Political competitiveness and the private–public structure of public expenditure: a model and empirics for the Indian States

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Abstract

Studies of government size usually try to identify the factors that explain what parts of economic activity are brought within the public sector and what parts are left strictly in private hands. Modern governments are now so large that the question of what determines the private/public composition, or privateness, of *public* expenditure is of comparable importance for understanding the role of government in society. In this paper, we use a model of the composition of public budgets to uncover the importance of electoral competitiveness and other factors in the evolution of the privateness of public expenditure across the Indian states. These states vary widely in their socioeconomic characteristics while sharing a common political heritage based on parliamentary government. New measures of public expenditure on private targetable goods and of electoral competitiveness at the Indian state level accompany the paper along with a primer on Indian public finance accounting practices in an Online Appendix. The empirical analysis shows that the degree of privateness in India's more developed states falls substantially with greater political competition and with rising incomes, while in the less developed states it responds more weakly to these key factors and in some cases even inversely.

Keywords Private/public good composition of government expenditure · Targetable private goods · Electoral competitiveness · Core versus swing voter · Pooled mean group estimation · Indian states

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1 Introduction and overview

Studies of government size in a democracy have traditionally focused on uncovering the factors that explain what parts of economic activity are brought within the public sector and what parts are left strictly in private hands. However, modern governments are now so large that the question of what determines the private good/public good composition, or *privateness* of public expenditure, is of comparable importance for understanding the role of government in society. In this paper, we construct a model with core and swing voters of the private–public composition of public budgets, where electoral competitiveness and income along with other factors play key roles. We then apply this model to explain the evolution of the privateness of the budgets of major Indian states over a substantial period of time. New measures of public expenditure on private targetable goods—required for measuring the privateness of state budgets—and of electoral competitiveness at the state level accompany the analysis.

The Indian states are an excellent subject for our investigation for several reasons. First, these states vary widely in the privateness of their public budgets as well as in their underlying socioeconomic characteristics, while sharing a common political heritage based on majoritarian, parliamentary government. Second, the privateness of their budgets matters: It is likely that the balance between redistribution via the provision of targetable private goods and expenditure on public goods is an important factor in Indian development. Finally, the data required for our investigation—including the detailed line item budgetary data required to construct a suitable measure of the private/public composition of state budgets, and the electoral data required to measure political competitiveness at the state level—are publicly available for a substantial period of time for each of the 14 major states (containing about 85% of the population) that are included in our panel data set.

In a core versus swing voter framework developed with application to India in mind, we are led to focus on the roles of political competitiveness and the real incomes of voters. A rise in competitiveness leads to a reduced role for targetable private goods relative to public goods in the public budget for several reasons.¹ First, swing voters are more concerned than are core supporters with the general economic consequences of public policy (see, for example, Besley et al. 2010), the core being more concerned with non-monetary goals and specific private benefits. These general interests include economic development and the public goods that are associated with it. Thus, as the weight of swing voters in the electorate increases, political parties find it electorally profitable to reduce the role of private goods in the budget. Second, the price of a unit of support gained from the supply of public goods falls (relative to that for private targetable goods) when the number of swing voters increases because of the non-rivalness in consumption of the public goods that such voters favor: A related mechanism is the center piece of the model of publicness

¹ Exactly what is meant by *electoral competition*, and by *targetable private goods*, will become clear as we proceed.

of government spending of Bueno de Mesquita et al. (2003).² The fact that swing voters are relatively more expensive to target effectively with private goods, as suggested by Dixit and Londregan (1996), reinforces the move away from private goods as their number increases. Finally, competition tends to reduce the rents that can be delivered to partisan supporters in the form of private goods. Hence, as electoral competition intensifies, taste, non-rivalness, targeting cost and rent-related considerations all lead competing parties toward more publicness in their budget plans.

In order to uncover the role of electoral competition, it is necessary to control for other factors that are also likely to be important including, notably, real income, which varies across the states by as much as 1–5 in our sample that extends from 1987–1988 until 2011–2012. A commonly observed stylized fact is that for poorer voters, private benefits publicly supplied form a significant part of their consumption bundle. As incomes rise, however, the public expenditure required to generate an additional vote—what we shall think of as the price of a unit of support—through provision of private goods targeted toward loyal supporters who, as Wintrobe (1986) explains, expect a private return to their loyalty, increases relative to the price of support from provision of public or non-rival goods. Core supporters must also be encouraged to turn out to vote, as Stokes et al. (2013) emphasize, a task which is accomplished more cheaply via the provision of private targetable goods rather than using public goods, but one that also becomes more costly as average incomes rise. For these reasons, as incomes rise we expect that electoral equilibria will be characterized by relatively less government spending on private targetable goods.

The importance of the level of development to the private/public composition of the public budget has been recognized before, for example by Magaloni et al. (2007) who use a different model with a similar idea about the price of support embedded in it.³ However, the role of electoral competition has not been well studied in the present context. The intensity of electoral competitiveness as we shall think about it depends on the uncertainty, or ‘swingyness’ of electoral outcomes at the electoral district or constituency level.⁴ Competitiveness in this sense rises with the relative number of swing voters because they are, by definition, less committed than are core supporters to vote for any particular party, as in Besley et al. (2010), Golden and Min (2013), Stokes et al. (2013), Datta (2019) and others. The contribution of this paper lies in the combining of electoral competitiveness with the level of development in a model that explains how and why the privateness of public expenditure varies across space and time.⁵

² See also Morrow et al. (2008). The argument in Bueno de Mesquita et al. (2003) and Morrow et al. (2008) is not phrased in terms of what determines the relative price of a unit of political support gained by supplying public or private goods, though it could be analyzed in this way.

³ The role of income is a part of almost any model of special interest politics when each voter’s marginal utility of consumption diminishes with income. The importance of income and its growth in determining electoral success in India is emphasized in a more general setting by Gupta and Panagariya (2014).

⁴ Competitiveness has often been defined as ex ante uncertainty about election outcomes. See, for example, Blais and Lago (2009) and Grofman and Selb (2009).

⁵ We note that the dimensionality of the issue space—consisting of a private good–public good budget composition and overall budget size—is greater than one. So this model will not have a decisive median voter. As with all such multi-dimensional models, the existence of electoral equilibrium depends on the

Testing the main implications of our conceptual framework requires a measure of public expenditure on targetable private goods and an index of electoral competitiveness.⁶ We construct both variables for 14 major Indian states over the 1987–1988 to 2011–2012 period.⁷ Each is of independent interest. Targetable private goods, when compared to general public expenditure, are (relatively) rival, targeted at identifiable groups of voters and, at least to some extent, retargetable over an electoral period. How this component of the public budget can be constructed from line item Indian state revenue expenditure accounts that first became available in the *Finance Accounts* in 1987–1988 is described in detail in the Online Appendix. We also provide a new measure of competitiveness in elections at the state constituency level that captures the ex ante uncertainty, or swinginess, of multi-party electoral contests. An index of the kind we construct was suggested some time ago by Przeworski and Sprague (1971) and implemented for Canada by Ferris et al. (2016) and for India by Dash et al. (2019).⁸ Such an index, which is superior to the often employed first versus second place vote share in ways described in detail later, has not to our knowledge been used to study public policy in the Indian context.

While our empirical investigation of the role of political competition in determining the composition of Indian state budgets is to our knowledge unique, we are not the first to study the privateness of public expenditure in a developing country context. For India in particular, there is interesting work by Chhibber and Nooruddin (2004), Thachil and Teitelbaum (2015) and Nooruddin and Simmons (2015), among others. Chhibber and Nooruddin and Nooruddin and Simmons relate the composition of the budget to the share of the vote required for a party to become the government or to join a governing coalition. As this share declines, it is argued that incumbent coalitions are incentivized to focus more narrowly on specific segments of the electorate, leading to greater privateness in the budget, as is also suggested by the model of Bueno de Mesquita et al. (2003). Although it is not part of the formal

Footnote 5 (continued)

existence of uncertainty about how voters will behave. See Coughlin (1992) for extensive general discussion of this matter and Hettich and Winer (1999) for discussion in the context of modeling fiscal structure.

⁶ Others who have investigated the privateness of public budgets are also concerned with these measurement issues. See, for example, Drazen and Eslava (2010) who study the privateness of public spending across Colombian localities. Drazen and Eslava's analysis focuses on variation in privateness over the election cycle, while we emphasize the longer-run consequences of development and competitiveness for the composition of the budget. And of course, they are studying Columbia, not India.

⁷ In the accompanying empirical analysis, we use data for 14 states that cover about 85% of the population and include Andhra Pradesh, Bihar, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Assam and Jammu and Kashmir are excluded. Although Assam has held elections since 1951, its division in the 1960s and 1970s resulted in variations in the number of electoral constituencies and instability in the party system over the first three decades. In Jammu and Kashmir, representatives are elected for terms of 6 years as opposed to 5 years, and due to insurgency-related issues, elections are often held amid heavy security, usually with low voter turnout. Furthermore, as special category states, both of these states are excessively dependent on central government transfers, which affects their fiscal autonomy.

⁸ For Canada, see Ferris et al. (2016). On the measurement of competition for the Indian states, see Dash et al. (2019).

model presented in the next section, which emphasizes the key roles of competition and of income, we allow for this route through which the composition of the budget may be affected in our empirical work.

To empirically study the determinants of budget composition over the longer run, the domain of our theory, we develop estimating equations formulated in error correction form and estimate using the pooled mean group approach of Pesaran and Smith (1995) and Pesaran et al. (1999).⁹ This procedure allows for variation in coefficients of explanatory variables across Indian states in the shorter run, while calculating a common cointegrating vector. We augment this method by allowing for the possibility that convergence is conditional on the level of development, which varies widely across the states. Other estimation methods are also employed.

Our empirical results confirm the hypothesized effects of electoral competition and income on the privateness of budgets in higher-income Indian states. In the richer states, more intense electoral competition and higher real incomes are shown to lead on to greater emphasis on public goods including capital infrastructure. In the lower-income states, however, we find that these effects are more muted, and even reversed in some cases, a situation that is consistent with a greater emphasis by contesting parties in these states on maintaining the loyalty and turnout of core supporters through redistribution. Counterfactuals are provided to illustrate the difference in the quantitative effects of competitiveness and the level of development on privateness across the states.

The paper proceeds as follows. A formal model is presented in section two with corresponding estimating equations outlined in section three. Our new measures of public expenditure on targetable private goods and of multi-party electoral competitiveness are presented in section four. Estimation follows in section five along with counterfactuals that illustrate the quantitative importance of competitiveness and real incomes for budget composition. Section six considers the robustness of our main results to the use of public sector wages and salaries as an alternative to our new measure of spending on targetable private goods and to the instrumenting of income as well as other methods of estimation. Section seven concludes.

An Online Appendix provides derivations and proofs. It includes a primer on public finance accounting in India for readers not familiar with Indian public finance accounting practices. This serves as a prelude to a detailed explanation of how our measure of state public expenditure on targetable private goods is constructed. The Online Appendix also provides summary statistics as well as details of the ancillary estimation discussed in section six.¹⁰

⁹ This dynamic panel data estimator is implemented in Stata by Blackburne III and Frank (2007).

¹⁰ See Winer et al. (2020). The Online Appendix along with a replication (Stata) data set and do files are found at: https://dataverse.scholarsportal.info/dataverse/Privateness_of_Public_Expenditure. The raw electoral data used in measuring electoral competitiveness are found in Winer et al. (2019).

2 A model of the privateness of public expenditure

We focus on how parties choose the private/public composition of their political platforms when there are both core and swing voters. To simplify the exposition, we consider one representative state where several parties $i = \{1, 2, \dots, I\}$ contest an election at time t .

The relative success of any party i depends on its ability to attract votes from a common pool of swing, relatively uncommitted and harder to target voters, of number n_{st} , in addition to retaining the support of its own, more committed and easier to target core supporters n_{cit} , with the total expected number of voters equal to $n_{st} + I * n_{cit}$ where I is the number of parties (there may be several).¹¹

Core supporters are more interested in party-specific ideas that are not narrowly defined in economic terms and so exhibit loyalty to a party that is not simply conditioned on what may be promised in the current election. But core supporters must also be targeted with private goods q_{it} since they are never loyal to their party *regardless* of the opportunity cost of such loyalty.¹² After all, they can always decide not to vote as we noted earlier. Spending on private goods targeted at the core also serves to establish a reputation or brand name for any party seeking core support. On the other side of that implicit exchange, leaders of groups of core supporters can solicit private benefits for its members by delivering group votes to the governing party (Krishna 2007; Stokes et al. 2013).¹³ In contrast to core supporters, swing voters are interested in the general economic consequences of public policy, as in Besley et al. (2010) and Lindbeck and Weibull (1987). In particular, we suppose that swing voters enjoy a higher marginal utility from the provision of public goods and services than do core supporters. Swing voters are also harder to target with private goods.

Before we can write down the actual or ex post budget constraint that faces the successful political party, it is necessary to introduce a second type of private good, z , which unlike q is relatively hard to target. These are goods like pensions and basic administrative services such as the post office and security. This third type of good

¹¹ The year in our analysis refers to the national accounting rather than the calendar year. We view election variables as representing outcomes measured at a point in time of ongoing processes, and so we interpolate between election years to derive annual time series.

¹² See, for example, Wintrobe (1986). He is analyzing dictatorship. But his approach to loyalty, which is never blind to its opportunity cost, applies more generally. This point does not appear to be generally recognized in the core versus swing voter literature. (But see Stokes et al. 2013 and Stokes 2005.) Dixit and Londregan explicitly build into their model of special interest politics the targetability of different groups, but do not discuss the loyalty issue.

¹³ It may be noted here that some of the literature conflates what we are calling targeted private spending on core supporters with clientelism. On clientelism, see for example Kitschelt and Wilkinson (2007), Hicken (2011) and Robinson and Verdier (2013). In our view, clientelism is more restrictive than targeted special interest spending, requiring the existence of a contractual relationship between a political party promising government assistance in return for the legislative support of a specific group. Its measure thus requires evidence of how political promises can be enforced feasibly. In our analysis, targeted spending is directed at special interest groups of relatively committed voters who can be expected to support the governing party with a reasonably high degree of confidence. In this sense, it is a model of special interest politics.

must be included in the model to allow us to specify a government budget constraint that can be matched to actual data from budgetary sources. The *ex post* government budget restraint facing the successful political party in a representative state after an election may then be written as follows, where state subscripts are now omitted for convenience, and prices p (discussed further below) along with corresponding real quantities are in lower case:

$$G_{it} = Q_{it} + p_{gt}g_{it} + p_{zt}z_{it}, \quad \text{where} \quad Q_{it} = p_{qt}q_{it} + R_{it}. \quad (1)$$

Total non-interest nominal government expenditure, G_{it} , consists of nominal public expenditure on private targetable goods Q_{it} , on public goods $p_{gt}g_{it}$ and on non-targetable private administrative goods $p_{zt}z_{it}$, all of which are interpreted to be in per capita form. Q_{it} has two components: expenditures on targetable private goods $p_{qt}q_{it}$, which are part of an announced electoral platform, and rent, R_{it} , which is regarded as a residual specific to each party that is determined *after* the election, and which is defined more explicitly below. It is important to note that (1) is not the *ex ante* government budget restraint that underlies a political party's choice of an election platform. That restraint will be specified later.

The prices and quantities in (1), assumed to be the same for all parties, are defined in terms of political support units. For example, consider *observed* spending on publicly provided public goods $p_{gt}g_{it}$. Given p_{gt} , the price in terms of the public expenditure on public goods required to generate a unit increase in expected political support, we can determine the support units of the public good actually provided by dividing observed spending on public goods by the electoral cost of a unit of support.¹⁴ We do not observe p_{gt} or g_{it} separately, but we can formulate hypotheses about the determinants of the support prices in (1) and test them empirically, in the manner explained below.

In their attempt to maximize electoral support, each party proposes a fiscal platform consisting of various types of private and public goods along with an overall government size. The fiscal choices will depend on the relative costs of gaining support through expenditure of various kinds and, in this respect, we make two key assumptions. First, we assume that the price of a unit of support (a unit increase in expected votes) from spending on targetable private goods, p_{qt} , depends on the level of income of the party's core supporters, as indexed by their per capita real income y_t which we assume is the same for all groups of core supporters in the representative state at time t :

$$p_{qt} = f(y_t), \quad f_y \geq 0, \quad f_{yy} \geq 0. \quad (2a)$$

¹⁴ More explicitly, the rupees, Rp, spent by the government on public goods to gain voter support (with the dimensions [(Rp/g)g]) can be decomposed into two parts: the cost of acquiring a unit of support, S, by providing public goods (Rp/S) and the number of units of support that those units of public goods will provide (S/g)g. The price of private targetable goods is defined accordingly.

Voters are more likely to offer their support to a party if it promises them a higher level of utility after an election. Since their marginal utilities decline with income, a larger expenditure on the targetable private good will be required to increase their expected support by one unit in higher-income compared to lower-income states, or within a state as development occurs over time. The second partial derivative allows for the possibility that the rise in the price of support as income grows is smaller in low-income states than it is in the more developed ones. Here, we are allowing for the possibility that it may continue to be more politically profitable to target private goods toward core supporters even if income grows in order to maintain their loyalty and turnout, at least up to some threshold income level which is not specified here.

A second assumption about the prices in (1) is based on the fact that there are scale economies in providing public goods. We assume that the price, in terms of the public expenditure on *public* goods required to generate a unit increase in expected support, p_{gt} , falls as the number of swing voters who intend to switch their vote from one party to another (adjusted for the cost of targeting), ϕ_t , increases. Thus:

$$p_{gt} = h(\phi_t), h_{\phi} \leq 0, h_{\phi y} \leq 0, \quad (2b)$$

where $\phi_t = (\lambda_t * n_{st}) * k_{ct}$. Here, λ_t represents the predetermined proportion of swing voters that parties think will likely switch their vote in the coming election t , assumed to be common to all parties, and k_{ct} is the common relative cost of targeting core as opposed to swing voters. As ϕ_t increases, the expected number of swing voters who are willing to switch their vote (adjusted for the relative cost of targeting them) becomes larger. Because of the non-rivalness of public goods favored by swing voters, the price of a unit of support generated by spending on public goods then falls. Again, the cross-partial allows for the possibility that the strength of this effect is weaker in the poorer states.

We may think of ϕ_t as an index of the degree of electoral competition among the parties, one that we operationalize later. The larger the number of voters that parties expect to switch their vote, the less predictable the outcome of the election will become, and the more intense will be the rivalry among the parties for the support of this part of the electorate. We assume there is no competition among a given number of parties for the support from (their own) core supporters, though such voters do have to be enticed by each party to turn out to vote.

The price of electoral support using expenditure on public goods may depend on factors other than ϕ_t . Bueno de Mesquita et al. (2003), Chhibber and Nooruddin (2004) and others argue that when there are more parties contesting an election, each of them will be incentivized to increase its support from a smaller portion of the electorate by spending more on private targetable goods. In other words, they are suggesting that the relative price of a unit of support from expenditure on public goods will be higher, the larger the number of parties. This effect is omitted from (2b), but we shall allow for it in our empirical implementation of the model.

2.1 Symmetric uncertainty among voters and parties, retrospective voting and rents

We turn now to the information structure of the model, for both parties and voters, along with the role of rents. We suppose that the nominal value of government services that can be produced from a given level of revenue, consisting of own tax revenue $\tau_{1,t}$ and exogenously determined grants from the central government ω_t , is a random variable that depends on the realized abilities of the party's electoral candidates and the specific economic circumstances to be encountered following the election.¹⁵ This we characterize as a shock, u_{it} , specific to each party that generates a nominal value of government services of:

$$G_{it} = u_{it}(\tau_{1,t} + \omega_t) \quad \text{where} \quad u_{it} \sim N(1, \sigma_u^2). \quad (3)$$

Uncertainty is symmetric in the sense that neither voters nor parties are assumed to know u_{it} ex ante. But from observations of past performance voters can and do calculate the mean value of this shock which, following Ferejohn (1986), then becomes an important part of their retrospective assessment of any party's political platform. Of course while voters can estimate and demand from parties the expected productivity, $E(u) = 1$, the winning party experiences the actual realization of u_{it} following the election.¹⁶

In the presence of symmetric uncertainty about u_{it} , and with retrospective voting by the electorate or at least by the swing part of it, the budget constraint that the representative party faces going into an election is

$$E_i(u_{it}(\tau_{1,t} + \omega_t)) = (\tau_{1,t} + \omega_t) = p_{qt}q_t + p_{gt}g_t + p_{zt}z_t, \quad (4)$$

where $(\tau_{1,t} + \omega_t)$ is the expected or promised level of government output. This is the *ex ante* restraint that the representative party considers in shaping its policy platform, and the one we shall use in characterizing its *ex ante* policy choices.

For the winning party with actual productivity $u_{it} > 1$, there will be a positive difference between actual output and what they promised to (and, we assume, do) provide. This residual rent

$$R_{it} = (u_{it} - 1)(\tau_{1,t} + \omega_t) \quad (5)$$

will depend on the size of the *ex post* realization of the productivity shock and is used to bolster the loyalty and turnout of core supporters through the provision to them of additional targetable private goods.¹⁷ R_{it} will then appear in recorded

¹⁵ We thank one of our referees for suggesting this simplification of our information problem. We note that state taxes here have a subscript 1 attached to distinguish them later from central taxation (subscripted with 2).

¹⁶ While we think of post-election outcomes as revealing production/management rather than electoral skills, we could also describe this as a situation in which parties differ in their ability to collect tax revenue from the same taxable base which depends on the state of the economy. This interpretation leads to the same propositions as are stated below. For convenience, we adopt the formulation that emphasizes differences across parties in their ability to produce goods and services or some combination of these interpretations.

¹⁷ Rents may be diverted to political agents, but this does not change the comparative statics of the model concerning the roles of income and political competition.

public expenditures on private goods. On the other hand, unfavorable realizations will result in a negative residual that reduces the target goods received by core supporters below what was expected. Finally, we note that R_t does not appear in (4) because of the nature of retrospective voting, nor do rents persist in the longer run since $E(R_t) = 0$.

2.2 The determination of party platforms, and the private/public composition of the budget

We assume that every political party wants to and can choose a policy platform that maximizes the political support that it can expect at the next election. In other words, we assume that the expected vote function that each party maximizes exists and is globally concave over the set of possible budgets.¹⁸

To begin the formal characterization of the expected support maximizing platform espoused by the representative party, we suppose that the probability that a member of group $v = \{c, s\}$ will vote for party i is given by $S_{it}^v = S_{it}^v(V_i; V_{l \neq i, t})$, where the policy platforms offered by the parties are V_i , $i = 1, 2, \dots, I$, and $V_{l \neq i}$ are platforms offered by competing parties. The expected proportion of the total vote going to party i from both types of voters, $E(S_{it})$, is

$$E(S_{it}) = n_{ct} S_{it}^c + n_{st} S_{it}^s. \quad (6)$$

To go further and derive the effects of competitiveness and income on the composition of the proposed budget for a party, it is necessary to adopt a specific functional form for $E(S_{it})$. We assume that it has the following CES form, where the expectation is with respect to u_{it} , given the policies of this representative party's competitors. Omitting the party and state subscripts for convenience:

$$E[S_t] = \left[\left\{ \alpha^{\frac{1}{\sigma}} q_t^{\frac{\sigma-1}{\sigma}} + (\beta \phi_t)^{\frac{1}{\sigma}} g_t^{\frac{\sigma-1}{\sigma}} + \gamma^{\frac{1}{\sigma}} z_t^{\frac{\sigma-1}{\sigma}} + \delta^{\frac{1}{\sigma}} c_t^{\frac{\sigma-1}{\sigma}} \right\}^{\frac{\sigma}{\sigma-1}}; V_t \right], \quad (7)$$

¹⁸ We are interested in how parties choose a budgetary mix of different kinds of goods and services and have designed our framework to focus on this issue. Our investigation of this matter is facilitated by directly specifying the expected vote function for the parties rather than 'going all the way down,' as Roemer (2001, p. 39) puts it, in trying to understand uncertainty at the level of the individual voter. One may note that Roemer (2001, chapter 2) makes the important observation that most probabilistic voting models that derive an expected vote function by aggregating over stochastic indirect utility functions for each of a continuum of voters, where the stochastic element is (as usual) assumed to be independently distributed, are not consistent with aggregate uncertainty at the party level because of the law of large numbers. Aggregate uncertainty at the party level requires some sort of correlation among voters, and it is aggregate uncertainty that is important for multi-dimensional politics. Expected vote functions have been the object of much empirical work. See Paldam (2004) for a review of this literature.

with $\sigma - 1 > 0$. The V_l appearing in (7) represents the given platforms of other parties in the election contest against which this party is strategizing. The parameters α , β , γ and δ reflect the relative weights in the support function given to the different components of the budget. Private consumption c_t is

$$c_t = y_t - \tau_{1t} - \tau_{2t}, \quad (8)$$

where y represents the voter's pre-tax income and τ_{1t} and τ_{2t} are, respectively, the level of taxes that will be paid by households to the state and central governments. We use the CES form of the support function because it allows price elasticities to vary, while holding the 'income elasticities' due to a change in $(\tau_{1t} + \omega_t)$ in (4) constant and equal to one. This allows us to separate income and substitution effects in order to focus more easily on the role of the factors that affect the prices of political support gained by public spending on different types of goods. The estimating equations allow for more general effects.

The task facing the parties is to maximize (7) subject to the ex ante budget restraint (4). This is the political problem that all parties face in trading off effective support from its core supporters, whose loyalty and turnout in an election depend on the provision of private goods targeted toward them, with support from swing voters who care more about public goods and who are more cheaply addressed by their supply as their number or electoral salience grows. If the support function (7) is strictly concave in the party's own policy instruments, and continuous in the policy instruments, with the instrument set being convex and compact, a theorem due to Nash (1951) assures that a noncooperative equilibrium exists in this multi-party electoral contest (Wittman 1987). We assume that the parties converge with respect to their proposed policy platforms in this equilibrium (and henceforth omit party subscripts).

The resulting first-order conditions for the representative party's problem and the full solution for the ex ante level of taxation and of public expenditure of different types are given in Part 1 of the Online Appendix. We proceed here by dividing the first-order condition for g (Online Appendix equation A2) into the condition for q (equation A1), which yields the ratio of expenditures on targetable private versus public goods in the representative party's proposed budget at time t :

$$\frac{p_{qt}q_t}{p_{gt}g_t} = \left(\frac{\alpha}{\beta\phi_t} \right) \left(\frac{p_{gt}}{p_{qt}} \right)^{\sigma-1}. \quad (9)$$

This leads directly to the following key propositions:

Proposition 1 *The ratio of public expenditure on private targetable goods relative to public expenditure on public goods, $p_{qt}q_t/p_{gt}g_t$, declines with per capita income.*

Proposition 2 *The budget ratio $p_{qt}q_t/p_{gt}g_t$ falls as the degree of political competition indexed by ϕ_t rises.*

Proofs For proposition 1, by differentiation of (9) with respect to y :

$$\frac{\partial(p_q q/p_g g)}{\partial y} = -\alpha(\sigma - 1) \left(\frac{p_g}{p_q}\right)^{\sigma-2} \cdot p_g \left(\frac{\partial p_q / \partial y}{p_q^2}\right) < 0. \quad (10)$$

For proposition 2, by differentiation of (9) with respect to ϕ :

$$\frac{\partial(p_q q/p_g g)}{\partial(\emptyset)} = \left\{ \left(\frac{\alpha}{\beta\phi}\right) \cdot \sigma - 1 \left(\frac{p_g}{p_q}\right)^{\sigma-2} \cdot \frac{1}{p_q} \frac{\partial p_g}{\partial(\phi)} \right\} + \left\{ \left(\frac{p_g}{p_q}\right)^{\sigma-1} \cdot \frac{-\alpha\beta}{\beta\phi^2} \right\} < 0. \quad (11)$$

The substitution away from private goods and toward public goods as relative prices of support attached to the use of targetable private and public goods change lies behind these results. $\square$

3 Empirical implementation

The empirical analysis based on the model we have outlined uses state economic and public finance data for 14 major Indian states, as well as corresponding election data aggregated up to the state level from constituency elections.¹⁹ This data set includes about 85% of the Indian population and all state elections held between fiscal years 1987–1988 and 2011–2012. The economic and state expenditure data are annual (by fiscal year) and come primarily from the Central Statistical Organization, the Statistical Abstract and the Finance Accounts. Some socioeconomic variables are taken from the Indian Census and annualized by interpolating between census years. Electoral data, collected by the Electoral Commission, are viewed as a point estimate of an evolving political process and so are interpolated between election years. Further details concerning definitions and data sources are provided in Table A2 in the Online Appendix.

3.1 Choosing expenditure ratios to represent budget composition

Empirical implementation of the model requires budgetary ratios representing spending on private targetable goods relative to spending on goods which are relatively non-rival in nature. Our main results are based on the use of our new measure of spending on targetable private goods to represent Q . The construction of this measure of targetable private goods publicly supplied is described in the next section and outlined in considerable detail in the Online Appendix. As noted in the Introduction, as an alternative measure of private targetable spending we also use public sector wages and salaries, the derivation of which from public finance statistics is discussed in the Online Appendix.²⁰ Estimation using

¹⁹ See again Footnote 7 for the names of the states in our sample.

²⁰ There is no direct measure of wages and salaries in Indian public finance statistics. However, a useful proxy can be constructed in the manner outlined in the Online Appendix.

this alternative measure of private goods spending provides a useful check on our main results since it does not use our new measure of private targetable goods.

As for the public goods denominator in the budget ratios, there are several alternatives available. Some types of public expenditures are certainly less rival in consumption than Q , particularly spending on capital infrastructure (net of loans and advances), which we shall refer to as *capital outlay*. This kind of spending is well measured and can be used to represent public expenditure $p_g g$. However, it is just one type of spending on goods and services that are, relative to our measures of Q , more non-rival in nature. Accordingly, we also consider $Q/(p_g NP)$, where $p_g NP = G - Q$ is spending on *all other* goods. NP includes public goods of all types as well as private non-targetable goods z .

To see that Propositions 1 and 2, amended so that $p_g NP$ is the denominator of the budget ratio, hold for this ratio too, we first define the non-private commodity as a composite good $NP = g + (p_z/p_g) \cdot z$ with price p_g . Then, we restate the support function (7) in terms of q and NP goods, with prices p_q and p_g . Omitting the time subscript, it follows that (9) then becomes

$$\frac{p_q q}{p_g NP} = \left(\frac{\alpha}{\beta \phi} \right) \cdot \left(\frac{p_g}{p_q} \right)^{\sigma-1}. \quad (12)$$

Since p_g is fixed in the proof of Proposition 1, this proposition carries through when g is replaced by the composite good NP . With respect to the suitably amended Proposition 2, the sign of $\partial p_g / \partial \theta$ remains the same as before. There is just one complication: The composite good theorem requires that the ratio p_z/p_g remains fixed, while the second proposition concerns a change in p_g . However, as ϕ rises, we expect the change in the ratio of expenditures, if it occurs in the data, to be dominated by the effect of the change in p_g relative to p_q , though in the end this is an empirical matter.

Another useful budget ratio is the ratio of spending on private targetable goods relative to total non-interest expenditure, Q/G . The use of Q/G does not rest on the composite good theorem, and this ratio does not by subtraction automatically incorporate into the denominator our new measure of the numerator. Using (1),

$$\frac{Q}{G} = \frac{1}{1 + (p_g g/p_q q) + (p_z z/p_q q)}. \quad (13)$$

A third ratio replaces total spending G with *capital outlay* which is a measured public expenditure with a relatively high degree of publicness. Finally, additional spending ratios can be formed using state public sector *wages and salaries* in place of our new measure of targetable private goods.

For the convenience of the reader, Table 1 summarizes all the budgetary ratios which are used in the empirical work along with the corresponding mnemonics appearing in the tables of results in the main text and in the Online Appendix. It should be noted that $p_g NP$ and G are defined net of interest payments, *capital outlay* is defined net of loans and advances and, because of accounting practices explained in Part 3 of the Online Appendix, the estimate of public sector wages

and salaries includes maintenance of the capital stock (which is a relatively stable part of the budget).

3.2 Estimating equations

The general form of the cointegrating relation we seek to estimate using our panel data for 14 Indian states is

$$B_{jt} = \alpha_0 + (\alpha_1 \cdot y_{jt} + \alpha_1^L \cdot D_{jt} \cdot y_{jt}) + (\alpha_2 \cdot c_{jt} + \alpha_2^L \cdot D_{jt} \cdot c_{jt}) + (\alpha_3' \cdot X_{jt} + \alpha_3^{L'} \cdot D_{jt} \cdot X_{jt}) + \alpha_4' \cdot Z_{jt} + \varepsilon_{jt}, \quad (14)$$

where B_{jt} is one of the budget composition ratios defined in Table 1 for state $j = \{1, 2, \dots, 14\}$ at any time t . Right-side variables, along with mnemonics used in the text and in the tables of results, are as follows:

y = state real per capita income (*rypc*); D = dummy variable used to identify the low-income states ($D_{jt} = 1$ for low income); c = index of multi-party electoral competitiveness representing the role of ϕ , the measurement of which is discussed in detail in the next section (*polcomp*, *polcomp_low*); X = additional political factors: (1) rent generation: seat majority of the winning party/coalition in the state assembly (*seat majority*, *seat majority_low*); (2) incentive to target private goods toward smaller parts of electorate: number of parties in governing coalition (*parties in govt*, *parties in govt_low*); and Z = selected state-specific controls, stated here and discussed below including: (1) proportion of assembly seats reserved for scheduled castes and tribes (*reserved seats*); (2) percent state population greater than 60 years (*old*); (3) percent labor force in agriculture (*agrilabour*); (4) population of the state relative to national population (*popsiz*); (5) $FRBM = 1$ during state-specific application of the Fiscal Restraint and Budget Measures Act; $= 0$ otherwise (*FRBM*); (6) grants from the central government relative to total non-interest state expenditure (*grantsiz*); and (7) indexes of (*drought*) and (*flood*). Sources of data are provided in Table A1 of the Online Appendix.

All variables except *FRBM*, *drought* and *flood* are in log form. Original variables *polcomp*, *old* and *popsiz* are linearly interpolated: *polcomp* because we view electoral competition as a continual process as noted earlier, while the latter two because only census data are available for selected years. *Seat majority*, *parties in govt* and *reserved seats*, discussed further below, are characteristics of specific legislatures for the corresponding legislative period between elections and are not interpolated between elections.

The superscript L in (14) refers to lower-income states, and vectors are in log form. The variables superscripted with L are defined to be the same as their unsuperscripted counterpart, but only for the lower-income states, and are equal to zero otherwise.²¹ Thus, the coefficient applying to higher-income states is the one for the variable without a superscript, while the coefficient applying to lower-income

²¹ We note that the groupings designated as higher and lower-income states have remained constant. Individual states have changed their order in the ranking within each category across time but have not crossed categories.

states is the sum of the corresponding two coefficients $\alpha_l + \alpha_l^L, l = \{1, 2, 3\}$. This formulation allows us to see if there is asymmetry in long-run effects related to selected aspects of governance across higher- and lower-income states, allowed for in Eqs. (2a) and (2b), by looking at the significance of the coefficient on the lower-income group. If the coefficient on the superscripted (L) coefficient is significant, then the corresponding difference in coefficients between higher- and lower-income states is also significant.

The index of competitiveness, c_{jt} (to be distinguished from private consumption), is an ex ante measure that is predetermined with respect to contemporaneous electoral and other events. The measurement of this variable is discussed in the next section. An ex ante measure of competitiveness is required since an election may be highly competitive ex ante but still result in a lopsided actual outcome. This is especially so for the Westminster type of majoritarian elections conducted in India.

Seat majority and *seat majority_low*, across all states and for lower-income states, respectively, are indicators of the strength of the government in the legislature *between* elections, being fixed for the term of a legislature. They are proxies for the ability of the governments to channel rents to core supporters despite opposition in the legislature. Cox and Weingast (2018) argue that their investigation using international panel data shows that ‘horizontal’ accountability of the executive to the legislature, which will tend to be high when *seat_majority*=0.5, is more important for income stability and growth than is ‘vertical’ accountability to the electorate.²² We consider this matter in the context of our study of Indian states.

Parties in govt and its analogue for lower-income states, *parties in govt_low*, allow for the possibility that as the number of parties in a governing coalition rises, its members are incentivized to deliver budgets with more private goods targeted on the (then) smaller segments of the electorate that are required to keep each member of the coalition in power.

The variables in the vector $\mathbf{Z}$ are included to allow for various factors that may play a role in determining the composition of the budget besides those of immediate interest. *Reserved seats* allows for the role of scheduled castes and tribes. Addressing such groups is likely to lead to the provision of private goods targeted toward them.²³ As with narrowly defined economic variables, we do not vary its coefficient with the level of development.²⁴ Allowance is also made for demographics (*old*), the structure of the labor force (*agrilabour*), the relative size of the state (*popsize*) and climate (*drought and flood*). In addition, we allow here for the possible effect of the

²² Absent a minority government, *seat majority* must be greater than 0.5 for the government or governing coalition. It averages about 0.63 in our samples.

²³ Reserved seats may also be a proxy for ethnic diversity. Such diversity may lead to reduced support for public goods benefitting members of ‘other’ groups. See, for example, Alesina et al. (1999) and Habyarimana et al. (2007).

²⁴ As with the economic variables, we are making a practical choice to conserve degrees of freedom. We also note that the number of reserved seats does not vary between elections and changes only when the states are divided or a delimitation commission’s suggestions are implemented. For some states, the number of reserved seats has remained the same throughout the sample period and largely it is a time-invariant variable.

Table 1 Alternative budgetary ratios

Budget ratio (B)	Definition (and mnemonics used in the tables of results)
$\frac{p_q q}{p_s NP}$	State expenditure on private targetable goods and services/non-private, non-interest state expenditure (<i>Private Targetable/Non-private</i>)
$\frac{p_q q}{G}$	Private targetable state expenditure/total non-interest state expenditure (<i>Private Targetable/Total</i>)
$\frac{p_q q}{\text{capital outlay}}$	Private targetable state expenditure/state capital outlay, where capital outlay is capital expenditure less loans and advances (<i>Private Targetable/Capital Outlay</i>)
$\frac{\text{wages\&salaries}}{G}$	Wages and salaries/total non-interest state expenditure (<i>Wages and Salaries/Total</i>).
$\frac{\text{wages\&salaries}}{\text{capital outlay}}$	Wages and salaries/state capital outlay (<i>Wages and Salaries/Capital Outlay</i>)

For Punjab, capital outlay is negative for years 1987–1988 and 1996–1997 due to an accounting anomaly. These years are replaced with interpolated values of capital outlay

Fiscal Restraint and Budget Measures Act imposed on the states at various dates and for the effect of grants from the central government (*grantsize*). All these factors typically appear in models of government size. We include them here to allow for the possibility that the composition of public budgets may not remain fixed as its scale changes.²⁵

The model of the previous section leads to predicted signs for the coefficients on income and competitiveness in the cointegrating relation (14). Proposition 1 indicates that we should expect $\alpha_1 < 0$. Its analogue for lower-income states α_1^L may be smaller in absolute value in view of the greater importance there of additions to net income. Proposition 2 indicates that $\alpha_2 < 0$, with its low-income analogue also possibly smaller in absolute value if parties in lower-income states find it advantageous to compete more strenuously to maintain the support and turnout of key supporters by delivering private goods. Although this is not the focus of our empirical investigation, the arguments made earlier suggest that the coefficients of *seat majority*, *parties in govt* and *reserved seats* will all be positive.

There is an additional, practical reason for making the estimated effects of competition, income and selected other factors in the empirical model that are associated with governance conditional on the level of state income. Political competition correlates inversely across rich and poor states over time for many of the rich–poor state pairs, as shown in Table A5 in the Online Appendix.²⁶ Hence, even when the same variable exerts the same signed effect on each state separately, the opposite directions of change mean that the overall measured effect may be washed out if we were to estimate one coefficient for all states. Estimating one equation for each state separately would avoid this problem, but the data available do not permit that approach. Instead, we allow for a separate effect in the short run for each state, while imposing the condition that all states share a common longer run which, with

²⁵ Kenny and Winer (2006) show that tax *structure* changes with overall government size, and we expect that expenditure structure (or composition) will also vary with size.

²⁶ If we consider the richer seven versus the poorer seven states, about 40% of the correlations are negative. This rises to 50% if we consider the richest five states versus the poorest five.

respect to specific factors related to governance, may also be conditional on the level of development.

The main results are based on the dynamic pooled mean group estimator of Pesaran and Smith (1995) and Pesaran et al. (1999), estimated using a maximum likelihood procedure.²⁷ This estimator is suitable only if the data are integrated of order zero or one: Table A3 in the Appendix demonstrates that this condition holds for the data we employ. This method allows for a short-run relationship in error correction form that varies across the states, while assuming that there is one long-run relation that is conditional on the level of real per capita income in the case of key parameters. Other methods, outlined later, are used to check the robustness of our results.

The error correction model from which estimates of the long-run relationship (14) are derived, is an error correction reparameterization of the ARDL version of it. The general form of this model is:

$$\Delta B_{jt} = \psi_j \left(B_{jt-1} - \alpha_{0j} - \alpha'_{1j} W_{jt} - \alpha'_{2j} Z_{jt} \right) + \gamma'_{1j} \Delta W_{jt} + \gamma'_{2j} \Delta Z_{jt} + e_{jt} \quad (15)$$

where $W = (y_{jt}, y_{jt}^L, c_{jt}, c_{jt}^L, X_{jt})'$ and L indicates a variable defined only for lower-income states; $=0$ otherwise, and e is the error term. The point estimate of the error correction coefficient ψ_j must lie on the open interval $(-1, 0)$ if the model has a stable long run.

y in (15) is current income, and we should ask if it can be regarded as predetermined with respect to budget composition B . Some positive shocks to the error in (14) or in (15) that increase B (say) may do so by increasing the numerator of it—that is, by increasing spending on targetable private goods. And some such positive shocks may increase B by reducing spending on public goods in the denominator. The first subtype of shock will tend to increase y , while the second will tend to reduce it; analogously for negative shocks to the error. Thus, we expect that the level of y will not be contemporaneously and systematically correlated in one direction with current or past unobserved events that alter the *composition* of the budget. On this reasoning, we regard y as being predetermined with respect to the contemporaneous value of B .²⁸

4 Measuring privateness and electoral competitiveness

The constitution of India assigns expenditure responsibilities to the central government and individual states through Union, State and Concurrent lists. Broad-based public goods such as national defense, railways, national highways, shipping, airways and banking are assigned to the Union or central government, while responsibility for local public goods such as police, public health, state highways and agriculture is assigned to State governments. Responsibility for expenditures on other

²⁷ The mean group estimator, which is based on separate equations for each element or state in the panel, is not feasible given the length of our time series for each state. Estimation uses *xtpmg* in Stata 15.

²⁸ Nonetheless, we do consider ancillary estimates produced by a panel data IV method later.

major items such as social security, electricity, education, forests and economic and social planning is shared by both levels of government. State governments make between 50 and 60% of total public expenditure in India and collect only 30–40% of total revenues, as most of the high-yielding revenue sources are assigned to the central level. The central government addresses this asymmetry between state revenue and expenditures through various types of intergovernmental transfers which we take as exogenous to state decision making.

To test the predictions of this paper, we need a measure of state spending on private goods that can be targeted at specific groups of voters for each state. The published public accounts do not provide this measure directly. Rather, state expenditures are categorized in three different ways: (1) in a revenue versus capital expenditure account; (2) in a development versus non-development expenditure account; and (3) as plan-related versus non-plan expenditure.

The first classification comes closest to meeting our requirements. Capital expenditures represent expenditures creating physical assets that will be consumed concurrently by the general public and are more public in nature than the revenue expenditure (or current consumption) accounts that cover the day-to-day expenses of running the government. While the so-called revenue spending is relatively private compared to capital spending, much of it is not targetable over an election cycle. Major spending items, such as pension and general administrative services (police and district administration), are largely fixed in nature and unrelated to the election cycle. Similarly, a large part of the expenditure on health and education pays doctors and teachers who were hired in the past and paid salaries that are relatively inflexible. On the other hand, some components of health and education spending are devoted to flexible government schemes that can be targeted at specific groups of voters. Other private good expenditure items in the revenue versus capital expenditure account, such as food subsidies and nutrition supplements, welfare benefits and affirmative action measures, rural development schemes, relief from natural calamities and civil supplies, vary widely from year to year, making these items useful for targeting purposes.

In 1987–1988, detailed line item data for revenue versus capital expenditure budgetary accounts first became available in the *Finance Accounts*. We have constructed our measure of private targeted public expenditure by selecting line items from the revenue expenditure budget. We turn next to the details of the measurement of private spending on targetable private goods using the *Finance Accounts* and then to the construction of an index of electoral competition.

4.1 Expenditure on private targetable goods

For purposes of measurement and interpretation of the empirical results, the adjectives private, targetable and public should be understood in the relative sense in which these components of public budgets can be measured. Private targetable goods Q are more rivalrous in consumption than are public goods g and are substantially more targetable than the private good, non-targetable component of public expenditure, z . By targetable, to recall, we mean that goods or services can be both

targeted at groups of voters and retargeted to a considerable extent from election to election, relative to the more limited targeting possible with the categories of non-private goods or public goods. Public goods can be targeted over some horizon—for example, capital infrastructure such as a bridge can be built here and not there. But building infrastructure takes time and is hard to move afterward.

A detailed description of the line items from the revenue expenditure accounting in the *Finance Accounts* used to compile our measure of targetable private goods is provided in the Online Appendix, along with a justification as to why each item is relatively private and relatively targetable in nature compared to other components of state budgets. Specific budget codes from the *Finance Accounts* that precisely identify each line item we include are also specified. Table 2 lists the main categories of expenditures that make up our new measure of private targetable goods, along with the percentage distribution of the main items for each of two equal-sized groups of states formed from the 14 major Indian states in our sample on the basis of per capita real income in the fiscal year 2008–2009. More than 55 percent of private targetable spending in the fiscal year 2008–2009 is accounted for by three categories: welfare payments to scheduled casts, tribes and other backward classes; general welfare payments; and subsidies for agriculture and for power supply. Another 30 percent is accounted for by targetable expenditures for housing, food, disaster relief and rural development subsidies.

Figure 1 illustrates the evolution of the proportion of spending on private goods in the two groups of states over the sample period. Spending on private targetable goods relative to total non-interest spending is generally larger in the poorer states. The role of spending on targetable private goods declines in all states until about 2001–2002 when the two groups of states converge in this respect. But after a few years, privateness is again consistently higher in the poorer states. As an aside, we note that *total* state non-interest spending (not shown) is consistently higher in the poorer states by about 2 percentage points in most of our sample period, rising to about 3 percent after 2008–2009.

The rise in privateness in all states after 2002–2003 shown in the figure coincides with the acceleration in the growth of real per capita income across India beginning in the early 2000s as illustrated in Fig. 2. One can also see some divergence in growth across the states as income growth in the richer group begins to pull ahead after 2004. This divergence of richer and poorer states has been noted before and studied by Rao et al. (1999), Sachs et al. (2002), Bandyopadhyay (2011), Chakravarty and Dehejia (2017) and others. If Proposition 1 is correct, then the rise of privateness after 2002 in Fig. 1 is lower than it would have been in the absence of the growth recorded in Fig. 2. We shall use our estimation results to construct counterfactuals that bear on this matter.²⁹

²⁹ It should also be noted that the relationship between Figs. 1 and 2 depends on the pattern of economic growth across the states over time, an explanation of which lies outside of our investigation.

Table 2 Distribution of state spending on targetable private goods, fiscal year 2008–2009. *Source:* Finance accounts, various years, CAG of India, procured from the NIPFP Data Bank and authors calculations. For list of states included in each income group, see Fig. 1

Category of private targetable spending	High-income states (7)	Low-income states (7)
	<i>Percentages of total</i>	
Government loans written off	2.00	1.50
Spending on textbooks, scholarship, and examination for primary, secondary and tertiary education	1.00	0.64
Public health schemes benefit to individuals	1.02	1.00
Rural family welfare services, urban family welfare services, maternity and child health, and family welfare compensation	2.17	2.22
Urban water supply program and rural water supply programs	1.22	5.03
Housing	6.66	4.10
Welfare payments to Scheduled Cast (SC), Tribes (SC) and Other Backward Classes (OBC)	13.35	14.99
Social security and welfare (general)	17.17	17.83
Food and nutrition	8.93	10.73
Relief on account of natural calamities	5.86	7.16
Food grain crops, seeds, commercial crops, and fertilizer; animal husbandry; fisheries; and schemes for debt relief to farmers	11.26	6.50
Integrated rural development programs, self-employment programs, employment services, drought-prone area programs, and rural employment	8.06	10.30
Power subsidies	16.60	12.39
Civil supplies	4.71	5.60
	100.00	100.00

Fig. 1 Private targetable state spending as a proportion of total non-interest state spending. Averages over seven higher- and seven lower-income Indian states, 1987–1988 to 2011–2012. Note: Public spending on lotteries is excluded. The 14 major states are divided into two equal groups based on real per capita real income in 2008–2009. *High-income group*: Gujarat, Haryana, Kerala, Maharashtra, Punjab, Tamil Nadu and Karnataka. *Low-income group*: Bihar, Uttar Pradesh, Madhya Pradesh, Orissa, Rajasthan, West Bengal and Andhra Pradesh

Fig. 2 Real per capita state GDP (rupees). Averages over seven higher- and seven lower-income Indian states, 1987–1988 to 2011–2012

4.2 Measuring competitiveness at the constituency level

Implementation of the model requires a measure of electoral competitiveness in addition to a measure of privateness. Often, the simple difference in vote shares of

first and second place candidates v_1-v_2 is used as a measure of electoral competition, with smaller margins of victory assumed to reflect greater uncertainty about the outcome and hence a greater degree of competitiveness.³⁰ One important shortcoming of this measure is that the size of any particular margin can be effectively large or small depending on the volatility of the vote. This point has been recognized for some time (Przeworski and Sprague 1971; Elkins 1974; Pedersen 1979; Bartolini and Mair 1990; Ferris et al. 2016; Dash et al. 2019). A close expected outcome or a relatively small winning margin can be ‘effectively large’ if that party’s vote in that constituency varies little across elections, while even a large margin may be consistent with intense competition in a constituency in which voters often switch political allegiances from election to election. Thus, to reflect more accurately the relevant margins faced by the candidates, constituency vote margins must be adjusted for vote volatility. It turns out empirically that this adjustment is crucial.³¹

A second problem, which applies especially to Indian states, is that it is not just the second place candidate or party that poses a threat to the leader, especially in a context in which coalitions may form a government at the state level, a common situation especially after 1990. The multi-party index of competitiveness that we construct, following an early paper by Przeworski and Sprague (1971), deals in principle with both issues.

Adjusting vote margins for volatility is not easy to do over long periods of time because of redistricting, an issue not addressed by Przeworski and Sprague. In our sample, this applies to electoral boundaries after 2008 following a delimitation commission.³² However, the consistency of administrative district boundaries over relatively long periods of time can be used to construct a prior voting history for constituencies that are new (i.e., have no past) due to redistricting after 2008–2009.³³ To avoid the data loss associated with redistricting, we match all constituencies to districts and, only when necessary, use the average of a given party’s votes over constituencies within the relevant district to construct a representative past history for parties and candidates in any newly defined constituency. This history is then used as an input into the measurement of vote volatility.

Assuming that redistricting has been appropriately dealt with, the measure of volatility of vote shares at time t used to scale the distance to go for each candidate or party in each constituency in a representative state j is

³⁰ For example, in the Indian context see Chhibber and Nooruddin (2000), Arulampalam et al. (2009), Crost and Kambhampati (2010), Banerjee and Iyer (2010), Sáez and Sinha (2010), Jha (2014), Dash and Mukherjee (2015), Afridi (2017), and Mitra and Mitra (2017) who use the 1 versus 2 margin v_1-v_2 in their work. Besley and Burgess (2002) use a variant of this margin, the difference in seat shares of the Congress Party and its main competitor(s), for a competitiveness index.

³¹ This matter is discussed extensively in Dash et al. (2019).

³² It also applies to constituencies before 1974, but the data in this paper begin with 1988 because of the need to use line item budget data available from that date onwards.

³³ How administrative districts can be used to link constituencies across time is explained in Dash et al. (2019).

$$V_{dt} = \frac{\sum_{i=1}^7 |v_{idt} - v_{idt-1}|}{2}, \quad (16)$$

where v_{idt} is the vote share of party i in constituency $d = \{1, 2, \dots, D_j^*\}$ in election t in this representative state with D_j^* constituencies. Note that volatility will incorporate changes in both the size of the franchise and voter turnout. It will be higher when more voters switch their vote between a given number of parties, and when an existing party disappears or a new party appears between elections. The sum is defined over six parties plus an ‘other’ residual category based on the observation that the sum over six parties captures most of the vote in any single constituency in any state.

The volatility-adjusted multi-party competitive margin defined in (17) is based on the idea that every candidate (or party that this candidate represents) views their primary objective as overcoming their deficit vis-a-vis the previous winner. This deficit is $v_{1dt-1} - v_{idt-1}$ for all candidates other than the incumbent, whose vote-share deficit is zero. The distance to overcome must then be adjusted for volatility to reflect the importance of (swing) voters who have recently switched their vote among candidates:

$$h_{id}^t = \frac{(v_{1dt-1} - v_{idt-1})}{V_{dt-1}}. \quad (17)$$

It is important to note that h depends on the previous two elections.

Using (17), a candidate or party-specific competitiveness index can then be constructed as:

$$c_{id}^t = \begin{cases} 1 & \text{if } 0 \leq h_{id}^t \leq 1 \\ \frac{1}{h_{id}^t} & \text{if } h_{id}^t > 1 \end{cases}. \quad (18)$$

When $c_{id}^t = 1$, the vote deficit faced by candidate or party i is smaller than the portion of the electorate that switched parties last time. In that event, we may say that this candidate is fully competitive. Otherwise, the index defined in (18) is less than one and falls as the margin to be overcome grows relative to volatility. Aggregating across all the candidates within each constituency d , using as weights the vote share that each candidate receives, gives the constituency-level competitiveness index:

$$C_d^t = \sum_{i=1}^{D_j^*} c_{id}^t v_{idt-1}. \quad (19)$$

Here, $C_d = 0$ indicates no competition among candidates in the constituency (and hence is the value used for constituencies in which an election was uncontested), while $C_d = 1$ is a situation of perfect competition, in which all candidates face vote-share ‘distances to go’ to overtake the frontrunner that are less than the proportion of the electorate that was willing in the recent past to switch their vote. A high value of this index indicates that voters who have switched recently are largely relative to the vote deficits facing the challengers to the leading candidate. This is an index of

the extent to which a constituency may swing from the previous winner to another party and, we assume, it is also a proxy for the related pressure on parties to use resources in order to compete successfully.

Aggregating across all constituencies, using the constituency's share of the aggregate state vote, w_{dt-1} , yields the state-level, multi-party competitiveness index that we employ in the estimation,

$$C_j^t = \sum_{d=1}^{D_j^*} (C_d^t \cdot w_{dt-1}). \quad (20)$$

The closer that this index is to 1, the greater is the competitiveness of an election.

It is interesting to note that in the sample of 14 states, the multi-party, volatility-adjusted vote margin index C_j^t is negatively but only weakly correlated with the first versus second place vote-share differential $v_1 - v_2$ over the 1987–1988 to 2011–2012 period, at -0.21 .³⁴ So the simple vote margin, unadjusted for volatility and absent a role for third and other parties, is a different indicator of competitive pressure at the constituency level than (20). In our view, it is inferior as a measure of electoral competitiveness in the present context. We recall that because the index in (20) uses data from the previous election—the previous election is used to compute the ‘distance to go’ of each party, while two previous elections are required to measure volatility applying to the previous election—it is an *ex ante* measure, predetermined with respect to contemporaneous events.

The linearly interpolated historical competitiveness index is shown in Fig. 3 for the sample of states divided into two parts on the basis of per capita real state GDP in 2008–2009.³⁵ A dramatic increase in competitiveness after the balance of payments shock to the Indian economy in the early 1990s, lasting about 5 or 6 years, is apparent in the figure. It can also be seen that since 1987–1988, the poorer states are, on average, consistently more competitive at the constituency level than the richer states, though the difference narrows considerably at the end of the sample period while competitiveness generally declines.

Estimating Eq. (15) distinguishes between groups of states based on income. Accordingly, we estimate this equation using the seven richest and seven poorest division of the states illustrated in Fig. 4, and with a sample of the five richest and the five poorest states.³⁶ Figure 4 shows the pattern of multi-party competitiveness at the constituency level for the poorest five or BIMAROU (sick) states of Bihar, Madhya Pradesh, Rajasthan, Odisha and Uttar Pradesh, compared to that averaged over the five highest-income states, Gujarat, Haryana, Maharashtra, Punjab and Tamil Nadu.³⁷

³⁴ It is somewhat positively correlated with volatility (16), at 0.44 for the same sample. For further investigation of indexes of competition for the Indian states, see Dash et al. (2019).

³⁵ There are approximately the same numbers of state elections across the states up to 2008–2009. Thereafter, up to the end of our sample in 2011–2012, the panel of elections becomes unbalanced in this respect. We utilize the complete data set in our estimation.

³⁶ We note that throughout our sample period, no state crossed over from one income category to another. Within an income category, for middle-income states there was some movement in their ranking.

³⁷ Although the top four states are at times singled out as ‘the’ high-income states by Finance Commissions, to ensure convergence of the algorithm used for maximum likelihood estimation, we add Tamil Nadu to the higher-income group.

Again, we see that the poorer states are more competitive at the constituency level, but now there is also a period in the late 1980s when competitiveness was similar across these income groups, and instead of convergence at the end of the period, we see some divergence.

Providing an explanation for the patterns in Figs. 3 and 4 is an interesting challenge for future research. Here, we are concerned with the budgetary consequences of them.

5 Main results

We first discuss estimates based on three budget ratios—private/non-private, private/total and private/capital outlay—for two samples: the 14 states divided into two equal-sized groups by level of real per capita income in 2008–2009; and then for a sample of states consisting of just the five highest- and five lowest-income states. We regard the results using all 14 states divided into two equal-sized groups as our primary estimates. The results using both 14 and 10 state samples are then used to construct counterfactuals that illustrate the quantitative importance of changes in income and competitiveness for the privateness of public expenditure.

Lag structure is based primarily on the need for convergence of the maximum likelihood estimation. In this regard, we note that adding additional (second or higher) lags of first difference terms in the short run part of the model leads to non-convergence, even when only income and competitiveness are so regarded. In this respect, it should be recalled that the measure of competitiveness uses data from two elections prior to the current one, so the past in this respect is present in the estimation.³⁸ Non-dynamic panel data estimates are also considered as part of our robustness analysis.

The main results for the states grouped into two equally sized groups are provided in Table 3. Here and in subsequent tables, we present only the long-run coefficients derived from the error correction model which fits the data as well as possible, along with error correction coefficients and log likelihoods. Some variables appearing in the long-run cointegrating relation are not used in the short-run dynamics, as indicated in notes to the tables, to ensure that the maximum likelihood procedure converges. Point estimates indicate that equations in the upper part of Table 3 are stable, with significant error correction coefficients that are less than -1 and of a size that indicates moderately rapid convergence.

We note that when fitted to each state separately, the model does not work as well, no doubt because the time series is not long enough. (Some results using sets of richer and poorer states as separate samples are discussed later.) The

³⁸ Experiments with a stripped down model using the equivalent procedure in Eviews 10 with automatic lag selection lead to the form of the lag structure used here.

Fig. 3 Average multi-party competitiveness for seven higher- and seven lower-income Indian states 1987–1988 to 2011–2012. Note: Using data for all 14 states, C_{ij}^x is weakly correlated with the 1 versus 2 vote-share differential $v_1 - v_2$ over the period shown, at -0.21

Fig. 4 Average multi-party competitiveness for the five richest and five poorest (BIMAROU) states 1987–1988 to 2011–2012. Note: Five BIMAROU or lowest-income states: Bihar, Madhya Pradesh, Rajasthan, Odisha and Uttar Pradesh; five highest-income states: Gujarat, Haryana, Maharashtra, Punjab and Tamil Nadu

model with distinct short runs and a common long-run conditional on the level of development is, in our view, a sensible compromise given the data available. Hausman tests using the consistent estimator of the covariance matrix indicate

Table 3 Public spending on private, targetable goods in the public budgets of 14 major Indian States: 1987–1988 to 2011–2012

Dependent variable (B)	Private targetable/non-private	Private targetable/total	Private targetable/capital outlay
Sample (high + low)	(7 + 7)	(7 + 7)	(7 + 7)
Pooled mean group estimation. Long run coefficients.			
<i>real income per capita</i>	−0.556 (8.50)***	−0.488 (8.36)***	−0.695 (2.94)***
<i>real income per cap_low</i>	0.628 (5.96)***	0.548 (6.10)***	0.786 (2.35)**
<i>net_real income per cap_low^a</i>	0.072	0.06	0.091
<i>political competition</i>	−0.273 (3.3)***	−0.245 (3.33)***	−0.233 (1.11)
<i>political comp_low</i>	0.798 (7.00)***	0.686 (6.93)***	−0.446 (1.47)
<i>net_political comp_low^a</i>	0.525	0.441	−0.679
<i>seat majority</i>	−0.087 (1.37)	−0.064 (1.14)	−0.295 (1.44)
<i>seat majority_low</i>	0.164 (1.22)	0.127 (1.11)	1.81 (3.75)***
<i>parties in govt</i>	0.003 (0.60)	0.003 (0.08)	0.095 (0.70)
<i>parties in govt_low</i>	−0.217 (2.70)***	−0.198 (2.81)***	−0.242 (1.39)
<i>reserved seats</i>	1.58 (7.81)***	1.41 (7.89)***	0.213 (0.43)
<i>old</i>	1.88 (4.75)***	1.63 (4.73)***	−0.173 (0.19)
<i>agrilabour</i>	−0.452 (3.01)***	−0.364 (2.83)***	−0.16 (0.4)
<i>popsiz</i>	3.99 (4.82)***	3.43 (4.79)***	−3.67 (1.93)*
<i>FRBM</i>	−0.111 (4.59)***	−0.095 (4.45)***	−0.118 (1.88)*
<i>grantsize</i>	0.218 (5.23)***	0.183 (4.97)***	0.027 (0.38)
<i>ec coefficient</i>	−0.902 (7.21)***	−0.897 (7.15)***	−0.757 (7.95)***
<i>95% C.I. for ec coeff.</i>	−1.15 −0.657	−1.14 −0.651	−0.943 −0.57
<i>Log likelihood</i>	266.99	312.81	27.55
<i>Observations (States)</i>	320	320	320
Sample (high + low)	(5 + 5)	(5 + 5)	(5 + 5)
<i>real income per capita</i>	−0.316 (3.19)***	−0.259 (3.00)***	−0.962 (2.61)***
<i>real income per cap_low</i>	0.520 (3.67)***	0.426 (3.57)***	0.779 (1.44)
<i>net_real income per cap_low^a</i>	0.204	0.167	−0.183
<i>political competition</i>	0.031 (0.17)	0.031 (0.19)	−0.352 (1.14)
<i>political comp_low</i>	0.238 (1.14)	0.191 (1.06)	−0.741 (1.68)*
<i>net_political comp_low^a</i>	0.269	0.222	−1.09
<i>seat majority</i>	−0.016 (0.08)	−0.016 (0.09)	0.452 (0.85)
<i>seat majority_low</i>	0.041 (0.17)	0.029 (0.14)	0.873 (1.22)
<i>parties in govt</i>	−0.104 (1.76)*	−0.078 (1.49)	0.187 (1.00)
<i>parties in govt_low</i>	−0.042 (0.61)	−0.05 (0.82)	−0.359 (1.65)*
<i>reserved seats</i>	1.27 (3.9)***	1.05 (3.83)***	1.88 (2.43)**
<i>old</i>	0.868 (1.65)*	0.689 (1.52)	0.737 (0.47)
<i>agrilabour</i>	−0.425 (2.36)**	−0.345 (2.25)**	−0.995 (2.17)**
<i>popsiz</i>	0.333 (0.32)	0.151 (0.17)	8.28 (3.26)***
<i>FRBM</i>	−0.113 (3.07)***	−0.095 (3.06)***	−0.129 (1.4)

Table 3 (continued)

Sample (high + low)	(5 + 5)	(5 + 5)	(5 + 5)
<i>grantsize</i>	0.214 (3.96)***	0.185 (3.92)***	0.101 (1.05)
<i>ec coefficient</i>	−1.04 (8.41)***	−1.04 (8.41)***	−0.724 (5.54)***
<i>95% C.I. for ec coeff.</i>	−1.28 −0.796	−1.12 −0.755	−0.981 −0.468
<i>Log likelihood</i>	177.11	210.51	21.13
<i>Observations (states)</i>	227	227	227

^a Coefficients of variables with suffix *low* are estimates applying to the lower-income states alone. Coefficients for variables with no suffix are the estimates for the higher-income states. For lower-income states, both coefficients need to be added to derive a net effect

|z| statistic: ***(**)*=significant at 1% (5%) 10%. ?=just misses significance at 10%. See the list of mnemonics for definitions of variables. Only long-run coefficients and error correction (ec) terms are reported. All variables in the long run are also used in the error correction model in first difference form, except for *old*, *popsiz* and *FRBM* (which appear in the long-run model only) to ensure convergence of the maximum likelihood procedure for pmg estimation and so that the point estimates of the ec coefficients are greater than −1. Dummy variables *drought* and *flood* are used only in the error correction model in original form

Samples: (1) 7+7 sample: 14 states, divided into two equal groups using per capita real income in 2008–2009. Higher-income group: Gujarat, Haryana, Kerala, Maharashtra, Punjab, Tamil Nadu (TN) and Karnataka. Lower-income group: Bihar, Uttar Pradesh (UP), Madhya Pradesh (MP), Odisha, Rajasthan, West Bengal (WB) and Andhra Pradesh (AP). (2) 5+5 sample: Based on a division of rich (4) and poor states (5) used by the Finance Commission, plus one richer state (TN) to deal with a convergence problem that arise when only four states are used in a panel. Middle-income states omitted from the higher-income group of seven: Kerala and Karnataka. Middle-income states omitted from the poorer group of seven: AP and WB. The poorer five states are also referred to as the BIMAROU or sick states (Bihar, UP, MP, Odisha and Rajasthan)

that this model is preferred to dynamic fixed effects versions that also constrain the short run to be the same across states.³⁹

We begin our discussion of Table 3 by pointing to two general features of these results: First, budgetary politics are evidently different in higher-income and lower-income states, with results for the richer states almost always conforming to the predictions of our hypotheses, while those for lower-income states may not. Second, the political economy of capital budgeting is different than that for other budget ratios—the effects of income and political competition tend to be larger in absolute value, and, for the poorer states, more in line with our predictions when we define *B* in estimating Eq. (15) as (the log of) targetable private expenditure relative to capital outlay. In assessing any of these results, it should be kept in mind that we are considering the *composition* of the budget.

With respect to results for the effect of competition on targetable private spending relative to capital outlay, there are two interpretations. One is that since capital outlay may be a better representation of spending on public goods than non-private or total non-interest spending, these results (here, and in what follows) relate more

³⁹ Using the covariance estimate from the efficient estimator (dfe instead of pmg in Stata's xtpmg procedure) indicates the opposite, while the mixed estimator is undefined. We conclude from this that the conservative assumption is to treat the short runs as distinct.

directly and, as it turns out, more favorably to our propositions. On the other hand, capital infrastructure is not the only public good the states provide, and estimation using the broader categories of spending fit better judging by associated log likelihoods. In proceeding further, we shall not favor one representation of budget composition over another.

Concerning the role of income: It has a robustly negative effect on the level of privateness in richer states as predicted by Proposition 1, for all budget ratios and for both samples. For the poorer states, the effect of income on privateness—given by the sum of the coefficients on *real income per capita* and *real income per capita_low*—is both significantly different in most cases and positive, except in the case of capital budgeting in the lower-income states where the effect on lower-income states is negative and significant.⁴⁰

One interpretation of a positive coefficient applying to the lower-income states is that this shows that growth leads parties to cater more to core supporters who tend to favor private goods. Greater salience of the core in the budgetary process of less developed states can come from more serious difficulties in getting the core to turn out to vote or from less intense loyalty to one party. The small positive effect of income on privateness for the lower-income states could also reflect a less intense preference by swing voters in these states for public services, as suggested by Afridi (2017).⁴¹ It is evident that assumption (2a) distinguishing the effect of income on the price of support in richer and poorer regions is not adequate or strong enough to capture the pattern revealed by our results; a threshold level of income may be required such that Proposition 1 only applies above that level, though we cannot estimate what that threshold might be.

Concerning the role of electoral competition: In the larger sample of 14 states we see that as competition intensifies, privateness of the budget robustly declines in the higher-income states, as predicted by Proposition 2. In the poorer states, however, and except for capital outlay, more competitiveness leads to significantly greater emphasis on targetable private goods spending (in the larger sample). When capital outlay is used to represent public goods, on the other hand, the effect is in line with our prediction.

The positive effect on privateness when measured relative to non-private or total spending is not accounted for by assumption (2b). In such cases, it may be, as Magaloni et al. (2007) suggest, that in order to respond to greater electoral pressure in the poorer states, it pays parties to diversify their appeal by providing something for everyone, including some public goods for less partisan voters. This interpretation is reinforced by the finding in Ferris and Dash (2019), who show that the size of the capital budget of Indian states gradually increases as an election approaches. Again, it may be that there is a point at which a low-income state switches to resemble a

⁴⁰ We recall that when the coefficient with a suffix_low is significant, so is the estimated difference between the two coefficients.

⁴¹ The work on Indian states of Afridi (2017) on a related topic suggests that a majority of voters in lower-income states do not value some types of non-private goods and services as highly as voters in the richer states.

higher-income one with respect to this aspect of its political economy. Consideration of when and how this happens may be a subject for further research.

We turn to results for other variables, beginning with *seat majority* and *parties in government*. *Seat majority* is generally insignificant except for the lower-income states, and then only when capital outlay is used to represent public goods. In that one case, it has a positive coefficient, indicating that more powerful governments in the legislature between elections are likely to be able to deliver private goods and rents to favored groups.

Turning to *parties in government*, we recall that previous work suggests that because each party in a larger coalition can maintain its place by appealing to a smaller segment of the electorate, it is incentivized to lobby for private targetable goods directed to its supporters rather than public goods. In the language of this paper, we would say that the price of a unit of political support for a government coalition member using private targetable goods is lower, the larger is the governing coalition.⁴² But the results in Table 3 as a whole indicate that the predicted positive effect on privateness of coalition government does not hold. Either the effect is not significant, or it is negative and significant. When significantly negative, it is so for poorer states, with one exception. Chhibber and Nooruddin (2004) also find anomalous results concerning the effect on the budget of the number of parties in a government coalition. They suggest that this may be due to the difficulties that coalitions have working out how the bureau is to be managed. Blais et al. (2010), using international panel data, reach a similar conclusion.

Reserved seats for scheduled castes and tribes is generally positive and significant. Parties evidently deliver private targetable goods to these communities, a result that will not surprise. The remaining covariates in model in Table 3 are included to acknowledge the possible importance of demographics (*old*, *popsize*), economic structure (*agrilabour*), budget restraint rules (*FRBM*) and grants from the central government (*grantsize*) on the composition of the budget. Generally, they are all significant. Note that *grantsize* and the budget rule regime represented by *FRBM* have consistently significantly positive and negative effects, respectively, on privateness. That grants from the central government affect the composition of state budgets is not surprising. On the other hand, budget rules are usually assessed in terms of their consequences for *aggregate* spending and the deficit. Here, we see a reason why the composition of the budget may also be an issue to consider in their design.⁴³

Finally, to further assess the models in Table 3, we have estimated them using separate samples consisting of seven higher- and seven lower-income states. Here, interstate variation in income, which is as much as 1–5 in 2008–2009, is reduced, while still leaving considerable variation in income over time. (Real income grows by about three times on average in the states over the sample period.) Table 4 reports

⁴² In assessing the results concerning *parties in govt*, it should be noted that since this variable is in log form, it is similar to a dichotomous dummy variable that indicates the effect of coalition government versus single-party government, while still distinguishing between coalitions according to the number of parties of which they are made up.

⁴³ Chakraborty and Dash (2017) have studied the impact of budget rules on the development/non-development expenditure composition of the budget but not with a model that features electoral competition.

Table 4 Public spending on private targetable goods in the public budgets of 14 major Indian states, 1987–1988 to 2011–2012

Dependent variable	Private targetable/non-private		Private targetable/total		Private targetable/capital outlay	
	(High 7)	(Low 7)	(High 7)	(Low 7)	(High 7)	(Low 7)
Pooled mean group estimation. Long run coefficients.						
<i>real income per capita</i>	-0.538 (6.89)***	0.287 (2.53)**	-0.478 (6.85)***	0.223 (2.35)**	-0.753 (2.65)**	-0.738 (1.83)*
<i>political competition</i>	-0.275 (3.14)***	0.661 (7.89)***	-0.242 (3.12)***	0.542 (7.90)***	-0.244 (1.15)	-0.946 (1.63)–?
<i>ec coefficient</i>	-0.934 (8.70)***	-0.908 (3.03)***	-0.918 (8.39)***	-0.922 (3.06)***	-0.820 (7.52)***	-0.817 (4.94)***
<i>95% C.I. for ec coeff.</i>	-1.14 – 0.72	-1.50 – 0.32	-1.13 – 0.70	-1.51 – 0.33	-0.777 – 0.48	-1.14 – 0.49
<i>Log likelihood</i>	135.30	139.25	256.93	163.80	33.09	-3.86
<i>Observations</i>	164	156	164	156	164	156

Higher- and lower-income states separately

The full specification of the estimating equations is the same as in Table 3, except that no allowance for separate coefficients for richer and poorer states is required. High and Low refers to states grouped by level of real income per capita in 2008–2009. The samples for the higher- and lower-income states are not the same because not all states have the same number of elections after 2008–2009. Only key long run coefficients are reported

the results for key coefficients on income and political competitiveness. Note that since each group of states is a separate sample, there is no need to add coefficients as in Table 3 to yield the effect for the lower-income group.

We see the same pattern in Table 4 as in Table 3: Coefficients on income and political competition are negative and significant for the higher-income states, and positive for the lower-income states except for the case of capital outlay where the coefficients remain negative and significant or almost so in one case. The same pattern of signs will also appear in other estimation results to be presented.

5.1 Counterfactuals that illustrate the pattern of the long-run impacts on privateness of growth and competitiveness

Since the variables used in estimation are all logs of the basic data, the coefficient estimates in the tables are elasticities. For example, for the larger sample of 14 states, and using the second column in Table 3 for the richer states, we see that a 10% increase in average real income would lead to a 5% reduction in the ratio of targetable private to total non-interest spending. For the lower-income states, the elasticity is slightly positive and an order of magnitude smaller in absolute size. For competitiveness, the elasticity for the richer states indicates that for a 10% rise in competitiveness (which is well within historical variation—see Table A2 in Online Appendix) there is a 2.5% decline in privateness of the budget, with the corresponding change in the lower-income states being about twice as large and in the opposite direction. Unfortunately, we do not (yet) have comparable elasticities from the literature with which to compare our estimates.

To make the pattern of results concerning income and electoral competitiveness in higher- versus lower-income states clearer, we turn to Tables 5 and 6 which show what would happen to spending on private targetable goods relative to total non-interest public expenditure, and relative to capital outlay, respectively, if real income per capita were to double (i.e., grow at about 5% per year for 14 years), and if the degree of electoral competitiveness were to rise to its maximum of 1. This growth rate of income is within historical Indian experience. So is the assumed change in competitiveness: As Table A2 in the Online Appendix records, the degree of competitiveness varies by as much as 0.75 among the lower-income states (though by less than this in the higher-income group) with a mean of 0.43 in the seven lower-income states.

To estimate the numbers in these tables, the difference between the counterfactual value and the actual group average of the variable to be changed in the counterfactual is computed. That difference is then multiplied with the corresponding income group's long-run coefficient and the share of private targetable expenditure to calculate the change in the expenditure share that would result under the counterfactual assumption. The final counterfactual number, in columns 3 and 5 of the tables, is obtained after adding this number to the actual sample average expenditure share. For example, in column 3 of Table 5, the counterfactual number indicates that the ratio of private targetable expenditure to total non-interest public expenditure of

Table 5 Counterfactual estimates of state public spending on private, targetable goods relative to total non-interest public expenditure

	(1) Private targetable/total non-interest spending. Average over the sample	(2) Sample average real per capita income (rupees)	(3) If per capita income grows at 5% per year for 14 years (income doubles)	(4) Sample average level of competitiveness index	(5) If electoral competition becomes more intense (competitiveness index = 1)	(6) Sample average of the seat share of the governing coalition/govt	(7) If competition in the state assembly becomes more intense (seat share of the governing coalition = 0.5)
<i>Estimation using 14 states</i>							
High 7	0.127	29,677	0.065	0.356	0.107	0.620	0.128
Low 7	0.152	15,343	0.161	0.431	0.190	0.640	0.151
<i>Estimation using 10 states</i>							
High 5	0.133	31,338	0.099	0.358	0.136	0.626	0.133
Low 5	0.147	13,133	0.172	0.400	0.167	0.619	0.147

Higher- versus lower-income states

Using the long-run relationship implied by pooled mean group estimation in column 2 of Table 3 for private targetable/total. Figures in bold are counterfactual estimates

Table 6 Counterfactual estimates of state public spending on private, targetable goods relative to capital outlay

(1) Private targetable/capital outlay. Average over the sample	(2) Sample average real per capita income (rupees)	(3) If per capita income grows at 5% per year for 14 years (income doubles)	(4) Sample average level of competitiveness index	(5) If electoral competition becomes more intense (competitiveness index = 1)	(6) Sample average of the seat share of the governing coalition/govt	(7) If competition in the state assembly becomes more intense (seat share of the governing coalition = 0.5)
<i>Estimation using 14 states</i>						
High 7	1,290	29,677	0.356	1.100	0.620	1.340
Low 7	1,430	15,343	0.431	0.878	0.640	1.130
<i>Estimation using 10 states</i>						
High 5	1,370	31,338	0.358	1.060	0.626	1.290
Low 5	1,170	13,133	0.400	0.403	0.619	0.986

Higher- versus lower-income states

Using the long-run relationship implied by pooled mean group estimation in column 3 of Table 3 for private targetable/capital outlay. Figures in bold are counterfactual estimates

the seven higher-income states would be reduced to 0.065 if average real per capita income doubled, all else held constant, compared to a sample average of 0.127.⁴⁴

The substantial effect of growth in reducing privateness in the budget as a whole in the richer states is apparent in column 3, as is the adverse effect of the same growth on privateness in the budget as a whole in the less developed states, as indicated in the rows labeled 'Low 7' and 'Low 5.' (We recall that the Low 5 here refers to the five BIMAROU or sick states with the lowest per capita real incomes.) The same sort of pattern with respect to expenditure on capital goods is evident in column 3 of Table 5, except that in the lowest-income states, growth also reduces privateness measured relative to capital outlay, though not by as much in percentage terms as in the richer states. We see a virtuous outcome in the higher-income states as growth leads to budgets that involve more publicness, and a less advantageous, or at least more muted, outcome in the less developed ones, with capital outlay again exhibiting a different behavior than other components of the budget.

Counterfactuals based on an assumption of greater competitiveness, in column 5 of Tables 5 and 6, show that with respect to the total budget, increasing competition in elections will generally reduce privateness in richer states (though it stays more or less the same in the five very highest-income ones) and increase it in poorer states.⁴⁵ Here too, results with respect to the budgetary role of capital outlay differ. With more intense electoral competition, capital outlay in all states rises relative to private targetable spending so that privateness falls, in some cases by more in percentage terms in the lowest-income states.

Finally, we also include in these tables an experiment concerning the effect of competition in the legislature. The results in the last column of the tables show the hypothetical effects of having the government's (or the governing coalition's) seat share in the state assembly reduced from an average of about 0.6 to 0.5, a situation in which horizontal accountability of the government (as in Cox and Weingast 2018) is maximized. The results in the last column of the tables show that only in the lower-income states is there then a reduction in privateness relative to the sample average, and then only with respect to capital outlay.

⁴⁴ For the higher-income states (column 2 of Table 3), doubling of per capita income leads to a percentage change of negative 0.488 in the sample expenditure ratio of 0.127, implying a fall in the ratio of 0.062 in the new, hypothetical long run. (Here, it should be recalled that all variables in the long-run estimating equations are in log form except for FRBM.) The implied counterfactual ratio then is $0.065 = -0.062 + 0.127$. Other counterfactuals are computed in similar fashion.

⁴⁵ The middle-income states obviously play a role in the difference in results for the two samples, but it is not clear if this is by increasing the sample size, or if their behavior is unique.

6 Robustness

To complete the empirical analysis, we present estimation using two-stage least squares to provide a check on potential endogeneity bias. We also discuss the results of using wages and salaries as an alternative to our new measure of private targetable goods.⁴⁶

6.1 Estimation with instrumental variables

Table 7 shows the results from using a panel data instrumental variable method in which *income* and the political variables *seat_majority* and *parties in govt* are considered endogenous. We argued earlier that income and the error term in the estimating equation are not correlated because the dependent variable *B* is the private/public composition of the budget, a shock to which is just as likely to increase income as to reduce it. Nonetheless, we instrument income and the other political factors listed using lagged values of them as instruments along with the exogenous variables in this model. It should be noted that *political competition* is not instrumented because it is the historically based measure used in Table 3 that is designed to be predetermined with respect to the composition of the budget.

The pattern of results is the same as in Table 3. While the effects of income for the first two budget ratios are not significant here, unlike in Table 3, coefficients on income and competition are negative for the higher-income states and positive for the lower-income ones. As in Table 3, we also see that the results for capital outlay are different: Income has a negative and significant effect in both richer and poorer states when capital outlay is used to represent spending on public goods.

6.2 Using wages and salaries instead of our new measure of targetable private goods

Finally, we briefly report on estimation provided in Table A6 in the Online Appendix where wages and salaries are used as an alternative to the new measure of public spending on private targetable goods we have constructed, with everything else the same as in our main Table 3. Despite the distinct difference in the variable used to represent public expenditure on private targetable goods, these results are qualitatively the same. Income and competitiveness both significantly reduce privateness in the richer states, with the effect on lower-income states being more muted (less negative).⁴⁷ Again, results with privateness measured relative to capital outlay are different: As in Table 3, competitiveness has a negative effect on privateness defined relative to capital outlay for both higher- and lower-income states in accord with Proposition 2.

⁴⁶ The Online Appendix also includes non-dynamic estimation using OLS with panel-corrected standard errors.

⁴⁷ There is one exception: The effect of growth on the lower-income states is also negative in the smaller sample of ten states (in accord with Proposition 1).

7 Conclusions

Governments are now so large in the economic life of most economies that the question of what determines the division *within* the public sector between what is ‘public’ and what is ‘private’ is of substantial importance for an understanding of the contemporary role of government in society. We have studied this public–private divide by modeling the share of public spending on private targetable goods in the budgets of Indian state governments. To do so, we have focused on how the intensity of political competition and the real incomes of voters affects the prices of political support using public expenditure on public goods and using public expenditure on private targetable goods. In the framework we have presented, an increase in the competitiveness of an election leads to a reduction in the price of electoral support gained from supplying public goods, and thus to planned increases in spending on non-rival goods. Growth of real income increases the price of support gained by supplying targetable private goods, thereby leading to budget plans in which spending on such goods is reduced.

Although the prices of a unit of electoral support generated by expenditures of different types are not observed, predictions concerning the effect of changes in these prices can be translated into hypotheses about the expenditure composition of observed public budgets. To test the resulting predictions of our model, we have constructed a new measure of public spending on private targetable goods from state line item budgetary data, and a new (to India) measure of electoral competitiveness which reflects the swinginess of constituency-level elections. The multi-party, volatility-adjusted, measure of electoral competitiveness we calculate and employ depends on the vote shares the various candidates in a constituency must gain to overcome the leading candidate, relative to the share of the electorate that has switched candidates and parties in recent past elections. By design, this index is predetermined with respect to the current election—an election may be highly competitive *ex ante* but (especially in majoritarian electoral systems like those in Indian states) may still exhibit lopsided actual outcomes.

The new measures of privateness and competitiveness are of interest in their own right. It turns out that on average over the 1987–1988 to 2011–2012 period we explore, privateness in state budgets has been on average higher in lower-income states, and constituency elections in the less developed states have been on average more competitive than those in the richer states, with the extent of both of these differences varying across time and space.

Pooled mean group estimation using these new measures as part of a model of the composition of Indian state budgets confirms the negative role of income growth on the privateness of budgets in the richer states, after controlling for other aspects of political, demographic and economic structure. In the lower-income, less developed states, growth has a more muted effect on privateness and may even increase it in some cases. It is as if below some income threshold, increases in tax revenue generated by rising incomes are used to ensure the loyalty and turnout of core supporters despite the increase in the relative price of support using private goods, perhaps reflecting a greater demand for redistribution.

Table 7 Public spending on private, targetable goods in the public budgets of 14 major Indian states: 1987–1988 to 2011–2012

Dependent variable	Private targetable/non-private	Private targetable/total	Private targetable/ capital outlay
Sample (High + Low)	(7 + 7)	(7 + 7)	(7 + 7)
Two-stage least squares for panel data			
<i>real income per capita</i>	−0.054 (0.67)	−0.033 (0.46)	−0.382 (2.94)***
<i>real income per cap_low</i>	0.125 (4.91)***	0.11 (4.88)***	0.136 (3.32)***
<i>political competition</i>	−0.832 (5.16)***	−0.742 (5.21)***	−0.937 (3.61)***
<i>political comp_low</i>	1.09 (5.64)***	0.95 (5.56)***	1.42 (4.56)***
<i>R-square</i>	0.54	0.54	0.4
<i>Wald statistic</i>	367.93***	364.13***	204.3***
<i>Observations (States)</i>	320	320	320

Using Baltagi's EC2SLS IV regression (xtivreg in Stata 15). See also Baltagi (2013). The specification is the same as the long run in the model of Table 3. Only key coefficients are reported. Instrumented variables: real income per capita, real income per cap_low, seat majority, seat majority_low, parties in govt and parties in govt_low. Instruments: political competition, political comp_low, reserved seats, old, agrilabour, popsize, FRBM, grantsize, drought, flood, and the first lag of the endogenous variables

More intense electoral competitiveness in richer states is also shown with a variety of estimation methods to have a negative effect on privateness in richer states, as predicted. The effect of competitiveness in elections in less developed states is not as clearly established in our results. In our preferred estimates (using all 14 states in the pooled mean group estimation in Table 3), spending on targetable private goods relative to non-private and relative to total non-interest spending actually rises with the intensity of competition in the poorer states, as if there is an arms race among the parties to deliver private goods to core supporters. However, spending on targetable private goods *relative to capital outlay* declines in *all* states when competition becomes more intense, with the effect being stronger in the less developed ones. So, if competitiveness does lead to more privateness in the budgets of lower-income states, it does not do so at the expense of capital infrastructure. One can imagine a situation in which increased competition in the less developed states leads governments there to try harder to maintain the loyalty and turnout of their core supporters by supplying more private goods, while at the same time increasing expenditure on capital projects at the expense of other parts of the budget in an attempt to broaden its appeal in the face of more intense electoral pressure.

As a whole, the pattern of results for richer and poorer states we uncover indicates that there is a virtuous effect in the more developed states, where growth and more intense electoral competition lead on to relatively more spending on public goods and services. In the less developed states, this sequence appears to be muted, and even reversed in some specifications, a situation consistent with a greater demand for redistribution. The consequences of such a pattern for development and inequality across the states in the future may be of considerable interest.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

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References

- Afridi, F., A. Dhillon, & E. Solan. (2017). Electoral competition and corruption: Theory and evidence from India. Unpublished, March 8.
- Alesina, A., Baqir, R., & Easterly, W. (1999). Public goods and ethnic divisions. *Quarterly Journal of Economics*, 114(4), 1243–1284.
- Arulampalam, W., Dasgupta, S., Dhillon, A., & Dutta, B. (2009). Electoral goals and center-state transfers: A theoretical model and empirical evidence from India. *Journal of Development Economics*, 88, 103–119.
- Baltagi, B. H. (2013). *Econometric analysis of panel data* (5th ed.). Chichester: Wiley.
- Bandyopadhyay, S. (2011). Rich states, poor states: Convergence and polarization in India. *Scottish Journal of Political Economy*, 58(3), 414–436.
- Banerjee, A., & Iyer, L. (2010). Colonial land tenure, electoral competition, and public goods in India. In J. Diamond & J. Robinson (Eds.), *Natural experiments of history*. Cambridge: Harvard University Press.
- Bartolini, S., & Mair, P. (1990). *Identity, competition and electoral availability*. Cambridge: Cambridge University Press.
- Besley, T., & Burgess, R. (2002). The political economy of government responsiveness: Theory and evidence from India. *Quarterly Journal of Economics*, 117, 1415–1451.
- Besley, T., Persson, T., & Sturm, D. M. (2010). Political competition, policy and growth: Theory and evidence from the United States. *Review of Economic Studies*, 77, 1329–1352.
- Blackburne, E. F., III, & Frank, M. W. (2007). Estimation of nonstationary heterogeneous panels. *Stata Journal*, 7(2), 197–208.

- Blais, A., Kim, J., & Foucault, M. (2010). Public spending, public deficits and government coalitions. *Political Studies*, 58(5), 829–846.
- Blais, A., & Lago, I. (2009). A general measure of district competitiveness. *Electoral Studies*, 28, 94–100.
- Bueno de Mesquita, B., Smith, A., Sievers, R. M., & Morrow, J. R. (2003). *The logic of political survival*. Cambridge: Cambridge University Press.
- Chakraborty, P., & Dash, B. B. (2017). Fiscal reforms, fiscal rule and development spending: How Indian states have performed? *Public Budgeting & Finance*, 37(4), 111–133.
- Chakravarty, P., & Dehejia, V. (2017). India's income divergence: Governance or development model? Briefing paper No. 5, IDFC Institute, Mumbai.
- Chhibber, P., & Nooruddin, I. (2000). Party competition and fragmentation in Indian national elections: 1957–1998. In P. Wallace & R. Ray (Eds.), *Indian politics and the 1998 elections: Regionalism, Hinduva, and state politics*. New Delhi: Sage Publications.
- Chhibber, P., & Nooruddin, I. (2004). Do party systems count? The number of parties and government performance in the Indian states. *Comparative Political Studies*, 37, 152–187.
- Coughlin, P. J. (1992). *Probabilistic voting theory*. New York: Cambridge University Press.
- Cox, G., & Weingast, B. R. (2018). Executive restraint, political stability and economic growth. *Comparative Political Studies*, 51(3), 279–303.
- Crost, B., & Kambhampati, U. (2010). Political market characteristics and the provision of educational infrastructure in North India. *World Development*, 38, 195–204.
- Dash, B. B., Ferris, J. S., & Winer, S. L. (2019). Measuring electoral competitiveness: With application to the Indian States. *Electoral Studies*. <https://doi.org/10.1016/j.electstud.2019.102070>.
- Dash, B. B., & Mukherjee, S. (2015). Political competition and human development: Evidence from the Indian States. *Journal of Development Studies*, 51, 1–14.
- Datta, S. (2019). Competition to save lives: Political competition and health outcomes in India. *Oxford Development Studies*. <https://doi.org/10.1080/13600818.2019.1645823>.
- Dixit, A., & Londregan, J. (1996). The determinants of success of special interests in redistributive politics. *Journal of Politics*, 10(1), 1–17.
- Drazen, A., & Eslava, M. (2010). Electoral manipulation via voter-friendly spending: Theory and evidence. *Journal of Development Economics*, 92(1), 39–52.
- Elkins, D. J. (1974). The measurement of party competition. *American Political Science Review*, 68(2), 682–700.
- Ferejohn, J. (1986). Incumbent performance and electoral control. *Public Choice*, 50, 5–25.
- Ferris, J. S., & Dash, B. B. (2019). Expenditure visibility and voter memory: A compositional approach to the political budget cycle in Indian states, 1959–2012. *Economics of Governance*, 20(2), 129–157.
- Ferris, J. S., Winer, S. L., & Grofman, B. (2016). The Duverger-Demsetz perspective on fragmentation and electoral competitiveness with application to the Canadian parliamentary system, 1867–2011. In M. Gallego & N. Schofield (Eds.), *The political economy of social choices* (pp. 93–122). Berlin: Springer.
- Golden, M., & Min, B. (2013). Distributive politics around the world. *Annual Reviews of Political Science*, 16, 73–99.
- Grofman, B., & Selb, P. (2009). A fully general index of political competition. *Electoral Studies*, 28, 291–296.
- Gupta, P., & Panagariya, A. (2014). Growth and election outcomes in a developing country. *Economics and Politics*, 26(2), 332–354.
- Habyarimana, J., Humphreys, M., Posner, D., & Weinstein, J. (2007). Why does ethnic diversity undermine public goods provision? *American Political Science Review*, 101(4), 709–725.
- Hettich, W., & Winer, S. L. (1999). *Democratic choice and taxation: A theoretical and empirical analysis*. New York: Cambridge University Press.
- Hicken, A. (2011). Clientism. *Annual Reviews of Political Science*, 14, 289–310.
- Jha, S. (2014). 'Unfinished business': Historic complementarities, political competition and ethnic violence in Gujarat. *Journal of Economic Behavior & Organization*, 104, 18–36.
- Kenny, L., & Winer, S. (2006). Tax systems in the world: An empirical investigation into the importance of tax bases. *Administration Costs, Scale and Political Regime, International Tax and Public Finance*, 13(2–3), 181–215.
- Kitschelt, H., & Wilkinson, S. I. (2007). *Patrons, clients, and policies: Patterns of democratic accountability and political competition*. Cambridge: Cambridge University Press.

- Krishna, A. (2007). Politics in the middle: mediating relationships between the citizens and the state in rural North India. In H. Kitschelt & S. I. Wilkinson (Eds.), *Patrons, clients, and policies: Patterns of democratic accountability and political competition*. Cambridge: Cambridge University Press.
- Lindbeck, A., & Weibull, J. (1987). Balanced budget redistribution and the outcome of political competition. *Public Choice*, 52(3), 273–297.
- Magaloni, B., Diaz-Cayeros, A., & Estevez, F. (2007). Clientelism and portfolio diversification: a model of electoral investment with applications to Mexico. In H. Kitschelt & S. I. Wilkinson (Eds.), *Patrons, clients, and policies: Patterns of democratic accountability and political competition*. Cambridge: Cambridge University Press.
- Mitra, A., & Mitra, S. (2017). Electoral uncertainty, income inequality and the middle class. *Economic Journal*, 127, 1119–1152.
- Morrow, J. R., BuenodeMesquita, B., Sieverson, R. M., & Smith, A. (2008). Retesting selectorate theory: Separating the effects of W from other elements of society. *American Political Science Review*, 102(3), 393–400.
- Nash, J. (1951). Non-cooperative games. *Annals of Mathematics*, 54, 286–295.
- Nooruddin, I., & Simmons, J. W. (2015). Do voters count? Institutions, voter turnout, and public goods provision in India. *Electoral Studies*, 37, 1–14.
- Paldam, M. (2004). Are vote and popularity functions economically correct? In C. K. Rowley & F. Schneider (Eds.), *The encyclopedia of public choice* (Vol. 1, pp. 49–59). Dordrecht: Kluwer.
- Pedersen, M. N. (1979). The dynamics of European party systems: Changing patterns of electoral volatility. *European Journal of Political Research*, 7, 1–26.
- Pesaran, M. H., Shin, Y., & Smith, R. P. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, 94, 621–634.
- Pesaran, M. H., & Smith, R. P. (1995). Estimating long-run relationships from dynamic heterogeneous panels. *Journal of Econometrics*, 68, 79–113.
- Przeworski, A., & Sprague, J. (1971). Concepts in search of an explicit formulation: A study in measurement. *Midwest Journal of Political Science*, 15(2), 183–218.
- Rao, M., Shand, R., & Kalirajan, K. (1999). Convergence of incomes across Indian states: A divergent view. *Economic and Political Weekly*, 34(13), 769–778.
- Robinson, J. A., & Verdier, T. (2013). The political economy of clientism. *Scandinavian Journal of Economics*, 115(2), 260–291.
- Roemer, J. (2001). *Political competition: Theory and applications*. Cambridge, MA: Harvard University Press.
- Sachs, J., Bajpai, N., & Ramiah, A. (2002). Understanding regional economic growth in India. *Asian Economic Papers*, 1(3), 31–62.
- Sáez, L., & Sinha, A. (2010). Political cycles, political institutions and public expenditure in India, 1980–2000. *British Journal of Political Science*, 40, 91–113.
- Stokes, S. C. (2005). Perverse accountability: A formal model of machine politics with evidence from Argentina. *American Political Science Review*, 99(3), 315–325.
- Stokes, S. C., Dunning, T., Nazareno, M., & Brusco, V. (2013). *Brokers, voters and clientism: The puzzle of distributive politics*. Cambridge: Cambridge University Press.
- Thachil, T., & Teitelbaum, E. (2015). Ethnic parties and public spending: New theory and evidence from the Indian state. *Comparative Political Studies*, 48(11), 389–420.
- Winer, S. L., Ferris, J. S., & Dash, B. B. (2019). Panel data for the study of Indian State Elections, 1952–2009. *Scholars Portal Dataverse*. <https://doi.org/10.5683/SP2/E1ZR XU>.
- Winer, S. L., Ferris, J. S., Dash, B. B., & Charabarty, P. (2020). Replication data for “political competitiveness and the private-public structure of public expenditure: a model and empirics for the Indian States”. *Scholars portal dataverse*. See https://dataverse.scholarsportal.info/dataverse/Privateness_of_Public_Expenditure. <https://doi.org/10.5683/sp2/ddzegj>.
- Wintrobe, R. (1986). *The political economy of dictatorship*. New York: Cambridge University Press.
- Wittman, D. (1987). Elections with M Voters, M Candidates and K Issues. In M. Holler (Ed.), *The logic of multiparty systems* (pp. 129–134). Dordrecht: Martinus Nijhoff.

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