Pivotal Patronage*

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July 10, 2009

Abstract

In contrast to traditional approaches to patronage politics, in which politician directly buy electoral support from individuals, we examine how patronage based parties can elicit wide spread electoral support by offering to allocate benefits to the precinct giving it the most support. Provided that the party can observe precinct level voting, this mechanism, which eliminates the need to observe individual votes or to reward a large number of individual voters, incentivizes voters to support a party even when the party enacts policies which are against their interests. When a party allocates rewards contingent upon precinct-level voting results, voters can be pivotal both in terms of affecting who wins the election and in influencing which precinct gets the benefits. The latter (prize pivotalness) dominates the former (outcome pivotalness), particular when a patronage party is anticipated to win. Competition between the precincts for prize pivotalness encourages rational voting even when the odds of outcome pivotalness approach 0.

*Paper prepared for presentation at the PEDI meeting in Portland OR, June 18-19, 2009. We thank Jon Eguia, Dimitri Landa and Jorge Gallego for their helpful discussions.

PIVOTAL PATRONAGE

Patronage is the granting of favors and rewards by politicians in exchange for electoral support. It is generally perceived as bad for economic performance and for democracy. Patronage is more often thought of as a feature of emerging rather than established democracies (Stokes 2007; Kitschelt and Wilkinson 2007, ch. 1). Studies of patronage tend to focus on direct transactions between political parties and voters. We, however, focus on the allocation of patronage benefits to blocs; that is, groups, of voters that provide parties with the most electoral support. In doing so we integrate the literatures on pivotal voting and patronage and provide an account of many of the phenomena associated with patronage politics. We also offer an explanation of why rational voters vote even when the outcome of an election is a forgone conclusion.

There are many interesting aspects of patronage parties. For instance, how the party elite control candidate entry and stymie internal party competition. However, here we focus on a single, yet crucial aspect of patronage parties: how they attract electoral support. Most explanations focus on how parties trade jobs, gifts, bribes or other favors in exchange for votes (Stokes 2005). While these arguments are attractive, they do not account for some important aspects of the patronage story. For instance, patronage systems seem to persist even though relatively few voters obtain direct benefits from the party. What is more, patronage politics has continued despite the long-ago introduction of secret ballots that make it hard for parties to verify that voters voted as promised.

In the pivotal-patronage argument we present, a patronage party has another mechanism to secure electoral support; namely, the party offers benefits (hereafter, a prize) to the group that generates the greatest electoral support for it. This parallel mechanism can be used either as a complement or as a substitute to the direct trade of favors and rewards for votes from individual voters. The group-prize mechanism requires that groups be identifiable; that the level of electoral support from each group is observable; and that parties can offer rewards that selectively benefit particular groups. We articulate the theory in terms of electoral precincts. These groups fulfill these criteria. Votes are counted at the precinct level and parties can allocate projects – pork for instance – to one geographical precinct over another. Our focus on precincts is purely for ease of exposition. The theory is equally applicable to any other societal groupings that satisfy these criteria, whether these groups are based on linguistic, religious, ethnic or economic divisions. That is, the theory is about bloc identification and is applied here to the specific case of geographically defined voter blocs.

By determining which precinct gets the prize based on electoral support (which we refer to as a *contingent prize allocation rule)*, a patronage party sets up the system such that the precincts race each other to demonstrate their loyalty to the party in order to gain rewards. Voters are incentivized to support the party, not because they want it to win, but because they want to increase their precinct's likelihood of being given the prize.

A common approach in the rational choice analysis of voting is to assume that voters behave as if their votes are pivotal in determining the outcome of the election (Downs 1957; Riker and Ordeshook 1968; Barzel and Silberberg 1973). A common critique of this approach is that since each voter's likelihood of being pivotal in the outcome is so low why should they bother voting. In the pivotal patronage system, voters can be pivotal in two senses. First, voters might be pivotal in the traditional sense of determining which party wins – *outcome pivot.* Second, voters can be pivotal in deciding which precinct (or voting unit) provides the party with the most support, and hence receives the prize –*prize pivot.* As we shall see, prize pivot dominates outcome pivot. We focus on a case involving three precincts. Within that case, we show that even when there is a hegemonic party supported by all voters, so that each voter has zero influence over the electoral outcome (that is, voters are not outcome pivotal), the voter's incentive to vote for the hegemonic party is equal to one third of the value of the prize. As we will see, this incentive is driven by the voter's influence over the allocation of the prize; that is, the voter's prize pviot.

The pivotal patronage setup explains high voter turnout for patronage parties that provide rewards contingent upon electoral support. It also explains why voters rationally support parties even though they implement policies that are detrimental to the voters' interests. Competition for the prize trumps influencing the electoral outcome. Provided that parties can discern the electoral support of different groups – through mechanisms like endorsements – and allocate spoils to the most supportive groups, pivotal patronage enhances a party's electoral prospects.

The paper proceeds by reviewing the literature on patronage politics. We also examine the rational choice literature on pivotal voting. Our analysis combines these literatures. We introduce our basic model which is composed of three electoral precincts and two parties, A and B. Parties can observe the vote totals from each precinct, but they can not observe individual votes. If party A allocates political rewards (prizes) on the basis of the number of votes each precinct produces, then voters can be pivotal both in the sense of determining the electoral outcome and altering the distribution of the prize. Having examined these concepts of pivotalness, we first derive symmetric voting equilibria. In these equilibria, voters rationally support parties even though the policies harm their welfare. Voters also want to turnout. We then discuss asymmetric voting and the endogenous polarization of precincts. Credibility and the ability of parties to monitor voters are key components of previous explanations of patronage. We explain why the pivotal patronage mechanism does not suffer from credibility concerns. Optimal policies for patronage parties depend upon whether they directly buy votes or utilize the contingent prize allocation scheme considered here. Based on formal results in the appendix, we discuss why parties that use a contingent prize allocation rule implement higher tax rates, larger prizes and fewer public goods than parties that directly reward precincts, resulting in some patronage-based democratic systems, like Tanzania or India, to emulate the corruption and inefficiency conditions of more autocratic regimes. We conclude by discussing the implications of our model and offering simple practical policy advice for eliminating political patronage.

PATRONAGE AND PIVOTAL VOTING

Stokes (2007) and Kitschelt and Wilkinson (2007, ch 1) offer excellent reviews of the patronage literature. Stokes (2007) defines patronage and clientelism as follows: clientelism is the proffering of material goods in return for electoral support, where the criterion of distribution that the patron uses is simply: did you (will you) support me (p. 605)? Patronage is the proffering of public resources (most typically, public employment) by office holders in return for electoral support (p. 606). For the purpose of this paper, we treat the two concepts synonymously. Although our approach differs from most extant studies in that we look at different allocation rules to target rewards to groups of voters rather than to identifiable exchanges between parties and individuals, the definition of patronage as benefits given in exchange for electoral support will serve well.

Patronage is a widespread phenomenon that is generally perceived as pernicious. It has been studied in Asia (Scott 1972), Africa (van de Walle 2007; Wantechekon 2003; Lemarchand 1972), Europe (Piattoni 2001), Argentina (Weitz-Shapiro 2006; Stokes 2005), Italy (Chubb 1982; Golden and Picci 2008), India (Chandra 2004), Japan (Kobayashi 2006), and Mexico (Fox 1994; Magaloni 2006; Greene 2001), to name but a few. Although prevalent throughout the world, it is generally regarded as a feature common to recently democratized nations (Malloy and Seligson 1987; Keefer and Vlaicu 2007; Keefer 2007). Patronage is also associated with poverty (Chubb 1982; Wilson and Banfield 1963; Calvo and Murillo 2004; Dixit and Londregan 1996;

Medina and Stokes 2007.). However, it can remain a persistent feature of governance even in long established and wealthy democracies. For instance, Scott (1969) observed that the working of big city political machines within the US, such as Tammany Hall, are virtually identical to parties in emerging democracies.

Patronage is far from benign. It impedes economic growth and hinders the provision of public goods (Barndt, Bond, Gerring and Moreno 2005; Keefer and Vlaicu 2007). Despite these policy failings, incumbent patronage parties still tend to win elections, even when they are acknowledged to be less popular that the opposition (Magaloni 2006). Patronage works well when voting lacks anonymity. The widespread introduction of the so called Australian ballot, an official ballot produced by the state rather than provided by the parties, has made it harder for parties to verify voter choice (Stokes 2007, 620-1). Despite these changes parties have found ingenious ways to undermine anonymity. For instance, early voting machines in New Jersey in the 1890s made different noises depending upon how votes were cast. Chandra (2004) documents how parties in India discern voter choice by frequently emptying the ballot box to provide an ongoing count of the votes. Despite these tricks, the secret ballot has greatly reduced the ability of parties to monitor individual votes. Yet, patronage parties persist.

Time consistency and credibility are key features in the patronage literature (Stokes 2007). Parties offer rewards in exchange for votes. Individuals promise to vote for a party in exchange for material benefits. Once elected, the party no longer wants to hand over rewards, and once rewarded the voters can renege on their promise. The anonymous ballot makes the credibility problem even harder to resolve because the party can not verify whether the voter held up her or his end of the deal. Norms and reciprocity have been proffered to solve the credibility dilemma (See Stokes 2007 and Kitschelt and Wilson 2007 for reviews).

Even discounting the credibility issue, direct exchanges between a party and individuals cannot fully account for widespread popular support because the party does not give bribes to everyone and in many cases the value of the bribes is very low. Stokes (2005 p. 315) illustrates the problem by citing the example of the Argentinian party worker given ten tiny bags of food with which to buy the 40 voters in her neighborhood. Further there is evidence that those who receive rewards are no more likely to support the party than those who do not (Brusco, Nazareno and Stokes 2004). The pivotal patronage explanation we offer resolves these difficulties.

Pivotal voting: In most large elections, the probability that an individual's vote alters which party wins is miniscule. This has led scholars to argue about the rationality of voting (Riker and Ordeshook 1968; Barzel and Silberberg 1973; Tulluck 1967; Green and Shapiro 1996). Although voters are unlikely to be pivotal, they still have a dominant incentive to vote as if their vote matters. Further the evidence on voter participation is consistent with the predictions: as elections become close, turnout rises. A number of scholars (for instance Morton 1991 and Shachar and Nalebuff. 1999) focus on group rationality and the incentives to follow leaders and argue that this increases voting. In our model voters are part of a group– their precinct– but are individually motivated to support a patronage party to increase their group's likelihood of winning a prize. Provided that voters believe the winning party will reward supportive groups, voters are incentivized to vote even when their vote has no influence on who wins.

A BASIC MODEL OF PATRONAGE AND PIVOTAL VOTING

We consider a simple electoral framework between two parties, A and B. We focus on the activities of party A and treat party B as a non-strategic caretaker alternative. The party's objective is to maximize its chance of winning an election. The voters are divided into three groups. Although the groupings need not be geographical, in democratic systems this is a common arrangement so we will refer to the groups as precincts. There are n (odd) voters in each of these precincts. The precincts are called 1, 2 and 3. For much of what follows we focus on three person precincts. To win the election, party A needs to win a majority of the votes, that is at least $(3n + 1)/2$ votes. All votes count equally.[1] Parties can not observe how individuals vote; however, they observe electoral results by precinct. Party A induces patronage support by promising to reward the precinct that gives it the most support, a prize allocation rule we will refer to as *contingent*. Later we explain why this promise is credible.

Our analysis focuses on how party A proposes to distribute benefits in order to win an election. Let α be the average voter's assessment of the policy-based value of party A relative to party B. Since patronage parties are generally perceived to be worse than a public goods oriented party, we typically work with the case of $\alpha < 0$. That is, on average voters would be better off under party B. In addition to the average benefit, each voter, i, receives ε_i benefits if party A is elected. We assume that each voter's evaluation of party A is independent, with expected value of zero. In particular, we assume that $\Pr(\varepsilon_i < x) = F(x)$, with associated density $f(x)$, which has full support and is symmetric about zero. The symmetry assumption is not substantively important. Rather we utilize the fact that $1 - F(x) = F(-x)$ in order to simplify mathematical expressions.

Parties can offer numerous rewards to entice voters. Initially we assume that party A offers a prize worth Θ to one of the voter groups. This prize can be interpreted in a variety of ways; for example as a job given to one of the people randomly chosen from the precinct. For convenience we shall think of the prize as a local public good for the precinct that receives it (See Kitschelt and Wilkinson 2007 p. 10-12, 21 for a discussion of types of rewards). If, for instance, the prize is given to precinct 1, then

[1] This is why we refer to the groups as precincts and not districts since the party needs a majority of the total votes not a majority of the precincts.

all members of precinct 1 receive value Θ and the members of the other precincts get nothing. For the time being we assume the size of the prize is fixed and examine the consequences of how it is allocated. Later we examine the trade-off between the provision of public goods, g, and prizes, Θ.

Pivotal voting

We start by examining voting within the symmetric pivotal voting context. Suppose that initially party A offers each precinct an equal chance of receiving the prize (or an equal division of the prize). We shall refer to this prize allocation rule as *non-contingent.* If A is elected rather than B, then voter i's net expected benefit is $\alpha + \varepsilon_i + \Theta/3$. If this is positive, then i prefers A to B. In many cases i's vote will not affect the outcome of the election. However, the standard approach in rational models, which avoids the pathology of everyone voting for a dominated outcome, is that people vote as if their vote matters. In this setting, the probability that voter i votes for party A is $v = \Pr(\alpha + \varepsilon_i + \Theta/3 \geq 0) = F(\alpha + \Theta/3)$ and the probability that party A wins the election is $\rho = \sum\limits_{i=(3n+1)/2}^{3n} \frac{3n!}{(3n-i)!i!} v^i (1-v)^{3n-i}$. This latter probability, which is given by the binomial theorem, is the probability of getting at least $(3n+1)/2$ votes when each voter has a v chance of voting for A.

One of the critiques of the analysis of rational voting is that the probability that a voter's choice matters (i.e. that the voter determines the election) is very low. Specifically, voter i is only pivotal in determining the election if $(3n-1)/2$ voters vote A and $(3n-1)/2$ other voters vote B, which only happens with probability $\frac{(3n-1)!}{(3n-1)/2!(3n-1)/2!} v^{(3n-1)/2} (1-v)^{(3n-1)/2}$. As n becomes large (or v differs from 1/2) this pivot probability becomes vanishingly small. If voting has even a small cost, then this brings into question the rationality of voting (Riker and Ordeshook 1968; Barzel and Silberberg 1973).

Outcome Pivot, Prize Pivot

While an individual's influence over the outcome of the election is small, the voter can remain highly pivotal in the allocation of the prize if a party uses a contingent prize allocation rule. Since the parties do not see individual votes, they can not allocate the prize based upon individual votes. However they can compare the level of support across different groups (e.g., voter blocs, precincts) and reward the precinct that produces the most votes by allocating the prize to it.

Unfortunately, due to their opaque nature, it is often difficult to discern the internal workings of patronage parties (Guterbock 1980, p15). Yet in some cases we can observe party rules structured so as to reward supportive groups in much the manner assumed here. For example, Gosnell (1939 p29) describes how in Chicago the size of each ward's Democratic vote directly translated into its influence on various Democratic committees. Hence, if one ward produced twice the Democratic votes as another then its ward leader would have twice the votes within the internal deliberations of the Democratic party and therefore a much greater opportunity to send rewards back to the ward. Such a system institutionalizes the mapping between electoral support and the allocation of rewards.

Similar biases exist at the national level in the U.S. The rules of the Democratic Party's national convention reward the states which provided the highest level of support to democrats in previous elections. In particular, each state's share of the 3000 democratic delegates is calculated by the following allocation formula (Democratic Party Headquarters. 2007 p1): $A = \frac{1}{2}(\frac{SDV1996+SDV2000+SDV2004}{TDV1996+TDV2000+TDV2004} + \frac{SEV}{538})$, where A = Allocation Factor, SDV = State Democratic Vote, SEV = State Electoral Vote, and TDV = Total Democratic Vote. The Republican party uses a more complicated system which allocates delegates on the basis of Republican support at both previous state and federal elections (for details see Republican National Convention 2008). In both cases, parties use a contingent rule to assign the prize– in this case influence over picking Presidential candidates.

Parties also allocate punishments according to electoral support. In Southern Italian cities, the Christian Democrats threaten merchants with health code violations if they did not support the party (Chubb 1982). Singapore's Lee Kuan Yew was notorious for punishing electoral districts by removing public housing benefits if the district did not overwhelmingly support him (Tam 2003). In Zimbabwe Robert Mugagbe has gone even further. He bulldozed houses and markets in those district which did not support him (BBC 2005). Clearly, some parties allocate rewards and punishments based upon electoral support. The objective of this paper is to see the consequences on voting behavior of such contingent prize allocation rules.

As the examples above illustrate, there are many allocation rules which are contingent upon electoral support. Here we analyze a single simple rule in which a party gives a prize to the precinct which gives it the most support. The key to all contingent prize allocation rules is that voters can be pivotal in two senses. First, they can be influential in terms of which party wins, which we refer to as *outcome pivotal*. Second, they affect the allocation of the prize across groups, which we refer to as *prize pivotal*. The latter pivot typically dominates the former and provides patronage parties with a means to incentivize voters to vote against their collective interests.

Suppose party A adopts the following simple contingent prize allocation rule: Give the prize to the precinct that gives it the most votes. If multiple precincts generate the same largest number of votes, then each is equally likely to receive the prize. Consider the incentives of a representative voter m from precinct 1 and suppose there are three voters in each precinct ($n = 3$). We examine the symmetric case where each voter votes for party A with probability p.

Table 1 illustrates the two concepts of pivotalness. The first row supposes that all three voters in precincts 2 and 3 and the two other voters in precinct 1 all support

A. Since party A already has 8 votes, voter m is not pivotal in influencing who wins, but she is pivotal in determining the allocation of the prize. If she votes for A, then district 1 will have three votes and so receives a one third chance of being allocated the prize, $Q_A(2,3,3) = 1/3$. Alternatively, if she votes for party B, then her precinct will produce fewer voters for party A than districts 2 and 3 and so have no chance of receiving the prize, $Q_B(2,3,3) = 0$. Hence in this circumstance, which occurs with probability $p^2p^3p^3$- the chance of two A votes in district 1, and three A votes in districts 2 and 3 - voter m is not outcome pivotal but contributes 1/3 to the prize pivot.

Table 1 about here

In the second row, the distribution of votes is 2,2,2. Again voter m's vote does not affect which party wins, but she is pivotal in the allocation of the prize. If she votes A, then her precinct gets the prize with certainty, $Q_A(2,2,2) = 1$. Her precinct's chance of receiving the prize if she votes B is $Q_B(2,2,2) = 1/3$. Her contribution to the prize pivot in this circumstance is therefore 2/3.

In the circumstance illustrated in row three, m's vote affects both the outcome and the allocation of the prize. In this case one voter in precincts 1 and 3 vote for A and two voters in precinct 2 vote for A. If m votes A, then her district's chance of receiving the prize is 1/2 and A is elected. If she votes B then A is not elected and so her district does not get a prize from A. In the final case, voter m is outcome pivotal but not prize pivotal.

Table 1 provides some illustration of how m's vote choice contributes to the outcome and prize pivot. We now formally derive outcome pivot OP and prize pivot PP.

$$OP = \sum_{i=0}^{n-1} \sum_{j=0}^{n} \sum_{k=0}^{n} \tfrac{(n-1)!}{(n-1-i)!i!} p^i (1-p)^{(n-1-i)} \tfrac{(n)!}{(n-j)!j!} p^j (1-p)^{(n-j)} \tfrac{(n)!}{(n-k)!k!} p^k (1-p)^{(n-k)} 1_{i+j+k=(3n-1)/2} \quad (1)$$

Equation 1 deserves some explanation. The calculation is made from the perspective of a representative voter. For clarity, let's continue to call this voter m and suppose she is from precinct 1. The three summations represent all the combinations of the $n-1$ other voters in precinct 1 and the n voters in precincts 2 and 3. The formula $\frac{(n)!}{(n-j)!j!}p^j(1-p)^{(n-j)}$, which comes from the binomial distribution, is the probability that j of n voters will vote A given that each individual's probability of voting A is p. The combination of the three binomial probabilities gives the likelihood of i votes for A in precinct 1 and j and k votes for A in districts 2 and 3. Voter m only affects the outcome of the election if the sum of the A votes across the precincts is one short of a majority. This is given by the indicator function $1_{i+j+k=(3n-1)/2}$, which takes value one when $i+j+k=(3n-1)/2$, and zero otherwise. Thus, the summation given by equation 1 gives the likelihood that voter m is pivotal in determining the outcome of the election.

The equation for prize pivot, PP, has a similar structure. It calculates the probability of each of the possible combinations of votes and then weights them by the difference between precinct 1's expected share of the prize if voter m supports A ($Q_A(i,j,k)$) or B ($Q_B(i,j,k)$) given the simple contingent prize allocation rule.

$$PP = \sum_{i=0}^{n-1}\sum_{j=0}^{n}\sum_{k=0}^{n} \tfrac{(n-1)!}{(n-1-i)!i!}p^i(1-p)^{(n-1-i)} \tfrac{(n)!}{(n-j)!j!}p^j(1-p)^{(n-j)}\tfrac{(n)!}{(n-k)!k!}p^k(1-p)^{(n-k)}(Q_A(i,j,k)-Q_B(i,j,k)) \tag{2}$$

where

$$Q_A(i,j,k) = \begin{cases} 1 & if \quad i+1>j \text{ and } i+1>k \text{ and } i+j+k+1 \geq (3n+1)/2 \\ 1/2 & if \quad i+1=j \text{ and } i+1>k \text{ and } i+j+k+1 \geq (3n+1)/2 \\ 1/2 & if \quad i+1>j \text{ and } i+1=k \text{ and } i+j+k+1 \geq (3n+1)/2 \\ 1/3 & if \quad i+1=j \text{ and } i+1=k \text{ and } i+j+k+1 \geq (3n+1)/2 \\ 0 & if \quad (i+1<j \text{ or } i+1<k) \text{ or } i+j+k+1 < (3n+1)/2 \end{cases}$$

$$\text{and } Q_B(i,j,k) = \begin{cases} 1 & if \quad i > j \text{ and } i > k \text{ and } i+j+k \geq (3n+1)/2 \\ 1/2 & if \quad i = j \text{ and } i > k \text{ and } i+j+k \geq (3n+1)/2 \\ 1/2 & if \quad i > j \text{ and } i = k \text{ and } i+j+k \geq (3n+1)/2 \\ 1/3 & if \quad i = j \text{ and } i = k \text{ and } i+j+k \geq (3n+1)/2 \\ 0 & if \quad (i < j \text{ or } i < k) \text{ or } i+j+k < (3n+1)/2 \end{cases}.$$

$Q_A(i,j,k)$ describes precinct 1's chance of receiving the prize if voter m chooses A. Under this circumstance the total number of votes in precinct 1 is $i+1$. If this is larger than j and k–the A votes in precincts 2 and 3– and the total A votes constitute a majority $(i+j+k+1 \geq (3n+1)/2)$ so that A is elected, then the whole prize goes to precinct 1. At the other extreme, if either precinct 2 or 3 have more votes than precinct 1 or party A does not get a majority, then the precinct gets no share of the prize. $Q_B(i,j,k)$ describes precinct 1's expected probability of being allocated the prize if m votes for B.

PP represents the difference in the expected share of the prize that precinct 1 receives if voter m votes for A rather than B. If party A makes its allocation of the prize contingent upon voter support, then voters are pivotal in two senses. Their votes could alter the outcome of the election and alter the distribution of the prize. Much of the intuition for our arguments can be gained by examining voter m's pivotalness.

Figure 1 plots outcome pivot OP and prize pivot PP as a function of p – the individual likelihood of voting for party A – and the number of voters. The solid lines represent outcome pivot OP. The dotted lines represent prize pivot PP. Figure 1 displays pivot probabilities when the number of voters per precinct is 3 (upper lines) or 33 (lower lines). The horizontal axis plots p.

Figure 1 about here

Outcome pivot, OP, drops off very quickly as n increases, particularly when p is not close to $\frac{1}{2}$. Likewise prize pivot, PP, declines as the size of the electorate grows. However, provided that $p > 1/2$, the impact of a voter's decision on the allocation of the prize remains substantially greater than 10% even when the electorate increases to 99 voters. Further, as the probability of voting for party A approaches one then prize pivot converges to a third (as $p \to 1$, $PP \to \frac{1}{3}$). This result is independent of the size of the electorate. Hence while the probability of being outcome pivotal becomes vanishingly small as the electorate becomes large, this diminution of pivotalness is not true in terms of the allocation of the prize.

Rational Voting.

We use the calculus of rational voting to explain two phenomena: why voters support patronage parties whose policies do not enhance their welfare and why people vote even when they have only a miniscule chance of influencing which party wins. If voter m supports party A rather than party B, then the voter affects outcomes in two ways. First, with probability OP she alters the probability that party A wins the election. Second, with probability PP she affects the allocation of the prize. As we saw in figure 1, the latter effect dominates the former, particularly when $p > 1/2$ or the electorate is large. More specifically voter m wants to vote for party A rather than party B when the following is true:

$$OP(\alpha + \varepsilon_m) + PP\Theta \geq 0 \tag{3}$$

Given that each of the other $3n - 1$ voters support A with probability p, with probability OP voter m gains $(\alpha + \varepsilon_m)$ in terms of her evaluation of A relative to B by voting for A. In addition, by voting for A, voter m increases her precinct's likelihood of receiving the prize by PP. Undominated voting implies that m votes for A iff $\varepsilon_m \geq \varepsilon^* = -\frac{PP}{OP}\Theta - \alpha$, which occurs with probability $F(\frac{PP}{OP}\Theta + \alpha)$.

Consider a voting game in which all the voters independently vote for A or B. If A is elected, then A allocates the prize according to the simple contingent prize allocation rule– giving the prize to the precinct which provided the most votes.

Proposition 1: There are two types of symmetric equilibrium solutions to the voting game. First, all voters can support party A; this equilibrium always exists. Second there can exist an equilibrium defined by the threshold strategy of voting for A iff $\varepsilon_i \geq \varepsilon^*$ where $\varepsilon^* = -\frac{PP}{OP}\Theta - \alpha$ and $p = F(\frac{PP}{OP}\Theta + \alpha)$. If such fixed points exist, then $\varepsilon^* < -\alpha$.

We examine the intuition behind these equilibria. We start with the equilibrium in which all voters support party A. This is equivalent to a voting threshold strategy in which voter i supports A if $\varepsilon_i \geq \varepsilon^* = -\infty$. In this equilibrium, the probability that the other voters support party A is $p = 1$. Therefore, the probability of being outcome pivotal is zero ($OP = 0$). However, the following logic shows why the probability of being prize pivotal is 1/3 ($PP = 1/3$). If m votes for A, then her precinct has a one third chance of being allocated the prize since then all precincts will give party A n votes. However, if she votes for B, then her precinct has one less vote than the other precincts and so has no chance of receiving the prize. Therefore $OP(\alpha + \varepsilon_i) + PP\Theta = \Theta/3 > 0$, so the voter strictly wants to support A. Equally importantly, provided the cost of voting does not exceed $\Theta/3$, the voter wants to turnout and vote even though she has no influence on the electoral outcome. This symmetric equilibrium always exists.

It is worth pausing to differentiate this equilibrium from a common pathology in voting equilibria. Nash equilibria require that no player can improve their payoff by switching their vote. The common pathology in voting is that even if everyone prefers outcome C to outcome D, everyone voting for D is a Nash equilibrium because for any individual, changing his or her vote does not alter the outcome. Therefore voting for D is a best response (see for instance McCarty and Meirowitz 2007, p.99, 138-140). To avoid these pathological cases, scholars typically focus on weakly undominated equilibria in which voters vote as if their decision matters, i.e. as if they are pivotal.

Although it might be the case that $(\alpha + \varepsilon_i + \Theta) < 0$ for all voters, such that even in the best case scenario support for A means voting for the least preferred party, voting for A strictly dominates voting for B when the prize allocation rule is contingent and p is substantial.

We now consider interior solutions to the voting game. In these equilibria, there is a threshold ε^* such that if $\varepsilon_i \geq \varepsilon^*$, then voter i supports A; and votes for B otherwise. The threshold is defined as follows: $\varepsilon^* = -\frac{PP}{OP}\Theta - \alpha$ and $p = F(\frac{PP}{OP}\Theta + \alpha)$. This is a fixed point. Given the threshold ε^* the probability that each voter supports A is $p = \Pr(\varepsilon_i \geq \varepsilon^*) = 1 - F(\varepsilon^*) = F(-\varepsilon^*) = F(\frac{PP}{OP}\Theta + \alpha)$. Given these vote choices by the other voters, voter m strictly supports party A if $\varepsilon_i > \varepsilon^*$, strictly prefers B if $\varepsilon_i < \varepsilon^*$ and so voting according to the threshold voting rule is a best response.

Figure 2 illustrates the logic of the voting calculus and illuminates the conditions under which interior equilibria exist. Suppose that each voter uses the threshold voting strategy of voting for A iff $\varepsilon_i \geq x$, such that $p = F(-x)$. Figure 2 plots the value of voting for A relative to B $(OP(\alpha + \varepsilon_i) + PP\Theta)$ evaluated at $\varepsilon_i = x$ against x using the values $n = 3$, $\alpha = -1$ and $\Theta = 1$ and assuming that ε_i is logistically distributed ($F(x) = \frac{e^x}{e^x+1}$). The solid line represents the value of voting for A for a voter with $\varepsilon_i = x$. The dotted line gives the probability with which each voter supports A given the voting threshold x. Since equilibria are fixed points, equilibria occur where the solid line crosses the x-axis. At this point, voters with a higher evaluation of A than x (i.e. $\varepsilon_i > x$) would want to vote for A, voters with lower evaluations (ie $\varepsilon_i < x$) would vote for B and those with evaluation $\varepsilon_i = x$ are indifferent about whether or not to vote for A.

Figure 2 about here

It is worth noting some features of the figure. As x decreases then the payoff for voting for A converges to $\frac{\Theta}{3}$. This is the logic behind everyone voting for A, as described above. Once everyone else is likely to vote for A, outcome pivot OP is small and prize pivot is about $\frac{1}{3}$ so voting for A becomes dominant. Next note that if $(\varepsilon_i + \alpha) \geq 0$, then the expected value of voting for A ($(\varepsilon_i + \alpha)OP + \Theta PP$) is always positive. Although as we see on the right hand side of figure 2, $(x + \alpha)OP + \Theta PP$ becomes small as x becomes large, because, as we saw in figure 1, both OP and PP become small as p get small. Therefore there are no equilibria with $\varepsilon^* \geq -\alpha$.

As can be seen in figure 2, there are two interior solutions. Indeed since $(x + \alpha)OP + \Theta PP$ is continuous in x and positive at both extremes there is generally an even number of solutions. The equilibria have threshold $\varepsilon^* = .251$ so that $p = .438$ and A's overall probability of election is $\rho = .251$ and threshold $\varepsilon^* = -.578$ so that $p = .641$ and A's overall probability of election is $\rho = .812$. For reference, if party A used the non-contingent prize allocation rule to give away the prize, then voters would support it only if $\varepsilon_i \geq \alpha + \Theta/3$, which in the example equals 2/3, which gives each individual voter's chance of supporting A as $v = .339$ and an overall probability of A being elected as $\rho = .154$. In this example, party A improves its chance of election by allocating the prize contingent upon the level of support it receives. This is a general result.

Proposition 2: For all symmetric voting equilibria and $n \leq 99$, the contingent prize allocation rule, in which party A gives the prize to the precinct(s) that give it the most support, increases the probability of A being elected relative to the non-contingent allocation of the prize: $p = F(\alpha + \frac{PP}{OP}\Theta) > v = F(\alpha + \Theta/3)$.

Proof: As characterized above, given the non-contingent prize allocation rule, voter i supports A with probability $v = F(\alpha + \Theta/3)$. Under the contingent prize allocation rule, voter i supports A with probability $p = F(\alpha + \frac{PP}{OP}\Theta)$. From proposition 1 we know that a solution to this always exists (in particular at $p = 1$). For $n = 3$, $PP/OP = \frac{99-328p+477p^2-297p^3+70p^4}{210(1-p)^4} > 1/3$ for all $p \in (0, 1)$. Therefore, either $p = 1 > v$ or $p \in (0, 1)$ which implies $p = F(\alpha + \frac{PP}{OP}\Theta) > v = F(\alpha + \Theta/3)$. A's overall probability of election is increasing in the probability of individuals supporting it, therefore using the contingent prize allocation rule increases A's chance of election. The proof for other values of $n \leq 99$ is by brute force evaluation of PP/OP and plotting it against p. QED.

We conjecture that proposition 2 is true for greater values of n. Using the brute force method described in the proof above, the ratio of PP/OP converges to a minimum around .37 as n get large. This minimum occurs as $p \rightarrow 0$. For computational reasons we have not calculated PP/OP for larger values of n.

TURNING OUT AND VOTING AGAINST YOUR INTERESTS

While clearly the model is a simplification of a much more complex process, it illustrates the incentives which lead to a large number of real world voting phenomena. The use of a contingent prize allocation rule for deciding which groups to reward enhances a party's chance of electoral success. If there is a consensus that a party is likely to win an election, $p > 1/2$, and that party uses contingent rewards, then voters have a strong incentive to support the party. Hegemonic parties win elections and continue to do so even if there is widespread recognition that they offer lousy policies.

The contingent prize allocation rule incentivizes voters to places much greater weight on the allocation of prizes than the quality of the party. Voters vote against their best interest. On average a voter receives rewards worth $\alpha + \Theta/3$ from the election of A. Yet even though this is negative they still rationally support A rather than their preferred alternative B.

Interestingly the pivotal patronage system does not require the party to buy all the votes it needs, nor to monitor those votes it does buy. Voters are incentivized to vote for the party, not in return for direct rewards, but to enhance their chance of being eligible for future rewards. Evidence from Argentina suggests the pivotal patronage explanation offers a more compelling explanation than the traditional quid pro quo. Brusco, Nazareno and Stokes (2004) examined whether people who received gifts from a party feel compelled to vote for it. They found that few respondents to their survey felt such an obligation, although many people felt that it was likely that recipients would have had a sense of obligation. Consistent with these results, in Chicago, Guterbock (1980) found that those who received party service were no more likely to vote Democratic.

Patronage parties work hard to turn out the vote (Allen 1993; Myers 1971) even when there is no doubt about the outcome. Hegemonic parties want to maintain an air of invulnerability. As seen in figure 1, once the voters believe that the majority of others are likely to vote for the patronage party, they can not influence the electoral outcome, but they can influence the distribution of the prize. The dominant choice becomes to support the patronage party.

Turnout is often seen as a failure of rational choice modeling (Green and Shapiro 1996). In large electorates the probability that any individual's vote influences the outcome is miniscule. Therefore citizens should abstain. A contingent prize allocation rule reverses these incentives. As we have seen, even when a party is certain to win, voters have an incentive to support it in the hope of increasing the rewards for their group, be this based upon geographical precinct, as examined here, or any other grouping. The key criteria is that the group's level of support can be discerned.

The pivotal patronage setting predicts high electoral turnout. Provided the patronage party can discern the electoral support of different groups and has discretion over which groups to reward, voters have an incentive to turnout and support it. Indeed even if the election is a forgone conclusion there is expected value in voting. In the limit, if everyone else is voting for party A, the net expected value of voting for party A is $\Theta/3$. A hegemonic party in a corrupt electoral system does not need to compel people to vote for it. If the voters believe the incumbent is likely to reward those societal groups that offer it the most support then they will readily bear the costs of voting for an alternative they detest!

A contingent prize allocation rule makes it hard for reformers to win, even if every voter recognizes that the reformer has the best policies and will produce the most benefits. The reformer's electoral problem is that while every voter might want them to win, each voter wants the reformer to win with someone else's votes.[2]

Consider for a moment the Pakistani election of 1997 in which Imran Khan, one of Pakistan's most successful and distinguished all round cricketers, launched the Pakistan Tehreek-e-Insaf (PTI) party against the entrenched patronage parties, Pakistan Peoples Party (PPP) and Pakistan Muslim League (PML-N). Khan, who had huge popularity and name recognition given his career as Pakistan's cricket captain, ran his party on the platform of cleaning up corruption. Although he admitted he had little political experience, he also said "but then neither have I any experience in loot and plunder (New York Times April 26 1996)." Despite the recognition of the need for reform, Khan was the only member of his party to win a seat. The PML-N party won the election by a landslide and engaged in corruption until being deposed by a military coup in October 1999.

Pivot patronage offers an explanation as to why the voters turned their backs on a reformist party in favor of continued corruption and patronage. Suppose for a moment we assume that Khan could and would have implemented reformist policies. Under this assumption PTI would have been better than the mainstream alternatives, PPP and PML-N, for the vast majority of Pakistanis. Yet, Khan's problem was that even if all the voters want him in office they want him elected on other people's votes. Since

[2] Feddersen et al (2009) offer an alternative analysis. They argue and offer experimental evidence that as (outcome) pivot probabilities become small voters pick the morally superior outcome, which in this context would be the reformer. In their experiments voters vote against their individual material well-being as the electorate gets large. However, their experiments only examine non-contingent prize allocation rules.

the PTI party ran on a platform of honest public goods provision, the benefits accrued to people whether they voted for it or not. This is not the case with a patronage party. Unless the voters were certain the PML-N would lose and hence could not reward their most supportive groups, voters want to vote for the PML-N to enhance their prospects of receiving the few rewards that it offered. Reformist parties have real problems challenging entrenched patronage parties. Everyone might want them to succeed but everyone also wants someone else to vote the reformist into power.

Asymmetric Voting

The analysis thus far has focused on symmetric voting equilibria. The model also offers insights into the endogenous formation of party allegiances and district polarization as the following argument illustrates. Suppose precinct 3 has a voter who is known to oppose patronage party A. If it is common knowledge that this voter will always vote B, then precinct 3 is at a severe disadvantage in the race for the prize. This causes the behavior of districts to differ. Since precinct 3 always has at least one B vote its chance of winning the prize is relatively low. This disincentivizes the other voters in precinct 3 from voting for party A. In contrast, by voting for A, the voters in precincts 1 and 2 can expect a larger share of the prize since precinct 3 rarely gets a share of the prize. Once a precinct is perceived to be anti-A, the pivotal patronage mechanism provides little incentive for its voters to support A, or even to turn up to vote. Turnout is likely to be lower in precincts with heterogenous party support. Thus, gerrymandering, for instance, not only benefits the incumbent party, but increases the chances of the voters to get prok-barrel prizes.

Several interesting implications follow from asymmetric considerations, especially if we expand the argument to consider competition between two patronage parties. Voters within a group have an incentive to align their votes, otherwise they have little chance of winning the prize. This incentive is created endogenously. Once one group leans towards a patronage party then such a group becomes a contender for receiving the prize. Members of the group are then incentivized to align their support behind this party. Small initial differences in group support for patronage parties can lead to radical polarization. This provides an alternative to sociological explanations for party identification and polarization [citesXXX]. Such polarization might be especially malevolent when based on racial or ethnic groupings.

The Congress party and its opponents in India provide an interesting example of this endogenous polarization. In the 1967 and 1971 elections – which marked the beginning of the decline of the Congress Party as a hegemonic organization – the Congress party garnered much of its support by appealing to different caste, ethnic, and religious cleavages depending on what worked in a given constituency. Which groups it relied upon varied from village to village and state to state (Chhibber 2001). So deep did patronage-based polarization run that other Indian parties formed ideologically incoherent, ethnically, economically and caste-based polarizing coalitions to defeat the Congress during this period. The pro-Soviet communist party (CPI), for instance, alligned with the pro-business Swatantra Party in Orissa and with the anti-Muslim Jana Sangh in the Punjab. Their ruling coalition governments relied on localized rewards to easily discerned voting blocs, rather than on policy agreement, to attract support (Park and Bueno de Mesquita 1979).

Although we only formally analyze symmetric voting equilibria, the framework offers provides a basis from which to examine other equilibria and to consider competition between competing patronage parties. The analysis also only considers a single contingent prize allocation rule, while there are clearly many such rules, as illustrated above. Which contingent prize allocation rule offers a party the greatest chance of electoral success depends upon the electoral rule. Here we considered a simple competition for the most total votes. However, in a single-membered district system, parties are more interested in winning a majority of districts, rather than maximizing vote share. In such a system a patronage party would better enhance its prospects by modifying its prize allocation rule to give the prize to the most supportive precinct in a marginal district.

CREDIBILITY

Credibility is a recurrent theme in the study of patronage as quid pro quo transfers between parties and individuals (Stokes 2007). The credibility problem is two fold. First, once given a reward why should voters actually vote for a party. Second, once elected why should parties reward voters. In contrast to the standard direct exchange mechanism, pivotal patronage has far fewer credibility issues and the remaining issues are easily dealt with by a simple reputational story.

Scholars have considered a variety of solutions to the issue of credibility in direct exchange models of patronage. For instance, Robinson and Verdier (2002) propose an economic explanation. They assume parties are better able to extract rents from some groups compared to others which de facto ties the fates of particular workers to particular parties. Other approaches look at reputation. For instance, drawing on the literature on cooperation in the repeated prisoners' dilemma setting, Stokes (2005) invokes a trigger punishment system to explain why parties deliver rewards and voters support them. If a party fails to deliver rewards then voters don't support it in the future, and if voters take bribes but fail to support the party then they never receive bribes in the future.[3] This punishment mechanism requires the party to know how individuals vote, which could explain why patronage works best in tight-knit communities.

While reputational arguments provide a means to maintain credibility, they fail to capture some of the realities of patronage transfers. For instance, typically only a

[3] In contrast to these views, Keefer (2007) and Keefer and Vlaicu (2007) argue that it is the inability of new parties to commit to policies that leads to patronage.

small proportion of voters directly benefit from patronage rewards and yet parties need to induce broad support (Guterbock 1980, ch1). Further, as discussed above, surveys suggest that the receipt of rewards often only has a weak impact on an individual's vote choice.

Pivotal patronage arguments do not suffer from these credibility issues. The mechanism does not rely on the credibility of the voters commitment nor on the party's ability to monitor the individual voters. Voters support the party, not in response to past gifts, but in the hope of winning the prize for their precinct in the future. Only a few voters need receive rewards in order to create competition for the scarce rewards in the future.

The only significant credibility issue in the pivotal patronage system is whether parties can commit to allocate prizes after they are elected. This is readily resolved by a simple reputation argument which we now model in terms of an infinitely repeated game with a simple trigger strategy. Provided that the party has allocated the prize in previous periods, groups of voters compete for the prize at the next election. If the party ever fails to allocate the prize then the voters infer it will never do so in the future. Once this occurs the incentive to vote for the patronage party in order to win the prize evaporates.

We formally model this reputational argument in an infinity repeated framework. In each period an election between A and B occurs. If elected, then party A must choose whether to allocate the prize according to the promised allocation rule (at cost Θ), or keep the prize for itself. Suppose the value of office holding for party A is Ψ. All players have a common discount factor δ. Each voter's individual assessment of the government, ε_i, is redrawn in each period[4].

Party A maintains credibility via a simple trigger strategy. If party A fails to

[4]This assumption is for techncal convenience. Alternatively, we might assume that the voter's individual assessments are fixed across periods.

allocate the prize according to the simple contingent prize allocation rule, then in all future periods the voters behave as if the party will never again allocate the prize. For party A, if it has ever failed to allocate the prize in the past, then it should keep the prize. However, if party A allocated the prize in every previous period, then A should allocate the prize according to the rule.

Proposition 3: Provided that $\Theta \leq \frac{(\rho_H - \rho_D)}{1-\delta+\delta\rho_H}\Psi\delta$ where $\rho_D = \sum_{i=(3n+1)/2}^{3n} \frac{3n!}{(3n-i)!i!} q^i (1-q)^{3n-i}$ and $q = F(\alpha)$ and ρ_H is the probability that party A is elected as characterized in propositions 1 and 2, there is a sub-game perfect equilibrium in which party A allocates the prize according to the contingent prize allocation rule provided that it has allocated the prize in every previous period in which it was elected and never allocates the prize if it has ever previously retained the prize.

Proof: Let H indicate any history in which party A has always allocated the prize. Let D indicates any path of play in which party A has ever retained the prize. Given the voters' strategy we calculate the expected payoff of playing the game for party A (Z_H). If A has always allocated the prize then in the current period it is elected with probability ρ_H, gains the office holding benefit less the value of the prize and starts the next period with a history of always allocating the prize (H): $Z_H = \rho_H(\Psi - \Theta) + \delta Z_H$. If A has ever previously retained the prize then it is elected with probability ρ_D and retains the prize if elected: $Z_D = \rho_D \Psi + \delta Z_D$. Therefore party A's continuation values are $Z_H = \frac{\rho_H(\Psi-\Theta)}{1-\delta}$ and $Z_D = \frac{\rho_D \Psi}{1-\delta}$. If the history is D then party A should always retain the prize because it is costly to give the prize and it does not influence subsequent elections. Suppose the history is H. If, when elected, A allocates the prize then its expected payoff is $(\Psi - \Theta) + \delta Z_H$. If, alternatively, A retains the prize then its payoff is $\Psi + \delta Z_D$. Hence if $\Theta \leq \frac{(\rho_H - \rho_D)}{1-\delta+\delta\rho_H}\Psi\delta$ then A prefers to allocate the prize.

Next consider the voters' strategy. If the history is D, then party A never allocates the prize in any future period. If A is elected, then voter i receives $\alpha + \varepsilon_i$. If B is elected then voter i receives 0. Therefore voter i supports A iff $\alpha + \varepsilon_i \geq 0$ which occurs with probability $F(\alpha)$. By the binomial theorem A's probability of election is ρ_D given in the proposition.

Suppose the history is H. In this situation party A will allocate the prize if elected. The voters can not change A's history of allocation so they choose a voting strategy to maximize their period by period payoff. Therefore voter i's voting decision is as characterized in proposition 1. QED.

Credibility in the pivotal patronage setting is easily maintained. The contingent prize allocation rule incentivizes the voters to support party A through competition for the prize. Party A allocates the prize provided that $\Theta \leq \frac{(\rho_H - \rho_D)}{1-\delta+\delta\rho_H}\Psi\delta$. By making some simple approximations this expression can be further simplified. Since $\alpha < 0$, the probability that individual voters support A is $q = F(\alpha) < 1/2$. Therefore as the number of voters rises ρ_D becomes close to zero. If we consider the equilibrium in which everyone votes for A (which always exists), then $\rho_H = 1$. This reduces the threshold for party A to credibly allocate the prize to $\Theta < \Psi\delta$, that is provided the discounted value of office holding is greater than the value of retaining the prize, then party A can credibly promise to hand out the prize.

As long as party A values long run office holding, pivot patronage has no credibility problems. The party does not need to identify the votes of individual voters and reward each of them accordingly. Offering a prize to the precinct which offers the greatest level of support incentivizes the voters to support A. So long as the patronage party is not so impatient that it is willing to sacrifice its future electability to steal the prize in the current period (and there might also be strong legal restrictions which limit this theft), credibility is maintained.

POLICY CHOICE

Patronage parties are generally perceived as pernicious (Stokes 2007). They offer policies detrimental to the well-being of the average voter. Pivotal patronage encourages higher tax rates, fewer public goods and a greater focus on prizes than would a traditional quid pro quo patronage system. Our discussion of taxation and policy choice is based on a formal analysis in the appendix.

That pivotal patronage encourages large prizes is best seen by comparing the marginal returns on increasing the size of the prize in terms of the voting calculus under non-contingent and contingent prize allocation rules. As derived earlier, under a non-contingent rule voter i supports party A if $\alpha + \varepsilon_i + \Theta/3 \geq 0$. Under the contingent rule voter i's calculus is given by equation 3, which is conveniently rewritten as vote for A if $(\alpha + \varepsilon_i) + \frac{PP}{OP}\Theta \geq 0$. In both calculations, increasing public goods improves the value of having A elected, that is it increases α. Taxes have the opposite effect on the value of party A, they decrease α. These effects are common to both contingent and non-contingent rules. However, the rules differ greatly with regard to the marginal value of increasing the size of the prize.

In the non-contingent case, the marginal value of increasing the size of the prize is 1/3. In contrast the marginal value of prizes in the contingent case is $\frac{PP}{OP}$. Since by proposition 2, $\frac{PP}{OP} > 1/3$, relative to the non-contingent case, a pivotal patronage party wants to increase the size of the prize at the expense of decreased public goods and increased taxes.

A contingent prize allocation rule encourages voters to compete for the prize. Pivotal patronage parties intensify competition for the prize by increasing the size of the prize. To finance this increased prize the patronage party cuts back on public goods expenditure and increases taxes. Patronage parties attract voters, not by offering attractive policies, but rather by incentivizing voters to compete for the prizes they do offer. High taxes and low public goods make the receipt of the prize even more valuable to voters. This further intensifies the competition to receive prizes and encourages precincts to be even more supportive of the patronage party.[5]

In light of these predictions, it is small wonder why the Tammany leader George Washington Plunket ran around New York offering clothing, comfort and shelter to fire victims in strongly democratic neighborhoods rather than implementing the building and fire code standards that would prevent fires in the first place (Allen 1993, Ch. 6; Riordon 1995).

CONCLUSION

Pivotal patronage explains how parties can incentivize voters to support them by offering to reward those groups which provide the greatest level of political support. Given such an incentive scheme, the voters support the party, not because they like its policies, but because they want to win the prize for their group. Voters can be pivotal in two senses. They can determine the outcome of the election – outcome pivotal–and they can alter the distribution of political rewards–prize pivotal. In large electorates, each voter's influence on the outcome of the election is miniscule. But not so with regard to the allocation of the prize. Given that the prize incentive dominates the incentive to influence which party wins, voters will vote for parties whose policies harm their welfare. Further the desire to win the prize motivates people to vote even though who will win the election is a forgone conclusion.

The basic model presented assumes a simple electoral setting between two parties, only one of which uses a patronage strategy. Additionally we mainly address the symmetric case. While a huge simplification, the model offers powerful insights into why voters turnout and why they will support parties that offer policies contrary

[5] Padro-i-Miquel (2004) makes a related argument regarding economic and ethnic groups in dictatorships.

to their interests. The model also offers the possibility of many extensions, some of which we have illustrated, to consider more complex electoral settings and multiple strategic parties. We believe such analyses will shed light on the endogenous formation of political groupings.

Pivotal patronage works when parties observe the electoral support of groups and target rewards to those groups which are most supportive. We have focused on geographical precincts because this is a common way in which voters are partitioned into groups. Yet, in the theory there is nothing special about this partition. All that really matters is that parties observe votes by groups and can target rewards to those groups. The pivotal patronage system fails if the technology of policy provision makes it difficult to target rewards to groups. The increasing complexity and scale of public policy projects has led to increasing professionalization and the requirement of talented and trained civil servants rather than just party loyalists. These technological changes can constrain the ability of parties to target rewards to certain groups. The prevalence of patronage changes as the types of goods and services which government provides changes.

Voting technology also affects whether patronage can flourish or not. The Australian, or secret ballot, limits the extent to which parties can directly exchange favors for votes. Pivotal patronage can also be restricted by voting technology. The contingent prize allocation rule incentivizes voters to support a patronage party in the hope of winning a prize for their group. Chandra (2004), Hale (2007) and Levitsky (2007) all report that parties use the counting of votes at subdistrict level to measure electoral support. In the context of geographical grouping, pivotal patronage is eliminated if votes are counted at the district level and not the precinct level. If the ballot boxes from all precincts are taken to a central district level office and votes from all the precincts are counted together, then the contingent prize allocation rule can not be used. This suggests both an experiment to test the pivotal patronage argument and a public policy fix. If the votes were aggregated at a larger district in some randomly chosen cities or provinces in a patronage prone nation, then we should expected differences in the policies and politics between areas where vote totals are disaggregate and places where they are not.

APPENDIX

In the main text we claimed that a party that uses a contingent prize allocation rule taxes more and produce more prizes and fewer public goods than a party that does not condition the allocation of benefits on electoral support. Here we demonstrate these claims using a simple model of policy choice. We focus on the case of three precincts, each with three voters. We also examine an asymmetric equilibrium in which party A only ever gives rewards to districts 1 or 2. This asymmetric case allows us to show that the logic of the argument is not restricted to the symmetric case. The analysis is very similar for the symmetric case.

Party A proposes tax rate t and an allocation of public goods, g, and local public goods or prizes Θ under different prize allocation rules. The cost of public goods is θ and the cost of prizes is normalized to 1. The voters' utility for public goods is $u(g)$ where $u' > 0$ and $u'' \leq 0$. Suppose the precincts are heterogenous in wealth. In particular let ω represent the level of income inequality. The rich voters in precinct 3 have $y(1+2\omega)$ income. The poor voters in precincts 1 and 2 have income $y(1-\omega)$. Average income is y. Since people try to avoid taxes, we assume the revenue earned from taxing a unit of income at a tax rate of t is $(t-\varsigma t^2)$. Party A's budget constraint is $(t-\varsigma t^2)y(3(1+2\omega)+6(1-\omega)) = K + \Theta + \theta g$ where K is the cost of running a patronage party.

Under the non-contingent prize allocation rule, precincts 1 and 2 have an even chance (or equal share) of receiving the local public goods. Under the tax system a voter in district 1 or 2 gets $(1-\omega)y(1-t)+\alpha+u(g)+\frac{\Theta}{2}+\varepsilon_i$ benefits from party A.

Assume party B does not tax and spend so that under B, a poor voter's rewards are $y(1-\omega)$. The net benefit of party A relative to party B for a voter in precincts 1 or 2 is $-t(1-\omega)y+\alpha+u(g)+\frac{\Theta}{2}+\varepsilon_i$. Hence these voters support A with probability $p=F(-t(1-\omega)y+\alpha+u(g)+\frac{\Theta}{2})$. In precinct 3 the probability of voting for A is $F(-t(1+\omega)y+\alpha+u(g))$ which to simplify the exposition we shall assume to be zero. Given that A needs 5 of the 6 votes in precincts 1 and 2, its probability of winning office is $\rho=\sum_{i=5}^{6}\frac{6!}{i!(6-i)!}p^i(1-p)^{6-i}=p^5\,(6-5p)$. This is maximized by maximizing p. Therefore, under the non-contingent prize allocation rule, A's objective is to maximize $-ty(1-\omega)+\alpha+u(g)+\frac{\Theta}{2}$ subject to the budget constraint. The appropriate Lagrangian is $L=-ty(1-\omega)+\alpha+u(g)+\frac{\Theta}{2}+\lambda((t-\varsigma t^2)y(3(1+2\omega)+6(1-\omega))-K-\Theta-\theta g)$. The first order conditions imply $\lambda=\frac{1}{2}$, $u'(g)=\frac{\theta}{2}$ and $t=\frac{1}{18\varsigma}(2\omega+7)$. Label these optimal policies g^*,Θ^* and t^*.

Under the contingent prize allocation rule, party A gives the prize to either precinct 1 or 2 depending upon which provides the most votes. To define pivotalness, consider voter m from precinct 1 when there are i A votes in precinct 1 and j A votes in precinct 2. If m votes A then precinct 1's expected probability of receiving the prize is $Q''_A(i,j)=\begin{cases}1 & if \quad i\geq j \text{ and } i+j\geq 4\\ 1/2 & if \quad i+1=j \text{ and } i+j\geq 4\end{cases}$. If m supports B then precinct 1's expected probability of receiving the prize is $Q''_B(i,j)=\begin{cases}1 & if \quad i>j \text{ and } i+j\geq 5\\ 1/2 & if \quad i=j \text{ and } i+j\geq 5\end{cases}$. Given that each voter in 1 and 2 supports A with probability p, the definitions of outcome and prize pivot are analogous to earlier definitions:

$$OP''=\sum_{i=0}^{2}\sum_{j=0}^{3}\frac{2!}{i!(2-i)!}p^i(1-p)^{2-i}\frac{3!}{j!(3-j)!}p^j(1-p)^{3-j}1_{i+j=4}=5(1-p)p^4 \quad (4)$$

$$PP'' = \sum_{i=0}^{2}\sum_{j=0}^{3}\frac{2!}{i!(2-i)!}p^i(1-p)^{2-i}\frac{3!}{j!(3-j)!}p^j(1-p)^{3-j}(Q_A''(i,j)-Q_B''(i,j)) = \frac{1}{2}(6-5p)p^4 \tag{5}$$

Under the contingent prize allocation rule voters in 1 and 2 support party A provided that $OP''(-t(1-\omega)y+\alpha+u(g)+\varepsilon_i)+PP''\Theta \geq 0$, which occurs with probability $p = F(-t(1-\omega)y+\alpha+u(g)+\frac{PP''}{OP''}\Theta)$. Therefore to maximize election to office, party A's objective reduces to maximize $-t(1-\omega)y+\alpha+u(g)+\frac{PP''}{OP''}\Theta$ subject to the budget constraint. The appropriate Lagrangian is $L = -t(1-\omega)y+\alpha+u(g)+\frac{PP''}{OP''}\Theta + \lambda((t-\varsigma t^2)y(3(1+2\omega)+6(1-\omega)) - K - \Theta - \theta g)$. The first order conditions imply $\lambda = \frac{PP''}{OP''}$, $u'(g) = \frac{PP''}{OP''}\theta$ and $t = \frac{1}{2\varsigma} - \frac{(1-\omega)}{18\varsigma}\frac{OP''}{PP''}$. Label the optimal policies under the contingent prize allocation rule as g^{**}, Θ^{**} and t^{**}. For all p, $\frac{PP''}{OP''} \geq 3/5$. Therefore, comparisons with optimal policies under the non-contingent allocation rule show that $t^{**} > t^*$ and $\frac{\Theta^{**}}{g^{**}} > \frac{\Theta^*}{g^*}$.

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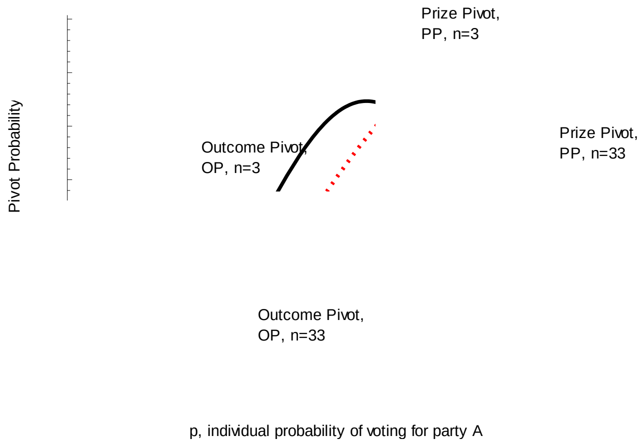

Figure 1: Outcome Pivot and Prize Pivot

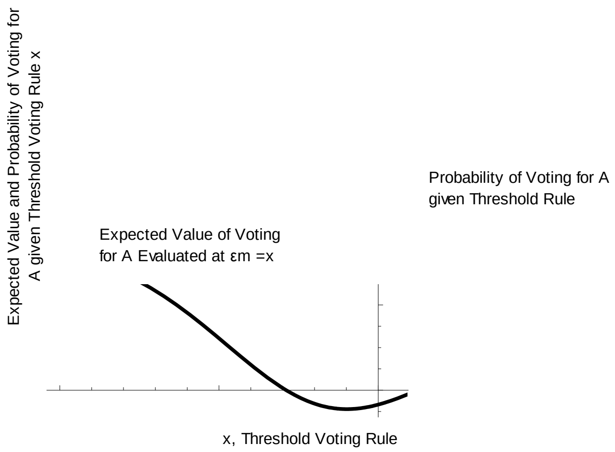

Figure 2: Individual Voting Incentives

Table 1: Contributions to Prize and Outcome Pivots.

Row	Votes for A in districts 1, 2 and 3	Probability of this circumstance	Expected share of prize- Vote for A $Q_A(i,j,k)$	Expecte V Q
1	2,3,3	$p^2p^3p^3$	$\frac{1}{3}$	
2	2,2,2	$p^2 3p^2(1-p)3p^2(1-p)$	1	
3	1.2,1	$2p(1-p)3p^2(1-p)3p(1-p)^2$	$\frac{1}{2}$	
4	1,3,0	$2p(1-p)p^3(1-p)^3$	0	