Political Rents and Voter Information in Search Equilibrium

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Abstract

We propose an equilibrium theory of electoral competition with endogenous political rents, information search and voter participation. A key assumption is that the parties' rent policies are ex ante unobserved by the citizens, but that they may acquire this information through costly search. Our two main results are: (*i*) the political equilibrium is characterized by a distribution of rent policies; (*ii*) a party's expected rent policy is inversely U-shaped in the level of information search cost. The latter result is driven by two competing effects of the information search cost on the expected rent policy of the parties: the information effect and the electoral participation effect. An increase in the information search cost makes citizens less likely to aquire information about parties' rents and, in isolation, this incentivizes parties to strategically bid up their rents. However, if the information cost increases beyond an endogenously defined threshold, the propensity that the least informed citizens participate in the election deacreases. This increases the effective share of the well-informed citizens in the election, which incentivizes parties to reduce their rents to compete for these citizens' votes. We discuss how our theory offers explanations for empirical patterns that other theories on political rents cannot explain.

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1 Introduction

Voters cannot easily observe, measure and compare different parties' political rents. Hence, theoretical and empirical research has focused how (lack of) voter information affects electoral accountability and political rent behavior in democratic environments (e.g., Ferraz and Finan, 2008 and 2011). However, despite this literature's achievements – perhaps most importantly, showing that more voter information leads to more electoral accountability and less political corruption – several key empirical patterns remain unexplained. First, there is considerable observed variation in political rents across parties, and measures of voter information (such as the electorate's average educational attainment) seem to be negatively correlated with both the level and the variance of political corruption, as illustrated in Figure 1 for the case of U.S. states.[1] Second, and perhaps surprisingly, while voter participation is indeed a prerequisite for a well-functioning democracy, the extent of political rent extraction seems to be higher when a higher share of the electorate participate at elections (as documented in, e.g., Escaleras et al., 2012, and Karahan et al., 2006, for the cases of U.S. states and counties, respectively).

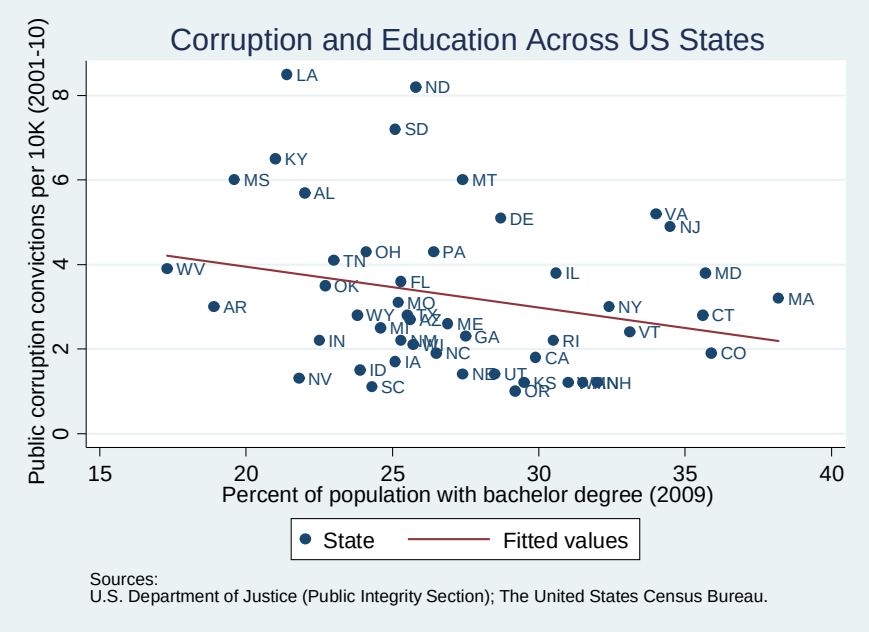


Figure 1

This paper proposes an equilibrium theory of political rents, with endogenous information aquisition and voter participation, that is consistent with the abovementioned observed patterns. In our theory, parties take the information structure, its implications for the equilibrium distribution of information across the electorate, and citizens' voting and turnout behavior into account when deciding on their respective political rent strategies. Citizens, in turn, form rational expectations about the parties' equilibrium strategies and adjust their information search, voting and turnout strategies accordingly.

[1] The negative relationship between state level corruption and education is also documented by Glaeser and Saks (2006). The negative slope of the regression line in Figure 1 is statistically significant at the 10 percent level.

Focusing on how the information structure affects citizens' voting behavior and the political equilibrium, our key assumption is that citizens ex ante cannot directly observe the parties' rent policies, but that they may search for this information (e.g., by going to a political rally, reading a newspaper, or discussing with friends). However, citizens face different information search costs (e.g., due to differences in education, access to media or social networks): a share of the citizens face a positive information search cost (the *uninformed*) while the remaining share face zero information search costs (the *informed*). We assume that citizens uniformly dislike voting for a party with high rents. In forming their search strategies, citizens thus trade off search costs against the expected gain of finding a party with low rents. Hence, it may be optimal – in particular for the uninformed – to do few searches and vote for a high-rent party even though this is associated with a direct utility cost. Further, there are no strategic voting incentives in our model, and we assume that the citizens get an exogenous, non-instrumental benefit of voting. In the turnout decision, they compare this benefit with the expected costs of voting, and it may be rational to abstain in the election, in particular for the uninformed citizens.

The first main result, and key mechanism, of our theory is as follows: The political equilibrium is characterized by a distribution of political rents across parties, where both the expected level and the width of the distribution are determined by the information structure. Thus, electoral competition does not lead to similar levels of rents across parties, or drive rents down to zero. To understand this result, notice that the partly stochastic voting of the uninformed voters constitutes a source of electoral uncertainty which provides the parties with the incentive to trade off a higher level of political rents against the associated reduction in their win-probabilities. Although this trade-off is similar to that in probabilistic voting models, the mechanism is fundamentally different. A key feature of this difference is the existence of a positive mass of informed voters which breaks the smoothness in the parties' mapping of rent strategies into expected payoffs. As a result, there exist no symmetric pure strategy equilibria, and the equilibrium we study is one in symmetric mixed strategies where parties optimally select a probability distribution for their rent policies. Intuitively, this means that, given some equilibrium rent strategy that is shared by all parties and consistent with expected payoff-maximization, each party commits to a level of rents with a probability that is consistent with the equilibrium distribution. Hence, parties that are ex ante identical may end up committing to widely different levels of political rents, within the support of the equilibrium distribution of rents. Our model thus implies that the level of political rents should display considerable variation across otherwise similar environments.

Our second main result is that there is an inverted U-shaped relationship between the search cost of the uninformed citizens and the parties' expected rent policy in political equilibrium. This non-linearity is due to two competing effects on the expected level of rents: the information effect and the participation effect. If more information dissemination in society (e.g., better media coverage) reduces the cost of information search, an uninformed citizen is more likely to search and become informed about the different parties' rents. This *information effect* exerts a downward pressure on the rent strategies of the competing parties. On the other hand, a lower cost of information acquisition stimulates the participation of some of the uninformed citizens that would otherwise have abstained, since their expected costs of voting is then lower. When the uninformed citizens participate to a larger extent, the effective share of the less informed relative to the fully informed voters increases. This is the *participation effect*, which reduces the competitive pressure on parties and pushes equilibrium rents up. As it turns out, in the part of the political equilibrium where

the participation effect is relevant (i.e., when the search cost is sufficiently high), the participation effect dominates the information effect, implying that a decrease in the information search cost increases both the expected rents set by the parties and overall electoral turnout. This result is consistent with the observation that corruption and turnout is positively correlated in the data.

In the part of the political equilibrium where participation is constant, the information effect gives a monotonic, positive relationship between the parties' expected rent policy and the search cost. Further, the equilibrium distribution of rents is also wider when the search costs are higher. Finally, the expected level of rents associated with the equilibrium distribution is weakly increasing (decreasing) in the share of uninformed (informed) citizens, since a higher share of informed citizens increases the competitive pressure on parties. These results are consistent with the observation that a lower level of educational attainment (higher search cost) is associated with both a higher mean and a larger variation in corruption convictions across U.S. states (as illustrated in Figure 1).

Finally, the expected level of political rents depends on the political institutions: the higher is the level of proportionality in the translation of vote shares into the parties' expected payoffs, the higher expected rent policy of the parties. A party's payoff is a function of the rent policy it commits to and its expected post-election political power, where the latter depends on a combination of the party's expected vote share and the political institutions. When the political system is characterized by a low level of proportionality, the expected payoff from setting rents high – with an associated low probability of attracting the votes of the informed citizens – is relatively low, since any party that does not receive the votes of the informed citizens will enjoy a disproportionately low expected political power and, hence, payoff, for any given rent policy. We discuss, in Section 2, how this result relates in interesting ways to existing theoretical and empirical research on the relationship between the electoral system and political rents.

Our theory combines key elements from, first, theories of voter behavior and, second, industrial organization (IO) models of information search. We analyze an election with a large electorate and, in line with insights from the literature on voter behavior in such elections, we disregard instrumental voting motives.[2] Doing this, we build on the decision theoretic framework for voting under uncertainty due to lack of information by Degan and Merlo (2011). In this framework, an individual citizen acknowledges that her vote cannot possibly change the election outcome, but she may still optimally choose to participate due to non-instrumental voting motives (for example, citizens may want to participate at elections to defend the values of democracy *per se,* as argued by, e.g., Cohen, 1973; Sen, 1999).[3] Further, the voter gets a direct disutility of voting for a party with a policy other than her reference policy. Hence, there is a relationship between how informed a citizen is about parties' policies and her perceived cost (in terms of disutility) of voting. While Degan and Merlo (2011) focus on the empirical identication of how information *per se* causally affects voter behavior and turnout (in a setting of multiple, simultaneous elections), our focus is a theoretical analysis of the full political equilibrium where both policies and voter information are endogenously determined.

As in the Industrial Organization (IO) literature (e.g., Stahl, 1989; Janssen et al,

[2] Instrumental voting motives lacks empirical support in the context of large elections. Extensive documentation is provided by, e.g., Aldrich (1993), Blais (2000), Dhillon and Peralta (2002), Feddersen (2004), Geys (2006), Merlo (2006), and Smets and van Ham (2013).

[3] Notice that, in the absence of an instrumental motive, the 'swing voter's curse' (Feddersen and Pesendorfer, 1996) – i.e., strategic abstention by uninformed voters – does not apply

2005), we model information search as a sequential process: paying the search cost once, a citizen receives private information about one, randomly selected party's rent policy; evaluating this policy against her rational expectation about other and, to the citizen, unknown parties' policies, the citizen then decides whether to pay the search cost again to observe the policy of another party, and so on. An individual citizen's search process goes on until she is sufficiently happy with the best party in her accumulated information set, given her rational expectation about the (other) parties' equilibrium rent policies. In contrast to IO-models, though, we analyze a political competition where the mapping of the share of the votes into political power is an essential feature, and where the level of proportionality is a key determinant.

The remaining of the paper is structured as follows. In Section 2, we relate our contribution to the existing literature. Then, we describe the model environment in Section 3 and characterize the political equilibrium in Section 4. Section 5 consists of a series of comparative statics exercises, mainly focussing on the effect of the level and the distribution of information search costs on the equilibrium level and distribution of rent policies set by the parties. In Section 6, we discuss potential extensions, as well as the robustness of our key assumptions. This includes a discussion of how our theory suggests a novel mechanism by which parties, or incumbents, have a joint incentive to manipulate information by changing the level of information costs rather than – as in the literature on media capture – the content of information. Finally, Section 7 sums up and concludes.

2 Related Literature

While our way of modelling electoral competition is, to the best of our knowledge, new, our proposed theory relates to a number of previous contributions and existing literatures—within the field of political economy and beyond. Most importantly, our paper relates to the large literature on political competition and the political agency problem and, more specifically, to the 'pre-election politics' branch of this literature (see, e.g., Persson and Tabellini, 2000, and Besley, 2006, for thorough reviews). In our framework, both the 'public choice school's' Leviathan (e.g., Brennan and Buchanan, 1980) and the 'Chicago school's' effective electoral competition (Stigler, 1972; Wittman, 1989) are at play, as parties trade off the private gains from political rents against the resulting drop in the expected vote share. In the more recent probabilistic voting branch of this literature, exogenous electoral uncertainty forms the foundation for parties' rent extraction in political equilibrium (Polo, 1998; Svensson, 1998), but this mechanism is fundamentally different from the endogenous uncertainty in our model which is due to the voting behavior of weakly informed citizens.[4]

A different branch of the political agency literature focuses on 'post-election politics' and the agency problems arising from moral hazard and/or incomplete information (e.g., Ferejohn, 1986; Alesina, 1988; Austen-Smith and Banks, 1989; Banks, 1990).[5] These problems are absent in our model. First, we abstract away from moral hazard concerns by modelling full commitment to policies, as is common in the 'pre-election politics' literature. Second, rather than exogenous type draws of preferences or abilities, as is common in models of incomplete information, citizens in our model

[4] Several recent extensions of probabilistic voting framework relate more closely to our paper. Aldashev (2013) proposes a probabilistic voting model with endogenous turnout, by adding a term (civic duty) to the turnout function which depends on the equilibrium level of political rents. Svaleryd and Vlachos (2009) takes into account how exogenous variation in voters' information affects the equilibrium level of rents.

[5] Persson and Tabellini (2000) and Besley (2006) reviews also this literature thoroghly.

face homogeneous politicians that differ in their political rents because they play a mixed strategy in political equilibrium.

A key feature of our theory is the equilibrium distribution of rent polices. We interpret rents broadly as some policy dimension where politicians' and voters' interests are not perfectly aligned.[6] Thus, our paper also relates to the literature on electoral competition more generally. It is well know that in a Downsian (Downs, 1957) election framework, with single-peaked preferences and commitment to policies, there full convergence toward a is a single equilibrium policy. This is in contrast to our model, in which divergence across parties' policies arises even with only one policy dimension. In spatial models with multi-dimensional policy space there are typically no pure strategy equilibria. However, as in our model, mixed Nash equilibria may exist (see e.g. Kramer, 1978; McKelvey, 1986; Banks et al., 2002). In these models, there is a conflict of interest between voters with different preferences, and the support for the mixed Nash distribution of polices is centrally located with respect to the ideal points of the voters (Schofield, 2007). By contrast, our conflict of interest is between voters and politicians, and the support of the equilibrium policies is typically diverging from the ideal point of the voters. A similar tension to that in our paper is found in the recent literature on multidimensional valence-models of spatial competition (see, e.g. Ansolabehere and Snyder, 2000; Aragones and Palfrey, 2002). In these models, the electorate is uncertain about, e.g., how effective a party will be in governing, and the resulting equilibrium policies may diverge away from the electorate mean (Schofield , 2007). However, the valence of each party is exogenously distributed in these models, while in our model the effectiveness (which can be interpreted as the inverse of rents) is an equilibrium outcome and voters may search to get more information about the parties' rents.

Central to our model is the link between the level of political information in society, through search costs, and voter activity in terms of electoral participation. The positive relationship in our model between information and turnout finds broad support in the empirical literature. Palfrey and Poole (1987) show that uninformed voters are more inclined to abstain from voting, and also display more variation in their voting behavior, and Lassen (2005) and Degan and Merlo (2011) provide evidence of a positive, causal effect of information on electoral participation. Similarly, there is a growing literature on media and voter turnout which generally find a positive effect of more media (see, e.g., Snyder and Strömberg, 2010; Gentzkow et al., 2011). Though, the evidence of the effect of Internet availability on electoral participation is more mixed: Falck et al. (2014) find a negative effect, while Campante et al. (2013) find that the effect is positive after some time. Both papers point out that a reason for the negative effect may be that the Internet crowds out other more relevant sources of political information. Further, there is evidence that costs of information acquisition are heterogeneously distributed and that this distribution can be related to voter activity. For example, Milligan et al. (2004) establishes a positive association between individuals' levels of education and their inclination to political participation, and Dee (2004) documents that educational attainment increases the quality of civic knowledge (as measured by the frequency of newspaper reading) which, in turn, affects voter participation. Finally, there is evidence that not all types of information are positive for turnout: If voters receive information that politicians are (more) corrupt, evidence suggest that they are more inclined to abstain in the election (Chong et al., 2015). On the theory side, there are several papers that find a relationship between information and turnout in large elections (see, e.g. Palfrey and Rosenthal, 1985, and Feddersen and Sandroni, 2006a). Fedder-

[6] In the discussion section (section 6.2) we address tax policies as implied rent policies.

sen and Sandroni (2006b) and Larcinese (2007) are among the few papers that also analyze costly information acquisition in this context. However, none of these papers on turnout study the policy setting of political parties. In contrast, our paper takes a general equilibrium approach in which parties' policy choice and voter behavior, in the forms of information gathering and participation, can be analyzed consistently.

Our model also relates to the literature on the economic effects political institutions and, in particular, that of constitutional features. Interestingly, our results corroborates the theoretical (as reviewed in Persson and Tabellini, 2000) and empirical (e.g., Persson and Tabellini, 2003; Persson et al., 2003; Kunicova and Rose-Ackerman, 2005) result that the more proportional is the aggregation of votes into decision power, the higher is the level of rents expected to be. Even though our model suggests a different causal mechanism, the underlying logic is somewhat similar: political competition is stiffer in majoritarian relative to proportional systems because competition will be more responsive with respect to the voting behavior of smaller groups of more homogeneous voters (e.g., Persson and Tabellini, 1999). In our setting, the small group of homogeneous voters is identified as the group of informed citizens whereas, in the existing literature, this group is the one with the least ideologically dispersed voters (a larger mass of 'swing voters').[7]

Methodologically, we rely on insights and techniques from the IO consumer search literature (e.g., Diamond, 1971; Varian, 1980; and Burdett and Judd, 1983). Insights from this literature suggest that prices in competitive markets do *not* converge to marginal costs in market equilibrium. Our modelling of citizen's information acquisition relates most closely to the family of search models commonly referred to as sequential search models (e.g. Stahl, 1989). Despite several obvious differences between the "political market" and the market for consumer goods, readers that are familiar with the consumer search literature will probably find the relationship between political rents (the "price of politics") and the search cost in our model familiar. Moreover, the intuition why the equilibrium is characterized by a distribution of rents, rather than a deterministic level, is also paralleled in the consumer search literature, and can be explained by the fact that a party faces a similar trade-off as an owner of a store in the consumer market: a party can either commit to a low level of rents ("low price") and hope to attract the best informed voters ("customers"), or set rents higher and gamble that it might still capture some positive share of the uninformed voters. Furthermore, the margin to participate in the market for consumer goods in Janssen et al. (2005) is similar to our margin to abstain in the election: uninformed voters ("consumers") may choose not to participate in the election ("market") if they expect political rents ("prices") to be too high. Technically, then, our main deviation from this IO literature is the institutional transformation of votes ("purchases") into parties' expected political power. Additionally, and perhaps trivially, since our search technology is similar to that in the consumer search literature, the so-called Diamond paradox may arise as a special case also in our political equilibrium: in the special case where *all* voters are uniformly uninformed, even a very small search cost will push equilibrium rents up to the maximum. At the other extreme, assuming that all citizens are fully informed gives, as in the median voter model, rise to a Bertrand competition for rents which pushes rents all the way down to zero (or some minimum, incentive compatible level) in political equilibrium. Hence, we focus on the more interesting case where search costs are distributed such that a positive share of voters are informed and the remaining are uninformed.

Finally, the information manipulation incentive that emerges from our model,

[7] For a broad review of the literature on the economic and political determinants of political corruption, see, e.g., Treisman (2000).

and which we discuss more thoroughly in Section 6.1, relates to the literature on media capture in politics.[8] The point of departure for these models is commonly a dichotomous environment where one type of politician, or voter group, has the power to strategically use the media to manipulate information in order to bias the election in their favor.[9] In contrast, we assume no heterogeneity across citizens (apart from the search costs they face) or parties. Interestingly, then, the parties in our model will have a joint interest in manipulating the information cost so as to increase the expected payoff for *all* parties. Hence, our theory suggests a new mechanism for the observed correlation between press freedom and corruption indices that has been documented (see, e.g., Brunetti and Weder, 2003) which, according to our theory, should be positive if the information effect dominates and negative if the participation effect dominates. Moreover, our mechanisms and results are also consistent with the findings that a more informed and politically active population strengthens the incentive for politicians to be responsive to the preferences of citizens (as suggested in, e.g., Besley and Burgess, 2002).

3 The Model Environment

Population characteristics Our model economy is populated by a unit mass of citizens with homogeneous preferences.[10] A small exogenous subset, $N \geq 2$, of citizens form parties $i = 1, ..., N$ which may be voted into government in popular elections.[11] As the population is assumed to be homogeneous, the exact mechanism by which citizens are selected, or self-select, into politics is inessential. Additionally, redistributional concerns do not apply and, finally, we disregard the role of ideology. The only remaining political tension, then, is the level of political rents, and the only source of heterogeneity, as will be explained below, comes from the information structure.[12]

Preferences and rents In line with most comprehensive theories in political economy, we assume that parties (or politicians) seeking political power prefer higher to lower rents while citizens prefer lower to higher rents.[13] We operationalize this notion by assuming that citizens incur a direct (psychological) disutility of voting for a party with political rents. The exact preference structure will be detailed out below, when considering the citizens' and parties' objectives. The level of political rents that any given party i commits to, r_i, can be interpreted narrowly as an amount of (excess) politician wages or outright corruption, or more broadly as the amount of any type of government waste.[14]

[8] Prat and Strömberg (2011) offer a recent review of this literature.

[9] For example, in Besley and Prat (2006), a 'bad' incumbent has the incentive to bribe the media to suppress bad news about policy performance, in Corneo (2006) a monopolist media has the incentive to team up with a specific group of voters, and in Petrova (2008) the 'rich' elite bribe the media to suppress information about the social return to public projects. In all of these models the equilibrium level of information manipulation is a function of the nature of these dichotomies and the structure of the media market, where the latter is taken as given.

[10] We refer to 'citizens' as the entire population entitled to vote in elections and 'voters' as those who, in political equilibrium, actually turn out to vote.

[11] The notion of parties may be interchanged with individually running candidates.

[12] Notice that, we could easily reformulate political rents in terms of a policy vector of taxation and a uniform (non-targeted) public good. In such a formulation, a party's level of rents would be the residual of this policy vector, which could be interpreted as government waste, graft, political corruption, etcetera.

[13] As in, e.g., Persson and Tabellini (2000), Besley and Persson (2011) and Bueno de Mesquita et al. (2003).

[14] Bandiera et al. (2009) makes a useful distintion between active and passive waste, where active waste provides utility for the policy maker, corresponding to the more traditional interpretation of political rents, while passive waste does not. At the policy making stage, however, engeneering a

Voter behavior Our key assumption about citizens' preferences – that they prefer voting for parties with low rents – forms the foundation for voter behavior in our model. The disutility of voting for a party with high rents is included in a cost function $C(\cdot)$. Conveniently, voter behavior can then be framed in terms of Riker and Ordeshook's (1968) classical calculus of voting model, where a citizen will participate in the election if her net benefit of voting, $pB + D - C(\cdot)$, is positive, and otherwise abstain. We focus on large elections and assume the probability of influencing the election outcome, p, to be infinitesimally small, and thus disregard the instrumental motive (pB) throughout (as in, e.g., Degan and Merlo, 2011).[15] Then, the only remaining benefit of voting stems from the so-called 'consumption benefit' of voting, D, which we refer to as the direct benefit of voting (for example, from fulfilling a civic duty, or from the desire to express oneself through the act of voting). Importantly, we need not take a stand on a specific interpretation of D except the following: noting that most common interpretations imply that citizens do not cast entirely random votes (which neither would be consistent with the notion of civic duty, nor the desire to express oneself), we assume that a voter must have a minimum amount of information about at least one party in order to enjoy the direct benefit D of voting. In other words, if a citizen decides to participate in the election, she must get informed about at least one party's rent policy before voting in order to enjoy D.[16] We assume that this direct benefit of voting is uniform among the citizens.[17]

In this voting framework, the key variable by which information affects the net benefit of voting and a citizen's voting behavior, is the cost of voting $C(\cdot)$. A citizen's optimal turnout and voting strategy will be such that it maximizes the net benefit of voting. Hence, a citizen will decide to vote if her expected benefit from participation is positive, i.e., if $E[D - C(\cdot)] > 0$, and otherwise abstain, and conditional on voting she will aim at minimizing $C(\cdot)$. This setup for voter behavior relates most closely to Degan and Merlo's (2011) informational model of voter behavior and turnout. In particular, their notion of making a "voting mistake" relates to the search problem in our model; a citizen may accept the disutility of voting for one of the policies in her information set, or she may search again to maybe find a party with lower rents. Importantly, however, the information set of citizens is exogenous in Degan and Merlo, while endogenous information acquisition is a key component of our model. Also notice that our model relates to Matsusaka's (1995) 'uncertain voter' model but where we, as Degan and Merlo, let information affect voter utility through $C(\cdot)$. As discussed also by Matsusaka (1995, p.96) and Degan and Merlo (2011, p. 212-213), the flexibility in terms of how to operationalize the way information affects individuals' net benefit of voting is a strength rather than a weakness of informational

policy platform that minimizes the amount of passive waste may take substantial effort, potentially providing the policy makers with a direct disutility of effort. For example, if a party, for convenience, focusses largely on other issues than on policies to reduce government waste, this is consistent with a high rent strategy in our framework.

[15] Notice that, in our setup, B would have a similar interpretation as Down's "party differential", i.e., the voter's expected (indirect) utility difference of some given party winning the election (in terms of receiving the largest vote share) relative to one of the other parties winning.

[16] Alternatively, we could assume that all citizens have information about at least one party and that all citizens participate in the election to enjoy D. This would, by assumption, rule out abstention (the participation effect), but the remainder of the political equilibrium and the information effect would remain unchanged.

[17] Allowing citizens' benefit of voting to vary with their cost of information aquisition too does not change any of our main results. All we need to assume is that this benefit is positive and conditional on the citizen having a mininum amount of information (i.e., knowing the political rents of at least one party).

models of voter behavior: whether more, or more accurate, information affects voter behavior primarily through increasing D or decreasing C is inessential in terms of the political equilibrium and the predictions from our theory.[18]

Information search costs In their process of acquiring political information, citizens face different levels of information search costs. Denote c^s the vector of search costs, with $c_i^s = 0$ for the informed citizens and $c_u^s > 0$ for the uninformed citizens. The distribution of search costs in the population is given by that a share $\mu \in (0,1)$ are informed while the remaining share $(1-\mu)$ are uninformed. Notice that all citizens are ex ante uninformed, only the individual cost of obtaining political information varies across individuals. For expositional convenience, however, we refer to the citizens with a strictly positive search cost as the uninformed (indexed by "U"), and the remaining citizens as the informed (indexed by "I").

Search technology When searching for information about the parties' policies, a citizen incurs the cost c^s and observes the rent policy r_i of a party i. Incurring the cost again gives another policy quote of another party, i.e., search is sequential, and c^s is the marginal search cost.[19] Each search gives an independent draw from the equilibrium policy distribution with cdf $F(\cdot)$ and support $[\underline{r}, \overline{r}]$. Both the distribution and the support is endogenous in our model and will be pinned down later when we characterize the equilibrium, but it is convenient to establish the notation for the distribution here. Importantly, we do not suppose anything about the shape of $F(\cdot)$, it could even be degenerate. Let $r \sim F(\cdot)$ denote the stochastic policy variable with $E[r]$ as the expected policy quote from each additional search action. Further, we assume that a citizen have recall over her observations from all previous searches and that she will choose the party with the lowest level of rent in her information set. If there are more than one party with the lowest observed rent level, their respective votes will be distributed equally across those parties. Last, we must assume that the informed citizens search for information about at least two of the parties' policy platforms.

Political institutions Once those citizens that participate in the election have cast their votes, the votes will be translated into payoffs for the different competing parties according to the specific political institutions of the economy. One may think of this as a translation of votes into political power, where a higher level of political power implies a higher likelihood of getting to consume the level of rents consistent with the party's stated rent policy (i.e, the rent level that the party has committed to). Crucially, we assume that the political institutions imply some degree of proportionality in the translation of vote shares into political power. Specifically, we assume: *i*) any positive vote share, however small, will map into some positive degree of political power and *ii*) the higher the vote share a party wins in the election, the more political power it will enjoy. How these institutional features depend on turnout rates of the citizens and further details of how votes map into political power will be explained in Section 4.2.

Game structure We consider a one-shot political game where the parties commit to policy platforms. Simultaneously, and based on the expected contents of these platforms, citizens decide whether to vote, and, conditional on voting, how much information to gather and which party to vote for. Alternatively, we could

[18] We could let information directly affect D, for example by letting this term be a function of information and the search cost. Notice, however, that as long as the 'consumption benefit' is always strictly positive for all citizens, all of our results go through and the comparative statics will be identical.

[19] Alternatively, we could have assumed 'noisy search', where a citizen may observe more than one rent policy quote for each search. In the discussion section, we argue that our main results do not hinge on our choice of search technology.

have considered a sequential game structure where parties first commit to policies and citizens then decide their search and voting strategies; a detailed discussion of the game structure is presented below in this section.

3.1 Citizens' and Parties' Objectives

We now turn to the parties' and the citizens' objectives. In this section we assume that the policy distribution $F(\cdot)$ with support $[\underline{r}, \overline{r}]$ exists, which will be shown to be the case in Section 4.3.

Citizens' Objective Let the parameter $c^v > 0$ be a measure of a citizen's disutility of voting for a party i if the value of r_i is higher than her reference policy.[20] In our framework, citizens prefer low over high rents and we define the reference policy as the lowest possible equilibrium rent. In political equilibrium, the lowest possible realization of the rent distribution $F(\cdot)$ is $\underline{r}$. The citizens form rational expectations of this lower bound, i.e., they calculate $\underline{r}$, and hold this as their reference point. The cost of voting for party i, net of search costs, is then given by $c^v(r_i - \underline{r})$, which is increasing in both the parameter c^v and in the distance $(r_i - \underline{r})$. Notice that, if an out-of-equilbrium policy $r_i < \underline{r}$ is observed, the voter is positively surprised and $c^v(r_i - \underline{r})$ then constitutes a positive benefit of voting for i.

Let Δ_S denote the information set of a citizen subject to having made $S(\cdot) \in N$ searches, and let $r_{\min}$ denote the lowest observed rent in this set. The total expected cost of voting for a citizen that searches $S(\cdot)$ times is then is given by

$$E\left[C\left(r_{\min}|\Delta_S, S(\cdot); c^s, c^v\right)\right] \equiv \sum_{s=1}^{S} c^s + c^v\left(E[r_{\min}|\Delta_S] - \underline{r}\right), \tag{1}$$

where $E[r_{\min}|\Delta_S]$ is the citizen's expectation of the lowest observed rent offer conditional on having assembled an information set of size $S(\cdot)$. A citizen's expected net benefit of voting is then given by $D - E\left[C\left(r_{\min}|\Delta_S, S(\cdot); c^s, c^v\right)\right]$, where we assume $c^s < D$ so that there may be a positive net benefit of participating.

The search strategy of a citizen, conditional on participating in the election, is to decide on a reservation rent $\rho \in R^+$. When a citizen observes a rent policy equal to or below the reservation rent, she stops searching and votes for the best policy in her information set; in the event that all rent policies are below the reservation rent, and conditional on participating in the election, the citizen will search all parties and pick the one with lowest rent. We can then write the citizens' objective as:

$$\max_{\{\tau,\rho\}} \tau\left(D - E\left[C\left(r_{\min}|\Delta_S, S(\tau,\rho); c^s, c^v\right)\right]\right), \tag{2}$$

where τ represents the citizens' strategy for participation which can straightforwardly be interpreted as the probability of participating, with $\tau \in [0,1]$. Hence, the number of searches a citizen makes follows endogenously from her participation and search strategies $\{\tau, \rho\}$, implying $S(\cdot) = S(\tau, \rho)$. Note that, since we will only analyze symmetric equilibria, the participation and search strategies will be identical across all citizens with identical search cost, however, the strategies will differ across the informed and the uninformed citizens.

Parties' Objective We assume that a political party i commits to a level of rents r_i and that it takes the participation decision of citizens as given. The party recognizes that the electoral outcome may be uncertain due to the partly stochastic

[20] Two alternative interpretations of c^v, which both are fully consistent with our setup, are, first, that this parameter measures a citizen's perceived cost of (or aversion toward) voting for a high-rent party, or, second, that it is a measure of how much a citizen cares about finding the right policy for her.

voting by uninformed citizens. Also, the turnout decision, and thus the number votes, influence the political decision power (through the political institutions). Taking into account uncertainty and participation, we define $\Gamma(F(r_i), \tau)$ as the expected political power of a party i to extract political rents. We can then define the expected payoff of a party i as

$$\Pi\left(r_i, F(r_i), \tau\right) \equiv r_i \Gamma(F(r_i), \tau), \tag{3}$$

which can be interpreted as the party's expectation of the level of rents it will be in a position to consume when committing to a platform with r_i. Importantly, (3) implies that expected payoff is increasing the party's rent commitment for a given expected power and increasing in the expected power for a given level of rents, but that the expected power is a function of the party's rent commitment. It is convenient to analyze the citizens participation and search strategies $\{\tau, \rho\}$ before defining $\Gamma(F(r_i), \tau)$, so we postpone this and further interpretations of the parties expectations to Section 4.2. A party i's objective is to set r_i as to maximize (3) taking τ as given. We denote F_i the party's mixed rent strategy, i.e. the probability distribution over $r_i \in R^+$, which is allowed to be degenerate.

Given our assumptions about the citizens' and parties' objectives, notice the strategic motives that emerges. Anticipating the citizens' turnout and voting behavior, the parties have, on the one hand, the incentive to adjust their rent policy down to attract the votes of the informed citizens and, on the other hand, the incentive to keep rents at some strictly positive level to exploit the fact that some uninformed citizens may vote for them anyway.

3.2 The Game Structure

Now, turning to the game structure, consider the following political game between parties and citizens:

Timing A two period model, $t = 1, 2$, where:

$t = 1$: Nature chooses a vector of parameters $\{D, N, c^s, c^v, \mu\}$ at the beginning of the period.

- Stage 1: Parties simultaneously decide on rent strategies F_i.
- Stage 2: Citizens decide on voting and search strategies $\{\tau, \rho\}$.
- Stage 3: The election takes place.

$t = 2$: Payoffs are realized.

Notice that our analysis remains unchanged if collapsing stages $1 - 3$. In any case, the parties choose their respective rent policies strategically, taking the other parties' strategies and the search and voting strategies of the citizens as given. The citizens anticipate the equilibrium policy distribution that follow from the parties' strategies and choose their respective optimal search and voting strategies according to this. Any party i commits to a rent policy r_i consistent with its rent strategy F_i . Citizens decide whether to participate or abstain and, subject to participation, they search, get information about one or more parties' policies, and cast their votes.

3.3 An Excursion: The Role of Informational Frictions

As an introduction to the analysis of the political equilibrium, consider first a political equilibrium where all citizens are fully informed, i.e., without informational frictions. To this end, consider a Nash equilibrium where all citizens observe all the parties' rent policies (this is technically equivalent to assuming $\mu = 1$). Obviously, no party

commits to a negative level of political rents, however, one (or more) party setting positive rents cannot constitute an equilibrium either, as the best response of each party then would be to undercut the others to capture all the votes. This Bertrand-type competition implies that rents quickly converge to zero and $r_i = 0 \ \forall i$ is the unique Nash equilibrium. In this situation, there is no disutility of voting as $E[r] = \underline{r} = 0$, all citizens participate in the election ($\tau = 1$) since $D > c^s$, citizens' search strategy is given by $\rho = 0$, and (by assumption) all citizens search at least two parties.

Second, to illustrate the role of informational frictions, consider next a political equilibrium with only two parties, some proportional representation, and full participation (i.e., assuming $\tau = 1$) where the share $(1 - \mu)$ of the citizens vote randomly. Then it is easy to see that the standard 'Median voter model' result of a Bertrand competition toward zero rents breaks down: if both parties commit to zero rents, both parties' expected payoff is zero, and any party i has the incentive to deviate and set $r_i > 0$ since that party then would still expect to get some uninformed votes and, hence, some expected political power and rents. At the other extreme, if both parties set rents to the maximum (e.g., up to an exogenously defined resource constraint, $r^{\max}$), either party would have the incentive to decrease its level of rents marginally as this would attract the votes of the μ informed citizens and, hence, imply a discrete jump in the party's expected payoff. The same would be true for any intermediate level of rents and, restricting attention to symmetric equilibria, the only possible equilibrium is one in mixed strategies where both parties symmetrically select a probability distribution for their rent policy with support $[0, r^{\max}]$.[21] In this example, it is the random votes of the uninformed voters, coupled with the assumption of some degree of proportionality in the translation of vote shares into political power, that forms the basis for the parties' equilibrium strategy of positive rents.

The intuition why the information structure lays the foundation for rent dissipating behavior is, hence, that it constitutes a source of electoral uncertainty which provides the parties with the incentive to trade off rents against the probability of winning the election. This trade off is, however, not as smooth as in a model with exogenous electoral uncertainty (e.g., the probabilistic voting model) because the leverage of the positive mass of informed voters generates discrete jumps in the parties' expected payoffs. Thus, the equilibrium is one in mixed strategies. In the complete specification of our model below, where we allow citizens to choose whether to participate in the election and how much information to search for, the level of electoral uncertainty and the equilibrium distribution of rents will be endogenously determined as a function of the information structure, parameterized by μ and c^s.

4 The Political Equilibrium

We now continue by defining and characterizing the political equilibrium with information search. We solve the game between citizens and parties in the following way. First, we assume that a policy distribution with cdf $F(\cdot)$ and support $[\underline{r}, \overline{r}]$ exist in equilibrium. Then, we analyze the citizens' search and voting strategy, given $F(\cdot)$ and that the support of $F(\cdot)$ includes ρ. Next, we set up the details of the parties' payoffs, given $F(\cdot)$ and ρ. After that, we analyze the parties strategies further, characterize $F(\cdot)$, and find ρ. Last, we show that $F(\cdot)$ indeed exists, that ρ indeed is in the support, and derive the sufficient parameter conditions for existence and uniqueness of the political equilibrium.

We only analyze symmetric equilibria Then, in political equilibrium, the mixed

[21] The formal proof for this mixed strategy equilibrium is analoguous to the proof for our political equilibrium, which we derive below.

strategies of the parties are given by the policy distribution $F_i = F(\cdot)\ \forall i$. Notice that distributions are allowed to be degenerate, though we will show this not to be the case in political equilibrium. We define the political equilibrium in our model as follows:

Definition 1 *A political equilibrium is a scalar $\overline{\Pi}$, a policy distribution $F(\cdot)$, and participation and search strategies $\{\tau, \rho\}$ such that:*

1. Parties have the same expected payoffs; $\Pi(r_i, F(r_i), \tau) = \overline{\Pi}$ for all r_i in the support of $F(\cdot)$;

2. Parties have no incentive to change their policies; $\overline{\Pi} \geq \Pi(r_i, F(r_i), \tau)$ for all r_i in the support of $F(\cdot)$, given ρ;

3. ρ is in the support of $F(\cdot)$;

4. $\{\tau, \rho\}$ solves the citizens' problem given by (2).

4.1 Citizens' Search and Voting Strategy

First, we analyze the citizens' search strategy, conditional on their participation. Recall that one search action gives an independent draw from the policy distribution. Then, using (1) and (2), the expected net benefit of taking only one search action, conditional on participating, can be written

$$d - (E[r] - \underline{r}) - c, \tag{4}$$

where we have used the linear transformations $d \equiv \frac{D}{c^v}$ and $c \equiv \frac{c^s}{c^v}$. Here, d and c have the interpretations of the relative importance of the direct benefit of voting and the search cost, respectively, to the parameter value of the disutility of voting for high rents. Next, if a citizen already has observed one (or more) rent quote(s), the expected net benefit from one more search action, is given by $c^v\left(r_{\min} - E\left[r\right]\right) - c^s$. Using the transformation in (4), this net benefit can be written

$$r_{\min} - E\left[r\right] - c. \tag{5}$$

The search strategy implies to search again if the last observed rent policy is larger than the reservation rent ρ. The reservation rent will depend on the level of search costs citizens' face, and we denote ρ_I and ρ_U the reservation rent of the informed and uninformed, respectively, where $\rho = \{\rho_I, \rho_U\}$. Continued search beyond the first search action is optimal for a citizen if her expected benefit of continued search exceeds the associated expected cost. Thus, the informed citizens set $\rho_I = \underline{r}$, as search is free, implying that there is a possible gain from searching again as long as $r_{\min} > \underline{r}$. In effect, then, the informed citizens will search all the parties, since $\Pr\{r_i = \underline{r}\} = 0$ in political equilibrium (that the equilibrium distribution is atomless will be shown in Section 4.3).

The uninformed, on the other hand, face a positive search cost and their reservation rent is given by the level of rents that makes them indifferent between accepting the party at hand and paying the cost to search once more. Using (5), we then have that the reservation rent of the uninformed satisfies

$$\rho_U - E\left[r\right] - c = 0. \tag{6}$$

This reservation rent constitutes an optimal stopping rule that is independent of the number of previous searches.

The following lemma states how many searches the uninformed citizens do, conditional on participating in the election.

Lemma 1 *The uninformed citizens do not search more than once in political equilibrium.*

Proof. See appendix A1. ■

The intuition for the result in Lemma 1 follows from that any party will set its level of rents below the reservation level of the uninformed citizens, or else it would not get any votes. Consequently, the rent policy that the uninformed citizens are offered by the first party they encounter in their search is always accepted and no further search takes place.[22]

A citizen may abstain from voting in political equilibrium. Since the uninformed only searches once, if they choose to participate, it follows from (4) that their participation condition is

$$d - (E[r] - \underline{r}) - c \geq 0, \tag{7}$$

or, equivalently, $D - c^v\left(E[r] - \underline{r}\right) - c_U^s \geq 0$. Hence, (7) implies that uninformed citizens are more likely to abstain from participating in the election the higher is the expected level of rents relative to the lower bound of the support.

A convenient way to endogenize the participation rates of the otherwise identical informed and the identical uninformed citizens in our model, is to allow them to play mixed participation strategies. Hence, rather than constraining by assumption the informed and uninformed citizens choice to either participate or not with probability one, we allow them to optimally choose their respective turnout probabilities. This allows, but does not constrain, the equilibrium turnout strategies to adjust smoothly to marginal changes in $E[r]$, as a result of changes in the exogenous, structural parameters. We denote τ_I and τ_U the participation strategies of the informed and the uninformed, respectively, where $\tau = \{\tau_I, \tau_U\}$. Note that the expected net benefit of participating for the informed is strictly greater than for the uninformed, since $E[r_{\min}|\Delta_{S=N}] < E[r_{\min}|\Delta_{S=1}] = E[r]$ for any non-degenerate distribution of r. Thus, as long as some of the uninformed citizens participate in political equilibrium, all of the informed will participate. The following lemma establishes that $\tau_U > 0$ and, hence, $\tau_I = 1$.

Lemma 2 *In political equilibrium all of the informed citizens and at least some of the uninformed citizens participate in the election.*

Proof. See appendix A2. ■

Lemma 2 implies that, in political equilibrium, there are at least some uninformed citizens participating in the election and searching for information. The intuition for this can be explained by considering what would happen if only the informed citizens participate in the election. If so, the party offering the lowest rent would get all the votes, as in the first part of our "excursion" in Section 3.3. This gives a Bertrand-type competition that would drive rents down to zero. But then there would be no disutility of voting and the uninformed citizens would benefit from deviating by participating in the election since $D > c_u^s$. Hence, a political equilibrium where only the informed citizens participate does not exist.

Observe that Lemma 2 suggests two candidates for political equilibrium: either a *full participation* case with $\tau_I = \tau_U = 1$ or a *partial participation* case with $\tau_I = 1$ and $0 < \tau_U < 1$. When convenient, we will separate the analysis into these two

[22] That uninformed agents do not search more than once is a standard result in sequential search models, see, e.g., Stahl (1989) or Janssen et al. (2005).

cases.[23]

The share of informed relative to uniformed citizens that participate in the election will vary according to the participation strategy of the uninformed citizens τ_U. For later use, we define the effective share of informed voters in the election as $\hat{\mu}(\tau) \equiv \frac{\mu\tau_I}{\mu\tau_I+(1-\mu)\tau_U}$. Since $\tau_I = 1$ in political equilibrium, we can write $\hat{\mu}(\tau) = \frac{\mu}{\mu+(1-\mu)\tau_U}$. When more (fewer) of the uniformed citizens choose to participate in the election, the effective share of informed voters mechanically decreases (increases), i.e. $d\hat{\mu}/d\tau_U < 0$.

4.2 Parties' Payoffs

Having established the search strategies of the citizens, we can now set up the parties' payoffs in more detail. A party conditions its rent strategy on its expectations of the rent policies of the other parties and of the search and voting strategies of citizens. Again, assume that $F(\cdot)$ exists, so that a party perceives the other parties' rent policies as random draws from $F(\cdot)$.

We define the expected political power of a party as

$$\Gamma(F(r_i),\tau) \equiv [1-F(r_i)]^{N-1}\gamma_L(\hat{\mu}(\tau)) + \left(1-[1-F(r_i)]^{N-1}\right)\gamma_S(\hat{\mu}(\tau)), \quad (8)$$

where $[1-F(r_i)]^{N-1}$ is the probability that r_i is the lowest rent, conditional on the distribution $F(\cdot)$. The functions $\gamma_L(\hat{\mu}(\tau))$ and $\gamma_S(\hat{\mu}(\tau))$ determine how much political decision power, through political representation, a party will enjoy as a result of setting the lowest rent and becoming the largest party ("L") in terms of vote share, or setting a higher rent and becoming one of the small parties ("S"), respectively. These functions depend on the number of votes a party gets and the level of proportionality. Recall that, in political equilibrium, the informed citizens choose the party with the lowest rent and the uninformed citizens stop after one search only. The party with the lowest rent, then, gets a vote share of $\hat{\mu}(\tau)+(1-\hat{\mu}(\tau))/N$, while the other parties get vote shares equal to $(1-\hat{\mu}(\tau))/N$.

Notice that our proportionality assumption on the transformation of votes to political decision power implies $\gamma_L(\hat{\mu}(\tau)) > \gamma_S(\hat{\mu}(\tau)) > 0$, i.e., the largest party in terms of vote share holds more, but not all, political power. We assume that the γ-functions are monotonic and twice differentiable, but otherwise we let them be flexible to accommodate different political institutions. For instance, in case of full proportionality, where political power directly follows from the parties' respective vote shares, we would have $\gamma_L(\hat{\mu}(\tau)) = \hat{\mu}(\tau)+(1-\hat{\mu}(\tau))/N$ and $\gamma_S(\hat{\mu}(\tau)) = (1-\hat{\mu}(\tau))/N$. Alternatively, in a (close to) majoritarian system, $\gamma_L(\hat{\mu}(\tau))$ would be close to one while $\gamma_S(\hat{\mu}(\tau))$ would be close to zero.

Using (8), the expected payoff of a party is then

$$\Pi(r_i, F(r_i), \tau) = r_i\left[[1-F(r_i)]^{N-1}\gamma_L(\hat{\mu}(\tau)) + \left(1-[1-F(r_i)]^{N-1}\right)\gamma_S(\hat{\mu}(\tau))\right]. \quad (9)$$

There are two alternative interpretations of rent policy implementation in this setup. First, that only the largest party's rent policy is implemented and all rents accrues to this party. In this case, $\Gamma(F(r_i),\tau)$ is a multiplicative factor for the expected power of being the only party which policy is implemented. Second, that a

[23] This way of analyzing the equilibrium is analogous to the methodology of Janssen et al. (2005). Later, when we do comparative statics in Section 5, we will show that whether there is full or partial participation crucially depends on the importance of the search cost relative to the expected cost of making a voting mistake.

combination of parties' rent policies is implemented, for example through the formation of a coalition government. In this case, each party receives in expectation a share of their own rent offer, where the share follows from the parties' political power. Although the policy outcome of those two interpretations may be different, the expected payoffs for the parties are invariant. Thus, the parties' trade-off is invariant. From (9) we see party i's trade-off when deciding on policy; a low level of r_i to attract the votes of the informed citizens versus a high level of r_i with a lower probability of getting the largest vote share but at the same time higher rents if the rent policy is implemented.

4.3 Characterizing the Political Equilibrium

Having analyzed the citizens' strategies and set up the details of the parties' payoffs, given $F(\cdot)$, we will now characterize $F(\cdot)$.

A major feature of our model is that there exist no symmetric pure strategy political equilibria. To see why this is the case, consider a rent policy $\hat{r}$ set by all the parties. If $\hat{r} = \rho_U > 0$, then any party will have an incentive to lower its rents marginally to attract the informed voters and, hence, get a discrete increase in its expected payoff. If $\hat{r} = 0$, then any party expect zero rents and has the incentive to increase its rent policy to exploit the leverage of the uninformed citizens, implying $\rho_U > 0$. If $\hat{r}$ is in the range $0 < \hat{r} < \rho_U$, both aforementioned mechanisms provide the parties with the incentive to deviate from $\hat{r}$. Thus, a single policy cannot be supported in equilibrium. Together with the assumption that we only analyze symmetric equilibria, we have then shown the following lemma.

Lemma 3 *The policy distribution $F(\cdot)$ is atomless in political equilibrium.*

Note that an atomless distribution also is a standard result in IO-search models that analyze price dispersion (see, e.g., Varian (1980); Stahl (1989); Janssen et al. (2005)).

Having established that the parties do not play a pure strategy in political equilibrium, we continue by analyzing mixed strategies. Recall that the symmetry of our model implies that all parties must play the same mixed strategy in equilibrium and, thus, the mixed strategy is given by the policy distribution $F_i = F(\cdot)\ \forall i$. In what follows, we will derive such a mixed strategy and show that a political equilibrium exists.

In a political equilibrium with mixed strategies, a party must be indifferent between committing to any rent policy in the support of $F(\cdot)$. We use this indifference to solve for $F(\cdot)$. More specifically, we use the property that for any rent policy r_i in the support of $F(\cdot)$, the party i's expected payoff must be equal to offering the supremum $\bar{r}$. Hence, we set $\Pi\left(r_i, F\left(r_i\right), \tau\right) = \Pi\left(\bar{r}, F\left(\bar{r}\right), \tau\right)$. Then the policy distribution in political equilibrium is characterized by

$$F\left(r_i\right) = 1 - \left[\frac{g(\tau)}{1-g(\tau)}\frac{\bar{r}-r_i}{r_i}\right]^{\frac{1}{N-1}} \quad : \quad \forall i, \tag{10}$$

where we have found it useful to define $g(\tau) \equiv \frac{\gamma_S(\hat{\mu}(\tau))}{\gamma_L(\hat{\mu}(\tau))}$ as the relative political decision power of being a small versus the large party.[24] From the assumptions on the γ-functions it follows that this function represents the degree of proportionality, where $g(\tau) \in (0,1)$. Notice that for a larger effective share of informed voters, a higher vote share will go to the party that has the lowest rent policy. Then, it

[24] See appendix A3 for the derivations of the expressions for $F\left(r_i\right)$ and $\underline{r}$.

follows from our proportionality assumption that $\frac{\partial g}{\partial \tilde{\mu}} < 0$. While the shape of $g(\tau)$ matters when we do comparative statics later, this turns out to be inessential for the characterization of the equilibrium.

The lower bound of the distribution is found by setting $F(\underline{r}) = 0$, which gives

$$\underline{r} = g(\tau)\bar{r}. \tag{11}$$

Notice that, since $g(\tau) \in (0,1)$, it follows that $\underline{r} < \bar{r}$. Having found a solution for the lower bound of the support, we analyze the upper bound. Recall that the reservation rent of the uninformed citizens is the level of r_i that makes them exactly indifferent between accepting the level of rents of the party at hand and searching once more. No party would propose a level of rents that is higher than ρ_U since this will induce all voters to search and vote for another party. Hence, the upper bound is given by $\bar{r} = \rho_U$.

Next we derive an expression for the expected rents set by the parties. To this end, we first solve (10) for r_i which, using $\bar{r} = \rho_U$, gives

$$r_i = \frac{\rho_U}{1 + \frac{1-g(\tau)}{g(\tau)}\left[1 - F\left(r_i\right)\right]^{N-1}} : \quad \forall i. \tag{12}$$

Since (12) is valid for any r_i in the support, due to symmetry, we can change r_i with the stochastic r, and then take the expectation over r to get

$$\begin{aligned} E[r] &= E\left[\frac{\rho_U}{1 + \frac{1-g(\tau)}{g(\tau)}\left[1 - F\left(r\right)\right]^{N-1}}\right] \\ &= \int_0^1 \frac{\rho_U}{1 + \frac{1-g(\tau)}{g(\tau)} z^{N-1}} dz, \end{aligned} \tag{13}$$

where, in the lower line, we have changed variables and used the fact that $F(r) \sim U[0,1]$.

Then, we find the reservation policy of the uninformed, ρ_U. The indifference between searching again or not is given by (6) which, by plugging in (13), can be written

$$\rho_U \left[1 - \int_0^1 \frac{dz}{1 + \frac{1-g(\tau)}{g(\tau)} z^{N-1}}\right] - c = 0. \tag{14}$$

Having established expressions for the expected rents and the reservation rent of the uninformed, we now turn to the existence of political equilibrium. From Lemma 2 we know that, for a political equilibrium to exist, at least some of the uninformed must participate, i.e., the participation condition (7) must be satisfied for some $\tau_U \in (0,1]$. Using that the lower bound of the support relates to ρ_U according to (11) and that expectations are given by (13), we can rewrite condition (7) as

$$d - \rho_U \left[\int_0^1 \frac{dz}{1 + \frac{1-g(\tau)}{g(\tau)} z^{N-1}} - g(\tau)\right] - c \geq 0. \tag{15}$$

The indifference to search again given by (6) and the participation condition (7) must hold at the same time in equilibrium, so it follows that

$$\left[1 - g(\tau)\right] \rho_U \leq d\,. \tag{16}$$

Then, using $(1-g(\tau))\,\rho_U \leq d$, we rewrite condition (15) as

$$\frac{1}{1-g(\tau)}\left[1-\int_0^1 \frac{dz}{1+\frac{1-g(\tau)}{g(\tau)}z^{N-1}}\right] \geq \frac{c}{d} \equiv \frac{c_U^s}{D}. \tag{17}$$

In what follows, it will useful to separate between a full participation and a partial participation case for the political equilibrium. Notice that in the partial participation case, with $0 < \tau_U < 1$, the constraint (15) binds. Then, conditions (6) and (7) can be jointly satisfied only if

$$[1-g(\tau)]\,\rho_u = d. \tag{18}$$

Thus, in this case it follows that (17) must hold with equality. Notice that $g(\tau)$ is lower in the partial participation case, since $\frac{dg}{d\tau_U} = \frac{\partial g}{\partial \tilde{\mu}}\frac{d\tilde{\mu}}{d\tau_U} > 0$. Condition (17), then, gives a set of parameters for which a political equilibrium exists, either with full or partial participation. We have the following proposition:

Proposition 1 *A political equilibrium exists and is unique. Further, there are two candidates for political equilibrium: either a full participation case with $\tau_I = \tau_U = 1$ or a partial participation case with $\tau_I = 1$ and $0 < \tau_U < 1$.*

Proof. See appendix A4. ■

The existence of a political equilibrium implies that at least some uninformed voters will have an incentive to participate in elections even though search comes at a cost *and* the parties' levels of political rents are strictly positive. The intuition is that citizens derive a direct benefit D from the pure act of voting (by assumption). Hence, it is the participation *per se* of uninformed citizens in the election that provides the foundation for political parties to abuse their power and extract political rents.

The participation condition for the uninformed citizens gives rise to the two cases for the political equilibrium. If the expected net benefit of participating for the uninformed is strictly positive, all citizens participate in the election. At the participation threshold, however, the uninformed citizens are indifferent between voting and abstaining and, depending on the exact parameter configuration, this threshold may either constitute an equilibrium with full or partial participation. Starting from an equilibrium at the participation threshold with full participation ($\tau_U = 1$), consider an increase in the cost of voting (e.g., via an increase in the search cost, c_U^s). This implies, ceteris paribus, that the uninformed citizens' net benefit of participating becomes negative, inducing some of these citizens to roll off the election ($\tau_U < 1$). That some uninformed citizens roll off the election has an effect on equilibrium outcomes since it changes the effective share of informed voters in the election. When τ_U goes down, the effective share of informed citizens and, hence, political competition increases, since the party that has committed to the lowest level of rents now gets a larger vote share (i.e., $g(\tau)$ goes down). Finally, the increased political competition for the informed citizens' votes pushes down the expected rents set by the parties and, hence, the expected voting costs of the uninformed citizens decreases; in political equilibrium the uninformed citizens are, again, indifferent to participating. The exact mechanisms by which a change in participation affects other equilibrium outcomes will become clear when we do comparative statics in the following section.

5 Comparative Statics

In this section we analyze the effects on the political equilibrium of changing the key voting cost parameters in the model. In particular, we analyze effects of changing

the level, c_U^s, and the distribution, μ, of the search costs. We also consider the effect of institutional reform, that is, a change in the degree of proportionality in the translation of vote shares into political decision power, as given by the shape of $g(\tau)$.

Whether there is full or partial participation in political equilibrium depends crucially on the voting costs, which is a combination of expected search costs and the expected disutility cost of voting for a party with high rents. In this section, we first analyze the cases with full and partial participation separately to highlight that the effects on equilibrium outcomes of changing costs depend on the (initial) level of participation. Then we join the two cases and show that there is a inversely U-shaped relationship between the parties' expected rent policy and the search cost.

5.1 Comparative Statics with Full Participation

In the following, we analyze the effects of changing search cost parameters when there is full participation, i.e., when the participation constraint (15) is not binding, implying $\tau_U = 1$.

The effects of changing the information search cost is then summarized in the following proposition.

Proposition 2 ***The search cost:*** *In political equilibrium with $\tau_U = 1$, an increase (decrease) in the search cost c_U^s:*

(i) increases (decreases) the reservation rent of the uninformed ρ_U;

(ii) increases (decreases) the lower bound, $\underline{r}$, and widens (narrows) the support $[\underline{r}, \bar{r}]$ of $F(\cdot)$;

(iii) increases (decreases) the parties expected rent policy $E[r]$.

Proof. See appendix A5. ■

Intuitively, a voter has less to gain from acquiring more information when this is more costly. Hence, when the search cost c_U^s is higher, the uninformed voters accept a worse policy without continuing their search for other and potentially better parties, implying a higher reservation rent ρ_U. That the reservation rent is higher implies that parties can commit to higher political rents and expect to get the same vote shares as before. Thus, the expected level of political rents set by the parties increases. We refer to this positive effect of search cost on the expected level of rent policies, through the incentives to search for information, as the *information effect*.

Increasing the search cost of the least informed voters, however, does not eliminate the competitive pressure on the parties to offer low rents due to the competitive "pull" of the fully informed voters. Hence, while the lower bound also shifts up, this shift is smaller than the shift of the upper bound when c_U^s increases, implying a wider equilibrium distribution of rents.

Then, in an election with full participation, and where obtaining information about parties is generally more costly (due to, e.g., a lack of freedom of the press or low internet coverage), the parties can offer, and get elected on, worse policy platforms from the citizens' point of view. This suggests that, if political parties could collaborate on the search cost, the information effect in isolation implies a joint incentive to keep this high, and we follow up on this point in the discussion in Section 6.1.

While the parameter c_U^s is a measure of the *level* of the search cost, the *distribution* of search costs in the population is pinned down by the share of the population with zero search costs, μ. Notice that, in the case of full voter participation, μ is identical to the *effective* distribution of information among the voters $\hat{\mu}$ (as opposed to the case of endogenous participation which we return to below), so $\frac{\partial g(\tau)}{\partial \hat{\mu}} = \frac{\partial g(\tau)}{\partial \mu} < 0$. The

effect of changing the distribution of voting costs on the political rents is summarized in the following proposition.

Proposition 3 ***The distribution of search costs****: In political equilibrium with* $\tau_U = 1$*, an increase (decrease) in the share of informed (uninformed) citizens* μ *(*$1-\mu$*):*

(i) decreases (increases) the reservation rent of the uninformed ρ_U*;*

(ii) decreases (increases) the parties expected rent policy $E[r]$*.*

Proof. See appendix A6. ■

When the share of informed citizens is larger, the parties' incentive to lower their rents strengthens since the party that offers the best policy from the voters' point of view will have, in expectation, more political power. Further, the uninformed citizens anticipate that the parties will compete harder for the votes of the informed citizens, expect to find a lower rent policy when searching, and thus have a lower reservation level of rents. Both these effects lead to a lower expected rents set by the parties in equilibrium. Hence, in an election with a larger share of citizens with low search costs (e.g., a large intellectual elite) the policies offered are better from the citizens' perspective. Notice that proposition 3 is consistent with $F(\cdot)$ shifting up for all r_i in the support, and that the support shifts to the left, when the share of informed citizens increases.

Generally, the transformation of vote shares into political decision power depends on the characteristics of the political institutions. In the current framework, institutions affect the aggregation of votes through $g(\tau)$. We let this transformation function be conditioned on an institutional index Υ and reformulate this function as $g(\tau_u|\Upsilon)$ when we analyze the effect of institutional change on the political equilibrium. Υ represents an index for the level of proportionality in the translation of votes into political decision power. We assume that a higher value of Υ corresponds to a higher effective level of proportionality, in the sense that the decision power of small parties increases, for any given vote distribution.[25]

Assumption 1 *Institutional characteristics and proportionality:* For any $\tau_u \in [0,1]$, if $\Upsilon_0 < \Upsilon_1$ then $0 < g(\tau|\Upsilon_0) < g(\tau|\Upsilon_1) < 1$.

Assumption 1 implies that a reform moving decision power away from the largest party and towards the smaller parties (in terms of vote shares)—e.g., from a majoritarian to a proportional electoral system—shifts $g(\tau|\Upsilon)$ up (for any value of μ).

Corollary 1 ***Institutional reform:*** *The parties expected rent policy in political equilibrium,* $E[r]$*, increases in the effective level of proportionality of the political institutions* Υ*.*

Assumptions 1 implies that the effect on $g(\tau|\Upsilon)$ of an increase in Υ is qualitatively similar to the effect of a decrease in μ. Then, since Υ and μ affect the political equilibrium exclusively via $g(\tau|\Upsilon)$, an increase in Υ must move expected rents in the opposite direction than an increase in μ (as described in Proposition 3).

Intuitively, when a party's political decision power is distributed proportionally to its vote share, as will be the case in a fully proportional system, there is relatively more to gain from setting high rents and gamble on getting some votes from the

[25] Generally, the translation of votes into political decision power depends on a combination of electoral rules and the form of government (see, e.g., Persson and Tabelini (2000)), hence, constitutional reforms may be considered as discrete shifts in Υ. The Υ index can further be interpreted in terms of observational proportionality indexes such as the (inverse of the) Gallagher (1991) index (assuming that decision power in the legislature is proportional to the respective parties' seat shares).

uninformed, compared to the case of a plurality ("first-past-the-post") system where decision power is concentrated in the hands of the largest party. Hence, the "pull from below" on the level of rents by the voting behavior of the informed citizens is weaker the more proportional is the translation of votes into legislative decision power. The effect of a reform towards a more proportional system on the expected rent policy of parties, thus, is qualitatively similar to a negative shift in the share of informed citizens.

5.2 Comparative Statics with Partial Participation

In this subsection we analyze effects of changes to the search cost parameters when some of the uniformed citizens choose to abstain, i.e. when $0 < \tau_U < 1$. The comparative statics are different than in the full participation case since, first, participation by the uninformed, τ_U, is sensitive to marginal changes in the other parameters and, second, the upper bound of the distribution is pinned down by (18), i.e. $\rho_U = d/(1 - g(\tau))$.

The effects of changing the cost of search for information is summarized in the following proposition.

Proposition 4 ***The search cost:*** *In political equilibrium with $\tau_U < 1$, an increase (decrease) in the search cost c_U^s:*

(i) decreases (increases) the participation of the uninformed citizens, τ_U, and, hence, decreases (increases) aggregate turnout and increases (decreases) the effective share of informed to uninformed voters in the election;

(ii) decreases (increases) the reservation rent of the uninformed ρ_U;

(iii) decreases (increases) the lower bound, $\underline{r}$, and keeps the width the support $[\underline{r}, \bar{r}]$ of $F(\cdot)$ constant;

(iv) decreases (increases) the parties expected rent policy $E[r]$.

Proof. See appendix A7. ■

The intuition why expected rents go down when the cost of acquiring information increases is that there is more competitive pressure due to abstention by the uninformed citizens. Higher search costs increases the expected cost of voting and thus makes the uninformed citizens more prone to abstain in the election. In turn, a higher expected abstention rate increases the expected effective share of informed to uninformed voters in the election. This again, increases the competitive "pull from below" by the most informed citizens on the parties' rent policies. We refer to this negative effect of search costs on the expected rents offered by the parties as the *participation effect*.

The information effect pulls expected rents in the opposite direction of the participation effect, as the uniformed, conditional on participation, have a weaker incentive to search for information when the search cost is higher. In total, though, the participation effect dominates. That rents is lower is anticipated by the uniformed anticipates and they decrease their reservation rent. Even though the expected disutility of voting is lower as expected rents are lower, this does not fully compensate the uninformed citizens for their higher search cost, so the expected cost of voting for these citizens increases. Hence, in political equilibrium, a higher cost of acquiring information implies a lower expected rents set by the parties and lower aggregate turnout in the election.

When considering the effect of changing μ, notice that this parameter refers to a population characteristic, as opposed to the function for the effective share of informed citizens in the election, $\hat{\mu}(\tau)$, which is an outcome variable. The effect of

changing the distribution of search costs on the political equilibrium is summarized in the following proposition.

Proposition 5 ***The distribution of search costs****: In political equilibrium with* $\tau_U < 1$*, an increase (decrease) in the share of informed (uninformed) citizens* μ *(*$1-\mu$*):*

(*i*) *increases (decreases) the uninformed citizens' propensity to participate in the election,* τ_U*;*

(*ii*) *does not change the reservation rent of the uninformed* ρ_U *or the parties expected rent policy* $E[r]$*.*

Proof. See appendix A8. ■

Notice that, even though expected rents do not change when μ changes, the participation rate of the uninformed citizens, τ_U, will change. Intuitively, when there are more informed voters in the population there is increased competitive pressure on rent policies as parties have more to gain form offering the best policy. Then, if expected rent policies are lower, more of the uninformed citizens will participate (i.e., τ_U will fall), which countervails the first effect as parties can exploit that there are more uniformed voters that do not directly compare rent policies. It turns out that the two effects offset each other exactly in political equilibrium, so that the parties' expected rent policies stay unchanged.

5.3 Summing up the effect of search cost

The full and partial participation cases in combination suggests a political equilibrium with two segments. Specifically, holding all other parameters constant, increasing the search cost from a low level, the expected rents offered by the parties will increase until the participation condition in (15) binds and then, as the search cost increases further, expected rents will start to decrease due to an increased abstention rate by the uninformed citizens. The following corollary summarizes this effect of search costs on rents.

Corollary 2 *In political equilibrium there is an inverted U-shaped relationship between the parties expected rent policy* $E[r]$ *and the search cost* c_U^s *.*

Proof. See appendix A9. ■

Let $\hat{c}_U^s$ denote the search cost threshold for full participation given by condition (17). Figure 2 below illustrates, first, the relationship between the search cost and participation (Figure 2a) and, second, between the search cost and the parties' expected rent policy (Figure 2b) in equilibrium. The participation threshold, $\hat{c}_U^s$, is illustrated by the vertical line cutting through both diagrams.

Figure 2a: Participation rate and search costs

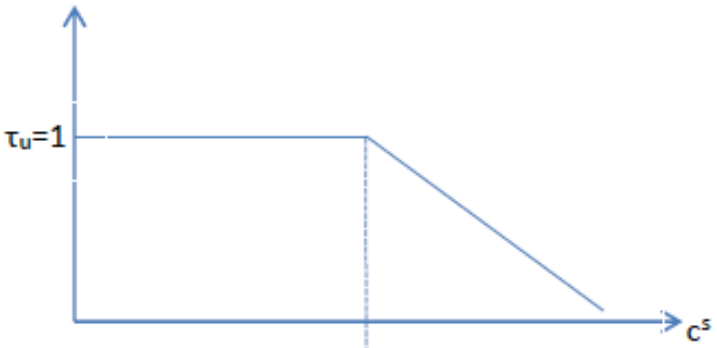
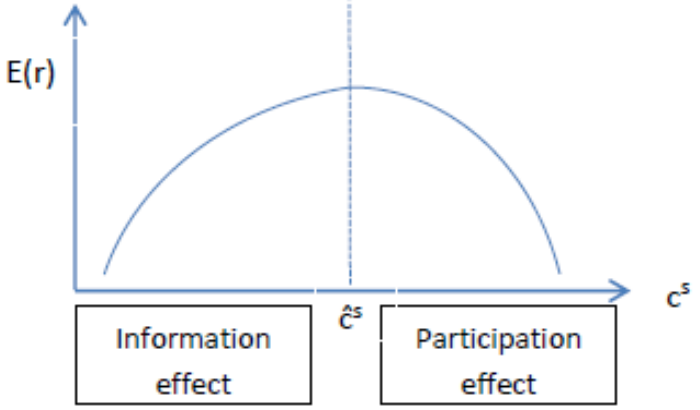


Figure 2b: Expected policies and search costs



From the illustration in Figure 2, we see that for costs lower than $\hat{c}_u^s$ (i.e., to the left of the vertical line), only the information effect is at work. In Figure 2b, as the search cost increases from a low level and toward the participation threshold, the uninformed continuously and monotonically increase their reservation rent for continued search, and the parties exploit this by increasing the level of political rents that they commit to (by shifting up their rent strategies). Notice however that, in the entire range to the left of the participation threshold, the expected cost of voting is sufficiently low to ensure full participation by all citizens at the election, as illustrated in Figure 2a.

Increasing the search cost beyond the participation threshold (i.e., crossing the vertical line in Figure 2), the participation effect kicks in immediately. At the participation threshold, the uninformed are just indifferent between participating and abstaining at full turnout, hence when increasing the search cost further, this indifference can only be sustained if the uninformed decreases their participation strategy τ_U: higher search costs increases the voting costs of the uniformed citizens and they become more inclined to roll off the election. This increases the effective share of informed voters and the level of political competition intensifies. In political equilibrium, the participation effect dominates the information effect, hence both the parties' expected rent policy and the participation rate of the uninformed are decreasing in the cost of information aquisition. We give more intuition for this result

further below when we discuss the information manipulation incentive of political parties.

6 Discussion

6.1 The Information Manipulation Incentive

The inverted U-shaped relationship between the parties expected rent policy and the search cost provides the parties with the incentive to collude against the citizens, by manipulating the information search cost. In our model, there is no mechanism by which the parties can act upon this incentive. However, one simple way of introducing an information manipulation mechanism would be to extend the model it into a simple two-period game, where an incumbent (any incumbent) is allowed to manipulate the search cost in the first period, and where all parties compete for votes, as before, to enjoy rents in the second period. For a sufficiently convex cost of manipulating the information search cost it is straightforward to show that any incumbent will have the incentive to manipulate the search cost so as to maximize the expected pay-off from entering into political competition. Exactly how much the search cost will change would generally depend on the incumbent's cost of information manipulation (and, potentially, how this cost is distributed among the partners in government in the case of a coalition), but the direction of change is: (i) unambiguously positive if the search cost is initially below the participation threshold; (ii) unambiguously negative if the search cost is initially above the participation threshold.

An immediate implication of the information manipulation incentive is, hence, that if the search cost is initially high, so that a positive share of citizens abstain from voting due to high costs of information acquisition, politicians have a joint interest in reducing citizens' information costs. In the model, doing so will increase parties' expected rents because it will incentivize more of the uninformed citizens to roll on to the election without increasing their intensity of information search. In other words, rent-seeking parties have the incentive to mobilize the masses to exploit their lack of information. To see this, notice that, on the one hand, the uninformed citizens will have the incentive to search for more information since information acquisition has become relatively cheaper. However, on the other hand, the increased participation by uninformed citizens influences the parties' trade-off, making it less costly to propose higher rents due to the increased electoral uncertainty caused by the increased share of uninformed citizens. In turn, when the parties' rent policies increase, this changes the uninformed citizens' expectations and makes them more prone to accept a party with higher rents without continuing the search for other parties (i.e., the uninformed citizens' reservation rent level goes up). This feeds back into the citizens' voting behavior by increasing their expected disutility of voting for a party with high rents. This second order effect on the citizens' expected costs of voting partly offsets the positive effect of reduced information search costs – however, the participation of uninformed citizens unambiguously goes up when the search cost decreases.

6.2 Taxes and political rents

As mentioned in Section 3, we interpret political rents broadly as some conflict of interest between politicians and citizens. This means that rents may also be implied by the overall level of taxation (as discussed by, e.g., Olken, 2007). Following Persson and Tabellini (2000), consider the government budget constraint given by

$$TY = G + r,$$

where T is the average tax rate, Y is the aggregate income, G is the government spending on public goods, and r is the level of political rents, as before. Then, if citizens have equal income and homogenous preferences, as in our main setup, there exists an optimal level of public goods, G^*, that all citizens agree upon. Since no party has the incentive to deviate from supplying G^*, it is clear that our model is isomorphic to political parties deciding on tax policies with political rents as a residual. This means that interpreting r as political rents, corruption, or government waste is, in the context of our model, theoretically equivalent. For instance, a party that spends more (costly) effort to lower the costs of financing the public sector through reform, might be able to provide the given G^* at a lower tax cost TY. Then, it is natural to interpret r as the overall amount of government waste. Bandiera et al. (2009) discusses different forms of government waste, and our interpretation of r is consistent with their notion of *active waste*: the type of waste that "... entails utility for the public decision maker ..." (p. 1278). Yet another alternative intepretation of r consistent both with our main setup, the tax setup, and the notion of active waste, is that r reflects the wages and pecuniary benefits to the government's friends and allies.

It could be interesting to analyze a model where taxes also have a redistributive effect, in addition to rent extraction. In such a setting, the trade-off of the parties will remain the same; high expected vote share against expected payoff from political rents. However, the perceived cost of rents (taxation) will be heterogeneous among citizens, which may influence equilibrium outcomes. To analyze heterogenous agents in our framework is a venue for future research.

6.3 Ideology and Partisanship

Citizens and politicians are homogeneous in our model. While we believe that our main mechanisms and main results also will be relevant in a multidimensional policy setting, adding additional dimensions might affect the equilibrium in different ways. For instance, it is natural to think that citizens may care about a policy on an ideological Left-Right (L-R) dimension, in addition to political rents. We can think of rents as a non-policy preference, as is typical in the valence-models of spatial competition. If politicians only care about rents, then, when placing themselves on the L-R dimension, they will clearly face the same trade-off as in the current model between rents and vote share, however, there will be a pull towards the median voter rather than low rents. More interesting results might emerge if also politicians have preferences over polices. In this case, the parties will face an additional trade off between its own ideological bliss point and vote share. We plan to explore these ideas in future research.

6.4 Noisy Rather Than Sequential Search

Search is sequential in our model; one search action gives one policy observation. Instead, one could imagine that each search gives more than one policy observation (e.g. by reading a fair and balanced newspaper). We could capture this by a 'noisy search' technology where one search gives one observation for sure pluss a chance of one more observation (Burdett and Judd, 1983). Using such noisy search, while keeping a share μ with zero search costs and the remaining $1-\mu$ with positive search cost, would mean that the expected gain of a search for the uniformed citizen is higher, than, ceteris paribus, with sequential search. Though there would still be an optimal reservation rent, the trade-offs of both citizens and parties would remain, and there would be a distribution of rent policies in political equilibrium. However, some of the uninformed, still only doing one search, would observe more than one rent

policy and then from a political party's perspective be as an informed voter, and the competitive pressure would be higher, and we conjecture that the parties expected rent policy would be lower than with sequential search, for given parameters.

Alternatively, one could assume that all citizens have the same search costs in a noisy search model. Then the probability of which more than one policy is observed from a serach action would in effect be the share of informed citizens in the election, at least from the parties perspective, and there would be a distribution of rents in political equilibrium.

7 Conclusion

We propose and analyze an equilibrium theory of political rents with electoral competition of multiple parties, where citizens endogenously search for information about the parties' rent policies as well as optimally decide whether to participate or abstain in the election. A key parameter in our model is the cost of searching for information about the parties' political rents, and main findings are that: (i) the political equilibrium is characterized by a distribution of rent policies; (ii) the parties' expected rent policies are inversely U-shaped in the citizens' costs of information aquisition.

The inverted U-shaped relationship between the information search cost and the expected level of rents is due to two competing effects: the information effect, by which a higher search cost makes citizens more inclined to vote for a party with high rents rather than searching for more information to potentially find another party with lower rents; the participation effect, which is only relevant at sufficiently high level of information search costs, and which implies that even higher search costs make the least informed citizens more likely to abstain from voting. In the segment of the equilibrium where the participation effect is relevant (i.e., when the search cost is higher than the participation threshold), the participation effect dominates the information effect, explaining the downward sloping part of the inversely U-shaped relationship between the search cost and the parties' expected rent policies.

Our theory's predictions are consistent with the observations that both the level *and* the variance of political corruption is higher in elections with a less informed electorate, as illustrated in Figure 1, which is based on cross-sectional data from U.S. states. Moreover, our theory is consistent with the observation that a higher level of political corruption is positively correlated with voter turnout, as has been documented for the cases of both U.S. county and state elections (e.g., Escaleras et al., 2012, and Karahan et al., 2006). We are not aware of any other equilibrium theories of political rents that can explain these patterns within a unified framework.

Although the interpretation of political rents in our theory is broad – ranging from active government waste to outright political corruption – there are several important issues that we do not explicitly address. In particular, we do not analyze how partisan politics and/or ideological voters and parties would affect the political equilibrium. We intend to pursue these issues in future research.

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Appendix

Note: In this Appendix we will, for convenience, simplify notation by using $g \equiv g(\tau)$ throughout, noting that $\frac{dg}{d\tau_U} > 0$ (and also that τ_U is endogenously determined).

A1 Proof of Lemma 1: Uninformed takes only one search

Let ρ_I and ρ_U exist in equilibrium, satisfying $\rho_I \leq \rho_U$. If all parties set $r_i \leq \rho_U$, then the uniformed citizens, conditional on participating, will optimally stop searching after the first policy is observed. In equilibrium no party will set $r_i > \rho_U$. By contradiction consider a party j setting $r_j > \rho_U$. Then it will not get any uninformed votes. For the informed votes there are two case to consider. First, if some other party $-j$ set $r_{-j} \leq \rho_U$, party j will not get any of the informed votes either. In this case, party j is (strictly) worse off committing to r_j than any other policy in the range $[\underline{r}, \rho_U]$ (this result follows from $\overline{\Pi} > 0$, as will be shown to be the case in equilibrium). Second, if all other parties set $r_i > \rho_U$, no party will get uninformed votes and the best response for each party is to undercut the others rents to capture all the informed votes. In this case, Bertrand-type competition implies that $r_i > \rho_U$ cannot be an equilibrium (rents would be competed down to at least ρ_U) and, thus, need not be considered.

A2 Proof of Lemma 2: At least some uninformed participate

By contradiction let $\tau_U = 0$ in an equilibrium where at least some of the informed participate. First, it cannot be the case that $r_i > r_{-i} \geq 0$ for a party i, since the party will get zero votes and can raise Π by setting r_i between 0 and r_{-i}. Next, it neither can be the case that $r_{-i} > r_i \geq 0$ for a party i, since it can set r_i between r_i and r_{-i}, keep the votes, and increase Π. Last, nor can it be the case that $r_i = r_{-i} > 0$, since any party could rise Π by reducing their rent policy. The only possible equilibrium is then that all parties set rents equal to zero. However, when equilibrium rents are zero, we have $E[r] = \underline{r} = 0$, and from (7) it follows that $d - c = D - c_U^s > 0$. Hence, the uninformed citizens would benefit of deviating from $\tau_U = 0$, by searching for a party and participating in the election.

Note that we do not consider the trivial equilibrium with $\tau_U = 0$ and $\tau_I = 0$.

A3 Deriving $F(r_i)$ and $\underline{r}$

$F(r_i)$ is derived by setting $\Pi(r_i, F(r_i), \tau) = \Pi(\bar{r}, F(\bar{r}), \tau)$. First note that $F(\bar{r}) = 1$. Then, using (9), we have

$$r_i \left[[1 - F(r_i)]^{N-1} \gamma_L(\hat{\mu}(\tau)) + \left(1 - [1 - F(r_i)]^{N-1}\right) \gamma_S(\hat{\mu}(\tau)) \right] = \bar{r}\gamma_S(\hat{\mu}(\tau)) \quad (19)$$

$$r_i \left[g + (1-g)[1 - F(r_i)]^{N-1} \right] = \bar{r}g,$$

where $g \equiv \frac{\gamma_S(\hat{\mu}(\tau))}{\gamma_L(\hat{\mu}(\tau))}$. Next solving (19) for $F(r_i)$ gives $F(r_i) = 1 - \left[\frac{g}{1-g} \frac{(\bar{r} - r_i)}{r_i} \right]^{\frac{1}{N-1}}$.

The lower bound of the distribution $F(r_i)$ is defined by $F(\underline{r}) = 0$, which gives

$$1 - \left[\frac{(\bar{r} - \underline{r})\, g}{\underline{r}\,(1-g)} \right]^{\frac{1}{N-1}} = 0$$

$$\Longrightarrow$$

$$\underline{r} = g\bar{r}.$$

A4 Proof of Proposition 1: Existence and uniqueness

First, we show existence, i.e. that condition (17) holds. To this end, note that g is a continuous function of τ_U, and construct the function $\xi(g) = \frac{1}{1-g}\left[1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right]$ from the LHS of (17). We then analyze the properties of this function on the domain $g \in (0,1)$. The first term of $\xi(g)$ is continuous and increasing in g. For the second term, note that $\frac{d}{dg}\left[\int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right] = \frac{1}{g^2}\int_0^1 \frac{z^{N-1}}{\left[1+\frac{1-g}{g}z^{N-1}\right]^2}dz > 0$, so $1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}$ is continuous and decreasing in g. Evaluating $1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}$ as g approaches zero gives $\lim_{g\to 0^+}\left[1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right] = 1$ (also note that $\lim_{g\to 1^-}\left[1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right] = 0$), and we see that $\lim_{g\to 0^+}\xi(g) = 1$. Then, regardless of $\lim_{g\to 1^-}\xi(g) \lesseqgtr 1$, it follows from the Intermediate-Value Theorem that we can pick at least one value for $\frac{c_U^s}{D}$ such that $\xi(g) \geq \frac{c_U^s}{D}$. For later use, note that we have also established that $1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}} > 0$ and thus $\xi(g) > 0$.

Second, we show uniqueness. Since, g is a continuous and increasing function of τ_U, it is sufficient for uniqueness to show that $\xi(g)$ is a monotonic function on the domain $g \in (0,1)$. The following lemma, then, gives our result.

Lemma 4 $\frac{d\xi(g)}{dg} = \frac{d\left(\frac{1}{1-g}\left[1-\int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right]\right)}{dg} < 0$ *on* $g \in (0,1)$.

Proof. We need to show that

$$\begin{aligned}
\frac{d\xi(g)}{dg} &= \frac{d\left(\frac{1}{1-g}\left[1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right]\right)}{dg} \\
&= \frac{1}{(1-g)^2}\left[1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right] - \frac{1}{1-g}\frac{1}{g^2}\int_0^1 \frac{z^{N-1}}{\left[1+\frac{1-g}{g}z^{N-1}\right]^2}dz \\
&= 1 - \int_0^1 \left(\frac{\left[1+\frac{1-g}{g}z^{N-1}\right]g^2}{\left[1+\frac{1-g}{g}z^{N-1}\right]^2 g^2} + \frac{(1-g)}{g^2}\frac{z^{N-1}}{\left[1+\frac{1-g}{g}z^{N-1}\right]^2}\right)dz \\
&= 1 - \int_0^1 \left(\frac{g^2 + (1-g^2)z^{N-1}}{\left[g+(1-g)z^{N-1}\right]^2}\right)dz,
\end{aligned}$$

is smaller than zero. To this end define the function $h(g) = \int_0^1 \left(\frac{g^2+(1-g^2)z^{N-1}}{[g+(1-g)z^{N-1}]^2}\right)dz$ on the domain $g \in (0,1)$. To establish $\frac{d\xi(g)}{dg} < 0$, it is sufficient to show that $h(g) > 1$. We show this in two steps. The first step is to evaluate $h(g)$ at the limits of the domain. At the lower limit we have $\lim_{g\to 0^+} h(g) = \int_0^1 \frac{1}{z^{N-1}}dz = \begin{cases} \left|_0^1 \frac{1}{2-N}z^{2-N}\right. & \text{if } N>2 \\ \left|_0^1 \ln z\right. & \text{if } N=2 \end{cases} > 1$. At the upper limit we have $\lim_{g\to 1^-} h(g) = \int_0^1 dz = 1$. Hence, $h(g)$ is always bigger than 1 if $h(g)$ is monotonically decreasing in g. The second step is then to show that

$\frac{dh(g)}{dg} < 0$. This derivative can be written:

$$\frac{dh(g)}{dg} = \int_0^1 \left(\frac{\left[2g - 2gz^{N-1}\right]\left[g + (1-g)z^{N-1}\right]^2 - \left[g^2 + (1-g^2)z^{N-1}\right] 2\left[g + (1-g)z^{N-1}\right](1-z^{N-1})}{\left[g + (1-g)z^{N-1}\right]^4} \right) dz$$
$$= \int_0^1 \left(\frac{2(1-z^{N-1})(g-1)z^{N-1}}{\left[g + (1-g)z^{N-1}\right]^3} \right) dz.$$

Note that the numerator of the integral, $2(1-z^{N-1})(g-1)z^{N-1}$, is negative on the interval $z \in [0,1]$ for all $g \in (0,1)$, while the denominator is positive. It then follows that $\int_0^1 \left(\frac{2(1-z^{N-1})(g-1)z^{N-1}}{[g+(1-g)z^{N-1}]^3} \right) dz < 0$. ■

A5 Proof of Poposition 2: Comparative statics of c_U^s when $\tau_U = 1$

We prove each part in turn. Note that g is not a function of c_U^s, so g is constant for a given τ_U. Part (i): For a given g, it follows from (14) that $\frac{d\rho_U}{dc} > 0$, where $c \equiv \frac{c_U^s}{c^v}$.

Part (ii): The supremum increases in c_U^s since $\bar{r} = \rho_U$, and we have established $\frac{d\rho_U}{dc} > 0$. From (11) it then follows that $\underline{r}$ increases, where $\underline{r}$ increases by less than $\bar{r}$ since $g < 1$.

Part (iii): For a given g, it follows from (13) that $\frac{dE[r]}{d\rho_U} > 0$. Then since we have established $\frac{d\rho_U}{dc} > 0$ in Part (i), it follows that $E[r]$ is a continuous function increasing in c_U^s.

A6 Proof of Poposition 3: Comparative statics of μ when $\tau_U = 1$

To show Part (i), first note that $\frac{d\left[\int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right]}{d\mu} = \frac{1}{g^2}\frac{dg}{d\mu}\int_0^1 \frac{z^{N-1}}{\left[1+\frac{1-g}{g}z^{N-1}\right]^2}dz < 0$, where the sign follows from that the integral is positive while $\frac{dg}{d\mu} = \frac{\partial g}{\partial \hat{\mu}} < 0$, for given τ_u. Then, using this, it follows from (14) that $\frac{d\mu}{d\rho_U} < 0$.

Then, using (13), Part (ii) is show by the differential

$$\frac{dE[r]}{d\mu} = \frac{d\rho_U}{d\mu}\int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}} + \rho_U \frac{d\left[\int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right]}{d\mu} < 0,$$

where the sign follows from that the integral is positive while both $\frac{d\mu}{d\rho_U}$ and $\frac{d\left[\int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right]}{d\mu}$ are shown to be negative.

A7 Proof of Poposition 4: Comparative statics of c_u^s when $\tau_u < 1$

We prove each part in turn. Part (i): From Lemma 4 we know that the LHS of (17) is decreasing in g, and thus in τ_U since $\frac{dg}{d\tau_U} > 0$. Hence, when c_U^s/D shifts up, τ_U must go down for (17) to hold.

Part (ii): The reservation rent of the uninformed decreases in c_U^s, since $\rho_U = \frac{d}{1-g}$ is increasing in g together with that we have established $\frac{dc_U^s}{dg} < 0$ in Part (i).

Part (iii): The infimum is given by $\underline{r} = g\bar{r} = g\rho_U$. From the results in Part (ii) toghether with $\frac{dc_U^s}{dg} < 0$, it then follows that the infimum also decreases. However, the width of the support is invariant as $\bar{r} - \underline{r} = d$.

Part (iv): Combining (18) with (13), expected rents can be written

$$E[r] = \frac{d}{1-g}\int_0^1 \frac{1}{1+\frac{1-g}{g}z^{N-1}}dz. \tag{20}$$

Next, note that (20) implies that $E[r]$ is a continuous function that is monotonically increasing in g (and thus in τ_u), since $\frac{dE[r]}{dg} = \frac{d}{(1-g)g^2}\int_0^1 \frac{z^{N-1}}{\left[1+\frac{1-g}{g}z^{N-1}\right]^2}dz + \frac{d}{(1-g)^2}\int_0^1 \frac{1}{1+\frac{1-g}{g}z^{N-1}}dz > 0$. Having established that $\frac{dc_U^s}{dg} < 0$ in Part (i), the result then follows.

A8 Proof of Poposition 5: Comparative statics of μ when $\tau_u < 1$

To show that $\frac{d\tau_U}{d\mu} > 0$, first recall that proposition 1 gives an unique g for a given set of parameters, and that g is pinned down by (17). Since μ only appears in (17) through g, we then know that g cannot change in equilibrium, i.e. $\frac{dg}{d\mu} = 0$. It then follows that $\frac{d\hat{\mu}}{d\mu} = 0$, since g is a function of $\hat{\mu}(\tau_U)$ with $\frac{\partial g}{\partial \hat{\mu}} \neq 0$ on its domain. Next, the total derivative of $\hat{\mu}(\tau_U) = \frac{\mu}{\mu+(1-\mu)\tau_U}$ is $\frac{d\hat{\mu}}{d\mu} = \frac{[\mu+(1-\mu)\tau_U]+\mu\tau_U}{[\mu+(1-\mu)\tau_U]^2} - \frac{\mu(1-\mu)}{[\mu+(1-\mu)\tau_U]^2}\frac{d\tau_U}{d\mu}$. Last, setting $\frac{d\hat{\mu}}{d\mu} = 0$ in the total derivative we get the result as $\frac{d\tau_U}{d\mu} = \frac{\mu+\tau_U}{\mu(1-\mu)} > 0$.

Part (ii) follows directly from that μ only appears in (18) and (20) through g, together with that we have established $\frac{dg}{d\mu} = 0$.

A9 Proof of Corollary 2: The inverse U-shape

Let $\hat{c}_U^s$ denote the search cost threshold for full participation given by condition (17), $\hat{c}_U^s = \frac{1}{1-g}\left[1 - \int_0^1 \frac{dz}{1+\frac{1-g}{g}z^{N-1}}\right]D$, where $c_U^s \leq \hat{c}_U^s$ implies $\tau_U = 1$ and $c_U^s > \hat{c}_U^s$ implies $\tau_U < 1$. We need to show that $E[r]$ is continuous at $\hat{c}_U^s$. First note that we have, in the proof of Proposition 2, established that $E[r]$ is continuous and increasing in c_U^s when $\tau_U = 1$. At the threshold $\hat{c}_U^s$ the participation condition (7) holds with equality, and since (6) also must hold, it follows that the reservation policy is ρ_U is given by (18). Then $E[r]$ at the threshold $\hat{c}_U^s$ (with $\tau_U = 1$) is given by combining (18) and (13):

$$E[r] = \frac{d}{1-g}\int_0^1 \frac{1}{1+\frac{1-g}{g}z^{N-1}}dz,$$

which is the same expression for expected rents as when $\tau_U < 1$. Then we have the result that we established, in the proof of Proposition 4, that $E[r]$ is a continuous function that is monotonically increasing in τ_U, and that $\frac{dc_U^s}{d\tau_U} < 0$.