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Voter Behavior and Seniority Advantage in Pork Barrel Politics¹

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-Abstract-

This paper uses experiments to explore electoral accountability in a legislative system that favors seniority. Voters face a trade-off between pork barrel transfers and policy representation. Term limits are tested as a mechanism to reduce the cost of searching for a legislator who better represents voters on policy, as well as reducing the resulting asymmetric distribution of income. Subjects' preferences on abortion are used in an innovative means of capturing incumbents' policy choices where subject legislators vote to determine whether a donation is allocated to either a pro-choice or pro-life foundation.

JEL classification codes: C91, C92, D72, D89, P16

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WORKING PAPER: PLEASE DO NOT CITE WITHOUT PERMISSION

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1 Introduction

Seniority in Congress creates two potential challenges. First, consider the principal-agent relationship between voters and legislators. Seniority advantage transfers power to the agent through their enhanced ability to acquire constituent benefits i.e. pork.³ This conceivably allows incumbents to shirk on policy and creates a collective action problem where voters sacrifice representation on policy issues by reelecting incumbents because of the implicit cost of foregone federal spending associated with electing an inexperienced challenger (Dick and Lott 1993; Bernhardt et al. 2004). Second, the competition for pork and the frequent reelection of incumbents redistributes income to districts with senior legislators (Friedman and Wittman 1995; McKelvey and Riezman 1992, Muthoo and Shepsle 2010). Proponents of term limits argue that capping seniority will reduce incumbents' ability to shirk as well as the cost of electing a challenger thereby improving representation in the legislature. Creating more turn over in the legislature will also reduce the redistributive effects of pork-barrel legislation (Dick and Lott 1993, Daniel and Lott 1997, Moncrief, Niemi and Powell 2004).

This project uses controlled experiments to determine whether subjects react to these incentives in the laboratory and whether they perceive that term limits reduce the implicit cost of replacing a senior legislator. The effect of term limits on income distribution is also of interest.

In the lab subjects are divided into districts and act as legislators and voters. Legislators set taxes that fund pork barrel projects, which are awarded according to seniority, and vote on policy. Abortion was chosen as the policy issue for its potential to compete with the monetary incentives subjects faced. Certainly most people have an opinion on the issue, regardless of their political activity. More importantly, I hoped to employ what Zajonc (1980) refers to as "hot cognitions" by introducing affect into the voters' decision process without requiring them to think much about why they may or may not identify with a legislator's choice. Voters could express their preference or suppress it in favor of collecting the monetary reward. As Zajonc argues, affect is inescapable, but it is possible for individuals to control their expression.

Policy was implemented through the novel use of donations to pro-life and pro-choice foundations, where legislators voted to determine the recipient. Legislators knew the majority

³ See Plott (1968), Dick and Lott (1993), Friedman and Wittman (1995), Knight (2002), Bernhardt, Dubey and Hughson (2004), and Chen and Niou (2005).

preference of the districts, but voters could only infer the legislators' preferences through their policy votes. Voters determined whether the incumbent was reelected or an unproven challenger took office in the upcoming round. The underlying model predicts that voters concerned with monetary payoffs reelect incumbents regardless of policy choices in order to maintain an advantage in pork barrel spending. Term limits were imposed with the expectation of increasing electoral accountability by decreasing the cost of replacing an incumbent. The cap on seniority was also predicted to diminish the asymmetric income effects of pork barrel legislation.

I find that senior incumbents do not capitalize on their advantage when voting on policy and that voters hold incumbents accountable when it is relatively inexpensive to do so. When terms are not limited, the reelection rate of senior incumbents who vote *against* district majorities (shirk) is high but is slightly lower than the reelection rate of those senior incumbents who vote *with* the district majority. On the other hand, junior incumbents who shirk are reelected at a significantly lower rate than both senior incumbents in general and junior incumbents who vote with the district majority. An important result of the paper is that shirking decreases an individual voter's likelihood of voting for the incumbent, but reelection rates are unaffected. This highlights the importance of the electoral process in aggregating individual decisions. Term limits do significantly affect the individual decision to vote for senior incumbents who shirk, but this effect does not manifest itself in reelection rates either. Finally, it is likely that term limits do impact the distribution of income resulting from pork barrel legislation.

The following section provides a brief summary of previous research. Section 3 contains the model and describes an equilibrium where senior incumbents are always reelected regardless of policy choice when terms are not limited. Introducing term limits into the model improves policy representation under certain conditions. Careful attention is devoted to the experimental design in section 4 where procedures and hypotheses are explained. Results follow in section 5 and a summary concludes.

2 Background

Structuring a contract that aligns principal and agent interests is challenging. In theory, voters can do this by holding recurring elections and rewarding agents with long-term employment; however, when tenure becomes an allocation mechanism for political benefits, the principal may be

inclined to lower her performance standard. That is, the principal and agent's interests are no longer aligned and the constitutionally established method of inducing acceptable effort is no longer effective (Barro 1973, Ferejohn 1986). Evidence suggests that shirking increases as the principal-agent bond between voter and legislator weakens (Kalt and Zuppan 1990).⁴

In the distributive theory of government, seniority advantage stems from experience, committee leadership, and agenda-setting power (Weingast and Marshall 1988; Lopez 2003; Muthoo and Shepsle 2010). Alvarez and Saving (1997) find strong evidence that committee membership on what they call "prestige" and "constituency" committees significantly increases spending in home districts.⁵ As Calamita (1991) wrote, "...[C]ommittee and subcommittee chairmen are often powerful enough to single-handedly land their district or state significant amounts of federal jobs and money."⁶

McKelvey and Riezman (1992) effectively frame seniority as a strategic advantage in reelection.⁷ Seniority provides incumbents with an asset that no challenger can trump (see also Muthoo and Shepsle 2010). Models in this vein use the concept of Markov subgame perfect equilibrium to showcase endogenously instituted seniority and zero legislator turnover. Legislative bargaining models featuring ideology imply that senior legislators use their advantage to buy votes and impose their ideology while never losing reelection (Baron and Ferejohn 1989, McKelvey and Riezman 1992, Jackson and Moselle 2002).⁸ Theoretical and experimental work using spatial models with valence advantaged candidates has shown that advantaged incumbents move closer to their preferred policy as the advantage increases (Stokes 1963; Feld and Grofman 1991; Wittman 1983;

⁴ There are several challenges to capturing the phenomenon empirically. First, it is difficult to truly measure electorate preferences as well as differentiate the geographic constituency from the electoral constituency whose vote is decisive. Deviations from general constituent interests are a necessary but not a sufficient condition for there to be shirking. Secondly, the traditional method of capturing the influence of an incumbent's preferences, or ideology, on their voting record with the residual from a first stage ideology regression likely suffers from multicollinearity problems, omitted variable bias, and measurement problems (Bender and Lott 1996). This provides justification for the use of experiments where the relevant constituency is identifiable and shirking is measurable as are preferences.

⁵ The prestige committees include Appropriations, Budget, Rules and Ways and Means. The constituency committees include Agriculture, Armed Services, Interior, Merchant Marine, Public Works, Science, Small Business, and Veterans' Affairs.

⁶ Calamita uses the example of Senator Robert Byrd who was able to transfer facilities of the FBI, CIA, Bureau of Alcohol, Tobacco and Firearms, Bureau of Public Debt, and IRS from Washington D.C. to West Virginia.

⁷ See also Holcombe (1989).

⁸ This suggests that economic outcomes are incorporated into the voter calculus. See Kramer (1971), Fiorina (1978), Lau and Sears (1981), Kiewiet and Rivers (1984), Stein and Bickers (1994), Alvarez and Saving (1997), Levitt and Snyder (1997), Gomez and Wilson (2001), and Arceneaux (2006) for empirical confirmation of this question. Here I argue that voters are both retrospective and prospective in vote choice. They are prospective in the sense that they look forward to future pork, but are simultaneously retrospective when considering legislators' policy choices.

Ansolabehere and Snyder 2000; Groseclose 2001; Aragonés and Palfrey 2002, 2004, 2005). These studies corroborate well with the evidence that winning incumbents are farther away from the median voter as a group compared to challengers of both major parties (Achen 1978). Incumbents from non-marginal districts have also been shown to almost always win despite typically being farther away from the median than the challenger (Sullivan and Uslander 1978).

Simultaneously high reelection rates and low approval ratings of Congress as a whole are suggestive of this principal-agent problem and the high cost of electoral accountability (Erikson and Wright 2005, Elhauge, Lott, and Manning 1997). Reelection rates in the 2010 elections were 87 percent in the House and 84 percent in the Senate, while Gallup polls show that 75 percent of respondents disapprove of Congress as a whole (Saad 2011). Approving of one's legislator while disapproving of the legislature as a whole is not necessarily a sign of inconsistency, but these results might hint at dissatisfaction with a system that encourages strategic reelection of incumbents who do not represent the electorate on policy.

Term limits have been proposed as a solution to lowering the cost of “voting the bums out.” However, the fact that the twenty-three states that unilaterally imposed congressional term limits between 1990 and 1995 used trigger clauses calling for a certain number of states to likewise impose limits before implementing them serves as evidence of the underlying collective action problem. The reality that twenty-seven states did not pass term limit amendments is an indication of the free riding involved (Elhauge, Lott and Manning 1997).⁹

Overall, the aim of this project is to add to this existing literature by using a novel experiment that examines electoral accountability and the effectiveness of term limits in a system with seniority advantage in pork barrel legislation.

3 Model

⁹ Empirical analysis of state legislatures suggests term limits limit incumbents' ability to promise service and favors leading to less campaign contributions and more competitive elections (Daniel and Lott 1997; Moncrief, Niemi and Powell 2004). This correlates well with the finding that incumbents in their final term spend significantly less time and effort acquiring district specific benefits and pork (Carey, Niemi and Powell 1998). Besley (2006) finds that governors in their final term are significantly more congruent to the electorate, suggesting a selection effect where those governors that make it to their last term are only those that perform according to electorate standards. We might infer from this an increased willingness of voters to not reelect a powerful incumbent. For a review of empirical work involving term limits see Besley (2006) and Morton (2006).

The model is constructed as a three period problem describing the incentives encountered with and without term limits. Incumbents are assumed to seek reelection while influencing policy and enjoying the perquisites of office. Voters value policy as well as transfers that are dependent on the incumbent's seniority status. Challengers do not assume an active role within the model, but the existence of an alternative to the status quo is sufficient for our purposes.. Some simplifications are made in explaining the model in order to form a concept of what to test experimentally.

Suppose there is an odd number of districts, D , and each has a legislator, L_d . The number of voters in a district is represented by N_d , $d = \{1, \dots, D\}$. For simplicity, each district has an equal number of voters. Incumbents are distinguished within the legislature by the measure e_{dt} , which is equal to their tenure in office. This leads to the first critical assumption.

Assumption 1: The incumbent from each district is determined to be either senior or junior based on e_{dt} . That is,

$$s_{dt} = \begin{cases} \text{senior if } e_{dt} \geq e_m \\ \text{junior otherwise} \end{cases},$$

where e_m is the median tenure among all incumbents.¹⁰

Voters are assumed to be risk neutral utility maximizers whose single period payoff is based on government transfers and policy choice:

$$U_{idt} = c_{idt}(s_{dt}) - \alpha |y_{idt} - \hat{y}_t| \tag{1}$$

The term $c_{idt}(s_{dt})$ indicates the consumption good that is a function of the incumbent's seniority status. The term α is the relative weight that the voter places on the policy issue. The enacted policy is \hat{y}_t and the voter's preferred policy is y_{idt} .

Assumption 2: The policy issue is a binary set. That is $y_{id} = \{0,1\}$. Preferences are independently and identically distributed where the median preference is y_{md} and σ_{yd} is the variance. The use of Euclidean preferences implies the median voter is decisive. Therefore $N_d = N_{0d} + N_{1d}$ describes

¹⁰ This assumption precludes the possibility of voters competing to have a more senior incumbent among the junior set, which admittedly may have important implications on the model's conclusions. Dick and Lott (1993) elaborate on this competition, but do not model it specifically.

the number of district voters on either side of the policy issue. In a world without transfers a candidate who supports (opposes) the policy would be elected if $N_{1d} > N_{0d}$ ($N_{1d} < N_{0d}$).

Assumption 3: The relative weight of the policy issue, α , is equal across all voters.

This is a vital assumption that allows us to remain in a single dimension policy space and rely on the median voter theorem to locate the pivotal voter in each district. This leads to the following lemma.

Lemma 1: All voters share the same α and the median voter on the policy dimension is pivotal.

Proof: This follows simply because α is a multiplicative constant that affects each voter equally.

Assumption 4: Voters with senior legislators enjoy positive transfers which are financed by voters in junior districts.¹¹ That is, $c_{id}(\text{senior}) = T$ and $c_{id}(\text{junior}) = 0$.

Legislators are risk neutral utility maximizers whose single period preferences are based on perquisites of office as well as policy:

$$U_{dt} = W - \beta |y_{dt} - \hat{y}_t| \quad (2)$$

The term W is the legislator's material utility. The term β is the relative weight that the legislator places on the policy issue where y_{dt} is his preferred policy choice. The next simplifying assumption determines the source of electoral challengers.

Assumption 5: There exists a pool of legislators who are waiting to take office. Legislators who lose reelection enter back into this pool and campaign for office elsewhere. Legislators in office earn a salary of W and those campaigning earn a salary of w . It is assumed that $W > w$ to reflect the

¹¹ The experimental design features a tax equal to the full voter endowment. Legislators vote to determine if voters are taxed. This part is in the background of the model for simplification. The structure of the tax benefits and seniority implies that the tax should always pass. This assumption is inconsistent with the theory of universalism where logrolling involves all legislators and legislation is passed unanimously; however, lack of empirical support for universalism strengthens this assumption (Alvarez and Saving 1997).

incentives and material advantages incumbents have over challengers as well as the perquisites of holding office.

Each period of the game has two stages.¹² In the first stage, legislators vote on policy. In the second stage, voters see their legislator's choice and vote to determine the incumbent's fate. The models found in McKelvey and Riezman (1992) and Muthoo and Shepsle (2010) are similar in that they contain the element of seniority but they lack policy choice. Allowing for weakly dominant strategies where a pivotal voter in a junior district is indifferent between a junior incumbent and a newly "minted" challenger leads to zero legislator turnover. (see Muthoo and Shepsle (2010) for a nice exposition of both models).

Adding policy to the model implies that the weight α in the voter utility function is crucial to finding an equilibrium where there is no legislator turnover. First I will show that when the pivotal voter is less than certain about turnover, there is a range for α in which she chooses a senior incumbent regardless of his policy choice. On the other hand, she will choose the challenger over a junior incumbent who votes against her policy preference. I will also show that there exists a range of α where the pivotal voter's choice depends on the presence of term limits. When terms are not limited she will vote for the senior incumbent regardless of his policy choice, but when terms are limited she will vote for the challenger rather than the shirking senior incumbent.

The voter strategy space \mathcal{V} includes two strategies: I = always vote for the incumbent and \mathcal{A} = vote for the incumbent if he agrees on policy. The state of the world is determined by the seniority of the incumbent and the enforcement of term limits. Table 1 lists the pivotal voter's payoffs beginning from period one of the three period game when the incumbent votes against her policy preference in the first period. Each case is a particular state of the world. It is a dominant strategy for a voter to reelect an incumbent who votes for her preferred policy, thus in the table it is assumed the incumbent votes against the voter's preference in period one.¹³ An elected challenger is

¹² The experiment includes another dimension to the legislators' role where the first stage involves legislators voting whether or not to tax voters to provide transfers to those in senior districts. This part is bypassed here for exposition purposes.

¹³ To see why this is sensible suppose that the legislator holds the minority preference and determines that in the first period he can maximize his period payoff by voting against the district majority. If he is reelected, he has no reason to then vote with the majority in the periods thereafter. However, it is necessary to justify ignoring the possibility that the incumbent votes with the district majority in the first period, but changes his vote in later periods. A legislator that votes with the majority might suspect he can get away with voting against the majority after being reelected in the first period, but this does not change the voter's choice of strategy because any strategy that maximizes utility conditional on α in the

assumed to have the same policy preference as the district majority. It is also assumed that he enters office as a junior legislator. This means that the voter does not receive a transfer in the first term with a newly elected legislator. The voter holds belief q_{id} that the newly elected challenger will become senior after his first term if reelected. In cases 3 and 4 term limits are imposed in the third period meaning that voters can keep the incumbent for periods one and two but are forced to elect a newly “minted” legislator without seniority in the third period.

Table 1: Voter strategies and Payoffs

Case 1: No Term Limits	
Incumbent in period 1 is senior and votes against the policy preference	
Strategy	Payoff over three periods
I	$(1 + \gamma + \gamma^2) (T - \alpha)$
A	$(\gamma + \gamma^2)q_{id}T$
Case 2: No Term Limits	
Incumbent in period 1 is junior and votes against the policy preference	
Strategy	Payoff over three periods
I	$(1 + \gamma + \gamma^2) (q_{id}T - \alpha)$
A	$(\gamma + \gamma^2)q_{id}T$
Case 3: Term Limits	
Incumbent in period 1 is senior and votes against policy preference	
Strategy	Payoff over three periods
I	$(1 + \gamma) (T - \alpha)$
A	$(\gamma + \gamma^2)q_{id}T$
Case 4: Term Limits	
Incumbent in period 1 is junior and votes against policy preference	
Strategy	Payoff
I	$(1 + \gamma) (q_{id}T - \alpha)$
A	$(\gamma + \gamma^2)q_{id}T$

three period case above would be optimal in a condensed version beginning in the period that the incumbent changed his vote.

Notice that imposing term limits simply reduces the payoff from using strategy I because she cannot elect the incumbent in the third period when the term limit is imposed. We will now find the conditions required on α to determine what strategy will be chosen in each case.

The pivotal voter plays strategy I if and only if Condition 1 (C1) holds:

$$\alpha < \left(1 - \left(\frac{\gamma + \gamma^2}{1 + \gamma + \gamma^2}\right) q\right) T \quad (3)$$

Similarly, for Case 2 the pivotal voter uses strategy I if and only if Condition 2 (C2) holds:

$$\alpha < \frac{q}{1 + \gamma + \gamma^2} T \quad (4)$$

Comparing C1 to C2 shows that as long as $q < 1$, C2 is more restrictive; otherwise they are equal. This leads to the first result.

Result 1: As long as voters are less than certain ($q < 1$) that changes in seniority are likely to occur, there exists a range of α where the pivotal voter will prefer a senior incumbent regardless of policy choice when terms are not limited, but will choose the challenger over a junior incumbent who shirks.

Figure 1 shows α as a real valued number bounded below by zero. If α is below C2, the voter prefers a senior incumbent regardless of his policy choice. If it lies above C1 then she always prefers a challenger over a senior incumbent who votes against her policy preference. Above C2 the voter prefers to elect the challenger if the current incumbent is junior and shirks. Consequently, if α is between C2 and C1 the voter will re-elect any senior incumbent, but will only elect junior incumbents who vote for her preferred policy.



Figure 1: Range of α showing Conditions 1 and 2

Now we can compare the conditions on α under term limits beginning with Case 3. The pivotal voter chooses I over A if and only if Condition 3 (C3) holds:

$$\alpha < (1 - \gamma q)T \tag{5}$$

For Case 4 it can be shown that the voter chooses I and A if and only if Condition 4 (C4) holds:

$$\alpha < (1 - \gamma)qT \tag{6}$$

A comparison of C3 and C4 shows that the latter is more restrictive, which implies that as long as $q < 1$ then there are voters who will keep a senior incumbent who shirks but not a junior one when terms are limited.

Result 2: As long as voters are less than certain ($q < 1$) that changes in seniority are likely to occur, there exists a range of α where a voter will prefer to hold onto a senior incumbent regardless of policy choice when terms are limited, but will choose the challenger over a junior incumbent who shirks.

The next result is the motivation of this paper. Comparing C1 to C3 shows that the latter is more restrictive. Of course, these conditions apply under two different sets of election rules. But the importance of this result is that it allows for the possibility of an equilibrium where electoral accountability is dependent on the presence of term limits.

Result 3: There exists a range of α where a voter will prefer to hold onto a senior incumbent regardless of policy choice when terms are not limited, but will choose the challenger over a senior incumbent who shirks when terms are limited.



Figure 2: Range of α showing Conditions 1, 2 and 4

Figure 2 shows that α in the range above C1 means that voters will not reelect any incumbent who shirks on policy. If α is between C1 and C2, voters allow senior incumbents to shirk when terms are

not limited. An α in the range between C1 and C4 implies that voters will allow senior incumbents to shirk when terms are not limited but will choose the challenger over a shirking senior incumbent if term limits cap seniority.¹⁴

Proposition 1: Assuming symmetry across all districts, if α is in the range $\left[(1 - \gamma)qT, (1 - \gamma + \gamma^2)qT \right]$ there exists multiple equilibria without legislator turnover among senior incumbents when terms are not limited. Senior legislators can shirk and win reelection, but junior legislators are only reelected if they vote with the district majority. This case is referred to as a “shirking equilibrium”. Considering the same range of α , when terms are limited shirking legislators are never reelected and legislator turnover is high in equilibrium. This is referred to as the “high-turnover equilibrium”.

Incumbents in the shirking equilibrium do not have an incentive to deviate from voting for their own preferred policy unless they are junior. Legislators will always vote for their preferred policy given a sufficiently large β when terms are limited even if they are junior, but more voters are willing to elect a challenger because of the reduced cost in terms of foregone transfers. The latter may seem like a grim outcome, but the fact that voters are not willing to put up with a shirking legislator means representation should improve overall.

Until now q has been assumed to be positive but less than one and any implications from a change in election rules have been ignored. However, the election rules are vital to a voter’s belief about change in seniority in any period. Allowing a voter’s belief to vary based on the election institution is important.

To give an example of what these equilibria might be like, suppose that when terms are not limited voters have little confidence that a change in seniority will take place i.e. $q = 0$. This expands the range between C1 and C2 such that the former is now equal to T (the tax transfer voters in senior districts receive) and C2 is zero. A voter will prefer a challenger to a shirking senior

¹⁴ Although the relationships between C2 and C1 and C4 and C1 in Figure 2 always hold, it is not the case that C4 is always greater than C2. In fact this is a very important result because for sufficiently large $q \left(q > \left(\frac{1 + \gamma + \gamma^2}{1 + \gamma + \gamma^2 + \gamma^3} \right) \right)$ C4 is less than C2. This would indicate a range (between C4 and C2) where voters tolerate shirking by either junior or senior incumbents when terms are not limited, but who do not tolerate any shirking when terms are limited.

incumbent only if she places an extremely large weight on policy in her utility function. Because legislators are first movers and anticipate voter reaction, the dominant strategy for them is to vote for their preferred policy even when it is against the district majority.

Now suppose term limits are imposed and the belief that seniority in the legislature will change increases to one. The new point for C4 is $(1 - \gamma)T$ such that if α is above this point she now prefers not to reelect a shirking incumbent even if he is senior. Below this point a voter will reelect a senior incumbent who shirks, but not a junior one. Of course if $0 < q < 1$, the range between C4 and T gets larger. This implies there is a greater likelihood that voters choose to re-elect a shirking senior incumbent when terms are not limited but vote to elect the challenger under term limits.

Corollary 1: There is asymmetric distribution of income from junior districts to senior ones in a shirking equilibrium. Voters from junior districts finance the transfers and senior incumbents never lose reelection. Term limits reduce the asymmetric redistribution by forcing incumbents out of office and reducing the cost of electing a challenger.

The model, while stylized, contains the correct incentives consistent with the research question and provides an outline of the results to be tested experimentally. The next section lays out the design and procedures.

4 Experimental Design and Procedures

4.1 Design

This section introduces the experimental design. Attention will be given to its implementation as well as the non-standard method of recruiting subjects. The general set up included $D = 3$ districts with $N_d = 3$ voters per district. The number of legislators was set to $L = 6$. Only three are in office

at one time and are referred to as being “active.” The other three are considered “inactive.” This means $N_d D + L = 15$ subjects total per session.¹⁵

Each session had three phases. The first phase lasted five periods and was the control treatment. Legislators only made decisions regarding taxes in this round. The second phase, Treatment 1, lasted ten periods. Here legislators made policy and tax decisions. Treatment 2 was the final phase and lasted ten periods. In this treatment a two period term limit was placed on the number of consecutive periods a legislator could be active. The order of the second and third phase was varied to account for order effects.

Subjects were regrouped into new districts with randomly chosen legislators at the beginning of each phase; however, the group of legislators remained fixed across all phases. Voters received an endowment of fifty cents each period subject to taxation to fund pork.¹⁶ Active legislators received a salary of sixty cents each period while in office. Inactive legislators did not receive a salary but could earn money decoding text strings for 2.5 cents for every correct code. This was done to create some incentive for legislators to stay in office as well as to keep inactive legislators engaged throughout the experiment. Payoffs were summed across all periods.

Voter payoffs were a function of the endowment, the tax and the legislator’s seniority,

$$U_{id} = E - t + \sigma \frac{\Pi}{N_d}, \quad (7)$$

where E is the endowment, t is the tax rate, and σ measures the legislator’s relative share of pork, Π , which is the sum of taxes collected across all voters. A voter’s share was based on her legislator’s seniority, thus σ is a fixed proportion. The vector σ lists the relative shares of the first, second and third ranked legislators based on tenure: $\sigma = (1/3, 1/3, 0)$. Taxes were homogenous such that $\Pi = D * N_d * t$. Thus, voters in a senior district received seventy-five cents whereas the others received nothing if the tax passed.¹⁷

A linear payoff function was implemented to sharpen incentives such that districts either desired a full tax or none at all. Junior voters want to avoid a tax because it meant financing pork for other districts. Thus the tax was a purely redistributive one. The structure of the shares implies that

¹⁵ The original design used five districts of three voters each and ten legislators for a total of twenty-five subjects per session. The first three sessions used this design, but due to recruiting challenges, I decided to use the design described above.

¹⁶ The voters in sessions with five districts received an endowment of 45 cents, but shares of pork for voters in senior districts stayed the same.

¹⁷ In the larger sessions the top three districts had a seniority advantage.

a majority of the active legislators always wanted to tax voters. Any other setup would allow for a majority to prefer not to pass pork legislation or call for allowing legislative bargaining. Fixing the shares accordingly such that there is always an advantaged majority is also consistent with legislative bargaining literature where a minimum winning coalition decides how to split the pie (Baron and Ferejohn 1989; Frechette, Kagel and Lehrer 2003; Frechette, Kagel and Morelli 2009).

To begin each phase active legislators were randomly determined to be either “senior” or “junior”. Seniority status was then dependent on the number of consecutive periods as an active legislator. There were an equal number of pro-choice and pro-life legislators in each experiment to allow control over district makeup. Districts always began with an active legislator that opposed the district majority in order to maximize the chance for observing shirking.

4.2 Survey

The goal was to create the possibility of shirking. This required a disparity between legislator and voter policy preferences. Subjects completed a short survey prior to the experiment to enable this. Recruiting from a small subset of the subject pool made filling a session a challenge, which led to a design change where the first three sessions featured five districts instead of three. The appendix includes the survey.

Subjects were given summaries of two foundations related to abortion and asked how well they identified with either foundation relative to a seven point Likert scale. The foundations used were the Pro-Life Action League and Pro-Choice America.¹⁸ The response scale ranged from “Strongly Do Not Identify” to “Strongly Identify.” The language in the survey was taken directly from the groups’ websites. They were selected based on the fact they appeared first in the list of search engine results. This was an attempt at being unbiased in selecting the groups. Similar questions on other topics and foundations were included so it was not obvious which topic would be involved in the upcoming experiment. Subjects provided names and email addresses so they could be contacted for the actual experiment.

There was a much greater response from self-identified “pro-choice” individuals (fifty-three percent) as well as students whose preferences were indiscernible or were explicitly neutral (twenty-three percent). This unbalanced survey sample led to five of the eight total sessions using self-

¹⁸ The Pro-Life Action League is a non-violent protest group and Pro-Choice America is a lobbying organization.

identified pro-choice subjects as voters. Of course, this was not the initial intent. Specific numbers of subjects from each self-identified group were recruited for each session. For instance, when the session featured three districts using pro-choice voters, twelve pro-choice subjects were recruited where nine filled the role of voter and three filled the role of legislator. Their roles were determined randomly upon arrival to the laboratory. Three pro-life subjects were recruited to fulfill the role of legislator with opposing preferences. While it was known that these subjects were to act as legislators, the group to which they were assigned was always random as was their beginning seniority rank. Sessions with pro-life voters likewise had twelve pro-life subjects and three pro-choice subjects.¹⁹

Much care was taken to prevent the ill-will of any subjects because of the divisive policy issue. Subjects were asked before entering the experiment whether they would prefer not to participate in an experiment that involved the issues from the survey, to which none of them objected. Within the experiment specific language from the consent form emphasizing the subjects' right to leave with their earnings at any moment was included in the first paragraph of the instructions. Finally, subjects voluntarily completed a post experiment opinion-poll with an open ended question about the experiment's content. This was to allow subjects the opportunity to express disapproval. No subject ever asked to leave or expressed reproach in the survey.

4.3 Experiment Procedures and Hypotheses

The experiment used generic terms where voters were referred to as "Type A players" and legislators were called "Type B players". Districts were rematched and assigned legislators with opposing policy preferences in the beginning of each treatment. The subjects were simply told that half of the legislators would begin "active" and half would begin "inactive". The actual instructions can be found in the appendix. Each period of the game included two stages. The following details the different treatments.

4.3.1 Control. In Stage 1 of the Control treatment legislators voted whether to tax the electorate or not. If the tax passed, each voter's entire endowment was allocated to a public account that was divided according to the explanation above. The shares were divided evenly among voters within the districts receiving a positive transfer. If the tax did not pass, the subjects kept their

¹⁹ Sessions with five districts used twenty subjects of one group where twelve were voters and five were legislators. Five subjects from the opposing group were used as legislators for a total of twenty-five subjects.

endowments and no pork was provided. This was a major simplification but it made the incumbents' decisions more salient to voters. It also allowed voters to understand that the asymmetric nature of the transfer

In Stage 2 an election was held in each district where voters were asked whether they wanted to reelect the incumbent. They were aware of the allocation mechanism based on seniority as well as the relative seniority of all legislators. They were also aware of their incumbent's choice as well as their payoff. The incumbent stayed in office if a majority of the district's voters approved and the experiment advanced to the next period proceeding in the same manner. If the incumbent failed to be reelected, he became inactive and was replaced by a randomly selected inactive legislator. This mimicked the idea that a challenger's true preferences are not known to voters and can only be revealed over time (Chen and Niou 2005). This leads to the first set of hypotheses.

Hypothesis 1.c: The tax will always pass in the legislature given the artificial minimum winning majority.

Hypothesis 2.c: Voters will always re-elect the incumbent given seniority advantage in pork barrel legislation. Seniority rank is non-decreasing if an incumbent always returns to office. Replacing him ensures a smaller share of pork except for voters in junior district when all districts simultaneously replace incumbents. Thus no incumbent will lose an election.

Hypothesis 3.c: At the end of the control treatment the voter payoff distribution will favor the districts that begin with seniority. Because the tax will always pass and there is no legislator turnover, endowments will be completely redistributed to voters in senior districts.

4.3.2 Treatment 1: Policy Choice – No Term Limits. In Stage 1 of Treatment 1, taxes and shares of pork were decided in the same manner as in the control treatment, but the legislators also voted on policy. They voted each period to determine which foundation would receive a donation of \$2.00. These donations were separate from subject earnings and were aggregated for the entire session. This created a non-monetary aspect to the legislators' choice set that voters may or may not approve of. In reference to the model in Section 3, this relates to the voters' α term, or the relative weight they place on policy representation. Observing voter behavior will provide inference regarding the importance of the policy issue in deciding how to vote. Legislators and

voters were informed about the preference of the district's majority. The intensity of preferences was recorded in the survey for ex-post analysis but was not disclosed to the legislators.

Stage 2 was the same here as other treatments, but voters also saw the incumbent's policy vote and which foundation received the donation.

Hypothesis 1.1: The tax always passes. Senior incumbents will vote for their preferred foundation. Junior incumbents will vote with the district's majority.

Hypothesis 2.1: Voters will always re-elect senior incumbents given the allocation mechanism regardless of their policy vote. Junior incumbents will be reelected only if they vote with the district majority.

Hypothesis 3.1: At the end of Treatment 1, the voter payoff distribution will favor those districts that begin with seniority.

4.3.3 Treatment 2: Policy Choice - Term Limits. Stages 1 and 2 proceeded the same way as in Treatment 1 with the addition of two-period term limits that capped legislative tenure. Term limits were staggered such that the senior legislators were removed from office after two periods if not already replaced by voters whereas the junior legislators did not face the term limit until the third period if not already replaced by voters. This was done to vary the timing of incumbents leaving office so junior legislators had a chance to become senior. It was possible a priori that voters rendered this ineffective, but there was never a case where every legislator was term limited in the same period.

Hypothesis 1.2: The tax always passes and legislators vote for their preferred foundation.

Hypothesis 2.2: Term limits reduce the cost of replacing shirking incumbents, thus senior and junior incumbents who vote against the majority will be replaced. Policy representation improves as districts' willingness to search for a legislator with matching preferences increases.

Hypothesis 3.2: Term limits reduce the possible seniority advantage and thus lead to a more egalitarian distribution of payoffs across all districts.

5 Results

A total of eight sessions were run at the XSFS laboratory on the Florida State University campus. The average payment was roughly \$20 for one hour in the lab. The first three of these sessions used the setup of twenty-five subjects and five districts and the final five used the fifteen subject-three district setup. Three sessions used self-identified pro-choice voters whereas the rest used pro-life voters. The order of treatments was reversed for three of the sessions as well. Analysis controls for these factors where possible.²⁰ Subjects appear to have understood the seniority structure and respond to the incentives it creates; however, term limits prove to be a weak mechanism for improving representation.

5.1 Passing the Tax

The tax passed eighty-one percent of the time ($n=300$ s.d. = 0.40) in the control treatment, which is a surprisingly low result. This is not particular to the control as seen in Figure 3. The fact that the senior legislators gave up monetary benefits for their voters is odd. Subjects were aware that their role as voter or legislator would be the same throughout the experiment, which rules out the possibility of subjects wanting to set a precedent of low tax passage rates in the case they became a voter at some point in the future. One possibility is that incentives were made so sharp that some legislators avoided repeatedly leaving other subjects with a period payoff of zero because of other-regarding preferences. The tax passed at even lower rates in Treatment 1. It passed merely sixty-five percent of the time ($n=600$ s.d. = 0.48) overall. It passed seventy-one percent of the time ($n=600$ s.d. = 0.45) overall in Treatment 2. It seems especially odd that the tax did not always pass after the policy issue was introduced because this provided legislators the opportunity to buy votes and vote for their preferred policy. Moreover, if a legislator wanted to serve the interest of voters on the policy issue, one would assume they would also serve their financial interests.

Perhaps legislators wanted to prevent other subjects from making more money than they did in the experiment, but this seems highly unlikely because a legislator relied on reelection to maintain his or her high payoff from period to period. Legislators with conflicting preferences might have tried to spite voters by not passing the tax, but this would have shown up in the policy vote as well.

²⁰ In the fifth session there was a shortage of two pro-choice subjects, so I elected to use two pro-life subjects as voters. This was the only incidence where session composition was not as I explained above. In Treatment 1 these two subjects were randomly grouped together, so this group has been dropped from all analysis.

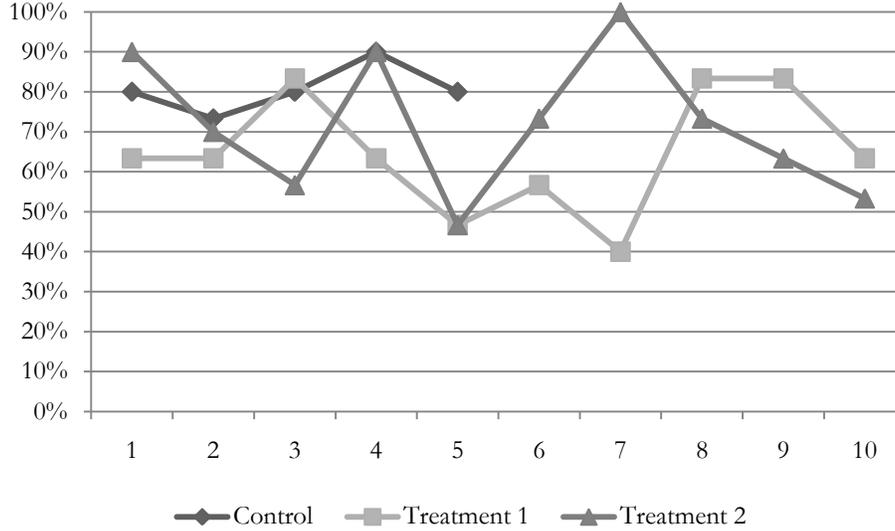


Figure 3: Passage Rate of Tax by Treatment

The distribution scheme of this game has an ultimatum game flavor, so it is possible that legislators exhibited fairness concerns for subjects who had no control over their future payoffs. This is contrary to the strategic play in the ultimatum game where it is the responders' other-regarding preferences that matter, as suggested by Bolton and Ockenfels (2000). Subjects frequently give positive amounts in dictator games, but it is well below the amount given in ultimatum games. Likewise, Guth and van Damme (1998) show that the dummy player in a three-player ultimatum game that has no role in accepting the suggested split by the proposer only receives marginal amounts from the agreed upon distribution casting doubt on pure equity concerns.

Given the binary nature of the legislators' decisions, a simple adaptation of the Bolton and Ockenfels (2000) ERC model can be used to estimate the proportion of legislators who have equity preferences and compare it to their results across different types of games. I ignore the junior incumbents because there is no story of equity concerns to explain junior incumbents voting *for* the tax. I call ξ the proportion of subjects with a preference for equal payoffs, or relativists (equivalent to α in Bolton and Ockenfel's original paper). The payoff of active legislators is not dependent on their seniority status, so equity concerns would involve the differences in voter payoffs. An egoist will vote for the tax ($v = 1$) so that their voters receive seventy-five cents and voters from junior

districts receive zero, and a relativist will vote against the tax ($v = 0$) so that all voters receive fifty cents. This means that the proportion of votes for the tax is $\bar{v} = (1 - \xi) * 1 + \xi * 0 = 1 - \xi$. Thus, $\xi = 1 - \bar{v}$. Using the overall proportion of senior legislators voting for the tax in all treatments, ξ is estimated to be 0.25. When broken down by treatment, the respective estimates are 0.22, 0.28 and 0.24 for the control, Treatment1 and Treatment 2. These figures are below the estimate of 0.50 Bolton and Ockenfels estimate for the dictator game, such that it is quite possible that other-regarding preferences of relativists led to this outcome.

Experiment Result 1 (Hypotheses 1.c, 1.1 and 1.2): Legislators do not always pass the tax, possibly because of other-regarding preferences for voters in junior districts.

5.2 Voting Against the District Majority

This section focuses on the legislators who opposed district voters on policy. These legislators did not always vote against the majority in Treatment 1. Only thirty-two percent ($n = 287$ s.e. = 0.03)²¹ of policy votes by these legislators went against the district majority. Figure 4 displays shirking according to seniority and treatment and shows that in Treatment 1 senior legislators were significantly more likely than junior legislators to vote against the district majority. Senior incumbents shirked forty-two percent of the time compared to the ten percent of votes by the junior incumbents (tstat 6.03 pvalue 0.00). This result is consistent with the predictions; however, it is far from the point predictions of 100 and 0 percent. The difference in Treatment 2 is not statistically greater than zero (tstat 1.14 pvalue 0.12), which is also consistent with predictions but the rates are lower than the point predictions of 100 percent.

Three results merit notice. Game theory suggests by backward induction that imposing a finite limit causes an unraveling. The results show that senior incumbents were less likely to vote against district majorities under term limits than when terms were not limited (34% versus 42%; tstat 1.67 pvalue 0.05). Likewise, term limited incumbents were no more likely to shirk in their last term than in their first term (33% versus 30% respectively; tstat 0.53 pvalue 0.30). Finally, junior

²¹ In one session a subject who had been registered by the experimenter as a pro-choice subject was actually pro-life. This was discovered after the fact when verifying subject preferences. The instances where this subject was an active legislator have been dropped from the analysis.

incumbents were more likely to vote against the district majority when terms were limited than when they were not. (27% versus 10%; tstat 3.26 pvalue 0.00), which is consistent with model predictions.

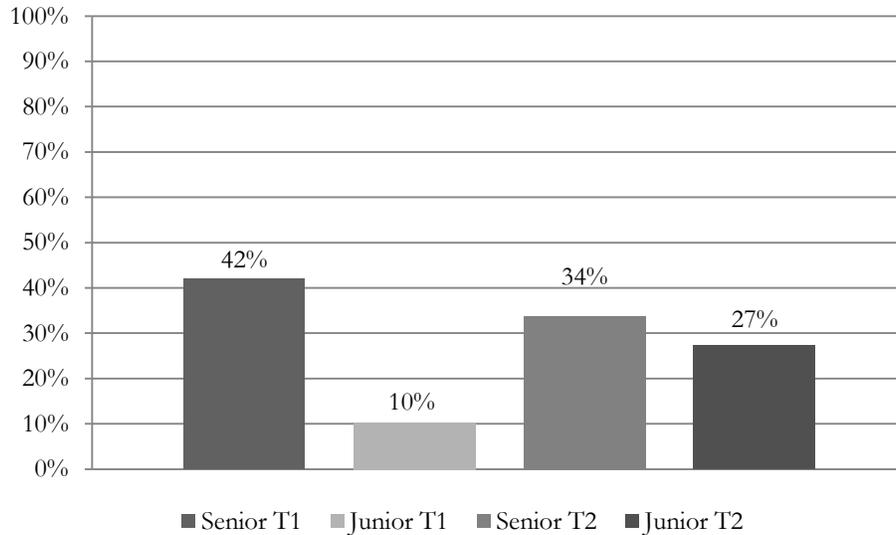


Figure 4: Proportion of Legislators Voting Against District Majority by Treatment and Seniority

Voting against district majorities occurred much less frequently than predicted in both treatments. The payoff difference for active and inactive legislators may have been so large that active legislators did not want to risk losing reelection. This makes sense in Treatment 1 if subjects believed their chance of becoming active again was extremely low if they lost reelection, but the small pool of legislators meant that chances of becoming active again were high in Treatment 2. In Treatment 2 an incumbent who lost reelection had an ex ante probability between forty and sixty percent of becoming active again after one period depending on how many incumbents were forced out of office by term limits. This is an upper bound because actual reelection outcomes may have disrupted how term limits were initially staggered. The data show that the ex-post probability was a twenty percent chance of returning after one period and a forty percent chance of returning after two periods. An incumbent remained inactive after losing reelection for 4.32 periods (out of 10) on average in Treatment 1. In Treatment 2 a losing or term limited incumbent remained inactive 3.25 periods on average before becoming active again. The difference is significant (tstat 2.73 pvalue 0.01). The fact that senior incumbents in Treatment 2 shirked less frequently suggests subjects did not understand the impact that term limits had on the likelihood of returning to office.

Although this was not explicitly tested or modeled, these results would be consistent with the classic articles on electoral control by Barro (1973) and Ferejohn (1986) that show voters can expect better performance from their representatives the higher the relative value of staying in office. Anecdotal evidence from the post-experiment surveys suggests that some subjects perceived that the legislators faced the difficult decision of choosing monetary benefits or their preferred policy. One subject wrote that, “it was interesting to see how money affects people’s choices. [Legislators] had to decide between money and what they believe in.”

Experiment Result 2 (Hypotheses 2.c, 2.1 and 2.2): Shirking was less frequent than predicted overall. Senior incumbents shirked more frequently than junior incumbents when terms were not limited. Junior incumbents shirked more frequently when terms were limited than when they were not. Senior incumbents were no more likely to shirk in their last term when terms were limited.

5.3 Reelection

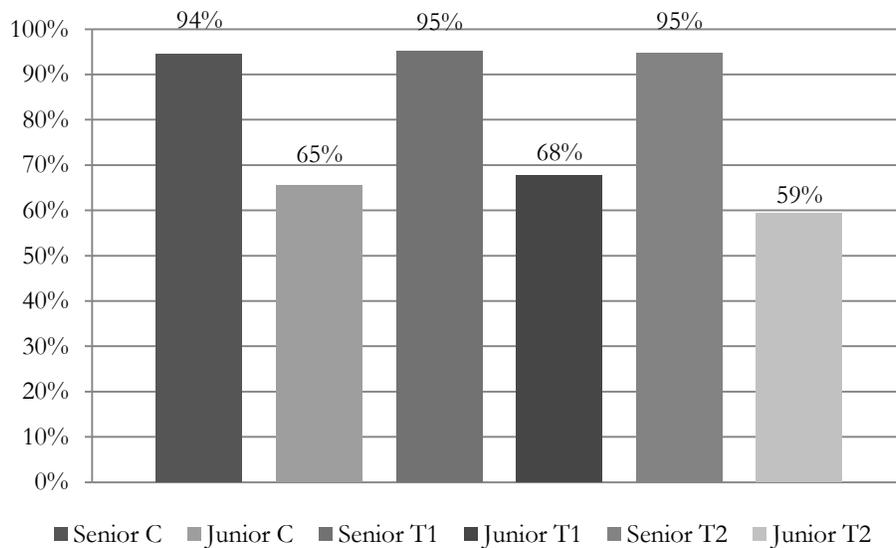


Figure 5: Reelection Rates by Treatment and Seniority

The effects that shirking and term limits had on reelection rates will now be analyzed. Senior incumbents were clearly favored in reelection when considering overall reelection rates as shown in

Figure 5. More important are the reelection rates of those legislators who were in office in the first period because they supported the opposite side of the issue than the voters. Table 2 shows that by the fifth and final period of the control treatment, only 20 out of 30 (67%) original legislators were still in office; however, 11 of the 19 original senior legislators (58%) were still in office. In Treatment 1, sixteen of the 29 (55%) original legislators were still in office after the last period. Ten of the original 18 (56%) senior legislators were still in office.

These results suggest that subjects understood the implications of seniority but do not match the predictions. More importantly, the differences are much more pronounced when conditioned on the incumbent voting against the district majority as shown in Figure 5. Senior incumbents who voted against the majority were reelected ninety-one percent of the time compared to thirty-six percent of the junior incumbents in Treatment 1 (tstat 5.38 pvalue 0.00). Likewise, senior incumbents who shirked in Treatment 2 were much more likely to be reelected than junior ones (tstat 4.92 pvalue 0.00). Voters were clearly responsive to the seniority structure when it came to choosing between pork and policy representation.

Perhaps the most important result is that senior incumbents who shirked were reelected eighty-eight percent of the time under term limits compared to ninety-one percent of the time in the no-term-limit treatment. Therefore it appears that voters were not significantly more inclined to respond to shirking by electing a challenger when terms were limited (tstat 0.54 pvalue 0.59).

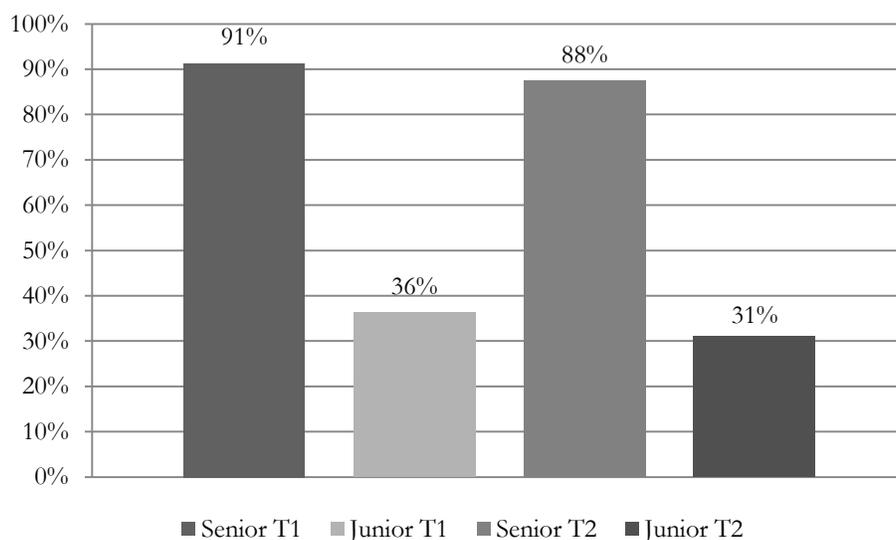


Figure 6: Reelection Rates of Shirking Incumbents by Treatment and Seniority

Table 2: Reelection of Original Legislators

	Control*	Treatment 1	Treatment 2
Overall number to begin	30	29	29
Overall number still in office at end of last period	20	16	-
Percentage	67%	55%	-
Number of senior to begin	19	18	18
Number of senior still in office at end of last period	11	10	All forced out by term limit in second period
Percentage	58%	56%	-

The control contained five periods whereas the other treatments contained ten.

It was a concern a priori whether subjects would care about policy in this setting. Abortion was selected because it was believed that the average person takes a firm stance on the issue, but the observed reaction might have been a function of donation size. The donation was roughly three to four times larger than each voter could have made each period so this argument appears weak. Regression analysis controls for subjects' strength of preference and indicates that a stronger preference meant lower tolerance for shirking; however, the biggest indicator that policy mattered is the low reelection rates of junior incumbents who vote against the district majority. This implies that when the cost of was accountability was low, voters reacted more frequently. Figure 7 confirms this by showing the reelection rates in both treatments by vote and by seniority.

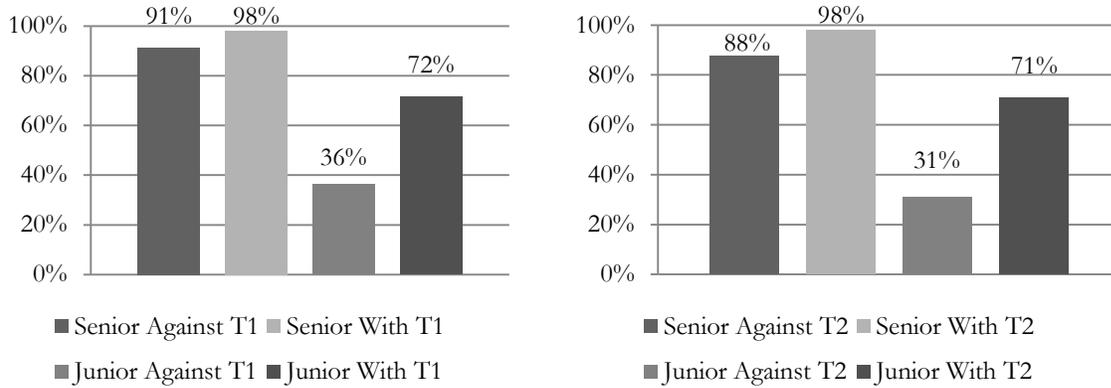
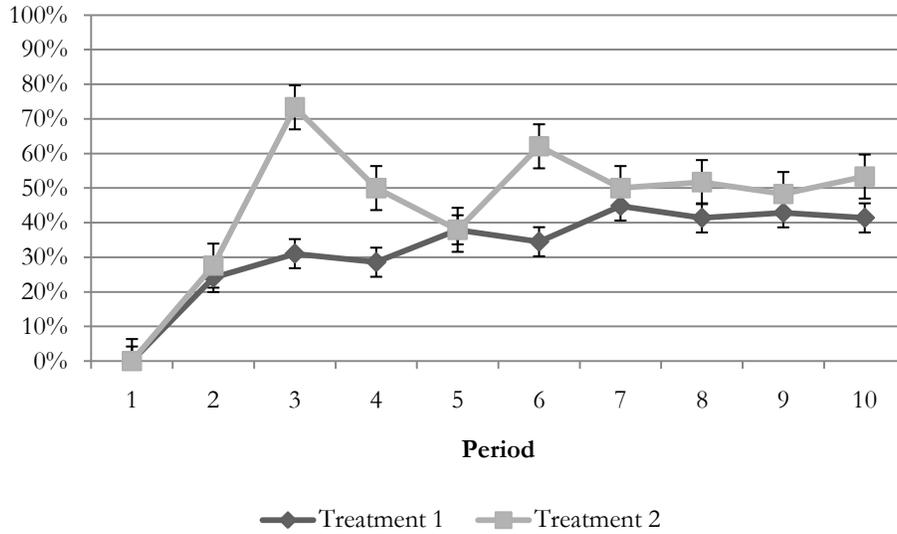


Figure 7: Reelection Rates of Incumbents Voting Against and With District Majorities

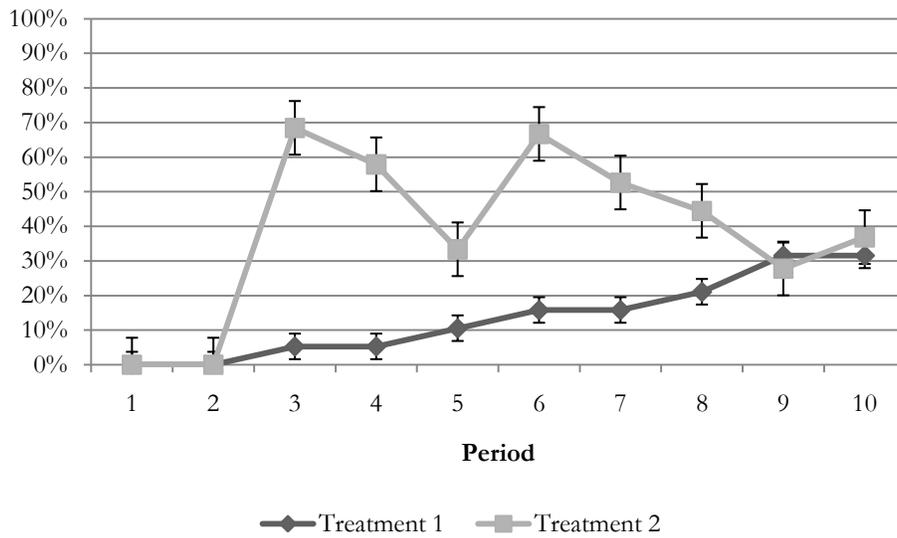
The reelection rates of senior incumbents who vote against the district majority are in fact lower than those who do not shirk in both treatments, but the rate is still very high (tstat 2.21 pvalue 0.01 for Treatment 1; tstat 1.92 pvalue 0.03 for Treatment 2). The difference is much more dramatic for junior incumbents. In Treatment 1 junior incumbents were reelected seventy-two percent of the time when voting with the district compared to thirty-six percent after having shirked (tstat 2.40 pvalue 0.01). The difference was even more pronounced in Treatment 2 at seventy-one and thirty-one percent respectively (tstat 3.92 pvalue 0.00).

This leads to another important consideration: the small size of the voting districts in the experiment. Pork may weigh more heavily on the voters' decisions because of the high probability of being pivotal. Caplan (2007) models voter preferences over beliefs and suggests that the price of holding certain beliefs is very low given the zero probability of being pivotal. In this case, the cost of acting on certain beliefs is high because the probability of being pivotal is high.

Experiment Result 3 (Hypotheses 2.c, 2.1 and 2.2): Voters respond to shirking, but more so when the incumbent is junior and the cost of not reelecting the incumbent is low. Senior incumbents who shirk are reelected at the same rate whether terms are limited or not, suggesting voters do not recognize the reduced cost of electing a challenger when seniority advantage is capped.



Panel A: Senior and Junior Incumbents Combined



Panel B: Senior Incumbents

Figure 8: Match Rates of Incumbent and Voter Preferences

A subtle measure of representation is the proportion of districts where the voter and legislator preferences match. There is an obvious departure from the model in the experimental design because a random inactive legislator replaces an incumbent upon losing reelection, but it is worthwhile to note that the match rate is significantly higher in Treatment 2 under term limits than under Treatment 1 even when voters are not directly choosing the replacement (44% versus 33%;

tstat 2.51 pvalue 0.01). Figure 8 shows the proportion of voters each period with a senior incumbent who has matching preferences. It is clear that under term limits voters are more likely to enjoy the advantages of seniority and a legislator with matching preferences (31% versus 14%; tstat 3.22 pvalue 0.00). There might be reason to suggest that even though term limits do not induce voters to replace incumbents who vote against district majorities, they improve representation by force; however this is dependent on the underlying distribution of legislators' preferences.

1.5.4 Voter Payoff Distribution

The payoff distribution in the control treatment clearly favored the districts that began with seniority, but there was not complete redistribution to those voters as predicted. This is partially attributable to a few senior legislators losing reelection, but it is largely due to the tax not passing every period. Figure 9 displays the proportions going to those districts that began with senior legislators and those that began with junior legislators for each treatment.

The distribution is still skewed in Treatment 1 but less so. This is a product of some of the original senior legislators losing elections after shirking and the fact that Treatment 1 contained twice as many periods, but it is mostly due the tax passing significantly less often than in the control treatment (65% versus 81%; tstat 5.00 pvalue 0.00).

The payoff distribution under term limits is much more equal than compared to the control, but it isn't significantly different from Treatment 1. However, two things should set these treatments apart. First, the tax was passed significantly more often in Treatment 2 than in Treatment 1 (72% versus 65%; tstat 2.61 pvalue 0.01). Second, the general reelection rate was much greater in Treatment 1 than Treatment 2 (85% versus 75%; tstat 2.69 pvalue 0.00). Combined, these factors likely mean that it was term limits that caused a more egalitarian distribution in Treatment 2.

Experiment Result 4 (Hypotheses 3.c, 3.1 and 3.2): Payoff distributions favor voters that begin with seniority in all treatments. It appears that term limits reduced this asymmetry in Treatment 2.

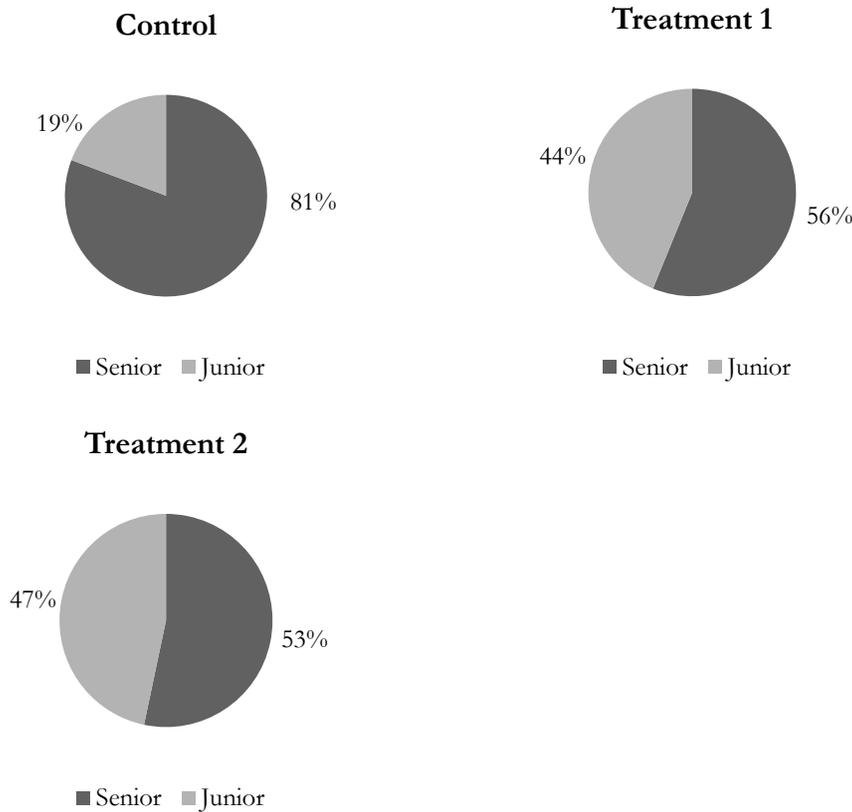


Figure 9: Distribution of Voter Payoffs by Beginning Seniority

1.5.5 Econometric Analysis

The following section details econometric analysis using individual voter and legislator choices. Table 3 shows results from pooled logit analysis using the data on voter choices. The dependent variable is the probability of voting for the incumbent. Period and session fixed effects are included and standard errors are clustered at the individual level. The session fixed effects served to control whether the voters in the session were pro-choice or pro-life as well as the order of the treatments. Treatment 1 and 2 data are pooled for this regression. The sample includes only those voters who did not always vote for or against the incumbent, hence the seemingly strange number of observations. Figure 10 shows the distribution of voters by incumbent vote for both Treatment 1 and Treatment 2. The horizontal axes measure proportion of votes for the incumbent by voter, and the vertical axes indicate the proportion of the sample in each bin. Results show that 32% of voters in Treatment 1 always voted for the incumbent and 19% of voters in Treatment 2 did likewise. The

shapes of the distributions are telling as the Treatment 2 distribution is far less skewed to the right indicating more voters choosing the challenger.

Table 3: Probability of Voting for Incumbent Pooled Logit Regression

Independent Variables	Marginal Effects and Standard Errors
Junior * Vote Against District Majority (VADM)	-0.18* (0.09)
Senior * Vote With District Majority (VWDM)	0.22*** (0.06)
Junior * VWDM	0.21*** (0.06)
Term Limits (TL) * Senior * VADM	-0.31** (0.13)
TL * Junior * VADM	-0.35*** (0.08)
TL * Senior * VWDM	0.32*** (0.04)
TL * Junior * VWDM	0.01 (0.06)
Tax Vote	-0.02 (0.04)
Strength of Preference	-0.06** (0.03)
Observations	1010
Likelihood Ratio	-581.16
PCP	0.68

Standard errors clustered at individual levels. (*),(**) and (***) indicate pvalue < 0.10, 0.05 and 0.01 respectively. Period fixed effects also included in the regression.

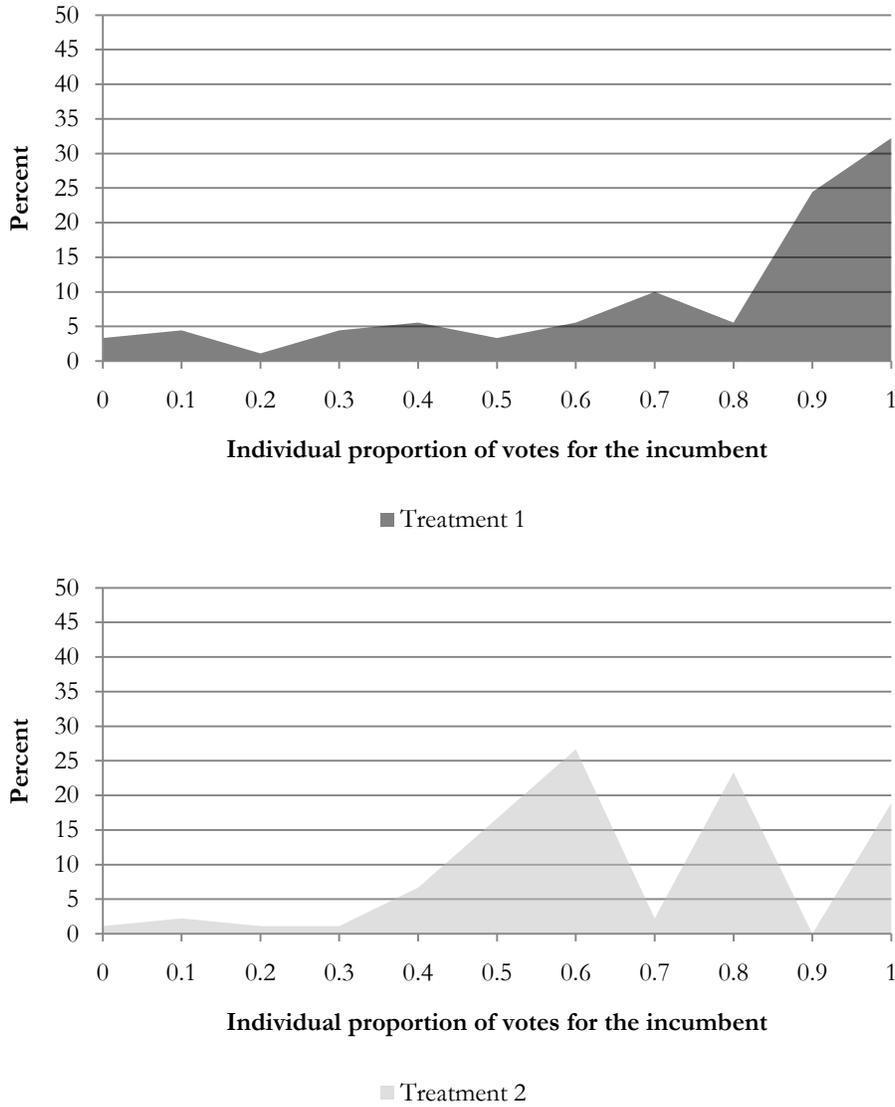


Figure 10: Distributions of Voters by Proportion of Votes for the Incumbent

The main goal in analyzing the individual voter decision is to verify that the individual response matches what the aggregate results are suggesting. The reference group contains voters with senior incumbents who shirk when term limits *are not* in place. We can see that voters were significantly less likely on average to vote for a shirking junior incumbent than a senior one implying once again that voters responded to the seniority structure in the legislature. Voters were also significantly more likely to vote for both senior and junior incumbents that did not shirk than a shirking senior incumbent when terms were not limited. In fact, they were approximately twenty-

percent more likely. This is interesting since it did not show up in the reelection rates, which implies that although the average voter responded to shirking the pivotal voter in most districts did not choose to hold the legislator accountable for shirking. Referring to Figure 7, there is only a small difference in Treatment 1 reelection rates between senior incumbents who shirk and those who do not; however, the positive and significant coefficient on $Senior*VWDM$ indicates that an individual was more likely to vote for a senior incumbent who does not shirk than one who does.

The main variable of interest is $TL * Senior * VADM$, or senior incumbents who shirk under term limits. Theory suggests that voters who value policy representation should be less likely to vote for a shirking senior incumbent under term limits. A vote was not taken in a district whose incumbent is actually term limited, so the variables indicating Treatment 2 signify incumbents who are in the first term of the two period term limit. Results show that a voter was significantly less likely to vote for senior and junior incumbents who voted against the majority under term limits than a shirking senior incumbent when terms were not limited. Under term limits, a voter was thirty percent less likely to vote for a shirking senior incumbent than when terms were not limited. A voter was roughly thirty-five percent likely to vote for a shirking junior incumbent when terms were limited than a shirking senior incumbent when terms were not limited. Therefore, the behavior at the individual level is consistent with theory and suggests that the average voter perceived that term limits reduced the cost of firing a senior incumbent. Recall though that the aggregate reelection rates of senior incumbents who voted against the district majority were not different between treatments.

Overall, it appears that the average voter responded to shirking, whether senior or junior, but they did so to a greater extent when the incumbent was junior and the cost of doing so was low. These results highlight the importance of group choice and aggregating individual decisions. They are also consistent with other findings that suggest voters respond to roll-call votes that align with extreme party positions, but it does not impact reelection rates (Canes-Wrone, Brady and Cogan 2002).

Finally, one of the important predictors of voting against the incumbent is a voter's strength of preference. These data come from the pre-experiment survey. The values range from 1 to 3. By this measure, a stronger policy preference means a voter is more likely to vote against a shirking incumbent. According to the results, a voter who strongly identified with the interest group and whose legislator was senior and shirked was twelve percent less likely to vote for reelection than a voter who only somewhat identified with the interest group all else constant.

Experiment Result 5: Regression results indicate that when terms are not limited an individual was significantly less likely to vote for a shirking senior incumbent than senior or junior incumbents who vote with the district majority. They were also significantly less likely to vote for a shirking senior incumbent when terms were limited than when they were not; suggesting voters recognized the reduced cost of replacing an incumbent when seniority is capped. The insignificant difference between reelection rates of shirking senior incumbents between treatments underscores the importance of aggregating choices and suggests that the average voter was influenced by shirking behavior but the pivotal voter was not. Stronger policy preferences also predict an inclination to vote against an incumbent who shirks.

Table 4: Probability of Voting Against District Majority Pooled Logit Regression

Independent Variables	Marginal Effects and Standard Errors
Senior	0.24*** (0.09)
Term Limit (TL) * Senior	-0.08 (0.10)
TL *Junior	0.12 (0.10)
Last Term	0.28 (0.19)
Strength of Preference (SOP)	0.21** (0.05)
Last Term * SOP	-0.09 (0.07)
Number of Observations	470
Likelihood Ratio	-231.81
PCP	0.24

Standard errors clustered at the individual level. (*), (**), and (***) indicate p-values < 0.10, 0.05 and 0.01 respectively. Period fixed effects also included in the regression. Limited indicates an incumbent that is in their last term.

The incumbents' decisions to shirk were analyzed and results are displayed in Table 4. The dependent variable is the likelihood of voting against the district majority. The sample only includes legislators whose policy preference differed from the majority in their district. Period and session

fixed effects are included and standard errors are clustered at the individual level. Senior incumbents are significantly more likely to vote against the district majority, which again suggests that subjects did understand that the seniority advantage insulates incumbents from losing reelection even though the rate of voting against the district majority was lower than expected.

One concern about term limits is the disincentive for incumbents to exert high effort in a repeated game with a finite ending. Incumbents have the incentive to shirk, especially in their last terms in office. *Last Term* is equal to one for legislators in their last term of the two period term limit. This variable is also interacted with an incumbent's strength of preference. The insignificant effects of these variables indicate that there was not significantly more shirking by these incumbents. This reinforces the difference-of-means test suggesting the unraveling predicted using backward induction does not occur.

Finally, the likelihood of shirking increased with the incumbents' strength of preference. An incumbent that strongly identified with their interest group was forty-two percent more likely to shirk than one who only somewhat identified their interest group.

Experiment Result 6: Seniority and strength of preference are significant predictors of an incumbent's vote against the district majority. Incumbents in their last term were no more likely to shirk under term limits ceteris paribus.

5.6 Supplementary Results

Subjects' strength of preference did not significantly differ from session to session, but this possibility was controlled for in the regression analysis. Pro-life subjects had an average strength of 1.83 whereas self-identified pro-choice subjects had an average strength of 1.98 (tstat 1.03 pvalue 0.30). Thus the average subject was at the midpoint of identifying themselves as either pro-choice or pro-life.

Remember that in a session all of the voters supported the same side of the issue. Overall, the charity that the voters did not prefer received the donation twenty-one percent of the time. In sessions 1,2,4,5 and 6 where voters were self-identified pro-choice, the pro-life policy passed fifteen times every 100 periods. In the third, seventh and eighth sessions with pro-life voters, the pro-choice policy passed thirty two times every 100 periods, which is a significant difference (tstat 2.52 pvalue 0.01). There was no difference between treatments. It is also important to note that controls for the policy outcome in the regressions was never significant and did not change the other results. Thus,

voters cared about the incumbents' choices but not significantly about the actual outcome of the policy vote.

6 Discussion and Conclusions

This project tests the theory that a system that favors seniority encourages voters to compete for transfers via the legislature and disregard policy. It employs a novel use of visceral and monetary incentives in the lab where payoffs are affected by seniority advantage but overall utility is affected by the policy choices of legislators. These policy choices are made by voting to donate money to either one of two foundations that stand on opposing sides of the abortion issue. Work by Zajonc (1980) and Lowenstein (1996) suggests that visceral responses are greater than those seen involving monetary payoffs, contrary to mainstream thought in economics and political science, but that does not seem to be the case here.

It was proposed that the advantage of seniority and competition for pork would lead voters to disregard policy choice and to reelect incumbents because of monetary incentives. This would then lead to poor policy representation by legislators as well as disparity in the balance of tax benefits and costs. Term limits were proposed as a way to reduce seniority advantage and reduce the cost of replacing an incumbent, encouraging voters to give weight to policy choices and replace legislators who vote against the district majority. They were also anticipated to improve the disparity in voter payoffs.

Results are not quite as expected. First, the tax does not always pass even with an artificial minimum winning majority. Senior legislators essentially give up monetary benefits to their voters. One might expect legislators with opposing policy preferences to at least pass the tax to buy off voters on the policy issue, much like the model by Jackson and Moselle (2002). The obvious possibility is that subjects exhibited other-regarding preferences.

Second, and more importantly, term limits do not decrease the likelihood of reelection for senior incumbents after voting against the majority. Although incumbents vote against district majorities far less than predicted, voters respond to the seniority structure by almost always reelecting senior incumbents even when they vote against the district majority while reelecting shirking junior incumbents much less frequently. Nevertheless, shirking senior incumbents are reelected significantly less often than those who vote with the district majority. Thus, voters appear

to compete for monetary payoffs and respond to policy representation when the cost of doing so is low. On the other hand, results at the individual level are in line with theory as the typical voter was significantly less likely to vote for shirking senior incumbent when terms were limited than when they were not. The discrepancy between district level results and those at the individual level are attributed to the problem of aggregation of preferences. Although voters responded to shirking on average, the pivotal voters was not moved enough to affect reelection rates to a very large degree.

Finally, it is likely that term limits significantly reduced the distribution effects on voter payoffs. Distribution of voter payoffs is highly skewed in the control treatment when the tax passed roughly every period, but there is no statistically significant difference between the distributions of Treatment 1 and Treatment 2 because the voters in Treatment 1 were not always taxed.

The model and experimental design are stylized, but I argue that the incentives point in the right directions. Results could impact policy by changing the institutions within legislatures. Term limits were tested here, but other mechanisms may be discovered after a general review of the seniority system. The mission of legislators in Congress might be re-examined if voters see them as providers of transfers rather than law makers. This may translate into a new institutional structure with term limits or some other change where leadership and committee seats are no longer determined by tenure but some other mechanism.

One important benefit of this experimental design is that it lends itself well to extensions that address other important topics in political economy as well as behavioral sciences. Right away it is apparent that according to the model used, smaller and poorer districts should be even more likely to reelect incumbents in order to secure more pork. Treatments using districts of different sizes and districts with varying endowments could easily address this concept. Another concern with seniority advantage is that voters disregard legislators' abuse of perquisites because of the competition for pork. A similar design can be easily implemented that allows the legislators to allocate a share of the transfer to themselves. The question is whether voters will overlook this knowing the district's share of pork is dependent upon seniority. This particular project is currently underway.

Opponents of term limits claim that an unintended consequence to capping tenure is that qualified challengers will postpone running for office until the incumbent is forced to leave in effort to more effectively use campaign funds. This of course excludes political capital building campaigns. Creating a cost for inactive legislators wanting to be considered to replace incumbents would simulate this idea. Framing it in opportunity cost terms and awarding bonuses to those inactive

legislators who withdraw their names from consideration could be a way of doing this. The laboratory has been, and will continue to be, an important research tool in answering challenging questions in political economy.

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Appendix A

A.1 Sample of Instructions

Thank you for coming on time and participating in today's experiment. This is an experiment on decision-making and you will have the opportunity to earn money according to the choices you make. You are free to withdraw from the experiment without additional compensation and without incurring the ill will of the experimenters at any time. If you do so, you may keep the \$10 show-up fee. Please do not talk during the experiment and do not use any device such as a cell phone, mp3 player or texting device. If you have a question, please raise your hand and I will be by to answer your question privately.

ROUND ONE

You have completed a short survey that included questions involving your preferences regarding certain political issues. While your responses will not directly affect your payoff, they will be used in today's experiment.

The experiment consists of three rounds. The first round will last five periods. The second and third rounds will last ten periods each.

In today's experiment, each of you will be assigned roles. You have been randomly selected to be either a Type A player or a Type B player. There will be five groups of players in the experiment, and each group will have three Type A players and one Type B player. There are a total of 15 Type A players and 10 Type B players in the experiment. This means that at any point in time, half of the Type B players will be in a group and half of them will not. You will be informed of your role shortly, but first we will discuss the differences between types and how the groups work.

Type A players receive an endowment of 45 cents each period, which they will either keep or contribute to a public account that will be divided among the groups. Each period the Type B players from each group vote to decide how the Type A players will use their endowments. The outcome is determined by a simple majority rule. That is, if at least three Type B players vote for keeping the endowment, the Type A players keep their endowments that period. If at least three Type B players vote for contributing to the public account, the Type A players will contribute their endowments to the public account and may receive a portion of the overall sum. Type A players will

see the outcome of the vote as well as the vote cast by the Type B player from their group. This will happen every period.

Type B players are either Active or Inactive. Whether a Type B player is Active or Inactive can change from period to period. Active Type B players belong to groups, vote and receive a salary of 60 cents each period for their participation in their groups. Inactive Type B players do not belong to any group, do not vote and do not earn a salary. They are waiting for the opportunity to replace an Active Type B player. While they are waiting they will have a chance to earn some money in another activity decoding words for 2.5 cents for every correct code. I will explain how that works shortly.

After Active Type B players vote to determine how Type A players will use their endowments, the Type A players will see the outcome and vote within their group whether to keep the Type B player for the next period or replace them. If at least two Type A players from the group vote to keep the Type B player, he or she will stay for at least one more period. If at least two of the Type A players vote to replace the Type B player, that Active Type B player becomes Inactive and is replaced by a randomly chosen Inactive Type B player. Type A players will vote every period.

The table below summarizes the different roles and group make up.

Role	Number in each Group	Activity	Pay
Type A	3	Vote on Type B players	Keep 45 cents or Split the Public Account
Active Type B	1	Vote on Type A endowments	60 cents
Inactive Type B	0	Decode text strings	2.5 cents for every correct code

Now I will explain how the public account is split up. The amount a group receives from the public account is based on the tenure rank of its Type B player. That is, the Active Type B players

will be ranked based on the number of consecutive periods they have been Active and this determines the amount their group gets from the public account. The Active Type B player that is ranked first has the highest number of consecutive periods as an Active Type B player, the second ranked has the second highest number of consecutive periods as an Active Type B player, and so on.

Tenure rank can change based on the groups' decisions to keep or replace their Active Type B players. For example, if you are in a group whose Active Type B player is ranked 3rd, he or she has the third highest amount of consecutive periods of activity. If the 2nd ranked Active Type B player is replaced, then all the Active Type B players ranked lower than 2nd will move up in the ranking. That is, the 3rd ranking Active Type B player will become the 2nd ranked Active Type B player, the 4th ranking Active Type B player will become the 3rd ranked, and so on. The Active Type B player ranked first will not be affected. If an Inactive Type B player becomes Active, they will begin at the bottom of the ranking. If more than one Type B player is activated at the same time, and thus have the same tenure, their ranks will be determined randomly.

The Type A players will know the ranks of each group's Active Type B player. This will be indicated on the screen next to "Group X Rank: #". The Active Type B players will know their own rank.

The three groups whose Active Type B players are ranked 1st, 2nd, and 3rd will receive 1/3 of the public account. This 1/3 will then be divided evenly among all the Type A players within those groups. The two groups whose current Type B players are ranked 4th and 5th will contribute to the public account, but will not receive a share when it is split up. To begin each round, the tenure rank will be randomly assigned to the Active Type B players. Thereafter, the tenure rank is determined by the number of periods as an Active Type B player.

If the Type A players keep their endowments, the public account contains nothing. If each Type A player contributes their 45 cents to the public account, there is $15 \times 45 = 675$ cents in the public account to be split up. (There are a total of 15 Type A players and each has 45 cents.) If your group receives 1/3 of the public account, it will receive 225 cents ($675 \times 1/3$) to split among the Type A players, or 75 cents for each Type A player ($225 \times 1/3$). When voting to determine how the Type A players will use their endowments, the Active Type B players as well as the Type A players will know how much their group will receive if the endowments are put into the public account.

To begin, the first round of five periods will function as I have explained. Half of the Type B players are Active and half are Inactive. The rank of Active Type B players has been randomly determined to begin the round.

The next screen will show you your role. If you are a Type A player you will also see your group number for this round. Remember you will be a Type A player for the entire experiment, but you will be in a new group each round. If you are a Type B player you will see whether you are Active or Inactive. Remember, you will be a Type B player for the entire experiment. When voting begins, the top of the screen will remind you of the Round and Period numbers and your role. If you are a Type A player you will see your Group number and your earnings for the entire experiment. If you are a Type B player you will see whether you are active or inactive, your tenure rank if you are active and your earnings for the entire experiment.

Decoding

I will quickly explain what the Inactive Type B players are doing while the others are voting. If you are Inactive you will see a screen like the one shown at the front of the room. You will be decoding lines of text and can earn 2.5 cents for every line of text you decode correctly. Notice the first box contains instructions and the second box contains the decoding key. You will use this to find the numbers that correspond to the letters given to you as shown. You will enter each number and hit "OK". Notice the box in the lower left corner keeps track of the number of correct and incorrect codes, along with your earnings from decoding. These earnings will be added to any earnings you receive while playing as an Active Type B player. There is no limit on how many codes you can be paid for, but your time is limited by the amount of time it takes for the Active Type B players and Type A players to vote. After the Active Type B players vote there will be a short pause informing you that the Type B players have voted and where you will see your current status. After that you will continue decoding while the Type A players make their decisions.

If there are no questions we will begin the first round of the experiment. Please click the OK button at the bottom of your screen.

ROUND TWO

Type A players will now be assigned a new group and will remain in this group for the entire round. Your role as either a Type A or Type B player is the same as the previous round. Half of the Type B

players begin the round Active and half begin Inactive. The group and rank of Active Type B players have been randomly determined to begin the round.

This round will last ten periods and will function similarly to the first round, but a new dimension has been added to the choice of the Type B players. Each period there is a sum of money to be donated to one of two foundations. Not only will the Active Type B players vote to determine how the Type A players use their endowments, they also vote to determine which foundation receives the donation. Remember that this sum of money does NOT affect your payoffs at the end of the experiment.

Each period there are 200 cents available to donate to one of two foundations. Those foundations are Pro-Choice America and the Pro-Life Action League. You have been given a description of each foundation. If at least three Active Type B players vote for Pro-Choice America, then the 200 cents will be added to a pot of money that will be sent to that foundation at the end of the experiment. If at least three Active Type B players vote for the Pro-Life Action League, the 200 cents will go to that foundation at the end of the experiment. Type A players will see the outcome of the vote as well as the vote cast by their group's Type B player.

Active Type B players first vote on how Type A players will use their endowments, and then vote on the donation. Before the vote the Type A players and Active Type B players will be shown the foundation that the majority of Type A players in their group prefer. These preferences were taken from the surveys you completed prior to participating in the experiment. Remember, the foundation you prefer does not affect your payoffs, nor does the donation. After the Type B players vote on both issues, the Type A players will see the outcomes of both votes and then vote on the group's Active Type B player just as you saw in Round One. The voting rules are the same in this round.

Remember, the groups and the rankings of the Active Type B players have been randomly determined to begin the round. The public account is divided in the same way as the previous round. If there are no further questions, we will begin the second round.

ROUND THREE

Type A players will now be assigned a new group and will remain in this group for the entire round. Your role as either a Type A or Type B player is the same as in the previous round. Half of the Type

B players will begin the round as Active and half will begin as Inactive. The group and rank of Active Type B players have been randomly determined to begin the round.

This round will last ten periods and will function similarly to the second round. Each period, Type B players vote to determine the use of Type A player's endowments as well as vote to decide how the donation will be allocated.

In this round Type B players will be limited in how many consecutive periods they can be Active for a particular group. That limit is 2 consecutive periods. When an Active Type B player reaches the 2 period limit, they automatically become Inactive and are replaced by a randomly chosen Inactive Type B player. The Type A players of that group are informed that the Type B player has reached the limit and they will not vote.

To begin the round, the three highest ranking Active Type B players face the limit after two periods if they are not voted Inactive by their group members prior to the second period. The other Active Type B players ranked 4th and 5th will then move up in rank and will face the 2 period limit in the 3rd period if they are not voted Inactive by their group prior to the third period. If any Active Type B player is voted Inactive in any period, the incoming Type B player faces the 2 period limit two periods after becoming Active regardless of their group or rank if they are not replaced before reaching the limit.

To be clear, the groups that begin the round with Active Type B players ranked 1st, 2nd and 3rd will face the two period limit in the second period of the round unless they vote to replace the Active Type B player before reaching the second period. The groups that begin the round with Active Type B players ranked 4th and 5th will face the two period limit in the third period of the round unless they vote to replace the Active Type B player before reaching the third period.

Remember, the groups and the rankings of the Active Type B players have been randomly determined to begin the round. The public account is divided in the same way as the previous rounds. The donation is determined the same way as before. If there are no further questions, we will begin the third round.

A.2 Sample of Foundation Descriptions

The **Pro-Life Action League** was founded in 1980 with the aim of saving unborn children through non-violent direct action. Members spread their message through non-violent protests,

confronting abortionists, sidewalk counseling outside of abortion clinics and youth outreach programs.

For 40 years, **NARAL Pro-Choice America** has been the nation's leading advocate for privacy and a woman's right to choose. The organization works to elect Pro-Choice candidates and lobbies Congress to support Pro-Choice legislation.

A.3 Pre-experiment Survey

Welcome and thank you for participating in this survey. The following questions relate to current political issues. Completing this survey will allow you the chance to participate in a future study at XSFS, but you are not obligated to do so. Your answers are confidential and secured and will not be distributed to any other party for any other purpose. You are not required to answer any of the questions, but you are encouraged to answer as accurately as possible.

Participation in the survey is purely voluntary and does not affect your eligibility to participate in other XSFS studies. If you choose, you can leave the survey at any time and doing so will not prevent you from participating in other experiments.

1. The Pro-Life Action League was founded by in 1980 with the aim of saving unborn children through non-violent direct action. Members spread their message through non-violent protests, confronting abortionists, sidewalk counseling outside of abortion clinics and youth outreach programs.

How well do you identify with the Pro-Life Action League?

Strongly Do Not Identify

Do Not Identify

Somewhat Do Not Identify

Neutral

Somewhat Identify

Identify

Strongly Identify

2. For 40 years, NARAL Pro-Choice America has been the nation's leading advocate for privacy and a woman's right to choose. The organization works to elect Pro-Choice candidates and lobbies Congress to support Pro-Choice legislation.

How well do you identify with NARAL Pro-Choice America?

Strongly Do Not Identify

Do Not Identify

Somewhat Do Not Identify

Neutral

Somewhat Identify

Identify

Strongly Identify

3. As America's oldest civil rights organization, the Nation Rifle Association's (NRA) mission is to preserve and defend the U.S. Constitution, especially the inalienable right to keep and bear arms guaranteed by the Second Amendment.

When restrictive “gun control” legislation is proposed at the local, state or federal level, NRA members and supporters are alerted and respond with individual letters, faxes, e-mails and calls to their elected representatives to make their views known.

How well do you identify with the NRA?

Strongly Do Not Identify

Do Not Identify

Somewhat Do Not Identify

Neutral

Somewhat Identify

Identify

Strongly Identify

4. The Coalition to Stop Gun Violence (CSGV) seeks to secure freedom from gun violence through research, strategic engagement and effective policy advocacy.

CSGV is comprised of 48 national organizations working to reduce gun violence including religious organizations, child welfare advocates, public health professionals, and social justice organizations.

How well do you identify with CSGV?

Strongly Do Not Identify

Do Not Identify

Somewhat Do Not Identify

Neutral

Somewhat Identify

Identify

Strongly Identify

5. Friends of the Earth are the world's largest grassroots environmental network and campaigns on today's most urgent environmental and social issues. It challenges the current model of economic and corporate globalization, and promotes solutions that will help to create environmentally sustainable and socially just societies.

How well do you identify with the Friends of the Earth?

Strongly Do Not Identify

Do Not Identify

Somewhat Do Not Identify

Neutral

Somewhat Identify

Identify

Strongly Identify

6. Generally speaking, do you consider yourself to be a(n):

Democrat

Independent

Republican

Libertarian

Socialist

Other (please specify) _____

Don't Know

7. Would you describe yourself as religious? Yes No

8. What, if any, is your religious preference?

Protestant

Catholic

LDS / Mormon

Jewish

Muslim

Other (specify) _____

No Preference / No religious affiliation

Prefer not to say

9. What is your age? _____

10. Are you male or female? _____

11. Are you?

Single

Married

Divorced

Remarried

Committed

12. Are you a parent? Yes No

13. What is your major? _____

14. Which of the following best describes you?

American Indian/ Native American

Caucasian/ White

African American/ Black

Hispanic / Latino

Asian

Pacific Islander

Other _____

15. What is your home state, district or territory? _____

16. How much of the time do you think you can trust government in Washington to do what is right?

Just about always Most of the time Only some of the time Never

17. Do you consider yourself politically active? Yes No

18. Did you vote in the last presidential election? Yes No

19. Did you vote in the last congressional election? Yes No

20. Did you vote in the last state elections? Yes No

21. If you would like to participate in a study related to this survey, please provide your name and the email address you use to receive emails from XSFS so that you can be invited to participate. _____

Thank you for completing the survey. Because of your participation, you are now eligible to participate in an upcoming experiment related to this survey.

The experiment connected to this survey will begin running in the near future and invitations for participating in it will be sent at that time.