An Informational Theory of Electoral Targeting: Evidence from Senegal*

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Abstract

To explain the puzzle of why parties target "core" supporters and reconcile existing theories with contradictory empirics that show significant vote switching, we propose and test a theory of *group*-level targeting driven by new incumbents learning about groups' capacity to coordinate votes. Unlike current theories, ours assumes that most groups are nonpartisan and respond to prior transfers as a function of their latent coordinating capacity. The targeting of "core" supporters and significant vote switching can thus be explained by new incumbents learning from local vote tallies about such capacity and refining targeting strategies over time to maximize the support of targeted groups. We test our theory's predictions using the case of Senegal. Interviews with politicians validate assumptions about new incumbents' informational disadvantage and potential to learn from local vote tallies, while village-level electoral and local public goods data confirm predicted patterns of targeting, both across groups and over time.

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1 Introduction

The literature on clientelism has focused on explaining patterns of apparent party favoritism – why politicians target partisan ("core") (Cox and McCubbins, 1986) or nonpartisan ("swing") (Dixit and Londregan, 1996; Lindbeck and Weibull, 1987) supporters.[1] A key puzzle motivating many such studies is why parties would ever devote resources to core voters who would support them even in the absence of transfers.[2] In new democracies, voter partisanship – party attachment motivated by ideological beliefs or ascriptive identity – is less likely, as evidenced by the lack of distinct party platforms and high levels of vote switching.[3] If voters do not support parties for ideological reasons (i.e., due to partisanship), what then explains differential patterns of electoral targeting over space and time? We offer a *group*-level theory of targeting in which, while most groups of voters are nonpartisan, a group's latent potential to coordinate votes (and politicians' information about such potential) explain the apparent favoritism observed in the data.

Coordinating votes is an appealing strategy when transfers are targeted at the group level and parties seek to maximize electoral returns through selective targeting with a limited budget. Variation in groups' *coordinating capacity* in response to transfers may either reflect their members' ability to self-organize (Rueda, 2014; Smith and Bueno De Mesquita, 2012) or local brokers' effectiveness in organizing them (Larreguy, 2013; Larreguy, Marshall and Querubin, forthcoming; Stokes et al., 2013). Parties want to target groups they believe to have greater coordinating capacity, but they may have imperfect and asymmetric information about such capacity. In particular, as we show for the case of Senegal, outgoing incumbents might have more accurate information than newly elected officials. However, since groups' electoral responses to past transfers is reflected in local vote tallies, new incumbents can

[1] Partisanship is generally measured *ex post* using electoral support after clientelistic exchanges have taken place.

[2] Nichter (2008), for example, argues that parties buy partisans' turnout. Stokes et al. (2013) propose a broker-mediated model of clientelism in which brokers target resources to core supporters to signal competence to party leaders, while Diaz-Cayeros, Estévez and Magaloni (2012) argue that this strategy is used to prevent supporters from becoming swing voters.

[3] We see strong evidence of this in the case of Senegal, where party switching is rampant (Resnick, 2013).

learn about the coordinating capacity of each group to make future transfers more efficient. In equilibrium, apparently core supporters are targeted not because of their partisanship, but because candidates have learned they have a high coordinating capacity and otherwise would behave as swing voters, thus demystifying the puzzle. While this prediction is also delivered by existing theories, as we explain in detail later, a key advantage of our theory is its ability to explain other patterns of targeting and electoral support across space and over time that other theories cannot.

While our informational theory of electoral targeting is general, it has most testable predictions when applied to contexts where new incumbents who gain access to targetable resources lack information about each group's coordinating capacity but are able to learn about it. Moreover, our theory is further testable when the new incumbent is better able to learn about such capacity among certain groups than others. Senegal, a democracy in which clientelistic targeting of village-level goods is common (Koter, 2013*a*; O'Brien, 1975), is thus a perfect case to test our theory for two reasons. First, there are two periods in which a new party with an informational disadvantage due to fewer opportunities to learn comes to power (2000 and 2012). Second, some villages house polling stations (and thus their electoral outcomes can be precisely observed), while others do not. Our quantitative data from the period following the 2000 elections allow us to study the subsequent targeting of local public goods, while our qualitative data collected after the 2012 election allows us to examine the informational disadvantage of the new incumbent. A second election (2007) over the period for which we have outcome data (2000-2009) allows us to further investigate our theory's predictions about the over-time changes in targeting – and ensuing electoral support – by observing differences in local public goods allocation when the new incumbent learns from two elections rather than just one.

Our theory incorporates three distinctive features. First, we challenge the key assumption underlying much of the literature on electoral targeting that predetermined partisanship drives the behavior of a significant share of voters. There is little room for partisanship in clientelistic contexts like Senegal, where only about 10% of bloc voting villages remain loyal bloc voters over time.[4] These high levels of vote switching suggest that electoral support is driven by personalistic relationships rather than programmatic ideals. We instead assume that most voters are nonpartisan; we endogenize groups' electoral support by allowing it to be a function of coordinating capacity and prior group-level transfers.[5] This focus on *collective* rather than individual transfers is consistent with both (1) the fact that most electoral targeting in Senegal takes place at the village level and (2) the literature that argues the monitoring problem posed by individual-level vote buying is solved when transfers are awarded at the lowest level at which electoral outcomes are observable (Chandra, 2007; Larreguy, 2013; Rueda, 2014; Schedler and Schaffer, 2007; Smith and Bueno De Mesquita, 2012; Rojo, Jha and Wibbels, 2015; Weghorst and Lindberg, 2013). A second, related feature of our theory is that villages naturally vary in their coordinating capacities. Prior studies of Senegal indicate that this variation is likely driven by the relative influence of local brokers (Beck, 2008; Boone, 2003; Gottlieb, 2015), but our predictions do not depend on identifying the source of variation.

A third distinctive feature of our theory is that, as our qualitative data highlights, politicians may have imperfect and asymmetric information about a village's coordinating capacity, which they can overcome by learning from electoral outcomes. In particular, new incumbents might be informationally disadvantaged relative to outgoing incumbents, who learned valuable conceivably idiosyncratic and unobservable information about groups from their responses to electoral transfers while in office.

The first prediction of our theory is that incumbent parties are more likely to target transfers to groups that voted for them – not because they are core partisans, but because incumbents are most certain that these groups have a high coordinating capacity. While this prediction is consistent with existing theories, ours delivers a host of predictions that

[4] In the empirical analysis, we consider that a village coordinates its vote for p if at least 66.66% of votes in the resident polling station are for p; otherwise, we consider the village *split*.

[5] Stokes et al. (2013) discuss and reject a model endogenizing individual-level (rather than group) loyalty.

other theories are largely at odds with or silent about. First, it provides distinct predictions about the relative targeting of mixed and opposition support groups, and how such targeting varies over time due to differential candidate learning about their coordinating capacities. Importantly, predictions regarding the dynamics of targeting account for the (thus far unexplained by other theories of electoral targeting) phenomena of groups switching their support from one party to another between elections. Second, our theory predicts that villages with polling stations are more likely to be targeted, since it is much easier to learn about their coordinating capacity (Larreguy, 2013) – a prediction that cannot be derived from existing theories, in which the observability of local vote tallies is irrelevant for subsequent targeting.

We corroborated our theory's assumptions by interviewing 48 current local Senegalese politicians. First, we show that the outgoing incumbent in 2012 had an informational advantage over challengers by comparing the ability of local politicians from each party to accurately report village-level vote returns from the most recent presidential election. Second, we demonstrate that incumbents learn more about villages with polling stations than those without. To that end, we show that the share of polling station voters that do not reside in the village housing the polling station is very small and, as a result, politicians are more likely to attribute voting behavior to voters who live in the village with the polling station than to neighboring villagers who also vote there. Third, we use confidence in guesses of village-level vote returns across parties and villages with and without polling stations to conclude that learning about electoral behavior from vote tallies is indeed more likely to occur within the incoming incumbent party than the outgoing incumbent party.

We test the theory's predictions by examining the change in a village's stock of targetable government-provided goods (henceforth, local public goods) over the first decade of the new incumbent's mandate (2000-2009). Our results are consistent with the theory's predictions. Notably, our findings reflect the power of our theory to account for patterns in the data that are inconsistent with existing theories, such as incumbents targeting villages that bloc voted for the opposition in the previous election, and these villages switching their vote *en masse* as a result. Moreover, the greater likelihood of targeting goods to villages with polling stations indicates the value of learning about coordinating capacity, which our theory distinctively highlights. Because non-random assignment to polling stations could confound our estimates of such differential targeting, we flexibly control for socio-demographics that correlate with polling station assignment. Our results are also robust to an instrumental variable (IV) analysis, which uses distinctive features of the polling station allocation process to predict assignment to villages; a placebo exercise further dismisses endogeneity concerns.

Despite some apparently strong simplifying assumptions in the formalization of our theory – and some special features of the Senegalese case that allow us to test its distinctive predictions – the patterns of electoral targeting predicted by our theory apply to any clientelistic context in which (1) groups have incentives to coordinate their vote and (2) politicians can observe group-level electoral behavior and thus learn about their coordinating capacity. As we explain later, most of our simplifying assumptions are made to highlight the mechanism of our theory and can be easily relaxed at the cost of a more complex characterization of our intuitive results. Moreover, even in contexts where candidates are fully informed about groups' coordinating capacities, which prevents testing the dynamic predictions of our theory that follow from new incumbents' learning, targeting should still be explained by variation in such capacities.

Our theoretical model, together with the qualitative evidence that supports its assumptions and the quantitative evidence that supports its predictions, contributes to our understanding of how political parties in clientelistic democracies target groups of voters. We thus demonstrate the utility of incorporating two new elements into the study of clientelistic targeting – the coordinating capacity of targetable groups and politicians' information about this construct. These parameters are largely absent from existing explanations of how and why clientelistic parties target apparently core or swing voters, in part because the assumption that predetermined partisanship drives electoral support makes coordinating capacity irrelevant.[6]

Our focus on aggregate targeting further allows us to look at many more moments of the data (as opposed to restricting whether *ex post* measures of electoral behavior indicate whether an individual is a core or swing voter), which highlight clear inconsistencies between the data and existing theories of electoral targeting. For example, data from Senegal suggest that about a tenth of all villages switch from bloc voting for one party to voting as a group for another party in the following election. Further, about a quarter of villages switch from bloc voting for one party in one election to splitting their vote among parties in the next. While these patterns are largely unexplained by theories that assume that predetermined partisanship drives electoral support, our theory accounts for them since villages with a high coordinating capacity might bloc vote for one party or split their vote between two parties, depending on the transfers they receive.

2 Clientelism in Senegal

The importance of modeling variation in coordinating capacity is partly inspired by the Senegalese context, where communities tend to have strong hierarchical ties to local leaders – often of traditional or religious significance (Beck, 2008; Boone, 2003; O'Brien, 1975) – with varying degrees of influence over voters (Gottlieb, 2015). Koter (2013*a*) argues that the preponderance of local elites with such ties to their communities makes clientelism via local intermediaries, or brokers, a more attractive electoral mobilization strategy than mass-based ethnic appeals. As such, the lessons of this study may be more applicable to countries where ethnic appeals are not the primary strategy of voter mobilization.

We focus on the provision of local public goods; rural Senegal makes such a strategy

[6] Stokes et al. (2013) is an important exception, but our theoretical model contributes a new, dynamic feature of the data. While brokers would want to signal competence by targeting partisan supporters in a single period, there is no advantage to continuing this behavior unless broker type is fluid – in which case, signaling their competence is less relevant. In our case, parties continue to target areas with apparent core supporters precisely because they have learned that these groups have high coordinating capacity and would otherwise be swing voters.

particularly attractive, given its "tight social structure, cohesion and the prominent role of local patrons" (Koter, 2013*b*) and the availability of polling station-level electoral data. In contexts such as ours where local leaders organize communities with observable electoral outcomes and with a rural geography that makes collective goods excludable, the targeting of local public goods to groups of voters is more cost-effective than providing private goods to individuals. While our model and findings are most applicable to rural contexts where goods are excludable, our theory may travel to certain urban settings (Nathan, 2015).

2.1 Presidential elections of 2000 and 2012

The informational theory of electoral targeting we develop in the next section has the most testable implications when applied to a context in which there is room for learning – where a new party has been elected to executive office, and electoral outcomes are observable at low levels of aggregation. The 2000 and 2012 presidential elections offer such a setting because the incumbent lost in each election, the incoming party held executive office for the first time, and reliable local-level electoral figures became available in 2000.

The 2000 elections saw the first alternation in political parties in the nation's history – from the Socialist Party (PS) that had ruled since the country's independence in 1960 to Abdoulaye Wade's Social Democrat Party (PDS). While party competition was legalized earlier, there was little opportunity for the opposition to learn about electoral behavior prior to 2000. Until 1991, "the administration controlled the entire electoral process, discouraged the secret ballot, and excluded representatives of opposition parties from verifying the vote tally" (Gellar, 2005, p. 81). While ballots were counted at each polling station and posted publicly (Schaffer, 1998) in the 1993 elections, the opposition "continued to cry fraud, refused to accredit the official results, and called for the establishment of an independent national election commission" (Gellar, 2005, p. 82).

In 2012 a candidate from a new party (Macky Sall) was also elected president after his predecessor served a relatively long term. Sall had created a party – the Alliance for the Republic (APR) – after being removed from his position as Wade's prime minister. The lessons derived from our analysis of interviews with local politicians in 2015 can thus reasonably inform the informational landscape in the 2000-2009 period, when Wade's PDS was considered the incoming incumbent and the PS was the outgoing party.

2.2 Outgoing incumbent's informational advantage

In our model, both the incumbent and challenger have a budget for clientelistic transfers,[7] but the incumbent has an informational advantage. We validate this in the current electoral climate in Senegal by examining the ability of 48 local politicians (PDS and APR partisans from 12 communes) to accurately report vote shares in 10 villages from their jurisdiction in the summer of 2015.[8] We find a significant difference in parties' ability to accurately report village-level electoral results in the first round of the 2012 presidential election. Looking at the absolute difference between actual vote shares and those reported by supporters, reported vote shares of the outgoing incumbent (Wade) are, on average, 5 percentage points more accurate than those of the incoming incumbent (Sall). Furthermore, when asked if the polling station results informed the party about a village's electoral support, 72% of Sall's supporters agreed, compared to 57% of Wade's supporters, which is consistent with higher levels of learning within the incoming party.

2.3 Learning by the new incumbent in polling-station villages

Our theory exploits information asymmetries not only between outgoing and incoming incumbents, but also across villages in which election outcomes are more or less observable. The evidence suggests that polling station results serve as a strong indicator of the voting behavior in the one-third of Senegal's rural villages that house polling stations, and a much weaker signal of the voting behavior of the surrounding villages. All members of a village

[7] In our interview data, both parties mentioned distributing collective goods to villages.

[8] See Appendix B for sampling details.

with a polling station vote in that village, while villages without a polling station split their vote across several different polling stations (median = 4). Consistently, politicians perceive the village to constitute a majority of voters in the polling station: 64% of respondents said that the vote total in a polling station reliably indicates the electoral support of the village in which it is located.[9] Our data confirm this is reasonable since in the median polling station, about 80% of voters reside in the host village.

We provide additional evidence for our model assumptions that 1) learning from vote tallies occurs among villages that host a polling station and 2) this learning only accrues to the new incumbent. To compare levels of politician information about electoral behavior across polling stations and non-polling stations, we examine the self-reported confidence levels (on a scale of 1 to 4) of our 48 interviewed politicians when making 20 discrete vote share guesses for the aforementioned list of villages – 10 with polling stations and 10 without polling stations.[10] We regress the confidence level of each unique village vote share guess on the interaction between polling station status and incumbent status.[11]

Figure 1 shows that politicians are generally more confident in predicting electoral outcomes in polling station villages than in non-polling station villages. However, the confidence gap across polling station status is significantly larger among supporters of the incoming incumbent (Sall) than among supporters of the outgoing incumbent (Wade), suggesting that newly elected officials have the greatest opportunity to learn about a village's electoral behavior. While we would not expect the incoming incumbent to be more informed about polling station outcomes than the outgoing incumbent, we know from our data that Sall supporters are relatively overconfident because they are worse at reporting correct outcomes than Wade supporters.

[9] As one politician explains, "Generally, the politician in analyzing the results doesn't integrate into his reflection all the villages that vote at the polling station but only the village that houses it (I agree that this is a failure, but it is so)" (Commune 12, Respondent S2).

[10] While confidence levels remain a proxy for actual guessing ability, reported confidence levels for round 2 guesses are significantly correlated with correct guesses (in the polling station villages) at 0.14 for Sall supporters and 0.16 for Wade supporters.

[11] We control for list order, which was randomly assigned; standard errors are clustered by politician.

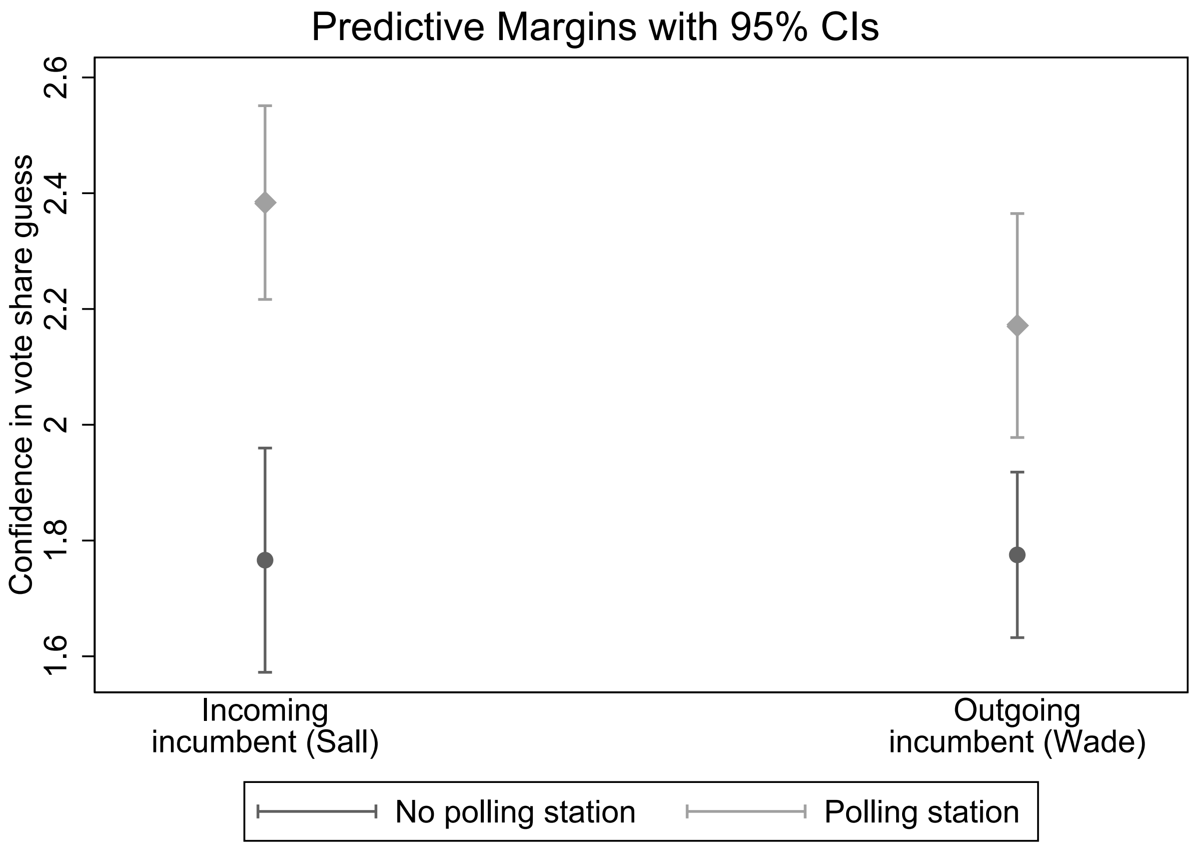

Figure 1: Predicted marginal effects of incumbent and polling station status on knowledge of electoral behavior

3 An informational model of electoral targeting

We develop a stylized model to illustrate new incumbent parties' learning about the partisanship and coordinating capacity of their electoral constituencies and subsequent allocation of targetable goods based on this information. We adopt several simplifying assumptions and a reduced-form approach for the building blocks of the model, which we avoid microfounding, to ease exposition and highlight the main drivers of the model's implications.

3.1 Agents and Actions

Consider a model of two parties (A, initially the incumbent, and B), which compete for the votes of individuals equally distributed among N villages, and allocate potentially different budgets of targetable goods $G_t^p < N$ for $p = A, B$, where $t = 1, 2$ indicates election time.[12] Targetable goods are discrete, and parties can allocate each village up to one at time t, $g_{t,i}^p \in \{0, 1\}$ for $p = A, B$, $t = 1, 2$, and all villages i.

Individuals cast their vote in such a way that the village's aggregate vote v can be of three types: A, B, or split, $v \in \{A, B, split\}$. While when $v = p$, all individuals in a village (possibly coordinate their) vote for party p, when $v = split$, they split their vote equally between both parties. This characterization of village voting outcomes abstracts from turnout considerations, but we show in Appendix F how a simple extension of the model that incorporates turnout delivers the same predictions.[13]

Villages differ according to whether electoral outcomes are observable: those with observable electoral outcomes are of type κ^O; otherwise, they are of type κ^{NO}. This apparently strong characterization reflects qualitative evidence suggesting that polling station-level election results more accurately indicate the voting behavior of the village that hosts the polling station. However, the model can be easily extended to allow the electoral outcomes of all groups to be somewhat observable; as long as observability varies across groups, the predic-

[12] The results of the model are unchanged if parties instead compete for office.

[13] Results are also not conditioned by whether our empirical specifications account for turnout considerations.

tions remain unchanged. The population shares of villages κ^O and κ^{NO} are, respectively, π^O and $\pi^{NO} = 1 - \pi^O$.

Voters are grouped into two types of villages based on their sensitivity to transfers, $\theta \in \left\{\theta^p, \theta^0\right\}$, which can be thought of as exogenous supporters and potential endogenous supporters, respectively. In the absence of targetable goods, in θ^p villages everybody supports party p, $v = p$, and in θ^0 villages individuals split their vote between the two parties, $v = split$. We refer to this parameter as partisanship, where party attachment may be motivated by ideological beliefs or ascriptive identity, as we further discuss below. The experienced incumbent A knows the partisanship of all villages, but B only knows the identity of the θ^B villages. Thus, B is unable to distinguish between θ^A and θ^0 villages. A's informational advantage can be thought of as originating from learning over time while in office. Importantly, we can relax the assumption that B has no knowledge about the identity of θ^A villages. The predictions of the model are unchanged as long as B's knowledge is less than A's. The population shares of villages θ^A, θ^B, and θ^0 are μ^A, μ^B, and $\mu^0 = 1 - \mu^A - \mu^B$, respectively. Consistent with our strategy to develop a model in which electoral support is largely endogenous and not given by exogenous partisanship, we assume that μ^A and μ^B are extremely small.

The empirical context we consider provides many natural interpretations of θ^A villages and A's differential knowledge about their identity. These could, for example, be places that idiosyncratically develop a strong allegiance to an incumbent in power longer than 20 years – villages where a particularistic relationship with a party leader yields unusually strong ties, or where the incumbent has coethnics who would vote for him even in the absence of targeted goods, which we will use to test some model predictions. Importantly, this last potential interpretation of θ^A does not imply that all votes for coethnics reflect exogenous partisanship. On the contrary, as we discuss in the conclusion, our model can account for the possibility that the majority of coethnic voting is endogenous. Justifying the existence of θ^B villages is not as straightforward, but none of the results of the model depends on them, and setting μ^B to zero only simplifies the model characterization.

Whether θ^0 villages can be persuaded to fully support a party through the targeting of goods depends on their coordinating capacity. While we do not explicitly model voter strategies, we implicitly assume for consistency with our case that bloc voting is conditioned by the presence of brokers (Baldwin, 2013; Larreguy, 2013; Larreguy, Marshall and Querubin, forthcoming; Stokes et al., 2013). However, our model's predictions are not conditional on the source of variation in coordinating capacity. For simplicity, we group villages into types $\eta \in \left\{\eta^l, \eta^h\right\}$. While η^H villages have a high coordinating capacity, which allows them to switch from splitting their vote to fully supporting p when they are targeted with a good by p, η^L villages have low and insufficient coordinating capacity to do so. If a village with a high coordinating capacity is targeted by both parties, it continues to split its vote.

Villages' coordinating capacity is private information only known to the village and the incumbent. Consistent with our qualitative data, we assume A enjoys a strong informational advantage over B, which can also be thought of as originating from learning over time during the incumbent's mandate. For example, past experimentation with villages' electoral responsiveness to transfers gives the incumbent a precise idea of both the partisanship and coordinating capacity of villages. However, our results are unchanged if we assume a weaker informational advantage of the incumbent relative to the opposition both with respect to partisan type and coordinating capacity. Population shares of villages η^H and η^L are, respectively, $\gamma^{H,O}$ and $\gamma^{L,O} = 1 - \gamma^{H,O}$ for the κ^O villages and $\gamma^{H,NO}$ and $\gamma^{L,NO} = 1 - \gamma^{H,NO}$ for the κ^{NO} villages. We assume $\gamma^{H,O} > \gamma^{H,NO}$ to reflect that, as an extension of our model that endogeneizes coordinating capacity, more skilled brokers should move to κ^O villages because monitoring them is easier. Lastly, we assume that θ^p villages do not switch their vote when targeted with a good by any party. We summarize all village-type shares in Figures 2 and 3, where relative size reflects population.

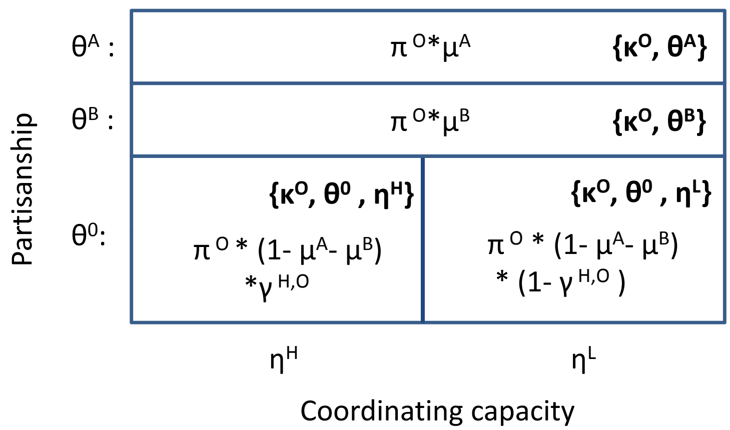

Figure 2: π^O share of villages κ^O in which electoral outcomes are observable. We show the population share of every village type, which is indicated in curly brackets.

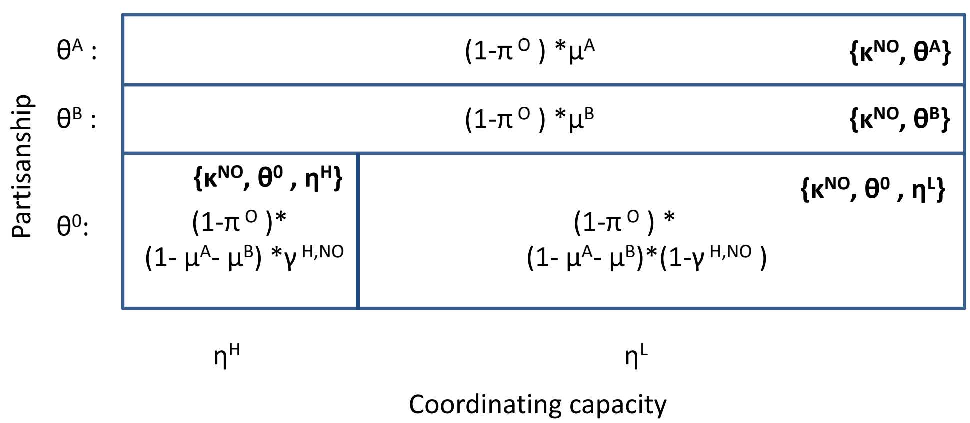

Figure 3: $1-\pi^O$ share of villages κ^{NO} in which electoral outcomes are not observable. We show the population share of every village type, which is indicated in curly brackets.

3.2 Timing and Elections

The timing of the game is as follows:

1. Before the first election, parties A and B *simultaneously* target goods across villages to maximize the votes they receive in the next election and future elections.

2. Individuals cast votes and the election outcome is realized. In the spirit of a probabilistic model, the election outcome is a function of votes v cast for each party and a random component that captures a valence shock that affects all voters equally. Formally, A wins the election if $\chi \sum_{i=1}^{N} v_{i,t} + (1-\chi)\,\delta_t \geq \frac{1}{2}$, where χ captures the weight that partisanship and the targeting of goods have for the election outcome and δ_t is a valence shock toward A that is uniformly distributed in $[0,1]$.

3. Each party observes the election outcomes in κ^O villages but not the targeting of the other party. This apparently strong assumption that the parties cannot observe each others' targeting is unproblematic, since the model results are unchanged as long as we allow for imperfect observability.

4. Regardless of the election outcome, B updates the likelihood that κ^O villages are of $\left\{\theta^0, \eta^H\right\}$ type.

5. Before the second election, A and B *simultaneously* target goods across villages with the same objective as before.

6. Individuals cast votes and the election outcome is realized.

3.3 Characterization

Before characterizing the model results, Table 1 revisits the main parameters of the model.

First election

We start by focusing on the actions of both parties before the first election, which determine village-level electoral outcomes. We then characterize B's updating of the likelihood

Table 1: Description of the main parameters of the model

Parameter	Description
G_t^p	budget of targetable goods for $p = A, B$ and $t = 1, 2$
$v \in \{A, B, split\}$	village's aggregate vote
$\kappa \in \left\{\kappa^O, \kappa^{NO}\right\}$	observability of village's electoral outcomes
π^O	population share of villages κ^O
$1 - \pi^O$	population share of villages κ^{NO}
$\theta \in \left\{\theta^p, \theta^0\right\}$	village's sensitivity to transfers
μ^A	population share of villages θ^A
μ^B	population share of villages θ^B
$1 - \mu^A - \mu^B$	population share of villages θ^0
$\eta \in \left\{\eta^l, \eta^h\right\}$	village's coordinating capacity
$\gamma^{H,O}$	share of villages η^H in the population of villages $\left\{\kappa^O, \theta^0\right\}$
$1 - \gamma^{H,O}$	share of villages η^L in the population of villages $\left\{\kappa^O, \theta^0\right\}$
$\gamma^{H,NO}$	share of villages η^H in the population of villages $\left\{\kappa^{NO}, \theta^0\right\}$
$1 - \gamma^{H,NO}$	share of villages η^L in the population of villages $\left\{\kappa^{NO}, \theta^0\right\}$

that villages with voting behavior $v \in \{A, B, split\}$ are of $\left\{\theta^0, \eta^H\right\}$ type, which we show is central to B's targeting of goods as the incoming incumbent.

While backward induction is often needed to characterize agents' equilibrium strategies in early periods of dynamic games, there is no need in this case, since both parties have clear dominant strategies for the targeting of goods before the first election in our set-up.

Since A has full information about the partisanship and coordinating capacity of all villages, it never targets goods to θ^A and θ^B villages. Individuals in those villages vote on a purely partisan basis (i.e., their vote is unaffected by targeting). Moreover, out of the remaining villages that could be targeted goods – θ^0 villages, the incumbent never targets those with η^L coordinating capacity. A then only targets goods to the share of $\left\{\theta^0, \eta^H\right\}$ villages. Since A is resource constrained, its dominant strategy is to randomly target the share $\left(1-\mu^A-\mu^B\right)\left(\pi^O\gamma^{O,H}+\left(1-\pi^O\right)\gamma^{NO,H}\right)$ of $\left\{\theta^0, \eta^H\right\}$ villages.[14] $\phi^A = \frac{G_t^A}{N\left(1-\mu^A-\mu^B\right)\left(\pi^O\gamma^{O,H}+\left(1-\pi^O\right)\gamma^{NO,H}\right)} < 1$ then determines the probability that A targets a $\left\{\theta^0, \eta^H\right\}$ village.

Contrary to A, B can neither distinguish between θ^A and θ^0 villages, nor η^H and η^L villages within θ^0 villages. B therefore never targets goods to θ^B villages, but cannot avoid targeting some goods to θ^A villages. Within the share of $1-\mu^B$ of θ^A and θ^0 villages, B can further differentiate between κ^O and κ^{NO} villages, which differ in the observability of their electoral outcomes. B's expected electoral return of targeting κ^O villages is larger than that of targeting κ^{NO} villages, since $\gamma^{O,H} > \gamma^{NO,H}$. Moreover, B can only learn about coordinating capacity by investing in κ^O villages where it observes electoral outcomes, which makes B's overall expected electoral return of targeting κ^O villages larger than that of targeting κ^{NO} villages. It is thus optimal for B to target goods to the share $\left(1-\mu^B\right)\pi^O$ of $\left\{\kappa^O, \theta^A\right\}$ and $\left\{\kappa^O, \theta^0\right\}$ villages. Since B is also resource constrained, it then randomly targets goods to share $\phi^B = \frac{G_t^B}{N\left(1-\mu^B\right)\pi^O} < 1$ of $\left\{\kappa^O, \theta^A\right\}$ and $\left\{\kappa^O, \theta^0\right\}$ villages.

[14] Despite the fact that, in equilibrium, A faces no competition from B in $\left\{\kappa^{NO}, \theta^0, \eta^H\right\}$ villages, A is indifferent between targeting $\left\{\kappa^{NO}, \theta^0, \eta^H\right\}$ and $\left\{\kappa^O, \theta^0, \eta^H\right\}$ villages. The electoral return of turning a village from casting $v = split$ to casting $v = A$ is the same as that of turning a village from casting $v = B$ to casting $v = split$

Figure 4 illustrates the optimal targeting by A and B before the first election, which is formalized in Lemma 1 in Section C of the Appendix, and clarifies that parties are only likely to jointly target a village if it is of type $\left\{\kappa^O, \theta^0, \eta^H\right\}$. Thus, among such villages there are four possible scenarios: 1) and 2) with probability $\phi^A\phi^B$ $((1-\phi^A)(1-\phi^B))$, a village is targeted by both (neither) parties and splits it vote; and 3) and 4) with probability $\phi^A(1-\phi^B)$ $((1-\phi^A)\phi^B)$, a village is targeted only by A (B) and votes for A (B).

Given A and B's targeting rules before the first election, and the voting decisions outlined above in the timeline, Lemma 2 in Section C of the Appendix characterizes the equilibrium of the first election. Together with the set-up and Figure 4, it highlights that A's information advantage creates an electoral advantage. While A is able to target goods to $\left\{\theta^0, \eta^H\right\}$ villages, which have the partisanship and coordinating capacity that make them responsive to targeting, B also targets goods to $\left\{\kappa^O, \theta^A\right\}$ and $\left\{\kappa^O, \theta^0, \eta^L\right\}$ villages, with the partisanship and coordinating capacity, respectively, that make them unresponsive to targeting. However, Lemma 2 also indicates that a low valence shock to A leads B to win office. Without a loss of generality, we assume such an equilibrium path to reflect the context of our empirical exercise.

Second election

In the simplest version of the model we consider the case where A continues to exist as the only opposition party. Alternatively, we could add a third party C that enters or replaces A as the opposition. Such an extension is irrelevant for the basic version of the model, since B cannot learn from C's electoral performance in the first election because it does not run.

Outcomes from the first election are not informative to the outgoing incumbent A since it has full information about villages' partisanship and coordinating capacity. Consequently, the optimal targeting strategy for A remains unchanged. On the contrary, B learns from the election outcomes of κ^O villages, which, recall, have observable electoral results. More precisely, among the set of villages of $\left\{\kappa^O, \theta^A\right\}$ and $\left\{\kappa^O, \theta^0\right\}$ type, which are crossed from south-west to north-east in Figure 4, B observes three types of voting outcomes $v \in \{A, B, \mathit{split}\}$

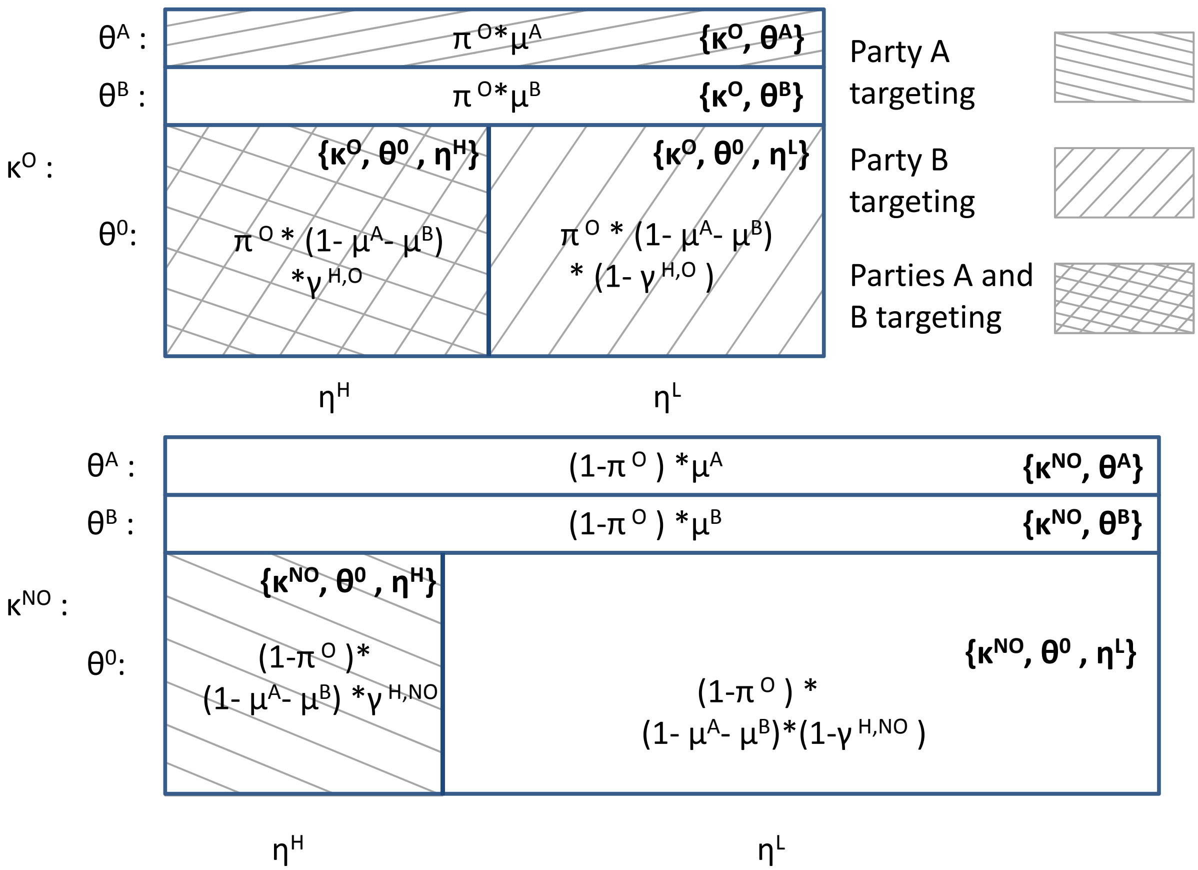

Figure 4: Optimal targeting of village types by parties A and B.

with which it can construct the posterior likelihood that each such village in this set is of type $\left\{\theta^0, \eta^H\right\}$.[15] We denote these probabilities as $\Pr(B)$, $\Pr(A)$ and $\Pr(split)$, respectively, and develop them formally in Lemma 3 in Section C of the Appendix.

Lemma 3 first highlights that $\Pr(B) = 1$. Only $\left\{\theta^0, \eta^H\right\}$ villages within the considered set of $\left\{\kappa^O, \theta^A\right\}$ and $\left\{\kappa^O, \theta^0\right\}$ villages vote fully for B. A village in this set that votes fully for B must therefore be of type $\left\{\theta^0, \eta^H\right\}$. Second, Lemma 3 clarifies that $\Pr(A) < 1$. Villages that vote fully for A can be either $\left\{\theta^0, \eta^H\right\}$ villages that were targeted only by A, or θ^A villages that vote for A for partisan reasons. Consequently, a village that votes fully for A cannot be of type $\left\{\theta^0, \eta^H\right\}$ with certainty. Lastly, Lemma 3 similarly underlines that $\Pr(split) < 1$. Villages from the considered set that split their vote are either $\left\{\theta^0, \eta^H\right\}$ villages that both (or no) parties targeted, or $\left\{\theta^0, \eta^L\right\}$ villages that cannot vote fully for any of the parties due to a low coordinating capacity. Thus, a village that splits it vote cannot certainly be of type $\left\{\theta^0, \eta^H\right\}$.

On the contrary, in the absence of electoral returns, B is unable to learn about the coordinating capacity of the $\left\{\kappa^{NO}, \theta^A\right\}$ and $\left\{\kappa^{NO}, \theta^0\right\}$ villages. Thus, as Lemma 4 in Section C in the Appendix indicates, the posterior likelihood that any such village has a coordinating capacity η^H, $\Pr(\emptyset)$ coincides with the prior likelihood, and thus continues to be lower than one.

B's dominant strategy is to target goods before the second election to the villages it believes have the highest likelihood of being a $\left\{\theta^0, \eta^H\right\}$ village. Consequently, the incoming incumbent's dominant strategy is to first target all the villages that voted for his or her party in the first election and are known not to be of type θ^B, which are thus type $\left\{\theta^0, \eta^H\right\}$ villages with certainty, i.e., $\Pr(B) = 1$. Which villages it targets next depends on the parameters of the model. From $\Pr(A)$, $\Pr(split)$ and $\Pr(\emptyset)$, it is clear that $\Pr(A) > \Pr(\emptyset)$ and $\Pr(split) >$

[15] Note that B could further condition on information about whether it targeted a local public good to a village prior to the first election. To better link the predictions of our theory to its empirical testing – we do not have the information that B has – and since the implications of the model are unchanged, we abstract from such further conditioning. However, at the cost of a more complex characterization, we can easily extend the model without significantly changing its predictions.

$\Pr(\emptyset)$, as long as $\gamma^{H,O}$ is sufficiently large relative $\gamma^{H,NO}$.[16] Consequently, since B is resource constrained, its dominant strategy is to target no goods to κ^{NO} villages. Lastly, from $\Pr(A)$ and $\Pr(split)$, it is unclear whether, after targeting all the villages that voted for it in the first election, B should target villages that fully supported the opposition A or those that split their vote. However, from $\Pr(A)$ and $\Pr(split)$, it follows that the likelihood that B will target villages that fully vote for the opposition as opposed to targeting those that exhibit mixed voting behavior in the first election is increasing in ϕ^A and decreasing in μ^A, $\gamma^{H,O}$, and ϕ^B. We summarize the resulting ranking of targeting priorities in the following proposition.

Proposition 1 *If $\gamma^{H,O}$ is large enough with respect to $\gamma^{H,NO}$ and the incoming incumbent B is resource constrained, before the second election, B will target goods to all villages that fully voted for it in the first election $(v = B)$ and are known not to be of type θ^B, but does not target goods to villages with unobserved electoral outcomes $\left(\kappa = \kappa^{NO}\right)$. Moreover, if there are remaining resources, the likelihood that B will target villages that fully voted for the opposition in the first election $(v = A)$, as opposed to targeting villages that split their vote $(v = split)$, is increasing in ϕ^A and decreasing in μ^A, $\gamma^{H,O}$, and ϕ^B.*

For the intuition behind the comparative statics that predict the relative targeting of mixed support and opposition villages, recall mixed-support villages are either of 1) $\left\{\theta^0, \eta^H\right\}$ type and failed to be targeted by either party, 2) $\left\{\theta^0, \eta^H\right\}$ type and were targeted by both parties, or 3) $\left\{\theta^0, \eta^L\right\}$ type. B will want to target mixed villages only in the first two cases. Opposition support villages are either of 4) $\left\{\theta^0, \eta^H\right\}$ type and received a transfer from A but not B or of 5) $\left\{\theta^A\right\}$ type. B will want to target opposition villages only in the former case. We can thus see that:

- ϕ^A (ϕ^B), or the probability that A (B) will target a $\left\{\theta^0, \eta^H\right\}$ village in the first election makes 1) and 2) less (more) likely than 3) and (4) more (less) likely than (5);

[16] One local politician interviewed confirmed that "influential local leaders tend to live in polling station villages, so politicians hope to win over these individuals with projects" (Commune 2, Respondent W2).

- μ^A, or the share of A's partisan supporters, makes (5) more likely than (4);

- $\gamma^{H,O}$, or the share of $\left\{\kappa^O, \theta^0, \eta^H\right\}$ villages, increases the likelihood of (1) and (2) relative to (3).

Consequently, while an increase in ϕ^A, μ^A or $\gamma^{H,O}$ provides incentives to the new incumbent to target more villages that vote fully for the opposition relative to those that vote mixed, an increase in ϕ^B generates the opposite incentives.

3.4 Dynamic extension

We next provide intuition for a dynamic extension of this simple model in which there is a third election. B continues to use electoral outcomes from the second election to learn about the likelihood that villages with specific voting behaviors are of type $\left\{\theta^0, \eta^H\right\}$.

We first consider the case where A continues to be the only opposition party to highlight the main intuitions of the dynamic extension of the model, and later incorporate the presence of a second opposition party C to better reflect the Senegalese case and inform our empirical analysis. Any village that voted for B in any of the elections, and is known not to be of type θ^B, is a $\left\{\theta^0, \eta^H\right\}$ village with certainty. Unintuitively, any village that voted fully for A in any of the elections but split its vote in another election is also a $\left\{\theta^0, \eta^H\right\}$ village with certainty. After targeting the villages known to be of type η^H, B moves on to the rest of the κ^0 villages, which can either always split votes or always vote fully for A. As before, we are unable to tell which of these types party B should target first. However, if A is significantly resource constrained, the incoming incumbent B should learn more in the second election about the villages that voted for A than about those that split votes in the first election. Consequently, as indicated in the following proposition, compared to after the first election, after the second election we should observe more targeting among villages that exhibited split voting among parties than among those that voted for A.[17]

[17]This holds irrespective of the likelihood that B will target villages that voted fully for A, as opposed to villages that exhibited mixed voting behavior, in the first election.

Proposition 2 *If A is significantly resource constrained, the decrease between the first and second elections in the likelihood that B will target villages that fully voted for A in the first election should be larger than the likelihood that B will target villages that split their vote.*

The logic of the result is as follows. B learns after the second election that a village that fully voted for A in the first election is of type $\left\{\theta^0, \eta^H\right\}$ if it switched its vote in the second election to either supporting both parties equally or to fully supporting B, which happens with probability $\Pr(A\ switches) = \left(1-\phi^A\right)\left(1-\phi^B\right) + \left(1-\phi^A\right)\phi^B$. Similarly, B learns after the second election that a village that split its vote in the first election is of type $\left\{\theta^0, \eta^H\right\}$ if it switched its vote in the second election to supporting either party, which happens with probability $\Pr(split\ switches) = \phi^A\left(1-\phi^B\right) + \phi^B\left(1-\phi^A\right)$. It is then straightforward to check that $\Pr(A\ switches) > \Pr(split\ switches)$ as long as $\phi^B < 1$, which naturally holds, and $\phi^A < 1/2$, which holds as long as A is significantly resource constrained. Thus, in the second election, B learns more about the villages that voted for A than about the villages that split their vote in the first election. This differential learning implies that the drop between the first and second elections in the likelihood that a village that voted for A in the first election is of type $\left\{\theta^0, \eta^H\right\}$ should be larger than the drop for a village that split its vote in the first election.

Extending the dynamic version of the model to incorporate a second opposition party C does not affect the qualitative results as long as A continues to compete against the new incumbent or its partisan supporters turn to support C. Importantly, the Senegalese context fits the former case since the initial incumbent party A has continued to run in every election since it lost power, and has received a sizable share of votes in each. Once a third party C is incorporated into the model, B can also learn from villages that switched from A to C, which can only be of type $\left\{\theta^0, \eta^H\right\}$. Incorporating this extra learning by B makes the forces driving the result in Proposition 2 even stronger, since when there are three parties there is even more learning in opposition villages than in mixed villages.

4 Empirical implications of the model

The theoretical model has clear implications for Senegal, where—as in the equilibrium path adopted in the model—in 2000 the incumbent party (PS) lost the presidency to a challenger (Wade's PDS) that was informationally disadvantaged and relatively resource constrained since it had never held executive office. This gives us the opportunity to observe how Wade's party (henceforth, Wade) learned about villages' electoral types after polling station outcomes were revealed in the two elections—2000 and 2007. To test whether Wade's learning is consistent with the predicted learning of our challenger party B in the model, we examine the targeting of local public goods. We restrict our attention to government-provided goods that could only have been targeted by the incumbent during the 2000–09 period.

The model requires there to be at least a small share of θ^A villages, or partisans of party A. While ethnic voting is less prevalent in Senegal than in many other African contexts, we still see that Diouf's coethnics are more likely than other groups to vote for him in 2000. While we think this differential support is largely endogenous, we find it reasonable to assume that partisan support is at least *more likely* among coethnics than non-coethnics. A second requirement of the model is that A continues to be active in politics after the first election. In our case, the PS wins 14% of the vote in 2007 and 11% in 2012.

Proposition 1 implies that Wade should first target resources toward polling station villages he believes have the highest likelihood of being a $\left\{\theta^0, \eta^H\right\}$—or non-partisan, high coordinating capacity—village. We thus get:

Hypothesis 1 *For sufficiently small μ^B, or population share of Wade's partisans, Wade should target more resources to villages that bloc voted for him in 2000 than any other village type.*

This prediction is not distinct from those of existing models. But whereas targeting bloc voters of one's own party would be attributed to the targeting of core supporters in existing models, our model attributes this behavior to knowledge about underlying coordinating capacity rather than partisanship.

The second clear prediction of Proposition 1 is that Wade should target scarce resources to villages where he can learn about their voting history. Thus, Proposition 1 predicts:

Hypothesis 2 *Wade should target more resources to villages with polling stations in 2000 than villages without.*

This is a novel prediction compared to existing theories, in which the observability of group-level vote tallies plays no role since they provide no room for learning.

Proposition 1 also predicts how relative targeting to mixed and opposition villages should vary with respect to parameters μ^A, $\gamma^{H,O}$, ϕ^A, and ϕ^B.[18] Where μ^A, or the share of villages that is partisans of A is higher, the model suggests the new incumbent should distribute more resources to mixed-support villages than to opposition villages. Using the coethnicity of the outgoing incumbent Diouf as a proxy for partisans of A, we predict:

Hypothesis 3 *Relative to non-coethnic villages, in coethnic villages, Wade should target more resources to mixed-support villages than opposition villages.*

Where $\gamma^{H,O}$, or the share of high coordinating capacity villages is higher, the new incumbent should distribute more resources to mixed-support villages than to opposition villages. However, while we abstract from this in the model, ϕ^A could also vary with $\gamma^{H,O}$ and, since the prediction for ϕ^A goes in the opposite direction, the results would be hard to interpret if we look for heterogeneous effects within a group that has high values for both parameters. We thus use the Diola ethnic group as a proxy for high coordinating capacity because, we argue, it has the key feature of having a high $\gamma^{H,O}$, but low ϕ^A. Other ethnic or religious groups in Senegal, such as the Mouride, are perhaps better known for strong local brokers, but these brokers also have important ties to the state, which makes them more likely to

[18]The last two parameters ϕ^A and ϕ^B, which can be thought of as A and B's budgets for public goods, are harder to measure. The former is highly endogenous and, while the latter could be proxied by, e.g., whether or not the council is controlled by the opposition, this happened so rarely in 2000—only 18 out of 316 communes—that there is insufficient variation to test predictions.

attract funds from the outgoing incumbent. The Diola, on the other hand, have relatively influential brokers (Gottlieb, 2015) but are arguably less likely to be favored by Diouf given their tendency to engage in political opposition, the relatively limited Socialist party apparatus in their region, and attempted secessionist movements pre-2000 (Beck, 2008). We thus predict:

Hypothesis 4 *Among the Diola, Wade should target more resources to mixed-support villages than to opposition villages compared to among non-Diola villages.*

Hypotheses 3 and 4 are also novel predictions generated by our recognition of the importance of incumbent learning—and by the fact that relative learning about mixed and opposition support villages varies across village types.

The dynamic predictions of the model are based on the assumption that villages that did not support Wade in the first election are more likely than mixed-support villages to change their voting patterns in the second election. As Table 2 indicates, the data support this assumption: the share of non-Wade support villages that switched their vote is 81.5%, while it is 47.2% for mixed-support villages. Due to a greater opportunity to learn in the second election about the voting behavior of villages that did not support Wade in the first election relative to those that exhibited mixed support, the model predicts that targeting resource transfers to non-Wade support villages should decrease over time relative to the targeting of mixed villages. We thus expect that:

Hypothesis 5 *Using the results of the 2007 elections, or in combination with the 2000 results, we predict a greater allocation of resources to mixed villages than to non-Wade villages than if we use data from only the 2000 elections.*

This prediction—which is the most important test of whether (and how) an incumbent learns about various villages' coordinating capacity over time—is also the most distinct from existing models' predictions, which cannot account for dynamic changes in targeting behavior.

5 Data

In this section, we describe the three sources of data we use to test the empirical implications of our theory: a village infrastructure survey, presidential election outcomes, and census data. The unit of analysis is the village.

5.1 Local public goods

The data for our dependent variable, local public goods provision, is from a public infrastructure survey of all rural villages in Senegal conducted in 2000 and 2009 by the Senegalese statistics office. We analyze changes in access to four major local public goods over this time period: sources of clean water, schools, health clinics, and rural roads.[19] We restrict our attention to these goods, which a) can be reasonably be targeted to a village and b) are financed primarily by the state or incumbent government. Figure 5 illustrates the share of villages with each type of public infrastructure for both years of the survey.

Funds for these four goods come primarily from the national government, which has decision-making authority for resource allocation across both sectors and districts. Communes receive transfers earmarked for particular sectors, but have the authority to decide a) which projects to fund within each sector, b) where to locate the project within the commune, and c) which construction company to contract with. We focus on within-commune variation in targeting. While there may be differential assignments of transfers to different communes, analyzing this variation is beyond the scope of our paper; and our estimates are not confounded due to the inclusion of commune fixed effects.

Because goods may be substitutes for one another (Kramon and Posner, 2013), we do not evaluate the political targeting of any individual good. Instead, we aggregate the goods by creating Y^t, which indicates the number of goods located in the village in year $t \in \{2000, 2009\}$. Because the data not only record whether goods are present in the village,

[19]These are coded in the survey as drinking fountains, boreholes, or wells; primary schools or adult literacy centers; rural maternity wards, health posts, or clinics; and unpaved roads, respectively.

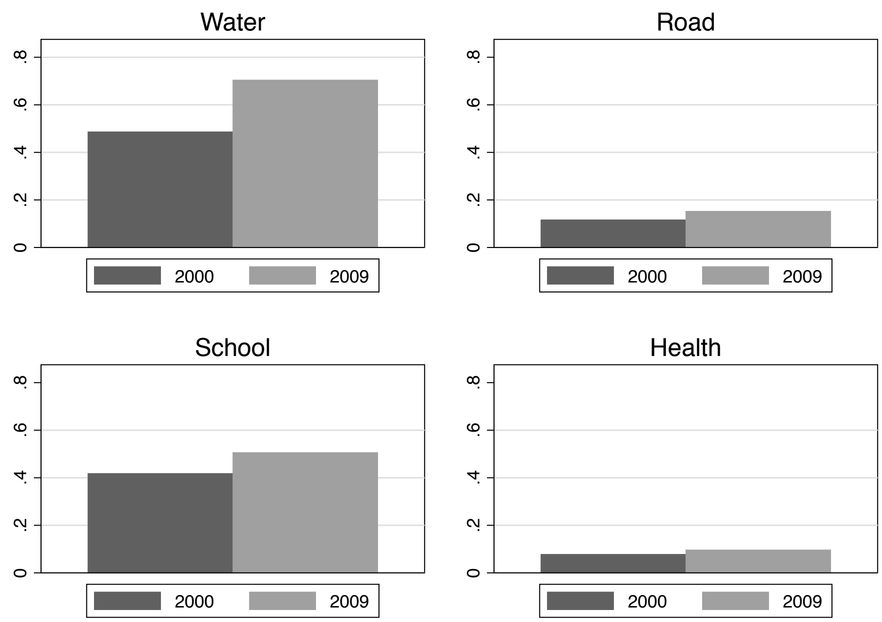

Figure 5: Distribution of local public goods in 2000 and 2009

but also the distance to the nearest good, we perform a robustness test in Appendix E that considers the ease of accessibility rather than simply their presence in the village.

5.2 Election outcomes

Polling station-level election outcomes are from Senegal's independent electoral commission (CENA). Because the second round of electoral contests provides the new incumbent better information about local levels of support, we focus on this round when there is more than one.

Our main constructs of interest are the presence of a polling station, coordinated voting, and incumbent support. To capture these three dimensions, we create a single categorical variable, *Type*, defined as follows:

1. Non-polling station villages;
2. Mixed support: 33% $\leq$ vote share for the incoming incumbent (Wade) $<$ 66%;
3. Non-Wade support: 0 $\leq$ vote share for the incoming incumbent (Wade) $<$ 33%;
4. Wade support: 66% $\leq$ vote share for the incoming incumbent (Wade) $\leq$ 1.

Like the politicians we interviewed, we attribute the vote share in each polling station to the village in which it is located. Summary statistics for this variable are in Table 2.

To test our dynamic predictions, we recode *Type* as follows:

1. Non-polling station villages;
2. Always mixed support: mixed support in 2000 and 2007;
3. Always non-Wade support (Always Diouf support): non-Wade (Diouf) support in 2000 and 2007;
4. Ever switched: Wade support in 2000 or 2007 or both, non-Wade in one election but mixed in the other (and Diouf support in 2000 and another non-Wade support in 2007),

Table 2: Village polling station status and electoral behavior

	2000	2007
Non-polling stations	0.653	0.614
Mixed support	0.183	0.179
Non-Wade support	0.087	0.062
Wade support	0.077	0.146
Percentage of mixed villages in 2000 that switched away from mixed support in 2007		47.2%
Percentage of non-Wade villages in 2000 that switched away from non-Wade support in 2007		81.5%

where the coding in parentheses is alternative recoding explained later.

5.3 Census

The final source of data is the most recent version of the Senegalese census for which disaggregated data are currently available—the RGPH 3 conducted between 2000 and 2002. The available population statistics, household assets, and ethnic and religious affiliations comprise our key control variables in the econometric specification.

Population size is the biggest potential confounder when comparing electoral targeting across village types. Non-polling station villages are, on average, less populous than villages with polling stations, and the politicians we interviewed perceive them to have weaker electoral returns as a result. We ultimately want to test whether, all else equal, politicians are more likely to target resources to villages with polling stations than those without. We thus control for population as flexibly as possible, using a fractional polynomial that fits the best model to the data. Because the census records age, we construct a village-level variable for village voting age population using individuals who were over 20 years of age in 2002 (and thus over 18 in the 2000 presidential elections). We log the population variable to account for the skew in the data.

Even though clientelist appeals are thought to dominate ethnic appeals in Senegalese politics, patron-client relationships are often built around common identities such as one's ethnicity or religion. If the new incumbent party were transferring goods to coethnics or members of the same religious brotherhood (Wade is a known member of the Mouride brotherhood) and that group also corresponded to a particular electoral type, this could confound results as well. To mitigate this source of bias, we flexibly control for the village-level population share of each ethnic and religious group available in the census.[20]

Another possible source of omitted variable bias is the level of development. More economically developed localities may attract more public goods, and development may be more

[20] Controls include the logged village-level population size of each group along with its quadratic and cubic terms.

concentrated in particular villages. For example, some of the politicians we interviewed mentioned that polling station villages have an economic advantage, and thus may be more likely to house a school, become a meeting place, or attract political campaigners. To mitigate this source of bias, we control flexibly for both the number of households with specific assets (from the census),[21] and village infrastructure in 2000 that does not fall under the category of government-provided and targetable (from the village-level survey).[22]

5.4 Empirical specification

To test our theory, we regress the local public goods index Y in village i in year 2009 on the public goods index in year 2000, our categorical variable $Type$, a vector of village-level controls S_i, and commune fixed effects Z_c. Standard errors are always clustered at the commune level.

$$Y_i^{2009} = \alpha + \beta_1 Type + \beta_2 Y_i^{2000} + S_i^{'}\Sigma + Z_c + \epsilon_i \quad (1)$$

Our baseline specification is an ordinary least squares (OLS) regression. We test robustness to different specifications of the dependent variable including logging the public goods indices for both years (Specification 2) and measuring the change in the index rather than simply controlling for the baseline level (Specification 3). In Specification 3, the dependent variable indicates whether the village-level stock of local public goods increased over the 2000-2009 period. Because our dependent variable is a count measure, we test robustness using a Poisson model (Specification 4).

We are interested in both the difference between each category of $Type$ relative to the baseline and each category relative to every other. We thus conduct Wald tests of the inequality of coefficients for each category of $Type$ in addition to the main regression.

To further dissipate concerns about endogeneity with respect to the process of assigning polling stations, we conduct an IV analysis. While there are no formal rules determining

[21] Controls include the logged village-level population size with each asset type along with its quadratic and cubic terms.

[22] See Appendix D for a complete list and summary statistics of all control variables.

which villages can host polling stations, according to the Directorate for Elections, villages are more likely to be assigned a polling station if they have more registered voters, are more central, and have a primary school in which to house polling booths on election day. We used these characteristics to construct an instrument that predicts which villages should be assigned polling stations.

6 Results

Figure 6 and specification 1 of Table 3 report results from the baseline specification using the 2000 presidential elections. Findings accord with Hypothesis 1: the new incumbent party (Wade) provides the most resources to polling station villages that vote for it. [23] Confirming Hypothesis 2, the fewest resources are targeted to non-polling station villages.

Specifications 2–4 of Table 3 test the robustness of these findings to our three alternative specifications. The main findings are qualitatively unchanged: there is always a significant difference between the targeting of polling station versus non-polling station villages and between the targeting of villages that fully support the incumbent party and those with split support.[24] The difference between the targeting of villages that bloc vote for Wade versus those that bloc vote for the opposition is clear in magnitude, but is only significant at conventional levels in two of the four specifications.

We then test Hypothesis 3—that, among coethnics, Wade should target more resources to mixed-support than to opposition villages—by examining whether targeting is conditional on the share of coethnics in a village. We use continuous and discrete measures of Diouf's coethnics (Peul or Toucouleur).[25] Table 4 provides evidence in favor of our hypothesis: among coethnics of the outgoing incumbent, the incoming incumbent is indeed more likely

[23] This finding implies that μ^B, or the share of villages that would vote for Wade unconditional on previous transfers, is sufficiently small.

[24] Appendix F recodes *Type* to take turnout into account; these results are also qualitatively unchanged, which indicates that party switching (rather than turnout mobilization) is most likely driving our results.

[25] Diouf's mother was of the Peul ethnic group and his father was of the Serer ethnic group, but he spent his formative years with his maternal uncle, who initiated him into politics by having him take notes at meetings of the PS.

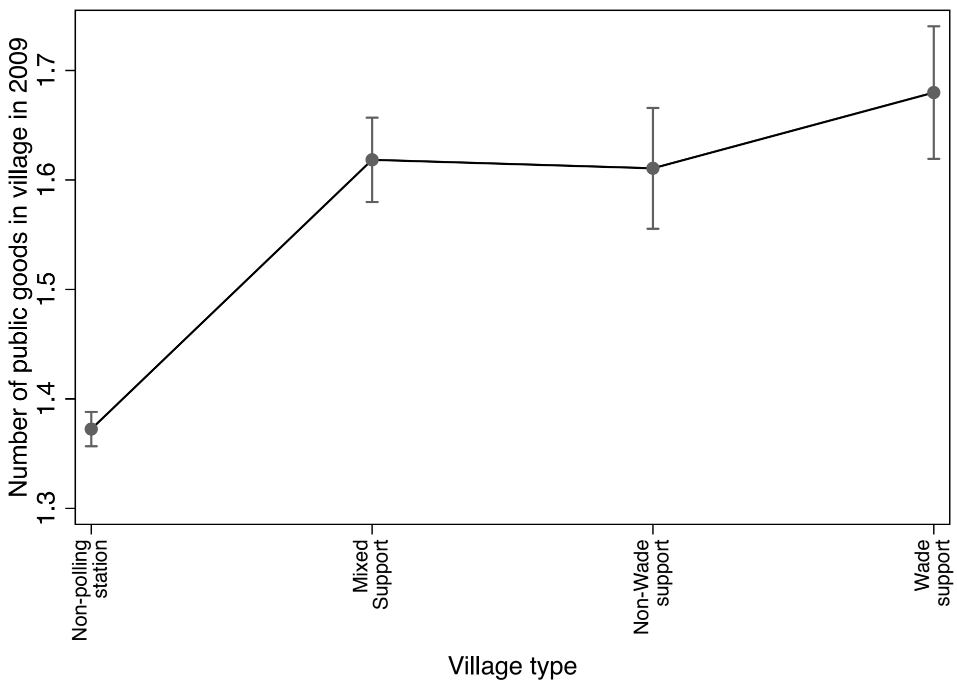

Figure 6: Predicted marginal effects of village type on local public goods

Table 3: Results on learning after one election (testing of Hypotheses 1 and 2)

	(1) OLS	(2) OLS (Logged)	(3) Δ Access	(4) Poisson
Mixed support	0.246***	0.114***	0.103***	0.157***
	(0.026)	(0.012)	(0.016)	(0.017)
Non-Wade support	0.241***	0.112***	0.106***	0.165***
	(0.032)	(0.015)	(0.020)	(0.021)
Wade support	0.307***	0.143***	0.139***	0.191***
	(0.036)	(0.016)	(0.021)	(0.022)
Public goods index (2000)	0.332***	0.255***	-0.283***	0.207***
(Logged in Model 2)	(0.015)	(0.014)	(0.009)	(0.010)
Observations	10,747	10,747	10,747	10,747
R^2	0.551	0.495	0.321	
One-sided Wald test (p-value)				
Null hypothesis:				
Mixed support $\geq$ Wade support	0.035	0.025	0.027	0.032
Non-Wade support $\geq$ Wade support	0.060	0.050	0.094	0.151

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

to target resources to mixed-support villages than opposition villages compared to among non-coethnics.

Lastly, we test Hypothesis 4—that, among the Diola, Wade should target more resources to mixed-support than to opposition villages—by running the same two specifications as above using share or majority Diola as the conditioning variable. Specifications 3 and 4 of Table 4 provide suggestive evidence in favor of this hypothesis but, while the point estimates are large and of the same order of magnitude as the results in the first two columns, the differences are not statistically significant.

6.1 Placebo test

Given the potential threats to causal inference outlined in the previous section, we conduct a placebo test to increase confidence that our results are not driven by omitted variable bias. We identify goods that might be subject to the same bias, but should not have the predicted relationship with our vector of independent variables, $Type$. Our dependent variable, Y^{2009}, has two key features: it is provided by the government and is targetable to villages. For our placebo outcomes, we seek goods that are provided by the government and *cannot* be targeted to villages. If the relationship between $Type$ and Y^{2009} is being driven by omitted variables—such as population size, economic development, or existing public goods—instead of our theory, we would expect similar outcomes to obtain with a government-provided, non-targetable good.

The goods that comprise our placebo index—paved roads and electric lines—are provided by the government, but are much less targetable to individual villages. While some studies have highlighted the targetability of these goods (Burgess et al., 2015; Min and Golden, 2014), they are aggregated at the district rather than the much smaller village level. Figure 7 shows the geographic distribution of our four local public goods and placebo goods, and clearly indicates that our placebo goods are much more concentrated within communes than our other local public goods. Not only are paved roads and electric lines too large and

Table 4: Heterogenous effects of results on learning after one election (testing of Hypotheses 3 and 4)

	(1) Toucouleur Peul (Cont)	(2) Toucouleur Peul (0.5)	(3) Diola (Cont)	(4) Diola (0.5)
Mixed support	0.258***	0.263***	0.247***	0.253***
	(0.027)	(0.027)	(0.026)	(0.027)
Non-Wade support	0.235***	0.236***	0.235***	0.234***
	(0.032)	(0.032)	(0.034)	(0.040)
Wade support	0.337***	0.341***	0.306***	0.309***
	(0.034)	(0.035)	(0.037)	(0.036)
Group	-0.121*	-0.079*	-0.059	-0.030
	(0.058)	(0.041)	(0.213)	(0.110)
Mixed support × Group	0.200**	0.202***	0.217	0.223
	(0.070)	(0.063)	(0.164)	(0.145)
Non-Wade support × Group	0.031	0.033	-0.108	-0.067
	(0.081)	(0.073)	(0.449)	(0.453)
Wade support × Group	0.335***	0.295***	0.102	0.097
	(0.088)	(0.081)	(0.137)	(0.119)
Public goods index (2000)	0.329***	0.329***	0.332***	0.332***
	(0.015)	(0.015)	(0.016)	(0.016)
Observations	10,757	10,757	10,757	10,757
R^2	0.553	0.553	0.552	0.552
One-sided Wald test				
Null hypothesis: Non-Wade support × Group ≥ Mixed support × Group	0.033	0.020	0.223	0.251

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

expensive to branch off into many small villages in a given commune, their benefits are less excludable from an individual village.

Constructed in the same way as our public goods index, the placebo index is regressed on $Type$, and all our control variables use the same baseline specification as above. Figure 8 and Table 5 show that there is essentially no difference in the targeting of placebo goods across villages with and without polling stations, or across villages with polling stations but differing electoral types. We interpret this as evidence that the relationship between our independent and dependent variables of interest is unlikely to be driven by omitted variables.

6.2 Instrumenting for polling station status

Since the concern that non-random assignment to polling stations could confound our estimates on differential targeting to villages where learning about coordinating capacity is more likely, we employ an identification strategy that exploits plausibly exogenous variation in polling station assignment. We construct an instrumental variable that uses local relative population size – measuring a village's local centrality, and presence of a school to predict polling station status.[26] While neither centrality or the presence of a school is arguably random, we provide evidence that their interaction is, and thus use it as an instrument of a village's polling station status.

Specification 1 of Table 6 presents the results of the first-stage regressing polling station status on the interaction between *Population rank* and the presence of a *School* in 2000, each term individually, and all original control variables. While population rank and school alone are correlated with polling station, and could also be independently correlated with our outcome variable, recall that we are only identifying off the *interaction* between rank and school—the excluded instrument. The F-statistic on the excluded instrument is large, indicating a strong first stage.

The exclusion restriction requires that the excluded instrument—the difference between

[26] We operationalize centrality by using the aggregate adult-population ranking among villages within 10km.

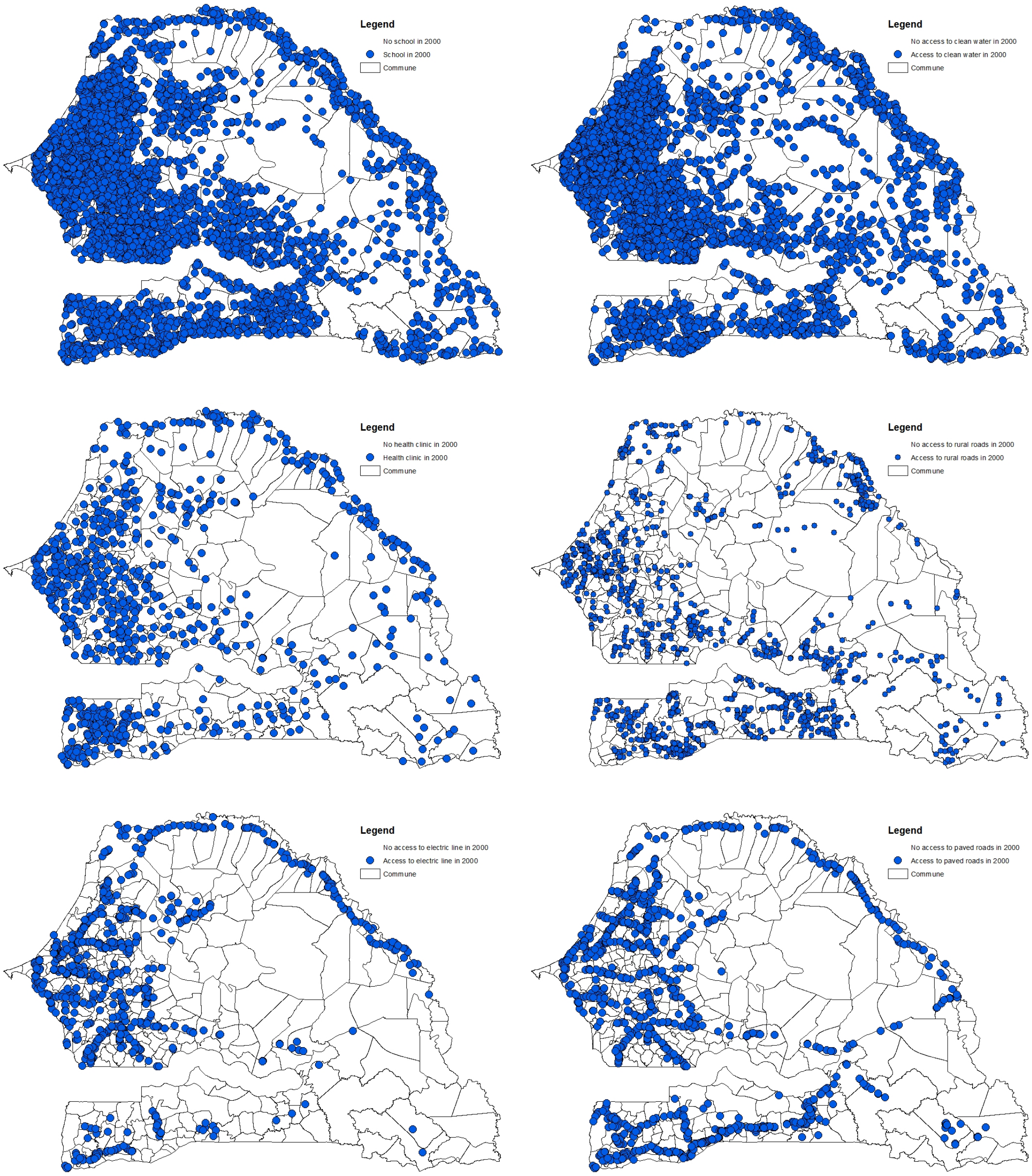

Figure 7: Geographic distribution of local public goods (top 2 rows) vs. placebo goods (bottom row)

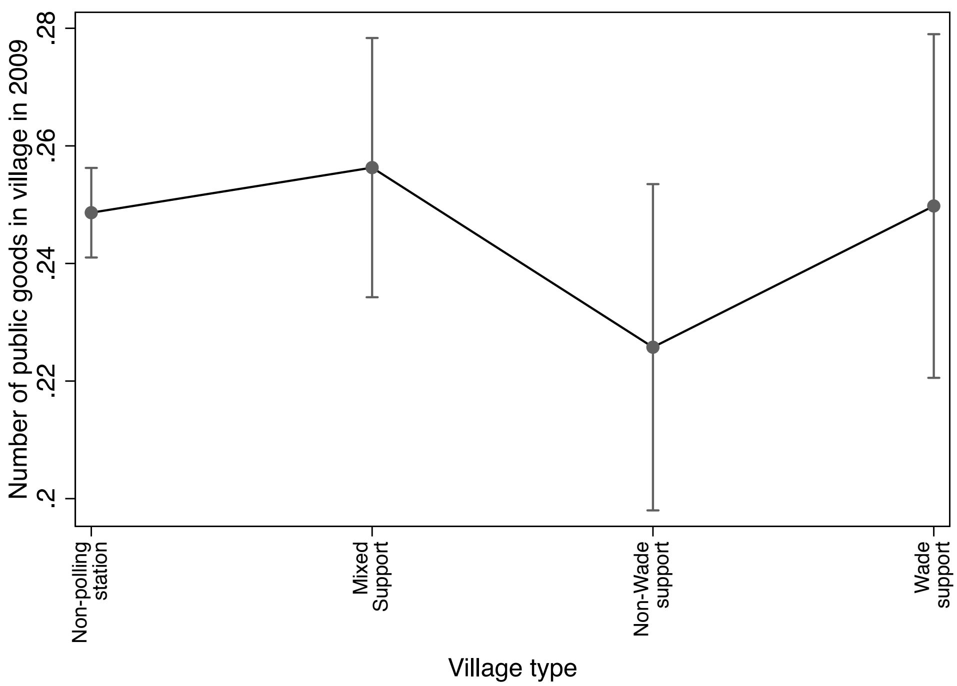

Figure 8: Predicted marginal effects of village type on placebo goods

Table 5: Placebo results on learning after one election

	(1) OLS	(2) OLS (Logged)	(3) Δ Access	(4) Poisson
Mixed support	0.008	0.003	-0.003	-0.017
	(0.016)	(0.009)	(0.011)	(0.063)
Non-Wade support	-0.026	-0.017	-0.025*	-0.113
	(0.017)	(0.010)	(0.012)	(0.076)
Wade support	0.001	0.002	-0.007	-0.016
	(0.018)	(0.011)	(0.014)	(0.077)
Access to placebos in 2000	0.634***	0.615***	-0.059***	1.062***
(Logged in Model 2)	(0.027)	(0.025)	(0.016)	(0.049)
Observations	10,036	10,036	10,036	10,036
R^2	0.535	0.521	0.170	
One-sided Wald test (p-value)				
Mixed support $\geq$ Wade support	0.632	0.520	0.608	0.490
Non-Wade support $\geq$ Wade support	0.132	0.097	0.167	0.161

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

having a school or not in central places relative to such differences in non-central places—should only affect the outcome (local public goods in 2009) through our endogenous variable, polling station assignment. Because we include controls for school and population ranking, we should only be concerned if we think the greater marginal effect of having a school in central places relative to non-central places is driving public goods provision through a mechanism other than polling station assignment. This could be the case if, for example, the presence of a school in a central village is more indicative of economic development. If this were the case, we should expect other public goods to also predict a greater likelihood of polling station assignment in central places relative to non-central places. Below, we provide evidence that this is not the case.

To assess the plausibility of the exclusion restriction, we test whether all other village-level goods and economic indicators interacted with relative ranking also predict polling station assignment. If the first stage were driven by an omitted variable such as economic development, then we should see similar correlations between interactions of other public goods and centrality and polling station assignment as we do with schools. Appendix Table G compares the instrument in Specification 1 to specifications adding other goods/characteristics interacted with relative ranking. We observe that, while our first stage is robust to the inclusion of these interactions, none of the other interactions is statistically significant. This suggests that our excluded instrument is unlikely to be correlated with our outcome variable except through polling station.

In Specifications 2 and 3 of Table 6, we compare the results of the baseline OLS regression of public goods on polling station to the IV estimates (with all usual controls). In the two-stage least-squares specification, the interaction term is the excluded instrument and the individual components of the interaction term—population rank and school—are included as controls. The coefficient on polling station remains a substantive and significant predictor of local public goods provision in the IV specification, which increases confidence that the observed relationship is being driven by polling station status rather than an unobserved correlate of polling stations.

One last concern is that polling station status could be predicted by prior voting behavior if the incumbent erects polling stations as a form of clientelistic reward. Appendix Table A.8 demonstrates the implausibility of this concern by showing that voting behavior in 2000, as measured by *Type*, does not predict polling station status in 2007.

6.3 Dynamic extensions of the model

As a test of the dynamic predictions of the model, Table 7 reports the results of using data from different election years. Specification 1 in this table reproduces Specification 1 of Table 3 for comparison. Specification 2 re-runs the same basic specification using data from the 2007 presidential election. Comparing Specifications 1 and 2, we find evidence in support of Hypothesis 5: the targeting of resources to mixed villages in 2007 increases relative to those that were mixed in 2000. We also see that, while there were no differences between mixed and non-Wade villages in 2000, we can reject the hypothesis that mixed villages received the same or greater resources as non-Wade villages in 2007 with 90% confidence.

In Specification 3 of Table 7, we combine data from both election years and recode the categories of *Type* as follows:[27]

- Always mixed support: mixed support in 2007 and mixed support or non-polling station status in 2000.
- Always non-Wade support: non-Wade support in 2007 and non-Wade support or non-polling station status in 2000.
- Ever switched: Wade support in 2007 or 2000, or switched between mixed support and non-Wade (either direction) across both election years.

The difference in targeting between "Always mixed" and "Always non-Wade" is clearer. These categories are now contaminated with fewer villages of unknown types. A mixed village

[27] We code those villages for which the election data is missing as if they had non-polling station status.

Table 6: Results of instrument variable strategy

Outcome (estimation method):	(1) Polling Station	(2) Public Goods (OLS)	(3) Public Goods (IV)
Polling Station		0.260***	0.909**
		(0.023)	(0.283)
Access to school	0.252***		-0.173***
	(0.022)		(0.052)
Population rank	-0.001*		0.003
	(0.001)		(0.001)
School × Population rank	-0.007***		
	(0.001)		
Public goods index (2000)	0.047***	0.332***	0.323***
	(0.008)	(0.016)	(0.026)
Observations	10,762	10,762	10,762
R^2	0.343	0.551	0.332
F-Statistic	28.127		28.130

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: Results on learning after two elections (testing of Hypothesis 5)

Data used for independent variables	(1) 2000	(2) 2007	(3) 2000 and 2007	(4) 2000 and 2007	(5) 2000 and 2007
Mixed support	0.246***	0.300***			
	(0.026)	(0.028)			
Non-Wade support	0.239***	0.264***			
	(0.032)	(0.039)			
Wade support	0.307***	0.300***			
	(0.036)	(0.027)			
Always mixed (both years)			0.317***	0.320***	0.320***
			(0.030)	(0.030)	(0.030)
Always non-Wade (both years)			0.231***		
			(0.056)		
Ever switched (both years)			0.291***	0.294***	0.294***
			(0.024)	(0.024)	(0.024)
Always Diouf (both years)				0.135	0.135
				(0.070)	(0.070)
Diouf to Non-Diouf Opposition (both years)				0.296***	
				(0.067)	
Public goods index (2000)	0.333***	0.329***	0.329***	0.328***	0.328***
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
Observations	10,763	10,763	10,763	10,763	10,763
R^2	0.552	0.554	0.554	0.555	0.555
One-sided Wald test (p-value)					
Null hypothesis:					
Always non-Wade $\geq$ Always mixed	0.416	0.180	0.074		
Always non-Wade $\geq$ Ever Wade	0.055	0.194			
Always mixed $\geq$ Ever Wade	0.035	0.499			
Always non-Wade $\geq$ Ever switched			0.144		
Always mixed $\geq$ Ever switched			0.813		
Always Diouf $\geq$ Always mixed				0.007	0.007
Always Diouf $\geq$ Ever switched				0.013	0.013
Always mixed $\geq$ Ever switched				0.818	0.181
Always Diouf $\geq$ Diouf to non-Diouf				0.036	
Diouf to non-Diouf $\geq$ Always mixed				0.362	
Diouf to non-Diouf $\geq$ Ever switched				0.512	

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

that was targeted in 2000 but remained mixed in 2007 is known to have a low coordinating capacity; similarly, a non-Wade partisan village that did not respond to targeting in 2000 is now known to be partisan. But because of the lower level of switching in mixed-support villages than in non-Wade support villages, the ability to learn is lower (and thus the amount of imprecise targeting is higher) in "Always mixed" villages. As predicted, relative to the ratio of targeting to non-Wade versus mixed villages in 2000, we see fewer resources being targeted to non-Wade than to mixed villages in 2007.

Our theory predicts that these results should hold independently of whether the new incumbent's main opposition is coming from the old incumbent party or a third party. Introducing the possibility of a third party indicates that the typology in Specification 3 is misleading because the category "Always non-Wade" may include some villages that never switch—"Always Diouf"—and some that switch, but to a party other than the incumbent—"Diouf to Non-Diouf Opposition." Disaggregating these possibilities in Specification 4 shows the predictions of the dynamic extension even more clearly: places that have ever switched away from the outgoing incumbent party are treated the same by the new incumbent, regardless of whether they switched to the new incumbent party, and places that remained with the old incumbent are seldom targeted. Specification 5 simply combines these places that switch into the "Ever switched" category and shows that the results are robust.

7 Conclusion

The distinctive features of our theory of electoral targeting generate two types of novel empirical predictions: dynamic predictions describing how targeting changes over time are, and comparative statics predictions of relative targeting to mixed-support and opposition groups. While at odds with existing theories, both are largely confirmed in the Senegalese context, and can be applied to other settings.

Theories that predict electoral targeting of apparently core supporters—where core is measured by post-electoral surveys—suggest that a high level of bloc voting for a party should be rewarded, and thus bloc voting patterns should remain relatively stable over time. As is made clear in Table 8, over the span of three elections, only about 10% of bloc voting villages remained loyal bloc voters to the same party. Just as many bloc voting villages shifted to vote for a completely different party, and many more switched from mixed to bloc or vice versa. This disconnect between existing theory and evidence motivated the first key feature of our model: that electoral support of a significant share of the voters is not driven by predetermined partisanship but rather is endogenous to previous electoral transfers. This insight applies to other clientelistic contexts in which parties attract voters through contingent, targeted rewards rather than particular platforms.

The second key feature of our theory—that villages differ in their electoral coordinating capacity, and thus in their attractiveness to incumbent parties—is motivated by previous work on Senegal that uncovered variation in brokers' ability to influence followers. We exploit these differences across groups to test, and ultimately provide support for, our theory's comparative statics predictions. These insights should also generalize to any context in which parties use collective rewards instead of (or in addition to) individual rewards, and where groups vary in their coordinating capacity. Such variation could be driven by any underlying features of communities, in addition to leaders, that aid or constrain coordinated action, e.g., the density of networks.

The third distinctive feature of our theory—that new incumbents have imperfect and asymmetric information about villages' coordinating capacity—is corroborated by qualitative interviews with 48 contemporary local politicians. The novel predictions generated by the ability of information-constrained incumbents to learn from electoral outcomes over time are also supported by quantitative evidence. These predictions are applicable to settings where local vote tallies are observable at low levels of aggregation, which is the case in many new democracies. And new incumbents' informational disadvantage about groups' coordinating capacity and partisanship is generalizable across countries as well: in any authoritarian

Table 8: Change between years (as share of shared polling stations)

Type of Switching	2000 to 2007	2007 to 2012	2000 to 2012
Bloc to mix	0.254	0.222	0.241
Stayed the same bloc	0.105	0.092	0.046
Bloc to different bloc	0.113	0.093	0.185
Mix to bloc	0.180	0.306	0.258
Stayed mix	0.348	0.287	0.270
N	3,699	4,105	3,657

regime that falls or where a dominant party loses power, the new incumbent party would have had little to no opportunity to experiment with electoral transfers and thus learn about group responsiveness.

Lastly, our theory contributes to studies of ethnic voting. It can help explain patterns of ethnic targeting and subsequent voting where political entrepreneurs use ethnicity instrumentally, and variation in coordinating capacity is conditioned by the strength of ethnic networks. More generally, our study implies that both groups' coordinating capacity and politicians' information about such capacities should be better integrated into existing theories of clientelist party strategies.

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Online Appendix to "An Informational Theory of Electoral Targeting: Evidence from Senegal"

A Data matching

The census data are from the most recent version of the Senegalese census for which disaggregated data are currently available—the RGPH (Recensement Général de la Population et de l'Habitat) 3 conducted between 2000 and 2002. Of the initial $13,813$ observations in the sample, largely due to the fact that we exclude the Dakar region and that we drop villages that have more than $10,000$ registered voters in the election data (due to the uninformativeness of polling station names and thus the difficulty of matching), 80% show in our sample.

The data on local public goods provision are from a public infrastructure survey of all rural villages in Senegal that was conducted in 2000 ($13,436$ observations) and 2009 ($12,796$ observations) by Senegal's National Agency for Statistics and Demography. After excluding the Dakar region and areas with more than $10,000$ registered voters, we are left with $13,133$ and $12,512$ observations from the 2000 and 2009 public infrastructure surveys, respectively. We respectively match 94.9% and 95.4% of these observations to the 2002 census using a combination of fuzzy matching on names within communes and hand coding. When matching the 2009 public goods data to the electoral data, we account for administrative boundary changes during the period—always following the original 2002 administrative demarcation. Due to differences in the overlap of the matched observations across data sets and, particularly, to the fact that we drop villages that have more than $10,000$ registered voters, our data set includes 84.2% and 88.4% observations of the 2000 and 2009 public infrastructure surveys, respectively.

The polling station-level data on election outcomes are from Senegal's independent electoral commission (CENA). There were a total of $4,473$ polling stations in rural villages in

Senegal in 2000. We were able to successfully match 93.4% of them to the 2002 census using a combination of fuzzy matching on names within communes and hand coding. However, due to differences in the overlap of the matched observations across data sets, and because we exclude the Dakar region and villages with more than $10,000$ registered voters from the 2002 census (for reasons of size), only 85.8% of the polling station data makes it to our data set. The corresponding numbers for 2007 are $5,251$, 93.6%, and 81.6%, respectively.

B Interviews with local politicians

To test some of our assumptions and better understand the mechanisms underlying our quantitative results, we conducted interviews with 48 current commune-level politicians and 64 village-level political intermediaries. For our sample, we randomly selected 12 communes, four from each the following strata: communes that are strongholds of the current incumbent party (Sall's APR), those that are strongholds of the primary opposition party (Wade's PDS), and mixed communes in which there is bloc voting for both parties. Within each of these 12 communes, we interviewed two members of each party/coalition, giving preference to the most senior of the local politicians, e.g., the mayor or his adjuncts.[28] We targeted commune politicians who were most influential on the commune council, e.g., the elected commune mayor, a member of the mayor's bureau (adjunct mayor, secretary), or an elected council member who is an active member of the party.[29]

To sample village-level intermediaries, we randomly selected one commune from each bloc. In the two stronghold communes, we then selected four villages, one of each of the following types: bloc vote ($> 70\%$) with a polling station, bloc vote without a polling station, non-bloc vote ($< 60\%$) with a polling station, non-bloc vote without a polling station. In the mixed commune, we identified eight villages, one of each type for each of the two main

[28] In four communes, we were unable to identify two council members of one of the coalitions, so we either interviewed a current council member who formerly belonged to the coalition of interest (and has since switched parties) or a former council member of the coalition of interest (who no longer holds office).

[29] In order to achieve representation from both coalitions, we interviewed former politicians who held office prior to 2014 if current politicians were not available.

parties/coalitions. To identify the political intermediary in each village, we asked the village chief who the most representative or influential intermediary was, and if there was more than one, we interviewed all of them.

The interviews were conducted in spring 2015 and examined knowledge of village-level electoral support, whether this knowledge differed by polling station status, and whether and how polling station status conditioned the allocation of resources. The commune politicians were asked to estimate their own party's village-level vote share in the most recent presidential elections in a random sample of 10 villages with polling stations and 10 villages without polling stations. After each guess, they were then asked to rate their confidence level on a scale of 1 to 4. This yielded a data set of 860 unique observations of vote share guesses by politician and village.[30]

[30] There were fewer than the expected 960 observations because several communes had fewer than 10 polling stations or no polling stations, or official election outcomes incorrectly reported the names or locations of polling stations.

C Models' proofs

C.1 Proof of lemmas

Lemma 1 *Before the first election, A and B target a given village i following, respectively,*

$$g^A_{1,i} = \begin{cases} 1 \textit{ with probability } \phi^A & \theta_i = \theta^0, \eta_i = \eta^H \\ 0 \textit{ with probability } 1 & \textit{otherwise} \end{cases} \textit{, and}$$

$$g^B_{1,i} = \begin{cases} 1 \textit{ with probability } \phi^B & \theta_i \in \left\{\theta^A, \theta^0\right\}, \kappa_i = \kappa^O \\ 0 \textit{ with probability } 1 & \textit{otherwise} \end{cases}.$$

Proof of Lemma 1

Consider a set of strategies in which party A and party B target resources to a given village i following, respectively,

$$g^A_{1,i} = \begin{cases} 1 \text{ with probability } \phi^A & \theta_i = \theta^0, \eta_i = \eta^H \\ 0 \text{ with probability } 1 & \textit{otherwise} \end{cases} \text{, and}$$

$$g^B_{1,i} = \begin{cases} 1 \text{ with probability } \phi^B & \theta_i \in \left\{\theta^A, \theta^0\right\}, \kappa_i = \kappa^O \\ 0 \text{ with probability } 1 & \textit{otherwise} \end{cases}.$$

This set of strategies constitutes an equilibrium, since neither party has an incentive to deviate. Party A's case is the simplest to see. First, targeting local public goods to any location that is not a $\left\{\theta^0, \eta^H\right\}$ is a dominated strategy, since those areas are unresponsive to targeting for either partisan reasons or because they lack sufficient organizational capacity. Second, party A has no incentives to target a share different from ϕ^A in either $\left\{\kappa^O, \theta^0, \eta^H\right\}$ or $\left\{\kappa^{NO}, \theta^0, \eta^H\right\}$ villages, since the expected electoral return is the same in both types of villages. This follows from the fact that the electoral return of switching a village from $v = split$ to $v = A$ is the same as that of switching a village from voting $v = B$ to voting $v = split$.

Party B's case follows a similar logic. First, targeting θ^B villages is a dominant strategy since these would vote $v = B$ anyway. Second, party B has no incentives to target the set of $\left\{\kappa^{NO}, \theta^0\right\}$ and $\left\{\kappa^{NO}, \theta^A\right\}$ villages (from which it cannot distinguish village types at first) since targeting the set of $\left\{\kappa^{O}, \theta^0\right\}$ and $\left\{\kappa^{O}, \theta^A\right\}$ villages gives it a higher expected electoral return, given that $\gamma^{O,H} > \gamma^{NO,H}$, and also allows it to learn about village types, which has a positive continuation value.

Lemma 2 *A wins the first election only if*

$$\chi \left\{ \begin{array}{l} \mu^A + \left(1-\mu^A-\mu^B\right)\left(\gamma^{O,H}\pi^O\phi^A\left(1-\phi^B\right) + \left(1-\pi^O\right)\gamma^{NO,H}\phi^A\right) + \\ \frac{1}{2}\left(1-\mu^A-\mu^B\right)\left(\begin{array}{c} \pi^O\gamma^{O,H}\phi^A\phi^B + \pi^O\gamma^{O,H}\left(1-\phi^A\right)\left(1-\phi^B\right) + \\ \left(1-\pi^O\right)\gamma^{NO,H}\left(1-\phi^A\right) + \\ \pi^O\left(1-\gamma^{O,H}\right) + \left(1-\pi^O\right)\left(1-\gamma^{NO,H}\right) \end{array} \right) \end{array} \right\} + (1-\chi)\,\delta_t \geq \frac{1}{2}$$

where recall that:

μ^A *is the share of* θ^A *villages,*

$\left(1-\mu^A-\mu^B\right)\pi^O\gamma^{O,H}\phi^A\left(1-\phi^B\right)$ *is the share of* $\left\{\kappa^O, \theta^0, \eta^H\right\}$ *villages targeted only by A,*

$\left(1-\mu^A-\mu^B\right)\left(1-\pi^O\right)\gamma^{NO,H}\phi^A$ *is the share of* $\left\{\kappa^{NO}, \theta^0, \eta^H\right\}$ *villages targeted only by A,*

$\left(1-\mu^A-\mu^B\right)\pi^O\gamma^{O,H}\phi^A\phi^B$ *is the share of* $\left\{\kappa^O, \theta^0, \eta^H\right\}$ *villages targeted by both parties,*

$\left(1-\mu^A-\mu^B\right)\pi^O\gamma^{O,H}\left(1-\phi^A\right)\left(1-\phi^B\right)$ *is the share of untargeted* $\left\{\kappa^O, \theta^0, \eta^H\right\}$ *villages,*

$\left(1-\mu^A-\mu^B\right)\left(1-\pi^O\right)\gamma^{NO,H}\left(1-\phi^A\right)$ *is the share of untargeted* $\left\{\kappa^{NO}, \theta^0, \eta^H\right\}$ *villages, and*

$\left(1-\mu^A-\mu^B\right)\pi^O\left(1-\gamma^{O,H}\right) + \left(1-\pi^O\right)\left(1-\gamma^{NO,H}\right)$ *is the share of* $\left\{\theta^0, \eta^L\right\}$ *villages that is unresponsive to targeting.*

Proof of Lemma 2

Together with the implications of Lemma 1 for v_i for all i, Lemma 2 holds since party A wins the election if $\chi\sum_{i=1}^{N} v_i + (1-\chi)\,\delta \geq \frac{1}{2}$. According to Lemma 1, there are two sets of villages that cast votes for party A—one that votes fully for party A and the other that splits its vote between both parties. The first set of villages that vote $v_i = A$ includes those that belong to the μ^A share of θ^A villages, the $\left(1-\mu^A-\mu^B\right)\pi^O\gamma^{O,H}\phi^A\left(1-\phi^B\right)$ share of $\left\{\kappa^O,\theta^0,\eta^H\right\}$ villages targeted only by party A, and the $\left(1-\mu^A-\mu^B\right)\left(1-\pi^O\right)\gamma^{NO,H}\phi^A$ share of $\left\{\kappa^{NO},\theta^0,\eta^H\right\}$ villages targeted only by party A.

The second set of villages that vote $v_i=\frac{1}{2}A$ include those that belong to the $\left(1-\mu^A-\mu^B\right)\pi^O\gamma^{O,H}\phi^A\phi^B$ share of $\left\{\kappa^O,\theta^0,\eta^H\right\}$ villages targeted by both parties, the $\left(1-\mu^A-\mu^B\right)\pi^O\gamma^{O,H}\left(1-\phi^A\right)\left(1-\phi^B\right)$ share of $\left\{\kappa^O,\theta^0,\eta^H\right\}$ villages targeted by neither party, the $\left(1-\mu^A-\mu^B\right)\left(1-\pi^O\right)\gamma^{NO,H}\left(1-\phi^A\right)$ share of $\left\{\kappa^{NO},\theta^0,\eta^H\right\}$ villages targeted by neither party, and the $\left(1-\mu^A-\mu^B\right)\pi^O\left(1-\gamma^{O,H}\right)+\left(1-\pi^O\right)\left(1-\gamma^{NO,H}\right)$ share of $\left\{\theta^0,\eta^L\right\}$ villages that is unresponsive to targeting.

Lemma 3 *Following Bayes rule, B's posterior likelihood that a village randomly chosen from the set of $\left\{\kappa^O,\theta^A\right\}$ and $\left\{\kappa^O,\theta^0\right\}$ villages and electoral behavior $v\in\{A,B,split\}$ in the first election, respectively, has organizational capacity η^H is given by:*

1. $\Pr\left(\theta=\theta^0,\eta=\eta^H|v=B,\theta\in\left\{\theta^A,\theta^0\right\},\kappa=\kappa^O\right)$ *or for simplicity* $\Pr(B)=1$*;*

2. $\Pr\left(\theta=\theta^0,\eta=\eta^H|v=A,\theta\in\left\{\theta^A,\theta^0\right\},\kappa=\kappa^O\right)$ *or, for simplicity,* $\Pr(A)=\frac{\left(1-\mu^A\right)\gamma^{H,O}\phi^A\left(1-\phi^B\right)}{\left(1-\mu^A\right)\gamma^{H,O}\phi^A\left(1-\phi^B\right)+\mu^A}$*;*

3. $\Pr\left(\theta=\theta^0,\eta=\eta^H|v=split,\theta\in\left\{\theta^A,\theta^0\right\},\kappa=\kappa^O\right)$ *or, for simplicity,* $\Pr(split)=\frac{\gamma^{H,O}\left(\phi^A\phi^B+\left(1-\phi^A\right)\left(1-\phi^B\right)\right)}{\gamma^{H,O}\left(\phi^A\phi^B+\left(1-\phi^A\right)\left(1-\phi^B\right)\right)+\left(1-\gamma^{H,O}\right)}$.[31]

Proof of Lemma 3

$\Pr\left(\theta=\theta^0,\eta=\eta^H|v=B,\theta\in\left\{\theta^A,\theta^0\right\},\kappa=\kappa^O\right)=1$ trivially follows from the fact that only $\left\{\theta^0,\eta^H\right\}$ villages within $\left\{\theta^A,\theta^0\right\}$ villages vote fully for party B.

$\Pr\left(\theta=\theta^0,\eta=\eta^H\,|v=A,\theta\in\left\{\theta^A,\theta^0\right\},\kappa=\kappa^O\right)=\frac{\left(1-\mu^A\right)\gamma^{H,O}\phi^A\left(1-\phi^B\right)}{\left(1-\mu^A\right)\gamma^{H,O}\phi^A\left(1-\phi^B\right)+\mu^A}$ follows from the Bayesian updating logic. The denominator is the mass of villages that vote fully for party A, which are either $\left\{\theta^0,\eta^H\right\}$ villages that were targeted only by party A (and there is a mass

[31] Note that we can restrict to θ^0 villages since they are the only ones that can exhibit a split vote.

$\left(1-\mu^A\right)\gamma^{H,O}\phi^A\left(1-\phi^B\right)$ of such villages), or θ^A villages that vote for party A for ideological reasons (and there is a mass μ^A of such villages). The numerator, however, includes only the mass of the former village types since these are the only ones that are $\left\{\theta^0,\eta^H\right\}$ villages.

$\Pr\left(\theta=\theta^0,\eta=\eta^H|v=split,\theta\in\left\{\theta^A,\theta^0\right\},\kappa=\kappa^O\right)=\frac{\gamma^{H,O}\left(\phi^A\phi^B+\left(1-\phi^A\right)\left(1-\phi^B\right)\right)}{\gamma^{H,O}\left(\phi^A\phi^B+\left(1-\phi^A\right)\left(1-\phi^B\right)\right)+\left(1-\gamma^{H,O}\right)}$ also follows from the Bayesian updating logic. The denominator is the mass of villages that split their vote across both parties, which are either $\left\{\theta^0,\eta^H\right\}$ villages that both or no parties targeted, and there are masses $\gamma^{H,O}\phi^A\phi^B$ and $\gamma^{H,O}\left(1-\phi^A\right)\left(1-\phi^B\right)$ of such villages, respectively, or $\left\{\theta^0,\eta^L\right\}$ villages that cannot vote fully for any of the parties due to their low organizational capacity, and there is a mass $\left(1-\gamma^{H,O}\right)$ of such villages. The numerator, however, includes only the mass of the first two village types, since these are the only ones that are $\left\{\theta^0,\eta^H\right\}$ villages.

Lemma 4 *Since there is no possible learning from electoral results, the likelihood that a village randomly chosen from the set of* $\left\{\kappa^{NO},\theta^A\right\}$ *and* $\left\{\kappa^{NO},\theta^0\right\}$ *villages has organizational capacity* η^H *is given by* $\Pr\left(\theta=\theta^0,\eta=\eta^H|\theta\in\left\{\theta^A,\theta^0\right\},\kappa=\kappa^{NO}\right)$ *or, for simplicity,* $\Pr(\emptyset)=\left(1-\mu^A\right)\gamma^{H,NO}$.

Proof of Lemma 4

The posterior likelihood that $\left\{\kappa^{NO},\theta^A\right\}$ and $\in\left\{\kappa^{NO},\theta^0\right\}$ villages have organizational capacity η^H coincides with the prior likelihood, since there is no learning due to the lack of information on their electoral outcomes.

C.2 Proof of Proposition 1

The incumbent party B's optimal strategy is to target goods to the villages that are more likely to be of the $\left\{\theta^0,\eta^H\right\}$ type. From Lemma 3, $\Pr(B)=1$, and thus party B first targets villages that vote for party B in the first election and are known not to be of type θ^B.

Second, since it is clear that both $\Pr(split)$ and $\Pr(A)$ are larger than $\Pr(\emptyset)$, if $\gamma^{H,O}$ is large enough with respect to $\gamma^{H,NO}$ and party B is resource constrained, it is then optimal for party B to next target villages that vote fully for party A or split their vote among both parties, and not to target κ^{NO} villages. Lastly, it is optimal for party B to prioritize villages that vote fully for party A over those that split their vote among both parties, as long as $\Pr(A) > \Pr(split)$, and thus, if

$$\left(1-\gamma^{H,O}\right)\frac{\phi^{A}\left(1-\phi^{B}\right)}{1-\phi^{A}-\phi^{B}-2\phi^{A}\phi^{B}}\frac{1-\mu^{A}}{\mu^{A}} > 1,$$

which is more likely to hold for a larger ϕ^{A} and smaller μ^{A}, $\gamma^{H,O}$, and ϕ^{B}.

D Summary statistics

Table A.1: Bloc voting (as share of total polling stations)

	2000	2007	2012
Bloc	0.473	0.407	0.487
PDS (Wade)	0.222	0.376	0.126
PS	0.251	0.011	
Primary challenger to PDS (Wade)	0.251 (PS)	0.010 (Remwi)	0.361 (APR)
N	3838	4283	4297

Notes: It should be noted that 2000 and 2012 results are from the second round of voting, whereas 2007 results are from the first round of voting because Wade received a majority of the votes and won the election. Bloc-voting in 2007 is thus somewhat lower because there were 15 candidates on the ballot. Election results at the national level for the parties listed above are as follows: In 2000, PDS (Wade) won 58.49%, while Diouf won 41.51% in the second round. In the first round of 2007, PDS (Wade) won 55.90%, Remwi won 14.92%, and PS won 13.56%. In 2012, PDS (Wade) won 34.20% and APR won 65.80% of the vote in the second round of elections.

Table A.2: Access to public goods in village

	2000	2009
Local public goods		
Water	0.485	0.704
Schools	0.419	0.505
Hospitals	0.077	0.095
Rural road	0.116	0.153
Placebo goods		
Paved road	0.094	0.102
Electric lines	0.070	0.147
Controls		
Phone line	0.069	
Electricity post	0.027	
Weekly market (Market 1)	0.027	
Market for agricultural inputs (Market 2)	0.029	
Warehouse for dried food (Market 3)	0.121	
Grocery store (Market 4)	0.339	
Fruit (Market 5)	0.167	
Animal products (Market 6)	0.373	
Materials from the sea (Market 7)	0.058	
Natural materials (Market 8)	0.388	
Cattle feed	0.166	
Artisan guilds	0.181	

Table A.3: Population shares (over 18)

	Observations	Mean	SD	Min	Max
Over 18 Population	10763	181.6448	279.5996	1	10805
Ethnicity share (over 18)					
Badiaran	10763	0.001	0.018	0	1
Bainouk	10763	0.001	0.023	0	0.876
Balante	10763	0.009	0.074	0	1
Bambara	10763	0.010	0.063	0	1
Bassari	10763	0.002	0.044	0	1
Bedick	10763	0.000	0.018	0	1
Coniagui	10763	0.001	0.011	0	0.643
Creole	10763	0.000	0.001	0	0.088
Diakhank	10763	0.003	0.043	0	0.982
Dialonke	10763	0.002	0.038	0	1
Diola	10763	0.034	0.168	0	1
Fula	10763	0.000	0.003	0	0.237
Laobe	10763	0.002	0.019	0	1
Lebou	10763	0.000	0.013	0	0.788
Malinke	10763	0.002	0.035	0	1
Mancagne	10763	0.002	0.037	0	1
Manding	10763	0.043	0.166	0	1
Manjag	10763	0.007	0.058	0	1
Maure	10763	0.009	0.069	0	1
Peul	10763	0.305	0.406	0	1
Pulaar	10763	0.060	0.204	0	1
Sarakole	10763	0.004	0.043	0	1
Serer	10763	0.113	0.275	0	1
Soce	10763	0.002	0.025	0	0.909
Soninke	10763	0.005	0.053	0	1
Soussou	10763	0.000	0.002	0	0.150
Tandanke	10763	0.000	0.005	0	0.362
Toucoule	10763	0.017	0.094	0	1
Wolof	10763	0.364	0.429	0	1
Foreigner	10763	0.002	0.017	0	0.750
Other	10763	0.000	0.010	0	0.768
Religion share (over 18)					
Catholic	10763	0.025	0.113	0	1
Khadrya	10763	0.131	0.262	0	1
Layenne	10763	0.002	0.026	0	1
Mouride	10763	0.297	0.381	0	1
Protestant	10763	0.000	0.008	0	0.377
Tidjane	10763	0.507	0.405	0	1
Other Christians	10763	0.002	0.026	0	0.951
Other Muslims	10763	0.029	0.119	0	1
Other religions	10763	0.006	0.052	0	1

Table A.4: Prevalence of household assets (as share of population)

	Observations	Mean	SD	Min	Max
Radio	10764	0.792	0.200	0	1
Television	10764	0.064	0.116	0	1
Video	10764	0.009	0.041	0	0.842
Refrigerator	10764	0.008	0.038	0	1
Telephone	10764	0.016	0.062	0	0.830
Cooking stove	10764	0.021	0.085	0	1
Fireplace	10764	0.012	0.074	0	1
Air conditioner	10764	0.001	0.012	0	0.830
Sewing machine	10764	0.011	0.038	0	1
Car	10764	0.024	0.075	0	1
Moped	10764	0.041	0.089	0	1
Bicycle	10764	0.169	0.285	0	1
Carriage	10764	0.440	0.296	0	1
Pirogue	10764	0.008	0.046	0	0.861
Hoe	10764	0.696	0.324	0	1
Cart	10764	0.368	0.302	0	1
Milking animals	10764	0.465	0.359	0	1
Tractor	10764	0.006	0.041	0	1
Truck	10764	0.007	0.031	0	1
Moped/bike	10764	0.010	0.044	0	1
Pirogue 2	10764	0.006	0.043	0	0.871
Refrigerator 2	10764	0.003	0.019	0	0.830
Sewing machine 2	10764	0.008	0.034	0	1
Music equipment	10764	0.002	0.022	0	1
Chair	10764	0.006	0.039	0	1
Fax	10764	0.002	0.016	0	0.830
Photocopier	10764	0.000	0.009	0	0.830
Computer	10764	0.000	0.009	0	0.830
Mill	10764	0.007	0.043	0	1
Camera	10764	0.002	0.019	0	0.830
Building	10764	0.013	0.083	0	1

E Results coding DV as difficulty of access rather than presence in village

In the following analysis, we code a local public good as present in the village if it is "in the village" or "somewhat close," as opposed to "somewhat distant" or "very distant." Following the coding of the national statistics agency, each good has a different range of kilometers that correspond to the distance measure. For instance, a water source is coded as "somewhat close" if it is less than 1km away, while a health clinic takes the same value if it is less than 5km away.

Table A.5: Using Indicator for Close Distance to Public Goods

	(1) OLS	(2) OLS (Logged)	(3) Δ Access	(4) Poisson
Type = 1 (Mixed support)	0.018^{**}	0.049^{***}	0.014^{***}	0.016
	(0.006)	(0.014)	(0.004)	(0.009)
Type = 2 (Non-Wade support)	0.024^{**}	0.052^{*}	0.018^{**}	0.027^{*}
	(0.009)	(0.021)	(0.007)	(0.012)
Type = 3 (Wade support)	0.028^{***}	0.072^{***}	0.022^{***}	0.033^{**}
	(0.007)	(0.017)	(0.005)	(0.011)
Mean distance to public good (2000)	0.270^{***}	0.626^{***}	0.617^{***}	-0.170^{***}
(Logged in model 2)	(0.006)	(0.012)	(0.014)	(0.009)
Observations	10756	10756	10756	10756
R^2		0.687	0.674	0.379
One-sided Wald test (p-value)				
Type 1 $\geq$ Type 3	0.100	0.125	0.089	0.079
Type 2 $\geq$ Type 3	0.347	0.214	0.303	0.343
Type 1 $\geq$ Type 2	0.231	0.450	0.266	0.197
Type 2 $\geq$ Type 1	0.769	0.550	0.734	0.803

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level (Type = 0) is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

F Predictions and results robust to turnout considerations

While we do not explicitly model turnout in the paper, it is straightforward to microfound the effect of targeted goods in $\left\{\theta^0, \eta^H\right\}$ villages to account for it. We assume that in such villages, half of the voters support party A and the other half supports party B. Moreover, within the supporters of a given party, half always turns out to vote but the other half only turns out if it receives transfers from its preferred party. As a consequence, in the absence of transfers, only half of voters turn out, of which half votes for party A and the other for party B. However, if a given party p targets the village, all its supporters turn out to vote and the party receives two-thirds of the votes. Similarly, if both parties target the village, all individuals turn out to vote and half vote for each party. This incorporation of turnout considerations delivers the same qualitative predictions.

Our data analysis does not take turnout into account either. However, the switching of village types could be generated by two distinct patterns of behavior: new voters entering the electorate or existing voters switching sides. To test whether the latter mechanism is driving outcomes, we re-run the analysis redefining *Type* in 2000 to only include in each polling station type villages that have greater than 33% voter turnout. In other words, very low turnout villages, which are the most likely candidates for the first mechanism, are instead recoded as split. Table A.6 shows that the results are qualitatively unchanged, which indicates that party switching rather than turnout mobilization is more likely driving our results.

G Placebo tests for alternative instruments

Table A.6: Recoding Type Using Turnout

	(1) OLS	(2) OLS (Logged)	(3) Δ Access	(4) Poisson
Type = 1 (Mixed support)	0.245***	0.114***	0.102***	0.157***
	(0.026)	(0.012)	(0.015)	(0.017)
Type = 2 (Incumbent support)	0.247***	0.114***	0.115***	0.168***
	(0.033)	(0.015)	(0.020)	(0.021)
Type = 3 (Challenger support)	0.304***	0.143***	0.135***	0.190***
	(0.035)	(0.016)	(0.021)	(0.022)
Public goods index (2000)	0.333***	0.255***	-0.283***	0.207***
	(0.015)	(0.014)	(0.009)	(0.010)
Observations	10753	10753	10753	10753
R^2	0.551	0.495	0.321	
One-sided Wald test (p-value)				
Type 1 $\geq$ Type 2	0.484	0.513	0.263	0.290
Type 1 $\geq$ Type 3	0.037	0.023	0.040	0.036
Type 2 $\geq$ Type 3	0.089	0.062	0.221	0.191

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level (Type = 0) is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table A.7: Placebo Instrument

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel A									
Other:		Health	Water	Rural road	Phone	Electric post	Market1	Market2	Market3
Schools=1 × Population Rank	-0.007***	-0.007***	-0.006***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Other=1 × Population Rank		0.003	-0.001	0.000	-0.002	-0.002	0.001	0.005*	0.002
		(0.003)	(0.001)	(0.001)	(0.002)	(0.004)	(0.003)	(0.003)	(0.002)
Observations	10762	10762	10762	10762	10762	10762	10762	10762	10762
R^2	0.343	0.343	0.343	0.343	0.343	0.343	0.342	0.343	0.343
First stage F-statistic									
F-Statistic (School × rank)	28.127	26.489	24.319	28.888	27.598	27.485	27.109	31.345	26.635
F-Statistic (Placebo × rank)		0.930	3.711	0.152	1.757	0.221	0.080	4.051	1.071
Panel B									
Other:	Market4	Market5	Market6	Market7	Market8	Cattle feed	Artisan guild	Paved road	Electric line
Schools=1 × Population Rank	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Other=1 × Population Rank	0.000	-0.002	-0.000	-0.001	-0.000	0.000	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Observations	10762	10762	10762	10762	10762	10762	10762	10762	10762
R^2	0.342	0.343	0.342	0.342	0.342	0.342	0.342	0.342	0.342
First stage F-statistic									
F-Statistic (School × rank)	27.839	28.108	28.341	27.774	28.147	28.030	27.234	27.390	26.687
F-Statistic (Placebo × rank)	0.245	2.648	0.005	0.267	0.194	0.152	0.015	0.061	0.046

Notes: Robust standard errors in parentheses, clustered at the commune level. *Population rank* ranks each village by population size in relation to other villages within a 5km radius. *Market 1* is an indicator for the existence of a weekly market in the village; *Market 2* is market for agricultural inputs; *Market 3* is warehouse for storing dried food; *Market 4* is grocery store; *Market 5* is access to fruit; *Market 6* is access to animal products (milk, leather/tannery); *Market 7* is access to materials from the sea (dried fish, salt, shells); and *Market 8* is access to natural materials (honey, coal, firewood). Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

H Testing the effect of voting behavior in 2000 on polling stations assignment in 2007

Table A.8: Predicting Polling Stations

	(1) Polling Station (2007)	(2) Δ Polling Stations
Type = 1 (Mixed support)	-0.000	-0.001
	(0.007)	(0.005)
Type = 2 (Incumbent support)	-0.002	0.002
	(0.010)	(0.008)
Type = 3 (Challenger support)	0.000	0.000
	(.)	(.)
Polling station (2000)	0.834***	-0.143***
	(0.011)	(0.010)
Public goods index (2000)	0.019***	0.016***
	(0.004)	(0.004)
Observations	10757	10757
R^2	0.803	0.127
One-sided Wald test (p-value)		
Type 1 $\geq$ Type 2	0.579	0.265
Type 1 $\geq$ Type 3	0.481	0.408
Type 2 $\geq$ Type 3	0.426	0.621

Notes: Robust standard errors in parentheses, clustered at the commune level. Electorate type base level (Type = 0) is a non-polling station village. Included controls are logged population (flexible), logged ethnic and religious group size (linear, quadratic, cubic), availability of private goods in 2000, and logged assets (linear, quadratic, cubic). Fixed effects are entered at the commune level.

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$