The Impact of Unions on Municipal Elections and Fiscal Policies in U.S. Cities*

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Abstract

The efficient decentralized provision of public goods requires that special interest groups, such as municipal unions, do not exercise undue influence on the outcome of municipal elections and local fiscal policies. We develop a new political economy model in which two politicians face each other in a local election. A union can endorse one of the candidates and thus influence the outcome of an election. One key finding of the theoretical analysis highlights the inherent conflict faced by the municipal union. Union support increases the chances of winning an election because the union can mobilize its members and provide "muscle" during the campaign. The endorsement, however, also generates a negative informational externality since voters update their beliefs about the position of the politician that receives the endorsement. In equilibrium, a politician that prefers an excessively large public sector can win an election if the union can provide sufficiently strong support during the campaign. We then test the predictions of our model. We have assembled a unique data set that focuses on municipal elections in the 150 largest cities in the U.S. between 1990 and 2012. Our empirical analysis shows union endorsements lead to an increase in the vote share of the politician that receives the endorsement. In particular, challengers strongly benefit from endorsements in competitive elections. Finally, we also find weaker evidence that suggests politicians with union endorsements adopt more union friendly fiscal policies if they are elected.

1 Introduction

Most developed countries have adopted a decentralized organization of government. While many important functions of government are allocated to the federal level, states and local jurisdictions play essential roles in the provision of local public goods and services (Oates, 1972). The efficient decentralized provision of public goods requires local politicians to adopt policies that are preferred by the "median voter."[1] Inefficiencies arise when special interest groups exercise an undue influence on the outcome of municipal elections and the adoption of local fiscal policies. There has been much theoretical and empirical work focusing on the impact of lobbying and special interest groups at the federal level of government.[2] However, there has been little research that focuses on special interest groups at the state or local level.[3] We explicitly model the strategic interactions between interest groups and politicians in municipal elections. We focus on an important local special interest group, municipal unions, which represent a large fraction of public

[1]Calabrese, Epple, and Romano (2011) suggest that distortions from inter-jurisdictional competition must also be small to obtain efficient allocations.

[2]Coate and Morris (1995) study transfers to special interest groups under commitment. Grossman and Helpman (1996) study how special interest groups make contributions to affect the equilibrium policy platforms under commitment. Grossman and Helpman (1999) treat endorsements as a language of communication between well-informed interest group leaders and lesser informed members. They show that policies may favor special interests at the expense of the general public under commitment. Kang (2012), for example, provides an empirical analysis of the impact of lobbying on the adoption of laws intended to regulate the electricity industry.

[3]Ferreira and Gyourko (2009) found no evidence that political partisanship of the mayors affect the size of city government, the allocation of local public spending, or crime rates. They find the most supported channel for this lack of partisan impact as the Tiebout competition among localities within metropolitan areas. Boustan, Ferreira, Winkler, and Zolt (2011) find that growing inequality is associated with an expansion in government revenues and expenditures on a wide range of services in US municipalities and school districts.

employees in U.S. cities.[4] The purpose of this paper is to explore the impact that local unions have on municipal elections and local fiscal policies.

We consider a model with three types of agents: local politicians, voters, and a union. Voters are city residents and, therefore, care about the level of local public goods and services that the city provides. A local union represents municipal workers and primarily cares about the size of the public sector. The union and voters will typically disagree about the optimal size of the public sector with the union preferring higher taxes, higher municipal employment, and thus a larger local government. We model politicians as having an objective function which is a weighted average of the objectives of voters and the objectives of a municipal workers' union. Politicians differ in the weight that they assign to the public cause.

An incumbent faces a challenger in a local election. This election can be thought of as a primary within a party that controls a city or a general election between candidates from different parties in a competitive, non-partisan environment. We assume that voters know the preferences of the incumbent, based on his or her historical record in office. Voters face more uncertainty about the position of the challenger. One key assumption of our model is that the union is better informed about the preferences of potential challengers than the public. This assumption is plausible since unions often track politicians and have better access to candidates than individual voters.

Given these informational asymmetries, the union can convey a signal to voters by endorsing a candidate. Endorsement also means that the union provides active support for a candidate during the campaign. Endorsing a politician is costly for the union and thus the union may decide not to endorse either candidate. The voters observe the endorsement decision of the union and update their beliefs about the position of the

[4]According to 2011 CPS data, 43.1 percent of local public employees are union members and 46.6 percent are covered under union contract. 63.5 percent of police officers and 61.1 percent of firefighters are union members.

challenger. Finally, the local election is held. Voters have idiosyncratic preference shocks associated with each politician. The outcome of each election is ex ante uncertain. One of the two candidates is elected as the new mayor of the city. Since politicians cannot commit to a policy or a transfer to the union prior to the election, the politician that wins the election implements his preferred policy when in office. We model these interactions among local politicians, unions, and voters as a game in extensive form with incomplete information focusing our analysis on perfect Bayesian equilibria. We provide conditions which guarantee that equilibria with and without an endorsement exist and characterize the properties of equilibria.

One key finding of the theoretical analysis highlights the inherent conflict faced by the municipal union. Union support increases the chances of winning the election because the union can mobilize its members and provide "muscle" during the campaign. The "muscle effect" depends on how well the union is organized in the city and how much support it can generate among likely voters.[5]

At the same time, the endorsement generates a negative informational externality. Voters observe the endorsement and update their beliefs about the position of the challenger. If the challenger receives the endorsement, voters will infer that the challenger places a higher weight on the objectives of the union than the incumbent. A necessary condition for the existence of an equilibrium with endorsement is that the positive "muscle effect" is larger than than the negative informational effect. This condition is not sufficient to generate an endorsement if the difference in positions between politicians is small or if the endorsement costs are large.

Equilibrium has significant implications for the change in public policy after the election. Consider the case in which the union endorses the challenger, and the challenger defeats the incumbent in the election. In this case, our model predicts an increase in

[5]Voter turnout is notoriously low in many municipal elections, which makes it possible that get-out-the vote campaigns of unions can be effective.

the size of the public sector following the election. Similarly, if the union endorses the incumbent, and the challenger wins the election, the model predicts a decrease in the size of the public sector. We expect only small policy changes if neither candidate is endorsed. If an incumbent is reelected, the size of public sector does not change.

In the second part of the paper, we provide an empirical analysis and quantify the impact of unions on local elections and fiscal policies. We have assembled a novel data set that includes municipal elections in the largest cities in the U.S. Our data set consists of general and run-off elections held in large U.S. cities during the past two decades. We have collected detailed data on union endorsements by searching electronic archives of local newspapers. We supplement these data with U.S. Census data that characterize fiscal policies and the size of local governments in the cities of our sample. Our final sample consists of 292 elections that pitted an incumbent mayor against a challenger in one of 92 different cities.

Our empirical analysis reveals some evidence that a union endorsement leads to an increase in the win probability of the politician who receives the endorsement. There is stronger evidence that challengers benefit from endorsements. Finally, we discover weaker evidence which suggests that politicians who receive a union endorsement adopt more union-friendly policies than politicians that do not receive such an endorsement.

Our paper is closely related to the topic of the conference which focuses on aggregate implications of local public finance. It has been widely recognized that fiscal federalism and inter-jurisdictional competition can have a variety of positive economic effects. Tiebout (1956) argues that fiscal competition leads to a better tailoring of expenditure policies to local needs.[6] "Tiebout competition" may also lead to efficiency gains in the provision of public goods.[7] Besely and Case (1995) show that fiscal decentralization

[6]Epple and Sieg (1999) and Epple, Romer, and Sieg (2001) provide an empirical test of these sorting models.

[7]Competition between the public and private sector may also be beneficial. Friedman (1955), sug-

can lead to increased levels of efficiency due to "Yard Stick Competition." Brennan and Buchanan (1980) argue that decentralization is an effective mechanism to control governments' expansive tendencies due to increased electoral accountability. Epple and Romer (1991) show that decentralization provides an effective tool to limit potentially harmful redistribution. Finally, decentralization may also lead to more experimentation with innovative policies (Rose-Ackerman, 1980).

Despite these potential benefits of decentralization, some researchers and policy analysts have argued that the recent economic recession has put state and municipal finance under stress which calls into question the sustainability of fiscal federalism.[8] Some local politicians appear willing to accommodate local unions and public employees, leading to an adoption of policies that are not in the interest of voters.[9] These inefficiencies in local public finance can have potentially large implications for the aggregate economy. The analysis of this paper addresses these questions by focusing on the impact of municipal unions on local fiscal policies.

The rest of the paper is organized as follows. Section 2 provides a model to analyze the impact of unions on municipal elections and fiscal policies. Section 3 presents the data set that is used in the empirical analysis. Sections 4 and 5 present the main empirical findings. Section 6 offers some conclusions that can be drawn from this analysis.

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gested to use vouchers to increase competition among public and private schools to raise school quality. Hoxby (2000) provides some empirical evidence that suggests that competition among public school districts increases test scores.

[8] Alesina and Spolaore (1997) have argued that fiscal decentralization may be excessive.

[9] The new New York Times rans a highly visible article by Santos and Chen (2012) on the front page claiming that Michael Mulgrew, the president of the New York teachers' union, is a "coveted friend for the people who hope to become mayor" and replace Michael Bloomberg.

2 A Model

2.1 Preferences and Actions

There are three types of players in our model: a large number of voters, a union, and two politicians seeking to be elected to become the mayor of a city. We distinguish between an incumbent denoted by I and a challenger denoted by C.

There is a continuum of voters with mass normalized to one. Voters care about the policy enacted after the election. Let R denote the exogenously given revenue available to the municipality and T the transfer to the union.[10] We make the following assumption.

Assumption 1

The quality of public good provision is given by

$$q = q(R - T) \tag{1}$$

The transfer to the union thus creates an inefficiency in public good provision. Voters would prefer to set $T = 0$.

The union only cares about the magnitude of the transfer that it receives from the elected politician.

Assumption 2

The utility function of the union is given by $u_g(T)$, which is strictly increasing in T.

Prior to the election the union can endorse, at most, one politician and provide active campaign support for the endorsed politician. Let d_g denote an indicator variable that

[10] It is straight forward to endogenize local revenues. The key results of the paper only depend on the fact the politicians can be ranked on a one-dimensional index by voters.

is defined as follows:

$$d_g = \begin{cases} 1 & : \text{ if the union endorses the incumbent,} \\ 0 & : \text{ if the union endorses neither candidate,} \\ -1 & : \text{ if the union endorses the challenger.} \end{cases} \tag{2}$$

Endorsement costs are denoted by $c \in \{c^I, c^C\}$. The also endorsement influences the outcome of the campaign by shifting voter preferences. As explained in detail below, the union choses an endorsement strategy to maximize expected utility.

We make the following assumptions about voters' preferences:

Assumption 3

a) The utility function of each voter is additively separable between the utility associated with policy q, an idiosyncratic component that reflects preferences for the politician, and the endorsement effect of the union. Hence voter's preferences can be expresses as:

$$\begin{aligned} u_v(q^I) + v^I + a^I 1_{\{d_g=1\}} \\ u_v(q^C) + v^C + a^C 1_{\{d_g=-1\}} \end{aligned} \tag{3}$$

where a_C and a_I measure the "advertising" effect or "muscle" effect of the endorsement. b) $v = v^C - v^I$ is a continuous random variable with full support and distribution denoted by $F(\cdot)$.

For simplicity we assume that utility is the same for all voters.[11]

Politicians care about voters and the union. We model the objective function of a politician as a weighted average of voters' preferences and union preferences. Some politicians are more "pro-union" than others. We capture this heterogeneity by assuming that politicians differ in the weight that they place on union preferences. This discussion motivates the following assumption:

[11] All of our main results can be extended cases with voter heterogeneity over policies.

Assumption 4

a) A politician has a utility function that is given by:

$$(1-\theta)\ u_p(q)\ +\ \theta\ u_p(T) \tag{4}$$

where $\theta \in [0,1]$ *is drawn from distribution* $G(\cdot)$.

b) For each value of θ *there exists a unique maximizer of the politician's utility, denoted by* $T_0(\theta)$*, where* $T_0(\theta)$ *is strictly increasing in* θ.

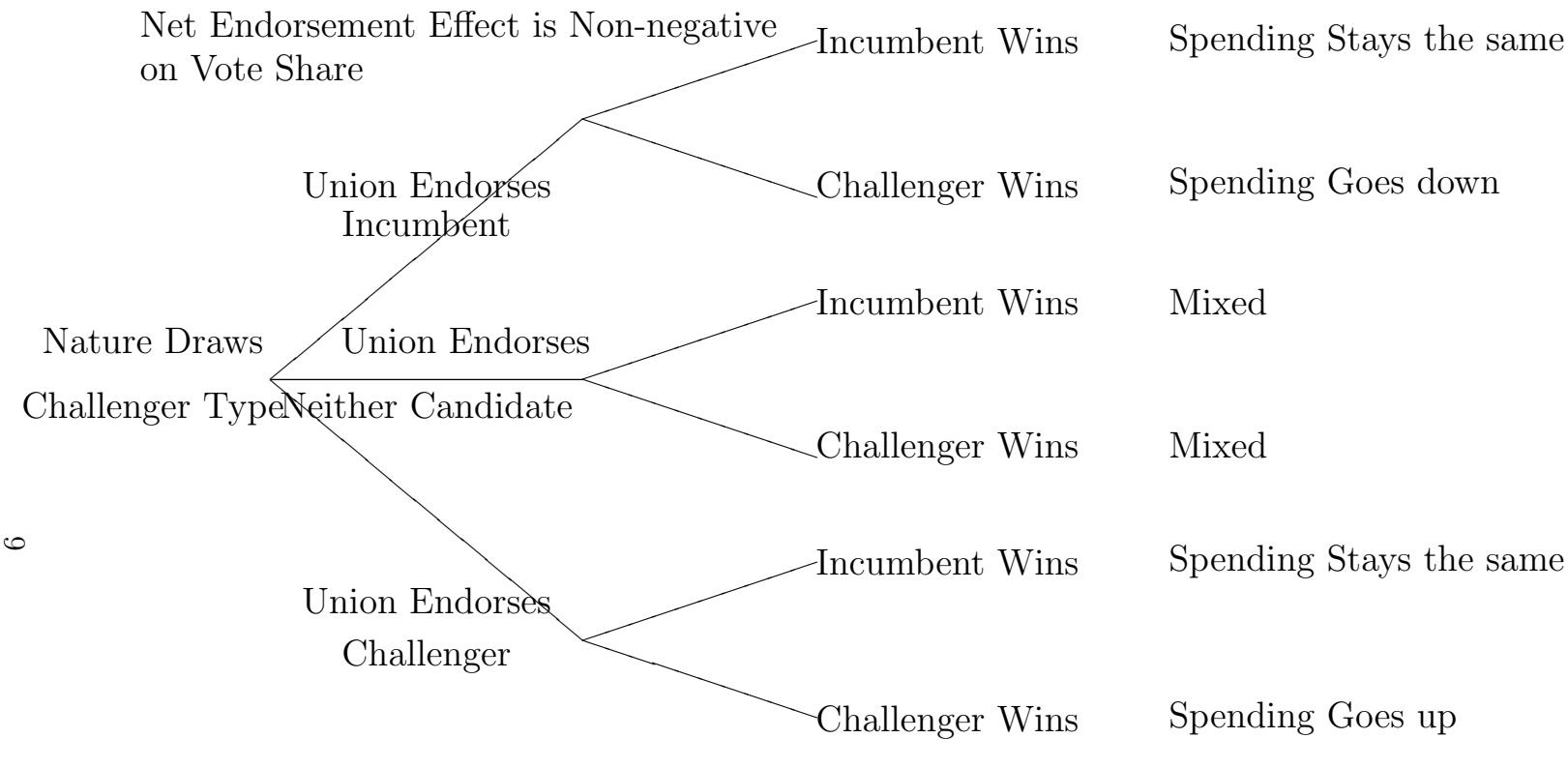
Assumption 4b implies that the function T_0 is invertible, hence $\theta = T_0^{-1}(q)$.

2.2 Timeline, Information, Strategies, and Equilibrium

We model the game between voters, the union, and the two politicians as a sequential game in extensive form with incomplete information. The timing of decisions is as follows:

1. The challenger type is drawn form the distribution $G(\theta)$.
2. The type is known to the union, but unknown to the voters.
3. The union decides whether or not to endorse one of the politicians.
4. The voters observe the endorsement and update their beliefs.
5. Voters elect one of the two politicians as the mayor of the city.
6. The mayor implements his or her preferred policy.

Timeline and Game Predictions



A pure strategy for the union is a mapping from the type space of challengers, denoted by $\Theta = [0, 1]$, into the endorsement space, $E = \{1, 0, -1\}$.

A pure strategy for each voter is a mapping from the endorsement space $E = \{1, 0, -1\}$ into the voting space, $V = \{1, -1\}$. Since there are only two candidates, sincere voting is a dominant strategy for each voter.

A pure strategy for a politician is mapping from Θ into the transfer space. As we have discussed above, a politician cannot commit to a policy or a transfer to the union prior to the election. Hence, the dominant strategy of a politician is to implement $T_0(\theta)$ after the election.

The equilibrium concept is a perfect Bayesian equilibrium in pure strategies.

2.3 Existence of Equilibrium

For given value of θ^I, the equilibrium strategy of the union can be characterized by a partition of Θ denoted by $\{\Theta_1, \Theta_0, \Theta_{-1}\}$ such that

$$d_g = \begin{cases} 1 & : \quad \theta^C \in \Theta_1 \\ 0 & : \quad \theta^C \in \Theta_0 \\ -1 & : \quad \theta^C \in \Theta_{-1} \end{cases} \tag{5}$$

Given this strategy, voters will update their beliefs about the challenger according to Bayes' Rule.[12] The incumbent's probability of winning the election conditional on the endorsement strategy is, therefore, given by:

$$\begin{aligned} S_1 &= F(u_v^I - E[u_v^C \mid \theta^C \in \Theta_1] + a^I) \\ S_0 &= F(u_v^I - E[u_v^C \mid \theta^C \in \Theta_0]) \\ S_{-1} &= F(u_v^I - E[u_v^C \mid \theta^C \in \Theta_{-1}] - a^C) \end{aligned} \tag{6}$$

[12]Here we implicitly assume that all Θ_j are not empty. We consider the case of corner solutions below.

The expected utility of the union is then:

$$\begin{aligned} \pi_1 &= S_1 u_g^I + (1 - S_1)\, u_g^C - c^I \\ \pi_0 &= S_0 u_g^I + (1 - S_0)\, u_g^C \\ \pi_{-1} &= S_{-1} u_g^I + (1 - S_{-1})\, u_g^C - c^C \end{aligned} \tag{7}$$

Recall that c^I is the cost for endorsing the incumbent, and c^C is the cost for endorsing the challenger.

Proposition 1 provides conditions that guarantee an equilibrium exists, with all three actions $d_g = \{1, 0, -1\}$ arising as equilibrium outcomes:

Proposition 1 *Define the strategy of the union as:*

$$d_g = \begin{cases} 1 & : \quad \theta^C < K_1(\theta^I) \\ 0 & : \quad \theta^C \in [K_1(\theta^I), K_2(\theta^I)] \\ -1 & : \quad \theta^C > K_2(\theta^I) \end{cases}$$

with $0 \leq K_1(\theta^I) \leq \theta^I \leq K_2(\theta^I) \leq 1$. $K_1(\theta^I)$ *and* $K_2(\theta^I)$ *are the solution to the following two equations:*

$$T_0^{-1}\{u_g^{-1}(u_g^I - \frac{c^I}{F(u_v^I - E[u_v^C \mid \theta^C < K_1] + a^I) - F(u_v^I - E[u_v^C \mid \theta^C \in [K_1, K_2]])})\} = K_1$$

$$T_0^{-1}\{u_g^{-1}(u_g^I + \frac{c^C}{F(u_v^I - E[u_v^C \mid \theta^C \in [K_1, K_2]]) - F(u_v^I - E[u_v^C \mid \theta^C > K_2] - a^C)})\} = K_2$$

This strategy is an equilibrium strategy if the advertisement effect is sufficiently strong, i.e. if a^I *and* a^c *satisfy:*

$$\begin{aligned} E[u_v^C \mid \theta^C < K_1(\theta^I)] - E[u_v^C \mid \theta^C \in [K_1(\theta^I), K_2(\theta^I)]] &< a^I \\ E[u_v^C \mid \theta^C \in [K_1(\theta^I), K_2(\theta^I)]] - E[u_v^C \mid \theta^C > K_2(\theta^I)] &< a^C \end{aligned}$$

Proof:

Assume that $S_1 > S_0 > S_{-1}$. We will provide conditions later on which guarantee that

this condition holds. For $d_g = 1$ to be equilibrium outcome, we need that unilateral deviations by the union are not profitable. Hence we need that $\pi_1 > \pi_{-1}$ which implies that

$$u_g^c \;<\; u_g^I - \frac{c^I - c^C}{S_1 - S_{-1}} \tag{8}$$

Moreover, we need that and $\pi_1 > \pi_{-0}$ which implies

$$u_g^C \;<\; u_g^I - \frac{c^I}{S_1 - S_0} \tag{9}$$

Note that equation (9) implies equation (8). Hence we have:

$$\theta^C \;<\; T_0^{-1}\{u_g^{-1}(u_g^I - \frac{c^I}{S_1 - S_0})\} \equiv K_1(\theta^I) \tag{10}$$

Similarly, for $d_g = -1$ to be equilibrium outcomes, we need $\pi_{-1} > \pi_0$ which implies

$$u_g^C \;>\; u_g^I + \frac{c^C}{S_0 - S_{-1}} \tag{11}$$

as well as $\pi_{-1} - \pi_1 > 0$, which implies as seen above:

$$u_g^C \;>\; u_g^I + \frac{c^C - c^I}{S_1 - S_{-1}} \tag{12}$$

Since equation (11) implies equation (12), we have:

$$\theta^C \;>\; T_0^{-1}\{u_g^{-1}(u_g^I + \frac{c^C}{S_0 - S_{-1}})\} \equiv K_2(\theta^I) \tag{13}$$

Moreover, we have

$$\begin{aligned} S_1 &= F(u_v^I - E[u_v^C \mid \theta^C < K_1(\theta^I)] + a^I) \\ S_0 &= F(u_v^I - E[u_v^C \mid \theta^C \in [K_1(\theta^I), K_2(\theta^I)]]) \\ S_{-1} &= F(u_v^I - E[u_v^C \mid \theta^C > K_2(\theta^I)] - a^C) \end{aligned} \tag{14}$$

Thus $K_1(\theta^I)$ and $K_2(\theta^I)$ solves the system of equations:

$$\begin{aligned} T_0^{-1}\{u_g^{-1}(u_g^I - \frac{c^I}{F(u_v^I - E[u_v^C \mid \theta^C < K_1] + a^I) - F(u_v^I - E[u_v^C \mid \theta^C \in [K_1, K_2]])})\} &= K_1 \\ T_0^{-1}\{u_g^{-1}(u_g^I + \frac{c^C}{F(u_v^I - E[u_v^C \mid \theta^C \in [K_1, K_2]]) - F(u_v^I - E[u_v^C \mid \theta^C > K_2] - a^C)})\} &= K_2 \end{aligned}$$

Finally, $S_1 > S_0 > S_{-1}$ requires that

$$E[u_v^C \mid \theta^C < K_1(\theta^I)] - E[u_v^C \mid \theta^C \in [K_1(\theta^I), K_2(\theta^I)]] < a^I \quad (15)$$

$$E[u_v^C \mid \theta^C \in [K_1(\theta^I), K_2(\theta^I)]] - E[u_v^C \mid \theta^C > K_2(\theta^I)] < a^C \quad (16)$$

Q.E.D.

Proposition 1 assumes an interior solution for the intercepts, i.e. $K_1, K_2 \in (0,1)$. In the remainder of this section we extend the result in Proposition 1 and consider the three cases that arise when the solution to the system of equations that defines the thresholds has, at least, one corner solution. The first case arises when $K_1 \leq 0$, $K_2 \in (0,1)$. In this case, $\{\theta^C : \theta^C < K_1\} = \emptyset$, so $d_g = 1$ will never be selected in equilibrium. To guarantee that $d_g = 1$ is not a profitable deviation, we need to specify voters' belief off the equilibrium path, i.e. specify beliefs about θ^C when $d_g = 1$ is played off the equilibrium path.

Assumption 5 *If $\Theta_1 = \emptyset$ and voters observe $d_g = 1$, they believe that $\theta^C = 0$*

Assumption 5 then implies that $E(u_v^C \mid d_g = 1) = E(u_v^C \mid \theta^C = 0)$. The probabilities of winning the election are now given by:

$$\begin{aligned} S_1 &= F(u_v^I - E[u_v^C \mid \theta^C = 0] + a^I) \\ S_0 &= F(u_v^I - E[u_v^C \mid \theta^C \in [0, K_2(\theta^I)]]) \\ S_{-1} &= F(u_v^I - E[u_v^C \mid \theta^C \in (K_2(\theta^I), 1]] - a^C) \end{aligned} \quad (17)$$

A corner solution arises if $K_1(\theta^I)$ satisfies the following condition:

$$K_1 = T_0^{-1}\{u_g^{-1}(u_g^I - \frac{c^I}{F(u_v^I - E[u_v^C \mid \theta^C = 0] + a^I) - F(u_v^I - E[u_v^C \mid \theta^C \in [0, K_2]])})\} \leq 0$$

The equilibrium strategy of the union in this case is is given by:

$$d_g = \begin{cases} 0 & : \quad \theta^C \in [0, K_2(\theta^I)] \\ -1 & : \quad \theta^C \in (K_2(\theta^I), 1] \end{cases} \quad (18)$$

The second case arises when $K_1 \in (0,1)$, $K_2 \geq 1$. Similar to the first case, we need to specify voters' beliefs about θ^C when $d_g = -1$ is taken.

Assumption 6 *If $\Theta_{-1} = \emptyset$ and voters observe $d_g = -1$, they believe that $\theta^C = 1$.*

Assumption 6 implies that $E(u_v^C \mid d_g = -1) = E(u_v^C \mid \theta^C = 1)$. Again define:

$$\begin{aligned} S_1 &= F(u_v^I - E[u_v^C \mid \theta^C \in [0, K_1(\theta^I))] + a^I) \\ S_0 &= F(u_v^I - E[u_v^C \mid \theta^C \in [K_1(\theta^I), 1]]) \\ S_{-1} &= F(u_v^I - E[u_v^C \mid \theta^C = 1] - a^C) \end{aligned} \tag{19}$$

Let $K_2(\theta^I)$ satisfies the following equation:

$$K_2 = T_0^{-1}\{u_g^{-1}(u_g^I + \frac{c^C}{F(u_v^I - E[u_v^C \mid \theta^C \in [K_1, 1]]) - F(u_v^I - E[u_v^C \mid \theta^C = 1] - a^C)}) \geq 1$$

while $K_1 \in (0,1)$. The equilibrium strategy of the union is given by:

$$d_g = \begin{cases} 1 & : \quad \theta^C \in [0, K_1(\theta^I)) \\ 0 & : \quad \theta^C \in [K_1(\theta^I), 1] \end{cases} \tag{20}$$

The last case arises when $K_1 \leq 0$, and$K_2 \geq 1$. Specifying off-equilibrium beliefs as before, we obtain the following probabilities:

$$\begin{aligned} S_1 &= F(u_v^I - E[u_v^C \mid \theta^C = 0] + a^I) \\ S_0 &= F(u_v^I - E[u_v^C \mid \theta^C \in [0, 1]]) \\ S_{-1} &= F(u_v^I - E[u_v^C \mid \theta^C = 1] - a^C) \end{aligned} \tag{21}$$

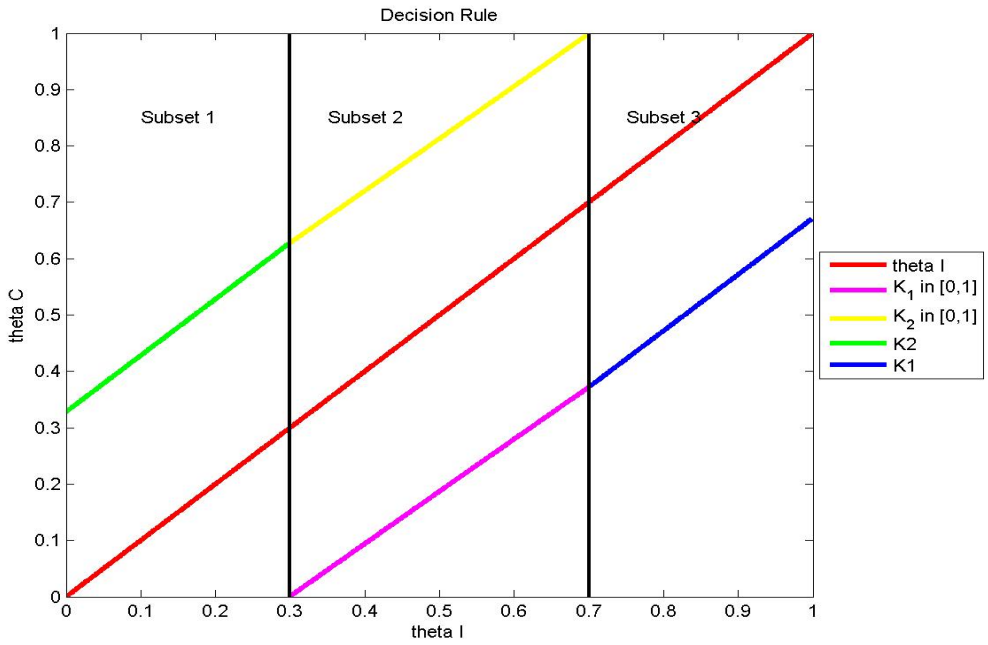
The equilibrium strategy of the union is then given by:

$$d_g = \begin{cases} 0 & : \quad \theta^C \in [0, 1] \end{cases} \tag{22}$$

To illustrate the main results of Proposition 1, we consider a fully parametrized numerical example of our model.[13] The strategy of the union is plotted in Figure 1. The

[13]Details about our parameterization and calibration are explained in Appendix B.

Figure 1:



two axes denote the type of the incumbent and the type of the challenger. The lines in the plot denote the cut-off levels, K_1 and K_2 that characterize the optimal strategy of the union. The red line is the 45 degree line which satisfies $\theta^I = \theta^C$.

There are three subsets of the underlying type space that deserve special attention. Subset 1 is the set of θ^I in which only $d_g \in \{0, -1\}$ arise as equilibrium outcomes. Subset 2 is the set of θ^I in which $d_g \in \{1, 0, -1\}$ arise in outcomes. Subset 3 is the set of θ^I with only $d_g \in \{0, 1\}$ are chosen in equilibrium. Figure 1 also shows that the 45 degree line falls between the two cutoff values K_1 and K_2.

Figure 2 plots the corresponding win probabilities of the incumbent that arises in equilibrium. The discontinuities in the probabilities arise due to the change in the endorsement strategy of the union that occurs at these points.

We also perform some comparative static exercises that are displayed in Figure 3. The upper panel repeats the optimal strategy of the union in the baseline example.

Figure 2:

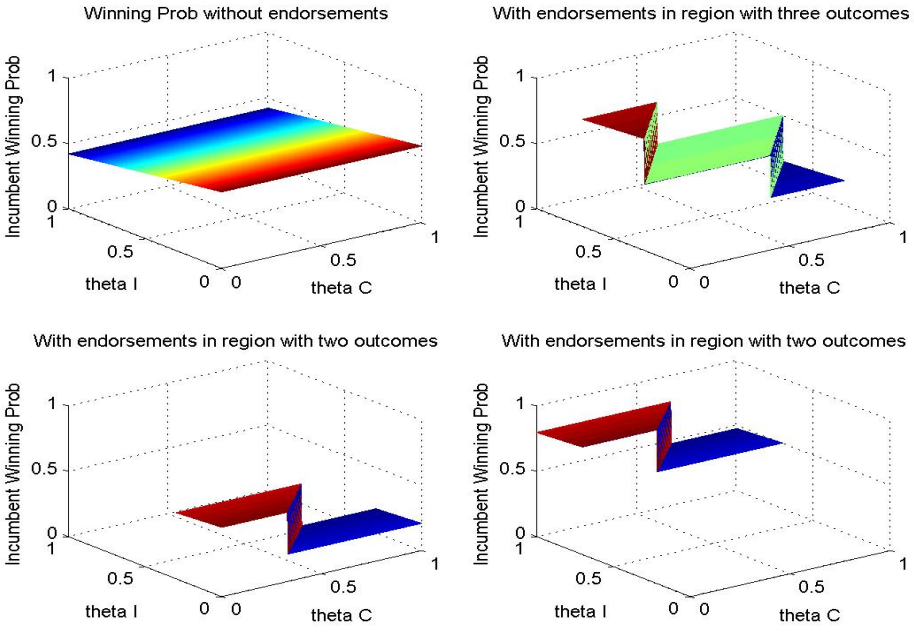
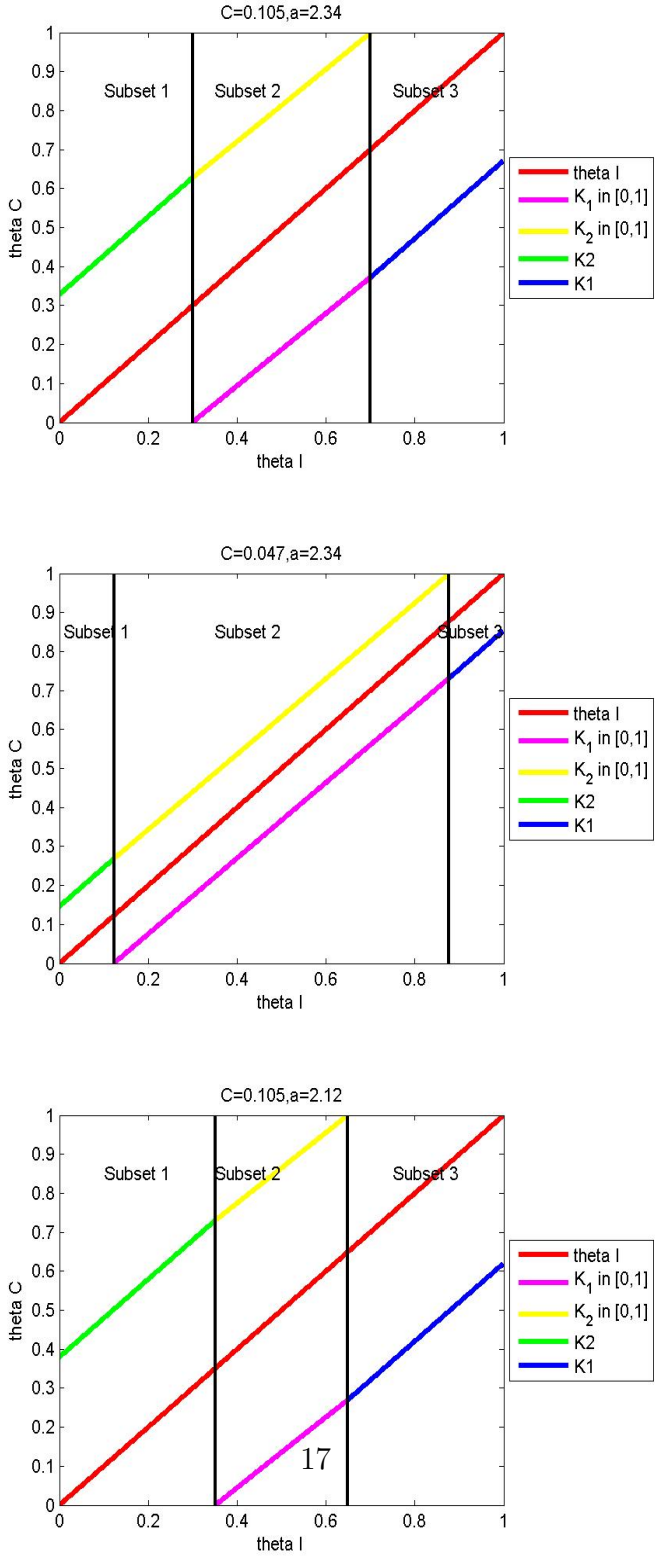

Winning Prob without endorsements
With endorsements in region with three outcomes
With endorsements in region with two outcomes
With endorsements in region with two outcomes
Incumbent Winning Prob
theta I
theta C
0
0.5
1

Figure 3:


C=0.105,a=2.34
Subset 1
Subset 2
Subset 3
theta C
theta I
theta I
K1 in [0,1]
K2 in [0,1]
K2
K1
C=0.047,a=2.34
Subset 1
Subset 2
Subset 3
theta C
theta I
theta I
K1 in [0,1]
K2 in [0,1]
K2
K1
C=0.105,a=2.12
Subset 1
Subset 2
Subset 3
theta C
theta I
theta I
K1 in [0,1]
K2 in [0,1]
K2
K1

Here we investigate how the optimal strategy varies as we change endorsement costs and the effectiveness of the endorsement. In the middle panel of Figure 3 we decrease the endorsement costs. We find that for every value of θ^I the region of θ^C with no endorsement decreases. The cheaper the endorsement is, the more active is the union. In the lower panel, we decrease the advertising effect. We find that for every value of θ^I, the region for θ^C with no endorsement increases. The intuition is that the lower advertising effect makes it harder to offset the negative signaling effect of the endorsement. Hence the union is less active.

Moreover we can show the equilibrium that we have characterized in Proposition 1 is unique in the following sense.

Proposition 2 *The above equilibrium is the only equilibrium with all three actions* $d_g = \{1, 0, -1\}$ *being used in the equilibrium strategy of the union.*

A proof of Proposition 2 is provided in Appendix A.

2.4 Properties of Equilibrium

Equilibrium imposes strong restrictions on the change in public policy after an election. Consider the case in which the union endorses the challenger, and the challenger defeats the incumbent in the election. In that case, our model predicts an increase in the size of the public sector following the election. Similarly, if the union endorses the incumbent, and the challenger wins the election, the model predicts a decrease in the size of the public sector. We expect only small policy changes if nobody is endorsed. If an incumbent is reelected, the size of public sector does not change. Proposition 3 formalizes this result.[14]

Proposition 3

[14]Here we only consider the case of an interior solution. The corner solution cases can be analyzed using a similar logic.

a) If $d_g = 1$ and the challenger wins then $\Delta T < 0$

b) If $d_g = -1$ and the challenger wins then $\Delta T > 0$

c) If $d_g = 0$ and the challenger wins then $|\Delta T| \leq \epsilon$

Proof:

For the interior solution, by assumption $S_1 > S_0$,

$$\begin{aligned} K_1 &= T_0^{-1}\{u_g^{-1}(u_g^I - \frac{c^I}{F(u_v^I - E[u_v^C \mid \theta^C < K_1] + a^I) - F(u_v^I - E[u_v^C \mid \theta^C \in [K_1, K_2]])})\} \\ &< T_0^{-1}\{u_g^{-1}(u_g^I)\} = \theta^I \end{aligned} \tag{23}$$

Similarly, by assumption $S_0 > S_{-1}$,

$$\begin{aligned} K_2 &= T_0^{-1}\{u_g^{-1}(u_g^I + \frac{c^C}{F(u_v^I - E[u_v^C \mid \theta^C \in [K_1, K_2]]) - F(u_v^I - E[u_v^C \mid \theta^C > K_2] - a^C)})\} \\ &> T_0^{-1}\{u_g^{-1}(u_g^I)\} = \theta^I \end{aligned} \tag{24}$$

Therefore, we have $K_1 < \theta^I < K_2$. Since $d_g = 1$ if $\theta^C < K_1 < \theta^I$, we have $T_0(\theta^C) < T_0(\theta^I)$, and thus if the challenger wins, $\Delta T < 0$.

Similarly, because $d_g = -1$ iff $\theta^C > K_2 > \theta^I$, we have $T_0(\theta^C) > T_0(\theta^I)$, and thus if the challenger wins, $\Delta T > 0$.

For the third case, since $d_g = 0$ iff $\theta^C \in [K_1, K_2]$, then $T_0(\theta^C) \in [T_0(K_1), T_0(K_2)]$, $T_0(\theta^C) - T_0(\theta^I) \in [T_0(K_1) - T_0(\theta^I), T_0(K_2) - T_0(\theta^I)]$, define $\epsilon = \max\{|T_0(K_1) - T_0(\theta^I)|, |T_0(K_2) - T_0(\theta^I)|\}$, we have $\mid T_0(\theta^C) - T_0(\theta^I) \mid \leq \epsilon$.

Q.E.D.

3 Data

Our empirical analysis focuses on the 150 most populous cities in the U.S., as classified by the 2010 U.S. Census. For each city, we focus on elections that were held between 1990 and 2012. In our final sample, 10.87 percent of all cities are located in the east, 34.78

percent in the west, 35.87 in the south, and 18.48 in the midwest. Cities in our sample can be classified into two types. First, there are partisan cities that require political candidates to enter a race with a party affiliation. In our final sample, partisan elections are only held in 15.22 percent of all cities in the sample. The vast majority of cities are thus non-partisan. In these cities, candidates are not allowed or are not obligated to run with a party affiliation.[15] In some non-partisan elections, it is common knowledge which candidates are members of and backed by which parties; in others, parties are not involved.[16]

There are two different types of elections that occur during our sample period: general elections and run-off elections. General elections have potentially more than two candidates. If the general election does not determine a winner, a run-off election is held between the two candidates that received the most votes in a general election, but failed to obtain an absolute majority of the votes. For partisan cities, we also collect data on Democratic and Republican primaries. For each election type we construct a list of candidates as well as information on vote shares, partisanship, and incumbency status. We have obtained the election data from two different data sources. First, we called the city registrar in each city and asked for historical election data. Second we cross-checked the information with data from a website called Ourcampaigns.[17]

In addition, we constructed mayoral histories for each city going back to the 1980's. Based on this historical data, we can then classify cities into two types: cities that were

[15]Nonpartisan elections are generally held for school boards, and are also common in the election of judges.

[16]In 1915, A.C. Townley founded the Nonpartisan League in North Dakota as s backlash against partisan politics. This movement quickly spread across the Midwest and attracted much attention in large cities. More recently, Proposition 14 in California mandated that all elections for municipal offices in California have to be nonpartisan. It was approved by 54 percent of the voters in 2010.

[17]The web site is http://www.ourcampaigns.com/ Ourcampaigns is a large electronic community with $8,674$ registered members and contains detailed information on $267,420$ political races.

primarily controlled by one party during the observed history and cities that are more competitive and have mayors from different parties. In our sample, the fraction of cities that are controlled by one party since 1990 (1980) is 27.17 (21.74) percent.

We also collected data characterizing differences in political institutions. Most cities impose, some sort of term limit. In many cities mayors can only be elected for two successive periods. We find that 89.13 percent of all cities have term limits for mayors. We also characterize the strength of the office of the mayor. We consider the position of a mayor as strong if he is directly elected by majority rule and if he is at the same time the head of the administration (i.e. if there is no professional city manger at the top of the city administration.) In our sample, 63.04 percent of all cities have strong mayors.

We have obtained endorsement data from two different data sources. First, we called the different municipal unions in each city. This approach was time consuming and did not yield in a high response rate. Second, we relied on local newspaper coverage to measure endorsements. Most cities in our sample have, at least, one large local newspaper which covers local political events. The influence of newspapers on voting behavior has been widely studied in political economics.[18] Local newspapers provide an important forum for politicians and unions to announce their positions and are, therefore, reliable sources to obtain endorsement information.

We utilize an electronic database called "Newsbank" that contains rich, searchable, full-text of international, national, regional, and local newspapers. We assign a newspaper to a city if the newspaper has the city's name in the title or if the newspaper serves the county and surrounding counties with headquarters in the city.

[18]Snyder and Stromberg (2010) find that voters living in areas where the newspapers covers their House representative less are less able to describe and rate him or her. Knight and Chiang (2011) find that newspapers endorsements are influential in voters' decisions during presidential elections. Gerber, Karlan, and Bergan (2009) conduct a field experiment and find that local newspapers affect readers' voting decisions in gubernatorial elections.

We consider two types of public sector unions: police unions (such as local chapters of the Fraternal Order of Police or the Police Officers' Association) and firefighters' unions (such as local chapters of the Fraternal Order of Firefighters and the International Association of Firefighters). If there are multiple unions in a city we aggregate unions of the same type and treat these as one union.[19] We focus on police and firefighters because both occupations have a long established tradition of unionization and are well organized in almost all cities. For instance, the Fraternal Order of Police, founded in 1915, has over 325,000 members organized in 2,100 local chapters. The International Association of Firefighters, founded in 1918, has 298,000 members in more than 3,200 locals. Police officers (firefighters) account on average for 16.61 (11.02) percent of public sector employment in our sample as well as 20.64 (13.92) percent of the payroll.

For each candidate, we search the local newspapers in the election year using the following key words:

- police + candidate name + city name + mayoral election + endorsement
- firefighter + candidate name + city name + mayoral election + endorsement

The database returns the articles with specific key words that we read to identify whether a public sector union endorsed the candidate. Since it is hard to determine at which stage of the election process the endorsement comes, we treat each endorsement as an endorsement for the entire length of the mayoral election.

We also collect data on city population, public sector employment, and payrolls by functions from the Annual Survey of Public Employment and Payroll collected by the U.S. Census Bureau.[20] We use full-time equivalent employees to measure employment. We

[19] In addition, we also collected data on city employee's unions such as local chapters of American Federation of State, County and Municipal Employees and local chapters of Services Employees International Union as well as teachers' unions.

[20] http://www.census.gov/govs/apes/

Table 1: Summary Statistics

	Mean	SD	10%	90%	Cities	Elections
Population	546210	909826	158169	867688	92	292
Public Sector Size/ Population	0.02	0.01	0.01	0.04	92	292
Payroll/Population	414.07	288.40	201.42	816.53	92	292
Police Size/Public Sector Size	16.61	5.70	8.50	22.99	92	292
Fire Size/Public Sector Size	11.02	3.78	6.09	16.21	91	290
Police Payroll/Public Sector Payroll	20.64	6.97	11.02	28.40	92	292
Fire Payroll/Public Sector Payroll	13.92	4.82	7.64	20.53	91	290
Turnout Rate in General Elections%	15.49	8.08	6.24	25.00	92	286
Turnout Rate in Runoff Elections%	21.77	8.67	12.61	33.49	31	59
Turnout Rate in Repub Primaries%	4.32	2.70	1.88	8.29	5	9
Turnout Rate in Dem Primaries%	13.70	6.69	3.63	20.86	10	24

adjust the payroll data by the Consumer Price Index - All Urban Consumers, published by Bureau of Labor Statistics. The base period is 1982-84. We normalize the public sector size and total payrolls by the city population. We interpolate the missing values.[21]

To construct the sample used in the empirical analysis, we start with the 150 most populous cities based on 2010 U.S. Census. First, we exclude Cincinnati and all cities in Arizona. Cincinnati adopts a different election system from our model: they elect six council members at one election, and the top candidate automatically becomes mayor. In Arizona, state law forbids local unions to participate in political activities in regions where they have a member. Therefore, local unions cannot make endorsement decisions as described in our model. The sample size shrinks to 141 cities. We managed to assemble election results of 723 elections in 124 cities.

The second step is to find police union and firefighter union endorsements from local

[21] An appendix is available upon request which provides details.

newspapers and phone conversations. That step reduces the sample to 97 cities and 499 elections. In the third step, we only keep elections with an incumbent and more than one candidate reducing the sample to 92 cities and 299 elections, including 294 general elections, 60 runoff elections, 9 Republican primaries, and 24 Democratic primaries. In the fourth step, we restrict our sample to elections with full public sector data reducing the sample to 92 cities and 292 elections, with 287 general elections, 59 runoff elections, 9 Republican primaries and 24 Democratic primary elections. Finally, we keep only elections with full turnout data. We delete one general election, and the rest remain the same. Table 1 provides summary statistics for the sample used in the subsequent analysis.

4 The Impact of Union Endorsements on Election Outcomes

We investigate the impact of union endorsements on election outcomes. Our main outcome of interest is the probability that the incumbent is reelected. We are also interested in the impact of union endorsements on voter turn-out. This is of separate interest since the main impact of a union endorsement may be to mobilize the base of municipal voters.

4.1 The Impact of an Endorsement on the Incumbent's Winning Probability

We can classify elections by observed endorsement status. Table 2 summarizes the election path that mimics the game developed in Section 2 of the paper.

We find that there is a strong incumbency advantage. Incumbents won 32 of 38 elections in which they received endorsements. Incumbents won 184 out 204 elections

Table 2: Path Analysis

	Endorse Incumbent Only		Incumbent Wins
	Marginal Victory	32.89	
	Obs	38	32
			Challenger Wins
			6
	Endorse Nobody		Incumbent Wins
	Marginal Victory	39.51	
	Obs	204	184
			Challenger Wins
Total			
299			20
	Endorse Challengers Only		Incumbent Wins
	Marginal Victory	16.60	
	Obs	44	24
			Challenger Wins
			20
	Endorse Both		Incumbent Wins
	Marginal Victory	18.43	
	Obs	13	7
			Challenger Wins
			6

without endorsements and 24 out of 44 elections with endorsements of the challengers.[22] The mean of margin of victory in elections with no endorsements is 39.51. The mean margin of victory is 32.89 if the incumbent is endorsed. It drops to 16.60 percent when the challenger is endorsed.

Table 3: Incumbent's Probability of Winning

Dependent Variable: Incumbent Wins					
Sector	Police or Firefighter Unions				
Election Type	General		Runoff	Key Election	
incumbent endorsed	-0.0983	-0.0858	-0.134	-0.0738	-0.0509
	[0.0703]	[0.0722]	[0.155]	[0.0674]	[0.0764]
challenger endorsed	-0.330***	-0.244***	-0.226	-0.406***	-0.299***
	[0.0737]	[0.0458]	[0.171]	[0.0840]	[0.102]
both endorsed	-0.516***	-0.268***	-0.474**	-0.436***	-0.247**
	[0.133]	[0.0643]	[0.228]	[0.124]	[0.123]
City characteristics	YES		YES	YES	
City and Year Dummies		YES			YES
Obs	294	294	60	299	299

Our model predicts that the effect of an endorsement on the endorsed politician's probability of winning the election should be positive, but potentially small. If the union endorses the incumbent, the advertising effect a^I increases the incumbent's vote share while the signaling effect decreases the share. To test these predictions, we estimate Logit models to quantify the impact of an endorsement on the winning probability of the incumbent. Our model specifications control for the full vector of observed heterogeneity among cities which includes geographic dummy variables, as well as variables capturing

[22] There are 13 elections with multiple endorsements.

partisanship, one-party control, term limits, and mayoral strength. Alternatively, we estimate model specifications using city and time fixed effects which controls for time-invariant (unobserved) city characteristics and aggregate shocks. Table 4 shows the results of our maximum likelihood estimates. We distinguish between general elections, run-off-elections and key elections. The key election can be a primary, a general or a run-off election. We use the one with the highest turn-out.

Table 4 shows that the endorsement has no significant effect for incumbents. That is not surprising since most incumbents are safe and are reelected with wide margins of victory. Hence, unions may not bother to endorse an incumbent who is virtually guaranteed to be reelected. In closer elections, endorsements are more meaningful. Not surprisingly, we find that challengers benefit much more from an endorsement than incumbents. Moreover, the effect on the incumbent's reelection probability is not only negative (as predicted by our model) and statistically significant different from zero, but the effect is large in magnitude. Our estimates that the probability of winning reelection is reduced by 22 to 41 percentage points if the challenger receives an endorsement.

As a sensitivity analysis we also regress the vote share of the incumbent on union endorsements controlling for observed and unobserved city characteristics. Overall, the findings are qualitatively and quantitatively similar. The is a large negative effect of a union endorsement for a challenger on the incumbent's vote share in a competitive election.[23]

4.2 The Impact of Endorsements of Voter Turnout

Next we consider the impact of union endorsement on election turn-out. Unions can influence the outcome of a local election by mobilizing their base including union members as well as friends and family of members. We, therefore, investigate whether there is a

[23]Details are available upon request from the authors.

systematic relationship between election turnout and union endorsement.

Table 4: Endorsement and Voter Turnout

Dependent Variable: Turnout Rate						
Sector	Police or Fire Unions					
Type	Key	General	Runoff	Key	General	Runoff
Incumbent endorsed	2.552**	0.550	-3.387	2.700**	0.973	3.689
	[1.145]	[0.965]	[2.383]	[1.325]	[1.002]	[5.345]
Challenger endorsed	4.404***	2.998***	5.835	3.330***	1.300	4.135
	[1.092]	[0.957]	[2.501]	[0.924]	[1.271]	[4.450]
Both endorsed	9.022***	7.989**	-4.476	6.456***	3.727	2.339
	[3.404]	[3.258]	[4.302]	[1.547]	[2.505]	[4.470]
City characteristics	Yes	YES	YES			
City and Year Dummies				YES	YES	YES
Obs	292	286	59	292	286	59

Note. 1.Endorsements come from either police or firefighter unions. 2. The city characteristics included in the regression are geographic locations and indicator variables for partisan elections, single party in power, term limits, and strong mayor.

Table 4 summarizes the main results. Overall, we find some evidence that suggests that union endorsements increase voter turn-out. This finding is true for endorsements of incumbents as well as challengers. The effect is larger if a challenger is endorsed and in key elections.

5 The Impact of Union Endorsements on Urban Fiscal Policies

Recall that Proposition 3 makes two predictions: a) If the incumbent is endorsed by the union and the challenger wins, spending should go down; b) If the challenger is endorsed by the union and the challenger wins, spending should go up. We can test these two predictions using a difference-in-difference estimation strategy. Let y_{it} denote the outcome of interest. Consider the following regression model:

$$y_{it} = \alpha_i + \alpha_t + \sum_{s=0}^{S} \gamma_{1s} L_{it-s} E^C_{it-s} + \sum_{s=0}^{S} \gamma_{2s} L_{it-s} E^I_{it-s} + \epsilon_{it} \quad (25)$$

where L_{it} is a dummy that is equal to one of the incumbent lost the election at time t and zero otherwise. E^I_{it-s} (E^C_{it-s}) is one if the incumbent (challenger) received a union endorsement in the election at time t and zero otherwise. We include lagged variables to account for possible adjustment costs, i.e. it may take some time for a new administration to implement changes in fiscal policy. This identification strategy accounts for time-invariant unobserved city characteristics and aggregate shocks.

Table 5 shows the results of our estimations for the full sample.[24] The upper panel of Table 5 considers the case in which a challenger was endorsed and the incumbent lost the election. Our model implies that the public sector will grow since the newly elected mayor is likely to be more "pro-union" than the incumbent that lost the election. All coefficients in the upper panel should be positive.

[24]Observations with no fire sector or police sector are excluded from respective regressions. Size per capita is increased by 10000.

Table 5: Public Sector Size and Payroll Changes

	Dependent Variables	Size/Population			Payroll/Population		
	Sector	Total	Police	Fire	Total	Police	Fire
Predicted to be Positive	Incumbent Loss * Challenger endorsed	7.462**	0.831**	-0.532	16.62*	2.026	-1.017
		[3.147]	[0.418]	[0.473]	[8.789]	[3.215]	[1.918]
	Incumbent Loss * Challenger endorsed: t-1	1.267	1.51	4.132	16.72	3.085	8.825
		[3.927]	[1.254]	[3.359]	[11.36]	[2.823]	[6.326]
	Incumbent Loss * Challenger endorsed: t-2	1.72	1.839	4.086	21.25*	2.178	10.83*
		[3.894]	[1.287]	[3.570]	[12.22]	[3.076]	[6.055]
	Incumbent Loss * Challenger endorsed: t-3	4.64	2.278	1.363*	20.2	3.343	3.764*
		[3.881]	[1.677]	[0.759]	[12.28]	[3.917]	[2.241]
	Incumbent Loss * Challenger endorsed: t-4	7.900*	2.614	0.369	16.11	4.747	0.642
		[4.627]	[1.749]	[1.131]	[14.02]	[3.795]	[3.686]
Predicted to be Negative	Incumbent Loss * Incumbent endorsed	-4.633	-1.666**	-0.382	-32.67	-5.826**	-5.089
		[7.146]	[0.803]	[0.428]	[23.25]	[2.648]	[3.644]
	Incumbent Loss * Incumbent endorsed: t-1	-4.22	0.858	-0.054	-15.68	3.073	0.471
		[3.226]	[0.590]	[0.404]	[12.60]	[3.358]	[2.019]
	Incumbent Loss * Incumbent endorsed: t-2	0.466	0.561	0.331	-12.24	1.338	1.72
		[3.514]	[0.481]	[0.431]	[12.44]	[2.911]	[1.809]
	Incumbent Loss * Incumbent endorsed: t-3	-1.791	0.168	0.429	-3.279	1.948	2.525
		[3.779]	[0.466]	[0.271]	[13.21]	[2.515]	[1.558]
	Incumbent Loss * Incumbent endorsed: t-4	-3.007	0.496	0.199	4.959	5.198*	3.982**
		[3.629]	[0.514]	[0.237]	[12.69]	[2.653]	[1.644]
	City and Year Dummies	YES	YES	YES	YES	YES	YES
	Obs	1,365	1,365	1,361	1,365	1,365	1,361
	R-square	0.97	0.909	0.843	0.967	0.886	0.832

Table 6: Public Sector and Payroll Changes: Competitive Cities

	Dependent Variables	Size/Population			Payroll/Population		
	Sector	Total	Police	Fire	Total	Police	Fire
Predicted to be Positive	Incumbent Loss * Challenger endorsed	5.205	0.768	-0.247	14.21*	3.207	-2.69
		[3.322]	[0.525]	[0.630]	[8.202]	[3.057]	[2.239]
	Incumbent Loss * Challenger endorsed: t-1	0.971	1.482	4.147	17.24	3.247	9.186
		[3.933]	[1.203]	[3.285]	[11.57]	[2.809]	[6.272]
	Incumbent Loss * Challenger endorsed: t-2	1.695	1.851	4.118	22.51*	2.392	11.21*
		[3.852]	[1.245]	[3.504]	[12.34]	[3.012]	[5.978]
	Incumbent Loss * Challenger endorsed: t-3	4.366	2.355	1.114	19.71	3.44	2.526
		[3.968]	[1.691]	[0.745]	[12.60]	[4.019]	[2.013]
	Incumbent Loss * Challenger endorsed: t-4	5.474	2.559	0.001	13.79	4.229	-0.212
		[4.825]	[1.968]	[1.229]	[15.50]	[4.174]	[3.726]
Predicted to be Negative	Incumbent Loss * Incumbent endorsed	-13.05	-1.968*	-0.815	-44.16**	-8.626***	-2.545
		[8.514]	[1.079]	[0.720]	[19.36]	[2.921]	[4.306]
	Incumbent Loss * Incumbent endorsed: t-1	-3.922	0.993	-0.0234	-15.5	3.608	0.348
		[3.106]	[0.621]	[0.402]	[12.15]	[3.389]	[2.072]
	Incumbent Loss * Incumbent endorsed: t-2	0.402	0.582	0.354	-13.67	1.746	1.569
		[3.397]	[0.501]	[0.424]	[12.29]	[3.032]	[1.846]
	Incumbent Loss * Incumbent endorsed: t-3	-1.55	0.286	0.462*	-3.329	2.43	2.455
		[3.563]	[0.478]	[0.268]	[12.61]	[2.510]	[1.578]
	Incumbent Loss * Incumbent endorsed: t-4	-1.856	0.656	0.319	8.265	5.845**	4.559**
		[3.443]	[0.528]	[0.281]	[12.69]	[2.597]	[1.963]
	City and Year Dummies	YES	YES	YES	YES	YES	YES
	Obs	1,295	1,295	1,291	1,295	1,295	1,291
	R-square	0.971	0.908	0.843	0.968	0.885	0.831

We find that this is case in most cases. However, only a small subset of all coefficients are statistically significantly different from zero.

The lower panel considers the case in which the incumbent lost the election despite the fact that he was endorsed by the union. In that case, the incumbent was more union-friendly than the challenger. Our model implies that the public sector will shrink since the newly elected mayor is likely to adopt less union friendly policies. All coefficients in the lower panel should be negative. We find that this is case for the majority of the estimates. But again, only a small subset of coefficients are statistically significant and some have the wrong sign.

In Table 6 we repeat this exercise focusing on competitive cities that are not controlled by one party. Overall, the empirical results are qualitatively the same, but somewhat stronger. We thus conclude, there is weak evidence that supports the empirical validity of the predictions based on Proposition 3 of our model.

6 Conclusions

The efficient decentralized provision of public goods requires that special interest groups do not exercise undue influence on the outcome of municipal elections or local fiscal policies. We have developed a new political economy model in which an incumbent faces a challenger in a local election. A union can endorse one of the candidates and provide political support. We have shown that there is an inherent conflict faced by the municipal union. While union support increases the chances of winning the election because the union can mobilize its members, the endorsement also generates a negative informational externality. Voters observe the endorsement and update their beliefs about the position of the challenger. Theory also predicts that unions can have a significant impact on fiscal policies by shifting policies away from the preferred policies of the voters and, thus,

potentially creating some serious inefficiencies in local public good provision and in the aggregate economy.

We have tested the predictions of our model using a novel data set that focuses on municipal elections in the largest cities in the U.S. between 1990 and 2012. Our empirical analysis shows that a union endorsement leads to an increase in the win probability of the politician that receives the endorsement. In particular, challengers strongly benefit from endorsements in competitive elections. Finally, we also find weaker evidence that suggests that politicians with union endorsements adopt more union friendly fiscal policies if they are elected.

We view the methods developed in this paper and our main empirical results as promising for future research. An interesting extension would be to study open elections in which there are no established incumbents. One drawback of studying open elections is that theory does not easily provide clear predictions about the sign and magnitude of the change in policy that we would expect after the election. It is, for example, possible that a unions may endorse a candidate in an open election that is less supportive of the union than the previous incumbent. More research is clearly needed to study these issues.

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A Proof of Proposition 2

Given $S_1 > S_0 > S_{-1}$, there can be only one equilibrium as shown in equilibrium analysis. To have other equilibrium, one of the following inequalities must be true: $S_0 > S_{-1} > S_1, S_{-1} > S_1 > S_0, S_{-1} > S_0 > S_1, S_1 > S_{-1} > S_0$ or $S_0 > S_1 > S_{-1}$. We will rule them out by contradictions. Suppose at equilibrium, $S_0 > S_1 > S_{-1}$. Then, to have $d_g = 1$ rather than $d_g = 0$,

$$\begin{aligned} \pi_1 - \pi_0 &> 0 \\ (S_1 - S_0)(u_g^I - u_g^C) &> c^I \\ u_g^C &> u_g^I + \frac{c^I}{S_0 - S_1} \\ \theta^C &> T^{-1}\{u_g^{-1}(u_g^I + \frac{c^I}{S_0 - S_1})\} \\ &\equiv \hat{K} \end{aligned}$$

So the strategy must have the form

$$d_g = 1 \text{ if } \theta^C \in (\hat{K}, \bar{K}]$$
$$d_g = 0 \text{ if } \theta^C \in [\underline{K}, \hat{K}]$$

for some $\underline{K}, \bar{K} \in [0, 1]$.

If $\hat{K} \geq 1$ or $\hat{K} < 0$, then this is trivially not an equilibrium with all three actions $d_g = \{1, 0, -1\}$ arising in equilibrium outcomes.

If $\hat{K} \in [0, 1)$, then the vote size would be

$$\begin{aligned} S_1 &= F(E[u_v^I - u_v^C \mid \theta^C \in (\hat{K}, \bar{K}]] + a^I) \\ S_0 &= F(E[u_v^I - u_v^C \mid \theta^C \in [\underline{K}, \hat{K}]]) \end{aligned}$$

and hence $S_1 > S_0$ which is a contradiction.

The other four cases ($S_0 > S_{-1} > S_1, S_{-1} > S_1 > S_0, S_{-1} > S_0 > S_1, S_1 > S_{-1} > S_0$) can be ruled out by the same method. Q.E.D.

B An Example

We select several parametric functions, calibrate the model, and illustrate the decision rules. We make the following additional assumptions:

1. $q = g(R - T) = R - T$
2. The politician's ex post utility function is $-|T_0 - \theta|$, so that $T_0(\theta^I) = \theta^I$
3. $u_v(q) = q = R - T$
4. $u_g(T) = T$
5. $\theta^C \in U(0, 1)$
6. $v_i \in U(-\frac{d}{2}, \frac{d}{2})$, with $d = 6$
7. $a^I = a^C = a$
8. $c^I = c^C = c$

We use the following calibrations for the cost and advertising parameters:

c	a
0.105	2.34
0.047	2.34
0.105	2.12

First, consider the equilibria with all three actions $d_g = \{1, 0, -1\}$ arising in equilibrium outcomes. The system of equations for $K_1, K_2 \in (0, 1)$ becomes

$$\begin{aligned} K_2 - \theta^I &= \frac{2d \times c}{K_1 - 1 + 2a} \\ K_2 - 2a &= \frac{2d \times c}{K_1 - \theta^I} \end{aligned}$$

subject to

$$K_1, K_2 \in (0, 1)$$

There are two solutions to the equations:

$$\begin{aligned} K_1 &= \frac{-B + \sqrt{B^2 - 4A \times CC}}{2A} \\ K_2 &= \theta^I + \frac{d \times c}{0.5 \times K_1 - 0.5 + a} \end{aligned}$$

and

$$\begin{aligned} K_1 &= \frac{-B - \sqrt{B^2 - 4A \times CC}}{2A} \\ K_2 &= \theta^I + \frac{d \times c}{0.5 \times K_1 - 0.5 + a} \end{aligned}$$

where

$$\begin{aligned} A &= 2a - \theta^I \\ B &= (2a - 1 - \theta^I) \times (2a - \theta^I) \\ CC &= 2d \times c(2a - 1) - \theta^I(2a - \theta^I)(2a - 1) + 2d \times c\theta^I \end{aligned}$$

Given the calibration, the second solution has both K_1 and $K_2 \notin (0, 1)$ for every $\theta^I \in [0, 1]$, so it is ruled out.

Next consider the equilibrium with only $d_g = \{0, -1\}$ arising in equilibrium outcomes. The solution is

$$\begin{aligned} K_2 &= \theta^I + \frac{c^C}{a^C - \frac{1}{2}} \\ K_1 &= \theta^I - \frac{c^I}{a^I - \frac{1}{2}K_2} \\ K_2 &\in (0, 1) \\ K_1 &\leq 0 \end{aligned}$$

Then consider the equilibrium with only $d_g = \{1, 0\}$ arising in equilibrium outcomes. The solution is

$$\begin{aligned} K_1 &= \theta^I - \frac{c^I}{a^I - \frac{1}{2}} \\ K_2 &= \theta^I + \frac{c^C}{\frac{1}{2}K_1 - \frac{1}{2} + a^C} \\ K_1 &\in (0, 1) \\ K_2 &\geq 1 \end{aligned}$$

Finally, consider the equilibrium with only $d_g = 0$. The solution is

$$\begin{aligned} K_1 &= \theta^I - \frac{c^I}{a^I - \frac{1}{2}} \\ K_2 &= \theta^I + \frac{c^C}{a^C - \frac{1}{2}} \\ K_1, K_2 &\notin (0, 1) \end{aligned}$$