

**Split Delegation Bias:  
The Geographical Targeting of Pork Barrel Earmarks in Bicameral Legislatures**

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### **Abstract:**

A substantial body of work in political economics has presumed the veracity of David Mayhew's classic theory of credit-claiming, whereby legislators enjoy electoral rewards for bringing home particularistic spending projects. However, recent empirical work has found that voters are generally unable to credit the correct legislator for each pork project, creating a research puzzle: How do parties benefit from pork spending if voters cannot properly assign credit? I revise Mayhew's classic theory to account for voter ignorance in bicameral legislatures, demonstrating that party leaders cope with voter uncertainty by directing pork away from neighborhoods represented by legislators from differing parties. I refer to this result as *Split Delegation Bias*, as a party leader strategically gives less pork to members whose districts overlap with the opposing party's districts. I introduce new line-item data on pork earmarks in the New York State Assembly to corroborate the formal model, using matching estimators to show that areas with *Split Delegations* receive 32% less pork, a difference of \$4.03 per capita.

In 2004, Hickey Freeman, a Rochester-based clothing manufacturer, threatened to shut down its New York plant and relocate, citing a need for upgraded facilities. In response, the Democrat-controlled State Assembly awarded a \$1.27 million earmark grant to Hickey Freeman for plant renovations in an effort to convince the company to remain in New York. Rochester's Assemblyman, David Gantt (Democrat – 133<sup>rd</sup> Assembly District), requested and obtained the pork earmark award from Assembly Majority leader Sheldon Silver. Hickey Freeman remained in Rochester, and Assemblyman Gantt engaged in classic credit-claiming behavior, boasting:

I am pleased to announce that Hickey Freeman is remaining in the Rochester community and 700 people will remain employed because of the efforts of Mr. Norwood [Gantt's former special assistant] working on my behalf.

Meanwhile, the Republican-controlled Senate sought to claim credit for the Hickey Freeman renovations as well. Rochester's Senator, Joseph Robach (Republican – 56<sup>th</sup> Senate District), petitioned Senate Majority leader Joseph Bruno and secured a \$1.27 million Senate earmark and tax breaks for the clothing company. In a May 13 press release, Robach claimed:

I am pleased to have been able to work with [Republican] Governor Pataki, the company and UNITE to create an economic development package that keeps Hickey Freeman in the City of Rochester

Which party was responsible for the Hickey Freeman renovations? Both Gantt and Robach attempted to unilaterally claim sole credit for funding the Rochester plant, so any voter who viewed both press releases would have been confused as to which party deserved more credit for the renovations. Of course, neither press release was entirely truthful. Funding the renovations was a collective effort involving a Democrat and a Republican, but both Gantt and Robach apparently sought to mislead voters into believing that each was solely responsible.

How does the partisan struggle to claim credit for local spending projects, as illustrated in the Hickey Freeman episode, affect parties' allocation of distributive benefits? This article demonstrates, both formally and empirically, that party leaders strategically direct spending

projects away from towns with *Split Legislative Delegations* – that is, a Senator and an Assemblymember from different parties – such as Rochester. Instead, Democratic Assembly leader Sheldon Silver awards more pork spending to Assemblymembers from *Unified Democratic Delegations*, such as Buffalo Assemblyman Sam Hoyt (Democrat – 144<sup>th</sup> District), who shares his constituency with Democratic Senator Antoine Thompson (60<sup>th</sup> District). Hence, even though Assemblymen Gantt and Hoyt are both Democrats, the Democratic leadership will strategically favor Hoyt (Buffalo, NY) over Gantt (Rochester, NY) in allocating pork projects.

**[FIGURE 1 ABOUT HERE.]**

The intuition behind this strategy is that parties prefer to claim sole credit for spending projects, rather than fight against an opposing party for such credit. The fact that Rochester is represented by a Democratic Assemblyman (lower chamber) but a Republican Senator (upper chamber) allows both parties to plausibly claim credit for positive economic events in Rochester, as illustrated by the conflicting Hickey Freeman press releases. In Buffalo, with a *Unified Democratic Delegation*, voters have less ambiguity in assigning credit to the correct party for targeted spending projects; any incumbency advantage arising from positive local economic events would invariably favor the two Democratic legislators.

Beginning with Mayhew (1974), work in political economics has long argued that legislators pursue particularistic spending projects for their constituents in order to claim credit from voters for such projects and reap electoral rewards. Subsequent work has affirmed the basic logic behind Mayhew's theory, finding that Congressmen enjoy electoral rewards for constituency service (Fiorina 1977; 1981) and bringing home federal grants (eg, Levitt and Snyder 1997). Furthermore, countless theoretical models of distributive politics have assumed the validity of Mayhew's claim and have begun with the premise that legislators pursue pork

projects to gain reelection votes (eg, Weingast, Shepsle, and Johnsen 1981; Niou and Ordeshok 1985; Ferejohn and Krehbiel 1987).

Nevertheless, several empirical studies have identified an important limitation to Mayhew's (1974) pioneering theory of credit claiming: Most voters pay little attention to the pork barreling activities of their respective legislators. For example, Stein and Bickers (1994) find that among members of Congress, credit claiming is rewarded only by voters who are highly attentive to politics or active within interest groups; in general, however, "many voters are disinterested about their legislator's role in securing projects for the district" (382). Moreover, most new pork projects are not widely publicized by the media, "making it difficult for even the most informed voters to know what type of benefits flow to their district" (383). In Brazil's Chamber of Deputies, Samuels (2002) finds that many legislators do not pursue pork barreling as a credit claiming strategy because the "identification of creditworthy politicians is relatively difficult...because voters may not perceive the benefits of the project and because voters may not credit the deputy for obtaining the project" (850). Furthermore, this problem of voter inattention is exacerbated when legislators issue misleading press releases, as illustrated in the Hickey Freeman episode. Not only do voters often fail to identify the legislator responsible for each project, but legislators may even unduly attempt to claim sole credit for the other party's pork.

These empirical findings present a research puzzle: If most voters remain unaware or misguided when their legislators bring home spending projects, then how do parties secure electoral rewards for delivering particularistic benefits to their constituents? To address this puzzle, I revise and extend Mayhew's (1974) pioneering theory of credit claiming to account for voters' ignorance of the legislator responsible for each local spending project. In this article's formal model, a voter observes only the indirect economic consequences of pork projects but cannot identify whether her Senator or Assemblymember was responsible for each project;

hence, the voter simply rewards both of her incumbent legislators for positive economic outcomes and punishes them for negative ones (eg, Kinder and Kiewiet 1979).

Consequently, party leaders will prefer to award pork projects to a party member whose district does not overlap with the opposing party's legislators. For example, Democratic Assembly leader Sheldon Silver should allocate more pork spending to Assemblyman Hoyt's Buffalo district, which has a unified Democratic delegation, than to Democratic Assemblyman Gantt's Rochester district, which overlaps with a Republican Senate district. Allocating a project to Assemblyman Hoyt guarantees that even if voters erroneously credit the wrong legislator for the project, at least a Democratic legislator will receive the credit. On the other hand, allocating a project to Assemblyman Gantt introduces the risk that Rochester voters might mistakenly credit a Republican Senator for the project. Hence, the Democratic party leader should distribute projects strategically to prevent Republican legislators from inappropriately reaping electoral rewards for Democratic pork projects. I refer to this result as *Split Delegation Bias*, or that:

*In a bicameral legislature, a party leader has an electoral incentive to direct particularistic benefits away from split delegation districts and toward unified delegation districts represented exclusively by the party's members.*

The *Split Delegation Bias* result represents a refinement of Mayhew (1974), extending his classic credit-claiming theory to account for voters' inability to correctly credit the legislator responsible for each pork project. Accounting for voter ambiguity in credit assignment is important for both substantive and theoretical reasons. Substantively, bicameralism is an important feature of legislatures worldwide. All but one U.S. state legislature and most national legislatures in modern democracies employ multiple chambers, and many of these chambers apportion legislative seats on the basis of geographic districts. Furthermore, both theoretical (eg, Bednar 2007) and empirical (eg, Stein and Bickers 1994) literatures have identified voters' inability to correctly assign credit as a significant problem in distributive politics.

If *Split Delegations* are disadvantageous in distributive politics, then why do voters elect them into office? In New York, *Split Delegations* arise because of the geographical asymmetry of Senate and Assembly district boundaries. Senate districts, which average 316,000 in population, are much larger and more politically diverse than Assembly districts, which average 126,000 people. Hence, the constituency that elects a particular Senator is geographically and politically quite different from the constituency that elects each overlapping Assemblymember.

For example, the town of Nyack, located 20 miles north of Manhattan along the Hudson River, is a Democratic stronghold, supporting Al Gore with over 67% of its votes in 2000. Nyack shares Assembly District 38, represented by Democrat Ellen Jaffee, with other solidly Democratic towns along the Hudson River, including Chestnut Ridge and Piermont (74% and 64% Gore voters, respectively). Yet, Nyack is located in a Republican Senate District, represented by Thomas Morahan (Republican – 38<sup>th</sup> District), because the Senate District extends 25 miles west into Orange County, a moderately conservative region. Hence, Nyack has long been represented by a Republican Senator and a Democratic Assemblymember, even though Nyack voters overwhelmingly favor Democratic candidates in every election.

The following section presents the pork earmarking process in the New York Assembly and describes the general distribution of pork across districts. Next, I present a formal model that derives *Split Delegation Bias* in equilibrium. Finally, I analyze New York Assembly earmarks, using matching methods to show that *Split Legislative Delegations* receive 32% less pork.

### ***Pork Earmarks in the New York State Assembly***

To empirically test for *Split Delegation Bias*, I introduce new data on pork barrel earmarks funded by the New York State Assembly during 2005 and 2006. Each fiscal year, Democratic Assembly leader Sheldon Silver has the right to distribute up to \$85 million in

earmarked spending to any of the 150 Assembly members. These earmarked expenditures, formally named the Community Projects Fund, may be used for any legally permissible purpose, including both construction projects and current expenditures for private companies, non-profit organizations, and local governments.

Though individual Assembly members may request specific earmarks for their respective districts, all pork spending is ultimately awarded at Silver's discretion, without approval from either legislative chamber or the Governor. Hence, the pork barreling process departs from the classic Baron and Ferejohn (1989) model, as there is no need to build a majority coalition. Rather, Silver exercises final authority over the distribution of the pork barrel and may use this power to advance the collective interests of the Democratic Party.

Traditionally, the state legislature has cloaked details about its pork earmarks in secrecy. However, in 2006, the Albany *Times-Union* sued legislative leaders, invoking New York's Freedom of Information Law (FOIL), to access line-item details about earmarks from the Community Projects Fund. As a result of the State Supreme Court's ruling in *Hearst Corporation v. Bruno* (2006), Sheldon Silver was forced to turn over records detailing the 5,850 earmarks he had awarded from the Fund during the 2005 and 2006 fiscal years. Each record lists the amount of the earmark, the street address of the earmark's recipient, and the Assemblymember who requested the earmark. Figure 2 illustrates an example of these records.

**[FIGURE 2 ABOUT HERE.]**

I geographically track the Assembly district of each earmark recipient, identifying the total amount of pork spending that Silver awarded to each Assemblymember's constituents during 2005-2006. The data illustrate that among the 104 Democratic Assemblymembers in New York, those whose districts overlap with Republican Senate districts receive significantly less in earmarked spending from Silver.

Table 1 describes the partisan distribution of pork earmarks. Assembly leader Silver invariably awards more pork to Democratic than to Republican Assmeblymembers; during 2005-2006, the average Democrat received \$944,600, while the average Republican received \$101,100. This partisan distribution is consistent with Balla et al. (2002), who argue that the majority party offers small pork earmarks to the minority party to prevent minority legislators from publicly criticizing the pork barreling process. However, there is also substantial variation in allocations among Democratic Assemblymembers. A Democratic Assemblymember from a *Unified Democratic Delegation* receives an average of \$1.28 million in earmarks. By contrast, a Democratic Assemblymember who shares her district with a Republican Senator (*Split Legislative Delegation*) receives only an average of \$373,300. Hence, Silver's distribution of pork appears significantly biased against Democrats from *Split Legislative Delegations*.

A potentially confounding factor, however, is that among the Democratic Assembly districts, ideologically moderate districts are more likely to have a Republican Senator; hence, the distributive bias against *Split Delegation* districts may simply be a manifestation of Silver's favoritism toward core left-wing districts. To separate the effects of *Split Delegation Bias* from mere ideological bias, the final section of this article uses propensity score and genetic matching estimators. I match zip codes within Democratic Assembly districts that have a different Senator but are otherwise similar with respect to voter ideology, demographics, and legislator seniority. For Democratic Assemblymen, sharing constituents with a Republican Senator has a statistically significant effect, causing a 32% decrease, from \$12.53 to \$8.50 per capita, in pork earmarks.

### ***The Bicameral Legislature Model***

***Players:*** There are  $N > 2$  legislative districts, denoted  $\{1, \dots, N\}$ , where  $N$  is odd, and each district is populated by one voter. Each district is represented by exactly one Senator (upper

chamber) and one Assemblyman (lower chamber) within the bicameral legislature. Finally, pork allocations are controlled by a Democratic leader,  $D$ , and a Republican leader,  $R$ . Hence, there are  $N$  voters,  $N$  Assemblymen,  $N$  Senators, and 2 party leaders.

Within each chamber, I assume w.l.o.g. that numerically lower districts have Democratic legislators, and higher districts are Republican. In the Senate, let  $\{1, \dots, D_S\}$  denote the districts with Democratic Senators, and  $\{D_S + 1, \dots, N\}$  is the set of districts with Republican Senators. Similarly, in the Assembly, let districts  $\{1, \dots, D_A\}$  have Democratic Assemblymen, and districts  $\{D_A + 1, \dots, N\}$  have Republican Assemblymen. Hence,  $D_S < N/2$  implies Democratic control of the Senate, while  $D_S > N/2$  implies Republican Senate control.

**Strategies:** The leader,  $D$  or  $R$ , whose party controls each chamber chooses the allocation of pork for all legislators in that chamber. Hence, the party leader who controls the Senate selects the vector  $S = \{s_1, \dots, s_N\}$ , where  $s_i$  is the amount of pork allocated to district  $i$ 's Senator. Similarly, the party leader controlling the Assembly selects  $A = \{a_1, \dots, a_N\}$ , where  $a_i$  is the amount of pork allocated to  $i$ 's Assemblyman. Strategies are chosen simultaneously, and the only restriction is that pork allocations must be non-negative:  $\forall i \in \{1, \dots, N\}, s_i, a_i \geq 0$ .

**Utility (Voters):** Voter payoffs depend on the total amount of pork obtained by their respective Senators and Assemblymen. Assume that each voter's benefit from  $x$  units of pork is  $f(x)$ , where  $\forall x \in [0, \infty), f'(x) > 0$  and  $f''(x) < 0$ . That is, the voter always prefers more pork but enjoys decreasing marginal returns. Moreover, each voter must pay a per capita share of the total cost of the pork allocated to all districts. Hence, voter  $i$ 's overall utility is:

$$u_i(S, A) = f(s_i + a_i) - \frac{1}{N} \sum_{j=1}^N (s_j + a_j), \quad (1)$$

where  $f(s_i + a_i)$  represents  $i$ 's benefit from the pork obtained by her Senator and Assemblyman, and  $\frac{1}{N} \sum_{j=1}^N (s_j + a_j)$  represents  $i$ 's per-capita share of total project costs.

**Legislator Credit Assignment:** Voter  $i$  observes her utility payoff,  $u_i(S, A)$ , but not the specific legislator responsible for obtaining each spending project. Voter  $i$  then randomly assigns  $u_i(S, A)$  units of credit to either her Senator or her Assemblyman with probabilities  $(\frac{1}{2}, \frac{1}{2})$ .

**Utility (Party Leaders):** Each party leader's objective is to maximize the total credit assigned to the party's legislators. The Democratic leader's ( $D$ ) utility is the sum of all credit assigned to Democratic legislators in the two chambers. Hence,  $D$ 's expected utility is:

$$EU_D(S, A) = \sum_{i=1}^{D_S} \frac{u_i(S, A)}{2} + \sum_{i=1}^{D_A} \frac{u_i(S, A)}{2}, \quad (2)$$

where the first term,  $\sum_{i=1}^{D_S} \frac{u_i(S, A)}{2}$ , represents the expected total credit assigned to Democratic Senators, while the second term,  $\sum_{i=1}^{D_A} \frac{u_i(S, A)}{2}$ , represents expected credit assigned to Democratic Assemblymen. The utility function in Eq. 2 is in expectation because voters randomly assign credit to their respective Senators or Assemblymen with one-half probabilities. Similarly, the Republican leader's ( $R$ ) expected utility is:

$$EU_R(S, A) = \sum_{i=D_S+1}^N \frac{u_i(S, A)}{2} + \sum_{i=D_A+1}^N \frac{u_i(S, A)}{2}, \quad (3)$$

summing the expected credit received by all Republican legislators.

**Equilibrium Results:** *Proposition 1* presents results for a divided legislature, where a different party controls each chamber. *Proposition 2* describes results for a unified legislature.

**Proposition 1 (Divided Legislature):** Assume w.l.o.g. that Democrats control the Assembly, and Republicans control the Senate. That is,  $D_S < N/2$  and  $D_A > N/2$ .

**1(a) (Equilibrium Pork Allocations):** In equilibrium,  $R$  selects the strategy  $S^* = \{s_1^*, \dots, s_N^*\}$ , and  $D$  selects the strategy  $A^* = \{a_1^*, \dots, a_N^*\}$ , which must satisfy:

$$\forall i \in \{1, \dots, D_S\}, \quad s_i^* = 0 \text{ and } f'(a_i^*) = (D_S + D_A)/(2N); \quad (4)$$

$$\forall i \in \{D_S + 1, \dots, D_A\}, \quad f'(s_i^* + a_i^*) = (D_S + D_A)/N; \text{ and} \quad (5)$$

$$\forall i \in \{D_A + 1, \dots, N\}, \quad f'(s_i^*) = (D_S + D_A)/(2N) \text{ and } a_i^* = 0. \quad (6)$$

**1(b): (Split Delegation Bias, Senate):** The Republican leader (R) distributes strictly less pork to a Republican Senator whose district is shared with a Democratic Assemblyman than to a Senator in a unified Republican district.

**1(c): (Split Delegation Bias, Assembly):** The Democratic leader (D) distributes strictly less pork to a Democratic Assemblyman whose district is shared with a Republican Senator than to an Assemblyman in a unified Democratic district. **Proofs: Appendix A.**

*Proposition 1* describes the equilibrium strategies of the two party leaders under a Republican Senate and a Democratic Assembly. The Republican leader (R) allocates a large amount of pork to Republican Senators whose districts overlap with Republican Assemblymen (*Eq. 6*). Republican Senators who share their districts with Democratic Assemblymen receive less pork (*Eq. 5*). Finally, Democratic Senators receive no Senate pork (*Eq. 4*). The Democratic leader (D) plays an analogous strategy, favoring unified Democratic districts with the largest pork allocations in the Assembly.

The intuition behind this result is that each party leader wishes to confine credit for pork to legislators within her own party. Giving pork to a *Split Delegation* district, with both a Republican and a Democratic legislator, is dangerous because the voter might mistakenly credit the incorrect party for the spending project. Hence, the Republican leader's safest strategy is to direct spending projects to districts with both a Republican Senator and a Republican Assemblyman, guaranteeing that voters will not erroneously credit a Democrat for such projects.

*Proposition 1(b)* and *1(c)* summarize the main result of the formal model, which I refer to as the *Split Delegation Bias*: Party leaders strategically divert pork away from *Split Delegation* districts in an effort to exclude the opposing party from profiting electorally from these projects. Thus, in *Proposition 1*, the Republican Senate leader effectively punishes Republican Senators whose districts are shared with Democratic Assemblymen. Similarly, the Democratic Assembly

leader awards smaller pork amounts to Democratic Assemblymen whose share their districts with Republican Senators. *Proposition 2* demonstrates this result holds even when one party has unified control of both chambers:

***Proposition 2 (Unified Legislature):*** Assume w.l.o.g. that Democrats control both the Assembly and the Senate and that  $D_A > D_S$ .

***2(a) (Equilibrium Pork Allocations):*** In equilibrium,  $D$  simultaneously selects the strategies  $S^* = \{s_1^*, \dots, s_N^*\}$ , and  $A^* = \{a_1^*, \dots, a_N^*\}$ , which must satisfy:

$$\forall i \in \{1, \dots, D_S\}, \quad f'(s_i^* + a_i^*) = (D_S + D_A)/(2N); \quad (7)$$

$$\forall i \in \{D_S + 1, \dots, D_A\}, \quad f'(s_i^* + a_i^*) = (D_S + D_A)/N; \text{ and} \quad (8)$$

$$\forall i \in \{D_A + 1, \dots, N\}, \quad s_i^* = 0 \text{ and } a_i^* = 0. \quad (9)$$

***2(b): (Split Delegation Bias):*** The Democratic leader ( $D$ ) distributes strictly less pork to each split delegation district,  $\{D_S + 1, \dots, D_A\}$ , than to each solidly Democratic district,  $\{1, \dots, D_S\}$ . ***Proof: Appendix A.***

Collectively, *Propositions 1* and *2* demonstrate that *Split Delegation Bias* emerges as an equilibrium strategy regardless of the party in control of each chamber. Under both *Propositions*, party leaders direct pork away from *Split Delegation* areas – districts  $D_S + 1$  through  $D_A$  – to avoid the risk that voters in these districts might assign credit to the wrong party.

### ***Empirical Tests***

To empirically test for *Split Delegation Bias*, I analyze Democratic Assembly leader Sheldon Silver's distribution of pork barrel earmarks among his own party's Assemblymembers. Among the 150 legislators in the Assembly, Democrats controlled 104 seats from 2005-2006. All districts in the Assembly and the Senate are single-member and were equally apportioned in 2002, so malapportionment is not a major concern.

During 2005-2006, Silver awarded 95% of his pork spending to Democratic Assembly districts. I focus exclusively on the distribution of pork among the 104 Democratic Assembly

districts in order to analyze whether Silver favored party members from *Unified Democratic Delegations* over those from *Split Delegations*. First, I estimate the basic econometric model:

$$\log\left(\frac{Pork_i}{Population_i} + 1\right) = \alpha + \beta_R \cdot (Republican Senator_i) + \beta_V \cdot (Voter Ideology_i) + \varepsilon_i, \quad (10)$$

where  $Pork_i$  is the total dollars of pork earmarks received by Assembly district  $i$ . Hence, the dependent variable in *Eq. 10* is the logged per capita dollars of earmarks directed to each Assembly district. *Republican Senator* is the proportion of the Assembly district's population that resides within a Republican-controlled Senate district. Upper and lower chamber districts do not share common boundaries, so most Assembly districts overlap with more than one Senate district. *Voter Ideology* is the proportion of the district's voters that registered as Democrats.

In Table 2, Models 1 and 2 estimate *Eq. 10* using the 2005 and 2006 earmarks data, respectively. Models 3 and 4 control for the *Assemblymember's Seniority*, measured as logged years of service in the Assembly, including 2005. Models 5 and 6 control for four additional demographic characteristics of each district: The *Per-Capita Income*, the proportion of the population that resides in *Urban* areas, the proportion of *Racial Minorities*, including Blacks and Hispanics, and the proportion that *Registered* to vote during 2004 elections. Overall, the estimated models confirm that sharing constituents with a Republican Senator has a significantly negative effect on pork earmarks for Democratic Assemblymembers. In Models 5 and 6, a Democratic Assemblymember whose district is shared with a Republican Senator, rather than a Democratic one, brings home 53% and 46% less in pork during 2005 and 2006, respectively.

Next, I analyze the distribution of Assembly pork earmarks across zip codes within Democratic Assembly districts. Many Assembly districts overlap with both Democratic and Republican Senate districts. Therefore, under the logic of the *Split Delegation Bias*, Silver should strategically distribute pork toward neighborhoods with a *Unified Democratic Delegation* and

away from neighborhoods with a *Split Delegation*, even if both neighborhoods lie within the same Democratic Assembly district. In Table 3, I analyze earmark distributions across only the New York zip codes that lie fully within Democratic Assembly districts. There were 504 such zip codes during 2005-2006. The basic econometric model is:

$$\log\left(\frac{Pork_z}{Population_z}\right) = \alpha + \beta \cdot (Republican Senator_z) + \beta_V \cdot (Voter Ideology_z) + \varepsilon_z, \quad (11)$$

where  $Pork_z$  is the total dollars of Assembly earmarks received by zip code  $z$ ,  $Population_z$  is  $z$ 's population,  $Republican Senator$  is the proportion of  $z$ 's population residing in a Republican Senate district, and  $Voter Ideology$  is measured as Al Gore's 2000 vote share. Zip codes vary widely in size, so observations are weighted by population.

In Table 3, Model 7 estimates *Eq. 11* for the 2005 Assembly earmarks, and Model 8 analyzes the 2006 earmarks. In Models 9 and 10, I control for each zip code's *Assemblymember Seniority*. When a zip code spans across multiple Assembly districts, this variable is measured as the population-weighted mean seniority of all Assemblymembers who represent the zip code. Models 11 and 12 include four additional control variables: *Per-Capita Income*, *Urban Proportion*, *Racial Minority Proportion*, and the *Voter Turnout* for the 2004 elections.

The Table 3 results illustrate significant *Split Delegation Bias*. Models 11 and 12 estimate that in 2005 and 2006, a zip code with a Democratic Assemblymember and a Republican Senator receives 22% less in pork than a zip code with a *Unified Democratic Delegation*. Though substantively smaller, this result corroborates the earlier district level analysis.

The empirical results do not reveal consistent bias by Silver toward either solidly liberal districts or relatively moderate ones. Nevertheless, it is necessary to address the potential confounding effect of possible ideological bias because politically moderate districts are more likely to elect *Split Legislative Delegations*. As Table 4 illustrates, areas with *Split Legislative*

*Delegations* tend to be more politically moderate, less urban, and less racially diverse.

Additionally, Assemblymembers from these areas are more junior. Hence, it is possible that the apparent distributive bias against *Split Legislative Delegations* simply reflects an electoral strategy of targeting core liberal voters or institutional favoritism toward senior legislators.

To separate the effects of *Split Delegation Bias* from these other forms of distributive bias, I use matching estimators to measure the average treatment effect of having a split delegation on pork earmarks. The intuition behind this approach is that I wish to compare pork in two zip codes that have similar voter ideologies, legislators, and demographics and both have Democratic Assemblymembers; however, one zip code has a Democratic Senator, whereas the other happens to lie within a Republican Senate district because it is adjacent to more conservative towns.

I separately employ two common matching procedures: Propensity score matching (Rosenbaum and Rubin, 1983; 1985) and genetic matching (Sekhon 2008). Under both procedures, the treatment observations are the 268 zip codes in the data that have Democratic Assembly and Republican Senate representation, or *Split Legislative Delegations*. Treatment observations are individually matched to the control observations, the zip codes with *Unified Democratic* legislative delegations, most similar with respect to the baseline covariates.

First, I estimate propensity scores for each observation with a binary logistic regression of *Republican Senator* onto the third-order polynomials of the six control variables from Table 3: *Voter Ideology*, *Assemblymember Seniority*, *Per Capita Income*, *Urban Proportion*, *Racial Minority*, and *Voter Turnout*. After propensity score matching, the treatment and control groups are significantly more balanced with respect to voter ideology and demographics; however, the groups remain imbalanced with respect to *Assemblymember Seniority*.

Second, to remedy this lingering imbalance, I use Diamond and Sekhon's (2005) genetic search algorithm to select the vector of weights for the baseline covariates that optimizes balance when pairing treatment and control observations. The genetic matching method eliminates the disparity between the groups with respect to *Assembly Seniority*. Table 4 compares the balance of treatment and control groups with respect to all baseline covariates prior to and after the genetic matching. After matching, both the treatment and the control groups have comparable *Assemblymember Seniority* (approximately 6 years of experience), similar voter partisanship (51% and 52% Gore supporters), and identical racial demographics (12% minority). Hence, after genetic matching, comparisons of pork in the treatment and control groups are no longer confounded by differences in voter demographics and legislator seniority.

Table 5 presents matching estimator results under both the propensity score and genetic matching methods. Both methods produce consistently significant evidence of *Split Delegation Bias*, corroborating the earlier regression results. Under the propensity score matching estimator, the presence of the *Split Delegation* treatment causes a 40% decrease in pork earmarks during 2005-2006. With genetic matching, the average treatment effect is a 32% decrease in pork. Substantively, this effect amounts to a \$4.03 per capita decrease in pork earmarks, from an average of \$12.53 to \$8.50 per capita, in neighborhoods with *Split Legislative Delegations*.

### ***Discussion***

A substantial volume of work in political economics has built upon Mayhew's (1974) classic argument that all legislators have a fundamentally similar credit-claiming motive to pursue pork barreling. For example, the Baron and Ferejohn (1989) model and its progeny presume that all legislators wish to maximize their respective districts' shares of distributive benefits. This article demonstrates that Mayhew's argument is fundamentally sound but leaves

room for improvement. I extend Mayhew's theory to account for voter ambiguity in assigning credit for pork projects. The formal model illustrates that although party leaders can award pork earmarks to specific legislators and to specific districts, they must also anticipate voters' inability to correctly identify the legislator responsible for each earmark. Awarding an earmark to a party member whose district overlaps with an opposing party's legislator introduces the danger that voters might assign credit to the wrong party. Hence, a party leader will prefer to confine pork spending to districts with *Unified Legislative Delegations*, where voter errors cannot inadvertently benefit the opposing party. The empirical results from the New York Assembly demonstrate that Sheldon Silver has employed this distributive strategy in recent years.

Each voter in the democratic world is represented by more than one elected official at the various levels of government, and these officials often belong to opposing political parties. Hence, the problem of voter uncertainty in crediting the correct legislators for spending projects is a ubiquitous one; any legislator who brings home pork invariably experiences the risk of not receiving due credit from voters. As illustrated by the conflicting Hickey Freeman press releases, even the most attentive voters may be misled by legislators who unscrupulously seek to claim sole credit for others' spending projects. The *Split Delegation Bias* result, supported by the empirical findings of this article, demonstrates that political parties play an important role in managing this risk of voter error and minimizing the consequences of such errors. A party leader strategically targets distributive benefits toward *Unified Legislative Delegations* to guarantee that voter errors do not inadvertently benefit an opposing party's incumbent legislators.

## Appendix A: Proofs

**Proof of Proposition 1:** Substituting Eq. 1 into Eq. 2,  $D$  faces the optimization problem:

$$\begin{aligned} \max_{s_1, \dots, s_N} : & \frac{1}{2} \sum_{i=D_S+1}^N \left[ f(s_i + a_i) - \frac{1}{N} \sum_{j=1}^N (s_j + a_j) \right] + \frac{1}{2} \sum_{i=D_A+1}^N \left[ f(s_i + a_i) - \frac{1}{N} \sum_{j=1}^N (s_j + a_j) \right] \\ \text{s.t.} : & s_1, \dots, s_N \geq 0. \end{aligned}$$

Similarly,  $R$  faces the optimization problem:

$$\begin{aligned} \max_{a_1, \dots, a_N} : & \frac{1}{2} \sum_{i=1}^{D_S} \left[ f(s_i + a_i) - \frac{1}{N} \sum_{j=1}^N (s_j + a_j) \right] + \frac{1}{2} \sum_{i=1}^{D_A} \left[ f(s_i + a_i) - \frac{1}{N} \sum_{j=1}^N (s_j + a_j) \right] \\ \text{s.t.} : & a_1, \dots, a_N \geq 0, \end{aligned}$$

The solution to these optimization problems are  $S^* = \{s_1^*, \dots, s_N^*\}$  and  $A^* = \{a_1^*, \dots, a_N^*\}$ ,

respectively, where  $S^*$  and  $A^*$  must satisfy:

$$\forall i \in \{1, \dots, D_S\}, \quad s_i^* = 0; \quad f'(s_i + a_i^*) = (D_S + D_A)/(2N); \quad (12)$$

$$\forall j \in \{D_S + 1, \dots, D_A\}, \quad f'(s_j^* + a_j) = (D_S + D_A)/N; \quad f'(s_j + a_j^*) = (D_S + D_A)/N; \quad (13)$$

$$\forall k \in \{D_A + 1, \dots, N\}, \quad f'(s_k^* + a_k) = (D_S + D_A)/(2N); \text{ and } a_k^* = 0. \quad (14)$$

Hence, in equilibrium,  $\forall j \in \{D_S + 1, \dots, D_A\}$  and  $\forall k \in \{D_A, \dots, N\}$ ,  $R$ 's strategy must satisfy:

$$f'(s_k^*) = (D_S + D_A)/(2N) \ \& \ f'(s_j^*) \geq (D_S + D_A)/N \Rightarrow s_j^* < s_k^*, \text{ since } f''(x) < 0 \text{ by assumption,}$$

proving Proposition 1(b). Further,  $\forall i \in \{1, \dots, D_S\}$  and  $\forall j \in \{D_S + 1, \dots, D_A\}$ ,  $D$ 's strategy must

satisfy:  $f'(a_i^*) = (D_S + D_A)/(2N) \ \& \ f'(a_j^*) \geq (D_S + D_A)/N \Rightarrow a_j^* < a_i^*$ , proving Proposition 1(c).

**Proof of Proposition 2:** Substituting Eq. 1 into Eq. 2,  $D$  faces the optimization problem:

$$\begin{aligned} \max_{s_1, \dots, s_N, a_1, \dots, a_N} : & \frac{1}{2} \sum_{i=D_S+1}^N \left[ f(s_i + a_i) - \frac{1}{N} \sum_{j=1}^N (s_j + a_j) \right] + \frac{1}{2} \sum_{i=D_A+1}^N \left[ f(s_i + a_i) - \frac{1}{N} \sum_{j=1}^N (s_j + a_j) \right] \\ \text{s.t.} : & s_1, \dots, s_N, a_1, \dots, a_N \geq 0. \end{aligned}$$

The solution to this optimization problem is  $S^* = \{s_1^*, \dots, s_N^*\}$  and  $A^* = \{a_1^*, \dots, a_N^*\}$ , respectively,

where  $S^*$  and  $A^*$  must satisfy Eqs. 7, 8, and 9. Hence, in equilibrium,  $\forall i \in \{1, \dots, D_S\}$  and

$$\forall j \in \{D_S + 1, \dots, D_A\}, \ D's \ strategy \ must \ satisfy: \ f'(a_i^*) = (D_S + D_A)/(2N) \ \& \ f'(a_j^*) \geq (D_S + D_A)/N$$

$\Rightarrow a_j^* < a_i^*$ , since  $f''(x) < 0$  by assumption, proving Proposition 2(b).

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**Table 1: Average Pork Earmarks per Assembly District, 2005-2006**

	<b>Democratic Senator</b>	<b>Republican Senator</b>
<b>Democratic Assemblymember</b>	<i>Unified Democratic Delegation</i> \$1,283,000 (43 Assemblymembers)	<i>Split Legislative Delegation</i> \$373,300 (23 Assemblymembers)
<b>Republican Assemblymember</b>	n/a (0 Assemblymembers)	<i>Unified Republican Delegation</i> \$107,900 (37 Assemblymembers)

**Note:** This table lists the average amount of pork received by each type of Assembly district. For example, there were 43 Assembly districts under *Unified Democratic* control; these districts received an average of \$1.28 million in pork. Some Assembly districts overlap with both Republican and Democratic Senate districts and are therefore not included from this table.

**Table 2: OLS Regression of Assembly Pork Earmark Spending in Democratic Assembly Districts**

	<b>Model (1)</b>	<b>Model (2)</b>	<b>Model (3)</b>	<b>Model (4)</b>	<b>Model (5)</b>	<b>Model (6)</b>
<i>Fiscal Year:</i>	<i>2005</i>	<i>2006</i>	<i>2005</i>	<i>2006</i>	<i>2005</i>	<i>2006</i>
Republican Senate District Overlap	-0.932** (0.296)	-0.842** (0.300)	-1.002*** (0.291)	-0.920** (0.293)	-0.747* (0.303)	-0.607* (0.304)
Voter Ideology (Percent Democratic Voters)	-1.855* (0.782)	-1.885* (0.793)	-2.186** (0.777)	-2.257** (0.783)	-0.251 (1.231)	0.238 (1.235)
Assemblymember's Seniority (Logged Years of Service)	-----	-----	0.177* (0.075)	0.199** (0.075)	0.156* (0.072)	0.175* (0.072)
Per-Capita Income (\$1,000's)	-----	-----	-----	-----	-0.001 (0.007)	0.001 (0.008)
Urban Proportion	-----	-----	-----	-----	0.603 (0.690)	-0.031 (0.692)
Racial Minority Proportion	-----	-----	-----	-----	-0.572 (0.432)	-0.671 (0.433)
Percent Registered Voters	-----	-----	-----	-----	2.430** (0.859)	2.281** (0.862)
Constant	2.422*** (0.542)	2.373*** (0.549)	2.264*** (0.534)	2.196*** (0.538)	-0.648 (0.964)	-0.368 (0.967)
$R^2$	0.090	0.073	0.138	0.134	0.263	0.266
$N$	104	104	104	104	104	104

\*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$ ; + $p < .10$  (two-tailed)

**Dependent Variables:** Total dollars of pork spending directed to each Democratic Assembly district, expressed in logged per-capita terms.

**Note:** Only districts with Democratic Assembly members are included.

**Table 3: WLS Regression of Assembly Pork Earmark Spending by Zip Codes in Democratic Assembly Districts**

	<b>Model (7)</b>	<b>Model (8)</b>	<b>Model (9)</b>	<b>Model (10)</b>	<b>Model (11)</b>	<b>Model (12)</b>
<i>Time Period:</i>	2005	2006	2005	2006	2005	2006
Republican Senate District Overlap	-0.338** (0.113)	-0.320** (0.112)	-0.353** (0.110)	-0.335** (0.109)	-0.253* (0.109)	-0.248* (0.109)
Voter Ideology (Percent Gore Voters)	-0.258 (0.330)	-0.273 (0.330)	-0.493 (0.325)	0.517 (0.324)	2.358*** (0.585)	2.328*** (0.584)
Assemblymember Seniority (Logged Years of Service)	-----	-----	0.217*** (0.041)	0.226*** (0.041)	0.173*** (0.041)	0.187*** (0.041)
Per-Capita Income (\$1,000s)	-----	-----	-----	-----	-0.000 (0.003)	-0.001 (0.003)
Urban Proportion	-----	-----	-----	-----	-0.041 (0.282)	-0.004 (0.281)
Racial Minority Proportion	-----	-----	-----	-----	-1.354*** (0.243)	-1.306*** (0.242)
Voter Turnout	-----	-----	-----	-----	-0.298 (0.467)	-0.059 (0.466)
Constant	1.174*** (0.260)	1.138*** (0.260)	0.855** (0.261)	0.807** (0.260)	-0.459 (0.412)	-0.585 (0.412)
$R^2$	0.021	0.018	0.071	0.072	0.141	0.141
$N$	520	520	520	520	520	520

\*\*\* $p < .001$ ; \*\* $p < .01$ ; \* $p < .05$  (two-tailed)

**Dependent Variables:** Total dollars of pork spending directed to each zip code, expressed in logged per-capita terms.

**Note:** The data include only zip codes fully embedded within Democratic Assembly districts. Observations are weighted by zip code population

**Table 4: Differences between Zip Codes with Split and Unified Legislative Delegations, Before and After Matching**

<i>Variable</i>	<i>Before Matching Adjustment</i>			<i>After Genetic Matching</i>		
	Split Legislative Delegation Mean	Unified Democratic Delegation Mean	t-test p-value	Treatment Group (Split Legislative Delegation) Mean	Control Group (Unified Democratic Delegation) Mean	t-test p-value
2005-2006 Pork Spending (Logged Dollars Per Capita)	0.68	1.53	<0.001	0.68	1.06	<0.001
Percent Gore Voters	0.51	0.71	<0.001	0.51	0.52	<0.001
Assemblymember Seniority (Logged Years of Service)	1.81	2.26	<0.001	1.81	1.83	0.768
Per Capita Income (\$1,000s)	26.17	25.85	0.85	26.17	26.34	0.68
Urban Proportion	0.56	0.92	<0.001	0.56	0.67	<0.001
Racial Minority Proportion	0.12	0.44	<0.001	0.12	0.12	0.56
Voter Turnout	0.44	0.36	<0.001	0.44	0.45	0.72

**Table 5: Average Treatment Effect of Split Legislative Delegations on Logged Per Capita Earmarks in Democratic Zip Codes**

	<i>Propensity Score Matching</i>			<i>Genetic Matching</i>		
	<b>2005 Earmarks</b>	<b>2006 Earmarks</b>	<b>2005-2006 Earmarks</b>	<b>2005 Earmarks</b>	<b>2006 Earmarks</b>	<b>2005-2006 Earmarks</b>
Estimated Average Treatment Effect	-0.381	-0.320	-0.518	-0.331	-0.242	-0.388
Standard Error	0.147	0.153	0.179	0.136	0.133	0.162
T-Statistic	-2.590	-2.087	-2.895	-2.428	-1.819	-2.399
p-value	0.010	0.037	0.004	0.015	0.069	0.016
N	268 Treatment and 268 Control Observations			268 Treatment and 268 Control Observations		

**Figure 1: Buffalo and Rochester’s State Legislative Delegations**

	<b>Rochester, NY</b>	<b>Buffalo, NY</b>
<b>Senator</b> (Upper Chamber)	Joseph Robach (Republican – 56 <sup>th</sup> Senate District)	Antoine Thompson (Democrat – 60 <sup>th</sup> Senate District)
<b>Assembly Member</b> (Lower Chamber)	David Gantt (Democrat – 133 <sup>rd</sup> Assembly District)	Sam Hoyt (Democrat – 144 <sup>th</sup> Assembly District)
<b>Type of Delegation</b>	<i>Split Legislative Delegation</i>	<i>Unified Democratic Delegation</i>

**Figure 2**

This form is one of the tens of thousands of pork earmark records the New York State Assembly was forced to turn over as a result of the State Supreme Court's ruling in *Hearst Corporation v. Bruno* (2006).

SFY 2004 - 2005 LEGISLATIVE INITIATIVE FORM	
<b>Legal Name, Address, and Telephone Number:</b>	
	ROME INDUSTRIAL DEVELOPMENT CORPORATION 139 WEST DOMINICK STREET ROME, NY 13440 (315) 337-6360
<b>Name of Project Director:</b>	
	MARK KAUCHER, EXECUTIVE DIRECTOR
<b>Purpose of Project:</b>	
	FUNDS WILL BE USED TO SUPPORT ECONOMIC DEVELOPMENT EFFORTS AIMED AT THE REVITALIZATION OF ROME.
<b>Funded Amount:</b>	
	\$25,000
<b>Requested By:</b>	
	DESTITO
<b>Name of Administering State Agency:</b>	
	DEPARTMENT OF ECONOMIC DEVELOPMENT