits, they tend to be unable to respond to sudden deficits. Moreover, under average conditions, unified Republicans tend to reduce spending and revenue whereas unified Democrats and split legislatures tend to be more flexible, i.e. they recur to both changes in revenue and spending. Thus, across the states, the response to economic conditions is conditional to the political control of political institutions that provides guidance to the bureaucracies; this response is also likely to be evident at the national level.

The partisan control models that aim to explain government size and fiscal response provide some insights as to how partisan effects may alter spending patterns regardless of how it is financed. It is clear that part of that growth comes from debt when budget deficits are allowed. Thus, it is expected to find partisan effects in the debt accumulation process too. The findings of Garand (1989) and Alt and Lowry (1994) provide us with a great incentive to believe that such relation is based on a reasonable expectation, because, both Democrats and Republicans differ in their reactions to worsening economic conditions (Hibbs 1977). And eventually, such reactions end-up having effects on the choices for taxation and spending policies. In turn, these diverging

policy preferences may ultimately lead to higher debt accumulation under different political configurations of partisan control.

But, why are divided governments unable to deal with sudden economic shocks? Primarily, for the obvious reason that it is more difficult to compromise in the legislative process. In a divided form of government, when the opposition party controls the Senate, there is more room for disagreement with the President (Krutz, Fleisher, and Jon 1998). Secondly, ideological differences about how to manage the economy may act from the same forces that increase polarization in Congress. Third, members of the House of Representative may need to respond consistently to voter's preferences. Tabellini and Alesina (1990) suggests that persistent deficits may exist whenever cooperation and coordination between intergenerational-majorities of the constituency (the median voter) concur.

Alesina and Sachs (1988) developed a partisan theory of economic policy under a two party system representing segmented constituencies; they concluded that long term deviations of GNP and money growth are due in part to the political cycle between Democrat and Republican administrations; but, the effects of new policies were higher in the first half of their terms in office. Moreover, as in Hibbs (1977), the authors suggested that Democrats were more concerned with an output target than an inflation target. As such, it is likely that long term deviations in the growth rate of debt accumulation may also originate from the political cycle. Then, in comparison to Republicans, higher levels of government debt can be expected under Democrat administrations pushing for more output, *ceteris paribus*.

Krause (2000) found that budget deficits, denoted by percent change of the ratio between public debt to GNP ratio, can be explained by ideological fragmentation in the House, Senate, the Presidency, and different configurations of partisan control of those institutions; his analyses

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control for economic conditions such as unemployment, inflation, and GNP. Krause (2000) found a positive relationship between ideological fragmentation of political institutions and public deficits. And only when party control of Congress was split, Senate and House, there was a positive effect of Republican control of the Executive branch in the growth of budget deficits. However, the parameter estimates of the presented regression models may be bias as a result of omitting the effects of interest rates even though inflation was included in the analyses (the reader is encouraged to read a more thorough critique of this study in the results chapter under replication and extension).

Moreover, it is important to keep in mind that political ideology of the majority in control or that of the broader coalition is what truly has the effect on the final decisions about revenue and spending policies; Cox and McCubbins (1994) have argued that the majority in the House has the incentive to build-up an keep-up a political coalition, since procedural "*rules are not determined exogenous*." They stated that "*the Constitution merely requires the House to choose a presiding officer, stipulates that a majority of the membership constitutes a quorum for doing business, and provides that "each house shall determine the rules of its proceedings" (Article I, Section 5:2).*" Furthermore, the president has the very same incentive of forming alliances with Congress, Wood and Lee (2009) concluded that "*modern presidents are partisans*" and that their level of issue liberalism depends upon the partisan alignment with Congress.[1] Likewise, it is expected that such political configurations of party control of governmental institutions will have an effect on the observed patterns of government debt accumulation. And that the ideology of the

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[1] In the following issues race, welfare, crime, the environment, education, urban problems, health care, military spending, and size of government. They created indicators for institutional configurations: Democratic President/Republican Congress, Republican President/Democratic Congress, Republican President/Divided Congress, and Republican President/Republican Congress. The category Democratic President/Democratic Congress was left in the constant term. The sample did not contain the category Democratic president with a divided Congress.

predominant coalition and the ideological differences across parties would also condition

legislation, policy making, and ultimately the achieved policy outcomes. As such, in what

follows, political ideology and political polarization are introduced into the conceptual structure

of this research project.

2.3 Political Ideology and Political Polarization

The causes and measurement of political ideology and polarization have being studied

thoroughly (Poole, Rosenthal, and Koford 1991; Lewis and Poole 2004; Theriault 2008; Carroll

et al. 2009); although, the myriad of possible effects of polarization are still under study. How

polarization builds up in the political system has been explained extensively (Bond and Fleisher

2000; Theriault 2008). Theriault (2008) summarizes the literature on the causes of polarization,

arguing that polarization in Congress is the result of an integrative process where three major

changing factors interplay: the constituency, the institutions and the party. But, ideology and

polarization among legislators, may start during campaigns as each candidate aims to

differentiate his policies from opponents (Theriault 2008; Iyengar, Sood, and Lelkes 2012).

Those preferred and differentiated proposed policies may have been originated from past

and current economic conditions as well; for instance, income distribution has been shown that

leads to a polarized congress and a polarized electorate (Bartels 2005; Garand 2010). Divergence

in policy preferences is then reflected in the policy preferences of political parties in political

institutions and voting behavior of individual legislators on the full floor and also the committee

assignments that may be influenced by party leadership. Therefore, increasing polarization in the

U.S. House of Representatives and the Senate may lead to greater accumulation of U.S.

government debt as economic policy preferences diverge. Theriault (2008) has argued that

polarization in Congress increments policy coordination within the institution as procedural

control is ceded by individual legislators to the leadership of the parties. Then, partisan control

becomes even more important as more disagreement about economic policies occurs, as a consequence, some groups may target tax policy while others spending policies, and others may focused on government's revenue policy; leaving open the use of debt markets, up to a point that it does not interfere with monetary policies that target price stability and employment.

Tabellini and Alesina (1990) present a theoretical model, in which the median voter influences fiscal policy and budget deficits, provided that a majority exists–it predicts stronger preferences for budget deficits under a polarized electorate. Moreover, Krause (2000) found that increasing ideological fragmentation by members of the House, Senate, and Presidency leads to greater public deficits (as measured by the percentage change of debt to real GNP ratio); clearly, the focus was not on identifying voter's ideology for locating the influence of the median voter on fiscal outcomes described by Tabellini and Alesina (1990) nor the focus was on explaining the debt accumulation process in itself (i.e. debt growth rates as opposed to debt/GNP ratios that obscure the debt accumulation process).

2.4 Towards a Political Economy Theory of Government Debt Accumulation

Having already discussed the political forces affecting economic and fiscal outcomes, a series of hypotheses are presented that directly associates politics with the government debt accumulation process. A political economy framework of government debt accumulation is advanced to guide the estimation of parameters that can provide empirical evidence for evaluating the formulated hypotheses. The selection of concepts and variables was based on previous findings in the literature at the state and national levels. The intention is to present a political economy theory in which partisan effects are emphasized, since it has being shown that changes in partisan control of the political institutions do have effects on economic outcomes (Hibbs 1977; Alesina and Sachs 1988). Likewise, it is assumed that economic conditions do activate the policy preferences for guiding policy making, but then, it is supposed that such

preferences are influenced by not only partisan control of political institutions but also by the dominating coalitions that favor the most preferred policy outcomes that are ultimately observed.

Hibbs (1977) concluded—in his study of unemployment in the U.S. and U.K under liberal and conservative administrations— that "*macroeconomic outcomes, then, are not altogether endogenous to the economy, but obviously are influenced to a significant extent by long- and short-term political choices. The real winners of elections are perhaps best determined by examining the policy consequences of partisan change rather than by simply tallying the votes.*" Then, it's viable to assume that partisanship exerts influence in the economy as administrations and led-party control of political institutions set economic policy targets in concordance with their political ideology. Therefore, all together, partisan control of the House of Representatives, the Senate, and the Presidency, and respective configurations are likely to alter the growth path of government debt accumulation, but such effects may also vary according to past economic conditions as Representatives, Senators and the President react and respond to own political preferences conditioned in great part by party affiliation and constituency.

Budget deficits contribute to the stock of debt. Still, Krause (2000) assumes that fiscal deficits can be measured as the percent change in public debt to real GNP ratios, and in the analysis it is assumed that such measure is contemporaneously related to current economic conditions (GNP, inflation and unemployment). However, it is argued that the preceding political configurations and economic conditions do have effects on the subsequent growth patterns of federal government debt as they are intrinsically connected to budget deficits and debt ceiling policies, which requires a high degree of policy coordination among political institutions for legislative approval and further implementation.

Given this process, five consistent reasons for incorporating lagged effects of political, economic and political-economic variables are delineated. First, for the debt to experience positive growth, the U.S. Department of the Treasury has to obtain prior authorization for the debt ceiling from Congress. Second, when Congress approves a debt ceiling, legislators are likely to vote according to the partisan alignment with both the party and the constituency, and most importantly–their vote is likely to be casted in direct correspondence to the prevailing economic conditions. Third, the U.S. Department of the Treasury is likely to seek a debt ceiling bill that satisfies their projected debt demands; once it is approved, they will use the debt according to current economic conditions and spending needs of the different agencies. And fourth, it is assumed that unexpected changes in interest rates would impact the growth of debt since the bond market is likely to respond faster to new information than political institutions since they are more likely to be less responsive to new economic information (García-Jiménez 2011). Finally, it can also be assumed that contemporary difference between tax revenues and government spending produces budget deficits and surpluses as a result of current economic conditions (Alt and Lowry 1994); thereby, according to the final outcomes of revenues and expenditures, they changed the stock of government debt provided that Congress has already approved a commeasured debt ceiling which is conditioned on past and future expectations about the economy. This divergence on receipts and outlays will partly be conditioned by extraordinary events that situate policy making options. However and most importantly, the stock of debt may change by the outcomes of the most preferred fiscal policy that is set by the political institutions under party control.

As a consequence of these assumptions, government debt may depend on partisan control of the House of Representatives, the Senate and the Presidency as well as political ideology,

ideological differences, and also on economic conditions such as employment, production activity and their corresponding interactions with partisan controls of political institutions. And inherently to the growth of debt, it is reasonable to assume that holders of debt instruments are more concerned with real interest rates than nominal interest rates, making necessary the inclusion of inflation in the analyses as well. Next, given the previously discussed theoretical fundamentals, hypotheses are outlined for guiding the empirical analyses for understanding how the debt accumulation process is impacted by politics.

2.4.1 Hypotheses

From the presented conceptual framework for describing the debt accumulation process, a set of hypotheses are delineated, describing in more detailed manner the relationships with the determinant factors. Changes in partisan control of political institutions had being linked to macroeconomic fluctuations (Hibbs 1977; Alesina and Sachs 1988; Cusack 1999). As candidates to Congress and the Presidency are nominated from political parties and elected by voters, they receive a policy mandate to govern from both platforms; once elected, their political preferences for debt accumulation will be revealed on their approval or disapproval for higher debt accumulation rates. If the elected majority of legislators in Congress are fiscal conservatives, then, reduction on total federal government debt is likely to follow. Conversely, if the elected majority of legislators in Congress are liberal, then, increase on total federal government debt is likely to follow. Likewise, if fiscal conservatives are elected to lead the Executive office, then, a reduction on total federal government is likely to follow. Conversely, a more liberal president would tend to increase it. And by assuming perfect alignment of political ideology and political party, the following hypotheses ensue:

H1: Democratic control of the House of Representatives generates higher debt accumulation.

H2: Democratic control of the Senate generates higher debt accumulation.

H3: Democratic control of the Executive branch generates higher debt accumulation.

Hodler (2011) presents a theoretical model where it shows that politicians can actively use fiscal policy for increasing the chances of reelection; thus, it is expected that election years and first terms in office may display different patterns of debt accumulation for increasing spending. Presidents in their second terms are assumed to be less policy-restrained in tax and spending targets, so that they are likely to seek more extreme positions. But, presidents running a re-election campaign may have constrained policy choices. If the president is under the second term in office, then, he is more likely to use debt to finance spending. The effect may vary according to the party in control of the Executive office; it is expected that Democrat presidents are more likely to use government debt in their second terms than Republican presidents. As such, the following hypotheses ensue:

H4: Presidents in the second term favor greater debt accumulation.

H5: Democratic Presidents in the second term favor greater debt accumulation than Republicans.

Elections may provide the incentive for politicians to seek greater expansion of spending; thereby, it is possible that government debt will be higher in years where presidential and midterm elections occur. In these years, the Executive and members of Congress have the motivation to persuade voters with greater spending, which would require increasing use of debt. So then, in either Presidential or midterm election years, the government is likely to accumulate higher levels of debt. As a result, the following hypotheses ensue:

H6: In Presidential election years, higher debt accumulation is experienced.

H7: In midterm elections years, higher debt accumulation is experienced.

Previous research has demonstrated that divided forms of government tend not to stabilize budget deficits (Alt and Lowry 1994; Lowry, Alt, and Ferree 1998); this occurs as the reach of

consensus and agreements about spending and tax policies becomes more difficult in political institutions with a diverse partisan control than in unified forms of government. Then, if the political configurations of partisan control present either divided government or divided Congress, then federal government debt will increase at a higher rate than in unified forms of government because not only consensus for reaching policy agreement is more difficult to achieve but also because these configurations increase the power struggle for obtaining more diverse policy preferences. Thus, in conditions of divided government or divided Congress, greater growth in government debt would be expected as it becomes more difficult to achieve a compromise for achieving spending and tax targets during negotiations across political institutions. Thus, the following hypotheses ensue:

H8: In years of divided partisan control of government, higher debt accumulation is experienced.

H9: In years of divided partisan control of Congress, higher debt accumulation is experienced.

The government is assumed to be very responsive to contractions and expansions of the economy (Hibbs 1977; Alesina and Sachs 1988). Irrespective of the party control in political institutions, the government is assumed to react to the economic conditions; as such, if the economy experiences high levels of unemployment or low levels of economic activity, then, the government would try to stimulate the economy with greater spending, in doing so–it uses more debt to cope with such situations. On the contrary, under increasing economic activity marked with higher levels of employment, a government is likely to reduce its dependency on debt markets for financing economic growth. The following expectations ensue. Higher unemployment in the economy increases the use of debt by the government; while increasing economic growth reduces the use of debt. But, the degree for such policy preferences is manifested in great part through partisan control and their political ideology (Hibbs 1977;

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Cusack 1999). As a result, fiscal conservatives and liberals may differ in their tax and spending policies in worsening economic conditions. If the economy presents higher unemployment or lower output than expected during regular economic conditions, then, Democrat legislators are more likely than Republicans to use spending policies which in turn may increase the stock of debt. The following hypotheses ensue:

H10: Increasing unemployment rate under Democratic control of the House, leads to higher debt accumulation than under Republican control.

H11: Increasing economic growth under Democratic control of the House, leads to lower debt accumulation than under Republican control.

The ideology of parties contribute to a political cycle that has effects on the economy through the policies that are advanced during elections (Hibbs 1977; Alesina and Sachs 1988). By their own constituency and geographic attachment, legislators from different political parties have divided views and policy preferences about the role of government in the economy and society. But, in the legislation process, regardless of those individual policy preferences of legislators, compromise is needed for forming coalitions that are able to produce the observed policy bills.

Republican may be representing conservative interests, favoring policies leading to the establishment of low tax rates; while the Democrats may be representing more liberal views about the government's involvement in the economy and society, pushing for legislation that requires more spending. These diverging sets of policies are simultaneously feasible when debt is used, as it finances the claimed decrease in the tax base and rising spending demands.

A legislative compromise would even satisfy a coalition of legislators that favor greater spending regardless of their tax preferences, and vice versa. So, as there is more disagreement about the economic policies, the more polarized representatives will behave, affecting their

policy preferences and final votes on any proposed legislation. Consequently, rising polarization makes more feasible the use of debt for financing the government's obligations, *ceteris paribus*– as compromise is easier to reach, making more likely the passing of bills in Congress. Thus, debt accumulation in The United States of America may be influenced by political ideology and political polarization in Congress, since reliance on debt markets to finance government activities becomes a feasible solution for the policy-demands of both Republican and Democrat legislators along with their respective constituencies.

Fragmentation in political ideology across political institutions has been theorized to be associated with higher public deficits (Cusack 1999; Krause 2000; Cusack 2001). Among legislators in Congress, ideological differences are sources of disagreement about the policies that are finally brought to the floor for an up or down vote. Then, one can assume that liberal legislators are less likely to favor conservative policies in comparison to conservative legislators, and vice versa. And if they ultimately do, then the question is to what degree a liberal legislator supports a conservative policy and vice versa? This suggests that a coalition of liberals and conservatives tend to have agreement on the authorized policies as suggested by their vote, and their level of disagreement can be observed in those votes on bills that do not pass as well. And since debt ceiling reauthorizations require approval from Congress so that government debt accumulation can occur beyond previously authorized levels, thus, debt accumulation is likely to be restrained by the extent of those partisan ideological differences and the ideology of Congress itself. Then the following hypotheses ensue:

H12: Increasing liberalism in the House and Senate leads to higher growth rates of government debt accumulation.

H13: Increasing polarization in the House and Senate leads to higher growth rates of government debt accumulation.

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These hypotheses are drawn from the analysis of previous research works that have aimed to comprehend the effects of politics on fiscal policy outcomes, but have not yet systematically and correctly studied the debt accumulation process by the federal government of The United States of America. In all, these hypotheses are well founded in theoretical and previously presented empirical evidence. In the next chapter, the research design for evaluating the hypotheses is presented. The data transformations are explained along with sources of the collected data and the specification of the statistical models. At the end of the next chapter, the justification for replicating the results in Krause (2000) is described.

CHAPTER 3. RESEARCH METHODS

This research project relies on quantitative information; yet, as supporting evidence, qualitative information is incorporated in the analyses for guiding the specification of the regression models. The goal of this research design is to reveal the most important political factors exerting influence on the rates of growth of debt accumulation by the federal government of The United States of America. The analyses use quarterly time series data in the 1953-2010 period (Table 1), for obtaining more observations and subsequently more degrees of freedom in comparison to annual data, but most importantly, the regression estimates take advantage of more variation within years. Time series research designs are preferred when control groups are not available, even though they may have lower validity than experiments for showing cause-effect relationships (Frankfort-Nachmias and Nachmias 2008).

3.1 Conceptual and Operational Definitions

The outlined hypotheses are tested using regression models whereby the dependent variable, quarterly growth rates of real U.S. federal government debt, is regressed on a myriad of factors such as political, economic, political-economic, a trend term, and structural breaks. The set of political factors includes dummy variables representing partisan control of the House of Representatives, the U.S. Senate, and the Presidency; Democratic control is set to one, otherwise such variables take the value of zero (i.e. Republican control is the benchmark for making comparisons). For capturing the effects of second terms of the President, a dummy variable represent those years with values of one, plus an interaction term is added for possible variation with respect to partisan control of that branch (i.e. for testing whether or not Presidents in the second term differ by their party affiliation). Similarly, both presidential and midterm election years are denoted with dummy variables. Likewise, a set of dummy variables are also created for evaluating the effects of divided government and divided Congress; the former is coded with

values of one when the House, Senate and Presidency are controlled by different political parties; and takes the value of zero under unified partisan control.

Table 1. Growth Rates of U.S. Federal Government Debt by Administration, 1953:1-2010:4.

President	Obs	Mean	Std. Dev.	Min	Max
Nominal growth rates[*]					
Dwight D. Eisenhower	31	0.27	0.38	-0.4	0.94
John F. Kennedy	12	0.6	0.25	0.12	0.98
Lyndon B. Johnson	20	0.72	0.77	-0.45	2.52
Richard M. Nixon	24	1.35	0.73	0.22	3.02
Gerald R. Ford	8	3.53	1.05	1.82	5.36
Jimmy E. Carter	16	2.2	0.46	1.06	2.9
Ronald W. Reagan	32	3.31	1.12	1.42	6.87
George H. W. Bush	16	2.76	0.54	1.96	3.85
William J. Clinton	32	0.94	0.89	-1.48	2.64
George W. Bush	32	2	1.19	-0.04	6.14
Barack H. Obama	8	3.36	0.5	2.76	4
Real growth rates[**]					
Dwight D. Eisenhower	31	-0.21	0.64	-1.79	0.80
John F. Kennedy	12	0.29	0.30	-0.39	0.76
Lyndon B. Johnson	20	0.00	0.68	-1.14	1.54
Richard M. Nixon	24	-0.13	1.01	-1.63	1.84
Gerald R. Ford	8	1.95	1.22	0.47	3.88
Jimmy E. Carter	16	0.26	0.64	-0.71	1.68
Ronald W. Reagan	32	2.33	1.28	0.01	6.14
George H. W. Bush	16	1.96	0.48	1.24	3.08
William J. Clinton	32	0.48	0.88	-2.01	2.06
George W. Bush	32	1.38	1.26	-0.72	6.01
Barack H. Obama	8	3.10	0.59	2.38	4.11

Notes: Percentage growth rates represent the quarterly change in the stock of government debt. Original data was obtained from the U.S. Department of the Treasury and Federal Reserve Economic Data. * Nominal stock of debt. ** Deflated with the GDP deflator (2005 = 100).

The latter dummy variable takes the value of one when partisan control in the House and the Senate differs; otherwise, when there is unified partisan control, it takes the value of zero. These dummy variables will capture the effects of configurations of partisan control that result from

elections, and to a certain extent, the separation of powers as envisioned in the Constitution of The United States of America, to the extent that partisanship may not exert strong effects.

A lot of effort has being made for obtaining appropriate measures of political ideology (Poole, Rosenthal, and Koford 1991; Lewis and Poole 2004; Carroll et al. 2009). These authors, primarily Keith T. Poole and Howard Rosenthal, have led this endeavor and have provided their DW-Nominate scores for legislators' roll call vote for each chamber of Congress–the House and Senate. The theoretical range of DW-Nominate scores of legislator's roll call vote varies between -1 and 1, which correspond to the extreme liberal and conservative scores of political ideology, respectively. For each chamber of Congress, average scores of the roll call vote were obtained in each corresponding year in the sample period. Then, quarterly observations were obtained by interpolating the annual values. Subsequently, for easing the interpretation of regression coefficients, the obtained scores were scaled so that the theoretical values range from -100 to a 100. The correlation of DW-Nominate scores of both chambers was low (0.58). Finally, the scores of both chambers were averaged, and this new variable represented congressional political ideology in the regression models. As expected, this new measure was highly correlated with the original values, with the House of Representatives (0.91) and the Senate (0.86) (Figure 2).

An index of political polarization was constructed, it resembles closely that presented by Theriault (2008) and measures in Bond and Fleisher (2000). For each chamber of Congress, the median DW- Nominate scores of Democrat and Republican legislators were calculated. Then, the party differences were taken, correspondingly. These differences, for the House and Senate, were averaged; and subsequently, these average differences were scaled to vary from 0 to 100, whereby 0 stands for the absence of political polarization, and 100 describes the extreme case of political polarization (please refer to Appendix B for more details about data transformations).

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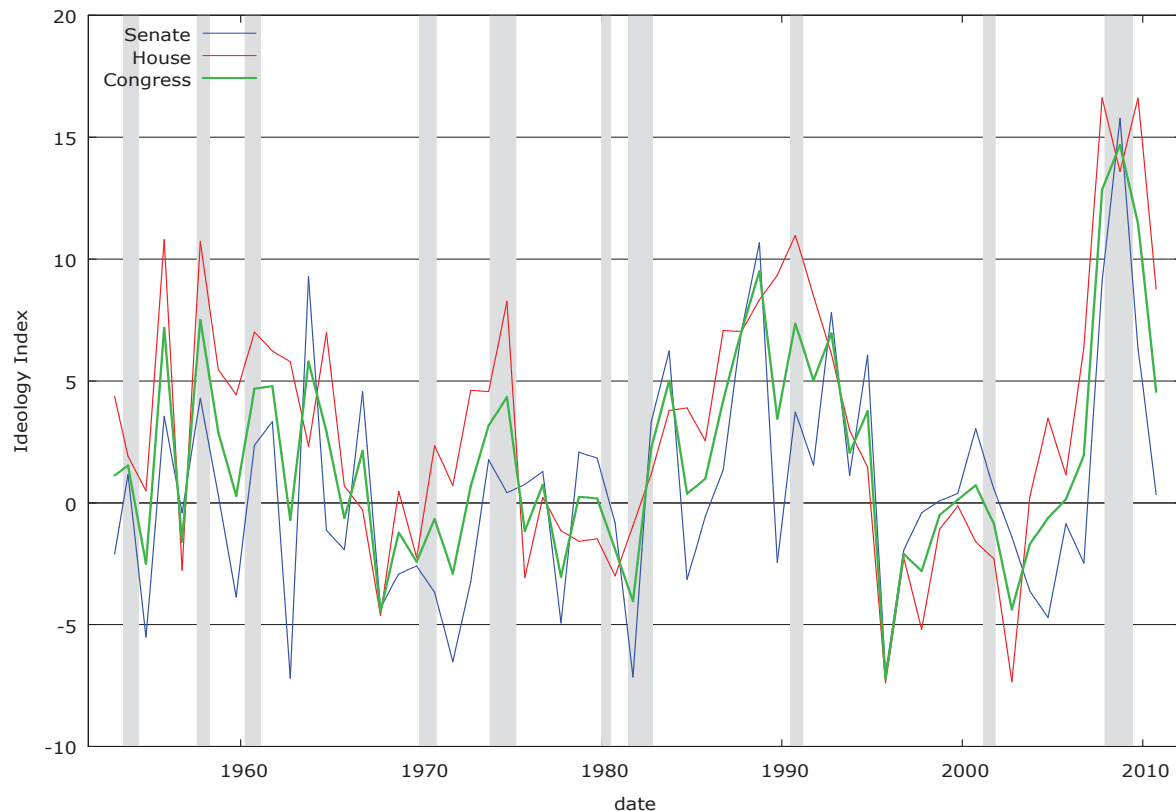
Figure 2. Political Ideology of Congress, 1953:1-2010:4.
Note: The original DW-Nominate Scores of Roll Call Votes were scaled to vary from -100 to 100. The shaded areas indicate recession periods as suggested by the National Bureau of Economic Research from the Business Cycle Expansions and Contractions reports <http://www.nber.org/cycles.html>. Original data was obtained from the VoteView Project.

Additionally, economic variables that may be associated with recessionary periods are added as well (unemployment, GDP) along with factors that are important to debt markets (inflation and medium term-interest rates) which also may serve as decision criteria in an economy that is reliant on debt. GDP and government debt are deflated with the GDP deflator, then, logarithmic first differences are used for obtaining the rates of growth. The unemployment rate denotes the proportion of unemployed people as a percentage of the labor force 16 years of age and older. Inflation is measured as the percent change in the Consumer Price Index for all items and urban consumers. As for interest rates, as in García-Jiménez (2011), yields on 10 year treasuries are used to reflect the average costs of financing government.

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Moreover, interaction terms are added for evaluating how economic factors such as the unemployment rate and the GDP growth rate coalesce with political factors in determining the accumulation process of federal government debt, predominantly the focus remains on the partisan control of the House of Representatives because its geographic distribution is more widely spread. Also, the analyses consider trend terms for capturing long term tendencies as well as the inclusion of structural breaks for representing extra-ordinary events such as military build-ups and great recessions (e.g. the 2008 financial crisis). The decision to add structural breaks was based on statistical tests for shifts on the mean of federal government debt growth rates (see Appendix C2). One additional structural change was considered, the period under the Bretton Woods system of exchange rate, these results are not reported since the respective coefficients were insignificant even at the 90% level of confidence across models. Finally, following Krause (2000), a dummy variable was introduced as a control for major wars such as the Korean war (1952–1953), the Vietnam war (1965 - 1973), the Afghanistan war (2002 - 2010), and the Irak war (2003 – 2010).

3.2 Data Sources

The time series data on this research project included observations from 1953 until 2010. The sample period encompasses an epoch of stable-two-parties political system. Moreover, the sample period includes the pre- and post-Bretton Woods System of monetary management that has influenced the world economy. The political data was collected from multiple sources, from the *Quality of Government* dataset of the University of Gothenburg, *The 2012 Statistical Abstract of the United States* from the U.S. Census Bureau, the White House. Data on the DW-Nominate scores was obtained from voteview.com. The economic data was obtained from the Federal Bank of St. Louis. Appendices A1 and A2 provide more detailed information about the sources of the data such as definitions and transformations. The dependent and independent variables are listed

and conceptually described, summary of the measurements are included along with the expected

signs of the corresponding regression coefficients (Table 2). The descriptive statistics of the

variables are also available in Appendix A3.

Table 2. Description of Variables and Expected Signs of Coefficients.

Variables	Measurement Summary	Expected Sign
Dependent variable		
U.S. Federal Government Debt (GD)[**]	Percentage growth rate	
Independent Variables		
Political variables		
Democratic House (HD)	D, Democratic majority = 1	+
Democratic Senate (SD)	D, Democratic majority = 1	+
Democratic Presidency (PD)	D, Democratic = 1	+
Second term of Presidency (STP)	D, Second term = 1	+
STP*PD (STPD)	STP under Democratic control = 1	+
Presidential Elections (PEY)	D, Election year = 1	+
Midterm Elections (MEY)	D, Election year = 1	+
Divided Government (DG)	D, Divided = 1	+
Divided Congress (DC)	D, Divided = 1	+
Ideology	Index	-
Polarization (PP)	Index	+
Economic variables		
Unemployment rate (U)	Percentage from total labor force	+
Gross Domestic Product (GDP)[**]	Real annualized growth rate (%)	-
Inflation rate (INF)	Percent change in CPI	-
Interest rate (INT)	Yields on 10-year Treasury bonds	-
Political-economic interactions		
HURATE (Unemployment rate *HD)		+
HGDP (GDP * HD)		+
Additional terms		
Constant		±
Trend	Index: 1 to T	+
Lag of dependent variable GD	Percent change	+
Structural breaks		
Reagan's Military Build-up	Dummy variable	+
2008 Financial Crisis	Dummy variable	+
War time	Dummy variable	+

Notes: Political and economic variables are lagged a year, with the exception of contemporaneous effects of PEY, MEY, STP, STPD, trend, structural breaks; moreover, debt is lagged one quarter for removing first order autocorrelation of the residuals. Notice that the standard errors of the coefficients are obtained with the Newey-West estimator, eliminating autocorrelation up to the eighth lag. ** Nominal variables are deflated with the GDP deflator. For details on the sources of the data, please refer to Appendix A.

3.3 Model Specification

The statistical models for understanding the political conditions having important impacts on the debt accumulation process are specified according to the theoretical insights previously discussed in chapters one and two. Equation 1 displays the response of the quarterly percentage growth rates of real government debt to a myriad of factors. The model is linear and the presence of unexpected disturbances is assumed to be normally distributed, homoscedastic, and non-serially autocorrelated (i.e. time independent).

$$(1) \quad GD = \alpha + \beta_1 HD + \beta_2 SD + \beta_3 PD + \beta_4 STP + \beta_5 STP*PD + \beta_6 PEY + \beta_7 MEY + \beta_8 DG + \beta_9 DC$$
$$+ \beta_{10} U + \beta_{11} GDP + \beta_{12} \Delta INF + \beta_{13} INT + \beta_{14} HD*U + \beta_{15} HD*GDP + \beta_{16} GD_{t-1} + \beta_{17} Time$$
$$+ \beta_{18} Wars + \beta_{19} Id + \beta_{20} PP + \varepsilon; where \varepsilon \sim N(0,1)$$

This basic formulation assumes contemporaneous effects to be exerted only by variables such as election years (PEY, MEY), variables involving the dummy variable denoting the second term of presidents (STP), the trend term (time), and the major wars dummy variable. As for the remaining economic and political effects, the corresponding variables are lagged a year, with the exception of the autoregressive term of government debt (GD). The main reason for this specification is that for debt accumulation to occur, Congress has to legislate on debt ceiling bills before the nominal stock of debt can be increased beyond previously authorized limits. As such, economic and political conditions are assumed to influence the determination of the debt ceiling, and thus later, the legislation does affect the rates of debt growth that may incur in future.

Furthermore, the autoregressive term of government debt (β_{16}) remains in the final set of estimates for removing first order autocorrelation of the residuals; this parameter may be interpreted as the "debt rollover parameter" that is independent of political and economic factors. In corporate finance, debt rollover is commonly associated with increasing credit risk that a firm may attain as a result of increasing reliance on debt to finance operations (He and Xiong 2012).

The parameters in the outlined regression model are estimated with the ordinary least squares method. Model miss-specification is evaluated by means of Ramsey RESET tests. Jarque Bera tests are also performed to determine normality of the residuals. Additionally, diagnostic tests for detecting colinearity are included, for that the variance inflation factors and condition indexes are analyzed (Belsley and Oldford 1986). Tests for heteroskedasticity, serial correlation, and normality of residuals are conducted as well. As for heteroskedasticity, the Breusch-Pagan / Cook-Weisberg test is conducted. A myriad of tests for serial correlation are considered, such as the Durbin-Watson test, the non-parametric Runtest, and the Portmanteau Q test for white noise. Besides estimating the autocorrelation function of the residuals, they are regressed on their own lags to detect serial correlation.

Contingent upon these test results, adjustments are made in terms of model specification and choice of estimation procedures. According to the unit root tests results, the variables unemployment, inflation and interest rate displayed an order of integration I(1) (see Appendix C). Thus, equation 1 is modified so that these variables are specified in first differences as in the next equation:

(2) $GD = \alpha + \beta_1 HD + \beta_2 SD + \beta_3 PD + \beta_4 STP + \beta_5 STP * PD + \beta_6 PEY + \beta_7 MEY + \beta_8 DG + \beta_9 DC$
$+ \beta_{10}\Delta U + \beta_{11} GDP + \beta_{12}\Delta INF + \beta_{13}\Delta INT + \beta_{14} HD * \Delta U + \beta_{15} HD * GDP + \beta_{16} GD_{t-1} + \beta_{17} Time$
$+ \beta_{18} Wars + \beta_{19} Id + \beta_{20}\Delta PP + \varepsilon; where \varepsilon \sim N(0,1)$

When the regression residuals only display departure from the assumption of homocedasticity, robust standard errors to heteroskedasticity are necessary for making inference (White 1980). However, in order to deal with both autocorrelation and heteroskedasticity, two additional estimators are considered for obtaining corrected standard errors, Prais–Winsten, and Newey–West. The Prais–Winsten estimator assumes that residuals follow a first-order autoregressive process whereas the Newey–West estimator is robust to heteroskedastic and

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autocorrelated residuals up to some specified lag (Prais and Winsten 1954; Newey and West

1987). Two procedures were used to define the lag length, determination of significance by the

autocorrelation function and by the significance of parameters from regressions of the residuals.

In the end, given the behavior of the residuals under different specifications, inferences were

made from models using Newey-West standard errors (Newey and West 1987).

In all, the following general model specification was applied for obtaining different sets of

regression results:

$$(3)\ GD_t = \alpha + \beta_1 HD_{t-4} + \beta_2 SD_{t-4} + \beta_3 PD_{t-4} + \beta_4 STP_t + \beta_5 STP_t * PD_t + \beta_6 PEY_t + \beta_7 MEY_t + \beta_8 DG_{t-4}$$
$$+ \beta_9 DC_{t-4} + \beta_{10}\Delta U_{t-4} + \beta_{11} GDP_{t-4} + \beta_{12}\Delta INF_{t-4} + \beta_{13}\Delta INT_{t-4} + \beta_{14} HD_{t-4} * \Delta U_{t-4} + \beta_{15} HD_{t-4} * GDP_{t-4}$$
$$+ \beta_{16} Id_{t-4} + \beta_{17}\Delta PP_{t-4} + \beta_{18} GD_{t-1} + \beta_{19} Time_t + \beta_{20} Wars_t + \beta_{21} SB1_t + \beta_{22} SB2_t + \varepsilon_t;\ where\ \varepsilon \sim N(0,1)$$

whereby government debt (GD) is dependent on one-year-lagged effects originated from

partisan controls, configurations of partisan control, change in unemployment, change in

inflation, change in interest rates, economic growth, political ideology, political polarization.

And GD is also affected by contemporaneous effects coming from election years, term types of

administrations, trend, and structural breaks such as major wars, the last recession, and the

military build-up under the administration of Ronald Reagan (see Appendix A for more details

on transformations and sources of data). Three sets of estimates are presented; emphasizing

partisan controls (HD, SD, PD) and partisan configurations (DG, DC), political ideology (Id),

and political polarization (PP), accordingly.

3.4 Replication of Results

We can agree on the notion that scientific progress does not occur in a vacuum because it is

the artifact of knowledge accumulation; as such, it is commonly observed, previous works being

cited when new ones are presented. However, very few researchers navigate the extra mile to

corroborate preceding findings; and yet, critiques and praise are made based upon our assessment

that is produced from our readings, experiences, and analyses. A stricter approach for assessing the extent of the value or quality of prior research can be followed by just replicating the results found on the most critical literature in one's research agenda or those works that cast serious doubts. Meticulously, a replication study allows us to scrutinize systematically, in terms of the used statistical methods, data requirements, and more importantly the theoretical frameworks that support the contributions being made. Essentially, a replication study allows us to learn in a very exhaustive manner how previous research work was conducted. In this thesis, the results from a replication study are presented, making emphasis on the implications for applied statistics and theory development. Moreover, brief explanations are offered for describing the hurdles that one may face in doing this type of work that some would even consider it a waste of time.

A replication is conducted for determining the feasibility of potential improvements in the specification of regression models as well as the prospective enhancement of the aforementioned theoretical arguments. Accordingly, in this section, the replicated estimates that follow model specifications found in Krause (2000) are presented. Notwithstanding the shared resemblance, the replication was not exact because the time period of the study was extended to include observations from 1953 until 2010; moreover, unlike partisan control variables, ideological and wartime variables were modified. The regression models used as dependent variable the percent change of the ratio of government federal debt to Gross National Product (hereinafter GNP, see graphs in Appendix B). Likewise, the independent economic variables followed the original operationalization. The considered economic conditions in the models are unemployment, inflation, and GNP. The variable describing time periods of major wars was modified to include the continuing conflicts in Afghanistan and the Irak war.

As for the partian controls of political institutions, the same configurations of dummy variables were used. The first configuration represents a Democratic president with a Republican Congress. The second configuration represents a Republican president with a Democratic Congress. Third, a Republican president with a divided Congress. And fourth, divided government is defined as those periods of time in which either political party has no simultaneous control of the House, Senate, and the Presidency. Conforming to the original specification in Krause (2000), these variables are lagged a year.

In explaining public deficits, Krause (2000) used distance measures of political fragmentation in terms of the median, average, and maximum distances in ideology scores among three political institutions–the House of Representatives, the Senate and the Presidency. For a particular year, the calculation used the median ADA scores for gauging political fragmentation across institutions, in accordance with the pivot ideological fragmentation model. In a nutshell, these distance measures are determining how far the institutions' ideological divisions are from each other.

In this replication two measures of ideological fragmentation are used. The first measure is concerned with the typical political ideological state of Congress whereas the second measure deals with the ideological divisions across chambers; as such, ideology is measured by the average DW-nominate scores of Congress and political fragmentation is also measured by the difference in average DW-nominate scores between the House and the Senate, respectively. Accordingly the first measure makes emphasis on the political actors themselves while the second measure focuses on the ideological divergence between the chambers of Congress. The measures are justified since both chambers of Congress have similar working procedures for

producing policies while at the same time their ideological differences may be influenced by term durations and institutional arrangements.

These measures of ideological fragmentation disregard the president for three major reasons. First, under the Constitution, Congress has the authority to appropriate funds through the budget and authorization of debt ceilings. Second, the president has not vetoed a debt ceiling bill during the sample period. Third, Senators and Representatives are more aware of the economic and financial needs of states and local districts, correspondingly; and thus, they are likely to react to those conditions even if electoral incentives are not assumed. Additional models are estimated to include political fragmentation that results from the preferences for economic policy by the political parties. As such, models are extended to include political polarization in the House and Senate, and then, average ideology of Congress is included to determine the robustness of these estimates. In the subsequent chapter, results for both the replication study and the original contribution of this thesis are presented.

CHAPTER 4. RESULTS

The outstanding debt that is hold by the federal government of The United States of America has tended to vary greatly with each presidency (Figure 1). In the 1953-2010 period, lower growth rates were experienced during the administration of Dwight Eisenhower, averaging .27% per quarter; in high contrast with the administration of Ronald Reagan that experienced nominal growth rates averaging 3.31% per quarter (Table 1). These differences may have originated from fundamental divergence in the pursued policies of each administration. The former president was leading the post-Second World War period while the war in Vietnam was initiated whereas the latter consolidated a military build-up by his second year in the presidency; and coincidentally, the public debt amounted to levels that have never been reached before. Moreover, it seems that after the administration of Richard Nixon, the growth rates of nominal debt have experienced more volatility as described by the standard deviation; predominantly, during the administrations of Ronald W. Reagan, William J. Clinton, and George W. Bush (Table 1).

4.1 Replication and Extension of Political Economy Models of U.S. Fiscal Budget Deficits

Krause (2000) used OLS to estimate the parameters; but, given the frequent presence of correlation and heteroskedasticity in the residuals, the Newey-West estimator is used for obtaining the corrected standard errors (OLS estimates are also presented in Appendix B). The replicated estimates resemble those of Krause (2000), however, there are some significant differences. In Table 3, models I and II include average ideology scores of the House and Senate whereas results in models III and IV include the average ideological difference of the House and Senate (House - Senate). The economic variables had the same significant qualitative effects on public deficits as measured by the debt to GNP ratio, while increasing inflation and real GNP growth decreased the reliance on deficits whereas expanding unemployment it seems to have

widened deficits. Similarly, war time periods increased the use of deficits to finance the

government, only in model III, war time appears not having a statistical significant effect.

Table 3. Models of U.S. Fiscal Public Deficits.

Variables	I	II	III	IV
Percent Change in Debt/GNP $_{t-1}$	0.145*	0.205**	0.191*	0.216**
	0.07	0.074	0.076	0.074
Real GNP growth	-1.011***	-0.970***	-1.010***	-0.978***
	0.096	0.095	0.105	0.1
Inflation rate	-0.174	-0.268*	-0.266*	-0.304*
	0.127	0.133	0.118	0.121
Unemployment rate	0.372***	0.422***	0.414***	0.444***
	0.1	0.085	0.088	0.078
War time	0.494*	0.432*	0.425	0.431*
	0.214	0.198	0.222	0.201
P. Dem/Cong. Rep $_{t-4}$	0.578*		0.363	
	0.274		0.233	
P. Rep/Cong. Dem $_{t-4}$	0.016		0.109	
	0.191		0.219	
P. Rep/Cong. Divided $_{t-4}$	1.157***		0.895**	
	0.3		0.27	
Divided Government $_{t-4}$		0.295		0.292
		0.175		0.168
Average ideology $_{t-4}$	0.080**	0.03		
	0.029	0.026		
Ideological difference $_{t-4}$			1.121	-0.818
			2.054	2.001
Constant	-1.662**	-1.765***	-1.676**	-1.781***
	0.592	0.494	0.546	0.462
R^2	0.73	0.697	0.709	0.693
N	228	228	228	228

Note: The sample period starts in 1953 and ends in 2010. The used dependent variable is the percent change in the debt to GNP ratio. Newey-West standard errors are reported as the residuals from OLS models deviated from the assumptions of homocedasticity and non-serial autocorrelation. Odd model numbers include partisan control variables. Even model numbers include the divided government variable. Levels of significance: * 5%, ** 1%, *** 0.1%.

As for the political variables, they exhibited mixed results. The partisan control variables did

follow the same patterns of significance as in Krause (2000). Across models, the only consistent

significant dummy variable was the partisan control configuration representing those periods

having a Republican president and a divided Congress. As for the ideological measures, only in

model I, average ideology had a significant effect statistically different from zero at the 1% level of significance. And as for the ideological difference between the House and Senate, it did not present a significant effect even though the signs of the coefficients were in accordance to the presented theory aiming to explain budget deficits.

These results are in direct contrast with the original results which found consistently that ideological fragmentation of political institutions was a very significant factor in the determination of the growth rates of budget deficits. Four main reasons explain this divergence. First, the replication and original study cover different time periods under investigation. Secondly, in the replication there is only one data source for the main independent variables whereas in the original study the data was compiled from multiple sources. Third, in the replication, Congress takes the most important role on debt related bills as the Presidency takes a less influential role in the absence of vetoes. And finally, in the replication, the standard errors of the parameter estimates are corrected for heteroskedasticity and autocorrelation.

The previous estimated models are extended for determining the changes on the debt to GNP ratio variable that result from the divergence in ideology of Representatives and Senators which is largely conditioned by their political party affiliation and respective policy preferences. These effects were gauged by an index of political polarization measured from the DW-Nominate scores. The original scores change from -1 denoting the extreme liberal ideology up to 1 denoting the extreme conservative ideology, for a maximum difference in the liberal-conservative scale of 2. For each chamber of Congress, differences in the median DW-Nominate scores of Democrats and Republicans were taken; then, these differences were averaged, taking the corresponding scores of the House and Senate. Finally, these average differences were scaled to vary from 0 to 100, whereby 0 stands for the absence of political polarization, and 100

describes the extreme case of polarization (see Appendix B for more details about the transformations of the data). This new standardized index of political polarization resembles closely that presented by Theriault (2008).

In Table 4, all of the models include a measure of political polarization. Models I and II excluded average ideology scores of the House and Senate while models III and IV includes it. Remarkably, the results for the economic and partisan economic variables were qualitatively similar as those discussed previously. But, ideology displayed no significant effects under both specifications, with both partisan control variables and the divided government variable. Nevertheless, political polarization presented a consistent positive effect on public deficits even when ideology is not included; the corresponding parameters were statistical significant different from zero at 1% level of significance or better. Thus, rather than focusing only on ideological fragmentation, this evidence overwhelmingly justifies the inclusion of political polarization measures in political economy models of fiscal policy. Average ideology and the index of political polarization have a correlation of 0.15, implying that the inclusion of both variables in regression models will result on lower levels of multicolinearity (please refer to Appendix B for more details).

In this replication, four lessons can be drawn. First, the effects of economic variables across model specifications were qualitatively similar with the original findings. Second, the effects of major wars were regularly not distinguishable from zero when political polarization was added into the models. Third, variables associated with ideology had infrequent significant effects across models, and these results are in direct contrast with the original estimates found in Krause (2000). It is likely that the main reason lies on the discrepancies of measurement construction even though the concepts are closely matched. Nonetheless, conceptually, it was

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Table 4. The Effects of Polarization on U.S. Fiscal Public Deficits.

Variables	I	II	III	IV
Percent Change in Debt/GNP $_{t-1}$	0.096	0.158*	0.085	0.148
	0.062	0.076	0.061	0.076
Real GNP growth	-0.966***	-0.957***	-0.975***	-0.951***
	0.094	0.095	0.092	0.091
Inflation rate	-0.290**	-0.277*	-0.225	-0.248*
	0.108	0.111	0.121	0.12
Unemployment rate	0.357***	0.458***	0.342***	0.440***
	0.088	0.093	0.097	0.1
War time	-0.139	0.198	0.007	0.208
	0.243	0.19	0.249	0.184
P. Dem/Cong. Rep $_{t-4}$	-0.601		-0.273	
	0.355		0.391	
P. Rep/Cong. Dem $_{t-4}$	0.285		0.186	
	0.191		0.184	
P. Rep/Cong. Divided $_{t-4}$	0.993**		1.141**	
	0.349		0.345	
Divided Government $_{t-4}$		0.26		0.267
		0.156		0.157
Political Polarization $_{t-4}$	0.071***	0.042**	0.058***	0.041**
	0.017	0.014	0.015	0.014
Average ideology $_{t-4}$			0.048	0.028
			0.026	0.026
Constant	-3.334***	-3.128***	-3.038***	-3.092***
	0.578	0.696	0.624	0.761
R^2	0.743	0.714	0.748	0.717
N	228	228	228	228

Note: The sample period starts in 1953 and ends in 2010. The used dependent variable is the percent change in the debt to GNP ratio. Newey-West standard errors are reported as the residuals from OLS models deviated from the assumptions of homocedasticity and non-serial autocorrelation. Odd model numbers include partisan control variables. Even model numbers include the divided government variable. Levels of significance: * 5%, ** 1%, *** 0.1%.

learned that political polarization is a more robust measure of policy preferences divergence and political fragmentation; moreover, the corresponding effects on the debt to GNP ratio measure were consistently significant and positive. Taken together these arguments, it can be said that political fragmentation starts with the political parties' platforms, and that policy makers and political institutions ensue; thus, disregarding political parties in measurements of ideological divisions or political divisions would be a mistake because parties do contribute to

differences on ideology, policy preferences, and ultimately on the passed legislations that are ultimately signed into law.

Krause (2000) assessed the role of ideological fragmentation across political institutions on explaining the percentage change in debt/GNP ratios, even though the theoretical arguments were tailored to the understanding of fiscal deficits of the United States. Thus, given the developed theory, the choice of dependent variable is not appropriate because federal government debt not only includes budget deficits but also contains spending on off-budget programs, rollovered debt, and legislated extra-ordinary spending. Moreover, the debt/GNP ratio variable is not only more closely associated with debt repayment capacity but it also makes the interpretation of parameters much more difficult as the effects on public fiscal deficits would not remain disentangled even when the intention is to measure the effects on debt, this occurs primarily because the dependent variable is measured in a ratio scale.

Furthermore, the regression models in Krause (2000), assumed that economic variables have contemporaneous effects on public deficits. This assumption may be wrong because policy makers are also likely to react to economic fluctuations; and then, legislators may approve funding bills accordingly, which in turn may have impacts on deficits and debt accumulation as well. As a result, it is more appropriate to assume that the state of the economy would condition how appropriation bills are realized, and then, once these policies are executed, they in turn do affect the economic circumstances. Therefore, economic variables should have the same type of temporal effects on debt accumulation as the ideological and partisan control variables.

Another improvement is to include an interest rate variable in models of government debt and public deficits; because such measure can reflect the average costs of financing government with debt instruments through the bond markets (García-Jiménez 2011). In general, other factors

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held constant, the higher the costs of debt the less likely a government is able to use it; on the other hand, if the costs of financing decline, government has more incentives to use it. Hence, the estimates in Krause (2000) are seriously biased because it omitted a variable of paramount importance affecting public finances either through budget deficits or debt accumulation.

Another critique that can be made to the estimates in Krause (2000) is that the partisan control variables represent distinct configurations of partisan control of political institutions. For instance, the effects of either a Republican president or a Democratic Senate cannot be distinguished, and even the effects of divided Congress are not disentangled as it was included in a political configuration that also includes a Republican president. Consequently, it is imperative that partisan controls be included in a more simple approach that eases its interpretation; but, political configurations of partisan control such as divided Congress or divided government should not be disregarded, to the extent that multicolinearity can be avoided.

4.2 Towards a Political Economy Model of Debt Accumulation

Regression models were estimated to elucidate the determinants of federal government debt accumulation. The analyses considered a myriad of variables such as partisan control of political institutions, political configurations of those institutions, electoral years, political polarization, the economic factors and interaction effects between economic factors (GDP and Unemployment) and political variables (Partisan control of the House, the Senate, and the Presidency). However, the interaction terms with partisan control of the Senate or the Presidency were consistently insignificant at the 10% and 5% levels of significance; thus, only those interaction terms with partisan control of the U.S. House of representatives are reported.

In general, the estimated parameters conformed to expectations, implying that empirical evidence to support the hypotheses that aimed to explain the political causes of government debt growth was found. The analysis included quarterly observations in the 1953-2010 period,

generating 232 observations. However, when growth rates for GDP and government debt are calculated, the sample is reduced by only one observation. Descriptive statistics for the growth rates of government debt and independent variables are reported in Appendix A4. The average growth rate of real government debt is .88% per quarter, while that of GDP was .75%–closed to a 1:1 correspondence. Moreover, the rates differ greatly on their corresponding estimates of standard deviation.

In the sample period, the U.S. House of Representatives has being controlled by Democrats in almost three out of four observations while the Senate two thirds of the sampled time; and finally, the Executive branch has being controlled by Republicans in two thirds of the observations. Most of the time, the Executive branch has being controlled by a different political party that holds the majority in either the Senate of the House. In general, Congress has being under unified partisan control. The average quarterly rate of unemployment is situated around 6% of the labor force. In the sample, the average yield on 10-year Treasury bonds oscillated around 6.3% (Appendix A4).

The correlation matrix and respective tests of significance for those coefficients indicated strong relationships between the dependent variable and explanatory variables. Among the independent variables, there was no evidence of high colinearity, as correlations were in general below 80% or they were simply statistically indistinguishable from zero; for the purpose of saving space, the correlation matrix, VIF factors and condition indexes are not reported, but, they are available upon request. Moreover, the independent variables appear not to be linearly correlated as condition index numbers are below 25 across models.

Two sets of estimates were considered. The first set was obtained with the OLS method. The independent variables were able to explain about two thirds of the variance of government debt

growth rates (see R^2 measures in Appendix C). The hypotheses that the estimated coefficients are

equal to zero were overwhelmingly rejected at the 1% level of significance. The results from

RESET tests indicated that the models do not suffer from omission of variables, as the tests fail

to reject the null hypotheses that the model has no bias from omitted variables.

Then, from OLS estimates, the residuals were obtained for further analyses. The Breusch-

Pagan/Cook-Weisberg tests for heteroskedasticity revealed serious problems in all the models.

The tests overwhelmingly rejected the null hypotheses of homoscedasticity. Furthermore, the

plots of the residuals against time showed no signals of autocorrelation as they seem to be

randomly distributed (Appendix C). However, the estimated autocorrelation functions revealed

potential problems of serially correlated residuals only at the eight lag. Furthermore, while Run

tests do not fail to reject the null hypotheses that residuals come from random processes, some

Portmanteau Q tests for white noise reject the null that the residuals conform to White noise at

10% level of significance. However, auto-regressive models of the residuals consistently

exposed serial correlation at the eight lag. Thus, it appears that residuals are not only

heteroskedastic but also correlated. As such, parameter estimates from OLS are no longer

efficient. Thus, Newey-West standard errors are reported for the second set of estimates. Various

regression analyses were conducted under different assumptions for obtaining enough empirical

evidence to support or reject the formulated hypotheses. Eighteen regression models are

reported, the first six models exclude political ideology whereas the remaining models include it;

in this way, the stability and variability of the parameter estimates can be assessed.

4.2.1 The Determinants of Government Debt Growth

In what follows, the results of models excluding political ideology and polarization are

presented (Table 5). The resulting effect of a Democratic controlled House of Representatives is

Table 5. Determinant Factors of U.S. Federal Government Debt Growth.

Variables (b/se) \ Models	I	II	III	IV	V	VI
Democratic House (HD)	0.566*	0.537	0.807***	1.002***	0.595***	0.596***
	0.259	0.278	0.203	0.24	0.176	0.176
Democratic Senate (SD)	-0.401*	-0.356*	-0.410*	-0.340*	0.023	0.026
	0.17	0.172	0.182	0.155	0.105	0.105
Democratic Presidency (PD)	-0.400*	-0.314*	-0.311*	-0.297*	-0.264*	-0.256
	0.164	0.127	0.122	0.127	0.132	0.13
Second term of Presidency (STP)	-0.186					
	0.149					
STP * PD (STPD)	0.159					
	0.249					
Presidential Elections (PEY)	0.08					
	0.148					
Midterm Elections (MEY)	-0.033					
	0.127					
Divided government (DG)	-0.083	-0.064	-0.056			
	0.159	0.155	0.154			
Divided Congress (DC)	0.550**	0.549**	0.486*	0.562**	0.291**	0.298**
	0.174	0.185	0.194	0.178	0.111	0.11
Unemployment rate (U)	-0.237	-0.157	0.534*	0.523*	0.524*	0.479**
	0.347	0.353	0.223	0.221	0.225	0.165
Gross Domestic Product (GDP)	-0.564*	-0.547*	-0.346	0.016	0.019	
	0.247	0.257	0.244	0.09	0.09	
Inflation rate (INF)	0.102	0.093	0.088	0.098	0.078	
	0.108	0.106	0.111	0.115	0.122	
Interest rate (INT)	-0.327*	-0.323*	-0.349*	-0.356*	-0.418**	-0.419**
	0.15	0.154	0.156	0.16	0.14	0.142
Unemployment rate * HD	0.960*	0.874				
	0.427	0.445				
GDP * HD	0.678**	0.661*	0.41			
	0.258	0.27	0.248			
Trend	0.008***	0.008***	0.008***	0.008***	0.007***	0.007***
	0.001	0.001	0.001	0.001	0.001	0.001
GD_{t-1}	0.347***	0.359***	0.354***	0.359***	0.330***	0.328***
	0.071	0.074	0.075	0.079	0.078	0.078
War time	-0.106	-0.11	-0.078	-0.04	-0.098	-0.097
	0.152	0.126	0.124	0.106	0.1	0.1
Reagan's Military Build-up					1.069***	1.064***
					0.214	0.216
2008 Financial Crisis					0.856*	0.886*
					0.366	0.368
Constant	-0.315	-0.414	-0.626**	-0.845**	-0.772**	-0.758***
	0.329	0.297	0.215	0.265	0.232	0.215
R^2	0.664	0.660	0.656	0.670	0.670	0.669

Note: N=227; Newey-West standard errors. The effects of political ideology and political polarization are excluded in these models. See fit statistics on Appendix D.
Levels of significance: * 5%, ** 1%, *** 0.1%.

found as expected (H1), the stock of debt tends to increase significantly higher in comparison with a Republican controlled House. In all of the models, a positive association emerges between debt accumulation and Democratic control of this government branch. For example, in model V, a Democratic controlled House would tend to increase the quarterly growth rates of government debt by 0.59% in comparison to a Republican controlled House, *ceteris paribus*. Statistically, the effect is considerably different from zero at 99.9% confidence level. Consequently, holding other factors constant, this evidence supports the notion that increasing federal government debt is likely to follow after an election that results in Democratic control of the House of Representatives, composed with a majority having more legislators with a stronger preference for liberal policies.

As for the effect of partisan control of the Senate, the results were qualitatively similar to those found for the Executive branch. In model III, a Senate controlled by Democrats would imply a subsequent reduction of debt growth rates by .41% in comparison with a Republican Senate; the effect is statistically different from zero at 5% level of significance. Moreover, in models I, II and IV, such differences remained statistically significant different from zero as well. These findings, contrary to the expectations (H2), support the idea that a Senate that is controlled by Democrats would tend to reduce the growth rates of debt accumulation in comparison with a Senate controlled by Republican senators. Therefore, partisan control of Congress matters for the growth rates of government debt. Even when Democrats control the House or the Senate, their approval or disapproval for higher debt accumulation diverges. As a result of these findings, one can argue that preferences for debt accumulation are revealed through the power that is derived from the partisan control of both chambers of Congress.

Is there a difference in the growth rates of government debt accumulation between Democrat and Republican presidents? It appears that Democrat and Republican presidents differ but the evidence is relatively weaker in comparison with the partisan control of the House and Senate. Democrat presidents tend to accumulate government debt at lower growth rates than Republicans. In models I though V, the coefficient denoting a Democratic presidency is consistently negative and statistically distinguishable from zero at the 5% level of significance; for instance in model V, for a given quarter, there is a 0.26 reduction in government debt by a Democratic controlled presidency in comparison with a Republican one. Thus, there is statistical evidence to believe that Democratic presidents accumulate debt at lower rates than Republican ones. And therefore, there is no support for the expectation that Republicans, more fiscal conservative presidents, would be more inclined to reduce government debt than Democrats. In fact, contrary to expectations (H3), more leaned liberal presidents, would tend to stabilize the growth of debt being accumulated by the federal government.

Both Republican and Democratic presidents in their second terms may reduce the growth of debt, but, the effects are not distinguishable from zero at the 5% level of significance (Model I). For Republicans, the effect is not significantly different from zero even at the 90% level of confidence. As for Democratic presidents, a quarterly period situated in their second terms in office, debt is reduced by -.027%; however, the null hypothesis that the coefficient is equal to zero cannot be rejected as the F-test produces a probability value of 0.88 (From Newey-West estimates: $F(1, 208) = 0.02$ Prob value $> F = 0.8856$). Therefore, when leaders of the executive branch are progressing into their second term of their administration, the growth rates of debt accumulation are not any different than those corresponding to the first term (H4). In addition, such effect does not vary with the political party in control of the White House (H5). It appears

that Presidents, in the second term, restrict themselves to a government debt policy that does not differ from the first term. But, the statistical evidence implies that when not having re-election incentives during the time of the second administration, policy makers would potentially reduce the rates of government debt accumulation. Either because they want to present the party as fiscal responsible in the next round of elections or simply because presidents need less financial resources since major policy goals might had already being achieved on the first term in office.

The U.S. federal government appears to accumulate more debt during presidential election years, and less during midterm elections in comparison with non-election years. The coefficients PEY and MEY are positive and negative, respectively; yet, these estimated parameters are not statistically significant different from zero at the 5% level of significance (Model I). These results imply that the growth rates of U.S. government debt do not vary significantly different during election-years and non-election-years (H6 & H7). As such, there is not enough statistical evidence for considering that politicians, through political institutions, have the electoral incentive to increase the debt with the goal of persuading voters with greater spending during election years.

The empirical evidence is mixed for the hypotheses that relate government debt accumulation and political configurations of partisan control, i.e. divided government and divided Congress. The debt accumulated by the federal government does not grow any different at times when the Presidency, Senate and/or the House of Representatives are controlled by different political parties. In model I, the estimated coefficient for divided government is negative (H8, contrary to expectation), yet it is statistically indistinguishable from zero at the 5% level of significance. For this variable, two additional forms of operationalization were investigated with resulting similar findings; divided government was defined as those time

periods in which the Presidency is controlled by a different political party than that controlling either the House or Senate, respectively. In all, one can argue that divided forms of government do not play a significant role on the process of debt accumulation in the United States.

Even though divided forms of government do not result in significance effects, split partisan control of Congress between Republicans and Democrats tends to increase the growth rates of federal government debt. These effects are highly significant in all the estimated models (H9). For instance, results from model V implies that when the government has divided partisan control of Congress, it leads to a 0.29% increase in the growth rate of debt accumulation, the effect is statistically significant different from zero at 1% level of significance. Accordingly, this would imply that unified partisan control of both chambers of Congress hints to future reduction of the stock of debt. Thus, it appears that reaching consensus about spending, tax and revenue policies is more difficult when partisan control of Congress is divided than when it is unified; thereby, debt is more likely to increase as a result of elections that produce non-unified partisan control of the legislative branch of government. These findings are in line with those of Alt and Lowry (1994) who found that states with split state legislatures are unable to cope with financial imbalances, in great part, because it is very challenging to reach a consensus and compromise on tax and spending policies during budget negotiations.

In all of the models, the majority of the economic variables had the expected signs. In model II, the interaction term composed of the change in the unemployment rate and Democratic partisan control of the House of Representatives is not significantly different from zero which implies that the difference in response between Republicans and Democratic representatives to increasing unemployment rate changes is not distinguishable from zero at the 5% level of significance (P-value = 0.051). Moreover, from model II, debt increases under Democratic

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control of the House as the total response to increasing unemployment is 0.72%, the coefficient is different from zero at 95% level of confidence (Newey-West F $(1, 212) = 8.41$ with Prob > F = 0.0041).

But, holding other factors constant, such response is lower under Republican control of the House, as debt decreases by 0.157% to a one unit increase in unemployment rate changes being observed a year earlier, but, this coefficient was not significantly different from zero at 5% level of significance. So, even though the undifferentiated positive effects of unemployment on debt accumulation are consistently significantly positive (models III-VI, there is some empirical evidence to believe that majority control of the House, either Democrat or Republican exerts some discernible influence on government debt in response to increasing unemployment rate (H10).

Additional regression models (as in models III-VI) provided further validating empirical evidence on the assumption that the effect of the unemployment rate on debt accumulation does not vary with partisan control of the House of Representatives (H10). Given the statistical evidence, the remaining models assume non-significant differences on debt accumulation between Democratic and Republican representatives in response to the changing patterns of employment. As expected, in models III-VI, decreasing employment in the economy leads to greater reliance on debt, the coefficients of the unemployment rate variable are positive and statistically significant different from zero at 5% level of significance. For instance, from results in model V, the growth of debt changes by 0.524 % in response to a change of 1% in the unemployment rate.

The effects of GDP on debt accumulation showed no stability as the estimated coefficients for GDP growth were not steady as model specification changed. In models I and II it was found

that increasing growth in GDP leads to decreasing reliance on government debt. A finding that is in accordance with Krause (2000) who found that public deficits are reduced with increasing GDP; even though, the analysis of Krause (2000) did not provide evidence about the interaction of GDP growth rates with partisan controls of either the House of Representatives or the Presidency. It was expected that the effect of GDP may vary with partisan control of the House of Representatives (H11). From model II, under Republican control of the House, a 1% increase in GDP leads to a significant decline in government debt of 0.55% at 95% level of confidence, but under Democratic control the effect was positive, the total response was equal to 0.11; but, such parameter estimate was not distinguishable from zero, even at 10% level of significance $(F(1, 212) = 1.98$ with Prob $> F = 0.1605)$.

However, the difference in response to increasing GDP growth between Republicans and Democrats, 0.66, was statistically significant different from zero at the 5% level of significance. This particular finding implies that political parties in the House of Representatives may differ greatly in their response to increasing economic growth, even though they may respond in the same way in reaction to increasing unemployment. In other words, it appears as if representatives (both fiscal conservatives and liberals) differ in their government debt policies when the economy improves in terms of real GDP growth but react in similar fashion to worsening labor market conditions.

The effects of GDP are further examined in model III. Even though the coefficients have the expected sign, they did not reach statistical significance which suggests instability in the parameters which originates from model specification. Moreover, models IV and V have shown the same patterns, to the point that GDP growth is statistically irrelevant in explaining debt accumulation; these are remarkable diverging results from those of unemployment. The main

reason for this finding is that the costs of debt have being included in the regression models. It was determined that higher interest rates discourage policy makers from using more debt. The effects are robust to model specification and they are statistically significant different from zero at 5% level of significance; moreover, the costs of debt are the most consistent effects among the financial-economic variables being tested. Thus, it can be said that any model of debt accumulation that does not take into account the costs of acquiring debt, may yield the wrong coefficient estimates and thus the wrong inferences (García-Jiménez 2011). For instance, in model IV, a change o one percent increase in interest rates produces a decline of 0.36% in the growth rates of debt that may be observed a year later.

Model V and VI differ from the other models in that they include controls for extraordinary events that could have led to greater accumulation of debt; the military build-up during the Reagan administration (Bartels 1991) and the recent recession period that emerged after the housing and financial crisis. The former structural change was scheduled from 1982:Q1 up to 1985:Q4 while the later from 2008:Q1 to 2009:Q2. As expected, growth rates of debt accumulation were significantly higher during these periods. In general, the inclusion of structural breaks in the regression models did not change the inferences made from the other models; but, the effects of partisan controls of the Senate became statistically insignificant at 5% level of significance; but still, the partisan effect of the Presidency achieved statistical significance in model V and only at 90% level of confidence in model VI. Finally, just as the inflation rate, the War time variable that denotes participation in major wars had ho influence on the growth rates of debt accumulation, this effect is found to be very consistent across various model specifications.

4.2.2 Ideology and Polarization

The effects of congressional political ideology on the growth rates of debt accumulation were analyzed in six regression models (Table 6). Reliably, in all the models, the effects of congressional political ideology remained positive and statistically significant at 1% or 5% level of significance. So, it appears that there is a direct relationship between political ideology and government debt accumulation (H12). For instance, from model V, an increase of one unit in the scaled DW-Nominate scores leads to a significant increase of debt by 0.042%, *ceteris paribus*; this particular parameter estimate was statistically significant different from zero at 99% level of confidence. The result suggests that as Congress becomes a more conservative political institution, the U.S. federal government would tend to accumulate more debt for financing spending and tax-decreasing policies. Thus, this result is counterintuitive because one would assume that the conservative ideology is highly associated with debt reduction. Consequently, it can be expected a decline in the growth rates of debt accumulation only when the elected members of congress lean back away from the conservative ideology, and become more liberal.

The inclusion of ideology in regression models did not alter the patterns of significance of the effects of partisan control of political institutions. But, the effects of having a divided Congress became statistically significant at even higher levels of confidence. It was found that higher growth rates of government debt accumulation are experienced in years where partisan control of the House and Senate differ; regularly, the effects of a divided Congress were positive and statistically significant at 1% or lower levels of significance; for instance, in model V, a divided Congress produces an increase of 0.41% in the growth of debt, the estimated coefficient was highly significant at 99% level of confidence. In contrast to these results, divided forms of government did not reach statistical significance in any model that included political ideology (as such, the variable was removed in model IV through VI).

Table 6. The Effects of Political Ideology on U.S. Federal Government Debt Growth.

Variables (b/se) \ Models	I	II	III	IV	V	VI
Democratic House (HD)	0.396	0.667**	0.831***	0.824***	0.436*	0.469*
	0.251	0.216	0.236	0.237	0.187	0.189
Democratic Senate (SD)	-0.476**	-0.461*	-0.381*	-0.401*	-0.019	-0.023
	0.179	0.188	0.177	0.166	0.112	0.113
Democratic Presidency (PD)	-0.291	-0.241	-0.292	-0.234	-0.214	-0.225
	0.17	0.138	0.153	0.121	0.125	0.119
Second term of Presidency (STP)	-0.207					
	0.157					
STP * PD (STPD)	0.106					
	0.238					
Presidential Elections (PEY)	0.089					
	0.152					
Midterm Elections (MEY)	-0.042					
	0.127					
Divided government (DG)	-0.03	-0.027	-0.1			
	0.15	0.154	0.161			
Divided Congress (DC)	0.715***	0.635**	0.745***	0.726***	0.409**	0.366**
	0.178	0.203	0.198	0.187	0.127	0.126
Ideology	0.047*	0.042*	0.045*	0.046*	0.042**	0.050**
	0.02	0.02	0.02	0.019	0.016	0.018
Unemployment rate (U)	-0.332	0.493*	0.493*	0.481*	0.484*	0.416**
	0.334	0.227	0.224	0.226	0.225	0.15
Gross Domestic Product (GDP)	-0.521*	-0.304	0.026	0.022	0.024	
	0.255	0.249	0.085	0.088	0.088	
Inflation rate (INF)	0.097	0.082	0.088	0.09	0.076	
	0.107	0.11	0.113	0.114	0.118	
Interest rate (INT)	-0.298*	-0.326*	-0.348*	-0.333*	-0.404**	-0.414**
	0.135	0.145	0.154	0.146	0.128	0.131
Unemployment rate * HD	1.016*					
	0.417					
GDP * HD	0.636*	0.367				
	0.269	0.25				
Trend	0.007***	0.007***	0.007***	0.007***	0.007***	0.007***
	0.001	0.001	0.001	0.001	0.001	0.001
GD_{t-1}	0.317***	0.327***	0.323***	0.327***	0.303***	0.305***
	0.073	0.075	0.078	0.079	0.079	0.08
War time	-0.017	-0.017	-0.027	0.013	-0.038	0.019
	0.145	0.115	0.113	0.102	0.097	0.1
Reagan's Military Build-up					1.114***	1.126***
					0.199	0.203
2008 Financial Crisis					0.676	
					0.357	
Constant	-0.157	-0.505**	-0.621**	-0.671**	-0.638**	-0.687**
	0.276	0.189	0.216	0.235	0.223	0.218
R^2	0.673	0.663	0.658	0.677	0.677	0.671

Note: N=227; Newey-West standard errors. The effects of political polarization are excluded in these models. See fit statistics on Appendix D. Levels of significance: * 5%, ** 1%, *** 0.1%.

The belief that this source of political influence in tax and spending policies is not causing higher growth rates of debt accumulation is made stronger by this empirical evidence. The negative effect on debt accumulation by a Democratic control of the Executive branch was found not significantly different than the Republican control at 95% confidence levels, this result was consistent across models (Table 6). From these results, it can be inferred that Democrat and Republican presidents may not display remarkable different growth rates of government debt accumulation during their administrations. On the debt issue, this would suggest that the presence of Congressional political ideology, in the regression model, makes the influence of the White House somewhat irrelevant, at least statistically.

As for Congress, the results were mixed. The inclusion of political ideology in the models, did not made statistically insignificant the effects of Democratic control of the House of Representatives; with the exception of the parameter estimate in Model I, the effects were significantly different from zero at 5% or lower levels of significance. In the other hand, Democratic control of the Senate appears to reduce the reliance on debt in comparison to Republican control; in models I through IV, such effects were significantly different from zero at 5% level of significance.

As in the models that excluded the political ideology variable, it was found that Presidents in their second term do not show statistically significantly different growth rates of debt accumulation compared to their first term; furthermore, such effect is not dependent upon the President's party affiliation. Likewise, growth rates of debt accumulation were not affected by either Presidential or Midterm elections; the effects did not reach statistical significance at standard levels of confidence. Altogether, these models of government debt do not support the notion that election years show any difference from non-election years; in addition, even greater

periods of time such as the second term of presidents appear not to differ from the first terms where more or less restrained fiscal policies would be expected.

The inclusion of political ideology in the models allows us to further study the effects of GDP on debt accumulation. Consistently, increasing growth rates of real GDP generated effects that are statistically indistinguishable from zero (models I through V). Only in the first model, the effect of GDP on debt was conditioned on the partisan control of the House of Representatives, as the interaction term was significantly different from zero at 5% level of significance. From model I, provided that the House is controlled by Republicans, a 1% increase in real GDP is associated with a decline of 0.521% in government debt, the estimated coefficient is significantly different from zero at 5% level of significance. In contrast, the corresponding effect of a Democratic controlled House produces an increase of debt by 0.10%, but, the effect is not discernible from zero ($F(1, 207) = 0.31$ Prob $> F = 0.5765$). However, as in the models without political ideology, the effects of GDP on debt are not robust to model specification in contrast to the effects of the costs of debt as measured by interest rates. Constantly, the interest rate had a persistent negative effect on the growth rates of debt. From model V, one can observe that a change of one percent increase in interest rates produces a decline in the growth rates of debt of 0.404%; this effect was highly significant at 99% level of confidence. This result implies that as interest rates decline, the incentive to increase the stock of debt increase because the costs of financing government activities have declined as a result (García-Jiménez 2011).

Another set of results was obtained for elucidating the effects of political polarization on debt accumulation (Table 7). Contrary to expectations (H13), it was found that a positive change in polarization had a negative effect on the growth rates of debt accumulation. However, regularly, the parameter estimates were not distinguishable from zero at conventional levels of

Table 7. The Effects of Political Polarization on U.S. Federal Government Debt Growth.

Variables (b/se) \ Models	I	II	III	IV	V	VI
Democratic House (HD)	0.386	0.657**	0.818***	0.811***	0.433*	0.466*
	0.251	0.219	0.237	0.237	0.187	0.189
Democratic Senate (SD)	-0.474**	-0.464*	-0.384*	-0.402*	-0.024	-0.029
	0.178	0.187	0.176	0.164	0.113	0.114
Democratic Presidency (PD)	-0.291	-0.239	-0.289	-0.237	-0.216	-0.227
	0.176	0.145	0.161	0.124	0.127	0.121
Second term of Presidency (STP)	-0.201					
	0.16					
STP * PD (STPD)	0.107					
	0.245					
Presidential Elections (PEY)	0.085					
	0.151					
Midterm Elections (MEY)	-0.038					
	0.129					
Divided government (DG)	-0.025	-0.019	-0.091			
	0.157	0.159	0.168			
Divided Congress (DC)	0.725***	0.649**	0.759***	0.742***	0.423**	0.382**
	0.178	0.205	0.198	0.185	0.129	0.13
Ideology	0.048*	0.043*	0.047*	0.048*	0.043**	0.051**
	0.02	0.02	0.02	0.02	0.016	0.018
Polarization	-0.202	-0.29	-0.307	-0.328	-0.192	-0.21
	0.416	0.392	0.406	0.402	0.369	0.389
Unemployment rate (U)	-0.349	0.473*	0.471*	0.459*	0.472*	0.409**
	0.327	0.227	0.222	0.224	0.221	0.151
Gross Domestic Product (GDP)	-0.525*	-0.307	0.02	0.016	0.021	
	0.256	0.25	0.084	0.086	0.086	
Inflation rate (INF)	0.097	0.082	0.088	0.09	0.076	
	0.107	0.11	0.113	0.114	0.118	
Interest rate (INT)	-0.304*	-0.334*	-0.357*	-0.344*	-0.409**	-0.420**
	0.13	0.138	0.147	0.139	0.125	0.128
Unemployment rate * HD	1.020*					
	0.414					
GDP * HD	0.637*	0.364				
	0.271	0.253				
Trend	0.007***	0.007***	0.007***	0.007***	0.007***	0.007***
	0.001	0.001	0.001	0.001	0.001	0.001
GD$_{t-1}$	0.315***	0.323***	0.318***	0.322***	0.300***	0.302***
	0.073	0.075	0.078	0.079	0.079	0.08
War time	-0.027	-0.028	-0.038	-0.003	-0.047	0.008
	0.146	0.116	0.114	0.107	0.104	0.105
Reagan's Military Build-up					1.099***	1.110***
					0.207	0.212
2008 Financial Crisis					0.675	
					0.358	
Constant	-0.135	-0.469**	-0.582**	-0.624**	-0.611**	-0.660**
	0.26	0.179	0.201	0.221	0.209	0.212
R^2	0.674	0.664	0.659	0.678	0.678	0.672

Note: N=227; Newey-West standard errors. Significance levels: * 5%, ** 1%, *** 0.1%.

confidence. It was expected that increasing polarization would result on higher rates of debt accumulation because at greater levels of political polarization would become even more difficult to reach consensus about future revenue, tax and spending targets; and then legislators would have found that debt is a feasible solution to their policy positions. In all, it can be said that political fragmentation that originates from party alignment of legislators has not influence on federal government debt accumulation patterns in the United States; and that the most important political driving forces affecting this process originate from the influences of ideology of Congress, partisan control of political institutions and respective configurations of partisan control. Please do notice that the presented analyses control for divided government, divided Congress, partisan controls, and political ideology; thereby, these findings were obtained in a very rigorous setting that has resulted in a comprehensive understanding of the debt accumulation process that is implemented by government for financing the activities of its bureaucracy.

CHAPTER 5. DISCUSSION AND CONCLUSIONS

The purpose of this research project was to conceptualize the determinant factors of debt accumulation by the federal government of The United States of America, aiming at the development of a comprehensive political economy model of debt accumulation that could provide some insights regarding strategies for sustainable fiscal policies in the future. Thus, three sets of regression results were presented in ways that are appropriate to these particular circumstances and goals. In the first set, debt accumulation patterns are evaluated in the presence of partisan controls of political institutions. In the second set, the influence of political ideology is evaluated, and in the third set, the role of congressional political polarization is assessed. In this approach, the statistical models in the first set can be seen as the benchmark for comparison whereas the second and third sets can be judged as robustness checks that embraces the legislative behavior of politicians on policy preferences which is not captured by partisan controls that result from the electoral outcomes and the policy preferences of the citizenry.

Even though Krause (2000) intended to explain government's public deficits with configurations of partisan control of political institutions, the parameters are not easy to disentangle, and much less easy to interpret and discern how political parties have effects on the percentage change of debt to GNP ratios. As such, in this research project ,partisan control of political institutions were specified in a very simple fashion, yet, making it easy to provide an interpretation of how electoral outcomes change the patterns of debt accumulation. It was found that divided government has no influence on this process whereas divided control of Congress does, while Democratic control of the Senate, the House, and the Presidency result on reduction, increment, and stagnation of the debt burden, correspondingly. This finding suits previous research on the conditioning of macroeconomic fluctuations and fiscal policy outcomes by

political institutions and their conforming partisan control configurations (Hibbs 1977; Alesina and Sachs 1988; Alt and Lowry 1994; Lowry, Alt, and Ferree 1998).

But, how is it that government debt accumulation is conditioned by politics? In the presented statistical models, economic indicators and partisan controls were specified in a way that they had no contemporaneous effects on the dependent variable. This specification was based on the assumption that partisan control of political institutions exerts great influence on debt ceiling bills that are passed by Congress, even though these bills are also conditioned by the economic circumstances (i.e. policy changes occur in response to past and current conditions, and policy preferences that are greatly influenced by party politics). And only then, these changes on policy will ultimately give rise to the observed variations on the macroeconomic indicators such as the stock of federal government debt. Therefore, the patterns of partisan control of political institutions–generated by electoral outcomes–have effects on debt accumulation through debt ceiling bills that are passed by Congress and signed into law by the President, but these bills are assumed to be influenced by partisan policy preferences and past economic environments.

Partisan control of the House of Representatives and the Senate exerted significant effects on the accumulation of federal government debt. So, the influence of Congress on debt appears to be much greater than that originated from the Executive branch. What could be driving these results? It can be contended that as candidates for Congress are nominated from differentiated political parties on policy preferences, elected legislators–by voters– receive a policy mandate to be legislated, the political preferences for spending and taxation are then revealed on their approval or disapproval of a debt ceiling that regularly has entailed higher accumulation of debt. If a Congressional district does not receive adequate spending, voters will hold accountable those policy makers and potentially remove them from office. The same process of accountability may

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occur if citizens prefer lower taxation (Lowry, Alt, and Ferree 1998). And this creates the incentive for legislators to use more debt if the costs of debt are favorable, this is even more important for the national government as there are no limits on the amounts of budget deficits that the federal government is allowed to make (Alt and Lowry 1994; Cox and McCubbins 1994; Krause 2000).

But, assuming political accountability by voters, it entails that they should effectively perceive party differences on fiscal policy outcomes, then, partisan effects could be observed as elected officials respond differently to economic conditions–according to their ideology, voters' preferences and inherent institutional influences. As such, the following question ensues. What policy preferences or changing characteristics among voters may have influence on the electoral outcomes that subsequently lead to partisan controls and fluctuations in the growth patterns of government debt? Future research should address this question considering the preferences of citizens towards cuts and increase in government spending, their perceptions on party differences, and voters' partisan affiliations.

However, in this research project, it was assumed that these conditions were directly affecting the partisan controls and respective configurations of partisan control of institutions which are outcome of elections (Tabellini and Alesina 1990; Lee, Moretti, and Butler 2004). This conjuncture would then imply that the aforementioned conditions have, eventually, effects on fiscal policy as well as effects on the growth patterns of federal government debt through partisan controls and the respective partisan control configurations that are formed immediately after elections. But, the primary reason lies on the conditioning of policy making by the electoral outcomes, and the re-election motives of legislators to remain in office (Bond and Fleisher 1984;

Levitt and Snyder 1997; Berry and Gersen 2009; Berry, Burden, and Howell 2010; Lazarus and Reilly 2010).

Apart from partisan controls and the effects of financial-economic conditions on debt, the effects of political ideology were consistently significant, suggesting a positive relationship between debt accumulation and the level of conservatism– and by implication– a negative relationship between debt accumulation and the level of liberalism. This finding clashes with the common view of conservatism favoring restrain on the use of government debt. And also, the presented results are in opposition to the association between the liberal political ideology with increasing debt financing and use of public deficits to support government activities (Clingermayer and Wood 1995; Cusack 2001).

However, the finding that associates conservatism with increasing use of debt may partially provide the empirical evidence for the theoretical findings of Hodler (2011), who has argued that due to electoral competition, conservatives may prefer increasing deficit spending when facing more liberal political candidates with a higher preference for higher spending. This explanation makes sense since Representatives face reelection every two years, electoral competition would incentivize them to vote for higher debt, regardless of their ideological views, simply for gaining the maximum amount of public support from the electorate.

Nevertheless, as political parties become more differentiated from one another and the ideological differences increase, political polarization showed no significant influence on debt accumulation in the estimated regression models; the lack of statistical significance was stable across model specifications despite the steady results that congressional political ideology displayed. These results diverged from those of Krause (2000) who found a positive and significant relationship between public deficits and political polarization as gauged by political

ideology fragmentation measures that considered the Presidency, House, and Senate even when the party differences across political institutions were disregarded. Additionally, such findings disregarded the role of congressional political ideology as a concept that differs from political polarization. Besides these differences, the results of Krause (2000) had other methodological issues that are meticulously described in the replication section.

What could be driving the observed effects originated from the partisan control of political institutions? Two forces may be at work, the simultaneous rise of income inequality and political polarization in the political system. As fluctuations in economic conditions occur, they may increase the economic disparity (e.g. increase in unemployment or decline in real wages) and may lead to greater political divisions. It is speculated that the rise in polarization among politicians may lead to partisan effects to have an effect on debt accumulation.

In this direction, Garand (2010) has provided evidence that associates rising polarization in the House and Senate with the expansion of income inequality. Garand (2010) quotes the work of McCarty, Poole, and Rosenthal (2006) in a way that exemplifies this notion "there is a ''dance'' at work, with income inequality and polarization acting as the two dance partners." Hence, as income inequality and political polarization increase, it makes more likely that politicians across political institutions will have more disagreements about the policies to tackle issues of greater impact to their constituency. For instance, it was expected in the theory section, that compromise on spending and taxation bills would lead to two diverging outcomes, increase in spending and decline in taxation that ultimately generates greater accumulation of government debt which is consistent with the policy preferences of politicians from different parties and political ideologies.

This occurs because political parties have diverging preferences on tax and spending policies (Lowry, Alt, and Ferree 1998). However, despite the changing patterns of political polarization, increasing government debt has been observed for the majority of the time periods that were included in the sample; and given that political polarization had no statistical significant effects on debt accumulation, ultimately, partisan control of political institutions may carry the heaviest influence on the rates of growth of debt accumulation because the political differences that are aroused by ideology are summoned on the established procedures of how Congress works. Ultimately, this provides greater influence to leaders of policy committees and political parties in each chamber.

In modern times, marked by low inflation rates and central bank independence around the globe, governments are able to access debt markets for resources to finance their activities that cannot be covered by their tax policy and/or other sources of revenue. This would imply that the size of the government grows in part due to the expansionary use of debt and also due to the economic disparities that signal politicians the need to spend more irrespective of the sources of financing–either through taxation or by participation on debt markets. Therefore, with the presented empirical evidence, it can now be argued that debt is also influencing the size of the government (Garand 1989). This would also indicate that the growth of government size is then facilitated by the favorable costs of acquiring debt since at lower interest rates may serve as incentive to increase dependency on debt (García-Jiménez 2011); specially, when current tax policies do not aim at the balancing of the budget-or simply-extraordinary spending policies are not funded properly (Alt and Lowry 1994; Mebane 1994). This occurs despite the fact that higher indebtedness results on increasing credit risks and it accentuates the likelihood of a major debt crisis with serious potential repercussions worldwide (He and Xiong 2012).

The presented statistical models are the result of the application of principles obtained from the comprehensive understanding of the debt accumulation process, encompassing the effects of partisan controls of federal political institutions, congressional political ideology and polarization, electoral and administrative considerations, and different configurations of partisan control that result from elections, and additionally, the interactions of political and economic determinants.

In general, supporting evidence for the described hypotheses was found–with the sings of the estimated coefficients as expected in the majority of the estimated statistical models. The presented empirical evidence implies that government debt accumulation is not only the result of financial and economic conditions but also that it is highly influenced by the partisan control exerted by politicians in their collective decisions to target fiscal policy outcomes; and in all likelihood, one can assume that such policy responses favor their constituents as well as the financial position of the government. In summary, this research has also produced a greater understanding about the effects on debt brought by the diverging policy positions of parties on fiscal policy across institutions. More tellingly, however, are the effects of elections producing a divided partisan control of Congress; consistently, the presence of this political condition was found to be associated with increasing accumulation of federal government debt.

Altogether, from the compiled statistical evidence, this implies that legislators in the House of Representative can be described as spending maximizers while Senators as political agents trying to limit the growth of the federal government debt;, and then, the executive branch having some sort of indifference to the government debt issue; at the least, one can suppose that there is an alignment of policy preferences between Congress and the White House as Presidential veto of debt ceiling bills have not occurred in the sample period. Additionally, even though

disagreements between parties and increasing ideological divide among legislators may intensify, these political realities may not have influence on the debt accumulation process being observed because it was found that political polarization had no significant role to play, statistically at the least.

Nonetheless, and even more important, it was determined that the stock of federal government debt may increase as a result of Congress shifting towards a more conservative ideology. In the last years, presidential candidates, legislators, and other elected officials have expressed stronger opinions towards the national debt issue than in the past, when the focus had being primarily the targeting of budget deficits in a year-to-year basis. But, such tough stands by politicians and their corresponding political parties may lack some credibility or authority on the debt issue, since the debt has increased coincidentally and regardless of the changing political conditions. In all, this research endeavor has increased our understanding about the influence of politics on debt accumulation by the federal government of The United States of America; there is now more certainty about the conditioning of fiscal policy outcomes by not only the financial-economic context but the political as well.

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APPENDIX A: DATA SOURCES

A1: Definitions and Sources of Political Variables.

Variable	Concept	Measurement	Sources
Democratic House	Partisan control of the House of Representatives.	Democratic=1, Republican=0.	The 2012 Statistical Abstract of the U.S., Census Bureau http://www.census.gov/compendia/statab
Democratic Senate	Partisan control of the Senate	Democratic=1, Republican=0.	The 2012 Statistical Abstract of the U.S., Census Bureau
Democratic Presidency	Partisan control of the Presidency	Democratic=1, Republican=0.	The 2012 Statistical Abstract and The Presidents from the White House < http://www.whitehouse.gov/about/presidents >
Second term of Presidency (STP) STP * PD	Second administrative term of presidents STP under Democratic control	Years under a STP=1; =0, otherwise. STP D=1; =0,otherwise	White House, QoG Standard dataset Author.
Presidential Elections	Presidential election years	Election year=1; =0, otherwise.	The 2012 Statistical Abstract , White House, QoG Standard dataset
Midterm Elections	Midterm election years	Election year=1; = 0, otherwise.	The 2012 Statistical Abstract , White House, QoG Standard dataset
Divided government	Different partisan controls between the Presidency, Senate, and the House.	Divided=1; =0, otherwise.	Author.
Divided Congress	Divided partisan control in the chambers of Congress.	Divided=1; =0, otherwise.	Author.
Ideology	Congressional Political Ideology Scores	Index (-100,100) based on DW-Nominate scores of Roll Call Votes in the House and Senate, index = average original scores * 100	DW-Nominate scores were collected from from the VoteView Project http://voteview.com, index by author.
Polarization	Congressional Political Polarization Scores	Index (0,100), average scores of House and Senate. Index = 100 * ((HRm-HDm + SRm-SDm) / 2) / 2	DW-Nominate scores were collected from the VoteView Project http://voteview.com, index by author.
War time	War periods. Korean war (1952–1953), Vietnam war (1965 - 1973), Afghanistan war (2002 - 2010), and Irak war (2003 – 2010).	Major war period = 1; =0, otherwise.	Krause (2000) and author.

A2: Definitions and Sources of Economic Variables.

Variable	Concept	Measurement	Sources
Government Debt	Growth of debt accumulation	Real growth rates of U.S. federal government Debt. Nominal levels (in billions US $) are deflated with the GDP deflator (index 2005=100), then, percentage growth rates were calculated.	FRED, historical tables from the U.S. Department of the Treasury, author.
GDP	Economic growth	Real growth rates of Gross Domestic Product. Nominal levels (in billions US $) are deflated with the GDP deflator, then, percentage growth rates were calculated.	FRED, author.
	GDP deflator	Index, 2005=100	FRED
Unemployment rate	Unemployment	The unemployment rate reflects the percentage of people, 16 years of age and older, from total labor force that is unemployed.	FRED
Inflation rate	Inflation	Percentage change in the Consumer Price Index (CPI).	FRED, author.
	CPI	Index of all urban consumers, all items; 1982-84=100.	FRED
Interest rate	Government debt costs.	Market nominal yields of U.S. government bonds, specifically, 10-Year Treasury Constant Maturity Rates. And the ex-post real cost of debt can be obtained by subtracting the rate of inflation.	FRED, author.
2008 Financial Crisis	Extraordinary recessionary time periods.	These are time periods marked by low economic activity. 2008:Q1 to 2009:Q2 =1; =0, otherwise.	National Bureau of Economic Research, taken from the Business Cycle Expansions and Contractions reports <http://www.nber.org/cycles.html>.
Reagan's Military Build-up	Military spending.	These are time periods characterized by extraordinary military spending. 1982:Q1 up to 1985:Q4 =1; =0, otherwise.	Bartels (1991)

A3: Descriptive Statistics of Variables in the Sample, 1953:1-2010:4.

Variables	Obs	Mean	Std. Dev.	Min	Max
Government Debt (GD)	231	0.881	1.362	-2.006	6.144
Democratic House (HD)	232	0.759	0.429	0.000	1.000
Democratic Senate (SD)	232	0.690	0.464	0.000	1.000
Democratic Presidency (PD)	232	0.379	0.486	0.000	1.000
Second term of Presidency (STP)	232	0.414	0.494	0.000	1.000
STP * PD (STPD)	232	0.138	0.346	0.000	1.000
Presidential Elections (PEY)	232	0.241	0.429	0.000	1.000
Midterm Elections (MEY)	232	0.259	0.439	0.000	1.000
Divided government (DG)	232	0.623	0.4863	0	1
Divided Congress (DC)	232	0.138	0.346	0.000	1.000
Ideology	232	1.805	3.986	-7.198	14.682
Political Polarization (PP)[*]	232	31.428	7.024	19.912	45.325
Change in PP	231	0.109	0.132	-0.101	0.411
Gross Domestic Product (GDP)	231	0.748	0.945	-2.749	3.856
Unemployment rate (U)[*]	232	5.841	1.581	2.600	10.700
Inflation rate (INF)[*]	232	0.915	0.780	-2.325	3.946
Interest rate (INT)[*]	232	6.290	2.694	2.302	14.674
Change in U	231	0.030	0.387	-0.900	1.700
Change in INF	231	0.004	0.525	-3.882	1.687
Change in INT	231	0.002	0.430	-2.018	1.550
War Time	232	0.327	0.470	0	1
Reagans Military Build-up	232	0.069	0.254	0	1
2008 Financial Crisis	232	0.026	0.159	0	1

Notes: Refer to Appendices A1 and A2 for more details about the definitions of variables and the respective sources of data. *These variables appear to be following a unit root process (I1); thus, in the regression models, they are included as change in quarter-to-quarter, respectively.

APPENDIX B: PRELIMINARY RESULTS

B1: Definition of Variables.

Below, you will find a summary of the used variables in the replication and extension of the results found in Krause (2000).

DEPENDENT VARIABLE: percent change in the ratio of federal debt and GNP.

INDEPENDENT VARIABLES:
Lagged percent change in the debt to GNP ratio
Percent change in real GNP
Inflation rate
Unemployment rate

Operationalization of war time

War	Duration	Operationalization
Korean wars	1950-1953	[1952–1953]
Vietnam	1950-1975	[1965 – 1973]
Afghanistan	Part of 2001 – present	[2002 - 2010]
Iraq war II*	Most of 2003 – 2011	[2003 - 2010]

*Iraq war I, in the early 90's, was not included because of its short duration.

1 Year-Lagged Partisan Control Dummies
President democrat / Cong Republican (House Senate)   [PCD1] [1, 0 ^ 0]
President republican / Cong Democrat (House Senate)   [PCD2] [0, 1 ^ 1]
President republican / Divided Congress   [PCD3]   [0, 1]
Divided government [PCD4]   House, Senate & Presidency != Dem or Rep 000 111

1 Year-Lagged Ideology Measures
Average ideology: average DW nominates scores of the House and Senate.
Ideological difference: is the distance in the average DW nominate scores between the House and the Senate.

Congressional Political Polarization
1 year-lagged political polarization scores, calculated as follow:
Polarization scores = 100 * ((HRm-HDm + SRm-SDm) / 2) / 2
where HRm, HDm, SRm, and SDm correspond to the median score among House Republicans, House Democrats, Senate Republicans, and Senate Democrats.

Correlation Matrix

	Polarization	Average Ideology	Ideological Difference
Polarization	1		
Average Ideology	0.1545*	1	
Ideological Difference	-0.1183**	0.2678***	1

P-values: * 0.0186 ** 0.0721 ***0.0000

B2: Debt to GNP Ratio (1953-2010).
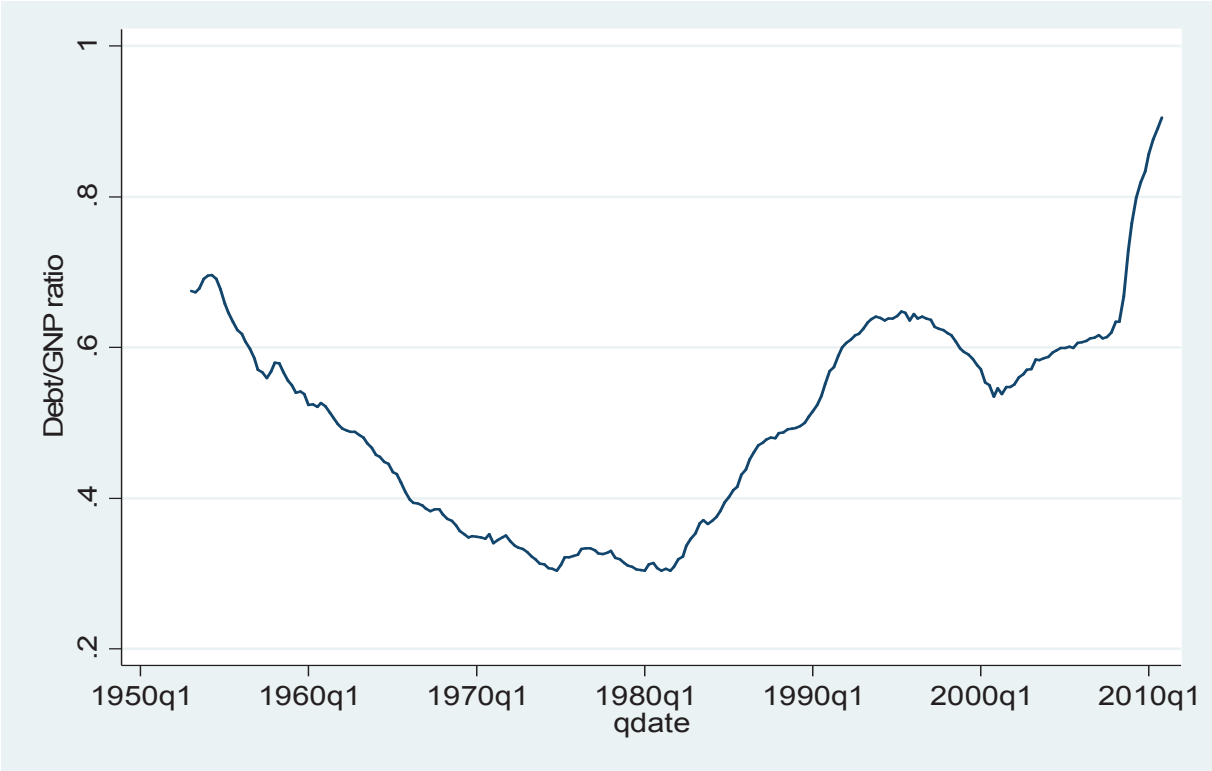
B3: Percentage Change in the Debt to GNP Ratio and Real Debt (1953-2010).
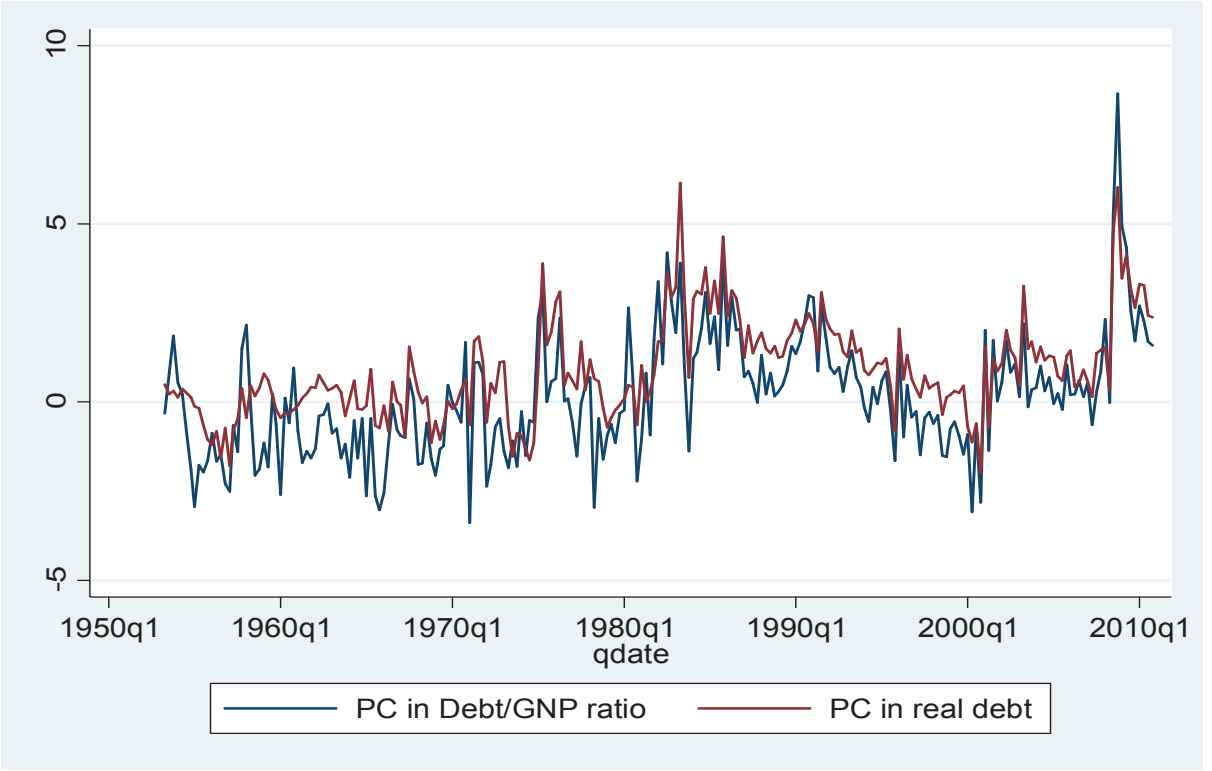
B4: Congressional Polarization Scores (1953-2010).
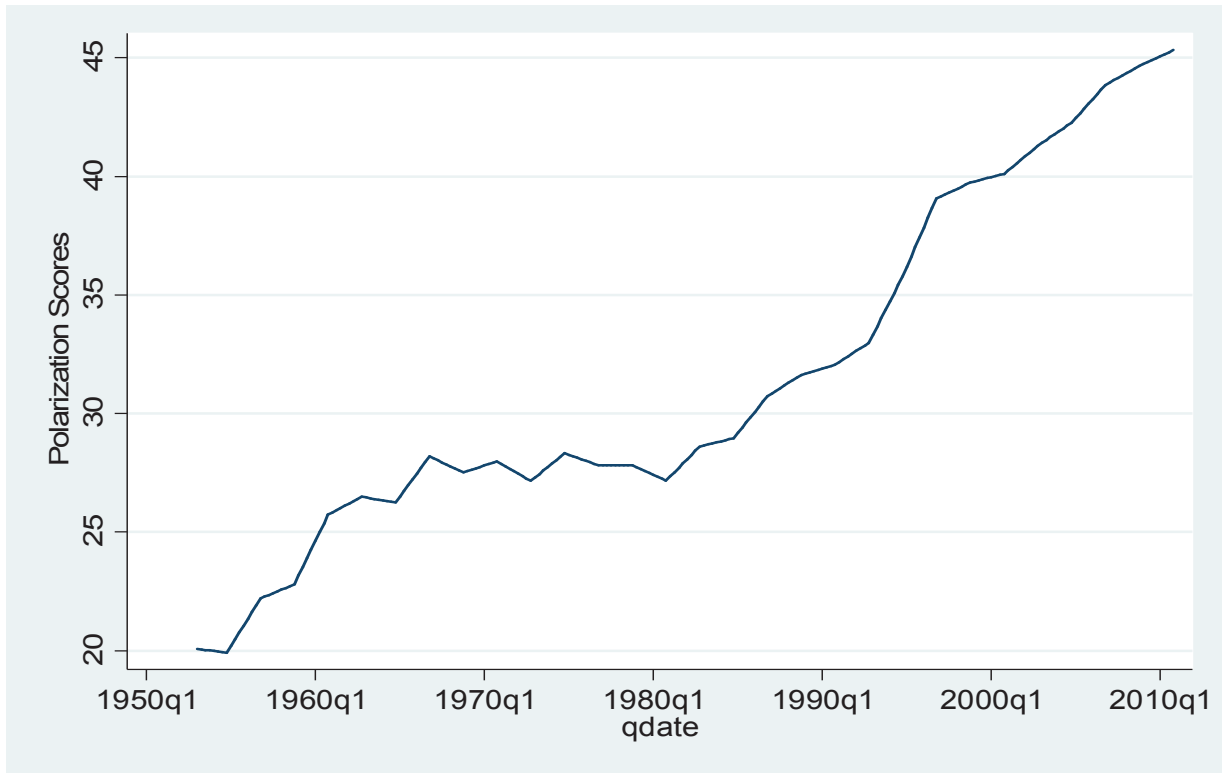
B5: Change in Congressional Polarization Scores (1953-2010).
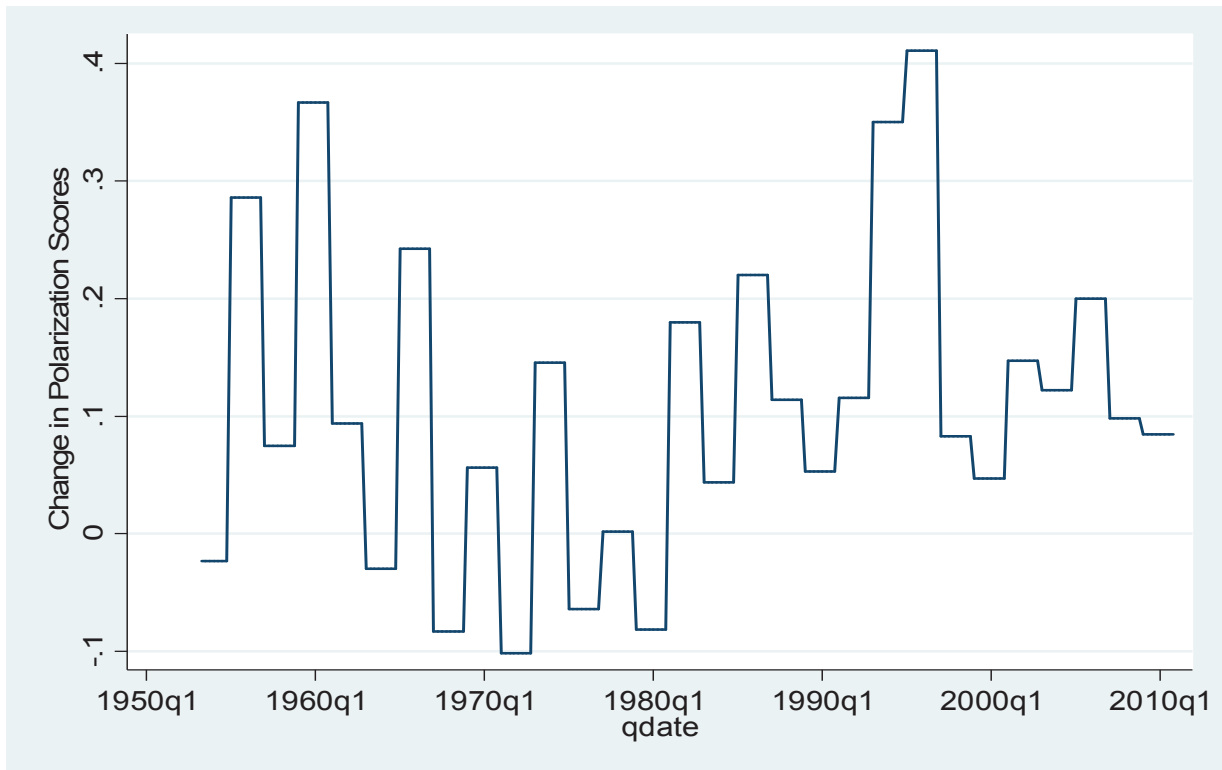
B6: OLS Estimates from Table 3: Models of U.S. Fiscal Public Deficits.

Variables	I	II	III	IV
Change in Debt/GNP $_{t-1}$	0.145**	0.205***	0.191***	0.216***
	0.049	0.051	0.05	0.051
Real GNP growth	-1.011***	-0.970***	-1.010***	-0.978***
	0.067	0.07	0.069	0.07
Inflation rate	-0.174*	-0.268**	-0.266**	-0.304***
	0.083	0.085	0.085	0.085
Unemployment rate	0.372***	0.422***	0.414***	0.444***
	0.056	0.056	0.057	0.055
War time	0.494***	0.432**	0.425**	0.431**
	0.143	0.145	0.147	0.146
P. Dem/Cong. Rep $_{t-4}$	0.578*		0.363	
	0.233		0.244	
P. Rep/Cong. Dem $_{t-4}$	0.016		0.109	
	0.145		0.152	
P. Rep/Cong. Divided $_{t-4}$	1.157***		0.895***	
	0.218		0.217	
Divided Government $_{t-4}$		0.295*		0.292*
		0.139		0.139
Average ideology $_{t-4}$	0.080***	0.03		
	0.019	0.017		
Ideological Difference $_{t-4}$			1.121	-0.818
			1.691	1.523
Constant	-1.662***	-1.765***	-1.676***	-1.781***
	0.355	0.349	0.372	0.351
R^2	0.73	0.697	0.709	0.693
N	228	228	228	228

Note: This table is included for making comparisons about the statistical significance between Newey-West and OLS estimates. The sample period starts in 1953 and ends in 2010. The used dependent variable is the percent change in the debt to GNP ratio. These OLS models showed both heteroskedasticity and serial correlation. Odd model numbers include partisan control variables. Even model numbers include the divided government variable.
Levels of significance: * 5%, ** 1%, *** 0.1%.

B7: OLS Estimates from Table 4: The Effects of Polarization on U.S. Fiscal Public Deficits.

Variables	I	II	III	IV
Change in Debt/GNP $_{t-1}$	0.096	0.158**	0.085	0.148**
	0.05	0.051	0.05	0.051
Real GNP growth	-0.966***	-0.957***	-0.975***	-0.951***
	0.065	0.068	0.065	0.068
Inflation rate	-0.290***	-0.277***	-0.225**	-0.248**
	0.078	0.081	0.081	0.083
Unemployment rate	0.357***	0.458***	0.342***	0.440***
	0.055	0.053	0.055	0.054
War time	-0.139	0.198	0.007	0.208
	0.174	0.151	0.182	0.151
P. Dem/Cong. Rep $_{t-4}$	-0.601*		-0.273	
	0.277		0.306	
P. Rep/Cong. Dem $_{t-4}$	0.285*		0.186	
	0.141		0.146	
P. Rep/Cong. Divided $_{t-4}$	0.993***		1.141***	
	0.204		0.211	
Divided Government $_{t-4}$		0.26		0.267*
		0.135		0.134
Political Polarization $_{t-4}$	0.071***	0.042***	0.058***	0.041***
	0.013	0.01	0.014	0.01
Average ideology $_{t-4}$			0.048*	0.028
			0.02	0.017
Constant	-3.334***	-3.128***	-3.038***	-3.092***
	0.468	0.473	0.479	0.471
R^2	0.743	0.714	0.748	0.717
N	228	228	228	228

Note: This table is included for making comparisons about the statistical significance between Newey-West and OLS estimates. The sample period starts in 1953 and ends in 2010. The used dependent variable is the percent change in the debt to GNP ratio. These OLS models showed both heteroskedasticity and serial correlation. Odd model numbers include partisan control variables. Even model numbers include the divided government variable.
Levels of significance: * 5%, ** 1%, *** 0.1%.

B8: Cross Model Specification of Table 3 Using as Dependent Variable Percent Change in Real Debt.

Variables	I	II	III	IV
Percent Change in Real Debt t-1	0.355***	0.440***	0.412***	0.451***
	0.08	0.085	0.092	0.087
Real GNP growth	-0.066	-0.053	-0.077	-0.062
	0.071	0.065	0.077	0.071
Inflation rate	-0.131	-0.187	-0.194*	-0.214*
	0.102	0.108	0.098	0.101
Unemployment rate	0.301***	0.316***	0.327***	0.332***
	0.084	0.072	0.077	0.068
War time	0.399*	0.328*	0.341*	0.328*
	0.17	0.153	0.173	0.154
P. Dem/Cong. Rep t-4	0.507*		0.34	
	0.214		0.186	
P. Rep/Cong. Dem t-4	0.036		0.112	
	0.143		0.16	
P. Rep/Cong. Divided t-4	0.873***		0.646**	
	0.229		0.195	
Divided Government t-4		0.244		0.242*
		0.128		0.122
Average ideology t-4	0.062**	0.023		
	0.023	0.019		
Ideological Difference t-4			0.794	-0.637
			1.677	1.533
Constant	-1.444**	-1.442***	-1.453***	-1.458***
	0.46	0.367	0.413	0.34
R^2	0.636	0.611	0.617	0.608
N	228	228	228	228

Note: The repression models follow closely the specification in Krause (2000). The sample period starts in 1953 and ends in 2010. Here, the dependent variable is the percent change in real debt. Newey-West standard errors are reported as the residuals from OLS models deviated from the assumptions of homocedasticity and non-serial autocorrelation. Odd model numbers include partisan control variables. Even model numbers include the divided government variable. Levels of significance: * 5%, ** 1%, *** 0.1%.

B9: Cross Model Specification of Table 4 Using as Dependent Variable Percent Change in Real Debt.

Variables	I	II	III	IV
Percent Change in Real Debt t-1	0.306***	0.392***	0.288***	0.381***
	0.072	0.086	0.069	0.085
Real GNP growth	-0.02	-0.032	-0.024	-0.024
	0.071	0.069	0.069	0.064
Inflation rate	-0.226*	-0.201*	-0.173	-0.181
	0.093	0.093	0.101	0.099
Unemployment rate	0.295***	0.347***	0.284***	0.334***
	0.076	0.077	0.082	0.082
War time	-0.064	0.164	0.057	0.171
	0.194	0.147	0.207	0.142
P. Dem/Cong. Rep t-4	-0.368		-0.097	
	0.288		0.33	
P. Rep/Cong. Dem t-4	0.233		0.149	
	0.148		0.143	
P. Rep/Cong. Divided t-4	0.758**		0.893***	
	0.263		0.268	
Divided Government t-4		0.219		0.224
		0.117		0.118
Political Polarization t-4	0.052***	0.030**	0.041***	0.030**
	0.013	0.01	0.012	0.01
Average ideology t-4			0.041	0.022
			0.022	0.02
Constant	-2.646***	-2.414***	-2.413***	-2.385***
	0.43	0.516	0.47	0.567
R^2	0.643	0.624	0.648	0.625
N	228	228	228	228

Note: The repression models follow closely the specification in Krause (2000). The sample period starts in 1953 and ends in 2010. Here, the dependent variable is the percent change in real debt. Newey-West standard errors are reported as the residuals from OLS models deviated from the assumptions of homocedasticity and non-serial autocorrelation. Odd model numbers include partisan control variables. Even model numbers include the divided government variable. Levels of significance: * 5%, ** 1%, *** 0.1%.

B10: Cross Model Specification of Table 7 Using the Percent Change in the Debt to GNP Ratio.

Variables (b/se) \ Models	I	II	III	IV	V	VI
Democratic House (HD)	0.758*	0.998**	1.153**	1.152**	0.765**	0.751**
	0.361	0.28	0.3	0.303	0.283	0.285
Democratic Senate (SD)	-0.408	-0.336	-0.257	-0.268	0.098	0.124
	0.23	0.222	0.207	0.189	0.206	0.2
Democratic Presidency (PD)	-0.329	-0.535**	-0.584**	-	-0.520**	-0.523**
	0.277	0.189	0.194	0.156	0.165	0.169
Second term of Presidency	-0.061					
	0.243					
STP *PD	-0.379					
	0.406					
Presidential Elections (PEY)	0.111					
	0.218					
Midterm Elections (MEY)	0.186					
	0.17					
Divided government (DG)	0.164	0.018	-0.05			
	0.272	0.246	0.235			
Divided Congress (DC)	0.545*	0.511	0.615*	0.608**	0.417	0.41
	0.258	0.261	0.243	0.232	0.228	0.212
Ideology	0.038	0.03	0.034	0.034	0.017	0.018
	0.038	0.038	0.038	0.036	0.03	0.03
Polarization	-0.118	-0.138	-0.152	-0.165	-0.009	0.062
	0.627	0.574	0.573	0.557	0.549	0.563
Unemployment rate (U)	-0.855	-0.124	-0.128	-0.133	-0.113	0.079
	0.514	0.325	0.319	0.32	0.315	0.203
Gross Domestic Product	-0.562	-0.451	-0.133	-0.136	-0.138	
	0.363	0.367	0.138	0.139	0.138	
Inflation rate (INF)	0.286*	0.289*	0.296*	0.296*	0.245	
	0.132	0.129	0.131	0.132	0.141	
Interest rate (INT)	-0.143	-0.171	-0.191	-0.185	-0.212	-0.226
	0.165	0.152	0.16	0.161	0.15	0.15
Unemployment rate * HD	0.897					
	0.663					
GDP * HD	0.51	0.355				
	0.397	0.376				
Trend	0.010**	0.011**	0.011**	0.011**	0.010**	0.010**
	0.002	0.002	0.002	0.002	0.002	0.002
Percent Change Debt/GNP$_{t-1}$	0.229*	0.239**	0.236**	0.237**	0.187*	0.189*
	0.092	0.082	0.085	0.084	0.074	0.074
War time	0.061	-0.059	-0.068	-0.049	-0.195	-0.21
	0.288	0.248	0.244	0.194	0.174	0.179
Reagan's Military Build-up					1.000*	0.990*
					0.416	0.402
2008 Financial Crisis					1.993**	2.082**
					0.568	0.555
Constant	-	-	-	-	-	-
	0.426	0.277	0.343	0.347	0.322	0.339
R2	0.533	0.523	0.520	0.554	0.554	0.546
N	227	227	227	227	227	227

Newey-West standard errors; Levels of significance: * 5%, ** 1%, *** 0.1%.

APPENDIX C: STATISTICAL TESTS

C1: Results of Unit Roots Tests Applied to the Political Variables.

Variables	ADF		DFGLS**		
	Lags	No Constant	Lags*	Constant	Trend
Ideology	8	-2.013	8	-2.357	-2.504
Political Polarization	8	3.724	1	1.641	-1.731
Ideological difference	8	-1.402	1	-4.982	-6.349
First difference					
Ideology	4	-4.945	4	-4.929	-4.727
Political Polarization	4	-3.117	1	-2.975	-3.770
Ideological difference	4	-6.45	4	-2.680	-4.713
Second difference					
Ideology	4	-11.414	1	-10.559	-10.563
Political Polarization	4	-6.633	1	-10.560	-10.561
Ideological difference	4	-11.137	3	-16.912	-16.909

Notes: These indicators appear to have an order of integration of one (I1); therefore, in the regressions, the functional form that is adopted is the change in quarter-to-quarter basis, respectively. *Selection of lags was based on the Schwarz Information Criteria. **These critical values come from Elliott, Rothenberg, and Stock (1996)
Critical values:
ADF test with no constant: -2.583 (1%); -1.95 (5%); -1.618 (10%)
DFGLS test with constant: -2.583 (1%); -1.95 (5%); -1.619 (10%)
DFGLS test with trend: -3.480 (1%); -2.86 (5%); -2.570 (10%)

C2: Results of Unit Roots Tests Applied to the Economic Variables.

Variables	ADF		DFGLS**		
	Lags	No Constant	Lags*	Constant	Trend
U.S. Federal Government Debt	8	-1.357	1	3.882	-4.565
Unemployment rate	8	0.265	1	-1.384	-3.041
Gross Domestic Product	8	-2.273	1	-7.754	-7.812
Inflation rate	8	-1.5	2	-1.643	-2.257
Interest rate	8	-0.401	4	-0.965	-1.012
House*Unemployment rate	8	-4.81	1	-7.493	-7.541
House*GDP	8	-2.453	1	-6.044	-6.5
First difference					
U.S. Federal Government Debt	4	-8.207	1	-13.206	-14.752
Unemployment rate	4	-6.149	1	-7.363	-7.695
Gross Domestic Product	4	-10.45	3	-2.538	-4.711
Inflation rate	4	-8.711	4	-3.372	-3.808
Interest rate	4	-7.215	3	-7.418	-8.731
House*Unemployment rate	4	-10.443	3	-10.428	-10.908
House*GDP	4	-10.316	2	-12.329	-12.329
Second difference					
U.S. Federal Government Debt	4	-13.334	2	-11.738	-15.743
Unemployment rate	4	-10.353	1	-8.682	-10.708
Gross Domestic Product	4	-12.96	2	-11.021	-14.822
Inflation rate	4	-14.236	4	-2.035	-4.252
Interest rate	4	-10.564	3	-9.905	-10.509
House*Unemployment rate	4	-13.355	4	-13.34	-13.083
House*GDP	4	-12.943	4	-12.931	-12.728

Notes: These indicators appear to have an order of integration of one (I1); therefore, in the regressions, the functional form that is adopted is the change in quarter-to-quarter basis, respectively. *Selection of lags was based on the Schwarz Information Criteria. **These critical values come from Elliott, Rothenberg, and Stock (1996)
Critical values:
ADF test with no constant: -2.583 (1%); -1.95 (5%); -1.618 (10%)
DFGLS test with constant: -2.583 (1%); -1.95 (5%); -1.619 (10%)
DFGLS test with trend: -3.480 (1%); -2.86 (5%); -2.570 (10%)

C3: Structural Breaks Tests for the Variable: Percentage Growth Rates of Deflated U.S. Federal Government Debt (GD).

Structural Breaks	Tests	Type	Dated Shifts	
			I	II
Single mean shift (1 lag)	Zivot-Andrews	Intercept	1993q3	
Single mean shift (1 lag)	Zivot-Andrews	Trend	1984q3	
Single mean shift (1 lag)	Zivot-Andrews	Both	1994q1	
Single mean shift (8 lags)	Zivot-Andrews	Intercept	1993q4	
Single mean shift (8 lags)	Zivot-Andrews	Trend	1983q3	
Single mean shift (8 lags)	Zivot-Andrews	Both	1995q3	
Single mean shift (1 lag)	Clemente-Montañés-Reyes	AO[*]	1982q4	
	Clemente-Montañés-Reyes	IO[**]	1974q2	
Single mean shift (8 lags)	Clemente-Montañés-Reyes	AO	1982q4	
	Clemente-Montañés-Reyes	IO	1974q2	
Double mean shifts (1 lag)	Clemente-Montañés-Reyes	AO	1982q4	2007q4
	Clemente-Montañés-Reyes	IO	1974q2	2008q1
Double mean shifts (8 lags)	Clemente-Montañés-Reyes	AO	1982q4	2007q4
	Clemente-Montañés-Reyes	IO	1974q2	2008q1

Note: shifts from Clemente-Montañés-Reyes tests were statistically significant different from zero at 95% level of confidence. *additive outlier method **innovational outlier method

APPENDIX D: FIT STATISTICS

D1: Fit Statistics for Regression Models Displayed in Table 5.

Statistics \ Models	I	II	III	IV	V	VI
OLS						
N	227	227	227	227	227	227
R2	0.664	0.660	0.656	0.670	0.670	0.669
R2 Adj.	0.635	0.638	0.635	0.650	0.650	0.652
F	22.846	29.460	31.223	33.245	33.245	39.488
P-value	0.000	0.000	0.000	0.000	0.000	0.000
BIC	642.152	622.870	620.537	611.093	611.093	600.900
LL	-269.539	-270.748	-272.294	-267.572	-267.572	-267.900
RMSE	0.829	0.825	0.829	0.812	0.812	0.809
Newey-West						
N	227	227	227	227	227	227
F	37.457	32.025	29.881	33.301	44.560	52.181
P-value	3.100E-55	1.200E-44	5.230E-41	1.390E-40	1.840E-53	1.440E-54

D2: Fit Statistics for Regression Models Displayed in Table 6.

Statistics \ Models	I	II	III	IV	V	VI
OLS						
N	227	227	227	227	227	227
R2	0.673	0.663	0.658	0.677	0.677	0.671
R2 Adj.	0.643	0.641	0.637	0.656	0.656	0.654
F	22.457	29.831	31.529	31.803	31.803	39.920
P-value	0.000	0.000	0.000	0.000	0.000	0.000
BIC	641.243	620.990	619.082	611.251	611.251	599.243
LL	-266.372	-269.808	-271.566	-264.938	-264.938	-267.072
RMSE	0.819	0.822	0.826	0.804	0.804	0.806
Newey-West						
N	227	227	227	227	227	227
F	39.998	37.634	38.526	39.597	65.369	58.459
P-value	1.120E-58	1.070E-49	9.770E-49	9.610E-48	8.360E-69	1.990E-58

D3: Fit Statistics for Regression Models Displayed in Table 7.

Statistics \ Models	I	II	III	IV	V	VI
OLS						
N	227	227	227	227	227	227
R2	0.674	0.664	0.659	0.678	0.678	0.672
R2 Adj.	0.642	0.640	0.636	0.655	0.655	0.653
F	21.263	27.797	29.241	29.583	29.583	36.484
P-value	0.000	0.000	0.000	0.000	0.000	0.000
BIC	646.441	625.947	623.990	616.464	616.464	604.416
LL	-266.259	-269.574	-271.308	-264.832	-264.832	-266.946
RMSE	0.821	0.823	0.827	0.806	0.806	0.808
Newey-West						
N	227	227	227	227	227	227
F	41.329	35.801	35.755	35.590	60.702	52.558
P-value	5.940E-61	1.170E-49	4.580E-48	2.980E-46	7.110E-68	4.980E-57

VITA

Carlos Ignacio García Jiménez was born and raised in Central America. In the 2012 spring semester, Carlos Ignacio was admitted in the Ph.D. program of the Department of Political Science associated with the College of Humanities and Social Sciences at Louisiana State University and Agricultural and Mechanical College. During his studies, Carlos Ignacio conducted research in fiscal and monetary policy as he successfully undertook a very diverse and comprehensive graduate coursework on public policy, public administration, comparative politics, policy making and politics of The United States of America.

In the 2013 summer semester, by his own initiative and upon approval of the faculty, Carlos Ignacio developed a compendious course on policy making and politics of Latin America–tailored to undergraduate and graduate students–the syllabus was approved by the department and certified by the LSU Communication Across the Curriculum Program (CxC Program). In the 2014 summer semester, Carlos Ignacio presented an initiative that created the LSU Foundation's Zamorano Scholars Program Support Fund with the purpose of enhancing and sustaining the LSU AgCenter Zamorano Visiting Scholars Program that was co-founded and is currently co-managed by the LSU AgCenter and Zamorano Agricultural Society at LSU. Since its inception between 2004 and 2005, this internship program has enabled the recruitment of graduate students and fostered collaborative research in the departments associated with the College of Agriculture. As he completed this research project, preliminary findings were presented in the Southern Political Science Association meeting as well as in the research seminar series of the LSU Department of Experimental Statistics. After deliberation, his research committee approved this thesis in December 2014, and in May 2015, Carlos Ignacio expects to be conferred with the Master of Arts degree in Political Science.