

# Crossing Party Lines: The Effects of Information on Redistributive Politics

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March 28, 2013

## Abstract

It is often lamented that poor governance impedes economic development in Africa. One problem is political accountability. Politicians in many African countries rely on tribal allegiances that deliver the vote of co-ethnics irrespective of performance, dampening electoral incentives. Giving voters information about candidate competence presents a counterpoint to tribal loyalty and strengthens accountability. I extend a canonical model of electoral competition to show how the provision of information flows through voter behavior and ultimately impacts the distribution of public goods. I test the theory on data from Sierra Leone using decentralization and differential radio coverage to identify information's effects. Estimates suggest that information increases voting across ethnic-party lines and induces a more equitable allocation of public spending.

JEL Codes: D72, O17, H41

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\*Stanford Graduate School of Business, kecasey@stanford.edu. I would like to thank my advisers, Brian Knight, Edward Miguel and Kaivan Munshi; collaborators on related research projects, Liz Foster and Rachel Glennerster; and the excellent Freetown-based field team. I am grateful for comments from Gustavo Bobonis, Steve Callander, Andrew Foster, Blaise Melly, Sriniketh Nagavarapu and David Stromberg, as well as seminar participants at Brown University, Boston University, the Center for Global Development, Dartmouth, the European Bank for Reconstruction and Development, IIES Stockholm, North East Universities Development Consortium, Stanford GSB, University of California Berkeley, University College London, University of Pennsylvania, University of Toronto and the Working Group on African Political Economy. This research would not have been possible without the assistance of the Institutional Reform and Capacity Building Project in Sierra Leone and generous financial support from the National Bureau of Economic Research African Successes Project funded by the Gates Foundation. All errors are my own.

# 1 Introduction

Poor governance has long been considered an impediment to economic development in Africa. Weak political accountability is a prominent contributing factor, yet our understanding of how democratic safeguards break down and what can be done about the problem remains limited. Politics in many African countries is dominated by tribal allegiances that enable politicians to take the support of co-ethnics for granted, thereby weakening electoral accountability. These allegiances deliver the vote irrespective of the competence or performance of individual politicians and dictate the allocation of public spending. One explanation for such uncritical support in the face of poor public service delivery is that widespread illiteracy and undeveloped media markets leave citizens with little alternative information on which to base their vote. If true, the provision of better information about candidates could naturally be part of the solution.

The first contribution of this paper is building a model of political competition that incorporates information provision. I derive the equilibrium effects of information on voter behavior and link these, via the strategic response of parties, to the ultimate effects of information on the distribution of public goods. The second, and main, contribution is a novel identification strategy and empirical test of the theoretical propositions that leverage institutional features of Sierra Leone. I use the country’s decentralized political system and differential radio coverage to isolate the effects of information on vote choice and public spending. The data broadly confirms the theoretical predictions.

The formal model is an extension of Lindbeck and Weibull’s (1987, hereafter LW) redistributive politics model. I incorporate candidate quality, which is imperfectly observed, to derive three propositions of interest. I first establish that LW’s original “swing” voter result continues to hold under the addition of candidate quality, where voter willingness to trade off ideological preferences for consumption transfers leads parties to invest more resources in areas with weaker underlying party affiliation.<sup>1</sup> Second, I show that providing citizens with information about candidates relaxes their partisan loyalty: voters become willing to cross party lines when the rival party fields a sufficiently superior candidate, but only if the information environment is rich enough for them to detect and find the quality advantage credible. Such crossing in turn makes party forecasting of vote shares more uncertain and effectively expands the set of competitive or “swing” jurisdictions. And third, parties optimally respond to increasing uncertainty by smoothing the allocation of public goods more equitably across jurisdictions. I then take these three propositions to the data.

Any empirical attempt to evaluate whether public spending favors more tightly contested

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<sup>1</sup>See also Dixit and Londregan 1996, 1998; and Bardhan and Mookherjee 2010.

areas confronts the fundamental identification problem of measuring the strength of partisanship, where the most obvious measure—actual vote shares—is endogenous to the strategic investments of parties (Larcinese, Snyder and Testa 2013). Longstanding ties between ethnic groups and political parties in Sierra Leone offer a plausible solution: they imply that ethnic composition is a strong (and easily observed) predictor of party loyalty; and, since it is largely determined by historical settlement patterns, the measure is exogenous to short term fluctuations in political patronage flows. If politicians favor “swing” jurisdictions in this context, then public investment will be decreasing in the ethnic population advantage (or homogeneity) held by either of the two major parties.

I find evidence that public spending does indeed favor more ethnically diverse and hence competitive jurisdictions in Sierra Leone. My estimates suggest that moving from a perfectly homogenous jurisdiction to one that is maximally competitive (where each party’s ethnic loyalists hold a 50 percent population share) results in a 1.02 standard deviation unit increase in the bundle of campaign goods distributed by national candidates and \$19,577 more public spending by elected local politicians. Regarding magnitude, the latter difference is three times the jurisdiction-level budget of a World Bank-funded development project (GoBifo Project 2009). Benefits accruing to more diverse constituencies in this way provide a counterpoint to the literature documenting the negative effects of diversity on local public goods. This apparent divergence arises from a difference in perspective. While leading papers explore dynamics internal to communities—like taste differences that reduce contributions to public goods (Alesina, Baqir and Easterly 1999) or greater difficulties imposing sanctions across as opposed to within ethnic groups (Miguel and Gugerty 2005)—the outcomes here concern patronage bestowed upon communities by external political agents vying for their support.

To test the second proposition—that information relaxes partisan loyalties—I exploit the information differences created by Sierra Leone’s decentralization reforms of 2004. While standard decentralization arguments focus on the information advantages held by local politicians (Oates 1999), I instead leverage the information advantages that voters have about politicians who are more proximate both geographically and within social networks. Since media coverage is limited, Sierra Leoneans rely primarily on word of mouth and interpersonal connections for information about government, and these sources tend to be richer with regard to local as compared to national politicians. For example, voters are twice as likely to be able to name and have been visited by their local representative. Using voter fixed effects to control for all other observable and unobservable determinants of individual party choice, I show that the same voters are 11.3 percentage points more likely to cross ethnic-party lines in local elections where they have better information about candidates. Information further

encourages voters to split their ticket across different parties when voting for multiple offices simultaneously, which they are 12.3 percentage points more likely to do in local races.

I can also leverage differences in access to the second most popular source of political information, the radio, to further substantiate that information drives these voting results. The aggregate coverage area of the dozens of community-produced radio programs overlaps with and extends beyond the reach of nationally syndicated broadcasts. This overlay enables a triple differencing empirical approach that (i) compares local and national vote choices, (ii) between radio owners and their neighbors without radios, (iii) across areas that have only community-produced versus both community and nationally syndicated radio shows. If community stations devote greater coverage to local candidates, then the knowledge premium that radio owners acquire will be larger with respect to local politicians in areas that have only community programs than in areas with access to both community and national news. Triple difference estimates establish this local knowledge premium first for the ability to correctly name politicians, and then for the willingness to vote across party lines.

To empirically link these voter-side effects back into the redistributive calculus of parties, I test for differences in the distribution of campaign spending across jurisdictions in local versus national elections. I confirm the third theoretical proposition regarding investment smoothing by showing that the allocation of campaign goods in local elections is more equitable and responds only half as strongly to underlying ethnic-party loyalties as that in national races. The result is robust to including fixed effects for the 112 Parliamentary constituencies nationwide, which control for all other factors that make these small geographic areas attractive to both politicians and migrants.

The welfare effects of providing better information about candidates in this context are unambiguous: information helps citizens make voting choices that enhance their utility, and leads to a more equitable allocation of public spending. Moreover, if the candidate attributes that voters respond to are in practice associated with professional competence, then increasing their salience further enhances the productivity of the public sector. Along these lines, I use pre-election peer evaluations of incumbent politicians as an empirical measure of effectiveness in office, and document greater electoral support for incumbents with stronger performance rankings, particularly among voters from rival ethnic groups.

While the marginal returns to information provision are likely larger and easier to identify econometrically in developing countries where mass media is limited, the underlying questions remain important for industrialized nations. Despite the abundance of news outlets in the United States, much of the American public remains poorly informed about politics and relies on heuristic shortcuts—foremost party label—in making voting decisions. A common concern is that reliance on such cues can mislead citizens to cast votes that do not reflect the

choices they would have made under full information (Lau and Redlawsk 2001), generating accountability problems and systematically biasing electoral returns (Bartels 1996). The division between those who are and are not informed raises further normative concerns if knowledge is a political asset that helps ensure politics represent the public interest (Delli Carpini and Keeter 1996). As a potential solution, experimental evidence suggests that giving voters additional information, like detailed policy assessment (Bullock 2011), alleviates their dependence on party cues and could thereby enhance electoral accountability. Taking these ideas to the developing world, the combination of limited media penetration and tribal-party allegiances facilitates identification outside the laboratory and reveals the power of information along margins—i.e. access to one versus two radio broadcasts—likely associated with sizeable gains in political knowledge.

The rest of the paper is structured as follows. Section 2 positions this paper in relation to the literature. Section 3 describes the institutional framework of Sierra Leone. Section 4 presents the model and derives the three propositions of interest. Section 5 discusses the data, econometric specifications and empirical results. Section 6 considers potential alternative explanations. Section 7 concludes with policy implications.

## 2 Related Literature

This paper builds on several strands of literature exploring the political economy effects of information, decentralization and ethnic allegiances in developing countries.

The finding that candidate information increases citizen willingness to cross ethnic-party lines adds to the literature regarding the effects of supplying better information to voters. Information has been shown to help citizens vote out corrupt politicians in Brazil (Ferraz and Finan 2008), increase voter turnout in Delhi slums (Banerjee et al 2011), curtail support for corrupt parties in Mexico (De La O et al 2012), increase support for opposition parties in Russia (Enikolopov et al 2011), and overcome social biases against female candidates in India (Beamnen et al 2009). The main contribution of this paper is integrating such voter-side partial effects into a unified model that also incorporates the response of parties: I carry the effect of information on vote choice forward, via its impact on the electoral landscape, to establish a subsequent effect on public investment.<sup>2</sup>

The pass through effect from voting behavior to public spending relates to the litera-

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<sup>2</sup>In the U.S. context, there is a related economics literature focused specifically on the role of mass media as a conduit of political information. For voter-side impacts, see for example Gentzkow (2006) and Gentzkow, Shapiro and Sinkinson (2011) on turnout and DellaVigna and Kaplan (2007) on party choice. For government-side effects, see for example Strömberg (2004) and Snyder and Strömberg (2010) on federal spending. Prat and Strömberg (2011) provide a review.

ture linking what the public knows to the incentives governing public financial management. Besley and Burgess (2002) explore how revealing information about government effort encouraged a stronger relief spending response to natural disasters in India. Reinikka and Svensson (2011) show that publicizing information on government resources deterred the capture of education funds in Uganda. This paper contributes a new mechanism whereby increasing public knowledge of candidate characteristics affects the distribution of public goods, and directly ties the allocation response to data on changing vote choices.

Moving outside the developing world, the specific empirical result that information induces a more equitable allocation of campaign spending is the converse of Strömberg (2008), who finds that the increasing availability of opinion poll data in the U.S. enables parties to more precisely predict vote shares and thereby encourages them to target their campaign resources more narrowly. The comparison establishes a striking non-monotonicity: a similar dynamic appears to be at work at two ends of the development spectrum and to opposite effect. In the U.S., information helps parties become more sophisticated and tailor their spending more calculatedly to narrower margins of victory; while in Sierra Leone, information helps voters become more sophisticated and less predictably beholden to ethnic histories, thereby eliciting a wider targeting of party spending.

Highlighting the information advantages citizens have with respect to local politicians adds a new perspective to the debate about decentralization in developing countries. Bardhan (2002) considers the theory and empirical evidence regarding the gains and risks of decentralization, and in particular how these may net out differently in less developed countries. Establishing the links between citizen information advantages, political knowledge and voting offers further supportive evidence that may be particularly influential in poorer countries where low information political contests are common. The greater availability of information regarding local politicians is also consistent with and provides a potential mechanism to explain Khemani (2001)'s finding that citizens evaluate the performance of local incumbents more comprehensively than they do for national incumbents when voting retrospectively in India.

I lastly contribute to the unsettled question of whether ethnic or caste-based political allegiances pose a threat or benefit to democratic accountability. Munshi and Rosenzweig (2010) argue that traditional sub-caste networks can solve the candidate commitment problem when political parties are weak; and provide evidence that intra-caste discipline leads to the election of more competent local leaders and greater public goods provision. By contrast, Banerjee and Pande (2009) posit that ethnic preferences give the numerically dominant group a competitive advantage that enables them to win even when other dimensions (like candidate quality) are weak; and provide evidence that increasing ethnic identification in

India led to the greater electoral success of more corrupt national officials. Aligned more closely with the latter perspective, this paper emphasizes how reliance on ethnic loyalties in poor information environments leads citizens to cast suboptimal votes that do not facilitate the election of the most competent individuals. At the same time, the empirical result that voters are willing to cross ethnic lines when they have better information suggests that such deeply entrenched allegiances are not in fact immutable.

### 3 Institutional Context of Sierra Leone

Three aspects of Sierra Leone’s political environment make it a particularly conducive empirical setting for estimating the effects of information on redistributive politics. First, the historical association between ethnic groups and political parties creates a plausibly exogenous measure of party preferences to test whether public spending favors “swing” jurisdictions. Second, the two tiers of decentralized government and overlapping coverage areas of radio broadcasts enable observation of the same citizens and parties acting under differing amounts of information. Third, exit poll data reveals an empirical tradeoff between party loyalty and candidate attributes that motivates the modeling choices of Section 4.

Beginning with the correlation between ethnicity and party loyalty, the two major political parties—the Sierra Leone People’s Party (SLPP) and the All People’s Congress (APC)—have strong, long-standing ties to the Mende and other ethnic groups in the South and the Temne and other groups in the North, respectively. As an example of the strength of these loyalties, in the 2007 Parliamentary elections the APC won 36 of 39 seats in the Northern Province, while the SLPP and its splinter party, the People’s Movement for Democratic Change (PMDC), swept 24 of 25 seats in the South.<sup>3</sup> This implies that the ethnic composition of a jurisdiction is a strong predictor of its expected party loyalty, and is observable to both political parties and the econometrician. Moreover, since ethnic composition is determined largely by historical settlement patterns and responds little to short term changes in government patronage, it is plausibly exogenous to the redistributive promises of candidates.

Table 1 presents summary statistics regarding the population shares and estimated party loyalties of the major ethnic groups in Sierra Leone. The first column lists the national population share of each ethnic group based on 2004 census data, where the two largest—the Mende and Temne—each account for roughly a third of the population. Column 2 estimates the party loyalty of each ethnic group by taking the proportion of voters belonging to that group who reported voting for the APC in the 2007 Presidential Election and subtracting

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<sup>3</sup>While there are other small political parties, this paper restricts analysis to candidates from these three largest parties, grouping together candidates from the PMDC with those from its parent party, the SLPP.

from that the proportion who reported voting for the SLPP or PMDC. The strong negative estimate for the Mendes indicates widespread support for the SLPP, while the strong positive estimate for the Temnes indicates broad allegiance to the APC. The empirical analysis uses these national level statistics to infer the party loyalty of each ethnic group as a whole, and then use differences in local population shares to measure how the strength of the expected loyalty varies across jurisdictions.

Second, the primary identification strategy leverages differences in the amount of information citizens have about politicians operating at different levels of a decentralized state. As background, the Local Government Act of 2004 reconstituted nineteen Local Councils over thirty years after former President Siaka Stevens abolished district-level government. Each local politician or Councillor represents roughly 10,000 citizens living in one of the 394 local jurisdictions, called wards. Three or four of these wards nest neatly inside one of the 112 Parliamentary constituencies, which are the jurisdictions of a national politician or MP. Seats at both levels are single member jurisdictions elected by first-past-the-post plurality.<sup>4</sup> Analysis covers candidates from the 2007 national and 2008 local elections, which were the second set of elections held since the end of the country's civil war (1991 to 2002). Between the war and the preceding decades of one party rule under Stevens, the experience with competitive multi-party democracy remained relatively new to most Sierra Leoneans.

Pre-election household data from 2007 confirms that citizens have more information about politicians at the local level: while 37 percent of respondents could correctly name their Councillor; only 17 percent could name their MP.<sup>5</sup> The different nature of the local versus national politicians' jobs creates more opportunities for interaction between citizens and their local representatives. By law, Councillors are mandated to work and reside in their jurisdiction, while elected MPs move to the capital. As a result, while 52 percent of communities reported being visited by their elected Councillor in the past year, only 27 percent reported a visit from their MP. Mechanically, the fact that an MP represents over four times as many people as a Councillor means that the probability of personal interaction with one's MP is likely to be far lower. These statistics collectively suggest that voters have roughly twice as much information about candidates competing for local as compared to national office.

Note how this informational framework differs from the U.S. where voters typically know more about national as opposed to state or county politics. The difference can be explained by the weak media presence in Sierra Leone: television ownership and programming are

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<sup>4</sup>Some large urban wards outside the capital are served by multiple Councillors. These multi-seat wards imply a total of 456 individual local seats, which is roughly consistent with the target of one Councillor per every 10,000 residents in a national contemporary population of around 5 million.

<sup>5</sup>Statistics in the next two paragraphs are based on the National Public Services (NPS) surveys, which are described in Section 5.

extremely limited (only 9 percent of households own a TV); high illiteracy rates mean that print media virtually does not exist outside the capital; and parts of the country are cut off even from radio coverage (and only 48 percent of households own a radio). Limited media leads voters to rely primarily on word of mouth and interpersonal exchange for information about politics: household data from 2008 shows that 57 percent of respondents hear about what the government is doing from friends and relatives, as compared to 34 percent from radio and less than 2 percent from television or newspapers. Such social networks are simply much richer with regard to local candidates, where the probability that someone within your network has a relationship or experience interacting with a local politician is higher.

To further isolate the effect of information acquisition on voting behavior, a complementary triple differencing approach works along the margin of geographic access to radio broadcasts. Nationally syndicated programs, like those of the Sierra Leone Broadcasting Corporation, are transmitted from towers located in the country's five largest towns. Independent community radio stations are located in these same large towns as well as in a number of smaller towns and villages scattered across the country. The aggregate coverage of these local stations thus largely overlaps with and extends beyond the reach of the national towers, thereby dividing the country into three areas: places with dual (community and national) radio coverage, those with only community radio coverage, and those with no coverage.<sup>6</sup> Broadcast coverage provides radio owners with access to additional information about politics that their neighbors without radios do not have. Under dual coverage this information premium comes from two sources, while under only community coverage it comes from one source. If there are differences in the extent to which local and nationally syndicated programs cover local candidates, these content differences will affect political knowledge and voting in predictable ways, which is the subject of Section 5.3.2.

Third, preferences reported in exit polls motivate the development of a three factor voting model where the relative factor weights depend on information. In exit polls conducted in 2008, voters listed the following reasons why they chose particular local candidates: i) political party (35 percent); ii) promises of development (23 percent); and iii) individual candidate characteristics such as their reputation or achievement in their previous job (17 percent), the candidate is a friend or relative (9 percent), the candidate helped the voter or his/her family in the past (4 percent), and gender (3 percent). Importantly, Table 2 shows that while party and candidate characteristics are equally important in selecting local candidates (where 35 percent of voters cite each as the primary determinant of vote choice),

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<sup>6</sup>While there are a small number of places that receive only national signals, there are too few observations in the sample used in Table 5 (only 26 respondents) to meaningfully estimate how knowledge in these areas may differ from that elsewhere.

the second row indicates that party is twice as important as candidate attributes in choosing national politicians (46 versus 21 percent). Looking at how the same voters behave in different elections, the final row of Table 2 shows that candidate attributes are significantly more likely to be the primary determinant of vote choice in a local versus national race (by 14.5 percentage points) while party is less likely to matter (by 11.0 points). Linking back to the information advantage enjoyed at the local level under decentralization, these differences preview the role information plays in encouraging voters to place more weight on candidate characteristics and less emphasis on their ethnic-party loyalties in deciding whom to support.

## 4 A Model of Redistributive Politics with Information Provision

This section builds an electoral model that explores how the quality of information available to voters affects their choices and in turn the allocation of public funds by competitive political parties. Using LW’s model as a foundation, I incorporate a candidate quality factor and an information asymmetry that were not explored in their seminal work. I first show that LW’s swing voter investment proposition still holds under the extended model, and then derive two new theoretical propositions regarding the effects of information on voting and redistributive spending. The model establishes a general tradeoff between party loyalty and candidate quality that is broadly applicable, with ethnic politics as one special case.

### 4.1 Jurisdictions and Political Transfers

The basic intuition of the LW model is that if voters are willing to tradeoff ideological loyalties for public investments in their jurisdiction, political parties will strategically allocate resources towards areas where their investments will “buy” them the most votes. More formally, voters are partitioned into  $J$  disjoint subsets ( $I_j$ ) or jurisdictions, which are defined geographically and contain  $n_j$  residents, where the total population is  $\sum_j n_j = n$ . Each constituency elects one politician to represent them in the national Parliament. Two political parties ( $p \in \{A, B\}$ ) compete for votes by promising consumption transfers to each jurisdiction ( $t_{pj}$ ), where they must treat every voter within a jurisdiction identically. These transfers can be thought of as government investments in local public goods, where for simplicity assume that all voters have the same preferences over goods. Parties allocate transfers to maximize the expected number of seats they will win in Parliament.<sup>7</sup>

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<sup>7</sup>Note that the LW model relates more directly to a single jurisdiction Presidential race where the parties maximize their expected vote shares in each jurisdiction. Modifying the party objective function from vote

An exogenous per capita tax levied equally on voters ( $\tau$ ) determines the total amount of transfers either party promises to distribute upon winning the election (where  $\sum_j n_j t_{pj} = n\tau$ ). Since the empirical analysis considers the allocation of both post-election public investments and campaign spending, assume for simplicity that the campaign budget for each candidate is proportional to the transfer promised to their jurisdiction should he or she win. As is standard in models of redistributive politics, assume that candidate promises are credible. I provide evidence in Section 5.2 that this assumption is plausible in my empirical setting where both campaign patronage and subsequent investments in public goods by elected officials favor more competitive “swing” jurisdictions.

The timing of the game proceeds as follows. Each political party chooses a vector of transfers that maximizes the total number of Parliamentary seats they expect to win, taking voter ideology as given. Nature draws candidate quality for each party in all races.<sup>8</sup> Voters then choose the party plus candidate package that will maximize their utility. Candidates who receive the most votes in each jurisdiction win and implement their promised vectors of transfers. I solve for the equilibrium of this political game through backward induction, beginning with the voter’s decision.

## 4.2 Voter Choice

In the LW model voters value consumption, which is determined by their exogenous post-tax income ( $\omega$ ) and the political transfers; and party identity ( $p_{pi}$ ), which reflects their ideological preference or, in my application, ethnic allegiance. To this I add candidate quality ( $q_{pj}$ ), which is simply shorthand for any bundle of characteristics specific to the individual running for office. Utility of voter  $i$  in jurisdiction  $j$  if party  $p$  wins is additively separable in its components:

$$u(t_p, p_p, q_p) = v(\omega + t_{pj}) + p_{pi} + q_{pj} \quad (1)$$

where  $v(\cdot)$  is a concave function capturing utility derived from consumption.

For each race, the two parties receive random draws from a common pool of potential candidates. I assume that relative candidate quality ( $\Delta q_j = q_{bj} - q_{aj}$ ) looking across jurisdictions or within the same jurisdiction over time is normally distributed with mean zero and variance  $\sigma_q^2$ . This assumption reflects the idea that the parties have access to the same

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shares to seats won leads to a better match with the empirical case of many simultaneous Parliamentary elections. See Appendix D for derivation of the model under the maximization of vote share case.

<sup>8</sup>The sequencing assumption that parties have no information about how voters evaluate the quality draws when making transfer decisions is stronger than necessary, but simplifies the exposition. I need only assume some degree of asymmetry in that parties cannot perfectly anticipate how voters will respond to candidates.

candidate recruitment technology, yet face some randomness in the actual characteristics of any particular candidate selected for a given race.

While voters know the transfers promised by parties and their own relative party loyalty ( $\Delta p_i = p_{bi} - p_{ai}$ ), they only imperfectly observe candidate quality. Introducing this uncertainty on the voter's side allows me to explore the effect of information on voting choice and the equilibrium allocation of transfers. Each voter receives a noisy signal ( $\theta_{ij}$ ) that combines true candidate quality difference with a mean-zero, normally distributed disturbance term:

$$\theta_{ij} = \Delta q_j + v_{ij} \text{ where } v_{ij} \sim N(0, \sigma_v^2) \quad (2)$$

Under Bayesian updating, voters form an expectation about which candidate is superior that weighs the content of the noisy signal against their prior beliefs. Since the distribution of relative quality is mean zero, all voters hold the prior belief that the two candidates are of equal quality. Given the signal, the expected quality difference favoring Party *B* is thus:

$$E(\Delta q_j | \theta_{ij}) = \delta \theta_{ij} + (1 - \delta) 0 \text{ where } \delta = \frac{\sigma_q^2}{\sigma_q^2 + \sigma_v^2} \quad (3)$$

Note that the weight placed on the quality signal ( $\delta$ ) depends inversely on the amount of noise in the signal, implying that voters place more weight on candidate quality when they have better information about candidate characteristics. Voters straightforwardly choose Party *A* if their party loyalty and the perceived candidate quality advantage favoring Party *B* are less than the consumption advantage they will enjoy under *A*:

$$\text{Vote A if : } \Delta p_i + \delta \theta_{ij} \leq v(\omega + t_{aj}) - v(\omega + t_{bj}) \quad (4)$$

### 4.3 Political Equilibrium

Now consider the perspective of political parties. In localities where voters are largely indifferent between parties (i.e. the differential  $\Delta p_i$  is small), promising a transfer that is even slightly larger than your rival's offer can swing a large number of voters toward your party. This suggests that parties will court jurisdictions where residents have weak underlying party loyalties or ideological preferences.

A key feature of the model is that parties cannot directly observe the loyalty factor, so treat the differential as a random variable in devising their investment strategies. For concreteness, suppose that both parties assume that underlying party loyalty ( $\Delta p_i$ ) is normally distributed with jurisdiction-specific mean  $\alpha_j$  and variance  $\sigma_p^2$ .<sup>9</sup> Thus the only factor that

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<sup>9</sup>LW refers more generally to the class of distributions that is unimodal and symmetric.

distinguishes one jurisdiction from the next is the mean of this bias distribution: jurisdictions with voters loyal to Party  $B$  have a positive value of  $\alpha_j$ , while those loyal to  $A$  have a negative value. Each jurisdiction-specific density of party loyalty  $f_j(\cdot)$  is thus a translate of a common normal density  $f(\cdot)$ , where the common density shifts further to the left or right as the expected party bias of voters inside a given jurisdiction becomes more extreme (i.e.  $f_j(t) = f(t + \alpha_j)$ ). Since parties must treat every voter within a given jurisdiction identically, it is this expected bias of the jurisdiction overall that ultimately determines the amount of transfers allocated to a given area.

Turning to the quality term, suppose that parties know the distributions of candidate quality and the noisy signals (but not their realizations) when determining transfer allocations.<sup>10</sup> Parties thus treat voter perception of candidate quality as a mean preserving spread of the estimated party loyalty distribution. From the parties' perspective the left hand side of the Vote  $A$  expression in Equation (4) is the sum of two normally distributed random variables. Breaking  $\delta\theta_{ij}$  into its two components and collecting all the individual-level terms to the left of the inequality in (4) generates:

$$\Delta p_i + \delta v_{ij} \leq v(\omega + t_{aj}) - v(\omega + t_{bj}) - \delta\Delta q_j \text{ where } \Delta p_i + \delta v_{ij} \sim N(\alpha_j, \sigma_p^2 + \delta^2\sigma_v^2) \quad (5)$$

The vote share for  $A$  can be expressed as the standardized cumulative density function of the distribution in (5) evaluated at the transfer differential minus the quality shock. Party  $A$  wins seat  $j$  if its vote share is at least one half, or:

$$\Phi\left(\frac{v(\omega + t_{aj}) - v(\omega + t_{bj}) - \delta\Delta q_j - \alpha_j}{(\sigma_p^2 + \delta^2\sigma_v^2)^{1/2}}\right) \geq 1/2 \quad (6)$$

Thus Party  $A$  wins when the quality shock and party loyalty favoring  $B$  are not large enough to outweigh the transfer differential favoring  $A$ , or when:

$$\delta\Delta q_j + \alpha_j \leq v(\omega + t_{aj}) - v(\omega + t_{bj}) \quad (7)$$

The probability of this event is:

$$F_j[v(\omega + t_{aj}) - v(\omega + t_{bj})] \text{ where } F_j(\cdot) \sim N_j(\alpha_j, \delta^2\sigma_q^2) \quad (8)$$

The key insight of the extension is that the variance of this distribution is increasing in the clarity of the candidate quality signal. This means that when voters have better information,

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<sup>10</sup>An interesting extension for future work would be to endogenize candidate quality as another type of investment that parties make in trying to win close elections.

they place more weight on individual candidate characteristics that are unobservable to parties, thereby making party forecasting of expected vote shares and the associated probability of winning particular seats more uncertain.

The assumed objective of political parties is to maximize the expected number of seats they win in Parliament, subject to the budget. From the perspective of Party  $A$ , it does so by choosing a vector of transfers that maximizes the probability of winning each jurisdiction:

$$\max_{t_{aj}} \sum_{i \in I_j} F_j [v(\omega + t_{aj}) - v(\omega + t_{bj})] - \lambda \left[ \sum_j n_j t_{aj} - n\tau \right] \quad (9)$$

Party  $B$  solves a symmetric problem with respect to  $t_{bj}$ , with corresponding Lagrange multipliers denoted by  $\mu$ . Comparing this extended model with the original LW two factor case, adding the quality term and revising the objective function affects only the variance of  $F_j$  and has no impact on the jurisdiction-specific means,  $\alpha_j$ . As such, it does not substantively alter LW's derivation of a swing voter Nash equilibrium, which I summarize in the Appendix.

**Proposition 1** *Spending by competitive political parties in a given jurisdiction is decreasing in the expected loyalty or ideological advantage held by either party (denoted  $\alpha_j$ ).*

Proof: see Appendix. Party strategy in equilibrium is intuitive. The symmetric nature of the problem implies that each party will promise the same transfer to a given jurisdiction ( $t_{aj} = t_{bj} = Y_j \forall j$ ). The solution to the optimization problem in (9) can thus be expressed by the general first order condition:

$$v'(\omega + Y_j) = \frac{\lambda}{f(\alpha_j)} \quad (10)$$

This yields the familiar prediction that transfers from parties ( $Y_j$ ) are decreasing in the absolute value of expected party loyalty ( $|\alpha_j|$ ), or that both parties favor “swing” jurisdictions where party affiliations are weakest. To see this, note that the density  $f(\cdot)$  falls in the tails, where  $\alpha_j$  is large and positive (indicating a Party  $B$  stronghold) or negative (a Party  $A$  stronghold). In these areas, the right hand side of Equation (10) becomes large, and thus the value of  $Y_j$  in the left hand side must fall to trigger a corresponding increase in the marginal utility of voter consumption. We have thus shown that LW's central theoretical result continues to hold under the extended information model. The first empirical contribution of this paper will be a novel test of this proposition in the context of ethnic politics, where favoring “swing” jurisdictions implies spending that is decreasing in the population advantage (i.e. ethnic homogeneity) that favors one party over the other.

## 4.4 Information and Voter Choice

The second objective is to derive the effect of better information on voting behavior. Since in equilibrium the two parties promise the same vector of consumption transfers, the voter's choice comes down to a tradeoff between party loyalty and the relative quality of the two candidates. Intuitively, where there is no information about candidate quality, voters never cross party lines: they know their own party preference and simply select the candidate affiliated with that party on the ballot. However, as better information becomes available, voters will cross over when confronted with an extreme draw from the quality distribution that favors the rival party's candidate. Thus the willingness to vote across traditional loyalties should be increasing in information.

**Proposition 2** *Voters are more likely to cross party lines when they have better information about individual candidate characteristics.*

Proof: see Appendix. The proof of Proposition 2 is straightforward. Since voters are promised the same transfers from both parties, the voter will choose Party *A* if the perceived quality advantage of candidate *B* is not large enough to outweigh the voter's party loyalty to *A*. Viewed over multiple elections, the probability that the voter chooses Party *A* in any particular election can thus be written as the standardized cumulative density function of perceived candidate quality evaluated at the voter's own party preference:

$$\Pr(\text{Vote } A) = \Phi \left( \frac{-\Delta p_i}{(\sigma_q^4 / (\sigma_q^2 + \sigma_v^2))^{1/2}} \right) \quad (11)$$

What this paper is specifically interested in is the willingness of voters to move away from their traditional party allegiances when they have better information. Crossing party lines—i.e. choosing a high quality candidate from the rival party—is a vote for Party *A* if the voter is Type *B* (i.e.  $\Delta p_i > 0$ ), which is exactly the probability in (11).

The key question is how information affects this probability. Note that improving the quality of the signal (by reducing the noise  $\sigma_v^2 \rightarrow 0$ ) increases the variance of the perceived quality distribution, as better information enables the voter to detect even subtle differences between candidates. Strengthening the signal thus increases the denominator of the argument in (11). Since the numerator for a Type *B* voter is less than zero, this increases the argument overall (by making it less negative). Because the CDF is increasing in its argument, conclude that for a given level of party preference, improving information increases the probability that a voter will cross party lines in the polling booth. (The argument is symmetric for a Type *A* voter.) In the context of ethnic politics and decentralization, this implies that

voters are more willing to cross traditional ethnic-party allegiances in local elections where they have better information about candidates.

## 4.5 Information and the Allocation of Political Transfers

The third objective is to derive how the quality of information available to voters affects the equilibrium redistributive strategy of competitive parties. As shown earlier, Proposition 1 implies that electoral pressures tilt the distribution of public spending away from areas where either party holds a popular advantage. Parties must estimate the underlying advantage—which is a combination of voter ideology and voter opinions of the relative quality of the candidate draws—based on what they know about voter preferences in a given jurisdiction. Proposition 2 further suggests that voters place more weight on quality (which is assumed to be unobservable to parties) when they have better information about candidates. This in effect makes the parties’ assessment of the underlying margin more uncertain, as it increases the weight on the component of advantage that from their perspective is a disturbance term. Greater uncertainty in turn induces parties to allocate campaign resources and public goods more evenly across jurisdictions. Taken to a logical extreme, if voters cared only about candidate quality, parties would optimally divide the budget equally across all jurisdictions.

**Proposition 3** *By making parties’ assessment of competitiveness more uncertain, providing voters with better information attenuates the slope of public spending with respect to the expected advantage held by either party.*

Proof: see Appendix. Intuitively, where expected advantage is positive (the case for negative is symmetric), Proposition 1 implies that the derivative of party spending with respect to expected bias in jurisdictions is negative ( $\frac{\partial Y_j}{\partial \alpha_j} \leq 0$ ). Proposition 2 states that providing better information increases voter responsiveness ( $\delta$ ) to candidate quality. The effect of information on spending in Proposition 3 can thus be expressed as the cross derivative of the spending slope with respect to responsiveness:

$$\frac{\partial}{\partial \delta} \left( \frac{\partial Y_j}{\partial \alpha_j} \right) = \frac{-\lambda \alpha_j (2\pi)^{1/2} (\alpha_j^2 + \delta^2 \sigma_q^2)}{v'' (\omega + Y_j) \delta^4 \sigma_q^3 \exp\left(\frac{-\alpha_j^2}{2\delta^2 \sigma_q^2}\right)} \geq 0 \quad (12)$$

The positive sign on the cross derivative implies that better information attenuates the negative relationship between spending and expected bias.

In the context of ethnic politics and decentralization, Proposition 3 predicts that public spending will fall less steeply with respect to the population advantage (i.e. ethnic homogeneity) favoring either party in local as compared to national elections. Regarding

interpretation, in national elections citizens know little about the candidates so vote predominantly in accordance with their underlying ethnic-party loyalty. Even an extremely unbalanced quality draw would have little impact on their choice since voters cannot clearly perceive the differences between candidates. This implies that ethnic composition is a fairly certain predictor of competitiveness in national races and encourages parties to aggressively target their spending toward more ethnically diverse, and thus competitive, jurisdictions. By contrast, in local elections voters consider a number of different things they know about candidates—like how successful they were before they became a politician or their family’s reputation in the area—that are difficult for parties to observe, making local ethnic composition a far noisier predictor of competitiveness. Parties anticipate that an unbalanced quality draw could make a local race in even a fairly homogenous stronghold area competitive, so smooth their transfer spending across a wider range of ethnic compositions.

## 5 Empirical Application

### 5.1 The Data

Empirically evaluating the theoretical propositions requires measurement strategies and data sources that capture jurisdiction-level party loyalty, voting behavior, the quality of information available to voters, and public spending.

The first empirical innovation of this paper is estimating the expected party loyalty or relative partisan bias of a jurisdiction based on its ethnic composition. Given the multiplicity of ethnic groups in Sierra Leone, the measure takes the absolute value of the sum of the population share of each ethnic group residing in the jurisdiction ( $\pi_{ej}$ ) multiplied by the national partisan bias of that group toward Party *A* over Party *B* ( $\alpha_e$ ):

$$|E(bias)_j| = |\alpha_j| = \left| \sum_e \pi_{ej} \alpha_e \right| \tag{13}$$

Demographic data on ethnic composition comes from the 2004 National Population and Housing Census conducted by Statistics Sierra Leone. As mentioned in Section 3, partisan bias is measured as the national proportion of voters of a particular ethnicity who reported voting for Party *A* (the APC) minus the proportion voting for Party *B* (the SLPP or its splinter party the PMDC) in the 2007 Presidential election.

Voting data come from two sources. First, the Decentralization Stakeholder Survey (DSS) exit polls were conducted by the Government of Sierra Leone’s Institutional Reform and Capacity Building Project (IRCBP) with financial support from the National Bureau of

Economic Research. Designed by the author, the polls surveyed 1,117 voters in 59 randomly selected local government jurisdictions on Local Council Election Day in 2008. The polls collected demographic characteristics and self-reported voting choices for both the local and the earlier national races. Similar questions were then included in IRCBP’s 2008 National Public Services (NPS) household survey, which covered a nationally representative sample of over 6,300 citizens in 634 census enumeration areas (slightly larger than village). As each source has its advantages, the preferred measure of bias used in (13) takes the average across these two datasets.<sup>11</sup> As a robustness check, results are re-run without reference to reported voting behavior by simply classifying each ethnic group as either pro-party *A* (bias = -1), pro-party *B* (bias = 1) or unaffiliated (bias = 0), based on historical accounts (Kandeh 1992) and author interviews with government officials (see Table 1, Column 3). Expected bias is then calculated as the absolute value of the difference in population shares of groups *A* and *B*:  $|(ShrA - ShrB)_j|$ . This measure yields similar results in magnitude and significance.

Measures of voting across party lines use individual-level data from the DSS exit polls on ethnicity and party selected for Local Council and Parliament. As a robustness test, Section 6 crosschecks the accuracy of these self-reported votes against the official voting returns using data from the National Electoral Commission (2007, 2008).

Information is measured in two ways. The first is an indicator variable, *LOC*, which equals one if the candidate or vote is for Local Council and zero if for national Parliament. Since Section 3 demonstrates that voters have significantly more information about candidates in local elections, *LOC* = 1 signals the better quality information case. The second information measure concerns radio coverage, which uses data collected in the community module of the 2008 NPS survey. A focus group discussion with village leaders elicited a list of all radio programs that could be received in the community and the corresponding quality of reception. Coverage by community radio was coded to one if the village reported “good” or “very good” reception of any one of 38 locally produced radio stations; and national coverage was similarly coded to one for reception of any of the five domestically produced and nationally syndicated radio programs. These reports align reasonably well with the cross-check of GIS-estimated distances to nearest national and community radio transmitter.<sup>12</sup> The geographic overlay of these two broadcast areas delineates places where radio ownership

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<sup>11</sup>The advantage of the exit poll data is that respondents suffer no recall problems for their local choices as they were surveyed immediately upon leaving the polling station. The disadvantage is the small sample size. The later household sample is much larger, however responses likely suffer recall problems and post-election re-evaluation of party support. Specifically, while extrapolating the national vote tally from the exit polls corresponds quite closely to the actual election results, extrapolating from the household data reveals a bias toward the winning Presidential candidate. Taking the mean across the two sources offers a compromise.

<sup>12</sup>For example, the correlation between reception and miles to nearest transmitter is -0.41 for national and -0.26 for community stations.

affords access to one versus two additional sources of political information.

Data on political party spending concerns two sets of outcomes: i) campaign spending by local and national candidates during the 2007 and 2008 elections, respectively; and ii) public investments made by the first cohort of elected Local Councillors over the period 2004-2007. The first set was collected in the community module of the 2008 NPS survey and recorded seven different measures of campaign spending by each local and national candidate: the distribution of cash, t-shirts, posters, handbills and food; personal candidate visits; and the hosting of a political rally. The second set connects the spending by candidates on the campaign trail to public investments by elected politicians. For this, the Local Government Development Grants (LGDG) program, which was financed by the World Bank (90 percent) and Government of Sierra Leone (10 percent), provided several million US dollars in discretionary grants to the first cohort of Local Councils to spend on development initiatives. Information on the budgets and geographic location of funded projects comes from the Local Government Finance Department and the Decentralization Secretariat, who provide technical assistance to the Councils and manage the LGDG program.<sup>13</sup> Regarding the relative merits of these two datasets, note that while the LGDG public goods outcomes relate more directly to the model, they are only available for local government. Without a national government counterpart, this public investment data can only be used to test Proposition 1, and cannot directly test the effect of information on redistribution. By contrast, the campaign spending outcomes relate less directly to the model, but are available for both local and national candidates, and thus allow direct tests of both Propositions 1 and 3.

## 5.2 Investment across Jurisdictions

The first theoretical prediction is that political competition, and hence investments by parties, will be decreasing in the expected partisan bias of jurisdictions. Testing this proposition requires estimation of the following equation:

$$Y_{ij} = \beta_0 + \beta_1|\alpha_j| + \mathbf{\Gamma}\mathbf{X}_j + \mathbf{d}_j + \varepsilon_{ij} \quad (14)$$

where  $Y_{ij}$  is the investment on behalf of candidate  $i$  in jurisdiction  $j$ ,  $|\alpha_j|$  is the absolute value of the expected bias toward Party  $A$  of the jurisdiction,  $\mathbf{X}_j$  is a vector of jurisdiction-

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<sup>13</sup>Linking these public investments to the campaign data encounters a time period disconnect: while ideally I would look at campaign spending and later investments by the *same* individuals, I have data only on *earlier* public spending by the first cohort of elected Councillors (who were campaigning in 2004) and *later* campaign spending by the second cohort of Local Council candidates. The underlying assumption is that since different cohorts of candidates and elected officials are playing the same game under the same constraints, and ethnic-party bias is largely fixed over time, the pattern of targeting is stationary.

level factors that may also affect transfers,  $\mathbf{d}_j$  is a set of district fixed effects, and  $\varepsilon_{ij}$  is an idiosyncratic error term. The theoretical model predicts  $\beta_1 < 0$  indicating that campaign spending and public investment are decreasing in the expected local advantage held by either party.

For campaign spending outcomes, estimates are provided for each of seven campaign items individually as well as a mean effects index that summarizes how ethnic composition affects campaign investment overall. Following Kling and Liebman (2004), index estimation first translates each binary and continuous outcome into standard deviation units and then estimates the  $K$  distinct equations simultaneously using seeming unrelated regressions system.<sup>14</sup> The reported coefficient is simply the average of the  $K$  treatment effect estimates, with an estimated standard error that accounts for both the variances of each individual  $\beta_k$  as well as any covariances between  $\beta_k$  and  $\beta_{-k}$ .

The vector of jurisdiction characteristics includes population density to control for urban/rural differences, and the population per seat to account for the fact that candidates are spreading their resources across differing numbers of voters. All results are robust to their exclusion (not shown). All specifications further include fixed effects for the country’s 14 districts, which control for any extra-electoral value of particular geographic areas, for example the attractiveness of controlling the diamond mining areas in the East of the country. For the analysis of local spending, these fixed effects further demarcate the distinct local government markets, each with its own party committees and resources.<sup>15</sup> The model predicts that spending by local politicians should favor those jurisdictions with the lowest bias relative to the other jurisdictions within their district.

Before examining the regression output, Appendix Figure 1 nonparametrically graphs the relationship between campaign investment and the expected party bias of jurisdictions. To place spending by local and national candidates on the same scale, these graphs use a z-score approach that expresses expected party bias in standard deviation units. Specifically, the absolute value of jurisdiction-level bias is first demeaned and scaled by the standard error of the distribution of bias in the relevant district (nation) for local (national) candidates. As predicted, the graphs reveal a clear downward sloping trend in investment with respect to bias for four of the five discrete outcomes considered. These refer, respectively, to whether or not the candidate distributed any t-shirts, posters, handbills, food or hosted a political

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<sup>14</sup>See also Kling, Liebman and Katz (2007) and Anderson (2008).

<sup>15</sup>As a point of clarification, there are 19 distinct Local Councils, which correspond to the 14 districts mentioned plus an additional 5 “city” councils representing small urban areas outside the capital that are surrounded by the larger rural council for that district. Since the political parties are organized at the district level, I aggregate these “co-located” urban and rural councils together into unified districts for all campaign spending analyses. (Note that relaxing this aggregation flattens the slope of local as compared to national spending even further, and thus strengthens my main conclusions.)

rally in the locality during pre-election campaigning.

The first two panels of Table 3 present the ordinary least squares results for campaign spending by national candidates only. Panel A uses the preferred measure of expected bias that incorporates voting data to calibrate the strength of party loyalty by ethnic group. The coefficient on underlying party bias is negative for all seven outcome variables and statistically significant for six. Regarding interpretation, the coefficient on absolute expected bias in the first column implies that moving from a perfectly competitive jurisdiction where each party expects to win 50 percent of the votes to one that is expected to vote uniformly for one party is associated with candidates passing out 21 fewer US dollars during a typical community visit. This is a significant transfer in a country where gross national income per capita is only \$320 and average rural communities contain fewer than 50 households (World Bank 2008). Column 2 suggests that this move translates into candidates making three fewer visits to communities in the jurisdiction.

Grouping the individual items together, the mean effects coefficient in Column 8 implies that moving from a maximal to minimally competitive jurisdiction is associated with a 0.953 standard deviation unit decrease on average across the bundle of seven campaign goods, which is significant at 99% confidence. As a robustness check, Panel B presents results for the population share measure of bias that abstracts away from voting data. Here the coefficients reflect the difference in spending when moving from a perfectly competitive area where each party holds an equal population share to one that is completely homogenous. All estimates are comparable in magnitude and significance.

Repeating the same series of specifications for local candidates, Panels C and D of Table 3 reveal a similar pattern of estimates that are somewhat less pronounced than the results for national candidates. In both panels the first seven coefficients on expected bias are negative, and four are statistically significant; and the mean effects indices in Column 8 are again negative and highly significant. Specifically, the index coefficient in Panel C (based on the preferred bias measure) implies that moving from a maximally to minimally competitive jurisdiction is associated with a 0.531 standard deviation unit average decrease in the bundle of campaign goods, which is significant at 99% confidence.

The additional ninth column in Panels C and D turns from campaign spending to public goods provision by elected local representatives. Using the preferred measure of expected bias, the coefficient of interest in Panel C suggests that moving from a maximally to minimally competitive jurisdiction results in a \$19,577 reduction in public goods investments by the governing district Council, which is significant at 95% confidence. Panel D repeats the same specification using the population share measure of bias, where the coefficient is qualitatively similar yet attenuated in magnitude and significance.

### 5.3 Information and Voter Choice

This section tests Proposition 2 using two distinct identification strategies to isolate the impact of information on voter behavior: one leveraging differences across tiers of government and another across the coverage areas of radio broadcasts. It closes by considering empirical evidence regarding whether performance in office is among the candidate characteristics to which voters respond.

#### 5.3.1 Decentralization and Individual Fixed Effects

Since voters have better information about local as compared to national politicians, the signal of relative candidate quality is likely less noisy with respect to local candidates, leading voters to place greater weight on expected candidate quality in local elections. To test the hypothesis that information advantages thereby make individuals more willing to cross partisan lines in local races, this section estimates:

$$CPL_{vi} = \gamma_0 + \gamma_1 LOC_v + \mathbf{f}_i + \varepsilon_{vi} \quad (15)$$

where the unit of observation is the vote, indexed by  $v$ , and there are two votes cast—one for local and another for national candidates—by each individual  $i$ . The outcome  $CPL$  indicates a vote that crosses party lines, or a vote for a party other than the one historically associated with the voter’s ethnic group as listed in Column 3 of Table 1 (I drop all respondents from unaffiliated tribes). As an example, the outcome would equal one for a voter from the Temne ethnic group traditionally associated with the APC casting her vote for the SLPP candidate.  $LOC_v$  is an indicator variable signaling that the vote was for a local office,  $\mathbf{f}_i$  is a set of individual voter fixed effects, and  $\varepsilon_{vi}$  is an idiosyncratic error term. The voter fixed effects mean that the analysis compares how the same person votes at the two distinct levels of election, thereby controlling for all other observable and unobservable individual determinants of party choice. The coefficient of interest is  $\gamma_1$ , which the theory predicts will be positive, indicating greater willingness to cross party lines for local candidates. Data for this specification comes from the 2008 DSS exit polls.

Column 1 of Table 4 shows that voters are 11.3 percentage points more likely to vote for a party not traditionally affiliated with their ethnic group in local as opposed to national elections, a difference that is significant at 99 percent confidence. Combined with the constant term, this suggests that while 86 percent of voters supported their ethnic-party in national races, only 75 percent did so in local. Columns 2 and 3 run the same specification for the ethnic groups affiliated with the each party separately. While the magnitude of effect appears larger for voters in the groups associated with the SLPP/PMDC compared to those

in groups associated with the APC (by 6.94 percentage points), the difference is not statistically significant (standard error 5.40). These three estimates reflect a broad interpretation of voting against traditional loyalties that includes votes for minor parties and Independent candidates.<sup>16</sup> As a robustness check, Column 4 narrows the interpretation of crossing party lines to only votes for the major rival and thus excludes voters who chose a minor party or Independent candidate in either election. This restriction reduces the magnitude of the effect to 5.0 percentage points as expected, but the coefficient remains statistically significant.

If better information encourages voters to place greater weight on individual candidate characteristics, they should also be more likely to split their ticket across candidates from different parties when voting for multiple offices simultaneously. The right half of Table 4 explores this possibility of choosing different parties when voting for Local Councillor and Council Chairman in local elections, and for Parliamentarian and President in national elections. Column 5 shows that voters are 12.3 percentage points more likely to split their ticket across parties in local as compared to national races, significant at 99 percent confidence. Implementing the same series of specifications as above, Columns 6 and 7 reveal an insignificant difference in the magnitude of the effect for the two sets of ethnic groups (13.9 for the SLPP-affiliated tribes versus 10.7 for the APC-affiliated tribes); and Column 8 shows that excluding voters who selected a minor party or Independent in any of the four races considered reduces the magnitude (to 7.6) but not the significance of the effect.

### 5.3.2 Triple Differencing by Radio Coverage, Ownership and Level of Election

For the second empirical test, recall from Section 3 that radio is the second (after friends and relatives) most important source of information about politics in Sierra Leone, and that the coverage of community-produced radio overlaps with and extends beyond the reach of nationally syndicated stations. While I have no direct data on the extent of reporting on local versus national politicians for either type of radio station, a minimally restrictive assumption is that community radio shows devote greater airtime to local politicians than nationally syndicated programs do. If so, the differential knowledge premium regarding local versus national candidates held by radio owners should be larger in areas with only community coverage than in areas under dual coverage. This intuition suggests a triple differencing approach to identify the role of information in voting: compare differences in local versus national political knowledge (and voting behaviors), between those who own and do not own radios, across areas with only community radio versus dual coverage.<sup>17</sup>

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<sup>16</sup>These findings hold despite the fact that there are more minor party and Independent candidates to choose from in national elections.

<sup>17</sup>More formally, suppose that community stations devote  $\pi_c$  proportion of programming time to discussing local politicians (and  $1 - \pi_c$  to national); while national programs devote  $\pi_n < \pi_c$  to local politicians.

The corresponding regression framework for outcome  $Y$  (i.e. political knowledge) is:

$$Y_{kiv} = \gamma_0 + \gamma_1 LOC_k + \gamma_2 C_v + \gamma_3 R_i + \gamma_4 LOC_k * C_v + \gamma_5 LOC_k * R_i + \gamma_6 C_v * R_i + \gamma_7 LOC_k * C_v * R_i + \mu_{kiv} \quad (16)$$

where  $Y$  concerns politician  $k$  and is measured for individual  $i$  living in village  $v$ ;  $LOC$  is an indicator variable equal to one if the outcome concerns a local politician and zero if national;  $C$  is an indicator equal to one if the village receives only community radio coverage and zero if dual coverage (villages with no radio coverage are excluded);  $R$  is an indicator equal to one if the household owns a radio and zero if not; and  $\mu_{kiv}$  is the usual error term. Specifications in Columns 2 and 3 of Table 5 further include enumeration area fixed effects<sup>18</sup> and a vector of respondent controls that likely affect political knowledge (gender, age, years of schooling, membership in a ruling house<sup>19</sup> and a principal components score of household assets); while the specifications in all remaining columns replace these with individual fixed effects. The coefficient of interest on the triple difference,  $\gamma_7$ , is expected to be positive. My empirical strategy is to first establish this positive triple difference for an outcome concerning knowledge of specific politicians (the ability to correctly name them) and then repeat the test for voting across party lines. Since the exit polls did not include radio ownership or coverage, data for these specifications comes from the NPS survey.

Note that the NPS survey covers a different subsample of races and may also suffer greater reporting error due to its later field date (implemented several months after the 2008 election and accompanying exit polls). To thus first establish comparability across the two datasets, Column 1 of Table 5 replicates the base crossing party lines specification found in Column 1 of Table 4. The estimated frequencies of crossing party lines in both national (the constant term) and local races are smaller than their counterparts in Table 4, which would be consistent with greater measurement error in the NPS survey. Reassuringly, however, the coefficient on local election remains positive and highly significant.

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Normalizing the amount of time citizens listen to the radio to 1, suppose that citizens in dual coverage areas on average allocate  $\rho$  of their listening time to community programming and  $(1-\rho)$  to national. Compared to their neighbors without radios, radio owners in areas covered only by community programming have access to extra information about local politicians via radio proportional to  $\pi_c$ , and under dual coverage proportional to  $\rho\pi_c + (1-\rho)\pi_n$ . To account for selection into radio ownership, consider the difference in the amount of radio information about local versus national politicians received by the same individual. All else equal, comparing local versus national political knowledge, across radio and non-radio owners, inside areas with only community coverage, generates a difference-in-difference in knowledge proportional to  $2\pi_c - 1$ . This same difference-in-difference among residents of dual coverage areas is proportional to  $\rho(2\pi_c - 1) + (1-\rho)(2\pi_n - 1)$ . The triple difference of interest across these two coverage areas is  $2(1-\rho)(\pi_c - \pi_n)$  which is nonnegative given the assumption  $\pi_n < \pi_c$ .

<sup>18</sup>The enumeration area (EA) is the unit of sampling for the NPS. Many EAs contain more than one village and radio coverage is measured at the village level.

<sup>19</sup>Ruling house membership denotes eligibility to stand for election in the traditional chieftaincy system and is an indicator of local political connectedness.

Column 2 of Table 5 estimates the triple difference for providing the correct name of individual local versus national politicians. As predicted, the triple difference coefficient is positive and significant at 95% confidence, indicating that the local versus national knowledge premium that radio owners gain under only community coverage is larger than the same premium under dual coverage. To provide a sense of magnitude, other coefficients suggest that radio owners under dual coverage are better able to name politicians at both levels, but their advantage is smaller with respect to local (by 4 versus 5.6 percentage points, for a double difference of -1.6). Under only community coverage, radio owners are relatively much better at naming local than national politicians (a double difference of 12 percentage points). The triple difference across areas is thus 13.6 percentage points. Other coefficients affirm priors: political knowledge appears to be higher for men, the better educated and the politically connected.

Having established a triple difference regarding knowledge, Column 3 repeats the specification for the outcome of crossing party lines. The positive and significant triple difference coefficient suggests that the knowledge premium translates into a greater willingness to vote across party lines for local candidates, equal to 9 percentage points. Columns 4 and 5 implement a more rigorous test that includes individual fixed effects. The coefficients on the triple difference for naming politicians and crossing party lines remain quite similar, although the latter diminishes in significance to the 94% confidence level.

Columns 6 and 7 present placebo tests on outcomes concerning general perceptions of local versus national government that are less likely to respond to marginal changes in the types of radio broadcast received. Column 6 concerns opinions of whether local (central) government “listens to what people in this town/neighborhood say or what they need,” while Column 7 concerns the proportion of voters who said that “promises of development” (akin to transfers in the model) was the most important determinant of their vote at the local (national) level. Reassuringly, the coefficient on the triple difference in both columns is small and statistically insignificant. The fact that voting across party lines tracks changes in knowledge about specific politicians over radio coverage areas, while general perceptions of government do not, lends confidence to the idea that it is information about individual candidate characteristics that drives the differential voting behavior. As an aside, note in the first row of Column 7 that voters do not see promises of development as being more or less important at the local versus national level. This null result is not consistent with an alternative explanation that voters are more willing to cross party lines in local elections because they perceive the role of local government as being more focused on delivering public goods.

### 5.3.3 Empirical Evidence that Voters Respond to Effectiveness in Office

While the model places no restrictions on the types of candidate characteristics that citizens respond to when voting across party lines, it is natural to ask empirically whether these attributes correlate with performance in office. One group of candidates for whom voters are likely to have information regarding professional competence is local incumbents who ran for re-election. These candidates' job performance was also evaluated by their peers a few months before the 2008 election as part of the DSS research program. Greater electoral support for incumbents with stronger performance rankings, and particularly among voters from rival ethnic groups, would suggest that part of what voters value is on-the-job effectiveness.

The fact that peer ranking data is only available for Local Council incumbents limits this exercise in two ways: first, the quality measure concerns only one candidate in the race so does not directly capture the relative quality difference identified in the model; and second, the lack of comparable data for MP incumbents precludes analysis of whether voters respond less strongly to this quality measure when they have worse information. The narrow objective of Table 6 is thus to exploit cross sectional differences in local incumbent peer rankings to provide suggestive evidence that citizens respond to productive attributes of candidates when making voting decisions.

Following the approach in Banerjee and Pande (2009), all sitting Local Councillors were asked to rank three standard vignettes that described the activities (i.e. committee membership, project implementation, external fundraising) of hypothetical Councillors of varying degrees of effectiveness as well as three randomly selected peers. Peer rankings were translated into a seven point scale with reference to the vignettes to account for respondent-specific biases in what constitutes effectiveness.<sup>20</sup> Each Councillor was ranked by multiple peers and I use the average across rankings. The analysis considers races where one of these incumbents ran for re-election. All specifications control for the incumbent's party.

Column 1 of Table 6 shows that a one point increase in average peer effectiveness ranking was associated with a 10.8 percentage point increase in the probability of re-election. The effect is large in real world magnitude, where the predicted difference in re-election probabilities for incumbents with the worst observed peer ranking (equal to 1) and the best (6.4) is 58 percentage points. Column 3 uses the NPS household data to show a similar increase in support among voters, where a one point increase in peer rankings is associated with a

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<sup>20</sup>If the peer was ranked lower than the least effective vignette, he was assigned a score of 1, if ranked equal to the least effective vignette, a score of 2, and so forth to a maximum of 7 if the peer was ranked as more effective than the best vignette. Sitting Councillors also completed corruption rankings, however the scores were generally much more favorable and exhibited less variation (i.e. nearly half of all peers were ranked on par with the least corrupt vignette) and thus held little predictive power (results not shown).

0.125 increase in the proportion of respondents who reported voting for the incumbent. Both estimates are significant at 99% confidence.

Column 5 turns more directly to the phenomenon of crossing party lines by limiting the voter sample to respondents from a rival tribe, i.e. an ethnic group historically associated with the party challenging the incumbent. While support for the incumbent amongst rival tribes is much lower than in the general population (14 versus 64 percent), the coefficient on peer effectiveness ranking is again positive and statistically significant (0.057 with standard error 0.028), indicating that these voters were more likely to cross party lines to support incumbents with higher peer rankings. Columns 2, 4 and 6 repeat these analyses on a restricted sample of wards that more closely mimics the exit poll sample of Table 4, with similar results save the loss of significance in the crossing party lines equation.

## 5.4 Information and the Allocation of Political Transfers

Testing Proposition 3—that the effect of information passes through voting behavior to ultimately affect the redistributive strategies of parties—requires estimation of the following equation on the pooled sample of spending by both local and national candidates:

$$Y_{ij} = \beta_0 + \beta_1|\alpha_j| + \beta_2LOC_i * |\alpha_j| + \Gamma \mathbf{X}_j + \mathbf{d}_j + LOC_i * \mathbf{d}_j + \varepsilon_{ij} \quad (17)$$

Outcome  $Y_{ij}$  is the investment on behalf of candidate  $i$  in jurisdiction  $j$ ,  $|\alpha_j|$  is the absolute value of the expected bias toward Party  $A$  of the jurisdiction,  $LOC_i$  is an indicator variable equal to one if the candidate is competing for local office,  $\mathbf{X}_j$  is a vector of jurisdiction-level controls,  $\mathbf{d}_j$  is a set of district fixed effects,  $LOC_i * \mathbf{d}_j$  is a set of local government fixed effects that define the 14 distinct local government markets for local candidates, and  $\varepsilon_{ij}$  is an idiosyncratic error term. As before,  $\beta_1 < 0$  indicates that campaign spending is decreasing in the absolute value of the expected party bias. However the main coefficient of interest is  $\beta_2$ , which the model predicts will be positive, indicating that spending in local elections responds less strongly to ethnic-party bias than in national elections.

Regarding the two sets of fixed effects, the first ( $\mathbf{d}_j$ ) captures district-level factors that affect local and national candidates similarly, for example, higher transport costs that lead to fewer community visits in districts with more rugged terrain. Their inclusion further eliminates potential inter-district targeting by national politicians, thereby limiting analysis to the remaining variation within districts. The second set of local government fixed effects ( $LOC_i * \mathbf{d}_j$ ) delineate the distinct political markets and district-level budgets that apply only to local candidates. The reference group for this second set is the national budget that applies to all national candidates. This distinction is important given that fiscal federalism uses

transfers from central to local governments in part to increase the equity of resource allocation across districts (Oates 1999), which would automatically lead to a smoother allocation of spending by local as compared to national government. These local government fixed effects control for this phenomenon empirically by allowing the intercept for each district-level budget line to shift independently for local candidates, as opposed to fitting a single (falsely flattened) line across all districts. These fixed effects further absorb any general differences between local and national candidates. The evidence for Proposition 3 thus draws on a comparison of the average slopes of the local versus national intra-district spending lines, and evaluates whether national spending responds more strongly to ethnic diversity net of any differences in targeting across districts.

Panels A and B of Table 7 present results using the preferred bias measure and robustness check population share measure, respectively. Supporting earlier findings, the sign of the coefficient on the expected party bias term is negative for all seven outcome variables and statistically significant for six in both panels. This suggests that parties allocate greater campaign resources to low-bias swing jurisdictions, or those that do not have strong traditional ethnic-party allegiances. As predicted by Proposition 3, the coefficient on the interaction term between local election and expected bias is generally positive, indicating that campaign spending responds less strongly to differences in expected party bias based on ethnic composition for local elections. Specifically, in Panels A and B the coefficient has a positive sign in six of seven outcome regressions and is statistically significant in two (one) when using the preferred (robustness check) bias measure.

The mean effects indices in Column 8 are consistent with the individual outcome results: the sign on the index for expected bias is negative and highly significant for both specifications; and the local interaction term is positive for both, statistically significant in Panel A, and marginally significant in Panel B. Regarding interpretation, the negative coefficient on the expected bias index in Panel A implies that moving from a maximal to minimally competitive area results in a one standard deviation reduction in average campaign spending by national candidates. At the same time, the positive index coefficient on the interaction term implies that this slope is only half as steep in local elections.

One may be concerned that local and national politicians are responding to omitted attributes of particular constituencies and that these features are in fact driving the results. In response, the final investment specification includes fixed effects for all 112 Parliamentary constituencies nationwide ( $\mathbf{c}_j$ ) to examine how the responsiveness of spending to bias varies across the level of election for the same constituency:

$$Y_{ij} = \beta_0 + \beta_2 LOC_i * |\alpha_j| + LOC_i * \mathbf{d}_j + \mathbf{c}_j + \varepsilon_{ij} \quad (18)$$

The new  $\mathbf{c}_j$  set of fixed effects controls for all other observed and unobservable characteristics that make particular constituencies more attractive for both political parties and migrants from different ethnic groups. They absorb the expected bias term, the vector of constituency-level controls and the district fixed effects in (17); however, the local government fixed effects still vary across local and national candidates within a given constituency, so remain in the regression. The coefficient of interest is again on the interaction between local election and the expected party bias of the constituency. While taxing on the data, this is the most rigorous test of whether the ethnic composition of a given constituency matters less in local than national elections.

Panels C and D of Table 7 present results of the constituency fixed effects specification using the preferred bias measure and robustness check measure, respectively. The coefficient on the interaction between local election and expected party bias is positive in sign for all seven outcome equations and statistically significant for two using either measure of bias. It is marginally significant for one additional outcome when using the preferred bias measure. Reassuringly, the mean effects index is positive and highly significant for both measures. These results confirm the pass through effect of information that equalizes the distribution of campaign spending by local as compared to national candidates, where the former responds significantly less strongly to ethnic composition.

## 6 Robustness Checks and Alternative Explanations

Beyond differences in available information, what other factors might explain the observed greater willingness of voters to cross party lines and the more equitable allocation of campaign resources in local versus national elections?

One immediate concern is that voters may have systematically misrepresented their local voting choices in the exit polls. As a robustness check, we can compare the exit poll data to the official voting returns that were released by the National Electoral Commission (NEC) a few weeks later. Appendix Table 1 presents results from regressing the actual jurisdiction-level vote share for the APC party in the NEC data on the APC vote share calculated from the exit poll sample, pooling Local Council and MP races together. The coefficient on the exit poll vote share is 0.734 and highly significant, indicating that the exit poll data strongly predicts the official voting returns. Moreover, the coefficient on the interaction term between the exit poll vote share and local race is small in magnitude and not statistically distinguishable from zero, providing no evidence that reporting error in the exit polls varies systematically by level of election. As a further “reality check” on my main argument, comparing official voting returns to demographic data suggests that local races are less of

an “ethnic census” than national races. Considering the universe of all MP and Council races, the correlation between the vote share for the APC party in official NEC returns and the corresponding jurisdiction-level population share of the six APC-affiliated tribes in the census data is 0.960 for national races, compared to 0.753 for local (for the SLPP/PMDC and three affiliated tribes, the correlations are 0.915 in national and 0.855 in local).

Since the local elections studied occurred several months after the national elections, voters may have strategically chosen to align local representatives with the party that won control of the central government, thereby relaxing partisan loyalties in the subsequent local races. If this were the case, there should be systematically more crossing of party lines by the ethnic groups associated with the party that lost both its majority in Parliament and the Presidency in 2007, the SLPP. Yet comparing Columns 2 and 3 in Table 4, while the difference between the coefficients for crossing party lines in local races for the SLPP-affiliated tribes compared to the APC-affiliated tribes is indeed positive, it is not statistically distinguishable from zero. Thus strategic alignment between local and national representatives does not explain the reduced salience of party affiliation in local voting choices.

Voter turnout is significantly lower in local as compared to national elections, which could create a selection bias issue in the composition of voters or trigger a change in strategy for political parties. The individual voter fixed effects take care of potential bias from voter self-selection—i.e. perhaps the better educated turn out in greater numbers in local elections and are more likely to cross party lines—by comparing how the same individuals behave in local versus national races. Regarding party strategy, low turnout might mean that parties focus more resources in “getting out the base” for local races, spreading their campaign resources into more homogenous areas. While turnout does not figure directly in the model, so long as abstention rates are not correlated with party affiliation, differences in turnout would not change the identity of the most competitive jurisdictions and thus would not alter the predicted redistribution strategies.<sup>21</sup>

By reducing the distance between citizen and state, decentralization may make the transfer promises of local politicians more credible or easier to hold to account and thus enable them to more effectively “buy” votes across ethnic lines. This would suggest that local candidates could offer a more attractive transfer package that persuades even quite partisan rivals to forego their ideological loyalties for greater consumption. While this is not inconsistent with the information story, the theoretical model predicts that both parties promise the same amount to each jurisdiction, so a credibility difference by level would not lead to a

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<sup>21</sup>Furthermore, if party efforts to get out the loyal vote were successful, we should see a greater proportion of more partisan voters turning out in local races. This would then suggest fewer Independent candidates elected to local office, which contradicts the actual voting returns: while no Independents won national office, they won 4% of the local seats.

corresponding difference in the probability of crossing party lines. Along similar lines, voters may value attributes like candidate integrity more strongly where their ability to monitor politician actions is weaker. In this case, willingness to cross party lines should be higher in national elections, which is the opposite of the findings above.

Finally, suppose that ideology matters more or the party system is stronger in national politics. If true, voters could rely more heavily on parties to set the agenda they prefer and constrain the behavior of their elected national as compared to local representatives. In local races, voters would instead rely on the preferences or character of the individuals competing for office to ensure that they will enact their more favored policies. While this is more difficult to rule out conclusively, it does not explain the changes in voting behavior that track differences in knowledge about individual politicians—but not differences in general perceptions of local versus national government—across radio coverage zones in Section 5.3.2. Here it is further important to note that there are not clear ideological differences between the two major parties in Sierra Leone: one is not more liberal and one more conservative; and they do not fall on opposite sides of key policy debates like the optimal size of government or social issues as they do in the U.S. While the district-level party committees may well be weaker—especially in terms of operating budgets—than their national counterparts, it does not appear that their ideological orientation plays a significant role in setting policy.

## 7 Conclusion

This paper provides evidence that politicians distribute more campaign goods and invest greater public resources in areas where electoral competition between parties is most intense. It further demonstrates how providing voters with better information about individual candidates relaxes their partisan loyalties. Two distinct empirical strategies identify variation in the amount of information available, one that works across levels of government and another across radio coverage areas, and produce similar results. When citizens become willing to cast votes across party lines, politicians respond by attenuating their redistributive strategies in favor of a more equitable allocation of resources across jurisdictions. These three findings carry policy implications for the management of ethnicity-based politics and the relative merits of decentralized governance.

Adapting the swing voter hypothesis to ethnic politics implies that more diverse jurisdictions, where neither party holds a population advantage, enjoy greater political patronage than their more homogenous neighbors. The idea that diversity creates political competition and thus attracts resources adds a new perspective to the literature linking ethno-linguistic fractionalization to the provision of local public goods. Yet recent history shows that this

kind of identity politics can also be destructive, violent and inefficient. In response, this analysis suggests that giving voters better information about candidates shifts the focus from party affiliation to individual competencies, which could speculatively help diffuse ethnic tensions surrounding elections. Better information could further break a country out of the low accountability equilibrium in which citizens cast their votes blindly along partisan lines, generating no incentive for parties to recruit high quality candidates.

Finally, as decentralization brings government closer to the people, it enhances the amount of information available to citizens in electing their local as compared to national politicians. This information advantage implies that local politics and patronage may be less dominated by ethnicity- or partisan-based swing voter redistribution. To the extent that the candidate attributes voters find attractive are productive, which the analysis linking incumbent performance to re-election success suggests may be the case, voting choices and political favoritism based on these individual factors is likely welfare enhancing compared to that based on partisan loyalty or ethnic identity. Yet even if they are not, the allocation of resources by local government remains more equitable than that by their national counterparts. Bringing these ideas together, this paper adds to the growing evidence that information plays a powerful role in politics, influencing both the voting choices of citizens and the investment strategies of politicians.

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**Table 1: Expected Party Bias by Ethnic Group**

Ethnic group	National population share (%)	Raw partisan bias	Party affiliation (robustness check measure)
	(1)	(2)	(3)
Mende	32.2	-0.63	SLPP/PMDC (bias = -1)
Kissi	2.5	-0.50	SLPP/PMDC (bias = -1)
Sherbro	2.3	-0.25	SLPP/PMDC (bias = -1)
Mandingo	2.4	0.05	Unaffiliated (bias = 0)
Kono	4.4	0.06	Unaffiliated (bias = 0)
Fullah	3.7	0.17	Unaffiliated (bias = 0)
Susu	2.9	0.19	Unaffiliated (bias = 0)
Krio	1.4	0.43	APC (bias = +1)
Loko	2.6	0.68	APC (bias = +1)
Koranko	4.1	0.68	APC (bias = +1)
Yalunka	0.7	0.81	APC (bias = +1)
Temne	31.8	0.83	APC (bias = +1)
Limba	8.3	0.89	APC (bias = +1)

Notes: i) Column 1 lists the national population share of the ethnic group from the 2004 Population and Housing Census; ii) Column 2 estimates the raw bias of each ethnic group as the (Proportion of the ethnic group who reported voting for the APC) - (Proportion of the ethnic group who reported voting for the SLPP/PMDC) in the 2007 Presidential Elections; iii) voting data for Column 2 comes from two sources--the Decentralization Stakeholder Survey (DSS) exit polls and the National Public Services (NPS) household survey--where bias is computed as an average value of four self-reports (each survey recorded party chosen in both the first and second run-off rounds of the Presidential race); iv) the NPS household sample is limited to respondents who could verify their claim of voting by producing a voter identification card with the corresponding hole punches made by polling station staff; and v) Column 3 presents an alternative measure of bias that abstracts away from voting data and is used as a robustness check in the empirical analysis. The measure maps each ethnic group directly to a party based on a combination of historical accounts (Kandeh 1992) and author interviews with government officials. Where there was broad consensus amongst these sources regarding which party a particular ethnic group historically supported, a mapping was assigned. Where the sources identified no historical allegiance, or conflicted, the group was classified as unaffiliated.

**Table 2: Self-Reported Primary Determinant of Vote Choice by Level of Election**

Level of election	Political party	Candidate characteristics	Difference across factors: Column (1) - (2)
	(1)	(2)	(3)
Local Council races (N = 1,091 LC votes)	0.345 (0.014)	0.355 (0.014)	-0.010 (0.025)
National MP races (N = 1,060 MP votes)	0.457 (0.015)	0.209 (0.013)	0.247** (0.024)
Difference across levels (Local - National)	-0.110** (0.031)	0.145** (0.032)	

Notes: i) significance levels indicated by +  $p < 0.10$ , \*  $p < 0.05$ , \*\* $p < 0.01$ ; ii) outcomes in Columns 1 and 2 reflect responses to the question "What was your first most important reason for choosing this candidate?" collected by the DSS exit polls; iii) candidate characteristics include the following responses: reputation / achievement in previous job, from same / nearby village, candidate is friend or relative, same religion, same "secret" or traditional social society, candidate's gender, candidate's education, and helped me / my family before; and iv) the local - national differences are from regression analysis with individual voter fixed effects and robust standard errors clustered at the level of Local Council ward (the unit of sampling).

**Table 3: Swing Voter Campaign Spending by National and Local Candidates**

Dependent variable:	Money (1)	Visits (2)	T-shirts (3)	Posters (4)	Handbills (5)	Food (6)	Rally (7)	Index (8)	LGDG (9)
<b>Panel A: Spending by national candidates, preferred bias measure</b>									
Expected bias <sub>c</sub>	-20.693** (5.966)	-3.153* (1.576)	-0.700** (0.182)	-0.432** (0.107)	-0.223 (0.159)	-0.565** (0.202)	-0.496* (0.208)	-0.953** (0.218)	---
<b>Panel B: Spending by national candidates, robustness check on bias measure</b>									
(Share group A - share group B) <sub>c</sub>	-17.192** (4.389)	-2.465* (1.164)	-0.533** (0.151)	-0.266** (0.092)	-0.151 (0.127)	-0.422** (0.153)	-0.413* (0.167)	-0.718** (0.177)	---
<b>Panel C: Spending by local candidates, preferred bias measure</b>									
Expected bias <sub>w</sub>	-0.189 (2.103)	-0.845 (1.183)	-0.520** (0.136)	-0.183* (0.074)	-0.136 (0.122)	-0.322** (0.116)	-0.521** (0.142)	-0.531** (0.139)	-19.577* (8.745)
<b>Panel D: Spending by local candidates, robustness check on bias measure</b>									
(Share group A - share group B) <sub>w</sub>	-0.495 (1.489)	-1.149 (0.916)	-0.417** (0.097)	-0.123* (0.053)	-0.112 (0.081)	-0.248** (0.082)	-0.426** (0.099)	-0.435** (0.100)	-9.155+ (4.327)
Mean, Panels A and B	\$4.9	2.7	0.44	0.75	0.41	0.30	0.41	---	---
Mean, Panels C and D	\$2.4	3.2	0.45	0.84	0.42	0.37	0.52	---	\$16.662
Number of observations, Panels A and B	2,044	1,705	2,192	2,194	2,187	2,188	2,182	2,212	---
Number of observations, Panels C and D	2,132	1,922	2,411	2,415	2,413	2,411	2,392	2,424	330

Notes: i) significance levels indicated by +  $p < 0.10$ , \* $p < 0.05$ , \*\* $p < 0.01$ ; ii) the unit of observation in Columns 1-8 is the community-candidate pair and in Column 9 is the Local Council ward; iii) robust standard errors clustered by jurisdiction in Columns 1 - 8 and district in Column 9; iv) all specifications include fixed effects for the 14 districts and a set of jurisdictional controls that include population density and population per seat, with an additional control for the location of the Council headquarters in Column 9; v) bias and jurisdictional controls are measured for the geographic area defined by the MP constituency (subscript c) in panels A and B and the Local Council ward (subscript w) in panels C and D; vi) Columns 1 to 7 refer to individual campaign outcomes while Column 8 presents the mean effects index in standard deviation units; vii) the money variable refers to cash passed out during community visits and is demarcated in US dollars; viii) estimates in Column 9 cover the entirety of Local Government Development Grant (LGDG) spending by the first cohort of Local Councils 2004-07 and is demarcated in US \$1,000's; and ix) the LGDG sample in Column 9 is limited to district Councils and excludes the urban Councils, as the latter represent only 3 wards in a narrowly circumscribed geographic area and thus have little scope to target spending with respect to differences in ethnic composition and there is no data on the specific location of projects in the capital (see footnote 15).

**Table 4: Probability of Crossing Ethnic-Party Lines in Local versus National Races**

Dependent Variable:	Cross Party Lines (%)				Split Ticket (%)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Local election	11.327** (4.039)	14.966* (6.193)	8.025+ (4.629)	5.009* (2.253)	12.343** (4.232)	13.937+ (7.039)	10.662* (3.856)	7.598** (2.582)
Constant	14.078** (2.020)	12.925** (3.097)	15.123** (2.314)	13.544** (1.127)	7.335** (2.116)	8.711* (3.520)	5.882** (1.928)	4.723** (1.291)
Number of observations	1,236	588	648	1,078	1,118	574	544	974
R <sup>2</sup>	0.73	0.71	0.75	0.77	0.61	0.59	0.63	0.56
SLPP-affiliated tribes included?	Yes	Yes	No	Yes	Yes	Yes	No	Yes
APC-affiliated tribes included?	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Votes for minor parties included?	Yes	Yes	Yes	No	Yes	Yes	Yes	No

Notes: i) significance levels indicated by + $p < 0.10$ , \* $p < 0.05$ , \*\* $p < 0.01$ ; ii) robust standard errors clustered by Local Council ward (the unit of sampling); iii) the unit of observation is the vote, where there is one local and one national observation for every individual; iv) all specifications include individual fixed effects; v) the sample of voters is restricted to those from ethnic groups affiliated with a party in Table 1 who reported their party choice in both the local and national elections (where “cross party lines” requires both of 2 votes and “split ticket” requires all of 4 votes); vi) the sample of wards excludes multi-seat LC wards, where voters can choose candidates from multiple parties, and wards where one of the two rival parties did not contest the race (i.e. those missing either an APC or SLPP/PMDC candidate); vii) Columns 1 and 5 are the preferred specifications, which include voters from tribes associated with both parties and votes for minor parties and Independent candidates; viii) Columns 2 and 6 show results from the same specification but limit the sample to voters from the 3 tribes affiliated with the SLPP/PMDC, while Columns 3 and 7 show results for the 6 tribes affiliated with the APC; and ix) Columns 4 and 8 provide robustness checks that limit analysis to individuals who voted for one of the three major parties for all races considered, thereby excluding anyone who voted for a minor party or Independent candidate in either of the 2 (4) races of interest for cross party lines (split ticket) outcome.

**Table 5: Triple Differencing by Radio Coverage, Radio Ownership and Level of Election**

	Cross (%)	Name (%)	Cross (%)	Name (%)	Cross (%)	Listen (%)	Dev't (%)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Local politician	3.502** (1.222)	3.698+ (2.168)	4.882* (1.946)	3.138 (2.168)	4.366* (1.822)	15.023** (2.516)	1.662 (1.937)
Only community radio coverage		-14.153 (11.313)	9.437 (6.122)				
Owns radio		5.568* (2.637)	-1.195 (2.056)				
Local politician * Only community coverage		5.891 (5.364)	-2.142 (3.518)	3.759 (5.462)	-1.779 (3.306)	6.406 (5.374)	-5.564 (4.207)
Local politician * Owns radio		-1.642 (2.826)	-3.082+ (1.840)	-1.346 (2.718)	-2.215 (1.736)	-6.731* (2.843)	2.109 (2.483)
Only community coverage * Owns radio		-12.455* (5.744)	-3.911 (3.773)				
Local politician * Only community radio coverage * Owns radio		13.604* (6.901)	8.963* (4.295)	15.543* (6.860)	7.441+ (3.936)	2.251 (6.544)	-1.568 (6.342)
Female		-7.897** (1.698)	-1.748 (1.389)				
Age		-0.085 (0.056)	-0.024 (0.047)				
Years of schooling		0.415** (0.145)	0.237 (0.163)				
Member of a ruling household		5.670** (1.848)	0.395 (1.852)				
PCA asset score		-0.340 (0.672)	-0.286 (0.665)				
Constant	11.356** (0.611)	74.566** (3.888)	10.743** (2.971)	70.155** (0.758)	10.829** (0.627)	61.792** (0.769)	21.503** (0.647)
Fixed effects level	Voter	Enumeration area	Enumeration area	Voter	Voter	Voter	Voter
Number of observations	3998	3578	3578	3860	3860	3692	3619

Notes: i) significance levels indicated by  $+p < 0.10$ ,  $*p < 0.05$ ,  $**p < 0.01$ ; ii) robust standard errors clustered by enumeration area (EA), which is the unit of sampling of the NPS survey and often contains more than one village; iii) Column 1 uses the NPS household data to repeat the base specification of Table 4 Column 1 that uses exit poll data; iv) there are two observations - one local and one national - for every individual; v) the sample of respondents is restricted to those from ethnic groups affiliated with a party in Table 1, who reported their vote choice and ability to name politicians at both the local and national level, and who could verify their claim of voting by producing a voter identification card with the corresponding hole punches made by polling center staff; vi) the sample excludes multi-seat LC wards, where voters can choose candidates from multiple parties, and wards where one of the two rival parties did not contest the race (i.e. those missing either an APC or SLPP/PMDC candidate); vii) membership in a ruling household denotes eligibility to stand for election in the traditional chieftaincy system and is an indicator of local political connectedness; viii) the PCA asset score is a principal components analysis of all seven household assets collected in the NPS (excludes radio) and the construction materials used in the walls, floor and roof of the respondent's dwelling; and ix) Columns 6 and 7 are placebo tests on general voter opinions regarding whether the local/central government listens to people in their area and on whether promises of development was the primary determinant of voting choice.

**Table 6: Voting Response to Candidate Quality Using Peer Rankings of Local Council Incumbents**

Dependent variable:	Re-elected, given incumbent		Voted for incumbent, all voters		Voted for incumbent, given from rival tribe	
	(1)	(2)	(3)	(4)	(5)	(6)
Effectiveness peer rank of incumbent	0.108** (0.035)	0.118* (0.050)	0.125** (0.035)	0.112** (0.041)	0.065* (0.030)	0.035 (0.039)
Mean	0.605	0.634	0.638	0.652	0.135	0.141
Unit of observation	Incumbents		Voters		Voters	
Number of observations	129	71	960	709	193	135
Number of races covered	115	71	86	62	37	29
R <sup>2</sup>	0.28	0.26	0.28	0.20	0.18	0.08

Notes: i) significance levels indicated by +p<0.10, \*p<0.05, \*\*p<0.01; ii) the peer rankings were completed by sitting Local Councillors a few months before the 2008 election and are on a 7 point scale anchored to three vignettes; iii) all specifications include controls for the incumbent's party; iv) Columns 1 and 2 cover all wards where a Local Councillor ran for re-election (due to redistricting, in a few wards multiple incumbents ran); v) Columns 3 and 5 include all wards covered by the NPS household sample where a single incumbent ran for re-election; vi) Columns 4 and 6 exclude multi-seat LC wards, where voters can choose candidates from multiple parties, and wards where one of the two rival parties did not contest the race (i.e. those missing either an APC or SLPP/PMDC candidate); vii) the sample of voters in Columns 3 through 6 is restricted to those who could verify their claim of voting by producing a voter identification card with the corresponding hole punches made by polling station staff; viii) the sample of voters in Columns 5 and 6 regarding crossing party lines is restricted to those from ethnic groups affiliated with a party in Table 1; and ix) the text of the anchoring vignettes in order of increasing effectiveness was as follows: "*Councillor X has attended council meetings and been a member of the development planning committee but has not been active in other ways as a councillor.*" "*Councillor Y was an active member of the development planning committee and got one of the RRI projects (a market) constructed in his ward.*" "*Councillor Z was an active member of the development planning committee and got one of the RRI projects (a market) constructed in his ward. Also, he worked with the Paramount Chief to mobilize labor and an NGO to provide funds to repair roads and culverts in the ward.*" Councillors rated each vignette and then three randomly assigned peers on a scale of 1 to 10. The peer rankings were standardized to a 7 point scale ranging from 1 if the peer was ranked lower than Councillor X, 2 if equal to Councillor X and so on up to 7 if ranked higher than Councillor Z.

**Table 7: The Effects of Information on Swing Voter Redistributive Campaign Spending**

Dependent variable:	Money (1)	Visits (2)	T-shirts (3)	Posters (4)	Handbills (5)	Food (6)	Rally (7)	Index (8)
<b>Panel A: Estimates using district and local government fixed effects, preferred bias measure</b>								
Expected bias <sub>j</sub>	-20.192** (5.845)	-3.503* (1.616)	-0.707** (0.190)	-0.440** (0.107)	-0.261 (0.170)	-0.589** (0.209)	-0.492* (0.203)	-1.021** (0.233)
Expected bias <sub>j</sub>   * Local candidate	20.465** (6.345)	2.590 (1.761)	0.200 (0.173)	0.261* (0.119)	0.114 (0.188)	0.248 (0.164)	-0.037 (0.170)	0.490* (0.244)
<b>Panel B: Estimates using district and local government fixed effects, robustness check bias measure</b>								
(Share A - Share B) <sub>j</sub>	-16.550** (4.241)	-2.755* (1.174)	-0.534** (0.154)	-0.274** (0.093)	-0.184 (0.131)	-0.442** (0.156)	-0.407* (0.160)	-0.769** (0.184)
(Share A - Share B) <sub>j</sub>   * Local candidate	16.455** (4.648)	1.588 (1.217)	0.128 (0.128)	0.153 (0.094)	0.065 (0.148)	0.183 (0.123)	-0.022 (0.129)	0.340+ (0.186)
<b>Panel C: Estimates using constituency fixed effects, preferred bias measure</b>								
Expected bias <sub>c</sub>   * Local candidate	17.549** (6.531)	1.516 (1.889)	0.095 (0.117)	0.044 (0.117)	0.219+ (0.124)	0.257** (0.082)	0.087 (0.105)	0.397** (0.133)
<b>Panel D: Estimates using constituency fixed effects, robustness check bias measure</b>								
(Share A - Share B) <sub>c</sub>   * Local candidate	11.989* (4.826)	0.895 (1.268)	0.062 (0.086)	0.051 (0.079)	0.117 (0.083)	0.176** (0.061)	0.075 (0.082)	0.269** (0.092)
Number of observations, all panels	4,176	3,627	4,603	4,609	4,600	4,599	4,574	4,636

Notes: i) significance levels indicated by + $p < 0.10$ , \* $p < 0.05$ , \*\* $p < 0.01$ ; ii) robust standard errors clustered by MP constituency; iii) Panels A and B include fixed effects for the 14 districts and LOC\*district interactions that define the 14 local governments, Panels C and D include fixed effects for the 112 MP constituencies; v) Panels A and B include jurisdictional controls include population density and population per seat, which are absorbed by the constituency fixed effects in Panels C and D; vi) the money variable refers to cash passed out during community visits and is demarcated in US dollars; vii) Columns 1 to 7 refer to individual campaign outcomes while Column 8 presents the mean effects index in standard deviation units; and iv) in Panels A and B for local (national) candidates the relevant geographic area (subscript j) for expected bias and jurisdictional controls is the Local Council ward (Parliamentary constituency), in Panels C and D bias is measured for the geographic area defined by the MP constituency (subscript c) for all candidates (this abstracts away from any residual differences in bias across the 4 Local Council wards

## For Online Publication: Appendix

### A. Proof of Proposition 1

Let  $t_j = v(\omega + t_{aj}) - v(\omega + t_{bj})$  denote the consumption utility differential for jurisdiction  $j$  in Equation (9). The first order conditions for Party  $A$  and  $B$  respectively are:

$$v'(\omega + t_{aj}) f_j(t_j) = \lambda \quad (19)$$

$$v'(\omega + t_{bj}) f_j(t_j) = \mu \quad (20)$$

Constant shadow prices indicate that gains in expected votes with respect to marginal shifts in transfers should be equal across jurisdictions. The ratio of the scalars ( $\lambda/\mu$ ) holds constant, while exhausting the budget, only if each party promises the same amount to any given jurisdiction ( $t_{aj} = t_{bj} = Y_j \forall j$ ). Voter consumption is thus identical under either party and implies  $t_j = 0$ . By the translate assumption, rewrite each jurisdictional density as a function of the common density,  $f_j(0) = f(0 + \alpha_j)$ , for the general first order condition:

$$v'(\omega + Y_j) = \frac{\lambda}{f(\alpha_j)} \quad (21)$$

The concavity of  $v(\cdot)$  and the unimodal and symmetric nature of  $f(\cdot)$  imply that transfers ( $Y_j$ ) are decreasing in the absolute value of the expected bias of jurisdictions ( $|\alpha_j|$ ). Assume that  $v'(0)$  is sufficiently high to generate an interior solution.

To establish uniqueness, the concavity of  $v(\cdot)$  implies that for any two solutions  $(\lambda, Y)$  and  $(\lambda', Y')$  to (21) that are not equal,  $\lambda < \lambda'$  implies  $Y > Y'$  in all jurisdictions, which violates the budget constraint. LW further prove that  $|f'(0)|/f(0) \leq |v''(\omega + Y)|/(v'(\omega + Y))^2$  is a necessary condition for existence, which is satisfied given the symmetry of  $f(\cdot)$  (as  $f'(0) = 0$ ).

### B. Proof of Proposition 2

Set the consumption differential in the right hand side of Equation (4) to zero. The voter chooses Party  $A$  if the perceived quality advantage of candidate  $B$  is not large enough to outweigh the voter's party loyalty to  $A$  (recalling that  $\Delta p_i = (p_{bi} - p_{ai})$ ):

$$\text{Vote A if : } \delta\theta_{ij} \leq -\Delta p_i \quad (22)$$

For voters, party preference is a known scalar, while relative candidate quality is based on a random draw from the quality distribution. Considering the same voter over multiple elections, the probability that the voter chooses Party  $A$  in any particular election is thus:

$$\Pr(\text{Vote } A) = \Pr[\delta\theta_{ij} \leq -\Delta p_i] \quad (23)$$

This probability is the cumulative density function of perceived quality advantage (of candidate  $B$  over  $A$ , from Equation (3)) evaluated at the voter's own party preference (for party  $A$  over  $B$ ). Standardizing this distribution yields:

$$\Pr(\text{Vote } A) = \Phi\left(\frac{-\Delta p_i}{(\sigma_q^4 / (\sigma_q^2 + \sigma_v^2))^{1/2}}\right) \quad (24)$$

Crossing party lines is a vote for Party  $A$  if the voter is Type  $B$  (i.e.  $\Delta p_i > 0$ ) and a vote for Party  $B$  if the voter is Type  $A$  ( $\Delta p_i < 0$ ). Thus for a Type  $B$  voter, the probability of crossing party lines is simply (24). (The argument is symmetric for Type  $A$ .) Improving signal quality increases the variance of the perceived quality distribution, thereby increasing the denominator of the argument in (24). Since the numerator for a Type  $B$  voter is less than zero, this increases the argument overall. As the CDF is increasing in its argument, conclude that improving information increases the probability of crossing party lines.

### C. Proof of Proposition 3

Consider the case of positive expected jurisdictional bias (the case for negative is symmetric). Recall that Proposition 1 implies spending that is decreasing in partisanship. Applying the Implicit Function Theorem to the first order condition in (10) generates a general expression for this derivative and one specific to the normal distribution case:

$$\frac{\partial Y_j}{\partial \alpha_j} = \frac{-\lambda \frac{\partial f(\alpha_j)}{\partial \alpha_j}}{v''(\omega + Y_j) f(\alpha_j)^2} = \frac{\lambda \alpha_j (2\pi)^{1/2}}{v''(\omega + Y_j) \delta \sigma_q \exp\left(\frac{-\alpha_j^2}{2\delta^2 \sigma_q^2}\right)} \leq 0 \quad (25)$$

The sign of this derivative is nonpositive for the normal distribution and holds quite generally:  $f(\alpha_j)$  is decreasing in its argument for any unimodal distribution;  $v''(\cdot)$  is negative given the concavity assumption; and  $f(\alpha_j)$  is positive by definition.

Providing better information increases voter responsiveness ( $\delta$ ) to candidate quality, which increases the variance of the parties' estimated distribution of advantage. Taking the derivative of (25) with respect to  $\delta$  shows how spending changes with information provision:

$$\frac{\partial}{\partial \delta} \left( \frac{\partial Y_j}{\partial \alpha_j} \right) = \frac{-\lambda \left[ \frac{\partial^2 f(\alpha_j)}{\partial \delta \partial \alpha_j} f(\alpha_j) - 2 \frac{\partial f(\alpha_j)}{\partial \delta} \frac{\partial f(\alpha_j)}{\partial \alpha_j} \right]}{v''(\omega + Y_j) f(\alpha_j)^3} = \frac{-\lambda \alpha_j (2\pi)^{1/2} (\alpha_j^2 + \delta^2 \sigma_q^2)}{v''(\omega + Y_j) \delta^4 \sigma_q^3 \exp\left(\frac{-\alpha_j^2}{2\delta^2 \sigma_q^2}\right)} \geq 0 \quad (26)$$

As the cross derivative is nonnegative for the normal distribution, conclude that information provision attenuates the slope of party spending with respect to jurisdictional bias.

The generality of this result is less immediately obvious than that of (25). Without assuming a specific functional form, the sign of the expression in (26) depends on which term within brackets dominates (the signs on the other terms remain as above and are together a positive multiplier of the expression in brackets). The first two terms are generally positive. Specifically, as the spread of a unimodal distribution increases, its density falls less quickly in response to any given change in its argument, implying that  $\frac{\partial^2 f(\alpha_j)}{\partial \delta \partial \alpha_j}$  is positive. For distributions that extend over an infinite range, this holds true everywhere save in the two extreme tails. This term is multiplied by  $f(\alpha_j)$ , which is positive by definition. The last two terms are generally negative. Specifically, in the center of the distribution, as the variance increases, the height of the density falls, implying that  $\frac{\partial f(\alpha_j)}{\partial \sigma_\alpha^2}$  is negative. This term switches sign as one moves outward towards either tail. It is multiplied by  $\frac{\partial f(\alpha_j)}{\partial \alpha_j}$ , which is negative as mentioned above. Moving from the center of the distribution outwards, the entire expression remains positive for distributions where the first term dominates in the center and is overtaken by the second term in the tails (the two terms agree over the intervening range). This clearly holds for the assumption of normally distributed partisan loyalties and candidate quality. If we revised the model to instead incorporate the (also) common assumption of uniformly distributed loyalties and perceived quality,  $f(\cdot)$  would take the triangular distribution and (26) would again be unambiguously positive.

#### D. Derivation of Propositions 1 to 3 under an alternative objective function

A closer match to the original LW framework would be to assume that parties maximize the expected number of votes they receive within each constituency, as opposed to number of seats won in Parliament. This reformulation does not affect the set up of the voter's decision (Equations 1 through 4) nor the assumptions regarding what parties know about the distributions of party loyalty, candidate quality and the noisy quality signals.

Recall that from the parties' perspective the left hand side of the Vote  $A$  expression in Equation (4) is the sum of two normally distributed random variables:

$$\Delta p_i + \delta \theta_{ij} \sim F_j(\cdot) = N_j(\alpha_j, \sigma_\alpha^2) \text{ where } \sigma_\alpha^2 = \sigma_p^2 + \left( \frac{\sigma_q^2}{\sigma_q^2 + \sigma_v^2} \right) \sigma_q^2 \quad (27)$$

The assumed objective of political parties is now to maximize the total number of votes they receive in each jurisdiction, subject to the budget constraint.<sup>22</sup> Party  $A$  does so by choosing a vector of transfers that maximizes the sum of expected votes for  $A$ . Notice that the probability a voter chooses  $A$  is the probability that the random variable in (27) is less than the promised consumption utility differential. Party  $A$  thus maximizes this probability

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<sup>22</sup>LW show that the first order condition for the alternative objective of maximizing the probability of winning collapses to that of the plurality case if both parties are equally popular.

with respect to the budget constraint:

$$\max_{t_{aj}} \sum_{i \in I_j} F_j [v(\omega + t_{aj}) - v(\omega + t_{bj})] - \lambda \left[ \sum_j n_j t_{aj} - n\tau \right] \quad (28)$$

Party  $B$  solves a symmetric problem with respect to  $t_{bj}$ , with corresponding Lagrange multipliers denoted by  $\mu$ . The first order conditions for Party  $A$  and  $B$  respectively are the same as in Equations (19) and (20), where the rationale above again applies and produces the general first order condition of Proposition 1:

$$v'(\omega + Y_j) = \frac{\lambda}{f(\alpha_j)} \quad (29)$$

where transfers are decreasing in the absolute value of expected party loyalty ( $|\alpha_j|$ ).

The derivation of Proposition 2 is unaffected.

To prove Proposition 3 again consider the case where the expected advantage is positive (the case for negative is symmetric). Apply the Implicit Function Theorem to (29) to generate a general expression for the derivative and one specific to the normal distribution:

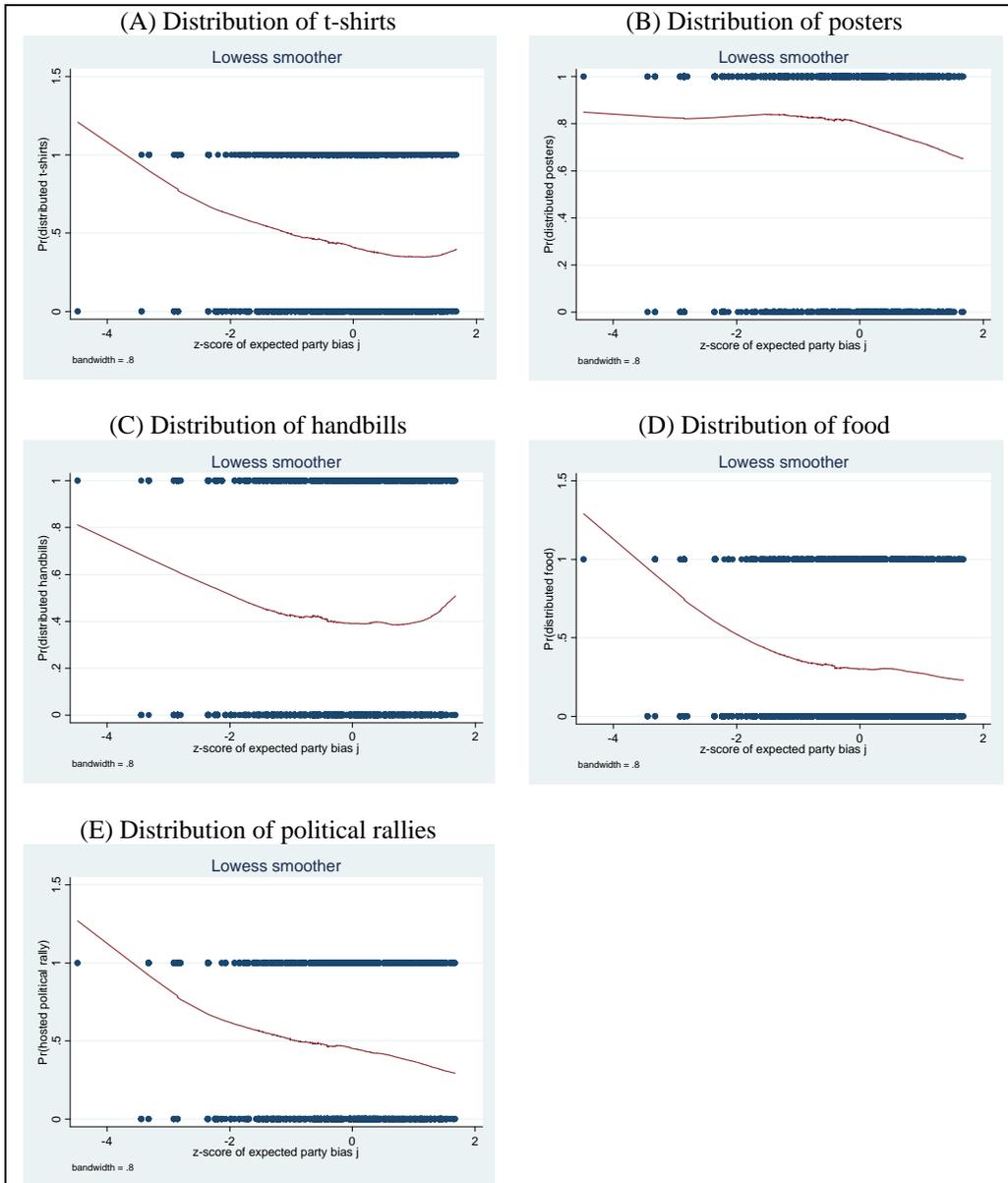
$$\frac{\partial Y_j}{\partial \alpha_j} = \frac{-\lambda \frac{\partial f(\alpha_j)}{\partial \alpha_j}}{v''(\omega + Y_j) f(\alpha_j)^2} = \frac{\lambda \alpha_j (2\pi)^{1/2}}{v''(\omega + Y_j) \sigma_\alpha \exp\left(\frac{-\alpha_j^2}{2\sigma_\alpha^2}\right)} \leq 0 \quad (30)$$

Recall that providing better information to voters increases the variance of the parties' estimated distribution of advantage. Taking the derivative of expression (30) with respect to the variance shows how spending changes when voters have access to better information about candidate quality:

$$\frac{\partial}{\partial \sigma_\alpha^2} \left( \frac{\partial Y_j}{\partial \alpha_j} \right) = \frac{-\lambda \left[ \frac{\partial^2 f(\alpha_j)}{\partial \sigma_\alpha^2 \partial \alpha_j} f(\alpha_j) - 2 \frac{\partial f(\alpha_j)}{\partial \sigma_\alpha^2} \frac{\partial f(\alpha_j)}{\partial \alpha_j} \right]}{v''(\omega + Y_j) f(\alpha_j)^3} = \frac{-\lambda \alpha_j (2\pi)^{1/2} (\alpha^2 + 2\sigma^2)}{v''(\omega + Y_j) 2\sigma_\alpha^{5/3} \exp\left(\frac{-\alpha_j^2}{2\sigma_\alpha^2}\right)} \geq 0 \quad (31)$$

For the normal distribution case the sign is unambiguously positive, indicating that supplying better information to voters attenuates the slope of party spending with respect to the underlying bias of jurisdictions.

**Appendix Figure 1: Nonparametric Mapping of Campaign Investments on Z-score of Expected Bias**



## Appendix Table 1: Robustness Check Comparing Exit Poll Data to Official Voting Returns

Dependent Variable:	APC party vote share in NEC official returns (1)
APC party vote share in exit polls	0.734** (0.048)
Local race	0.117* (0.051)
Local race * APC party vote share in exit poll:	-0.019 (0.083)
Constant	0.035 (0.025)
Number of observations	107
R <sup>2</sup>	0.72

Notes: i) significance levels indicated by  $+p < 0.10$ ,  $*p < 0.05$ ,  $**p < 0.01$ ; ii) robust standard errors; iii) the unit of observation is the jurisdiction, of which there are 57 Local Council wards and 50 Parliamentary constituencies in the exit poll sample.