Power in Numbers: Examining the Influence of Political Majorities on Growth within the United States

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Honors Thesis
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Abstract:

In this paper I examine the relationship between the size of a political majority in state legislatures and its effect on state growth. The data used in this paper covers the 50 US states over the time period from 1993 to 2011. In order to calculate these effects, I implement an OLS empirical strategy in which I regress 2- and 4-year growth rates on the size of the political majority within a particular legislative chamber and a number of other covariates. My empirical strategy accounts for a possible non-linear relationship between growth and the size of the majority and that the relationship might depend on which political party is in the majority. I also tested the longevity of these effects on growth by lagging the majority variable. I show that large republican majorities provide strong increases to growth, while democratic majorities offer detrimental effects to growth. These effects appear to be short lived and do not persist into the future, implying that majorities do not have lasting impacts on growth.

Introduction:

The role fiscal policy plays in the calculation of GDP has long been understood: changes in tax policy and government spending can have important effects on the growth of the economy. This paper aims to examine the relationship between the size of state legislative majorities and the growth of a state's GDP. I choose to focus my attention on the US states because they are more similar than nations in that they have the same monetary policy, trade rules, and governmental structure. In the past two decades, there were many examples that demonstrated how the size of the political majority influenced the passage of legislation and caused or prevented the gridlock of the political process. Combining the findings from papers examining the role of politics in state growth as well papers discussing the impact of majority practices on the individual legislator I will develop a model for examining the role that increased political majorities play in a state's economic growth. The results of this paper provide important and interesting results as it relates to the voting behavior of individuals as well as opening a discussion as to which political party provides stronger growth for states.

The paper utilizes several theories as its foundation for empirical analysis. In Rogers (2002), one finds the theory of legislative free riding. In his paper Rogers determines that as the majority increases legislative production decreases. Thinking of growth in these terms, as a public good, if the majority is too large one would assume that growth would slow. Along with the initial interest in the role political majorities play on the growth of a state I will be able to examine whether a republican or democratic majority is better for growth. The results from this analysis may impact how voters behave in the next election process. Several interesting

questions arise from this model, depending on the results. If for example, I find that strong republican majorities lead to higher growth rates than larger democratic ones or vice versa, then in those states where the majority yields lower growth voters should now be choosing their representatives not only on how they the citizen relate their own political beliefs with candidates, but they should also be accounting for how the other party's candidate may affect the State's growth rate. With this in mind the results of this model may suggest that every state should be run by the same large majority. However, the model may also suggest that smaller more competitive majorities are more beneficial to growth. These implications may prove to have profound implications for the way in which future US elections are decided and how voters choose their representatives. Other possible implications for this paper surround the way in which voting and legislative bodies identify or define majorities. If certain levels of political majorities yield better, or worse, growth levels there may be policy implications for how parties campaign or align themselves in elections. In order to answer these questions I will use state level data taken from the years 1993 to 2011.

Finally I will examine the long lasting effects of majorities on state growth. The data I am using in this paper offers observations on term lengths of two or four years, with that in mind I intend to see how the majority of a given term effects growth two and three time periods after the initial majority leaves office. The results will show how long a state's growth will be affected by a given political majority; furthering the implications for voters as they enter each election cycle. The initial findings of the paper suggest that large republican majorities provide significant increases to a state's growth; while large democratic majorities provide significant and longer lasting negative effects on a state's growth.

Background Literature:

This analysis fits into two main strands of the political economy literature: the first field considered how increased majorities in state legislatures impacted the potential problem of free riding in the legislature itself (Rogers 2002), while the second field encompassed two distinct but related topics: the first being the impact of congressional representation on state economic growth Levitt and Poterba (1999), while the second covered the role of state fiscal policy decisions on a state's growth Garrett and Rhine(2011). These two fields offer me the materials and theory upon which my own research is based. Through a combination of models, I will be able to examine how certain levels of majorities' impact state growth.

Through the work of Rogers "Free Riding in State Legislatures" (2002), one understands the implication of increased majorities on legislative production. Building off of the results of Alchian and Demsetz (1972) and Crain and Tollison (1982), Rogers identifies first the existence of team production at the state level. From this discovery he then concluded that as the size of a political majority increased, the production, both at the individual and aggregate levels, decreased. The intuitions behind these findings rely on an understanding of team production as a public good. In private markets team production enables the existence of free riding when members of the production team are able to enjoy the benefits with participating in the production of goods. This problem is also synonymous with public goods, specifically when determining who pays for the good Alchian and Demsetz (1972).

Rogers identified the properties of team production with respect to state legislatures when he thought of the production of legislation as a public good with respect to the legislators

(Rogers 2002 pp. 61-62). This definition comes from Rogers comes from own calculation where he identified the total number of bills passed into law and divided it by the number of legislators in the respective legislative body. As the number of legislators from the same party increases, the ability for legislators to free ride off the work of their fellow representatives' increases. This can also be understood from the stand point of a legislator's ability to devote his or her time to difference agenda points. If there are more likeminded people willing to commit the time to push a particular piece of legislation the individual will choose to focus their time elsewhere, while still enjoying the benefits of legislation becoming law, presumably in the form of reelection (Rogers 2002 p. 61). The importance of this paper to my own research stems from the model used to capture political majorities as well as the data set used to conduct the regressions. Rogers provides one with a foundation to work from with respect to political majorities.

Rogers' results demonstrated the real effect increasing majorities has on production within politics; it would not be hard to think that these same majorities do not influence other areas of the economy. Enough space exists between the area Rogers examined and the area I am interested in for my results to offer new insight into the impact of polarization on economic growth. As his theory suggest, I hypothesize that as the size of the majority increases, the growth of a state's economy should decrease.

Although Rogers offered insight and a model which helped to quantify the effects of political majorities on legislative production, his work did not examine the effects of political majorities on economic factors. To understand how legislators influence a state's economy I will rely on the work of several authors who examined how different aspects of government decisions influenced state economic growth. In Levitt and Poterba work, "Congressional Distributive Politics and State Economic Performance" (1999), the authors examined how political

representation in congress impacted state income per capita (Levitt and Poterba 1999 p. 186). An important factor in understanding their paper and model is the recognition by Levitt and Poterba that legislators can influence the well being of constituents in a variety of ways. The second aspect of their paper focused on behavior of legislators based on two factors, the individuals own well being and the well being of the party (Levitt and Poterba 1999 p. 186). In their paper, Levitt and Poterba distinguished between the two sets of behaviors while also acknowledging that given certain conditions individuals may sacrifice portions of their own utility in order to increase the welfare of the party (Levitt and Poterba 1999 p. 186). The theory put forth by Levitt and Poterba provides me with a portion of the understanding of the ways in which the current research examines some of the effects of political party identification on State's economy.

Using a Generalized Least Squares equation Levitt and Poterba examine how the inclusion of different levels of competition in national legislative representation effects State's income growth. The results indicate that there is significance to having more senior representatives in congress. Another important finding from the study centered on the significance of shifting competitive district to Democratic representation from Republican representation, this action resulted in an increase in income by approximately 0.06%. In further tests, Levitt and Poterba examine how democratic percentage influenced growth and found a "substantial positive effect…" (Levitt and Poterba 1999 p. 197)

The most important objection highlighted in Levitt and Poterba (1999) concerns the potential for reverse causality, in other words do the political variables cause the growth of per capita income or does the impact of positive growth result in political outcomes. This question provides one of the central concerns to my own research: will the size of political majorities' impact growth or will the performance of a state's economy result in certain politicians being

elected. Their paper provided a strong base for modeling growth with respect to political variables. From this work I began to understand how to model growth while incorporating political variables, but it also posed the question that the potential existed in the literature to try and examine how different types of policies enacted could be related to certain politicians or political parties (Levitt and Poterba 1999 p. 210). In this way one could begin to formulate potential questions and hypothesis concerning how larger majorities could influence growth relative to smaller ones. In order to understand how these types of policy decisions effect growth I examined Garrett and Rhine's paper, "Economic Freedom and Employment Growth in U.S. States" (2011).

In this work the authors examined three factors of "state economic freedom": the size of government, level of taxes, and labor market freedom (Garrett and Rhine 2011 p. 2). Their hypothesis focused on how these factors influenced employment growth, in the area of the macro economy which intuitively impacts state growth. The economic freedom index used in Garrett and Rhine (2011) was calculated based on the following three parameters: first the size of government measured by the consumption of the government itself, transfers and subsidies, and social security payments all as percentages of GDP; second the level of taxation as a percentage of total tax revenue, the top marginal rates, indirect revenues, and sales tax revenue as percentages of GDP; finally labor market freedom was measured using the minimum wage, number of government employees in the in the total employment pool, and the density of unions (Garrett and Rhine 2011 p.4). Their findings suggest that as economic freedom increases states experience increased employment, confirming their hypothesis. Their work offered me the intuition that certain types of policies, the relative size of government, taxation, and union empathy can influence different components that factor into state economic growth. The work

also offered me insight into the control variables that should be included in a model of state growth to help control for omitted variable bias.

A final paper which provided additional support to the idea that majorities influence state growth, through certain policy agendas, was the work of Tomljanovich in his paper, "The Role of State Fiscal Policy in State Economic Growth" (2004). In this paper Tomljanovich examined how policy makers effect growth and per capita out through changes in tax rates. The paper used fixed effects models over the time period 1972 to 1998 to examine this question. The results showed that higher tax rates impact state growth rates in the short run, but in the long run the effects of policy changes do not exist. This paper helped to both substantiate the findings of my own work while also aiding in the production of my models. The use of fix effects provided me with evidence to suggest that these types of models provide important results for questions similar to my own. Along with the use of fixed effects models, Tomljanovich's work confirmed the trends I found in my own results; that as one moves further into the future, the effects of a given majority lessen and eventually become indistinguishable.

Methods and Data:

The main question of interest for this model will be the influence of the size of political majorities on the growth of State GDP. The model itself encompasses many of the key variables used to describe and explain growth as well as a group of variables meant to explain the different political variables. In this paper I utilized an OLS model with fixed effects capturing data across time and varying by state over the years 1993 to 2011. The development of this model came out of discussion with Professor Svec, who suggested several of the standard variables from his own work with growth regression for my model. Along with suggesting several variables for the

model, Professor Svec helped me to determine how to measure growth while also capturing the effects of political majorities. In conjunction with Professor Svec I also relied on the decisions made by Levitt and Poterba (1999), Tomljanovich (2004), and Garrett and Rhine (2011) in order to account of some of the growth variables used in my model.

Equation one will exist in three different forms depending on the length of time being used to define State's growth. The three time lengths being used involved measuring growth at the present period when the majority was elected, and in the following two election cycles, meaning the four and six years after the initial majority was elected. One would expect as in Tomljanovich (2004) that as time moves forward the effects of a particular majority will diminish over time.

$$\text{Growth}_{[(t+2)-t]/t} = \alpha + \beta 1\ \text{Majority}_t + \beta 2\ \text{Republican Controlled Chamber}_t + \beta 3\text{Republican Majority}_t + \beta 4\ \text{Income}_t + \beta 5\ \text{Population}_t + \beta 6\ \text{Federal Transfers}_t + \beta 7\ \text{Unemployment} + \text{Year Effects} + \text{State Fixed Effects} + \varepsilon \quad (1)$$

Accounting for which political party held the majority was a key component used to calculate the majority variable. If one simply constructed the variable as the difference between the total of one party, say democrats for example, and the total of the other party and then divided that difference by the total number of representatives, one would obtain a majority calculation but it would be incredibly hard to interpret. For example if the total number of republican s exceeded the total number of democrats, as it does in many states over the sample, then the majority variable would be a negative number. To avoid this problem, Professor Svec and I constructed a majority variable which allowed for a positive majority for both parties. In our variable the calculation is conditional on which party has the greater number of seats in a

given chamber. That means that the calculation of the majority changes based on the majority itself, for example if the Democrats are in the majority, then the calculation is:

$$\frac{\text{(Total number of Democrats} - \text{Total number of Republicans)}}{\text{(Total number of Democrats} + \text{Total number of Republicans)}}$$

If the Republicans are in the majority then the variable was calculated:

$$\frac{\text{(Total number of Republicans} - \text{Total number of Democrats)}}{\text{(Total number of Democrats} + \text{Total number of Republicans)}}$$

Writing the majority in this way ensures that the majority variable is a positive number, and also ensures that the variable exist continuously between the value of (0.50 and 1]. An evenly split chamber will have a majority of 0 as the difference between Republicans and Democrats will be zero in either calculation.

In order to calculate the size of the majority I am utilizing data from Shor and McCarty, "The Ideological Mapping of American Legislatures" (2013). This data set offers individual level data on state politicians over the years 1993 to 2011. Using Shor and McCarthy's data allowed me to construct the political variables for each chamber of a state's legislature. The calculation I used to create the majority involved taking the individual observations in each state in a given year and summating the information in order to account for the total number of representatives in each chamber of each state's legislature. Next I sorted the information based on the identified political party and summed this figures as well. Once complete I was able to use the information to calculate the majority variable for the model.

Accounting for the fact that there are not elections every year for representatives, while also trying to capture potential time effects of political majority's decisions on a state's economic growth, Professor Svec suggested that I measure growth over different lengths of time. An examination of the data found that two different term lengths exist in lower and upper chambers of state legislatures. Legislator terms can be either 2 or 4 year in length and vary by state in both the lower and upper chambers of the legislature. In order to account for the impact that majorities have on growth, I constructed two separate measures of GDP depending on the term lengths being examined. This allowed for growth to capture the potential friction that exists between a policy decision being made and its actual impact on the economy. In order to account for this potential friction I intend to measure growth using three different averages:

Growth for term lengths of 2 years:

$$(Y_{t+2} - Y_t) / Y_t$$

Growth for term lengths of 4 years:

$$(Y_{t+4} - Y_t) / Y_t$$

From these equations I computed growth rates over 2 and 4 year periods. I then used this calculation to lead the growth rates of a given period to examine how the majority of at a given time influences the growth rates of a state at some period in the future. Although the impact of policy may not be seen for several years, all of the explanatory variables will be measured in year t terms in order to explain how the variables from year t influence the future growth.

As in Rogers (2002) I separated out the two chambers of each state in order to test the effects of growth on the higher and lower chambers[1]. I used equations (2) and (3), along with several other models where growth leads the explanatory variables, to measure how the majority impacted the upper and lower chambers of the state's legislature impacted state growth. In this way the results will be able to speak to any potential influence from the different chambers of a state's legislature on a state's growth. I utilized a binary variable to distinguish between the two parties. The variable took on a value of one when the republicans held the majority. To capture the effects of a republican majority I interacted the dummy variable and the majority variable.

$$\text{Growth}_{[(t+2)-t/t]} = \alpha + \text{House Majority}_t + \beta 2\ \text{Republican House}_t\ \beta 3\ \text{Republican House Majority}_t + \beta 4\ \text{Population} + \beta 5\ \text{Federal Transfers}_t + +\beta 6\text{Unemployment}_t + \text{Time effects} + \text{State Fixed Effects} + \varepsilon \quad (2)$$

$$\text{Growth}_{[(t+2)-t/t]} = \alpha + \text{Senate Majority}_t + \beta 2\ \text{Republican Senate}_t\ \beta 3\ \text{Republican House Majority}_t + \beta 4\ \text{Population} + \beta 5\ \text{Federal Transfers}_t + \beta 6\text{Unemployment}_t + \text{Time effects} + \text{State Fixed Effects} + \varepsilon \quad (3)$$

The State fixed effects used in this model capture the differences across states in a single variable. Capturing the state effects in this way helps the model by acknowledging that there are characteristics of each state that make them unique, but because we are not interested in the particular uniqueness of any given state I accounted for the unique qualities by aggregating the states into one term, through fixed effects. This allows the characteristics to be accounted for but saves degrees of freedom and protects the significance of our key variables. Including time fixed

[1] Because Nebraska is a unicameral legislature, meaning it operates with one chamber I chose to place it in the upper chamber pool. An additional reason for including Nebraska in this pool related to the term length of the state. An overwhelming majority of lower chambers operated on a two years term system so I excluded lower chambers with four year terms from my regressions. Conversely the divide between two and four year terms in the upper chambers was more equal, for that reason I placed Nebraska in the upper chamber pool.

effects as an explanatory variable also serves to capture any macroeconomic events that impacted the nation as a whole; specifically thinking of events such as September 11th or the financial crisis of 2007. The use of state fixed effects serves to account for unobservable characteristics of states over the course of the data set.

In order to control for non linear effects of majorities on state growth, I ran a second set of regressions with quadratic models for the effects of political majorities. Again these models will be lead over the initial two years following the election as well as the four and 6 years following the regression. Equations (4) and (5) represent these quadratic models for the lower and upper chambers respectively:

$$\text{Growth}_{[(t+2)-t/t]} = \alpha + \text{House Majority}_t + \beta 2\ \text{Republican House}_t\ \beta 3\ \text{Republican House Majority}_t + \beta 4\text{House Majority}^2 + \beta 5\text{Republican House Majority}^2 + \beta 6\ \text{population} + \beta 7\ \text{federal transfers}_t + \beta 8\text{unemployment}_t + \text{Time Effects} + \text{State Fixed Effects} + \varepsilon \quad (4)$$

$$\text{Growth}_{[(t+2)-t/t]} = \alpha + \text{Senate Majority}_t + \beta 2\ \text{Republican Senate}_t\ \beta 3\ \text{Republican Senate Majority}_t + \beta 4\text{Senate Majority}^2 + \beta 5\text{Republican Senate Majority}^2 + \beta 6\ \text{population} + \beta 7\ \text{federal transfers}_t + \beta 8\text{unemployment}_t + \text{Time Effects} + \text{State Fixed Effects} + \varepsilon \quad (5)$$

Using data from the US Census, Bureau of Labor Statistics, and the Bureau of Economic Analysis I generated variables accounting for the levels of income, federal transfers, and unemployment for the years within my data set. The use of years effects aided in capturing the unobservable characteristics within the model. Over the course of these two decades the congressional majority switched several times which may account for changes in the way people view politics or how they approve, or disapprove of certain types of majorities. Along with several changes in congressional majorities over the last twenty years the country has also

experienced several macroeconomic shocks including two separate recessions, the September 11th attacks, and the beginning of the War on Terror. One would anticipate these events impacting the model in several different ways none of which may help to explain how majorities influence growth.

Results:

The results of the regressions offered several interesting points of analysis; the most surprising of which included the implications for growth based on political party. In almost every model, democratic majorities provided negative growth rates, while republican majorities exhibited a positive, and significant, impact to growth. Moving through each model I will discuss and interpret the results.

Beginning with the models examining the lower chamber of the legislature, table 2.1 provides the results of the regressions, without quadratic terms. These three models provide the basis for the rest of the paper, and as one will see the results hold with a fair amount of consistency across several different parameters. Looking first to column (1) in table 2.1 the variables of interest are: *hou_maj* which represents the democratic majority and *rep_hou_maj* which represents the republican majority. Simply examining the p-value and t-statistic of the republican coefficient did not provide enough robustness to feel confident in reporting an interpretation of the estimate. In order to confirm the significance of the republican majority I utilized the delta method[2]. In doing so I was able to derive the significance for not only the

[2] I would like to thank Professor Baumann and Professor Engelhardt for their contributions to this portion of the paper. Their consultation led to the use of the delta method and without their assistance I would not have implemented this robustness check in my final paper. The delta method is used in order to calculate, among other things, the standard error, covariance, t-statistic, and p-value for a combination of linear or non-linear estimates.

republican coefficients, but also the significance of the quadratic estimates used in later models. The coefficients are statistically significant at the five and one percent levels respectively.

In order to put these variables in context, I will interpret them under a hypothetical movement of the majority in both the Republican and Democratic Party by ten percent. With respect to the Republican majority, a ten percent rise in the majority results in a 1.06 percentage point rise in growth. Conversely in the context of a democratically controlled chamber, a ten percent rise in growth results in a 0.699 percentage point drop in growth. These results offer drastically different results, the figures suggest that in a state suffering from economic hardship, like many of the US states in the wake for the 2008 recession, voters should vote for republicans if the voter's belief is the government plays a vital role in the economic growth of their state. Keeping in mind the example of an economically stagnate state, who may be experiencing growth of around 1 or 1.5 percent growth, the data suggests that if this state had an increase in the republican majority of 10 percent it should see growth of approximately 2 to 2.5 percent.

In order to test the longevity of these results I tested the influence of a given majority over time. Columns (2) and (3) in table 2.1 represent growth regressions where the explanatory variables are measures in the current two year period, while the GDP calculation is taken from the proceeding periods four and six years into the future respectively. These models intend to show the effects of today's majority on tomorrow's growth. As one can see the effects of a republican majority drops off after the term in which the majority exist ends. However, democratic majorities still exhibit harmful effects to growth, even four years after the majority was initially elected. If the democratic majority increased by ten percent today, GDP four years from now would decrease by 0.658 percentage points. This implies that voters should not vote for democrats if they are concerned about the short and medium run growth of their states.

Although these results offered promising results, I wanted to test for the potential non-linear relationship between growth and political majorities.

The non-linear models differ from table 2.1only by the addition of quadratic terms for democrat and republican majorities: hou_majsq and rep_hou_majsq respectively. When interpreting these results one must again rely on the delta method in order to capture the effects of majorities on growth. Thinking momentarily about the mathematics of the model, in order to interpret the effects of either majority on growth one must take the derivative of the model. As a result the interpretation cannot simply be an application of a shift in the majority as was the case in the initial models. The derivative, leaves a continuous variable in the equation, this means that the effects on growth must be measured for a given majority. In this case three scenarios were chosen to represent given levels of political climate. The three levels were: a perfectly competitive chamber with a majority of zero, a chamber where the majority was 50 percent, and finally the majority was evaluated at the average house majority[3]. The purpose of choosing these three levels serves to take into account how growth responds to increase to very small majorities, very large majorities, and more majorities of a more realistic size. In the two years following the election of a given majority the results for both republicans and democrats were significant for the later two levels of political majorities.

Observing the effects of republicans on growth in table 2.2, a 10 percent rise in the majority when the majority is 50 percent, results in 2.23 percentage point rise to growth. A ten percent rise from the average majority results in a 1.02 percentage point rise in growth. Both of these figures are significant at the 1 percent level. Conversely the effects to growth based on

[3] This majority was taken by averaging the size of the majority for the given chamber across all states and across all years in the data set.

increases to a democratic majority are as follows: in the two years after the election of a democratic majority, a ten percent increased in the majority from 50 percent results in a 1.17 percentage point decrease to growth. When examined from the average, at tem percent increase to a democratic majority results in a 0.635 percentage point decrease to growth. Both of these figures were significant at the five percent level.

These numbers support the initial findings of the paper, but they also provide an additional layer of analysis. These figures demonstrate that voters should not only want republican majorities but that those majorities should be as large as possible. When the figures are examine at the different levels of majority, the effect of increasing the republican majority from 50 percent to 60 percent produced a much higher increase to growth than a ten percent increase from the average, 2.23 compared to 1.02. In the same regard voters should be aware that large democratic majorities hurt growth as compared to smaller democratic majorities, 1.17 compared to 0.636. When these effects are tested over time the result hold from the initial results, the only effects that last are for democratic majorities, and they only last into the periods directly following the end of the majority's term in office. Interestingly, the effect only holds for a change in majority when taken from the average; a ten percent increase in a democratic majority leads to a 0.663 percentage point decrease to growth. This figure was significant at the five percent level.

Moving to an examination of the upper chamber data it is important to note that roughly half of the states utilized two year terms, while half utilized four year terms. As a result the sample was broken down further into a pool of states that used two year terms and a pool that used four year terms. I began my analysis by examining chambers that used 2 year terms. None

of the baseline models provide significant results. However the quadratic models offered several interesting results.

Looking to table 3.2, in the two years following an election, democratic majorities in upper chambers who use two year terms appear to affect growth when examined from the extreme case of increasing a majority by ten percent, when that majority is already 50 percent. The increase caused a 1.45 percentage point decrease to growth, which was significant at the five percent level. When the effects are measured over time, the impact the democratic majority exist into the next period when the majority is measured from the average. A ten percent increase in the democratic majority, when measured at the average, results in a 0.607 percentage point decrease in growth, significant at the ten percent level. All other results from the 2 year upper chamber models proved insignificant.

In comparison, the upper chambers utilizing a four year term provided a large amount of significant results. In these models I used a different growth calculation; in these models growth is calculated over four years rather than two. In calculating how the majority affected growth over time I still examined it over the following two periods. The only difference between the periods is their length, four years rather than two. Looking first to the baseline models, the democratic majorities exhibited significant results while none of the republican variables returned significant findings. Focusing on column (13) in table 3.3, in the two years following the election, a ten percent increase in the democratic majority resulted in a 1.60 percentage point decrease in growth. This result was significant at the one percent level. A ten percent increase in a democratic majority resulted in a 0.586 percentage point decrease to growth in the period following the election; this result was significant at the ten percent level. Significance drops out two periods after the majority is elected.

Examining the quadratic forms of the senate models, both the democrat and republican variables demonstrate some significant results. Examining the response of growth to a small increase in political majorities found in column (16) of table 3.4, when the majority moves from even to a ten percent increase for democrats the result is a 2.68 percentage point drop in growth, significant at the one percent level. In the republican case, a ten percent increase in the majority, from an even split, results in a 2.65 percentage point increase to growth, significant at the ten percent level. Interestingly when the republican majority is large, the effect on growth is negative; this was the only instance of negative effects of republican majorities in any iteration of the models. When the republican majority is 50 percent, a ten percent increase to the majority results in a 3.14 percentage point decrease to growth, significant at the ten percent level. When the majority is taken at the average, a ten percent increase to the majority for democrats' results in a 1.29 percentage point drop in growth, significant at the one percent level. When the effects are measured over time in column (17) of table 3.4, democrats experienced a 0.986 percentage point drop in growth in the period following the election of the majority; significant at the five percent level. All other measurements provided statistically insignificant results.

Conclusions:

The results of this project provided extremely interesting results. In general, the results of this paper support the claim that large republican majorities are good for growth in the period in which they are elected, while democratic majorities seem to hurt growth both in the period when they are elected, and in the following period. These were not the anticipated results of this project and the paper seems to open more questions than it answered. For instance, many of the states with the largest economies historically have large democratic majorities. The results of the paper beg one to ask the question how this is possible. It would appear that large democratic

majorities prevent growth of any kind from occurring; and if a state desires to not only grow its economy, but grow it quickly it should promote large republican majorities.

Although these question offer further opportunities to examine the data used in this paper, I believe several important factors must be addressed in any interpretation of these results. First any model trying to model growth runs into the problems of inherent endogeneity as well as omitted variable bias. So many things factor into the calculation of GDP that no one model will ever capture all the components, as result there could be some factors of growth not included in these models which lead to biased estimators. Second, the time period over which this data was taken included two recessions, the worst terrorist attack in 60 years, and two ten plus year long wars all of which influenced the macro economy, these shocks could also be biasing the results of the paper, along with a relatively small sample size. Finally, in thinking about how these models relate to the strength of a given states economy, these figures represent relative growth rates rather than the actual size of an economy. Historically speaking the states which tend to have large republican majorities are the South and Midwestern states, thinking about the size of those states' economies relative to the states which exhibit large economies, the models may be capture some aspects of the catch up effect. States with lower overall economies have the capacity to grow at a faster rate than states with established industry. These proposed explanations offer interesting avenues for future work, particularly controlling for states with larger economies. In any event the results offer a fascinating look into the effects of political majorities on state growth rates.

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Appendix A

Table 1.1 Summary Statistics:

Variable	Obs	Mean	Std. Dev.	Max	Min
senate	676	1	0	1	1
sen_tot	676	38.90385	10.99796	6	74
tot_rep_sen	676	18.7574	7.895823	0	38
tot_dem_sen	676	19.64053	8.434291	1	49
sen_maj	676	0.258282	0.191263	0	1
sen_majsq	676	0.100875	0.139478	0	1
rep_sen_majsq	676	0.038153	0.085558	0	0.686531
house	691	1	0	1	1
house_tot	691	109.6744	56.39937	38	403
tot_rep_hou	691	52.25615	34.04102	6	282
tot_dem_hou	691	56.6686	31.93166	6	239
hou_maj	691	0.24811	0.182918	0	0.842105
hou_majsq	691	0.094969	0.126984	0	0.079141
rep_hou_majsq	691	0.038756	0.082525	0	0.645257
trans	960	2.78E+07	3.41E+07	1218983	2.62E+08
pop	960	5769578	6330776	473081	3.77E+07
unemp	960	5.410729	1.917887	2.3	13.7
gdp	960	217704.1	270187.6	13027	1905155
growth	960	0.089102	0.059791	-0.11379	0.320415
lead2	861	0.084369	0.059958	-0.11379	0.320415
lead4	761	0.079633	0.060582	-0.11379	0.320415
growth_sen_4yr	760	0.21137	0.096207	-0.07068	0.667439
lead2_sen_4yr	660	0.203142	0.096072	-0.07068	0.667439
lead4_sen_4yr	560	0.194379	0.096826	-0.07068	0.667439

Appendix B:

Lower Chamber Tables:

Table 2.1 Lower Chamber Results without Square Terms:

VARIABLES	(1) growth	(2) lead2	(3) lead4
hou_maj	-0.0699**	-0.0658**	-0.0161
	(0.0288)	(0.0291)	(0.0312)
rep_hou	-0.0176***	-0.0133**	-0.00473
	(0.00658)	(0.00658)	(0.00684)
rep_hou_maj	0.1063***	-0.0026	-0.0313
	(0.03078)	(0.0308)	(0.03187)
pop	-1.71e-08***	-2.17e-08***	-2.04e-08***
	(5.75e-09)	(6.23e-09)	(7.12e-09)
trans	2.02e-10	9.41e-10***	1.15e-09***
	(2.90e-10)	(3.26e-10)	(4.13e-10)
unemp	-0.00827***	0.00882***	0.0116***
	(0.00222)	(0.00232)	(0.00250)
Constant	0.297***	0.191***	0.162***
	(0.0397)	(0.0421)	(0.0457)
State Effects	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes
Observations	606	593	542
R-squared	0.587	0.646	0.688
Number of stid	44	44	44

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

Table 2.2 Lower Chamber Results with Square Terms:

VARIABLES	(4) growth	(5) lead2	(6) lead4
hou_maj	-0.0113	-0.0741	0.00192
	(0.0493)	(0.0508)	(0.0547)
rep_hou	-0.00278	-0.0163**	-0.00103
	(0.00806)	(0.00808)	(0.00839)
rep_hou_maj	-0.00645	0.101	-0.0646
	(0.0723)	(0.0734)	(0.0789)
hou_majsq	-0.0113	-0.0741	0.00192
(Maj = 0)	(0.0493)	(0.0508)	(0.0547)
hou_majsq	-0.1165***	-0.0583	-0.03
(Maj = 0.5)	(0.0398)	(0.0413)	(0.0446)
hou_majsq	-0.0635**	-0.0663**	-0.0140
(Maj = Avg)	(0.0293)	(0.0299)	(0.0320)
rep_hou_majsq	-0.0177	0.02677	-0.0627
(Maj = 0)	(0.0556)	(0.0566)	(0.0596)
rep_hou_majsq	0.2227***	-0.0303	0.00018
(Maj = 0.5)	(0.0526)	(0.0539)	(0.0594)
rep_hou_majsq	0.1016***	-0.00155	-0.0315
(Maj = Avg)	(0.0306)	(0.0309)	(0.0319)
pop	-1.66e-08***	-2.19e-08***	-2.04e-08***
	(5.71e-09)	(6.25e-09)	(7.14e-09)
trans	1.49e-10	9.51e-10***	1.15e-09***
	(2.89e-10)	(3.28e-10)	(4.14e-10)
unemp	-0.00844***	0.00891***	0.0116***
	(0.00221)	(0.00233)	(0.00251)
Constant	0.293***	0.192***	0.161***
	(0.0396)	(0.0423)	(0.0460)
State Effects	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes
Observations	606	593	542
R-squared	0.595	0.647	0.689
Number of stid	44	44	44

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

Appendix C

Upper Chamber Tables:

Table 3.1 Upper Chamber 2 Year Term Results without Square Terms:

VARIABLES	(7) growth	(8) lead2	(9) lead4
sen_maj	-0.0669	-0.0392	0.0224
	(0.0408)	(0.0391)	(0.0447)
rep_sen	-0.00494	-0.0135	-0.00159
	(0.0109)	(0.0103)	(0.0119)
rep_sen_maj	-0.04917	-0.0302	0.0276
	(0.03636)	(0.03379)	(0.03774)
pop	-2.83e-08**	-2.31e-08*	-1.36e-08
	(1.34e-08)	(1.29e-08)	(1.64e-08)
trans	5.56e-10	8.51e-10**	8.59e-10
	(3.47e-10)	(3.89e-10)	(5.86e-10)
unemp	0.00261	0.0154***	0.00867*
	(0.00379)	(0.00392)	(0.00475)
Constant	0.104	-0.0257	0.114*
	(0.0640)	(0.0611)	(0.0643)
State Effects	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes
Observations	182	174	157
R-squared	0.700	0.764	0.718
Number of stid	13	13	13

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

Table 3.2 Upper Chamber 2 Year Term Results with Square Terms:

VARIABLES	(10) growth	(11) lead2	(12) lead4
sen_maj	0.0222	0.0229	0.0587
	(0.0744)	(0.0712)	(0.0826)
rep_sen	0.00955	-0.00286	0.0155
	(0.0140)	(0.0133)	(0.0153)
rep_sen_maj	-0.126	-0.0995	-0.172
	(0.104)	(0.0999)	(0.118)
sen_majsq	0.0222	-0.118	0.0587
(Maj = 0)	(0.0744)	(0.0521)	(0. 0826)
sen _majsq	-0.1452***	-0.0908	0.0087
(Maj = 0.5)	(0.0670)	(0.0698)	(0.0771)
sen _majsq	-0.0642	-0.0607*	0.0329
(Maj = Avg)	(0.0407)	(0.0354)	(0.0447)
rep_ sen _majsq	-0.1043	0.0788	-0.1133
(Maj = 0)	(0.0773)	(0.1055)	(0.0834)
rep_ sen _majsq	-0.0179	0.1240	0.0954*
(Maj = 0.5)	(0.0511)	(0.1198)	(0.0521)
rep_ sen _majsq	-0.0597	0.1021	-0.0055
(Maj = Avg)	(0.0390)	(0.1055)	(0.0413)
pop	-3.08e-08**	-2.34e-08*	-5.21e-09
	(1.45e-08)	(1.40e-08)	(1.72e-08)
trans	5.96e-10	8.18e-10**	6.52e-10
	(3.71e-10)	(4.04e-10)	(5.94e-10)
unemp	0.00308	0.0156***	0.00708
	(0.00390)	(0.00410)	(0.00485)
Constant	0.0929	-0.0259	0.0889
	(0.0646)	(0.0624)	(0.0652)
State Effects	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes
Observations	182	174	157
R-squared	0.706	0.767	0.726
Number of stid	13	13	13

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

Table 3.3 Upper Chamber 4 Year Term Results without Square Terms:

VARIABLES	(13) growth_sen_4yrs	(14) lead2_sen_4yr	(15) lead4_sen_4yr
sen_maj	-0.160***	-0.0586*	0.0283
	(0.0319)	(0.0325)	(0.0374)
rep_sen	-0.0225	0.00431	0.0307*
	(0.0141)	(0.0151)	(0.0183)
rep_sen_maj	-0.0141	-0.0291	-0.102
	(0.0676)	(0.0727)	(0. 095)
pop	-2.01e-08	-7.77e-09	-1.80e-08
	(1.57e-08)	(1.80e-08)	(2.46e-08)
trans	-2.92e-10	-8.21e-10	-2.66e-10
	(9.35e-10)	(1.23e-09)	(1.87e-09)
unemp	-0.00211	0.0175***	0.0241***
	(0.00497)	(0.00532)	(0.00668)
Constant	0.466***	0.245**	0.188
	(0.0981)	(0.107)	(0.138)
State Effects	Yes	Yes	Yes
Year Effects	Yes	Yes	Yes
Observations	443	374	302
R-squared	0.578	0.648	0.673
Number of stid	36	36	36

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

Table 3.4 Upper Chamber 4 Year Term Results with Square Terms:

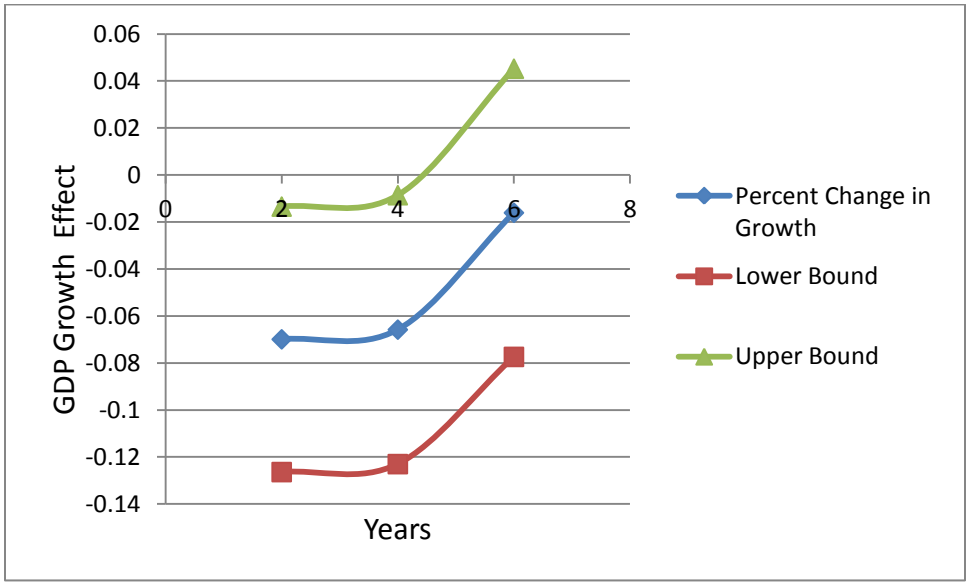
VARIABLES	(16) growth_sen_4yrs	(17) lead2_sen_4yr	(18) lead4_sen_4yr
sen_maj	-0.268***	-0.0986**	0.0806
	(0.0447)	(0.0449)	(0.0493)
rep_sen	-0.0492***	-0.0109	0.0487**
	(0.0176)	(0.0188)	(0.0223)
rep_sen_maj	0.533***	0.243	-0.407*
	(0.157)	(0.167)	(0.214)
sen_majsq	-0.2684***	-0.0986**	0.0860
(Maj = 0)	(0.0447)	(0.0447)	(0.0492)
sen _majsq	0.00175	0.00742	-0.0596
(Maj = 0.5)	(0.0534)	(0.0541)	(0.0614)
sen _majsq	-0.1288***	-0.0438	0.00810
(Maj = Avg)	(0.0323)	(0.0335)	(0.0385)
rep_ sen _majsq	0.26475*	0.1446	-0.32690
(Maj = 0)	(0.1519)	(0.1620)	(0.2095)
rep_ sen _majsq	-0.31396*	-0.2288	0.1851
(Maj = 0.5)	(0.1624)	(0.1802)	(0.2530)
rep_ sen _majsq	-0.0342	-0.0483	-0.0624
(Maj = Avg)	(0.0672)	(0.0741)	(0.0993)
	(0.299)	(0.322)	(0.433)
pop	-1.92e-08	-6.26e-09	-2.07e-08
	(1.54e-08)	(1.80e-08)	(2.46e-08)
trans	-6.94e-10	-1.14e-09	1.74e-10
	(9.27e-10)	(1.24e-09)	(1.88e-09)
unemp	-0.00450	0.0173***	0.0232***
	(0.00493)	(0.00535)	(0.00671)
Constant	0.479***	0.238**	0.209
	(0.0965)	(0.107)	(0.138)
State Effects	Yes	Yes	Yes
Observations	443	374	302
R-squared	0.595	0.651	0.679
Number of stid	36	36	36

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

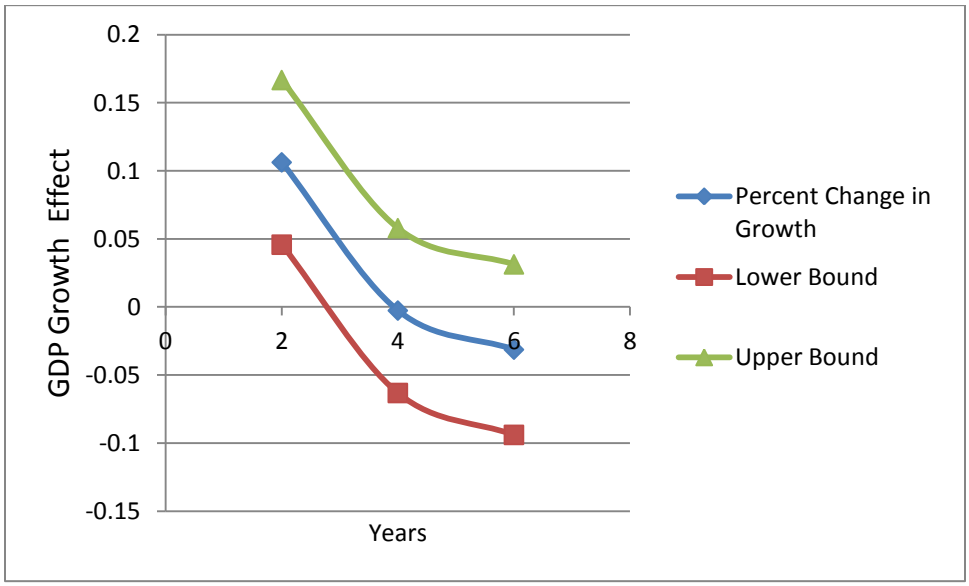
Appendix D

Impulse Response Functions:

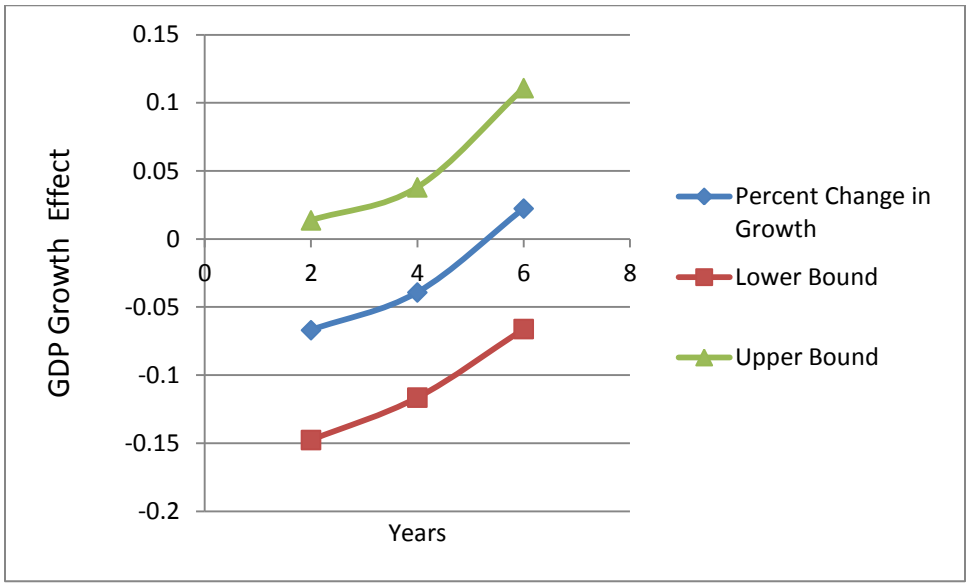
Lower Chamber Democrats with 2 year terms



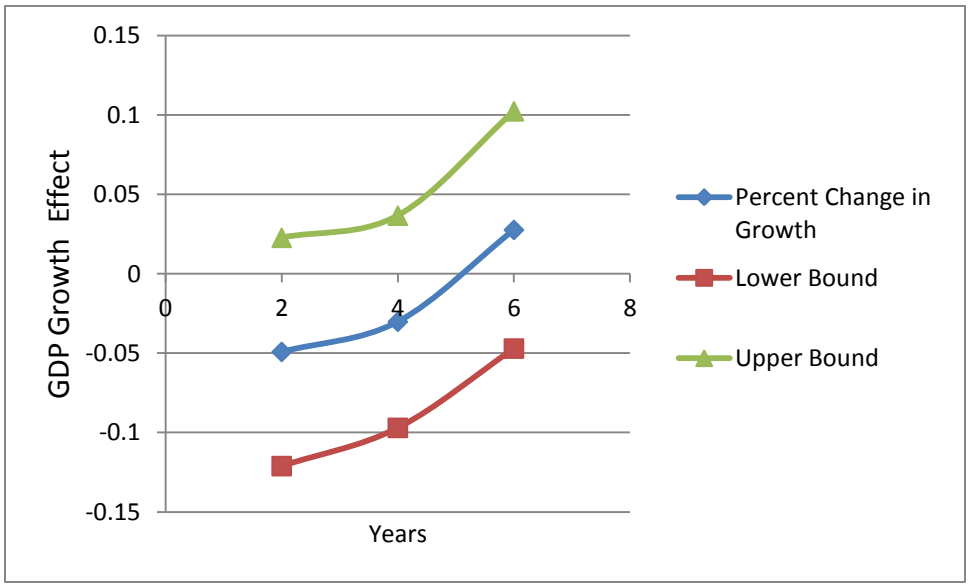
Lower Chamber Republicans with 2 year terms



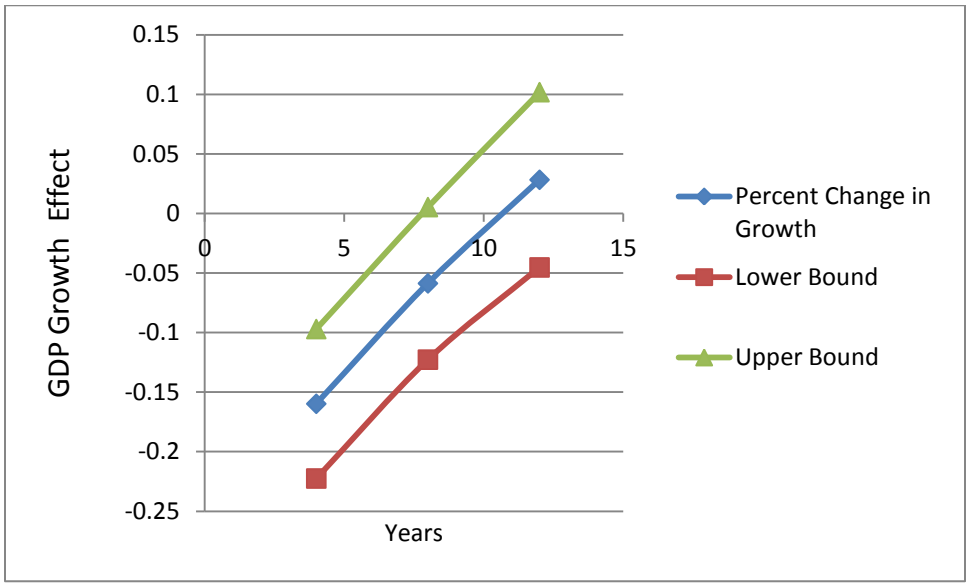
Upper Chamber Democrats with 2 year terms



Upper Chamber Republicans with 2 year terms



Upper Chamber Democrats with 4 year terms



Upper Chamber Republicans with four year terms