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Three Essays on the Nature and Impact of Legislative Tenure

Matt E. Ryan

Dissertation Submitted to the
College of Business and Economics at
West Virginia University
In partial fulfillment of the requirements for the degree of

Doctor of Philosophy
In
Economics

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Abstract

Three Essays on the Nature and Impact of Legislative Tenure

Matt E. Ryan

This dissertation is an examination of the nature and effects of legislative tenure. Specifically, I analyze the role of tenure at the federal level, in the United States Congress. The first chapter provides a background on nature of legislators and the roles that United States Congressmen play in the American economy, the three main questions that this dissertation looks to address, and describes the unique dataset that belies this research. Chapter 2 is an in-depth analysis on the nature of accrued legislative tenure throughout the entire history of the United States Congress. The second chapter then explores possible explanations for the structural break to legislative tenure rates that occurred sometime in the last quarter of the 19th century. Ultimately, while the ability to regulate an economy and the United States Civil War are likely causes, the ability to tax-and-spend did not contribute to the initial upswing in accrued tenure rates. Chapter 3 analyzes the impact of federal spending on state economic performance in light of the variation in tenure between states' Congressional delegations. States that have more tenured delegations secure more federal money for their respective constituencies, and this increased level of federal funds causes a dampening effect upon state economic performance. The result is robust when considering alternative measures of federal spending, such as federal spending received net of federal taxes paid, and the ratio of federal spending received to federal taxes paid. Finally, due to the nature of the two-stage process, I provide a range of estimates for the marginal harm caused by having increasingly tenured Congressional delegations. Chapter 4 investigates the impact that increased tenure, both in absolute amounts and in increased dispersion, has upon legislative productivity. Increased amounts of tenure, as well as increased amounts of tenure dispersion, leads to a reduction in the quantity and an increase in the price of legislation produced. The effects are akin to a cartel. Chapter 5 concludes and discusses future areas of research interest.

In addition, I would like to extend a thank you for the love and support in all aspects of my life from my friends and family. I may have been far away, but they always made it seem they were just down the road.

Finally, I would like to thank the Koch Foundation, Ken and Randy Kendrick, the Earhart Foundation, the American Institute for Economic Research, and the Public Policy Foundation of West Virginia for their financial support throughout my graduate school career.

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Chapter 1

The Nature and Impact of Legislative Tenure

1.1 Introduction

This dissertation is an analysis of legislative tenure in the United States at the federal level; as such, my analysis concerns both chambers—the House of Representatives and the Senate—of the United States Congress.

Traditional economic theory attributes several far-reaching characteristics to economic actors in the public sector. Assigned the task of leveraging market-correcting policies, legislators possess all of the information required to determine and execute the necessary tax, expenditure and regulatory adjustments. In other words, once assuming office, individuals know exactly what tax rates to impose that satisfy their ends of revenue generation in light of deadweight loss and equity/equality concerns, and which firms to regulate, and in what manner, to achieve their economic goals. Similarly, rational, utility-maximizing individuals are benevolent servants of the public good. Economists removed individual utility from consideration with respect to public sector decisions. Public sector officials act in a manner that maximizes social welfare regardless of the impact on their personal well-being.

However, public choice theory provides an alternative under which to analyze the actions of public officials. These conflicts with traditional economic theory fall broadly under the categories of "information" and "incentives." Public officials, like private individuals, do not operate in an environment of perfect information. As such, there exists no calculus by which to determine which goods or services to tax, a "correct" tax level to impose upon these goods and services, or whom and how to regulate activity across an economy. Therefore, any fine-tuned tax rate is most likely to be different from the unobservable "correct" tax rate as prescribed by

economic theory, independent of the intention of the individual or group specifying the tax system. "Only for the public good" does not describe the objectives of public officials. Economic actors traditionally look to maximize their personal well-being; once placed into public office, these intentions do not change. Public officials, if presented with the choice between personal and social welfare, can choose to favor themselves at least a nontrivial percentage of the time, and perhaps a large percentage of the time. Either way, the fact that individuals may not *choose* to pursue policies that maximize a social welfare function is just as crucial as realizing that political actors do not have the information to make the appropriate decisions, regardless of intention.

Given the recognition of the characteristics of the individual within the process of public decision-making, it is fair to consider the role that tenure plays. I aim to answer three overarching questions with each chapter. First, exactly how has the nature of Congressional tenure evolved throughout the history of the United States, and specifically, what causes contributed to the sudden increase in legislative tenure in the last quarter of the 19th century? Second, do more tenured legislators secure additional federal spending for their home states, and if so, what is the economic impact of this additional spending? Third, what role does tenure play in the productivity of Congress?

The basis of my dissertation is a dataset heretofore unassembled. For every U.S. Representative and U.S. Senator from every state for every year for the entire history of the United States Congress, I recorded the number of years of accrued tenure. In total, this yields 68,244 individual data points for Representatives, and approximately 16,542 individual data points for Senators. With this level of specificity, I construct two types of metrics: measures of level and measures of dispersion. First, I generate a time series showing the evolution of average

accrued tenure within both the House of Representatives and the Senate. This calculation is the foundation for Chapter 2, which takes a full historical view of the trends in legislative tenure. In addition, I calculate a simple arithmetic mean for the entire United State Congress, utilizing both the House and Senate figures, and incorporate this figure into the analyses of legislative productivity in Chapter 4.

Second, due to individual level data, I can construct dispersion measures of tenure within each chamber of Congress, as well as across Congress. The analysis utilizes two measures of dispersion. The first measure of dispersion is Generalized Entropy (GE). GE measures the inequality amongst a group; specific to my analysis, GE represents the inequality in accrued tenure. Generalized Entropy measures consist of four classes, defined as GE(a) where a = -1, 0, 1, and 2. I utilize class 2 Generalized Entropy, or GE(2), which is half of the squared coefficient of variation. The second measure of dispersion is the Gini coefficient, a more complex but more common measure of inequality. I present the specifics of the Gini coefficient calculation in Chapter 4. For both metrics, higher figures represent more inequity in the distribution of tenure.

The remainder of this chapter will provide an outline of the following four chapters in this dissertation.

1.2 The Evolution of Legislative Tenure in the United States Congress: 1789-2004

The second chapter of my dissertation investigates the nature of legislative nature throughout the history of the United States. Currently, U.S. Representatives average nearly ten years of accrued tenure, and U.S. Senators average over twelve years of accrued tenure. These figures are in stark contrast to the tenure profiles of average legislators throughout Congressional history;

Representatives average nearly four times as much tenure, and Senators nearly three times as much tenure, as their earlier counterparts.

The evolution of Congressional tenure occurs over two distinct periods in American history. The first period, from the inception of Congress in 1789 until the mid-1870s, has largely consistent levels of tenure for both Representatives and Senators. Beginning at the end of the 1870s, however, both chambers of Congress exhibited a distinct rise in average tenure rates. At this point, tenure rates began a steady climb that continues through to the present day. This rise in tenure rates characterizes the second period in the evolution of tenure in the United States Congress.

The question, then, is what caused the sudden rise in tenure that occurred in the late 1870s? The decision to pursue public office reduces to a cost/benefit decision. The costs of pursuing additional service as a legislators are primarily the foregone wages from serving in the private sector. The benefits of serving, which can include legislative salary, personal satisfaction from holding office and increased social standing, reside primarily in the ability to favor constituents through taxing/spending and regulation. Shocks to the cost/benefit calculus cause changes in the decision to pursue additional legislative service and, as such, establishes a connection between exogenous influences and the resulting amounts of tenure seen across the United States Congress.

What changes to these factors could contribute to the increase in legislators pursuing additional years in office? Wages paid to United States Congressmen are unlikely to be the answer; outside of a short span from 1871-1873, salaries of Representatives and Senators remained constant at $5,000 from 1865 to 1907. Foregone wage opportunities are likely not the reason as well; real wages in both manufacturing and building occupations rose steadily from the

end of the Civil War through to the beginning of the 20th century. (Recall that foregone wages are an opportunity cost; a rise in other wage opportunities would, on the margin, cause average tenure rates to *decrease*.) An increase in life expectancy would cause an increase in tenure rates, as increases in expected years of life decrease the percentage of life that one term of service comprises. As such, the opportunity cost of service falls, strictly in terms of years of expected life remaining. However, the life expectancy gains amongst cohorts eligible to serve in Congress took place at least a decade into the 20th century, well beyond the initial upward movement of average accrued tenure.

Outside of major shocks to the personal satisfaction received from serving and one's social standing as a public official, the abrupt change in tenure rates concerns changes either to the ability to tax-and-spend, or to the ability to regulate. In addition, the United States Civil War could play a significant role in the evolution of tenure due to its temporal proximity to the structural change in average accrued tenure.

The largest shock to the ability of the public sector to tax, and ultimately spend, came with the passage of the 16th Amendment, which declared income taxes legal and loosened the requirements for expenditures. After the passage of the income tax amendment, federal spending began its steadily upward climb that continues through to the present day—not unlike the trend in average accrued legislative tenure. The amendment, however, passed in 1913, over thirty years after the initial upward trend in average tenure began. While the model predicts that increased federal spending leads increased average tenure rates, the income tax amendment cannot be the reason for the initial increase in tenure that occurred in the late 1870s.

Instead, changes to the ability of legislatures to regulate economies caused the initial surge in average tenure rates. In 1877, the United States Supreme Court ruled, in *Munn v.*

Illinois, that state legislatures had the right to regulate transactions concerning private property that were deemed in the "public interest." The precedent set by the Court was clear—legislatures could now be a source of economic manipulation, a valuable tool for business and individuals looking to compete outside of the market system.

The increase in tenure of the late 19th century could also be a function of the United States Civil War. Due to the expansive nature of the federal government during the Civil War—expenditures, at their height, totaled nearly 20% of GDP—a new mindset emerged in which the federal government could play a large role in national issues, economic or otherwise, should the need present itself. A broad sense of nationalism emerged after the Civil War, as a strong commitment to a national identity dominated the previous understanding of a lesser federal government and more powerful state-level governments. Opinions on the changing role of the federal government even come from semantics. Prior to the Civil War, many referred to the United States in the plural—*these* United States—yet this reference changed to the singular after 1865.

1.3 Legislative Tenure, Federal Spending, and State Economic Performance: 1981-2004

The third chapter concerns the economic impact that legislators with higher levels of tenure may have upon their home states through their ability to procure more federal funding.

Given the amount of money directed towards states from federal tax revenue, it is reasonable to expect that these public expenditures have a tangible economic impact. In 2004, federal spending attributable to West Virginia was nearly $8400 per resident, or roughly 30% of state income per capita. By comparison, New Jersey received almost $6400 in federal funds per resident, or 13% of state income per capita. The discrepancy between West Virginia and New

Jersey highlight two important factors. First, there is exists a significant degree of variation in federal spending across states; when viewed in terms of the size if each respective state's economy, the fiscal footprint from federal spending in West Virginia is over two and a half times that of New Jersey. Second, federal expenditure even at 13% of gross state product is still a nontrivial amount of spending within a state. Federal impact across states is not only varied but universally tangible.

Traditional economic theory dictates that the federal government most efficiently provides certain large-scale public goods. Interstate highways, welfare programs, and national defense are common examples of these large-scale public goods. However, even the most conservative estimates must conclude that federal spending has far eclipsed this limited role. The question, then, is what impact does the marginal spending beyond providing these traditional public goods have on state economic performance?

There are several reasons to believe that this additional spending will have detrimental effects on state economic performance. Government provision of goods and services entails the reallocation of assets through taxation. Such activity is not wealth creating but wealth reorganizing. Thus, the process of taxing to support public expenditures could be wealth reducing, even in states that receive more in federal funds than they pay out in federal taxes. In addition, federal spending intended to correct a market shortcoming is unlikely to result in a net gain in welfare. The inability of public officials to aggregate the required information needed to implement an appropriate policy harms the policy's effectiveness, as does the time inconsistency that exists between the time that the policy is incorporated and its economic impacts emerge. Finally, assuming that the intention of increasing social welfare is inherent in all federal

spending may be inconsistent with the model of self-interested individuals serving in the public sector.

Given its potential for economic impact, it is important to important to explore the process by which legislators allocate federal spending across the states. This chapter contends that accrued tenure is a primary determinant of the topography of federal spending across states. There is a variety of reasons to believe that Representatives and Senators can secure additional amounts of federal spending for their constituents as the amount of time spent in Congress increases. Legislative rules and processes become increasingly familiar as time spent engaging in legislative activity increases. Committees, which play a crucial role in the budgeting of federal funds, in general choose more tenured legislators. Finally, logrolling is a function of the ability of a legislator to build working relationships with fellow legislators; such social capital surely increases as years of accrued tenure increase.

I incorporate a two-stage panel regression analysis in order to isolate the effects of legislative tenure on federal spending and, in turn, federal spending on gross state product per capita. The results confirm that, over a variety of specifications, state congressional delegations with higher levels of tenure secure more federal spending for their states, and that this increased expenditure depresses long term state economic growth. The results are further verified when considering 4-year averages of federal spending and state economic performance, net federal spending received (in light of federal taxes paid), and the ratio of federal spending received to federal taxes paid.

Finally, it is possible to find the marginal impact of an additional year of accrued tenure on state economic performance due to the two-stage estimation process. Depending on the

specification, U.S. Representatives and Senators harm their states between $30 and $270 in gross state product per capita per additional year in office.

1.4 Seniority and Anti-competitive Restrictions on the Legislative Common Pool: Tenure's Impact on the Overall Production of Legislation and the Concentration of Political Benefits

Chapter 3 of this dissertation establishes that individual states benefit, in terms of the portion of government spending they capture, from having congressional delegations that possess more accrued service, holding constant the tenure of the other members of Congress. However, this fact does not consider the legislative outcomes if all members of Congress accrued more years of tenure. How does the productivity of Congress change as its members as a whole gain or lose tenure, and in addition, how does the productivity of Congress change as the dispersion of tenure amongst its members varies?

Existing studies that analyze the industrial organization of the United States Congress lead to clear predictions concerning the impact of the level of accrued tenure, as well as the dispersion, amongst United States Senators and Representatives on legislative productivity. Increases in the level of accrued tenure, as well as the dispersion of tenure, should lead to: (1) a less competitive legislative marketplace; (2) increased concentration of the benefits of government policy; (3) an increased ability of the committee structure to establish property rights over the legislative common pool; and, (4) an increased ability of senior legislators to substitute agenda control (and other methods of rule manipulation) for vote trading (logrolling) to secure passage of legislation. All four of these effects should lead to the production of less legislation, and the ability to sell this reduced output at a higher price analogous to the impact of a cartel on the output and price in a product market. Within this context, a higher price reflects higher rent

seeking by constituents or interest groups per bill, higher spending per bill, and increased selectiveness in the number of vote trades across legislators.

Previous studies show that institutional structures within Congress, such as the committee system, arise to help reduce transactions costs and enforce bargains among legislators (as well as limit coalition formation). The committee system, as well as the seniority system, exists to establish property rights over sub-areas of legislation, thereby helping to eliminate the common pool nature of the legislature's agenda. The legislative agenda suffers from common pool problems in the sense that any individual legislator has free access to any aspect of the legislature's agenda. Restricting access to this common pool comes in the form of a committee system. Committees, not any sitting legislator, set legislative agendas. However, insofar that the committee system establishes a form of property rights over the legislative agenda, there must also be a form of protection for these rights. Here, the seniority system establishes durability of property rights assigned to legislators through the committee system. Committee members lose their seats only in unusual circumstances; simple partisan conflict does not extinguish the right to the legislative agenda.

The evolution of the committee system in light of seniority allows for a direct test of the above-mentioned effects. The use of a seniority system for committee appointments in the U.S. Congress is a 20th century phenomenon. In the House of Representatives, for example, prior to the seniority system, the Speaker of the House made committee assignments for both political parties. As such, this allows the subsequent hypotheses to be tested both in a time period of committee systems with the underpinnings of seniority, in addition to prior to the development of such a structure. Therefore, as we move into our empirical testing, an interesting possibility exists to compare the results for modern Congresses with those from Congresses prior to their

modern structure to search for differences. The clear empirical implication of this line of research is that by reigning in the common pool, the committee system, through seniority, tends to reduce the amount of legislation produced. Both higher average tenure and more disparity in tenure result in more entrenched committee leadership positions, increasing the ability to establish property rights and 'fence in the commons,' leading to less total legislation.

Several additional empirical implications become clear. Should the committee system create less competition over potential new measures, we should witness, per a cartel, a decrease in legislative output at a higher price. Further, as tenure increases, legislators are better able to provide favors for interest groups in exchange for future support by gaining increased access to agenda control through the committee system. Indeed, as the level of tenure within Congress grows, we observe fewer bills (lower output) but a greater amount of spending per bill (higher price). In addition, the ability to manipulate an agenda can be a substitute for logrolling. Consider the effort put forth by legislators of different accrued tenure levels. A Congressman with a low level of accrued tenure must spend his time logrolling in an effort to garner support for a bill of particular importance of his constituency. A Congressman with a higher level of tenure, however, has the opportunity, via committee appointment, to substitute effort towards logrolling for effort towards agenda control. Therefore, as the amount of tenure and disparity in tenure both increase, we would expect less vote trading and, therefore, less total legislation. Again, the empirical analysis confirms this hypothesis.

Chapter 2

The Evolution of Legislative Tenure in the United States Congress: 1789-2004

2.1 Introduction

Given the necessity of collective decision making within societies, it is crucial to understand how this decision making process functions. The United States Congress is a clear and obvious example of decisions made by a few that affect the economic outcomes of many. While a range of potential determinants of legislator activity has been isolated, such as ideology or re-election prospects, this analysis isolates another influence upon legislative behavior: tenure in office.

In previous studies, the amount of time spent in office is a determinant of the way a legislator behaves. Payne (1991) suggests that legislators develop a culture of spending as they accrue additional years of service in the United States Congress. In other words, Congressmen will become increasingly supportive of spending legislation as their tenures rise. Sobel and Wagner (1998) show that tenure is a significant determinant in voting behavior as well as bill sponsorship in the 103rd Congress. Lott (1987) shows that as accrued years of legislative experience increase, Congressmen establish for themselves a voting position based upon their previous actions, and hence create an ideological boundary for future voting activity. Should a legislator shirk from their ideological record, voters are quick to remove them. Poole and Rosenthal (1991) find that a legislator's ideological position becomes more stable as years of service increases.

Further, previous studies that look to examine specifically the nature of legislative tenure do so only over brief and/or discontinuous time spans. Reed and Schansberg (1992) utilize a continuation rate approach necessary when analyzing an incomplete section of legislative history

and show that the tenure of both U.S. Representatives and U.S. Senators increased from the early 1950s to the early 1990s; in particular, Representative tenure increasing notably, starting in the 1970s. Scully (1995) finds that tenure in the 86th Congress (January, 1959 to September, 1960) to be greater than that of the 57th Congress (March, 1901 to March, 1903), that this increase in tenure can not be solely attributed to increases in life expectancy, and also identifies a correlation between higher tenure levels and lower per capita incomes in southern states. Gilmour and Rothstein (1996) show that congressional tenure of U.S. Representatives increased significantly from 1870 to 1930, and that 75% of this increase can be explained by declining incidences of retirement. In addition, Representative tenure continued to increase into the 1980s, though declining rates of electoral defeat largely account for this time frame's increase in tenure. Glazer and Grofman (1987) note that Representative and Senator tenure from 1953-1983 can be considered roughly equal, once factoring in for differences in term length between the two types of federal legislators.

There are several theoretical justifications for why tenure could influence the behavior of a legislator as well as his ability to function within a legislative body. In the broad sense, additional years of service within a legislature allow a legislator to become a more effective political entrepreneur. Legislators "learn by doing;" that is, legislative processes become more familiar as years of experience increase. This could be as trivial as memorizing legislative activities by routine, or as essential as discovering which political players within the legislature hold particular sway in allowing a legislator to achieve his desired ends. In addition, with more years of service come more opportunities—however slight or infrequent—to change procedural rules *within* the legislature. Similarly, as legislators accrue tenure, they develop an increased level of recognition amongst their constituents. This benefits the politicians' ability to retain

their office. Incumbents retain a familiarity with their constituents, which creates a barrier to entry for any potential challengers. An additional barrier to entry comes from the increased ability of sitting legislators to raise campaign money for reelection.

Committees generally gravitate towards more tenured legislators for membership, which themselves play a very important role in the political process. Finally, as years of experience increase, so does the social capital a legislator can build amongst his fellow politicians. Social capital can result in an increasing possibility of securing a committee appointment, but also aides in the ability of a legislator to establish the vote-trading relationships crucial in passing measures that favor his constituents. Logrolling, to an extent, requires a socially adept policy maker, and legislative tenure increases the ability of a legislator to act successfully in such a manner.

Due to the numerous reasons listed above, it is clear that legislative tenure is a topic of interest. While a variety of studies highlight the outcomes which legislative tenure impacts, far fewer studies examine the historical nature of legislative tenure itself. Further, these studies, summarized in Section II, do not take a complete historical view of the evolution of tenure throughout the entire existence of the United States Congress. When taking a global view of the trends of tenure in the United States Congress from its inception in 1789, a couple of characteristics stand out. Today, the average United States Senator possesses over twice the amount of tenure than that of a Senator in early Congresses; the average United States Representative, nearly four times as much. This marked gain in accrued legislative experience did not occur steadily throughout American history; in fact, the first ninety years of the United States Congress exhibited relatively constant rates of tenure for both Senators and Representatives. During the latter half of the 19th century, legislative tenure began an upward

trend that continued steadily through to the present day, and shows no notion of ceasing in the near future.

In this paper, I explore specific questions related to the evolution of legislative tenure within the United States Congress. I examine the expansion of tenure rates of Congressmen, in particular in the late 1800s, and attempt to isolate potential causes of the sudden and distinct shift in tenure trends.

The paper continues as follows. Section 2.2 provides a model of the decision to pursue additional years of legislative service. Section 2.3 describes the data, and provides results from an empirical breakpoint analysis. Section 2.4 explores some of the possible influences for the shift in legislative tenure rates. Section 2.5 concludes.

2.2 Theoretical Model

Once elected, the decision to pursue additional years of service, S_i, either as a United States Representative or United States Senator can be modeled as follows:

$$(2.1) \quad S_i = f\,[\text{ Benefits due to service, Costs due to service }]$$

More specifically, the benefits and costs of service can be split in the following manner:

$$(2.2) \quad S_i = f\,[\text{ U}(p_i, l_i, y_i, w_i, z_i)\,]$$

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p_i represents the legislative salary or stipend that an individual receives for his service in the United States Congress. As direct fiscal compensation from serving increases, *ceteris paribus*, legislators would pursue longer periods of service. Therefore, $\delta S_i / \delta p_i > 0$.

l_i is the expected benefit an individual receives from legislative activities within the United States Congress. Legislative activities consist of the ability to favor a constituency through taxation and expenditure programs, as well as through regulation. As the benefits from legislative activities increase, ceteris paribus, legislators would pursue longer periods of service. Therefore, $\delta S_i / \delta l_i > 0$.

y_i represents all other benefits received from serving in the United States Congress. Other benefits from serving could include a range of factors. For example, individuals may feel a "warm glow" from public service, akin to giving to charity. Increased standing in social circles could also be a benefit of serving in Congress. As these benefits rise, legislators would pursue longer periods of service. Increases in life expectancy would imply longer terms of service, as a term of service would consist of a decreasing percentage of one's life as years of expected life increased. Therefore, $\delta S_i / \delta y_i > 0$.

w_i is the prevailing market wage. As the expected wage from employment in the private sector increases, the opportunity cost of continued service rises as well. Therefore, as marketplace wages rise, *ceteris paribus*, legislators would pursue shorter periods of service. Therefore, $\delta S_i / \delta w_i < 0$.

z_i contains all other costs incurred from serving in the United States Congress. Other costs from serving could include a range of factors. For example, time spent serving in the federal legislature necessitates time spent away from one's family or, in the least, their familiar social circle. Should this cost rise—perhaps a social shift in the importance of family time—

time spent in office would fall. Similarly, costs incidental to serving in office would decrease the time spent; for example, increased travel costs required to serve in Washington, D.C. would lower the time spent in office. Therefore, $\delta S_i / \delta z_i < 0$.

Figure 2.1: Average Accrued Tenure for U.S. Representatives and Senators, 1789-2004
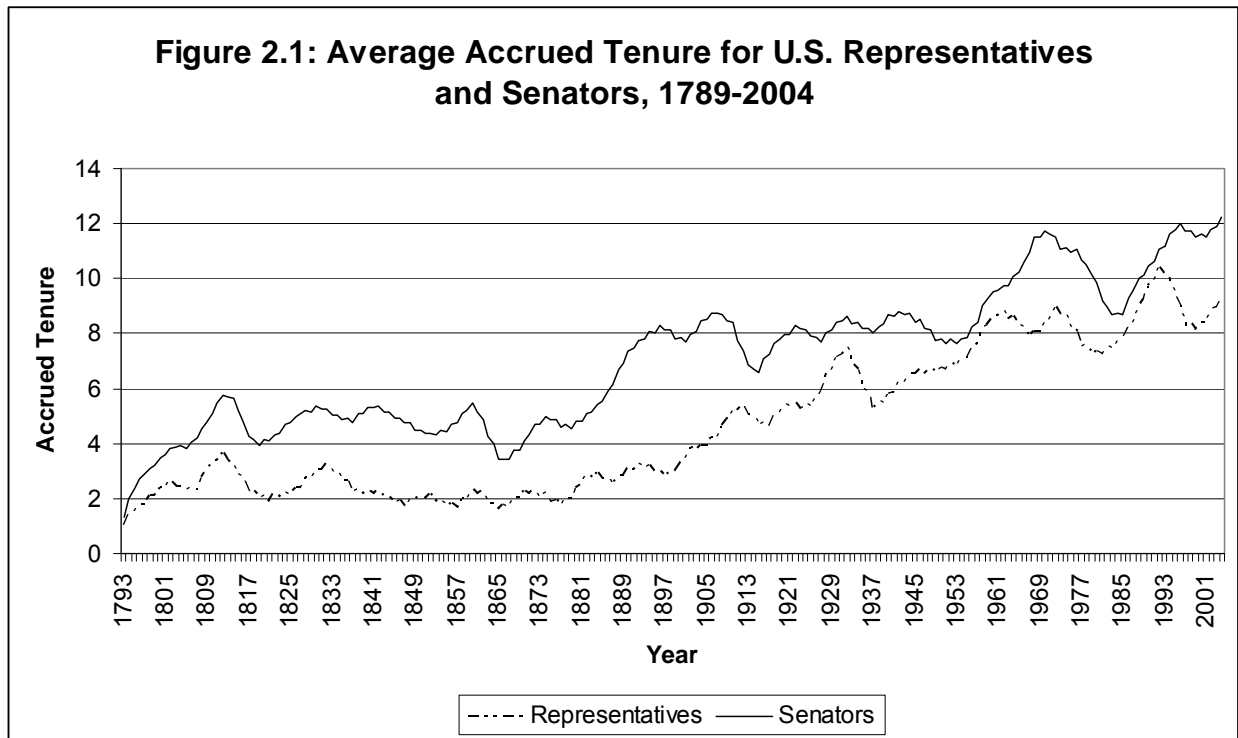
2.3 Empirical Analysis

2.3.1 Data

Figure 2.1 displays the average tenure rates for United States Representatives and Senators from the inception of Congress until 2004.[1] In order to calculate the average tenure rates of United States Representatives and Senators, total years of accrued tenure for every Representative and Senator from every state for every year for the entire history of the United States was gathered from the Biographical Directory of the United States Congress. "Accrued tenure" is the total

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[1] Note that the first value in Figure 2.1 occurs in 1793; the 1st Congress assembled in 1789. Each year value is a five-year running average; therefore, the value at 1793 is a five-year average of the average tenure rates from 1789-1793. The adjustment is for visual purposes only and does not distort the time trends presented in any significant manner.

number of years previously served within the chamber of the United States Congress in which the legislator serves in year t. The analysis utilizes 68,244 annual Representative-level accrued tenure values, and 16,542 annual Senator-level accrued tenure values, to derive the average amount of accrued tenure across Representatives and Senators for each year throughout the history of the United States Congress.

Legislators serving discontinuous terms retained their previous experience; for example, a Senator serving exactly one full term, leaving office and then resuming Senatorial service began the second term with six years of accrued tenure. Representatives or Senators holding different seats within the same chamber retained their accrued tenure as well; for example, a Senator alternating between the two allotted seats within a state, or a Representative serving two or more districts within the same state.

Tenure rates have evolved within the United States Congress over two distinct periods throughout American history. The first period, from the inception of Congress in 1789 through the 1870s, exhibited fairly constant average tenure rates amongst both Representatives and Senators; average Representative tenure over the first eighty years of Congress hovered around two years, and average Senator tenure remained around five years. However, during the 1870s, the second period of Congressional tenure emerges, characterized by consistently increasing rates of average tenure for both Representatives and Senators. From a stationary average tenure rate of about two years, average Representative tenure increased to an all-time high in 1992 of over eleven years, and was at ten years in 2004. Similarly, average Senator tenure increased from a stationary value of five years to thirteen years by 2004.

However, during the 1870s, the second period of Congressional tenure emerges, characterized by consistently increasing rates of average tenure for both Representatives and

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Senators. From a stationary average tenure rate of about two years, average Representative

tenure increased to an all-time high in 1992 of over eleven years, and was at ten years in 2004.

Similarly, average Senator tenure increased from a stationary value of five years to thirteen years

by 2004.

2.3.2 Empirical Breakpoint Analysis

In order to isolate a single breakpoint for the time series of average U.S. Representative tenure

rates, I estimate the following model:

$$(2.3) \quad Tenure_{it} = \alpha + \beta_1\tau_t + \beta_2 Senate_i + \beta_3[year_t \cdot \tau_t] + \beta_4[Senate_i \cdot year_t \cdot \tau_t] + \varepsilon_{it}$$

where *Tenure* represents the average years of accrued tenure in Congressional chamber *i* across

all United States Congressmen in year *t*. Since the analysis focuses on effects to legislative

activity, both Senator and Representative tenure measures are combined into a single time series.

Senate allows for separate levels of tenure, as Figure 2.1 proves necessary, yet the model still

imposes the same breakpoint upon both time series. τ is a time trend. *year* is a dummy variable

having value 0 for every year prior to year *t* and having value 1 for year *t* and every year and

after year *t*. For example, in the regression estimating 1860 as the year in which the break in the

series occurs, the dummy variable takes the value 0 for every year 1859 and prior, and takes the

value 1 for every year 1860 and forward. *year* represents the hypothesized year that the

structural break in *Tenure* occurs; the model is then estimated over a range of potential years to

find the most likely year in which the break took place. The specific regression that has the most

statistically significant values of β_3 and β_4, by virtue of a joint F-test, represents the most likely

breakpoint in the data. By visual analysis of Figure 2.1, the range of interest for possible

breakpoint years appears to fall between 1850 and 1890, though the test still takes every year

from 1821 to 1994 into consideration. Andrews (2003) provides the appropriate critical values

for the overall significance levels of the breakpoints.

2.3.3 Results

Figure 2.2: Breakpoint signficance, 1821-1994
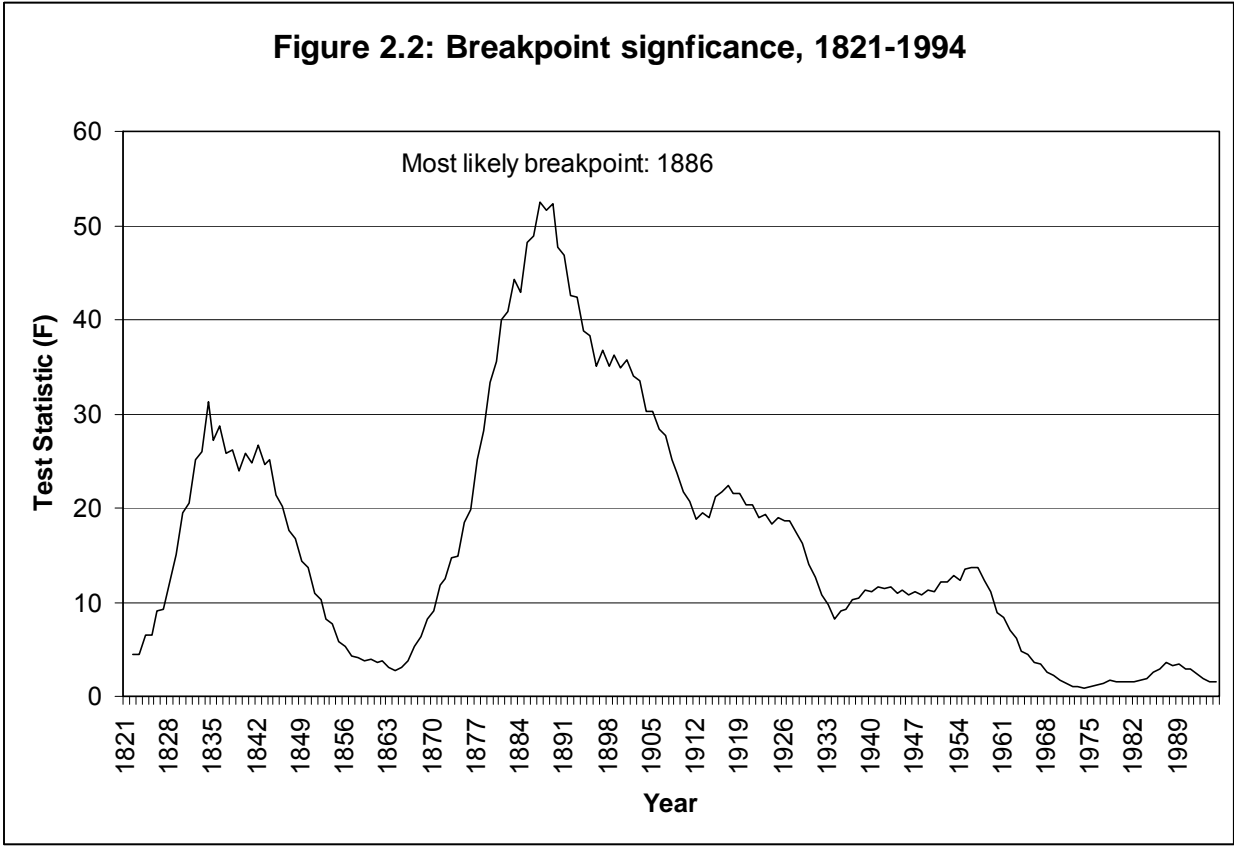
Figures 2.2 displays the results for the single breakpoint analysis on the United States

Representatives and Senators tenure time series, respectively. The x-axis represents the tested

breakpoint year from Equation 2.1, and the corresponding y-axis value is the F-statistic for null

hypothesis that $\beta_3 = \beta_4 = 0$. The iteration with the highest F-statistic is the most likely breakpoint

in the pair of time series. In estimating Equation 2.1, the most likely breakpoint in the time

series for United States Representatives and United States Senators is 1886.[2] Per Andrews

(2003), the significance of the breakpoint is well beyond the critical value for 99% (p < 0.01).[3]

2.4 Possible Explanations for Breakpoint in Average Accrued Tenure

Section 2.3 models the decision of a legislator to pursue additional periods of service. Shocks to

the factors that play a role in the decision to pursue additional years of office should have

predictable impacts upon legislative tenure rates. Conversely, with knowledge of an

approximate breakpoint in the data, focus should rest most on shocks that occurred around this

time period. I focus solely on the initial shock to legislative tenure that occurred, according to

the previous breakpoint analysis, sometime near 1886.

2.4.1 Life Expectancy

As life expectancy increases, legislative tenure, *ceteris paribus*, should increase as well. One

term of service comprises, in percentage terms, a progressively lower portion of an individual's

expected life span as years of living increase. Therefore, a public servant desiring, for example,

fifteen years of life after public service can pursue holding office for a longer period of time

without compromising his private lifestyle preferences.

Increases in life expectancy, however, can not be responsible for the increase in

legislative tenure observed in the late 1880s. The United States Census' *Historical Statistics of

the United States* shows that, from 1850 to 1890, the increase in life expectancy among those

cohorts eligible to serve in the United States Congress was either extremely minor or negative.

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[2] Breakpoint tests performed on each time series independently isolate 1904 as the most probable year for the United States House of Representatives and 1884 as the most probable year for the United States Senate.
[3] The maximum critical values reported by Andrews (2003) as pertaining to two breakpoint-influenced variables are 11.20, 12.93, and 16.44, for p-values of 0.10, 0.05 and 0.01, respectively.

Among those aged 20-29 and 30-39, increases in life expectancy were only 0.56 and 0.05 years, respectively. Every cohort above these age groups (40-49, 50-59, 60-69, 70-79, and 80+) actually witnessed a decrease in life expectancy (of 0.53, 0.88, 0.87, 0.85, and 0.50 years, respectively). While an increase in life expectancy could theoretically cause an increase in the length of service of United States Congressmen, in actuality it can not be the reason for the sudden increase in legislative tenure which occurred in the late 1870s. Large increases in life expectancy amongst these serving cohorts did not surface until at least a decade into the 20th century, and likely several decades into the 20th century—at least thirty years after the initial increase in legislative tenure occurred.

2.4.2 Legislative Salary

As previously mentioned, a rise in compensation would, *ceteris paribus*, cause average tenure rates to rise. Should congressional salaries increase, existing legislators would seek to retain their positions with more intensity, and utilize their advantage as incumbents to hold onto their seats for longer periods of time.

The United States Senate retains information on the salaries of Congressmen. The United States Constitution dictates that Congress determines its own compensation. Excluding a few brief periods in Congressional history, of which differences were both minor in magnitude and not coincident with the time periods of interest here in this analysis, U.S. Representatives and Senators have received equal compensation. This compensation, however, is an unlikely source of the increase in tenure witnessed in the late 1870s. From 1817 through 1855, Congressmen received $8 each day in which they were in session. In 1855, this changed to a flat, $3,000 stipend per year, and in 1865 it rose again to $5,000. However, congressional salaries remained

constant at this level for the ensuing forty-two years, except for a brief two-year period from 1871-1873, until 1907. Given the nature of steadily rising tenure rates throughout the last quarter of the 19th century, and the constant compensation received by federal legislators over this same time period, it is unlikely that Congressional salary spurred the initial increase in tenure.

2.4.3 Prevailing Market Wages

As mentioned above, one of the significant costs of serving in office is the opportunity cost of earning a market wage. In a situation of rising market wages, *ceteris paribus*, the increasing cost of holding office would lead to fewer legislators pursuing additional terms of office. As such, average tenure rates would decrease in the presence of rising market wages.

Long (1960) looks at a range of manufacturing and construction wages from 1860 to 1890 and found that while wages in some industries may have fallen during the early part of the time period (due to the Civil War, through about 1865), wages nearly unilaterally rose in all occupations throughout the remaining years of the sample. Prevailing market wages, from the end of the Civil War until 1890, distinctly rose. With wages putting downward pressure on tenure rates throughout the later half of the 19th century, these, too, can be eliminated from the possible reasons as to the sudden increase in average legislator tenure rates that occurred in the late 1870s.

2.4.4 Federal Spending

The process of distributing federal expenditures is one example of legislative activity that can benefit the legislator. Constituencies often feel grateful towards their national representatives for

allocating federal funds towards programs in which they will benefit; furthermore, constituencies that benefit in such a manner while paying a proportionally lower share of federal taxes to fund such projects are better off still. The process of distributing federal revenues generates personal benefits for the legislators through the process of rent seeking.

While in any one year federal revenues may exceed (trail) federal spending, creating a surplus (deficit), the trend of federal revenues generally mirrors the trend of federal spending. As such, as federal outlays have evolved throughout American history, so too has the ability of legislators to levy taxes to fund this public spending. Since the tax-and-spend process can be utilized to make holding office more valuable for the legislator, comparing the trends in federal spending to the trends in tenure could reveal some common ground.

Figure 2.3: Federal Spending per capita (2000$), 1792-2006
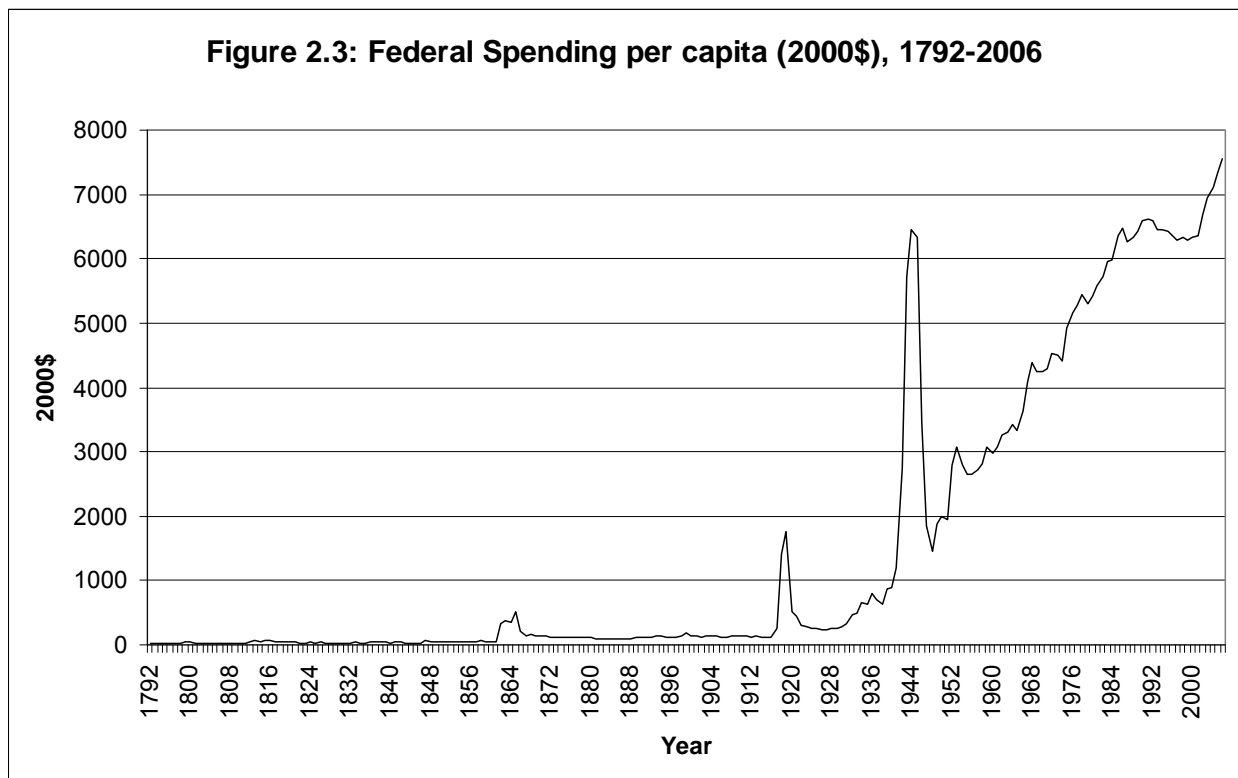
Figure 2.3 shows the evolution of federal spending per capita in the United States from 1792 through 2002. Beside a small bump in federal outlays due to the Civil War in the 1860s,

federal spending on a per-person basis remained at a minimal level through the mid-1910s, when the onset of World War I caused a spike in spending that never receded. Aside from another spike in spending due to World War II, per capita federal spending has increased steadily for nearly an entire century.

Though many factors could contribute to an increasing level of federal spending, one significant factor must be the passage of the 16th Amendment by Congress on February 3, 1913. Its text is brief: "The Congress shall have the power to lay and collect taxes on incomes, from whatever source derived, without apportionment among the several states, and without regard to any census or enumeration." The impact of the 16th Amendment was two-fold. First, Congress now had the power to directly tax incomes. Income taxation existed only briefly on two separate occasions. During the Civil War, the United States Congress (as well as the Confederate States of America) imposed an income tax to help generate revenues to offset the heightened expenditures due to conflict. Congress also briefly had the ability to tax income due to the passage of the Wilson-Gorman Tariff Act in 1894, though one year later the Supreme Court effectively eliminated the ability of Congress to collect income tax revenue in *Pollock v. Farmers' Loan & Trust Company*. Due to the 16th Amendment, incomes would no longer be off-limits to legislators in search of a long-term source of tax revenue.

The combination of World War I, which provided an outward shock to public sector demand for revenue, and the 16th Amendment, which eased the process by which the federal government could collect funds, generated an almost immediate increase in federal spending. At the inception of income taxes in 1913, the lowest federal tax bracket stood at 1% for those making an annual income of $20,000, and the highest federal tax bracket was just 7%, applicable to those making $500,000. By 1918, the lowest federal tax bracket jumped to 6%, and applied to

incomes of $4,000; the highest federal tax bracket, though pushed upwards to incomes of $1,000,000, skyrocketed to 77%. As a result, federal spending increased by a factor of 10 from 1913 to 1918, from just under $130 per capita to over $1400 per capita.

The second important factor contributing to the increase in federal spending concerned the fact that taxation and its subsequent apportionment no longer was subject to the strictures of Article I of the Constitution; namely:

> Article I, Section 2: "…direct Taxes shall be apportioned among the several States which may be included within this Union, according to their respective Numbers…"
>
> Article I, Section 8: "The Congress shall have the Power To lay and collect Taxes, Duties, Imposts and Excises…but all Duties, Imposts and Excises shall be uniform throughout the United States."
>
> Article I, Section 9: "No Capitation, or other direct, Tax shall be laid, unless in Proportion to the Census or enumeration herein before directed to be taken."

In essence, the Constitutional constraints on redistribution via taxation were removed with the 16th Amendment. Whereby Article I intentionally tied the hands of Congressmen with regards to legislative fiscal favoritism, the 16th Amendment cut these bounds. In the end, the income tax amendment allowed for a swelling of federal coffers by permitting taxation on previously unavailable sources of tax revenue, and introduced large scale redistribution of these bulging federal accounts by removing the Constitutional constraints against taxing one group and spending these funds on another.

However, while attributing, if not wholly, the increases in federal spending to the passage of the 16th Amendment appears prudent, a similar relationship between the income tax Amendment and the accrued tenure rates of U.S. Representatives and U.S. Senators can not be established. Though tenure rates rose after 1913, they began to rise well before the turn of the

20th century. While the 16th Amendment may have contributed to today's high tenure rates, it was not the initial cause of the rise that took place in the late 1870s.

2.4.5 Regulation

As directing federal expenditures towards constituents is one legislative activity that benefits federal legislators, the process of regulation is a second legislative activity that similarly benefits the federal legislator. Federal spending involves direct fiscal outlays which, in turn, are a derivative of taxation. In this sense, federal spending can be viewed as a balance sheet activity; constituents pay a certain amount in federal taxes and receive a certain amount in federal expenditures. The calculation may not be easy (or feasible) for any individual to perform, but that is beside the point; citizens pay into a large federal fund, and hope to receive as many programs that personally benefit them as possible.

Regulation is a separate type of legislative activity. Instead of focusing on revenues and expenditures, regulation is the process by which legislators change the rules of the economic game to favor their constituents. As these rules ultimately have (considerable) fiscal consequences, rent seeking activity follows from regulatory action as well. Thus, the ability to regulate an economy is a benefit to holding legislative office.

Anderson and Hill (1980) investigate the impact of the Supreme Court throughout its first two centuries and its role in encouraging either productive activity, by solidifying property rights and aligning the self-interest of the individual with the welfare of society as a whole, or promoting transfer activity, whereby individuals can benefit through takings that generate individual gains at the expense of others, and creates a reduction in society-wide welfare. The authors identify a shift in constitutional interpretation beginning in 1877 with *Munn v. Illinois*, a

case concerning the ability of the Illinois legislature to set grain storage rates. Munn & Scott, grain warehouse operators, sought to charge rates of their own choosing for the storage of grain. In turn, the state of Illinois argued that the warehousemen were "engaged in public employment," and as such, their services were subject to regulation by law. (Munn v. Illinois (1877))

The agreement of the Supreme Court with the state of Illinois' interpretation of private property in light of public use was crucial towards modifying the Constitution's stance on property as a whole. Property is used for market transactions, either itself (i.e., a bushel of grain) or as a means of providing other goods and services (i.e. a warehouse by which to store grain for future transactions). Market transactions involve voluntary participation between agents; insofar that property involved in exchange involves more than one individual—either a transfer of ownership or a venue for transactions—nearly all property can be viewed as "public" in nature, per the arguments of the state of Illinois. (See also Justice Field's dissent in *Munn v. Illinois* below.) Previous to *Munn*, owners of private property decided how to allocate their assets; property may be accessible by and privy to transactions between a large portion of a community, but ownership was never mistaken for frequency of use.

The majority opinion in *Munn v. Illinois* highlights this new understanding of private property. Chief Justice Morrison Waite wrote:

> "When, therefore, one devotes his property to a use in which the public has an interest, he, in effect, grants to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest he has thus created. He may withdraw his grant by discontinuing the use; but, so long as he maintains the use, he must submit to the control."

The submission of property owners to the will of the legislature is the lasting precedent of *Munn v. Illinois*. Anticipating the impact of establishing property to this perception of "public use," Justice Stephen Johnson Field highlights the exact implications of the Court's decision in his dissent:

> "If this be sound law, if there be no protection…all property and all business in the State are held at the mercy of a majority of its legislature. The public has no greater interest in the use of buildings for the storage of grain than it has in the use of buildings for the residences of families…The public is interested in the manufacture of cotton, woolen, and silken fabrics, in the construction of machinery, in the printing and publication of books and periodicals, and in the making of utensils of every variety, useful and ornamental; indeed, there is hardly an enterprise or business engaging the attention and labor of any considerable portion of the community, in which the public has not an interest in the sense in which that term is used by the court in its opinion…"

Munn v. Illinois legitimized the regulation of any private property that could be classified as 'in the public interest,' and, in doing so, provided legislatures the ability to intervene into markets much further than previously allowed. As such, the foundations for regulation were established.

The *Munn* decision headlines a group of lawsuits known as the Granger cases, a series of eight lawsuits that dealt with the ability of states to regulate the railroad industry in addition to grain storage. Building upon this regulatory momentum, Congress established the Interstate Commerce Commission through the Interstate Commerce Act of 1887, which became the blueprint by which future regulatory agencies were modeled after.

The timing of *Munn*, as it pertains to the rise in legislative tenure, is striking. Recall from Section 2.3.3 that the most likely breakpoint in the tenure series occurs in 1886, but a few election cycles following the Munn decision in 1877. Similarly, the subsequent steady rise in tenure rates is buttressed by the ensuing Granger cases and the larger regulatory climate inherent

in the 'private property for public use' belief system. *Munn v. Illinois* and its place in allowing

for the regulation of the economy must be considered as a probable cause for the initial rise in

legislative tenure that began in the 1880s.

2.4.6 United States Civil War

Due to the proximity of the empirical breakpoints to the 1860s, it is worth considering the role of

the United States Civil War in creating a stronger, more centralized federal government. A

stronger federal government means that public officials at the federal level, all else equal, hold

more powerful positions and have a more pervasive sphere of influence. Insofar as public

officials desire more powerful roles (see Niskanen (1971) as an early work, among many), a

stronger federal government leads to more attractive public offices and, as it pertains to federal

legislators, longer tenures in office.

While Figure 2.3 displays the total amount of federal spending in real 2000 dollars, this

graph gives no indication as to the volume of spending relative to the size of the economy.

Hummel (1996) notes that federal government spending in 1865 was approximately 20 percent

of the economy—a level that approximates the federal government's footprint upon today's

economy. Such a rise in spending was astounding; prior to the war, federal outlays were but a

slight percentage of GDP. The realization that the federal government *could* become such a

significant portion of the economy in times of need shed new light upon the role of the federal

government. In peace or during war, the role of the federal government had changed from a

minimalist, restrained unit to a proactive, further-reaching entity of economic involvement.

Reconstruction is certainly an example of the post-war advancement of the federal government.

Hummel (1996) also identifies a surge in nationalism after the war, and a sense of national identity that simply did not exist prior to 1861. Writes Hummel:

> William Ellery Channing, a Unitarian minister representing the New England intelligentsia, had complained in 1835 that "most men value the Union as a Means; to me it is an End." But by 1865 the poet James Russell Lowell observed a "national conciousness," in which "every man feel himself a part, sensitive and sympathetic, of a vast organism."

The shift in opinion about the role of the federal government can even be traced to semantics. Donald (1978) notes that prior to the Civil War, "many politicians and writers referred to the United States in the plural," yet became almost universally singular after 1865. Higgs (2004) remarks that prior to the Civil War, those referring to the country used "these" United States, whereas afterwards the phrase became "the" United States. Further, Hummel (1996) explains that instead of using "Union," Abraham Lincoln used the word "nation" five times in the Gettysburg Address—in less than three hundred words.

Due to the timing of Civil War with the sudden rise in legislative tenure, and role that the Civil War played in redefining the federal government, the Civil War can not be ruled out as a potential cause of the rise in legislative tenure. Though the end of the Civil War predates the rise in tenure, even by the most conservative estimates, by over a decade, any event within this time span, economic or otherwise, must be viewed in light of what many call the defining event of American history.

2.4.7 Conclusion

This section examines a range of possible factors that could influence the rates of accrued tenure amongst Congressmen. The analysis eliminates changes in life expectancy, legislative salary,

and prevailing market wages as possible explanations for the sudden rise in legislative tenure in the last quarter of the 19th century. More significantly, the legislature's ability to generate tax revenues and distribute them as spending projects fails to explain the rise in tenure as well. Instead, the ability of a legislature to regulate an economy is a more likely possibility. Finally, the proximity of the United States Civil War to the upturn in legislative tenure also deserves consideration.

2.6 Conclusion

This article looks to isolate the nature of legislative tenure throughout the complete history of the United States Congress. Average accrued tenure evolved through two distinct phases. The first phrase, from the inception of Congress until the late 1870s, is characterized by relatively constant accrued tenure rates across federal legislators. The second phase, starting in the late 1870s and continuing to the present day, is characterized by constantly increasing accrued tenure rates by both U.S. Representatives and Senators.

While previous studies have taken a statistically limited approach towards making assertions about the trends of legislative tenure over time, this analysis provides a comprehensive overview of accrued tenure rates that has not been performed to the knowledge of the author. By looking at every year of the United States Congress, subtleties in trend movement can be isolated to particular points in time. Previous studies can make only broad statements of tenure trends; this analysis can pinpoint tenure evolution much more precisely.

In order to investigate the nature of the abrupt change in legislative tenure rates, the decision to pursue additional years of legislative service is modeled, and shocks to the different inputs into the decision-making process. Ruled out as possible causes to the shift in tenure rates

are changes to life expectancy, legislative salary, prevailing market wages, and the legislative process of directing federal expenditures towards constituents. Possible causes for the upward shift in tenure rates are the ability to regulate via legislative processes and the United States Civil War.

The comparison of changes to legislative processes is of particular interest. At first take, prior to analyzing Figure 2.1, it would seem to be that average tenure rates would mirror the ability of legislators to direct federal funds towards their constituents. The story of the initial rise in tenure rates, however, is not about taxation and expenditure, but regulation. It was the ability of legislators to regulate an economy that initially caused the implicit value of holding office to rise. It would be foolish to imply that the ability to tax and spend has not played any role in the evolution of tenure of the history of the United States Congress. After all, allocating federal monies constitutes a large part of job of a current United States Congressman, and average tenure rates continued their steady climb after the passage of the 16th Amendment in 1913. But the income tax amendment can not be declared as the initial cause of rising legislative tenure rates. This view gives credence to Holcombe (1999), which posits that the income tax amendment was endogenous to the federal system, not an external shock, passed by legislators realizing the value of office and seeking to increase it further. Amongst legislative activities that permeate the market, regulation played the initial role in causing the rise in tenure, not federal spending.

The value of the analysis is reflexive. As put forth in this analysis, accrued tenure rates can be analyzed in a global sense, and points of particular interest within the overall trend can be studied in light of historical events. For example, a significant shock to legislative tenure rates occurred at some point during the late 1870s; given this shock, events surrounding this time period that have a legislative impact must be considered as possible causes. However, the

robustness of the data allows for the opposite to be done. Should any events be considered influential towards the value of holding office, particular tenure rates over any conceivable time span can be analyzed to provide an empirical basis to the claim that the value of holding office changed due to an exogenous shock.

This research, while isolating a major breakpoint in the evolution of accrued tenure rates throughout American history, focuses on only one (albeit significant) cause of the rise in tenure rates of federally elected legislative officials. There may be other contributing factors outside of *Munn v. Illinois* and the Granger cases, along with the United States Civil War, that contributed to the initial rise in accrued tenure in the last quarter of the 19th century. In addition, due to the robust nature of the data, other periods of significant changes to average tenure rates can now be isolated and investigated in a similar manner to this analysis. For example, the 1970s appear to contradict an otherwise steadily climbing average accrued tenure trend throughout the 20th century; to what could we attribute as a cause of this sudden and rapid decline?

Chapter 3

Legislative Tenure, Federal Spending, and State Economic Performance: 1981-2004

3.1 Introduction

What impact does legislative tenure have on federal spending and, in turn, states' economic

performance? Levitt and Poterba (1999) find that states represented by senior Democratic

congressmen, as well as those with politically competitive House districts, grew faster than

average. They stop short, however, of attributing the variance in state growth to the variance in

federal spending within states. This analysis looks to establish such a connection between

federal spending and state economic performance through differences in tenure among state

delegations to the United States Congress.

Recent studies have begun to shed light on the process of the allocation of federal

spending and the impact of federal spending on state economic performance. Matthews,

Shughart and Stevenson (2007) address the hypothesis of a 'small-state bias' in federal spending;

that is, since small states are 'over-represented' in the Senate, they receive an inordinately large

share of federal spending. The findings are sensitive to the time period covered, and per this

analysis, a small-state bias does not seem to exist after 1980. Higgins, Young and Levy (2006)

proxy for the influence of federal, state, and local governments into the economy by utilizing

public sector labor force data and find that, at the federal, state, and local level, increased

government involvement in the economy is either negatively correlated with or uncorrelated with

economic growth.

It is important to investigate the impact of federal spending upon state economic

performance because of the sizeable influence federal spending could potentially have. Further,

the amount of spending in the United States at the federal level attributable to individual states varies significantly; in 2004, federal spending in West Virginia alone was nearly $8400 per resident, or roughly 30% of state income per capita. By comparison, New Jersey received almost $6400 in federal spending per resident in 2004—only 13% of state income per capita. While even 13% of state income per capita is a nontrivial amount, the federal spending footprint within West Virginia is nearly two and a half times that of New Jersey. As such, while the possibility for a tangible impact of federal spending upon both economies is large, the chance that the difference in federal spending between the two states having separate effects is extremely likely as well, and therefore worthy of investigation.

As federal spending amounts vary amongst states, so too does the tenure of their delegations to the United States Congress. In 2004, the average tenure of a state's delegation was 9.33 years to the House of Representatives, with a range of 30 years. The average tenure of a state's delegation to the Senate was 12.64 years, also with a range of 30 years. As previously mentioned, West Virginia received nearly $8400 per resident, with an average Representative tenure of 17 years and an average Senator tenure of 32 years; New Jersey received nearly $6400 per resident with an average Representative tenure of 10.5 years and an average Senator tenure of 2 years. Insofar as tenure is an important determinant in the allocation of federal funds to separate states, it is crucial to include tenure to obtain a full view of the federal funding/state economic performance picture.

This analysis finds that states with more tenured congressional delegations receive more federal spending, and this increase in federal spending has a detrimental long-run effect on state economic performance. Depending on the specification, each additional year of tenure for a U.S. Representative harms their home state's income $130 to $270 per capita (linear), or $20 to $140

per capita (quadratic); each additional year of tenure for a U.S. Senator harms their home state's income $30 to $90 per capita (linear), or $10 to $145 per capita (quadratic), in constant 2000 dollars. At mean tenure levels, these effects can approach or surpass over $1000 per capita in foregone state income—and increasing as tenured officials continue to stay in office.

The chapter proceeds as follows. Section 3.2 outlines the role of federal spending in the economy. Section 3.3 presents the empirical models. Section 3.4 discusses the results. Section 3.5 concludes.

3.2 Federal Spending in the Economy

Federal programs can range from traditional economic "public goods"—such as highways and welfare programs, thought to be difficult for the market to provide—to federally supported programs designed to supplement or even replace private market activity. Further, due to discrepancies between the amount of federal taxes paid by states and the amount of federal spending received, the process of allocating federal spending can become an effective redistributive tool for federal legislators.

Though oftentimes thought to be a crucial to a functioning state economy, or even intended to provide an economic boost, there are a number of reasons to believe why increases in federal spending may be detrimental to a state's economy. Government provision of goods and services entails the reallocation of assets through taxation. Such activity is not wealth-creating but wealth-reorganizing, and insofar that this government activity crowds out the private sector and its wealth-enhancing properties, states with more federal spending could lag behind those states where the presence of the federal government is lower. Should federal spending be an attempt to correct a perceived market shortcoming—a lack of or an inefficient provision of a

good or service—there exist significant barriers to the public sector improving upon market outcomes. Hayek (1945) identifies that the dispersed nature of information prevents the public sector from making an efficiency enhancing decision with any certainty. In addition, time inconsistency exists between the decision to spend public money and the actual execution of the project.

Public choice theory presents another avenue in which the process of federal spending may not lead to welfare enhancement. The previous shortcomings assume elected officials act in a strictly social welfare-maximizing manner; this need not be the case. The prospect of (re-) elections has been shown to distort the decision making processes of a wide array of elected officials. Garrett and Sobel (2003) find that areas of political importance to the president have more disasters declared, and FEMA disaster expenditures are higher in areas having congressional representation on FEMA oversight committees. Kubik and Moran (2003) show that state executions are timed to coincide with gubernatorial elections. Young, Reksulak and Shughart (2001) note that IRS audits occur less often in districts that are politically important to the president.

Figures 3.1a and 3.1b present a brief picture of the overarching results put forth in this analysis. From 1981 to 2004, four states are handpicked to track their growth in federal spending and income per capita. New Hampshire, Wisconsin, Montana and West Virginia all had very similar levels of federal spending per capita within their state in 1981, and had very similar levels of income per capita. However, two of the states, Montana and West Virginia, experienced sharp increases in federal spending per capita relative to New Hampshire and Wisconsin. Subsequently, New Hampshire and Wisconsin experienced much strong growth over the twenty-four year sample. By 2004, Montana and West Virginia was receiving roughly one-

Figure 3.1a: Federal Spending per capita (2000$), 1981-2004

Legend: Montana, New Hampshire, West Virginia, Wisconsin
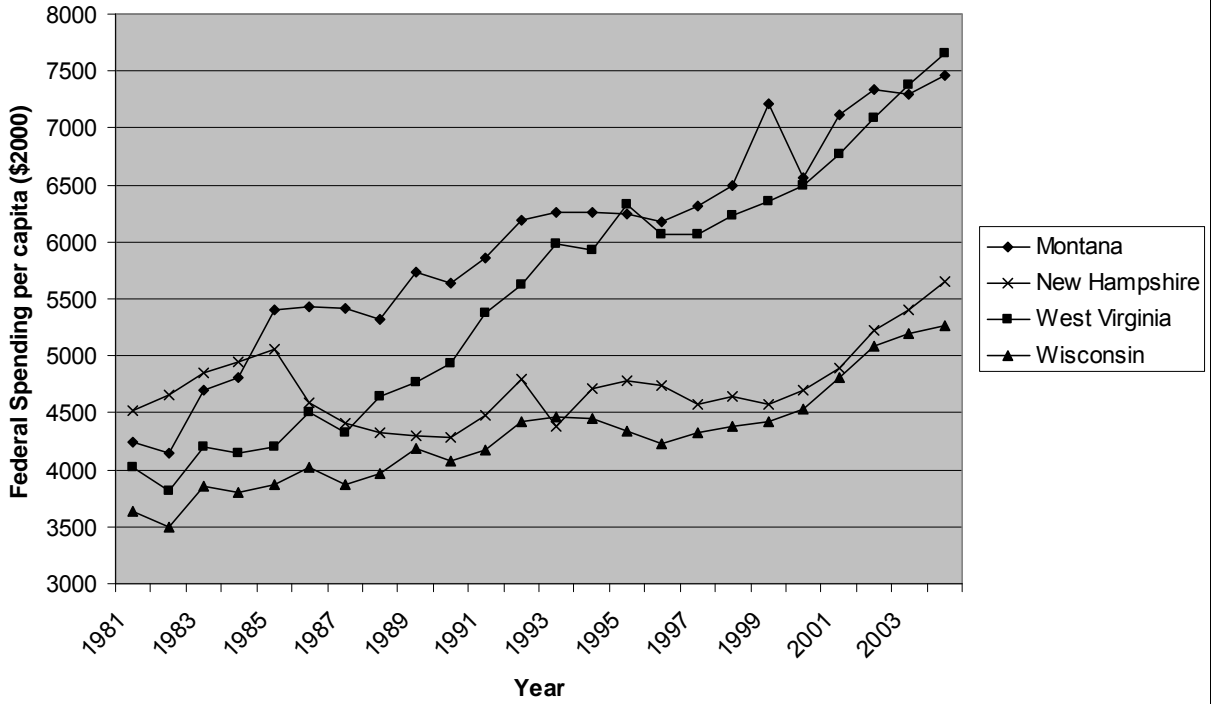
Figure 3.1b: Gross State Product per capita (2000$), 1981-2004

Legend: Montana, New Hampshire, West Virginia, Wisconsin
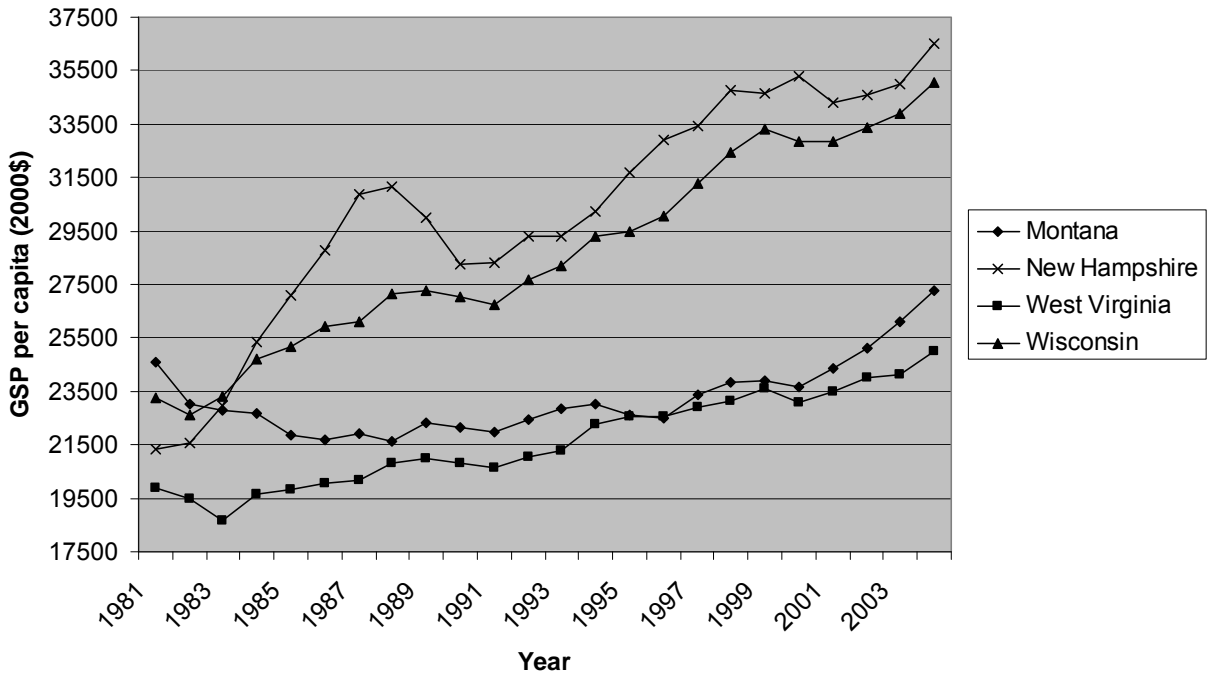
third more federal spending, yet only had 70% of the income per capita, of New Hampshire and Wisconsin. While this snapshot does not address issues of causality nor control for any other mitigating factors in state growth (both factors are considered in Section 3.3), the effects increased federal spending have in dampening long-run economic growth are displayed here.

3.3 Empirical Model

3.3.1 Initial Panel Specification

To isolate the long-run effects of state-level federal spending on states' economic performance, I examine a panel analysis to isolate the impact of federal spending upon state economic performance. I estimate the following equation,

$$(3.1) \quad GSPpc_{it} = \beta_0 + \beta_1 FedSpendpc_{it} + \varphi \mathbf{Y}_{it} + \gamma \mathbf{Z}_{it} + \varepsilon_{it}$$

where $GSPpc_{it}$, the dependent variable, is the per capita gross state product (GSP) of state i in year t. These data are available through the Bureau of Economic Analysis' Regional Economic Accounts. $FedSpendpc_{it}$ is the amount of federal spending procured to state i in year t, and is the independent variable of interest. Since gross state product includes federal funds, as reported by the Bureau of Economic Analysis, the amount of federal spending within state i in year t is subtracted from reported GSP for state i in year t.[4] The Tax Foundation provides concise figures on the amount of annual federal funding each state receives.[5] β_1 is the coefficient of interest, pertaining to $FedSpendpc$. $\mathbf{Y}_{it}$ is a matrix of control variables that attempt to capture factors

---

[4] See Section 3.3.2 for further information on the gross state product (GSP) variable.
[5] The Tax Foundation, per the Census Bureau's Consolidated Federal Funds Report (CFFR), reports the amount of federal spending allocable to an individual state. These programs cover grants, salaries and wages, procurement contracts, direct payments for individuals, other direct payments, direct loans, guaranteed or insured loans, and insurance. For FY 2004, they report 8% of the CFFR is not attributable to the states.

affecting gross state product particular to each state. These control variables include the annual

unemployment rate, collected from the Bureau of Labor Statistics, as well as the percentage of

the population aged 25 or over that hold a high school diploma, collected from the U.S. Census

Bureau. The matrix of coefficients for these control variables, φ, will not be analyzed.[6]

$\mathbf{Z}_{it}$ is a full slate of year- and state-fixed effects. The matrix of coefficients for these fixed

effects, γ, will not be analyzed. ε_{it} is the error term. The results for this initial estimation are

found in section IV.

3.3.2 A Note Concerning Gross State Product

By construction, gross state product of state i can be represented in the following expression:

$$(3.2) \quad GSP_i = P_i + SL_i + F_i$$

where GSP is gross state product of state i, P is private market activity within state i, SL is state

and local government spending within state i, and F is federal government spending within state

i. Taking the total derivative of Equation 3.2 with respect to federal government spending yields

the following:

$$(3.3) \quad \delta GSP_i / \delta F_i = \delta P_i / \delta F_i + \delta SL_i / \delta F_i + 1$$

By subtracting out federal government spending within state i, the GSP effect reported in Tables

3.1 and 3.2 is $(\delta P_i / \delta F_i + \delta SL_i / \delta F_i)$. Alternative specifications of the empirical model that do

---

[6] The control variables end up with the appropriate signs (unemployment: negative, percent of population with high school diploma: positive) in all specifications, and with significance in nearly all specifications.

not remove federal spending from gross state product, i.e., estimate $\delta GSP_i / \delta F_i$, produce very similar results. While $\delta P_i / \delta F_i$ may be of some empirical interest, its specific effect cannot be extracted from the analysis presented here.

3.3.3 Instrumental Variable Analysis

Implicit in the initial analysis are issues concerning endogeneity. In the above model, it could be argued that it is federal spending that has a direct impact upon a state's gross economic output. Conversely, it could also be that state i's economic performance is a factor in the amount of federal funds allocated to state i. To address these issues of causality, the analysis incorporates an instrumental variable (IV) for federal spending of interest from the initial specification.

This analysis posits that a main determinant of the topography of federal spending is the tenure of each state's congressional delegation. While incumbent representatives attempt to direct federal funds to their districts in order to curry favor with their constituents, there are reasons to believe that their ability to do so increases as they spend more time in office. Legislative rules and processes become increasingly familiar as years of experience increase. Further, more tenured legislators are generally those chosen to sit on committees, which play an important role in the political process. Moreover, logrolling is only as effective as a representative's ability to build bonds with follow legislators in order to garner trust and support; such social capital most certainly increases, ceteris paribus, as years in Congress increase.

In order for an instrumental variable to be valid, its impact upon the final dependent variable (in this case, gross state product) must occur only through the variable instrumented for (here, federal spending). Therefore, a state's economic performance must not affect the amount of tenure accrued by its congressional delegations. Levitt and Poterba (1999) note that prior state

economic performance affects current tenure rates; that is, if the decision to retain existing

Congressmen in year t is a function of state economic performance, it is only a function of

economic performance before year t. The lagged nature of the relationship between tenure and

economic performance assures no contemporaneous issues in the model.

To incorporate the average tenure of a state's Congressional delegation as an instrumental

variable, I estimate the following two-stage least squares (2SLS) model:

$$(3.4) \quad FedSpendpc_{it} = \alpha_0 + \alpha_1 Tenure_{it} + \varphi \mathbf{Y}_{it} + \lambda \mathbf{Z}_{it} + \eta_{it}$$

$$(3.5) \quad GSPpc_{it} = \beta_0 + \beta_1 FedSpendpc_{it} + \omega \mathbf{Y}_{it} + \gamma \mathbf{Z}_{it} + \varepsilon_{it}$$

Equation 3.5 is the original panel model (Equation 3.1) from above. In equation 3.4, $Tenure_{it}$ is

the instrumental variable for per capita federal spending.[7] *Tenure* is a measure of the average

accrued years of experience in year t of a member of state i's delegation to the United States

Congress. The Biographical Directory of the United States Congress provides term information

for all members of Congress. The measure of congressional experience is divided into average

senator tenure and average representative tenure for state i's congressional delegation. As the

House and the Senate play decidedly different roles in the allocation of federal spending, their

effects are therefore worthy of separation. Squared terms for average tenure are also utilized in

some specifications for both houses of Congress to capture the effect of increasing returns to

experience.[8] Again, $\mathbf{Y}_{it}$ and $\mathbf{Z}_{it}$ are a matrix of control variables and a matrix of year- and state-

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[7] Levitt and Poterba (1999) dismiss any potential endogeneity issues between legislator tenure and federal spending, as those legislators whose constituents reward them with additional years in office are making their decision based on *previous* years of federal spending, not current levels.

[8] Given the margins upon which increased tenure could increase federal spending within a legislator's home state (see Section 3.2), it is feasible that increasing returns scale in tenure could exist through committee membership or the accumulation of social capital.

fixed effects, respectively, and φ and γ, each matrix's respective matrix of coefficients, will not be analyzed. η_{it} and ε_{it} are the error terms at the first and second stage, respectively. The results of these instrumental variable specifications are summarized in section 3.4.2.

3.4 Results

3.4.1 Long-Run Estimation Results

Table 3.1 presents the results from the models estimated in Section III. Regression (2) presents the initial panel model specification. Controlling only for state- and year-fixed effects, it is shown that increased federal spending has a detrimental effect on a state's economic performance. Each additional dollar of federal spending per capita does $2.40 in harm to the state's GSP per capita per year, evidence towards the crowding-out effect of wealth-generating private activity. At the one standard deviation level, federal spending generates a discrepancy in GSP per capita of $2967 in constant 2000 dollars—a difference that would allow the median state in 2004, Wisconsin, to rise to the 15th richest economy.

As previous mentioned, issues of endogeneity abound at this initial stage. An argument could be made at this juncture that it is not federal spending that is harming a state's economic performance. Instead, it is states that have the poorest economies that receive the most federal funding, and it is this relationship that is reflected in the initial panel regression.

To extract a causal relationship, an instrumental variable analysis is incorporated. A range of IV specifications are presented in regressions 3-8. Every instrumental variable

Table 3.1: Long-Run Impact of Federal Spending on State Economic Performance

Dependent Variable: Gross State Product per capita ($2000)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			Second Stage Results					
Federal Spending per capita ($2000)	-2.395*** (0.575)	-3.360*** (0.577)	-22.095*** (6.532)	-19.566*** (2.146)	-5.848** (2.666)	-4.546* (2.470)	-13.223*** (3.036)	-17.389*** (1.801)
Unemployment Rate		-321.19*** (94.93)	-1195.26*** (378.69)	-1077.27*** (223.88)	-437.27*** (159.10)	-376.53** (150.21)	-781.33*** (201.65)	-975.72*** (198.50)
% population with H.S. diploma		563.96*** (96.77)	1908.08*** (486.10)	1726.64*** (192.13)	742.47*** (199.56)	649.06*** (185.65)	1271.55*** (232.90)	1570.49*** (165.41)
			First Stage Results					
Avg. U.S. Rep. Tenure			12.567*** (3.949)	-52.874*** (8.803)			10.758*** (3.981)	-53.987*** (8.773)
Avg. U.S. Senator Tenure					8.084*** (2.347)	13.555** (5.593)	7.117*** (2.368)	16.353*** (5.424)
Avg. U.S. Rep. Tenure Squared				3.419*** (0.414)				3.435*** (0.414)
Avg. U.S. Senator Tenure Squared						-0.206 (0.192)		-0.388** (0.187)
Rep. Tenure Impact			-277.67	-45.17			-142.25	-25.28
Sen. Tenure Impact					-47.28	-41.41	-94.11	-138.76
N	1200	1200	1200	1200	1200	1200	1200	1200
R-squared	0.360	0.416	0.023	0.025	0.370	0.406	0.035	0.028

Notes:
* \- Indicates statistical significance at the 90% level
** \- Indicates statistical significance at the 95% level
*** \- Indicates statistical significance at the 99% level
First stage estimation for Federal Spending per capita ($2000).
All regressions include state- and year-fixed effects.
Robust standard errors in parentheses
"Tenure impact" for quadratic terms evaluated at the respective mean tenure value

specification in Table 3.1 verifies the negative causal impact of federal spending on state economic performance; in no specification does federal spending have a positive impact on state economic performance. While all instrumental variable models present a negative value in the second stage for the federal spending variable, it is those models that incorporate the average tenure of U.S. Representatives that yield the strongest statistical results. This is not a surprising result; Crain and Tollison (1977) note: "The House has constitutional primacy over money bills, which means they get first crack at appropriations bills each year....The Senate is essentially in the

position of responding to House actions, and most observers view the Senate as an appeals body in the appropriations process..."

For robustness, Table 3.2 provides the exact same analysis utilizing four-year averages of all variables.[9] While federal spending drops below the 10% level of significance in regression (13) as compared to regression (5), the results from Table 3.2 confirm the annual data results put forth in Table 3.1. Table 3.3 presents information on the first stage of the regressions presented in Table 3.1 and Table 3.2. In addition to a sound theoretical foundation, Table 3.3 highlights the statistical relationship between the instrumental variable, the average number of years of accrued legislative tenure from state i's congressional delegation in year t, and the instrumented variable, the amount of federal spending in state i in year t.

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[9] Due to data availability limiting the time frame of the analysis to 24 years, four-year averages allow for the most efficient use of the data. Using five-year averages gains only a modicum of generality in exchange for sacrificing 50 potential data points and dropping 4 years of data.

Table 3.2: Long-Run Impact of Federal Spending on State Economic Performance
4-year averages

Dependent Variable: Gross State Product per capita ($2000), 4-year average

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
				Second Stage Results				
Federal Spending per capita ($2000), 4-year average	-3.303*** (0.798)	-4.831*** (0.800)	-18.280** (7.51)	-19.517*** (3.468)	-5.476 (4.433)	-4.459 (4.249)	-11.894*** (4.108)	-17.150*** (2.873)
Unemployment Rate, 4-year average		-244.91 (164.95)	-963.76* (538.04)	-1030.08** (422.97)	-279.42 (317.27)	-225.02 (309.77)	-622.53* (340.19)	-903.53** (372.03)
% population with H.S. diploma, 4-year average		732.31*** (229.63)	1698.49*** (573.60)	1787.63*** (323.62)	778.70** (338.50)	705.58** (326.02)	1239.86*** (327.19)	1617.54*** (276.55)
				First Stage Results				
Avg. U.S. Rep. Tenure, 4-year average			17.022** (7.614)	-57.595*** (17.065)			14.997* (7.640)	-57.941*** (16.979)
Avg. U.S. Senator Tenure, 4-year average					10.048** (4.506)	16.977 (11.559)	8.846* (4.521)	20.628* (11.012)
Avg. U.S. Rep. Tenure Squared, 4-year average				3.781*** (0.782)				3.769*** (0.782)
Avg. U.S. Senator Tenure Squared, 4-year average						-0.264 (0.406)		-0.510 (0.390)
Rep. Tenure Impact			-311.16	-66.95			-178.37	-49.57
Sen. Tenure Impact					-55.02	-40.30	-105.21	-165.02
N	300	300	300	300	300	300	300	300
R-squared	0.391	0.473	0.033	0.031	0.096	0.114	0.047	0.035

Notes:
* - Indicates statistical significance at the 90% level
** - Indicates statistical significance at the 95% level
*** - Indicates statistical significance at the 99% level
First stage estimation for Federal Spending per capita ($2000).
All regressions include state- and year-fixed effects.
Robust standard errors in parentheses
"Tenure impact" for quadratic terms evaluated at the respective mean tenure value

Table 3.3: Instrumental Variable
First-Stage Regression Information

Regression Number	N	R-squared	F-statistic
(3)	1200	0.20	122.18
(4)	1200	0.21	127.21
(5)	1200	0.21	122.43
(6)	1200	0.21	117.96
(7)	1200	0.21	118.83
(8)	1200	0.22	119.84
(11)	300	0.22	130.47
(12)	300	0.22	129.29
(13)	300	0.22	130.45
(14)	300	0.22	115.73
(15)	300	0.23	117.75
(16)	300	0.23	107.35

3.4.2 Tenure and Long-Run State Economic Performance

Due to the instrumental variable analysis, it is possible to derive the impact of additional years of

congressional tenure upon state economic outcomes. From equations (1) and (2) in Section 3.3,

(3) $GSPpc_{it} = \beta_0 + \beta_1(\alpha_0 + \alpha_1 Tenure_{it} + \varphi \mathbf{Y}_{it} + \lambda \mathbf{Z}_{it} + \eta_{it}) + \omega \mathbf{Y}_{it} + \gamma \mathbf{Z}_{it} + \varepsilon_{it}$

and

(4) $GSPpc_{it} = \beta_0 + \alpha_0\beta_1 + \alpha_1\beta_1 Tenure_{it} + (\beta_1\varphi + \omega)\mathbf{Y}_{it} + (\lambda\beta_1 + \gamma)\mathbf{Z}_{it} + \beta_1\eta_{it} + \varepsilon_{it}$

Of interest is $\delta GSPpc/\delta Tenure$, or the change in state income per capita due to a change in

average congressional tenure. For the linear first-stage specifications in regressions (3), (5), and

(7) in Table 3.1 (and (11), (13) and (15) in Table 3.2), this simply reduces to

$$(5) \qquad \delta GSPpc/\delta Tenure = \alpha_1 \beta_1$$

while the quadratic specifications in regressions (4), (6) and (8) (and (12), (14), and (16)) reduce to

$$(6) \qquad \delta GSPpc/\delta Tenure = \alpha_1 \beta_1 + 2\alpha_1' \beta_1 (\text{Mean Tenure})$$

where α_1' is the coefficient on the squared tenure term. As a tenure value is needed to derive a marginal effect, the mean tenure value is used for all calculations.

The results of the tenure analysis are under "tenure impact" on Table 3.1 and Table 3.2. As expected, connecting the mechanism of more-tenure-leads-to-more-funding with more-funding-leads-to-worse-economic-outcomes generates an overall detrimental effect of increased congressional tenure on state's economy. Though varied, all estimated impacts of additional years of tenure in a state's congressional delegation are negative. Marginal impacts differ according to the specification used. For U.S. Representatives, linear specifications yield a negative marginal impact of additional years of average congressional tenure between $140 and $310 on gross state product per capita; quadratic specifications estimate the negative marginal impact of additional years of average Representative tenure between $25 and $66. For U.S. Senators, linear specifications generate a negative marginal impact of additional years of average Senator tenure between $47 and $105 on gross state product per capita; quadratic specifications

estimate the negative marginal impact of additional years of average Senator tenure between $40 and $165.[10]

3.5 Conclusion

This analysis put forth has shed light on the role of tenure in states' congressional delegations in allocating federal spending, and the role of this spending in states' long-run economic outcomes. By incorporating an instrumental variable analysis, we can isolate the process by which increased tenure of congressional delegations enhances a state's ability to secure federal spending, and subsequently, how this increased spending harms a state's long-term economic growth. While it is important to identify the role of the federal government in state economic vitality, it should also be noted that this study examines only a recent twenty-four year period. A more comprehensive study examining a larger portion of American economic history may identify times when the federal government had a different impact on state-level economies; after all, the role of the federal government in the economy has changed drastically over the course of the last two centuries. Nonetheless, in recent times, the federal government has been an anchor to state economic potential.

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[10] In revisiting footnote 4, should be there be a positive correlation between legislative tenure and gross state product, any bias that would exist would be downwards, as those legislators that get higher levels of tenure further do harm to their home states by securing more federal funds. The estimate provided for the impact of average legislative tenure would therefore be understated.

Chapter 4

Seniority and Anti-competitive Restrictions on the Legislative Common Pool: Tenure's Impact on the Overall Production of Legislation and the Concentration of Political Benefits

4.1 Introduction

It is well established that individual geographic areas benefit, in terms of the share of government spending they capture, from having a legislator with higher tenure, *holding constant* the tenure of other members of Congress [See, for example, Chapter 3, Levitt and Poterba (1999), Payne (1992), Payne (1990), Moore and Steelman (1994)]. However, the implications of this literature for how the total production of legislation would change if *all* members gained seniority is less clear. That is, a remaining question is whether a higher average tenured legislature would have a predictably different level of overall activity.

In addition, theories about the impact of individual tenure changes do not lend an obvious prediction about how the degree of inequality in seniority within the legislature impacts total legislative output. In other words, ceteris paribus, what happens to total legislative production when the inequality in tenure across legislators increases?

Drawing on the literature that uses an industrial organization framework to analyze legislative institutions, however, leads to a more clear prediction [Holcombe and Parker (1991), Weingast and Marshall (1988), Weingast, Shepsle, and Johnsen (1981)]. Both higher average tenure, and increased disparity in tenure, should lead to: (1) a less competitive legislative marketplace; (2) increased concentration of the benefits of government policy; (3) an increased ability of the committee structure to establish property rights over the legislative common pool; and, (4) an increased ability of senior legislators to substitute agenda control (and other methods of rule manipulation) for vote trading (logrolling) to secure passage of legislation. All four of

these effects should lead to the production of less legislation, and the ability to sell this reduced output at a higher price analogous to the impact of a cartel on the output and price in a product market. Within this context, a higher price would be reflected in higher rent seeking by constituents or interest groups per bill, higher spending per bill, and increased selectiveness in the number of vote trades across legislators.

The chapter begins by reviewing the literature on how the industrial organization of Congress, through committee and seniority systems, influences the productivity of Congress. Next, I present data on average tenure levels, and measures of within-congress tenure disparity, along with several measures of legislative production. Then, I subject a recent subset of this data to econometric investigation to test our predictions. The results confirm the idea that in the modern U.S. Congress, increases in average tenure (and/or inequality in tenure) result in fewer bills enacted, but more spending per bill.

The findings also suggest that during periods when the same party controls both chambers of Congress *and* the presidency, there is a clear increase in the supply of legislation, causing output (the number of bills enacted) to rise and price (the average spending per bill) to fall. Finally, I also fail to find evidence that this same dynamic between tenure and legislative output was at work in early U.S. Congresses, which is consistent with Holcombe and Parker's (1991) property rights theory based on the rise of the seniority system in the 20th century as being the primary explanation for the results.

4.2 Channels Through Which Tenure Influences Legislative Production: A Literature Review Extended to Testable Implications

4.2.1 Seniority & Committee Systems: The Industrial Organization of Congress

In their seminal paper, Weingast and Marshall (1988) suggest that the institutional structures within Congress, such as the committee system, arise to help reduce transactions costs and enforce bargains among legislators (as well as limit coalition formation). In analogous fashion to product markets, legislative markets can be viewed within the context of industrial organization theory.

Specifically with regard to the committee and seniority system, Holcombe and Parker (1991) claim that these structures exist to establish property rights over subareas of legislation, helping to eliminate the common pool nature of the legislature's agenda. They argue:

> Without some institutional constraints, a legislature is a non-exclusive resource because every legislator has free access to all parts of the agenda… As with any non-exclusive resource, unrestricted access reduces the total value of the resource … [because it] will be used too intensively…[restricting the commons] is the role of the committee system. [Holcombe and Parker (1991, p 11)]

However, Holcombe and Parker (1991) argue that the committee system itself cannot achieve this goal unless property rights to committee seats can be protected and enforced at low cost. They argue:

> If the legislature is to be subdivided and parcels given to individual members, there must be some system for protecting the rights to the parcels, and the seniority system is the mechanism… The seniority rule makes assignment to a committee a property right, preventing members from losing their committee positions except under unusual circumstances, and not merely partisan transgressions. [Holcombe and Parker (1991, p 15)]

Therefore, Holcombe and Parker (1991) argue that the seniority system is the integral reason why the committee structure is able to harness in the common pool problem over the congressional agenda. The seniority system helps to enforce property rights over subareas of the agenda at low cost. In addition, Holcombe and Parker (1991) point out that because longevity on a committee increases the likelihood of becoming a leader or chair, the value of this property right increases with time.

The use of a seniority system for committee appointments in the U.S. Congress is a 20th century phenomenon. In the House of Representatives, for example, prior to the seniority system, the Speaker of the House made committee assignments for both political parties. Therefore, as we move into our empirical testing, an interesting possibility exists to compare the results for modern Congresses with those from Congresses prior to their modern structure to search for differences.

Determining the marginal impact of the level of tenure in Congress on legislative productivity is akin to determining the impact of incumbency advantage upon legislative productivity. Section 4.2.2 outlines the nature of incumbency advantage within a legislature. Additionally, as total years of service increase, public officials become more efficient legislators via a process known as "learning by doing." Determining the marginal impact of the dispersion of tenure upon legislative productivity, however, is akin to determining the effect of the seniority system upon legislative productivity. Greater disparities in tenure within a legislature reduce the amount of competition for committee seats and, as a result, further entrench the property rights that exist due to the seniority system underpinning the committee system.

The clear empirical implication of this line of research is that by reigning in the common pool, the committee system, through seniority, tends to reduce the amount of legislation

produced. Both higher average tenure and more disparity in tenure result in more entrenched committee leadership positions, increasing the ability to establish property rights and 'fence in the commons,' leading to less total legislation.

4.2.2. Incumbency Advantage, Reduced Competition, and the Cartelization of Legislation
Along with higher tenure comes increased name brand recognition for a legislator, as well as other forms of 'incumbency advantage' that tend to reduce both the legislator's within-congress competition from other legislators' bills, and also the degree of electoral competition faced at home in upcoming reelection bids. This link between electoral and legislative competition and total legislative output has two channels.

First, if the committee/seniority system can be viewed as analogous to a cartel that reduces competition within a legislature among potential new bills, the obvious empirical implication of reduced competition is lower total output and a higher price. By cartelizing the legislative process, just like a monopoly, fewer units of legislation will be produced and they can be auctioned off at a higher price. If one views these prices paid as the value of the contributions (e.g., rent seeking) of interest groups, for example, the clear analogy is that the way to maximize the total value (or P times Q) of rent seeking is by reducing output and raising price until demand was of unitary elasticity and total revenue was maximized.

Second, if increased tenure translates into legislators being in more secure positions at re-election time, this should increase their ability to provide benefits to well-organized interest groups at the expense of the widespread electorate in exchange for political favors. The common argument is that legislators generally have an incentive to produce policies with concentrated benefits and dispersed costs [see, for example, Weingast, Shepsle, and Johnsen (1981)]. Their

ability to do this, however, is not constant across their legislative careers. As legislators become more tenured they are more able to conduct this type of activity because: (1) they get greater control over the agenda and eventual legislative outcomes; (2) additional years of on-the-job experience lead to a higher effectiveness at getting bills passed; and, (3) with higher tenure comes increased job security and less competitive re-election races, lowering the cost to the legislator of catering to special interest groups. The clear empirical implication is that as tenure grows, legislators become better able to focus, or concentrate, the benefits of government—that is, fewer bills (i.e., reduced output) with a higher level of spending in each bill (i.e., higher price).

4.2.3. Agenda Control and the Substitution of Skill for Vote Trading

A legislator may accomplish the objective of getting his or her bill passed using different productive inputs. Time and effort spent trying to manipulate the agenda can be effective, as can be time and effort spent trading votes and support with fellow legislators. The idea that control of the agenda can change outcomes is well established in the public choice literature [see Romer and Rosenthal (1978)]. The idea that it is a substitute for logrolling, however, produces new insights. With increased tenure comes increased agenda control, meaning senior legislators have to trade fewer votes in favor of other legislators' potential bills on the way to securing passage of their own bill. A simple example helps to easily illustrate this concept.

Suppose a legislator wants to get bill "A" passed. Suppose that if it faces competition in the form of a vote of "A" versus some other bill "B" that it isn't likely to pass. The legislator will have to then trade votes with other legislators, offering to support their future legislation for passage, in order to sway votes from "B" toward "A" to secure its approval. On the other hand,

if the legislator has enough seniority and power that he or she can control the agenda, then "A" can instead be paired up in vote with some other bill "C" that stands a much lower chance of beating "A". Therefore "A" passes over "C" with less need to trade votes in support of others' legislation. In this simple example, agenda control (or other means of manipulating congressional rules) can be substituted for vote trading. Therefore, higher tenure or disparity in seniority, are predicted to both result in less total legislation. It is also worth pointing out that by needing to offer fewer votes for sale in the congressional marketplace, senior legislators can therefore extract higher prices in return for their votes when they are sold to colleagues.

4.2.4. Summary

All three of the above lines of logic suggest that increases in the overall average tenure, as well as increases in the disparity of tenure across members, should work to lower the total volume of legislation that eventually becomes law. These theories don't necessarily imply that fewer bills will be introduced or offered, just that a smaller number will make it through the process into law. These theories also predict that this lower volume of total output can be sold at higher prices per unit, and that the multiplicative total (P times Q) should increase.

4.3 Data

4.3.1 Measures of Legislative Tenure

The analysis utilizes two categorical measures of tenure: level and dispersion. For an explanation on the specifics of the data utilized for this calculation, please see Section 1.1. From this data we calculate both the average tenure, annually by chamber and Congress-wide, and in

addition, compute two different measures of the inequality in tenure within each Congress: (1)
the Gini coefficient, and (2) the generalized entropy.

The Gini coefficient pertains to the Lorentz curve. Specific to this study, the Lorentz
curve is a graphical representation of the cumulative proportion of accrued tenure across a
population of legislators (the House of Representatives, the United States Senate, or the entire
United States Congress) ordered in ascending fashion. The Gini coefficient represents twice the
area between the Lorentz curve and the graphical equivalent of an equal distribution of tenure
across all members (a 45° line). Mathematically, this generates the following equation for the
calculation of the Gini coefficient:

$$(4.1) \quad G = 1 - 2 \int L(p)dp$$

where $L(p)$ is the Lorentz curve and the integral is evaluated from 0 to 1. For a full description
of the Gini coefficient and Lorentz curves, see Gini (1912) and Lorentz (1905), respectively.

Generalized entropy, GE(a), consists of four classes of measures, where a = -1, 0, 1, 2. In
this analysis, we utilize the class a = 2, which is half of the square of the coefficient of variation,
or

$$(4.2) \quad GE(2) = (1/2)(CV)^2$$

and

$$(4.3) \quad CV = \sigma / \mu$$

where σ is the standard deviation of accrued tenure, and μ is the mean accrued tenure.

   Figure 4.1 shows the evolution of the average tenure within the U.S. Congress, for each chamber separately, and a simple average of the values for the two chambers.[11] After taking a few years to rise to its eventual level, the average tenure levels in both chambers stayed relatively constant from 1800 to the 1880s, when it began its upward trend that continues today.[12] The upward trends are similar for both chambers, and in much of our subsequent empirical analysis we find the same results whether we use the overall average or include both chambers' average tenure separately.[13]

Figure 4.1: Average Accrued Tenure, 1789-2004

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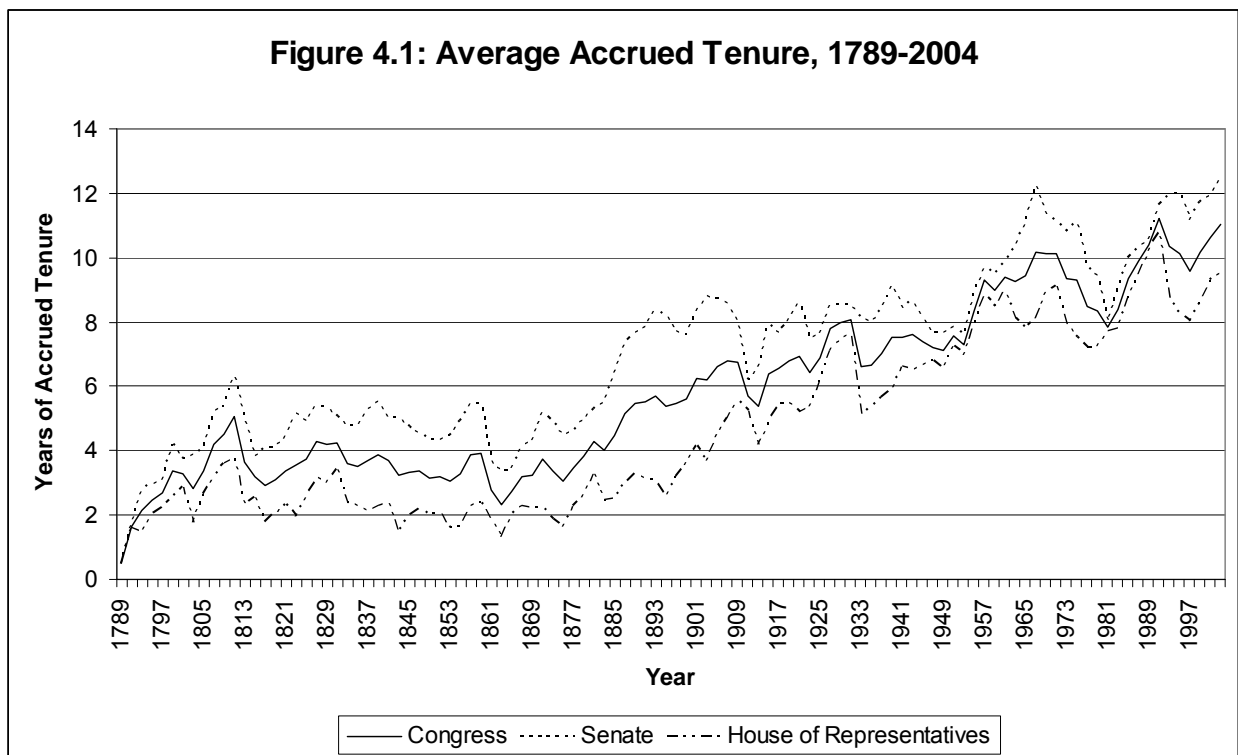
[11] We choose to measure the average tenure for Congress as the simple average of the House and Senate values, rather than as the average across all members as this would place much heavier weight on the House because it has a much larger number of members.

[12] For a discussion of the factors leading to this break in the late 1800s see Chapter 2.

[13] For ease in viewing, presented is a five-year running average for average accrued tenure from each chamber of Congress. The resulting time-series displays the same trends as a figure presenting annual averages without the choppiness due to biennial elections. All calculations performed in this analysis utilize the original annual data.

Figure 4.2 shows how the two measures of within-year inequality in legislative tenure have changed through time. These are the averages arrived at by first computing each measure only within each chamber, then taking the simple average of the two numbers. The results for the individual chambers track these overall averages almost perfectly (similar to the above average tenure data), and again, in much of our subsequent empirical analysis we find the same results whether we use the overall inequality measure or include both chambers' inequality measure separately.

Figure 4.2: GE(2) and Gini for U.S. Congress, 1789-2004
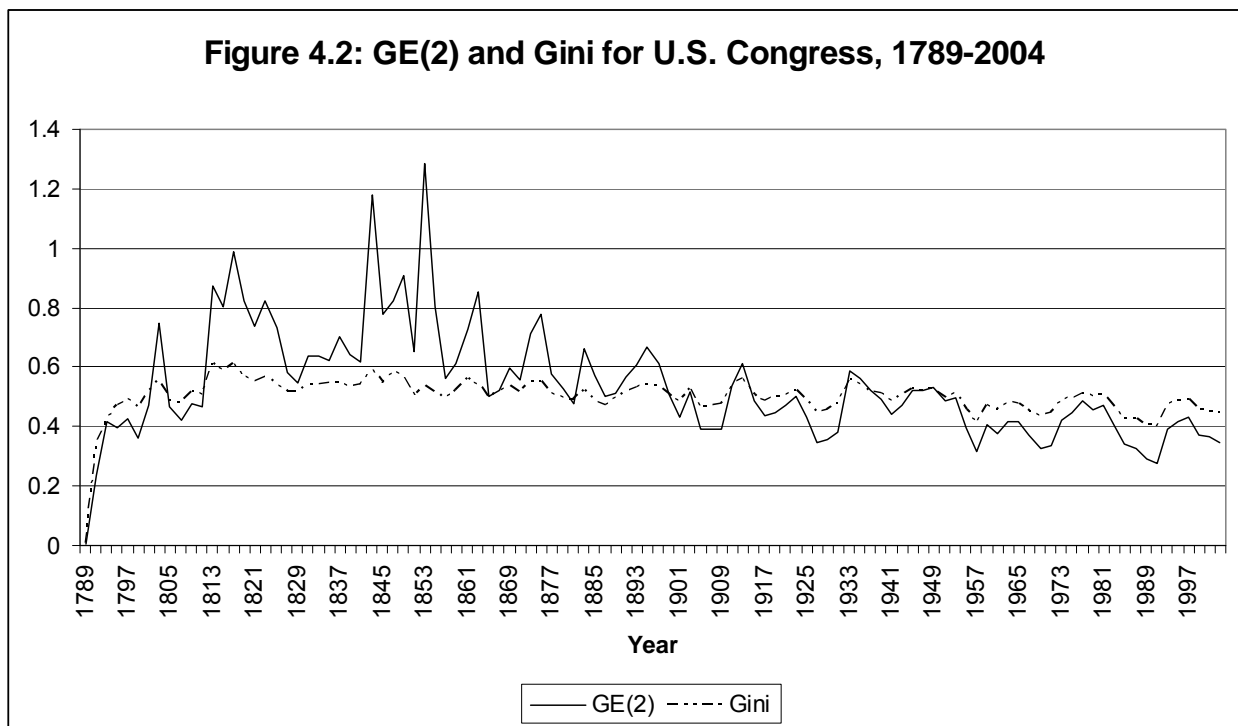
Examining Figure 4.2 suggests that earlier Congresses in the early to mid 1800s tended to have more inequality within the chambers than is present today. The trend in both measures has been slightly downward for the entire 20th century.

4.3.2 Measures of Legislative Production and Output

We examine several measures of legislative production using data on the number of bills introduced, the number enacted, and the amount of real per capita federal spending embedded in those bills.[14] First, our data on the number of measures introduced and enacted is taken from the Statistical Abstract of the United States. Holcombe (1999) provides data on real per capita federal spending. As our analysis concerns data for each Congress, we utilize two-year averages of federal spending per Congress that coincide with each year's budget. For example, fiscal years 1793 and 1794 correspond to the third Congress, which was in session from March 4, 1793 until March 3, 1795.

Figure 4.3: Total Measures Introduced and Enacted, 1789-2004

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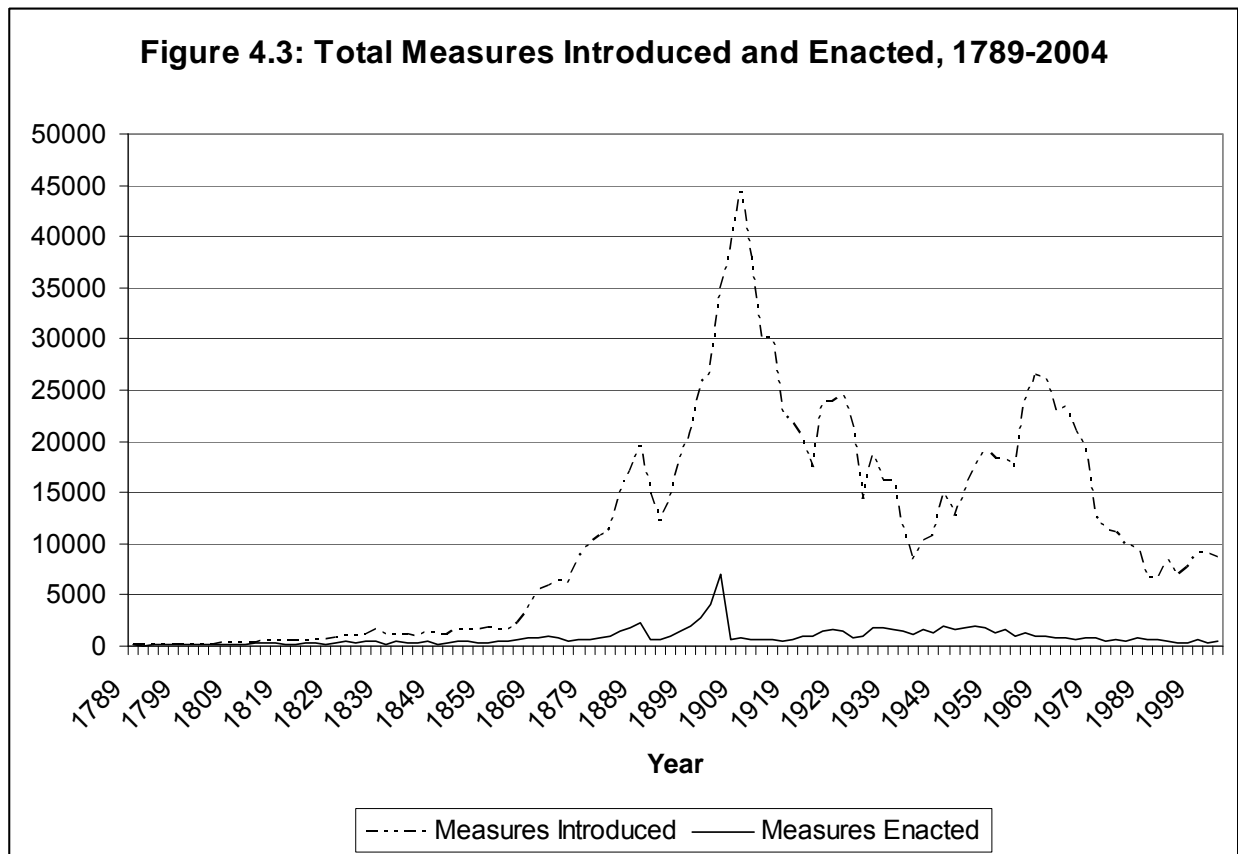
[14] The nature of measures passed by Congress creates the possibility of measures in one Congress affecting the amount of spending in future Congresses. That is, the passage of all bills and the allocation of all spending is not necessarily contemporaneous. However, short of analyzing every measure passed in the entire history of the United States Congress, this aspect cannot be addressed.

Figure 4.3 shows the entire series for the number of measures introduced and enacted. After a slight upward trend until the Civil War, two upward spikes, with a large one in the early 1900s become dominant. This spike is, interestingly, associated with a topic discussed at great length in Holcombe (1999), the influence of the first well-organized interest group in America—the Civil War veterans receiving pensions. While Holcombe (1999) shows and discusses the impact of this group on federal spending during this period, our data show it also dramatically impacted legislative production. In terms of explaining this phenomenon with respect to the bills themselves, Robert Luce (1935) states:

> The [number of measures] figures are not to be taken wholly at their face value. When years brought infirmities to the surviving veterans of the Civil War, in great numbers they sought help in the shape of special pension bills. These were the chief factor in swelling the total to the maximum reached in the 61st session, 33,105. …Then the need began to be met by general pension legislation, which with statutes putting outside the pale certain classes of hoary claims, caused a sharp drop in the number of bills. The total still included, however, a large number of private pension bills separately introduced and then consolidated. In the 66th Congress the seventeen omnibus pension bills reported to the House contained 3596 private bills that became law. [Luce (1935), p. 647-8]

This upward spike due to the individual pension bills was a temporary phenomenon, both in time, and in that Congress was able to find internal methods to combine the bills, helping to restore the series back to their more normal levels at least by the 1940s.

Figure 4.4 shows real federal spending per capita. After remaining virtually constant for 70 years, there is a slight bump upward during the Civil War. Afterward spending falls back, not quite to its prior level, but nonetheless again remains fairly constant until the early 1900s when the clear upward trend in federal spending begins. There are again upward spikes for World Wars I and II.

Figure 4.4: Federal Spending per capita (2000$), 1792-2006
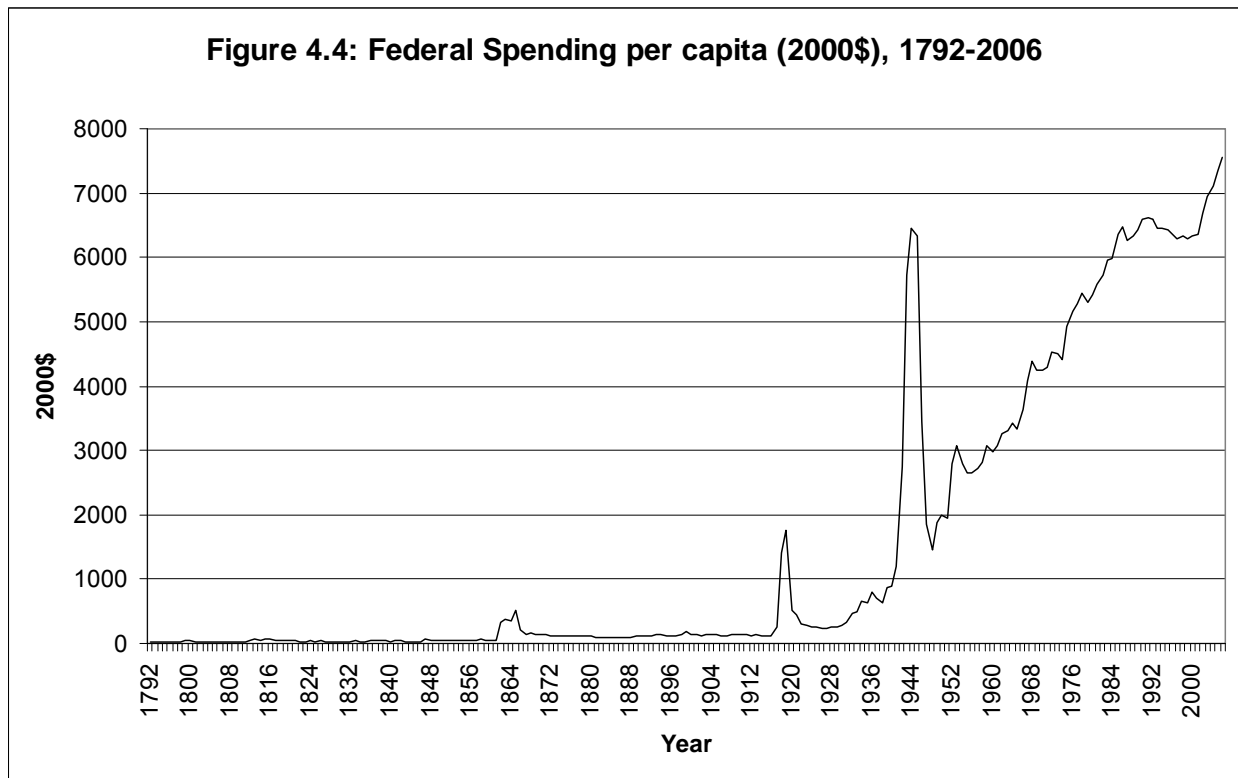
Among all of our variables, there are clearly several major disturbances in the data from the Civil War through the end of World War II. Thus, for our empirical analysis we choose to pick only data beginning in 1950 to the present. We also felt like this would give us the clearest assessment of how these factors are at work in the modern U.S. Congress. Ironically, our results do hold for the entire sample period, even using simple OLS in levels, however, we do not present those results due to the clear presence of many hard to control for events that occur within the full data period. I do, however, take advantage of the relatively stable period from 1800 to the Civil War on which to perform a comparison analysis and draw additional conclusions.

In addition to performing our analysis on the variables presented above, we also compute two slightly revised versions of the measures enacted variable. First, there are wide variations in

the number of days in session across Congresses, and clearly additional days in session might result in a higher number of bills. We therefore also compute the number of measures enacted *per* days in session (i.e., measures enacted divided by days in session). To help get a measure of the dollar values incorporated in these bills, we also calculate real federal spending per capita *per* measure enacted for each Congress (i.e., real per capita federal spending divided by number of measures enacted). These final two variables are shown in Figure 5. Again, both measures show the most stability in the post World War II (and prior to Civil War) periods.

4.4 Empirical Analysis

For our main analysis, we then restrict our sample to only 1950 forward. Our first task is to determine if these time series variables are stationary. If they are, they can be included in a regression in their original, level, form. If they are nonstationary, the regression must be performed using the first differences (or changes) in the variables to ensure efficient and unbiased estimates. For each variable we perform the standard Augmented Dickey Fuller (ADF) test for stationarity, and the results of these tests are shown in Table 4.1.

The null hypothesis for this test is that the series has a 'unit root' (i.e., it is nonstationary). Therefore, a significant test statistic suggests the variable is stationary. The first column of numbers shows the ADF tests performed on the original post 1950 series in levels. In every case except one (the Gini coefficient for the House), the test statistics cannot reject the presence of a unit root. Therefore, the series cannot be used, and we move on to see if a first-differenced (i.e., 'change in') series is stationary and thus usable in the econometric analysis. The second column of numbers in Table 4.1 shows the ADF tests on the first differenced series, and all are significant—indicating that they are now stationary and can be used in a regression equation.

Table 4.1 - Augmented Dickey-Fuller Tests for Unit Root

Test Statistics (Null: Series is nonstationary)		
Variable	**Initial Variable**	**1st difference**
Average Accrued Tenure, Congress	-1.800	**-4.403****
Average Accrued Tenure, Senate	-1.552	**-4.670****
Average Accrued Tenure, House	-2.369	**-4.293****
Generalized Entropy (Tenure), Congress	-2.814	**-4.640****
Generalized Entropy (Tenure), Senate	-2.828	**-4.697****
Generalized Entropy (Tenure), House	-2.865	**-4.718****
Gini Coefficient (Tenure), Congress	-2.929	**-5.077****
Gini Coefficient (Tenure), Senate	-2.928	**-4.897****
Gini Coefficient (Tenure), House	**-2.998***	**-5.040****
Total Measures Enacted, Congress	-2.126	**-11.816****
Total Measures Enacted per days in session, Congress	-1.558	**-6.344****
Total Measures Introduced, Congress	-0.722	**-4.635****
Total Measures Introduced per days in session, Congress	-1.328	**-4.500****
Federal Spending per capita (constant 2000$)	-1.351	**-4.966****
Federal Spening per capita per Measure Enacted	-1.513	**-8.909****

* (**) denotes significance at the 5% (1%) level. Significance represents stationarity.
1% critical value: -3.736, and 5% critical value: -2.994
Augmented Dickey Fuller test run on above time series variables from 1950 to 2004.

The main series, in their first differenced forms used in the regression analysis, are in Figure 4.5.

Figure 4.5: Changes in Tenure and Productivity, 1951-2004
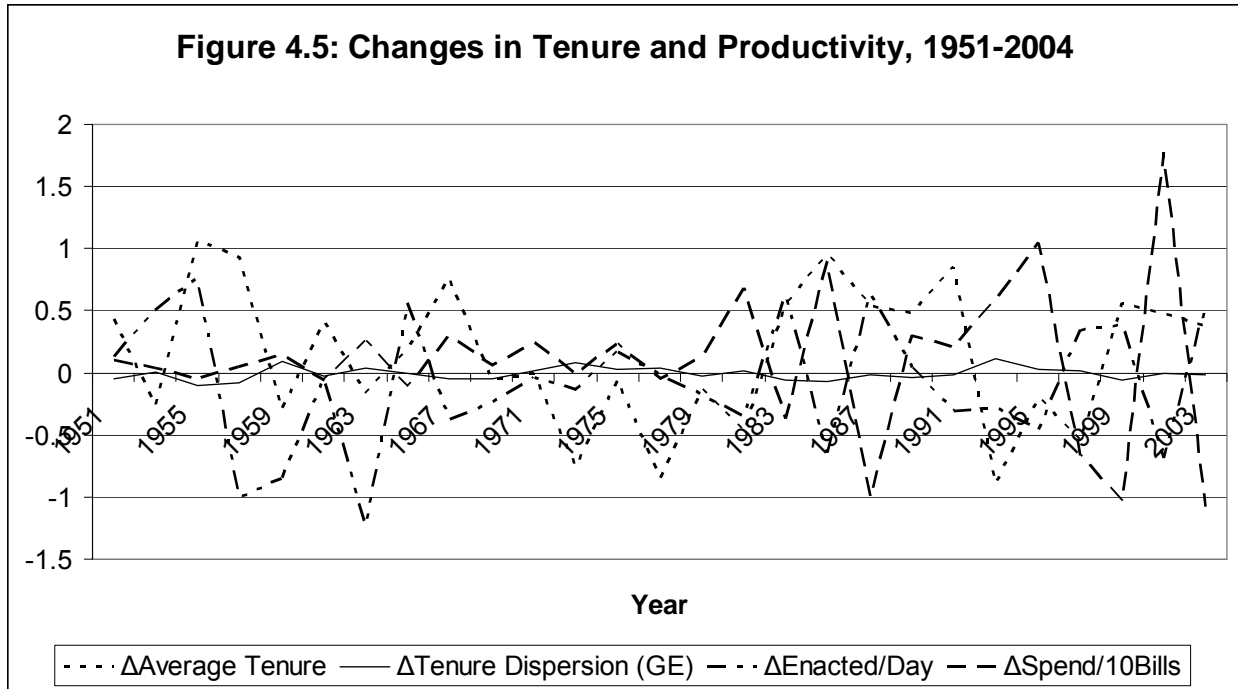
While econometric analysis extricates the relationship between levels and dispersion of tenure better than a simple grouping of time trends, it is important to note the stationary characteristics of the first-differenced variables, especially the level of tenure over our relevant time span from 1951 to 2004, per Figure 4.1. The series also displays substantial annual variation, and does not contain any significant breakpoints.

The results of our main regressions are shown in Table 4.2. We run several specifications, looking at measures enacted and introduced, both in numbers and per day in session, and real federal spending per capita and per bill enacted as dependent variables (all in their first difference form). For independent variables we include measures of average tenure, our two measures (individually) of inequality in tenure, plus three other controls. We include a zero/one indicator variable for if both houses of Congress and the president are of the same

Table 4.2 - Main Results: 1951-2004

	Dependent Variables											
	ΔTotal Measures Enacted		ΔMeasures Enacted per Day in Session		ΔTotal Measures Introduced		ΔMeasures Introduced per Day in Session		ΔFederal Spending per capita per bill enacted		ΔFederal Spending per capita	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔAverage Accrued Tenure, Congress	**-249.13****	**-216.20****	**-0.59****	**-0.53****	1309.46	883.88	3.20	2.07	**8.53****	6.05	106.33	38.68
	(91.93)	**(96.15)**	**(0.25)**	**(0.25)**	(1530.03)	(1178.98)	(4.89)	(4.15)	**(3.65)**	(3.64)	(152.21)	(146.04)
ΔGeneralized Entropy (Tenure), Congress	**-3944.30*****		**-9.15****		6407.34		21.88		**141.37*****		599.07	
	(1222.97)		**(3.37)**		(18858.44)		(56.45)		**(40.74)**		(1981.73)	
ΔGini Coefficient (Tenure), Congress		**-6276.11*****		**-14.84****		801.52		10.69		**192.36****		-628.53
		(2141.92)		**(5.73)**		(26458.66)		(85.19)		**(72.47)**		(3171.87)
ΔHouse, Senate and President: same party	**128.47***	**118.05***	0.18	0.15	-229.61	-186.51	-1.47	-1.35	**-3.14***	-2.67	128.31	134.30
	(65.80)	**(63.47)**	(0.15)	(0.15)	(555.66)	(553.08)	(2.18)	(2.20)	**(1.74)**	(1.88)	(96.70)	(96.79)
ΔMajority % of Senate	356.73	414.74	0.17	0.38	13063.37	15545.82	1.27	7.57	**-105.54****	**-98.68***	-754.56	-329.49
	(1564.26)	(1327.09)	(3.80)	(3.46)	(19167.31)	(17415.06)	(44.18)	(42.44)	**(47.13)**	**(53.52)**	(1749.02)	(1725.70)
ΔMajority % of House	1083.8	1027.46	**3.35***	**3.20***	-3612.81	-4037.36	29.18	28.171	9.02	9.24	-187.85	-266.19
	(852.33)	(814.11)	**(1.82)**	**(1.64)**	(17749.30)	(17280.72)	(37.60)	(37.67)	(22.30)	(27.47)	(1790.37)	(1792.62)
N	27	27	27	27	27	27	27	27	27	27	27	27
R-squared	0.28	0.28	0.26	0.26	0.07	0.07	0.12	0.11	0.47	0.38	0.10	0.10

*** (**, *) denotes 1% (5%, 10%) significance.
All variables run as 1st differenced values and for years 1950-2004.
Robust standard errors reported in parentheses.

party, as well as the percentage majorities held by the majority party in each chamber. As the entire equation (most importantly the dependent variable) is first differenced, these control variables must be as well.

The results in Table 4.2 suggest that for both the total measures enacted or the number enacted per day in session, that average tenure, and either measure of inequality are significant, and negative. Both higher average tenure, and more dispersion in tenure, lead to fewer measures enacted in Congress. The results for measures introduced are insignificant, lending substantial support to the Holcombe and Parker (1991) explanation of our results. Tenure and inequality in tenure do not impact the number of bills that people are trying to introduce, but rather simply help to control this commons to restrict which bills actually make it to floor vote and eventual passage.

With reduced output of total legislation, do prices rise? The measure of real federal spending per capita per bill tends to suggest an affirmative answer. Higher tenure (or more inequality in tenure) result in fewer, but larger, bills. Therefore, the impact of tenure is to create more highly concentrated legislation—each of fewer bills enacted contains more spending. With more spending per bill, but fewer bills, what happens to total spending across all bills? The final two columns show mainly positive, but clearly insignificant results. Therefore, this rise in tenure (and inequality in tenure) can't necessarily produce a larger budget to allocate, but it does result in what money there is to allocate being loaded into fewer, large bills.

Interestingly, the case in which one party controls both houses of congress and the presidency, provides a nice test to complement our main logic. When this condition is present, the "Venn diagram" representing the feasible set of mutually agreeable policies greatly expands. In contrast to how anti-competitive measures reduce the supply of legislation (leading to lower Q

Table 4.3 - Robustness Measures: 1951-2004

	Dependent Variables											
	ΔTotal Measures Enacted			ΔMeasures Enacted per Day in Session			ΔFederal Spending per capita per bill enacted			ΔFederal Spending per capita		
	(13	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
ΔAverage Accrued Tenure, Congress	-300.43*** (102.72)			-0.71*** (0.25)			9.50** (3.85)			68.91 (159.78)		
ΔAverage Accrued Tenure, Senate		-111.66** (46.70)	-151.56** (62.50)		-0.26** (0.12)	-0.31* (0.18)		4.03** (1.62)	4.81** (1.79)		39.76 (86.54)	-58.88 (111.18)
ΔAverage Accrued Tenure, House		-199.28 (119.48)	-146.95 (138.69)		-0.54* (0.27)	-0.47 (0.33)		5.62 (3.61)	4.59 (3.91)		130.71 (140.91)	260.05* (149.89)
ΔGeneralized Entropy (Tenure), Congress		-4713.49*** (1518.53)			-11.62*** (3.87)			155.33** (56.2)			1397.46 (2095.15)	
ΔGeneralized Entropy (Tenure), Senate	-2968.20*** (943.69)		-2973.97*** (967.86)	-6.81** (2.68)		-6.60** (2.89)	89.53** (32.92)		89.81** (33.07)	-427.17 (1270.67)		-826.98 (1098.18)
ΔGeneralized Entropy (Tenure), House	-1697.37** (657.94)		-1669.96 (1088.92)	-3.96** (1.59)		-4.93* (2.71)	65.49*** (17.75)		64.15* (34.28)	500.01 (1203.68)		2396.37* (1333.29)
ΔHouse, Senate and President: same party	125.43* (62.85)	116.77* (66.93)	125.96* (72.58)	0.17 (0.13)	0.14 (0.14)	0.15 (0.15)	-3.07* (1.56)	-2.92 (1.80)	-3.11* (1.68)	126.09 (103.27)	140.45 (87.76)	163.16* (85.52)
ΔMajority % of Senate	628.76 (1301.55)	325.90 (1362.60)	637.48 (1440.36)	0.78 (3.42)	0.07 (3.14)	0.47 (3.49)	-110.69** (45.17)	-104.98** (44.91)	-111.11** (46.72)	-556.10 (1756.28)	-722.55 (1723.84)	47.64 (1556.07)
ΔMajority % of House	831.68 (817.66)	1093.39 (820.79)	824.59 (886.86)	2.79 (1.84)	3.38** (1.59)	3.04 (1.97)	13.78 (24.19)	8.84 (22.07)	14.13 (25.39)	-371.80 (1774.03)	-197.80 (1908.82)	-862.22 (1831.00)
N	27	27	27	27	27	27	27	27	27	27	27	27
R-squared	0.32	0.30	0.32	0.30	0.30	0.30	0.49	0.48	0.49	0.12	0.12	0.21

*** (**, *) denotes 1% (5%, 10%) significance.

All variables run as 1st differenced values and for years 1950-2004.

Robust standard errors reported in parentheses.

and higher P), situations of one party control should result in increases in the supply of legislation, leading to higher Q and lower P. Indeed this is what is found in our empirical estimates as the coefficient on this indicator variable are positive for the number of measures enacted and negative for spending per bill. Thus, one party control tends to lead to more (arguably marginal) legislation that pulls down the average. This result is not quite as robust as our other results, but we highlight it as an interesting comparison case.

As was mentioned previously, the results found using one average tenure and inequality measure across both chambers are virtually unchanged when they are split apart and included separately. Because of the high degree of correlation between the measures for the two chambers, significance levels fall slightly, but the actual coefficient estimates remain virtually unchanged, and are similar between chambers. Statistical testing confirms the equality of the coefficients across chambers, and this is why we prefer our single measure specifications presented in Table 4.1 as our main results. I, however, include these results as Table 4.3 for readers interested in examining the performance of these alternatively specified regressions.

4.5 The Early Days: Congress Before the Seniority System and Property Rights

Our main empirical results, using post 1950 data, support the hypothesis that more tenured legislatures (and more inequality within a legislature) tends to reduce legislative production (measured by the number of bills) but increases the spending per bill. At the outset of the paper we presented several different arguments for why increased tenure could cause a reduction in legislative output.

A unique method to see how important the Holcombe and Parker (1991) argument is to the analysis is to compare our results with what we would have found using data from the early

Table 4.4 - Robustness Measures: 1801-1859

	ΔTotal Measures Enacted		ΔMeasures Enacted per Day in Session		ΔTotal Measures Introduced		ΔMeasures Introduced per Day in Session		ΔFederal Spending per capita per bill enacted		ΔFederal Spending per capita	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ΔAverage Accrued Tenure, Congress	-3.78	16.43	-0.03	0.00	**97.26***	**102.23***	0.34	0.34	-0.03	-0.05	-7.02	-4.66
	(49.76)	(45.78)	(0.13)	(0.15)	**(50.29)**	**(54.64)**	(0.29)	(0.37)	(0.05)	(0.06)	(5.57)	(5.40)
ΔGeneralized Entropy (Tenure), Congress	-3.54		0.04		198.23		0.69		-0.03		-9.75	
	(135.99)		(0.25)		(132.67)		(0.60)		(0.10)		(6.24)	
ΔGini Coefficient (Tenure), Congress		403.17		0.84		1312.18		4.12		-0.53		-9.95
		(683.31)		(2.02)		(800.96)		(4.09)		(0.88)		(49.75)
ΔHouse, Senate and President: same party	**-176.76***	**-170.27***	**-0.51***	**-0.50***	**-260.43***	**-260.70***	**-0.77**	**-0.78**	**0.14**	**0.14**	-5.21	-4.36
	(58.71)	**(53.91)**	**(0.18)**	**(0.17)**	**(69.09)**	**(71.26)**	**(0.33)**	**(0.29)**	**(0.06)**	**(0.06)**	(3.20)	(3.09)
ΔMajority % of Senate	201.90	207.13	0.12	0.13	711.72	711.82	0.98	0.97	-0.13	-0.13	**34.38***	**35.05***
	(217.07)	(215.20)	(0.53)	(0.64)	(426.24)	(438.10)	(1.13)	(1.17)	(0.23)	(0.23)	**(17.12)**	**(17.29)**
ΔMajority % of House	-157.51	-131.91	-0.22	-0.15	-329.18	-185.62	0.34	0.81	-0.07	-0.12	**-43.13**	**-46.59**
	(235.37)	(246.41)	(0.53)	(0.51)	(263.16)	(271.97)	(1.27)	(1.19)	(0.22)	(0.20)	**(19.94)**	**(19.18)**
N	30	30	30	30	30	30	30	30	30	30	30	30
R-squared	0.20	0.21	0.27	0.27	0.40	0.40	0.25	0.25	0.19	0.20	0.30	0.27

*** (**, *) denotes 1% (5%, 10%) significance.

All variables run as 1st differenced values and for years 1950-2004.

Robust standard errors reported in parentheses.

Table 4.5 - Robustness Measures: 1801-1859

	Dependent Variables											
	ΔTotal Measures Enacted			ΔMeasures Enacted per Day in Session			ΔFederal Spending per capita per bill enacted			ΔFederal Spending per capita		
	(13	(14	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
ΔAverage Accrued Tenure, Congress	-4.46 (50.17)			-0.04 (0.14)			-0.02 (0.06)			-6.53 (5.38)		
ΔAverage Accrued Tenure, Senate		-61.53 (53.14)	-83.89 (54.52)		-0.17 (0.13)	-0.25* (0.14)		-0.01 (0.04)	0.02 (0.05)		-7.02 (4.46)	-7.10 (4.87)
ΔAverage Accrued Tenure, House		**80.79*** **(39.31)**	**97.71**** **(43.98)**		**0.20*** **(0.10)**	**0.25**** **(0.11)**		-0.03 (0.05)	-0.05 (0.05)		1.36 (4.73)	1.42 (5.34)
ΔGeneralized Entropy (Tenure), Congress		107.62 (128.47)			0.32 (0.26)			-0.05 (0.12)			-3.20 (8.34)	
ΔGeneralized Entropy (Tenure), Senate	-12.28 (199.02)		-114.27 (175.78)	-0.12 (0.54)		-0.40 (0.45)	0.17 (0.24)		0.21 (0.25)	2.63 (12.87)		-2.15 (12.56)
ΔGeneralized Entropy (Tenure), House	-1.58 (69.67)		72.55 (62.15)	0.02 (0.13)		**0.23*** **(0.12)**	-0.02 (0.05)		-0.05 (0.06)	-5.02 (3.24)		-1.54 (4.56)
ΔHouse, Senate and President: same party	**-176.37***** **(61.08)**	**-181.99***** **(56.87)**	**-176.66***** **(51.54)**	**-0.51**** **(0.19)**	**-0.53***** **(0.18)**	**-0.51***** **(0.17)**	**0.13**** **(0.06)**	**0.14**** **(0.06)**	**0.13**** **(0.06)**	-5.48 (3.56)	**-5.51*** **(3.03)**	**-5.50*** **(3.09)**
ΔMajority % of Senate	198.72 (229.50)	386.10 (292.90)	381.42 (288.40)	0.08 (0.67)	0.60 (0.82)	0.59 (0.81)	-0.07 (0.24)	-0.15 (0.28)	-0.14 (0.28)	**36.66*** **(18.41)**	45.24 (21.31)	**45.22**** **(12.77)**
ΔMajority % of House	-158.41 (241.42)	-262.71 (225.33)	-307.41 (235.76)	-0.23 (0.53)	-0.49 (0.52)	-0.64 (0.53)	-0.06 (0.21)	-0.06 (0.23)	0.00 (0.24)	**-42.49**** **(19.91)**	**-49.33**** **(23.12)**	**-49.47*** **(24.19)**
N	30	30	30	30	30	30	30	30	30	30	30	30
R-squared	0.20	0.27	0.29	0.27	0.33	0.37	0.22	0.19	0.23	0.31	0.35	0.35

*** (**, *) denotes 1% (5%, 10%) significance.

All variables run as 1st differenced values and for years 1950-2004.

Robust standard errors reported in parentheses.

U.S. Congresses. As the authors point out in their study, the seniority system that allows the formation of secure property rights to committees evolved mostly in the 20th century. By examining the period from 1801 to 1859 we can isolate a period after tenure had reached its initial equilibrium level but one that was free from major shocks and disturbances in the series clearly visible in the earlier figures that begin occurring during and after the Civil War through World War II.

Table 4.4 shows our same specifications from Table 4.2 performed on data from this earlier period, while Table 4.5 mirrors Table 4.3 but for the earlier period. Again, due to the similarity of the results when the variables are separated or not, we will pursue a comparison simply of the overall Congressional averages presented in Tables 4.2 and 4.4.

Not only are both the average tenure and inequality measures insignificant for measures enacted and spending, but they interestingly turn significant on measures introduced. In the early U.S. Congress, higher average tenured legislatures tended to have more bills introduced, but not necessarily a different level of bills passed. In the early Congresses, the most important variable in explaining legislative output is the variable indicating that both houses of Congress and the president are of the same party. Almost ironically, the impact was quite opposite of today, with this condition leading to fewer bills sold at higher prices (suggesting a decrease in the supply of legislation). As the impact of party control is not our main concern, we leave the inquiry into this interesting change up to subsequent research. Simply as a robustness check, however, we see no evidence of tenure's impact to reduce congressional output in the early U.S. Congresses before the rise of the seniority system that Holcombe and Parker (1991) suggest is the key factor in allowing committees to enclose the legislative commons.

4.6. Conclusion

While specific states may benefit if they are represented by more senior legislators (holding constant the tenure of others), in terms of their share of federal spending, this paper explores the interesting question of how an increase in overall average tenure (and changes in the inequality of it within a legislature) impact total legislative output or production. Based on theories of the industrial organization of Congress, we argue the clear theoretical hypothesis is that higher average tenure or more inequality in seniority should result in less legislation (lower output), and a higher price (spending or rent seeking per bill). We then test this hypothesis using data on the U.S. Congress for as much of its history as is possible given the breaks in the data. Our results confirm this hypothesis, and suggest the main route through which it occurs is the one identified by Holcombe and Parker (1991). They argue that the committee structure of congress, coupled with the seniority system, helps to alleviate the common pool problem present in a legislative agenda. By enclosing the commons, the legislature can act like a cartel to reduce output and sell it at a higher price. Higher average levels of tenure, and more disparity among members of Congress, tend to increase the degree to which this is accomplished.

Chapter 5

Conclusion and Areas of Future Research

This dissertation examines the nature of legislative tenure and the impact that varying levels of legislative tenure has on political and economic outcomes. While others investigate the impacts of tenure in an abstract manner, the dataset collected for this analysis trumps any previous Congressional dataset by a large margin. As such, it is possible to execute a previously unreachable, yet necessary, empirical analysis of prior stated claims as well as new theoretical possibilities.

Chapter 2 of this dissertation explores the evolution of federal legislative tenure over the entire history of the United States Congress. The chapter provides a theoretical model by which to describe the decision of a legislator to pursue additional terms of service. In light of this model, I can assess different shocks that could affect legislative tenure rates and secure a better understanding of what caused the sudden and distinct rise in tenure in the last quarter of the 19th century. In visiting a range of possible factors, the ability to regulate an economy and the United States Civil War are likely sources for beginning of upward trending legislative tenure rates. More importantly, ruled out of the picture is a legislator's ability to tax and spend.

After describing the evolution of tenure throughout the history of Congress, Chapter 3 analyzes the impact of federal spending on state economic performance in light of the observed variation in tenure across states' Congressional delegations. I incorporate a two-stage process by which the amount of tenure present in a state's Congressional delegation is a determinant of the amount of federal spending that state receives, and in turn, that level of federal spending has an state-level economic impact. The empirical analysis determines that states with more experienced Congressional delegations secure larger amounts of federal funds for their

constituencies. These larger federal procurements, however, have a dampening effect on state economic performance. These results are robust when considering, in place of the amount of federal spending a state receives, the amount of net federal spending received (federal spending less federal taxes) as well as the ratio of federal spending to federal taxes paid. Finally, due to the nature of the empirical analysis, I provide a range of estimates for the marginal state economic harm due to an additional year of average tenure among a Congressional delegation.

Chapter 4 investigates the relationship between the levels of tenure, as well as the dispersion of tenure amongst a Congress, and the productivity of the legislature. The previous chapter considers the role of additional tenure for a state holding all other congressional delegations' tenure constant; here, I consider Congress-wide variations in tenure and how these changes play a role in the performance of Congress as a whole. Both higher average tenure, and increased disparity in tenure, should lead to: (1) a less competitive legislative marketplace; (2) increased concentration of the benefits of government policy; (3) an increased ability of the committee structure to establish property rights over the legislative common pool; and, (4) an increased ability of senior legislators to substitute agenda control (and other methods of rule manipulation) for vote trading (logrolling) to secure passage of legislation. All four of these effects should lead to the production of less legislation, and the ability to sell this reduced output at a higher price analogous to the impact of a cartel on the output and price in a product market. The empirical analysis confirms these hypotheses in light of a natural experiment that developed over the history of the United States Congress. Since the seniority system did not enforce property rights over committee assignments until the 20th century, I can isolate the role of property rights over the legislative agenda by comparing legislative productivity in the first half of the 19th century to that of the second half of the 20th century. The cartel-like effects of

decreased volume of legislation at a higher price are evident in the latter period where the seniority system provides an underpinning for committee assignments, yet not in the initial period.

While this dissertation fills an important niche by analyzing an important characteristic of legislators, there exist numerous additional opportunities for future research. Chapter 2 provides an analysis of one particular period of interest in Congressional history; the robust nature of the data allow for a similarly in-depth analysis of any period of Congressional history. For example, legislative tenure sustains marked drops in both the 1910s and 1970s; a historical case study may provide additional insight into the nature of tenure by analyzing these periods. Chapter 3 provides a picture of the impact of legislative tenure and its impact, through federal spending, on state economic performance. While illuminating, the analysis looks only at a very recent slice of the American economy. A fuller, more long-term view of the impact of tenure may reveal alternative influences over different eras.

One additional empirical quirk deserves investigation. While the accrued tenure rates of both U.S. Representatives and U.S. Senators seem to rise and fall in accordance with each other (see Figure 2.1), this reality does not speak to the state-level characteristics of the tenure of Congressional delegations. It could be that while nation-wide tenure rates are rising, any particular state could have relatively high or relatively low tenured Senator or Representative delegations to Congress. That is, the coincident rising rates of tenure amongst U.S. Senators and U.S. Representatives do not imply a similar relationship *within* states. However, such a relationship does in fact exist. Those states that tend to have high (low) tenured Senator delegations also have high (low) tenured Representative delegations. This reality implies that state-level characteristics drive the across-state observable differences in delegation tenure.

Given the importance of tenure in determining economic outcomes at the state level, it could well be fruitful to pull the analysis back one step further and ascertain what underlying factors may be driving the differences in tenure.

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