Corruption and the Effort Trap: Credibility, Beliefs, and Effective Time Preferences

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Abstract

This paper studies how political corruption affects private economic behavior through expectations about public good provision. In environments where public infrastructure and private effort are complementary, uncertainty about state reliability can depress forward-looking private initiative – even when agents are fully rational. We develop a political economy model of electoral competition in which a voter chooses both a candidate and an effort level for a private project. Political parties differ by type (corrupt or benevolent) and strategically announce budget allocations between transfers and public goods. The model yields multiple Perfect Bayesian Equilibria (PBEs), both in pure and mixed strategies. We apply the Intuitive Criterion to refine the PBEs and show that a unique pooling PBE survives the refinement for each parametric configuration. We find that the association between equilibrium expected corruption and the voter's prior belief about the political parties being corrupt is non-monotonic. Competition between similar parties (weakly) increases corruption and (weakly) decreases voter's utility. Corruption in an affluent society is higher, while, a less-affluent society remains in a low effort trap with a higher probability.

Keywords: Corruption, Public Goods, Private Investment, Political Economy

JEL Codes: D73, H41, O12.

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1 Introduction

Political corruption affects citizens not only by limiting access to quality public goods but also by shaping their perceptions of the returns to private investment. These returns typically increase with improved public infrastructure and decline in environments where corruption is prevalent. When individuals perceive such returns as weak or uncertain due to poor governance, they may rationally reduce their effort and investment. In this way, corruption influences societal outcomes not only through diminished public goods but also by distorting individual effort choices, suppressing private economic activity, and more broadly, altering forward-looking private behavior.

This paper develops a political economy model to formalize this indirect channel through which corruption affects private decision-making. It focuses on the rational adjustment of individual effort in response to uncertainty about public goods provision. Specifically, we examine how (perceived) corruption shapes expectations about the effectiveness of personal effort in generating future outcomes, in settings where private initiative and public infrastructure are complementary inputs. This leads individuals to assign lower expected returns to forward-looking investments. In this sense, corruption depresses private initiative by inducing an effective shift in how the future is valued, not due to intrinsic impatience, but as a rational response to uncertainty regarding the state's reliability.

To formalize, we develop a political economy framework of electoral competition in which political parties choose policies strategically, balancing their preferences over electoral success and policy outcomes. The voter, meanwhile, is uncertain about the political environment and the likelihood of corruption, and must choose both a candidate and an effort level for a private project. The return to this project depends on public infrastructure, which is determined by the elected party's budget allocation and its type. Political parties can be of two types: corrupt or benevolent. A corrupt party, if elected, fully extorts the funds allocated to public goods, whereas transfers are assumed to be non-extractable[1]. A benevolent party values voter welfare and incorporates it into its objective. Both types care about winning the election and choose policy allocations between public goods and transfers strategically.

We consider an election between two candidates. Each candidate can be either corrupt or benevolent and candidate's type is private information. The prior belief over each candidate's

[1] We believe that it is more difficult for a political party to renege on an electoral promise regarding private transfer because the future electoral cost is likely to be heavy. However, for funds allocated to the public good, auditing by voters is near impossible and the politician can always blame other factors like inefficient bureaucracy for the low quality of public goods. For this paper, we assume that the politician, if corrupt, fully extracts the funds allocated for the public good. However, qualitatively our results will go through even if we allow for imperfect public audit of funds allocated for provision of public goods.

types is common knowledge. At the beginning of the game, both candidates simultaneously announce a budget allocation between public goods and transfers. Based on these announcements and her belief about the candidates' types, the voter elects a candidate and chooses an effort level for her private project. The return to this investment is realized in the next period and depends on both her effort and the actual provision of public goods. Since the voter does not know the elected party's true type when choosing effort, her decision is guided by her posterior belief – shaped by the prior and the policy announcements.

We find that the voter's optimal effort increases with the promised level of public good provision and decreases with perceived corruption. This is because greater infrastructure support enhances the return to private effort. In particular, the marginal return to effort rises with the expected level of public good provision. Consequently, effort increases either when the promised amount is higher, or when the likelihood of delivery is greater – that is, when perceived corruption is lower. The election outcome depends on the priors about the candidates and their policy announcements.

In our model, there are multiple Perfect Bayesian equilibrium (PBE) both in pure and mixed strategies for all values of the prior. For refinement of the set of equilibria, we apply the intuitive criterion and find that, for each prior, a unique PBE survives. In this unique equilibrium, the corrupt and the benevolent types always pool and thus the voter's posterior coincides with the prior. When the prior about a candidate being corrupt is above a threshold – both types of that candidate allocate the entire budget to private transfer. If the prior about the other candidate being corrupt is also above the threshold, in the unique equilibrium surviving the intuitive criterion, both candidates allocate their budget to private transfer keeping zero allocation for public good provision. The voter may vote for either candidate with non-zero probability, and both ex-post and ex-ante equilibrium corruption is zero.

If the prior about the other candidate being corrupt is below the threshold, that candidate wins the election with probability one. However, two types of equilibrium emerge in such a situation. If the prior about the winner being corrupt is sufficiently low – below another threshold, both types of winner choose the first best transfer. Since the allocation to the public good remains same in this range of priors, ex-post corruption remains constant but ex-ante expected corruption rises as the prior probability of the winner being corrupt rises. On the other hand, if the prior about the winner being corrupt is moderately high - in between the two thresholds - only a pooling equilibrium with a positive allocation to the public good that makes the voter slightly better off than the zero public good offer by the first candidate survives the refinement.

Crucially, when the priors for both candidates fall short of the higher threshold, the candidate with higher prior announces a positive amount of public good. However, for the other candidate a new threshold dependent on the prior about the first candidate emerges. If the prior about the second candidate is lower than this new threshold, the first best transfer is chosen and the second candidate with probability one. However, in case the prior is above this new threshold, more than first best transfer is chosen. Once again, in this equilibrium, the voter votes for the candidate with lower prior with probability one.

Our results suggest that both ex-post as well as expected corruption is lower for high values of the prior. This result is driven by electoral competition between the candidates. Intuitively, when the candidates are relatively similar (priors about the candidates are close) with the priors being high, stiff electoral competition from a not so dissimilar competitor forces both candidates to allocate higher portion of budget to transfers - funds that cannot be expropriated - thus reducing ex-post corruption. On the other hand, when the priors about the candidates are far apart, the voter votes with probability one for the candidate with lower prior, allowing the corrupt winner to leverage its private information more to extract rent.

In our model, lower corruption doesn't necessarily bode well for the voter since it reduces the expected provision of public good which in turn decreases the future return from private investment/effort. Thus, in an environment of political corruption, even when the actual corruption is low, the voter discounts the future more heavily since the expected future return from privately costly effort is low given the complementarity between private effort and the level of public good. We argue that in the presence of electoral competition and uncertainty about the type of political parties, this effect is stronger since even a benevolent politician in its bid to win the election commits to higher private transfer lowering public good provision. The resulting lower future return to effort changes the effective time preference of the voter.

While the model is fully rational, the prior belief about the candidates' type may reflect social context, networks, or persistent biases – shaped by structural or cultural forces. This highlights a broader implication: societies with pessimistic priors may rationally perpetuate low effort and poor governance, even in the presence of reformist candidates – trapping themselves in self-sustaining cycles of low trust and underdevelopment.

In a nutshell, this paper highlights a key implication of political corruption: When public infrastructure and private effort are complements, even rational agents may reduce effort in response to uncertainty about state reliability. By embedding this mechanism within a model of electoral competition, the paper shows how beliefs about political integrity can shape both policy outcomes and private economic behavior – offering an explanation for persistent development gaps across otherwise similarly endowed societies.

1.1 Related Literature

This paper relates to a wide range of research on political corruption, electoral competition, and the effects of governance on private economic behavior. These works of literature collectively highlight both the direct impact of corruption on public good provision and its indirect consequences on citizen behavior, investment, and trust. By drawing from and connecting these strands, our paper develops a framework in which perceptions of corruption shape both electoral outcomes and individual effort decisions, offering a novel explanation for persistent underdevelopment.

A large body of work investigates how corruption shapes electoral incentives and political strategies. Acemoglu et al. (2013) argue that when voters perceive politicians as potentially corrupt, even honest ones may adopt "populist" policies as a signaling device. Our analysis parallels this result, showing that when corruption perceptions are high, even a benevolent party may choose inefficient allocations to reassure voters and secure electoral victory. Building on this, Afridi et al. (2024) shows that in environments with high political uncertainty, particularly in developing democracies, greater electoral competition may actually increase corruption. In contrast, our model generates the opposite implication under certain beliefs: when parties are perceived as similar, competition reduces ex-post corruption, though at the cost of depressing public good provision and consequently private initiative. Classical theoretical contributions such as Coate and Morris (1995) highlight how limited information about policy effects channels transfers to targeted groups, while Mani and Mukand (2007) show that governments often neglect essential but less visible public goods in favor of projects that more directly secure electoral benefits. Our framework complements these accounts by showing how such distortions feed not only into political equilibria but also into forward-looking individual behavior.

A related literature emphasizes the role of policy credibility and commitment problems. Alesina (1988) demonstrates that in the absence of credible commitment mechanisms, policy announcements that stray too far from a politician's preferred outcome lack credibility, making it rational for parties to converge to their ideal platforms. Our approach instead incorporates partial commitment: transfers are credibly enforceable, while promises of public goods are more vulnerable to deviation by corrupt types. This asymmetry is central to our findings, since it implies that voters rationally discount promised public goods when corruption risk is high. Empirical support comes from the comparative politics literature, which shows mixed effects of competition on corruption: while in Western democracies competition generally reduces corruption (Svaleryd and Vlachos, 2009; Besley et al., 2010), in developing country settings characterized by uncertainty, higher competition does not always yield better governance (Afridi et al., 2024).

Another strand explores how corruption interacts with aspirations and forward-looking investment behavior. Genicot and Ray (2017) develop a seminal model in which aspirations act as socially determined milestones, encouraging investment when moderately above current status but causing frustration and inaction when set too high. Dalton et al. (2016) extend this logic to show how poverty exacerbates aspiration failure and leads to self-sustaining poverty traps. Our paper ties these insights to the political environment: we demonstrate that even absent heterogeneity or behavioral traps, rational agents may reduce effort when corruption undermines confidence in infrastructure provision. This mechanism produces low-effort equilibria that echo aspiration traps but arise from political uncertainty rather than psychology or poverty alone.

Research on trust in political institutions further supports the link between corruption perceptions and individual behavior. Martin et al. (2020) shows through survey experiments in the U.S. that signals of honesty significantly boost political trust, while signals of corruption have weaker effects, likely due to already low baseline expectations. Similarly, Torcal and Christmann (2021) demonstrates that in Spain, perceptions of corruption and lack of responsiveness are more important drivers of declining political trust than economic outcomes. Studies in China highlight the nuanced effects of anti-corruption campaigns: Wang and Dickson (2022) and Fang et al. (2025) both find that transparency efforts can backfire if citizens learn that corruption is deeper than expected, reducing rather than increasing trust. Rothstein and Eek (2009), in experimental work, and Correa and Jaffe (2015), using multiple rounds of the European Social Survey (2002–2012) data, show that perceptions of corruption erode not just trust in political elites but also generalized social trust, both of which are critical for sustaining cooperative investments in society. Our analysis builds on this literature by showing how rational expectations of corruption translate into intertemporal discounting, systematically lowering private investment even absent changes in income or preferences.

At the macroeconomic level, extensive work has documented corruption's influence on growth, investment, and public spending. Mauro (1995, 1996) demonstrates that corruption reduces economic growth by discouraging private investment and biasing public expenditures away from human capital sectors such as education or health. Tanzi and Davoodi (1998) complement this by showing that corruption leads governments to prefer large, capital-intensive projects with greater opportunities for rent extraction, at the expense of maintenance and efficiency. Bardhan (1997) provides an influential survey of the multiple channels through which corruption hampers economic development, while his later work on decentralization (Bardhan and Mookherjee, 2005, 2006a,b) explores how local autonomy interacts with corruption incentives. More recent empirical contributions (Correa and Jaffe, 2015; Liu and Chen, 2022) reinforce these findings, showing strong correlations between corruption, inequality, and long-term underdevelopment. Importantly, micro-level studies (Choi and Thum, 2004; Svensson, 2003, 2005) show that firms facing corruption adapt not by investing more but by strategically underinvesting or choosing flexible but less efficient technologies, mirroring the mechanism in our model where corruption perceptions lower equilibrium effort.

Taken together, this body of literature highlights critical aspects of how corruption shapes political choices, institutional trust, and economic outcomes. Yet, an important gap remains: most models treat citizens as passive consumers of state policies, focusing either on electoral equilibria or on macroeconomic growth outcomes. Our contribution is to formalize an additional and subtle mechanism linking political corruption to private behavior. Specifically, we show that when private returns depend on public infrastructure, uncertainty about government reliability rationally suppresses individual effort. Embedding this mechanism within a model of electoral competition with type uncertainty, we connect the literature on political corruption, credibility, aspirations, and development. In doing so, we explain why corruption may depress economic activity beyond its direct fiscal effects, and why societies with similar endowments diverge in development outcomes due to differences in political trust and expectations.

The remainder of the paper is organized as follows. In Section 2, we introduce the formal model. Section 3.1 analyzes the voter's optimal choice of effort given the policy announcements and her posterior belief. Section 4 analyzes the social planner's problem. In Section 5, we solve the voting game for the entire range of prior beliefs. Section 6 analyzes the comparative statics and expected corruption across different levels of prior belief. Section 7 concludes the paper with a discussion.

2 The Model

We develop a political economy framework with two political parties and a median voter.[2]

Each candidate proposes a policy by announcing how a fixed public budget will be allocated between a direct transfer to the voter and an investment in public infrastructure. While there is no commitment problem regarding the transfer – the elected party always delivers the promised amount – there is no such guarantee for the infrastructure component. A party may misappropriate the portion allocated to public goods if doing so yields higher utility, depending on its type.

A political party can be one of two types: corrupt or benevolent. Regardless of its type, the political party values electoral victory and derives a positive utility from winning. A corrupt party misappropriates the entire amount allocated to infrastructure, delivering only the announced

[2]We do not consider voter heterogeneity in order to focus on the distortion in private effort caused purely by corruption.

transfer. In contrast, a benevolent party puts a positive weight $\alpha \geq 0$[3] on the voter's utility.

While the realized types of both parties are private information, it is common knowledge that party i is corrupt with probability $\lambda_i \in [0,1]$, where $i = \{1,2\}$. Without loss, we assume that $\lambda_1 \geq \lambda_2$.

After observing the policy announcements, the voter updates her belief about the types of the political parties and votes to maximize her expected utility. In addition, she exerts effort on a private project whose return depends both on her effort and on the level of public infrastructure provided by the elected party.

Next, we describe the timeline.

2.1 Timeline

Nature draws a type for political party i – corrupt with probability λ_i and benevolent with the complementary probability. Each political party privately observes its type and simultaneously announces policy, the amount of direct transfer t_i from the set $[0, B]$. The rest it pledges to allocate to the public good; however, in case the elected party is corrupt, it misappropriates the entire amount it pledged for the public good.

The voter observes the policy announcements of both parties t_i and t_j, updates her belief about the types of political parties, votes, and chooses an effort level for a private project. The return to this effort is realized in the next period and depends on the level of public infrastructure provided by the elected candidate.

2.2 Strategies, Beliefs, Payoffs

A strategy for political party i, where $i \in \{1,2\}$, specifies, for each possible type of the party (corrupt and benevolent), a probability distribution over the feasible set of transfers $t_i \in [0, B]$. Denote these as $\sigma_i^{\text{corrupt}}(t_i) \equiv \sigma_i(t_i|\text{corrupt})$ and $\sigma_i^{\text{benevolent}}(t_i) \equiv \sigma_i(t_i|\text{benevolent})$, respectively.

Given the announcements of both political parties, t_1 and t_2, the voter's strategy is to choose a probability of voting for party 1, denoted $\sigma_v(t_1, t_2)$. She votes for party 2 with the complementary probability. The voter's posterior belief that party i is corrupt, after observing its transfer

[3]To be more precise, a benevolent political party puts weight $1 - \alpha_b$ on its winning payoff and the rest on voter's payoff, thus $\alpha \equiv \frac{\alpha_b}{1-\alpha_b}$. The characterization of equilibrium does not depend on α. However, at any parametric condition, there are multiple equilibria. For comparative statics, we need a unique equilibrium; this weight α allows us to refine the equilibria and get a unique equilibrium at any parametric condition.

announcement t_i, is given by

$$\mu_i(t_i) \equiv \mu_i(\text{corrupt}|t_i) = \frac{\lambda_i \cdot \sigma_i^{\text{corrupt}}(t_i)}{\lambda_i \cdot \sigma_i^{\text{corrupt}}(t_i) + (1-\lambda_i) \cdot \sigma_i^{\text{benevolent}}(t_i)} \tag{1}$$

provided that the denominator is strictly positive.

Let us now consider the payoffs of the voter and the political parties. Recall that the parties make policy announcements simultaneously, and after observing these announcements, the voter updates her belief as in (1), chooses an effort level, and votes for a candidate.

The voter derives utility from two sources: consumption and the return from her private project net of effort cost. Therefore, the voter's *ex ante* payoff from voting for party i, after observing party i's announcement t_i, is

$$\begin{aligned}
&V(t_i, \mu_i(t_i)) = u(C + t_i) + \pi(t_i, \mu_i(t_i)),\\
&\text{where}\\
&\pi(t_i, \mu_i(t_i)) = \delta\left[(1-\mu_i(t_i))R(e^*(t_i, \mu_i(t_i)), B - t_i) + \mu_i(t_i)R(e^*(t_i, \mu_i(t_i)), 0)\right] - c\left(e^*(t_i, \mu_i(t_i))\right),\\
&e^*(t_i, \mu_i(t_i)) = \arg\max_{e \geq 0} \left\{\delta\left[(1-\mu_i(t_i))R(e, B - t_i) + \mu_i(t_i)R(e, 0)\right] - c(e)\right\},\\
&\text{and } \mu_i(t_i) \text{ is derived as in equation (1).}
\end{aligned} \tag{2}$$

There is no commitment problem in private transfers, so the voter's total consumption from voting for party i is $C + t_i$, where C is her own consumption endowment. The return from her private project, however, is uncertain as it not only depends on her effort but also on the level of the public good. As she believes that party i is corrupt with probability $\mu_i(t_i)$, she expects that the public good of size $B - t_i$ will be provided with probability $1 - \mu_i(t_i)$, and not be provided at all with probability $\mu_i(t_i)$. Given these beliefs, she chooses her effort optimally.

The payoff of political party i, if of the corrupt type, from announcing t_i and winning the election is

$$W + (B - t_i),$$

where W is the payoff from winning, and $B - t_i$ is the amount it misappropriates. Its utility from losing the election is zero.

The payoff of political party i, if of the benevolent type, from announcing t_i and winning the election is

$$W + \alpha \cdot \left(u(C + t_i) + \delta R(e^*(t_i, \mu_i(t_i)), B - t_i) - c(e^*(t_i, \mu_i(t_i)))\right)$$

where α is the weight the benevolent type puts on voter's utility. The voter is not aware of the type of the political party, and believes it to be corrupt with probability $\mu_i(t_i)$ as given in (1), hence she chooses $e^*(t_i, \mu_i(t_i))$ as in (2). However, the benevolent type knows that it will deliver the public good, therefore, it knows that the return to private project will be $R(e^*(t_i, \mu_i(t_i))), B - t_i)$ with certainty. Finally, the payoff of political party i, if of the benevolent type, from losing the election to political party j that announces t_j is $\alpha \cdot V(t_j)$, where $V(t_j)$ is as defined in (2).

As this is a multistage Bayesian game, our solution concept is *Perfect Bayesian Equilibrium (PBE)*. We find that at any parametric condition, there are multiple PBE-s, we refine them using *Intuitive Criterion*.[4]

3 Analysis

We start our analysis with the voter's problem. The voter observes the policy announcements t_1 and t_2, and updates her beliefs, as in (1), regarding the probabilities that political parties 1 and 2 are corrupt, $\mu_1(t_1)$ and $\mu_2(t_2)$, respectively. Given these policy announcements and beliefs, she computes her optimal effort and expected utility, as in (2), from voting for party i. She votes for the party that yields the higher utility; in case of equal payoff, she mixes the probability of voting. We therefore begin our analysis with the voter's effort choice when she votes for party i.

3.1 The Voter's Effort Choice

We first introduce a few standard assumptions on $R(e, B - t)$ and $c(e)$.

Assumption 1. *(i)* $R(0, B - t) = 0$, $R(e, 0) > 0$; *(ii) for any* $B - t \geq 0$, $R(e, B - t)$ *is strictly increasing in* e *and for any* $e > 0$, $R(e, B - t)$ *is strictly increasing in* $B - t$; *(iii)* $R(e, B - t)$ *is strictly concave in both arguments; (iv)* $c(e)$ *is strictly increasing and strictly convex in* e; *(v)* $R_{12}(e, B - t) > 0$; *(vi) for any* $t \in [0, B]$, $\lim_{e \to 0} R_1(e, B - t) = \infty$.

The assumptions are standard: First, if the voter exerts no effort, the return from the project is zero, regardless of the level of public goods. Conversely, even in the absence of public goods, a positive level of effort yields a strictly positive return. The function R satisfies standard properties: it is strictly increasing in both effort and public goods provision (given effort is positive), strictly concave in both arguments, and satisfies the Inada condition with respect to effort. In addition, we assume complementarity: the marginal return to effort is higher when the level of public goods is greater. The cost function c is also assumed to satisfy standard properties: it is strictly increasing and strictly convex in effort.

[4] We provide formal definitions in Appendix B.

Given this assumption, consider any transfer t_i and corresponding posterior belief $\mu_i(t_i)$. We find that the voter's optimal effort level $e^*(t_i, \mu_i(t_i))$ is unique and strictly positive. Moreover, the optimal effort is increasing in the expected amount of public goods; that is, it is decreasing in the posterior belief $\mu_i(t_i)$ and increasing in the promised amount of public good $B - t_i$. We state this result formally in the following proposition. All proofs are collected in Appendix A.

Proposition 1. *Suppose Assumption 1 holds. The optimal effort is increasing in expected amount of public good: For any given posterior belief, it is increasing in the level of public good $B - t$; for any given level of public good $B - t$, it is decreasing in posterior belief μ.*

The intuitions are straightforward. Since effort and public goods are complements, an increase in the expected amount of public goods raises the expected marginal return to effort, leading the voter to exert more effort.

The Voter's Ideal Transfer: For any given posterior belief μ, there exists a transfer that maximizes the voter's expected utility, denoted by t^μ. If the posterior belief μ increases, the probability that the promised public good will be provided decreases; thus, the ideal transfer amount increases with μ. Furthermore, as the posterior belief increases, the probability that the budget allocated to public good is misappropriated also increases; hence, for any given policy announcement, the voter's *expected* utility decreases with posterior belief μ.

The ideal transfer also depends on the voter's consumption endowment C. If C is already high, the voter's marginal utility from consumption is lower; thus, the ideal transfer is also lower, as such a voter prefers a higher allocation to the public good. Consequently, when C is sufficiently large, the ideal transfer becomes zero; whereas, when C is very low, the ideal transfer becomes the entire budget. Thus, t^μ is decreasing in C. At this ideal transfer, the expected utility increases with the consumption endowment. The intuition is straightforward: even if the transfer were the same, the expected utility would rise with the consumption endowment. Since the transfer is chosen optimally, the expected utility at the ideal transfer must increase with C.

Two threshold values of the posterior belief are significant: $\underline{\underline{\mu}}$ and $\bar{\mu}$, such that $t^\mu = 0$ if $\mu \leq \underline{\underline{\mu}}$, and $t^\mu = B$ if $\mu \geq \bar{\mu}$. From the above discussion, we observe that the thresholds of posterior belief $\underline{\underline{\mu}}$ and $\bar{\mu}$ are increasing in C. We provide the definition below; a more formal definition can be found in Appendix A.

Definition 1. *Consider any posterior belief of the voter μ.*

(i) The ideal transfer t^μ is defined as the transfer that maximizes the voter's ex ante payoff, i.e. $V(t^\mu) \geq V(t)$ for all t.

(ii) *There exist two thresholds* $0 \leq \underline{\underline{\mu}} \leq \bar{\mu} \leq 1$. *The threshold* $\underline{\underline{\mu}}$ *is the value of the posterior belief such that* $t^{\mu} = 0$ *if* $\mu \leq \underline{\underline{\mu}}$. *The threshold* $\bar{\mu}$ *is the value of the posterior belief such that* $t^{\mu} = B$ *if* $\mu \geq \bar{\mu}$.

Observation 1. *The ideal transfer* t^{μ} *is increasing in the posterior belief* μ *and decreasing*[5] *in private consumption endowment* C. *The expected utility from* t^{μ}, $V(t^{\mu}, \mu)$ *is decreasing in* μ *– it is strictly decreasing when* $\mu < \bar{\mu}$ *and remains constant when* $\mu \geq \bar{\mu}$. *At any* μ, $V(t^{\mu}, \mu)$ *is increasing in* C. *The thresholds of the posterior belief* $\underline{\underline{\mu}}$ *and* $\bar{\mu}$ *are increasing in* C.

Next, we consider the social planner's problem, which gives us a benchmark for comparison.

4 The Social Planner's Problem

We consider a social planner who puts equal weights on the utilities of a political party and the voter. The social planner's problem is to allocate the budget between private transfer and public good. Note that if a corrupt political party's utility from misappropriating the amount allocated to the public good is higher than the return to the private project when the public good is actually provided, then the social planner would instead allocate that amount directly to the corrupt political party. To avoid such an uninteresting case, we make the following assumption:

Assumption 2. *For any* $t \in [0, B)$, *we have*

$$\delta \cdot R(e^*(t), B - t) - c(e^*(t)) > B - t$$

where $e^*(t) = \arg\max_{e \geq 0}\{\delta \cdot R(e, B - t) - c(e)\}$.

It is easy to see that the social planner would allocate $\hat{t} \equiv t^{\mu=0}$, where t^{μ} is as in Definition 1, to transfer and the rest to the public good. The voter's utility is then $V(\hat{t})$, as in (2), with $\mu = 0$. One of the political parties wins: if it is of corrupt type enjoys W, while if it is of benevolent type, in addition to W, it also enjoys $\alpha V(\hat{t})$.

5 The Voting Game

We first note that a purely separating equilibrium, in which the announcements of the political parties reveal their types completely, does not exist. The simple intuition is that the corrupt type has an incentive to deviate and mimic the benevolent party, thereby unraveling the equilibrium.

[5] t^{μ} is *strictly* increasing in μ and C only when $\mu \in (\underline{\underline{\mu}}, \bar{\mu})$, otherwise.

Claim 1. *A purely separating equilibrium that fully reveals the types of the political parties does not exist.*

Two types of equilibrium exist: a pooling equilibrium, in which both types of political parties announce the same policy with certainty; and a hybrid equilibrium, in which the corrupt type mixes between two policy announcements. We restrict attention to pooling equilibria:[6] Both types of each political party announce the same policy, hence, the posterior belief remains equal to the prior belief; the voter may vote for one party with certainty or randomize.

The maximum expected utility the voter can get from voting for political party 1 in a pooling equilibrium is $V(t^{\lambda_1})$, where t^{λ_1} is as in Definition 1. Similarly, the maximum expected utility from voting for political party 2 in a pure strategy pooling equilibrium is $V(t^{\lambda_2})$. Since $\lambda_1 \geq \lambda_2$, it follows from Observation 1 that $V(t^{\lambda_2}) \geq V(t^{\lambda_1})$.

When the voter believes that political party 2 is corrupt with strictly lower probability, party 2 enjoys leverage: it can announce any policy $t_2 \in (\underline{t}_2(t_1), \bar{t}_2(t_1))$ and still be elected with probability one, where

$$V(\underline{t}_2) = V(t^{\lambda_1}) = V(\bar{t}_2).$$

This leverage exists as long as $\lambda_2 < \lambda_1$ and $\lambda_2 < \bar{\mu}$. When $\lambda_2 = \lambda_1$, then at the unique pooling equilibrium, both announce t^{λ_i} for $i = 1, 2$, and the voter randomizes. And, for $\lambda_2 \geq \bar{\mu}$, both parties are believed to be corrupt with such high probability that the only possible pooling equilibrium is one in which both parties, regardless of type, announce the same policy $t = B$. This leaves the voter indifferent between the parties, and she therefore randomizes. Below, we formally define the thresholds $\underline{t}_2(t^{\lambda_1})$ and $\bar{t}_2(t^{\lambda_1})$, for any λ_1. The properties of these thresholds which we use in further analyses are stated in Claim 2.

Definition 2. *Suppose $\lambda_2 < \min\{\lambda_1, \bar{\mu}\}$. For any policy announcement made by party 1, t_1, there exist two policy announcements made by party 2, $\underline{t}_2(t^{\lambda_1})$ and $\bar{t}_2(t^{\lambda_1})$, with $\underline{t}_2(t^{\lambda_1}) < t^{\lambda_2} < \bar{t}_2(t^{\lambda_1})$, such that*

$$V(\underline{t}_2(t^{\lambda_1}), \lambda_2) = V(t^{\lambda_1}, \lambda_1) = V(\bar{t}_2(t^{\lambda_1}), \lambda_2). \tag{3}$$

Claim 2. *Suppose $\lambda_2 < \min\{\lambda_1, \bar{\mu}\}$. Then,*

1. *for any λ_2, $\underline{t}_2(t^{\lambda_1})$ is decreasing and $\bar{t}_2(t^{\lambda_1})$ is (weakly) increasing in λ_1; if $\lambda_1 \geq \bar{\mu}$, then $\bar{t}_2(t^{\lambda_1}) = B$,*
2. *for any λ_1, $\underline{t}_2(t^{\lambda_1})$ is increasing and $\bar{t}_2(t^{\lambda_1})$ is (weakly) decreasing in λ_2,*
3. *for any λ_1 and λ_2, $\underline{t}_2(t^{\lambda_1})$ is decreasing in the voter's private consumption C.*

[6] We fully characterize hybrid equilibria in Appendix B.

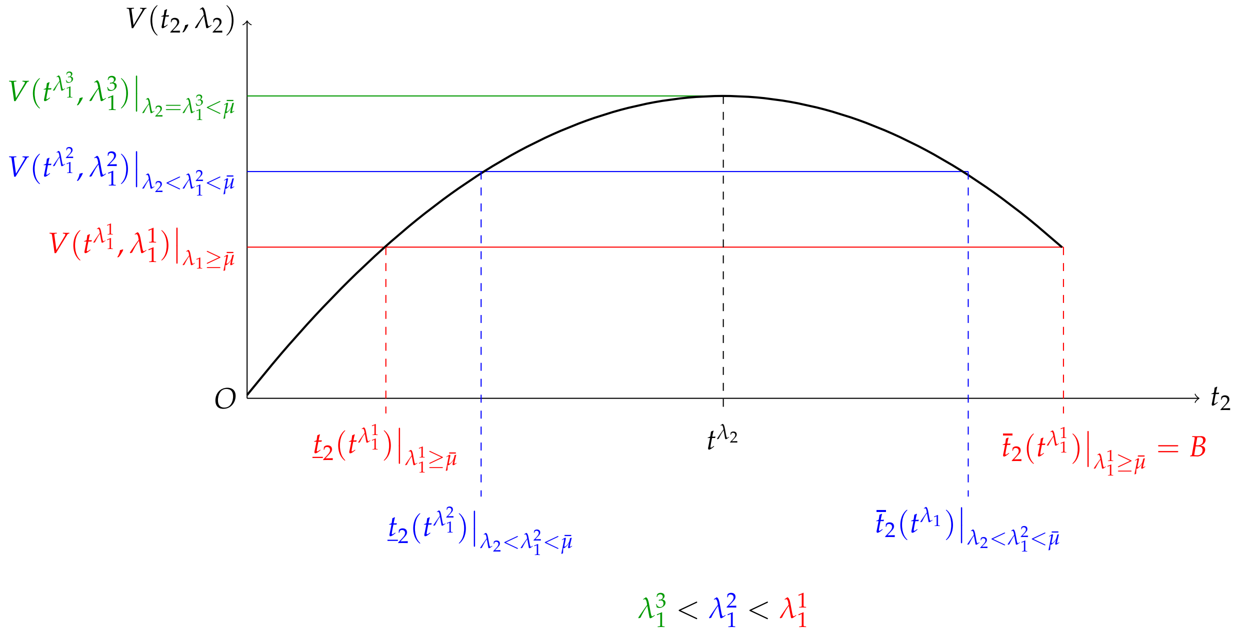


Figure 1: Change in Thresholds with a Change in λ_1, for any given $\lambda_2 \in (0, \lambda_1]$

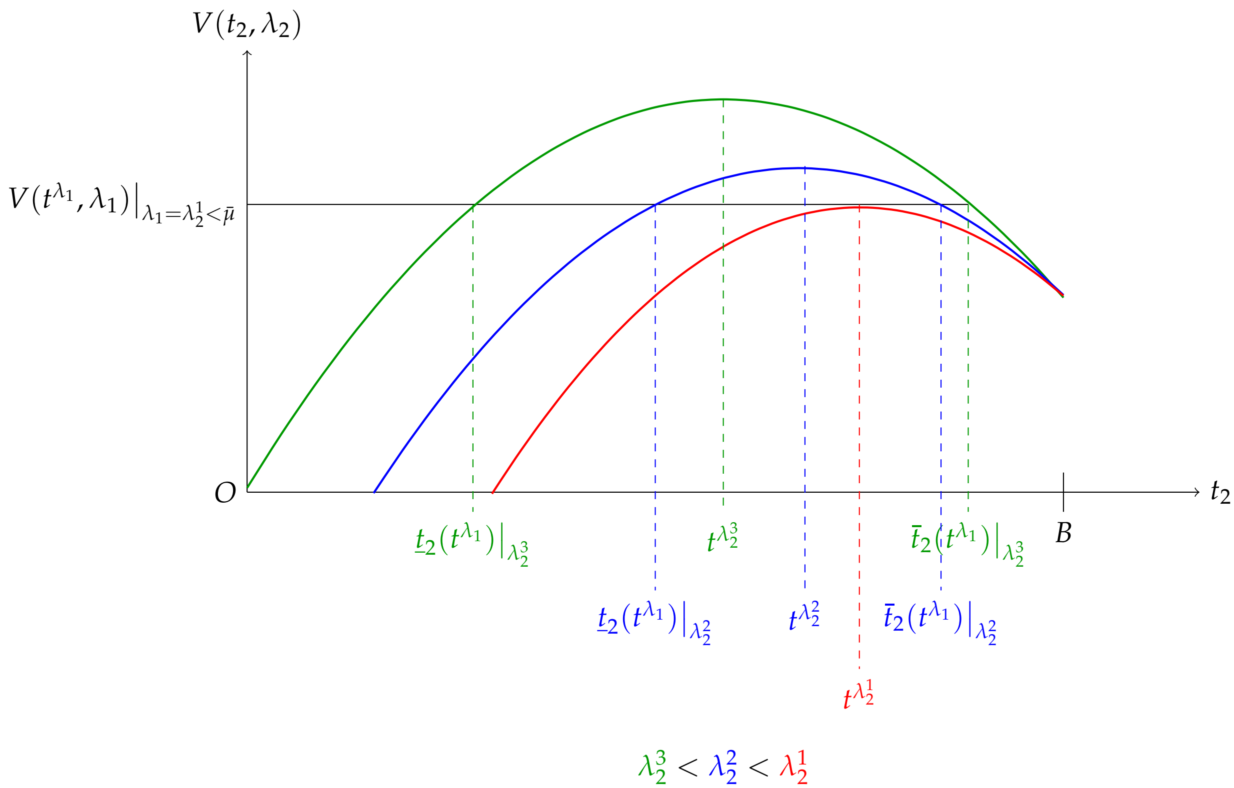


Figure 2: Change in Thresholds with a Change in λ_2, for any given $\lambda_1 \in (0, \bar{\mu})$

The following proposition characterizes the pooling equilibria for any $\lambda_2 \leq \lambda_1 \in [0,1]$.

Proposition 2. *Consider a median voter and two political parties, 1 and 2, with prior beliefs that they are corrupt with probabilities λ_1 and λ_2, respectively, with $\lambda_1 \geq \lambda_2$. At any parametric condition, multiple PBEs exist:*

1. *If $\lambda_2 < \min\{\lambda_1, \bar{\mu}\}$: Party 1, irrespective of type, announces $t_1^* = t^{\lambda_1}$ and Party 2, irrespective of type, announces $t_2^* = t \in (\underline{t}_2(t^{\lambda_1}), \bar{t}_2(t^{\lambda_1}))$. The posterior beliefs of the voter is $\mu_i(t_i^*) = \lambda_i$, and for any $t_i \neq t_i^*$, $\mu_i(t_i) = 1$, for $i = 1,2$. The voter votes for party 2 with certainty upon observing $\langle t_1^*, t_2^* \rangle$.*

2. *If $\lambda_1 = \lambda_2 \in [0,1]$ or $\bar{\mu} \leq \lambda_2 < \lambda_1$: Both paries, irrespective of type, announce $t_1^* = t^{\lambda_1} = t^{\lambda_2} = t_2^*$. The posterior beliefs of the voter are $\mu_i(t_i^*) = \lambda_i$ and for any $t_i \neq t_i^*$, $\mu_i(t_i) = 1$, for $i = 1,2$. The voter randomizes, voting for Party 1 with probability $\sigma_v(t_1^*, t_2^*) \in [0,1]$, and for Party 2 with the complementary probability.*

When Party 2 is corrupt with low probability, $\lambda_2 < \bar{\mu}$, multiple PBEs exist, as Party 2 can announce any policy $t_2^* \in (\underline{t}_2(t^{\lambda_1}), \bar{t}_2(t^{\lambda_1}))$. By contrast, when Party 2 is corrupt with high probability, $\lambda_2 \geq \bar{\mu}$, both parties announce $t_i^* = B$; in this case, multiple equilibria arise because the voter is indifferent between the parties and can therefore vote for Party 1 with any probability.

For the former type of multiplicity, that is when $\lambda_2 < \bar{\mu}$, we refine the equilibria using the intuitive criterion and show that, for any parametric condition, only a unique equilibrium survives. For the latter case, when the voter is indifferent between the parties, we impose the restriction that if she knows she will be *ex post* indifferent, she randomizes with equal probability. These refinements yield a unique equilibrium, which in turn allows us to conduct comparative statics.

For the intuitive criterion, we impose a 'reasonability' filter on the voter's off-equilibrium-path beliefs. Consider any pooling equilibrium when $\lambda_2 < \bar{\mu}$: Party 2 announces $t_2^* \in (\underline{t}_2(t^{\lambda_1}), \bar{t}_2(t^{\lambda_1}))$ and wins with probability one. Off-equilibrium path, if the voter observes any $t_i \neq t_i^*$, her belief is $\mu_i^*(t_i) = 1$; that is, she believes that party i is corrupt with probability one.

Now, if the benevolent type of party i gets strictly higher utility by choosing an off-equilibrium announcement t_i (while the utility of the corrupt type is strictly higher at t_i^* than at t_i), then the voter's reasonable off-equilibrium belief after observing t_i is $\mu_i(t_i) = 0$. Similarly, if the corrupt type of party i gets strictly higher utility by choosing an off-equilibrium announcement t_i (while the utility of the benevolent type is strictly higher at t_i^* than at t_i), then the voter's reasonable off-equilibrium belief for announcement t_i is $\mu_i(t_i) = 1$. Finally, if both types, benevolent and corrupt, of political party i get strictly higher utility by choosing an off-equilibrium announcement t_i, then the voter's reasonable belief after observing t_i should just be the prior, that is $\mu_i(t_i) = \lambda_i$.

Proposition 3 characterizes the equilibrium that survives the intuitive criterion. Before that, we define a threshold of posterior belief and its key properties for later analysis.

Definition 3. *For any λ_1 and λ_2 with $\lambda_2 \leq \lambda_1$, the threshold $\hat{\mu}_2(\lambda_1)$ is the value of the posterior belief μ_2 such that*

$$\underline{t}_2(t^{\lambda_1}) = \hat{t} \quad \text{and} \quad \mu_2(\underline{t}_2(t^{\lambda_1})) = \hat{\mu}_2(\lambda_1)$$

where $\hat{t} = t^{\mu}\big|_{\mu=0}$ and t^{μ} is as in Definition 1, part (i).

Recall that $\hat{t}$ is the ideal transfer for the voter when the elected party is benevolent with certainty. Even though Party 2 is corrupt with a positive probability, it can still offer this amount and win the election, since Party 1 is corrupt with a higher probability. This is possible only when the gap between the priors is sufficiently large: for any given λ_1, there exists a threshold belief about Party 2 such that, if Party 2 with that belief offers $\hat{t}$ and Party 1 with λ_1 offers t^{λ_1}, the voter is indifferent between the two parties. We denote this threshold of λ_2 by $\hat{\mu}_2(\lambda_1)$. Intuitively, as the prior that Party 1 is corrupt, λ_1, increases, this threshold must also rise; otherwise, the voter would strictly prefer Party 2. Furthermore, as the consumption endowment C increases, the voter's marginal utility from private consumption decreases. In other words, she prefers a larger share of the budget to be allocated to the public good for the same beliefs. Consequently, the threshold $\hat{\mu}(\lambda_1)$ increases with C. We state these results formally in the following claim.

Claim 3. *Consider any λ_1 and λ_2 with $\lambda_2 \leq \lambda_1$ and $\lambda_2, \lambda_1 \in (0, 1]$. The threshold $\hat{\mu}_2(\lambda_1) \in (0, \lambda_1)$. For any given λ_2, the threshold $\hat{\mu}_2(\lambda_1)$ is strictly increasing in λ_1 when $\lambda_1 \in (0, \bar{\mu})$; it remains constant at $\hat{\mu}_2^{\max}$ when $\lambda_1 \geq \bar{\mu}$. $\hat{\mu}_2(\lambda_1)$ is increasing in voter's private consumption endowment.*

Next, we turn to the refinements. First, we note that the benevolent type would always prefer to offer $\hat{t}$. The voter's reasonable belief, however, depends not only on the benevolent type's intent but also on that of the corrupt type. The corrupt type understands that if it does not mimic the benevolent type, it will lose with certainty.[7] Therefore, if the benevolent type strictly prefers any off-equilibrium announcement, the corrupt type would also prefer it under reasonable beliefs. Hence, the voter's belief will remain equal to the prior.

It follows that when parameters are such that $t_2^* = \hat{t}$ is a PBE, then this is the only equilibrium that survives the intuitive criterion. If announcing $\hat{t}$ is not a PBE, the unique equilibrium that survives is the one in which Party 2 offers the closest possible transfer to $\hat{t}$ that ensures a win. Finally, when $\lambda_2 \geq \bar{\mu}$, at any PBE, both parties announce B, the voter is *ex post* indifferent between them, and hence can randomize with any probability. To refine these equilibria, we impose the

[7] Recall that we restrict attention to the pooling equilibria. In Appendix B, we characterize all equilibria and show that refining equilibria with this restriction is without loss of generality.

restriction that the voter randomizes equally between the parties. We state the result formally in the following proposition.

Proposition 3. *1. Suppose $\lambda_2 \in [0, \hat{\mu}(\lambda_1))$. At the unique PBE that survives the intuitive criterion, Party 1, irrespective of type, announces t^{λ_1}, Party 2, irrespective of type, announces $\hat{t}$, and the voter votes for Party 2 with certainty.*

2. *Suppose $\lambda_2 \in [\hat{\mu}(\lambda_1), \bar{\mu})$. At the unique PBE that survives the intuitive criterion, Party 1, irrespective of type, announces t^{λ_1}, Party 2, irrespective of type, announces $\lim_{\epsilon \to 0} \underline{t}_2(t^{\lambda_1}) + \epsilon$, and the voter votes for Party 2 with certainty.*

3. *Suppose $\lambda_2 \geq \bar{\mu}$. At the unique PBE that survives the requirement that if the voter is ex post indifferent, she votes for each party with equal probability, both parties, irrespective of their types, announce B, and the voter votes for each party with equal probability.*

6 Comparative Statics

We compare the voter's welfare, her optimal effort, and expected corruption – the amount misappropriated in expectation – by varying the prior belief that political parties are corrupt. The voter's welfare and optimal effort are $V(t_i^*, \lambda_i)$ and $e^*(t_i^*, \lambda_i)$, respectively, when Party i wins the election and the prior probability that it is believed to be corrupt is λ_i. We consider the unique PBE that survives the intuitive criterion. Thus, Party i is Party 2 when $\lambda_2 < \bar{\mu}$, and when $\lambda_2 \geq \bar{\mu}$, the voter is indifferent between the two parties, so i could be either 1 or 2. Expected corruption is $\lambda_i[B - t_i^*]$, given the above discussion, this boils down to $\lambda_2[B - t_2^*]$.

Though Party 1 loses the election with probability one when Party 2 is believed to be not very corrupt, $\lambda_2 < \bar{\mu}$, and wins with probability one-half otherwise, due to electoral competition the prior belief about its corruption probability affects the voter's welfare, her optimal effort, and expected corruption by the elected party.

The intuition is simple: the higher the belief that Party 1 is corrupt, the lower the equilibrium announcement needed for Party 2 to secure electoral victory. This allows Party 2 to pledge a larger amount of public good while still winning the election. The benevolent type would never pledge more than the first-best level $B - \hat{t}$; therefore, the pledged public good increases with the prior for Party 1 up to this maximum, beyond which it remains constant. For any fixed λ_2, this implies that the voter's expected utility either remains constant (either at the maximum $V(\hat{t}, \lambda_2)$ or at the minimum level $V(B, \lambda_2)$), or decreases with λ_1. Interestingly, the optimal effort increases in the moderate range $\lambda_2 \in [\hat{\mu}(\lambda_1), \bar{\mu})$, because a higher amount of public good is pledged while it gets delivered with the same probability λ_2. Finally, due to this greater leverage through higher pledged public good, the amount that can be misappropriated (weakly) increases with λ_1.

Proposition 4. *Consider any $\lambda_2 \in (0,1]$ and $\lambda_1 \in [\lambda_2, 1]$, and the unique PBE that survives the intuitive criterion for this pair. For any fixed λ_2, with an increase in λ_1:*

1. *The voter's expected utility remains constant at $V(\hat{t}, \lambda_2)$ when $\lambda_2 \in (0, \hat{\mu}_2(\lambda_1))$, decreases when $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, and remains constant at $V(B, 1)$ when $\lambda_2 \geq \bar{\mu}$.*

2. *The voter's optimal effort remains constant at $e^*(\hat{t}, \lambda_2)$ when $\lambda_2 \in (0, \hat{\mu}_2(\lambda_1))$, increases when $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, and remains constant at the minimum level $e^*(B, 1)$ when $\lambda_2 \geq \bar{\mu}$.*

3. *The expected corruption remains constant at $\lambda_2[B - \hat{t}]$ when $\lambda_2 \in (0, \hat{\mu}_2(\lambda_1))$, increases when $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, and remains constant at 0 when $\lambda_2 \geq \bar{\mu}$.*

Furthermore, $\hat{\mu}_2(\lambda_1)$ is (weakly) increasing in λ_1.

We now analyze the effect of a change in λ_2 – the prior belief about the party that gets elected (whenever $\lambda_2 < \min\{\lambda_1, \bar{\mu}\}$) – on the voter's expected utility, her optimal effort, and expected corruption.

When Party 2 is believed to be corrupt with sufficiently low probability $\lambda_2 < \hat{\mu}_2(\lambda_1)$, at the unique equilibrium $B - \hat{t}$ is pledged for the public good by the winning party, Party 2. As λ_2 increases, this amount is misappropriated with higher probability; therefore, the voter's expected utility decreases, and expected corruption increases with λ_2. The voter's optimal effort also decreases, because λ_2 rises while the pledged amount for the public good remains constant.

When λ_2 is moderate, $\lambda_2 \in [\hat{\mu}(\lambda_1), \bar{\mu})$, Party 2 announces $\lim_{\epsilon \to 0}[\underline{t}_2(t^{\lambda_1}) + \epsilon]$ and wins with certainty. At this parametric condition, the voter's expected utility remains constant at a level slightly above $V(t^{\lambda_1}, \lambda_1)$. Now, $\underline{t}_2(t^{\lambda_1})$ increases with λ_2, so the amount pledged for the public good decreases while the probability that it will be misappropriated increases with λ_2. Hence, the voter's optimal effort unambiguously decreases. However, the effect on expected corruption is ambiguous: it may increase because the probability of misappropriation rises, but it may also decrease because the pledged amount itself becomes smaller.

Finally, when $\lambda_2 \geq \bar{\mu}$, the entire budget is allocated to transfer by both parties. Hence, corruption is zero. The voter's optimal effort is at its minimum since no public good is being provided, and her utility remains constant at $V(B, 1)$. We state this formally in the following proposition.

Proposition 5. *Consider any $\lambda_2 \in (0,1]$ and $\lambda_1 \in [\lambda_2, 1]$, and the unique PBE that survives the intuitive criterion for this pair. For any fixed λ_1, with an increase in λ_2:*

1. *The voter's expected utility decreases when $\lambda_2 \in (0, \hat{\mu}_2(\lambda_1))$, remains constant at* $\lim_{\epsilon^v \to 0}[V(t^{\lambda_1}, \lambda_1) + \epsilon^v]$ *$\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, and remains constant at $V(B, 1)$ when $\lambda_2 \geq \bar{\mu}$.*

2. *The voter's optimal effort decreases when $\lambda_2 < \bar{\mu}$, and remains constant at the minimum level $e^*(B, 1)$ when $\lambda_2 \geq \bar{\mu}$.*

3. *The expected corruption increases if $\lambda_2 < \hat{\mu}_2(\lambda_1)$, and remains constant at zero when $\lambda_2 \geq \bar{\mu}$.*

The voter's expected utility increases with C. When $\lambda_2 < \hat{\mu}_2(\lambda_1)$, the transfer remains constant at $\hat{t}$, and when $\lambda_2 \geq \bar{\mu}$, it remains constant at B. In both cases, the expected utility increases with C because private consumption increases with C. When $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, the expected utility is slightly larger than $V(t^{\lambda_1}, \lambda_1)$. As shown in Observation 1, $V(t^{\lambda_1}, \lambda_1)$ increases with C.

When $\lambda_2 \notin [\hat{\mu}_2(\lambda_1), \bar{\mu})$, the transfer and the probability that it is misappropriated do not change with C. Therefore, both the optimal effort and the expected corruption remain constant. When $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, the transfer decreases, so the pledged amount for the public good increases without any change in the probability of misappropriation. As a result, both the optimal effort and the expected corruption increase with C.

Proposition 6. *Consider any $\lambda_2 \in (0, 1]$ and $\lambda_1 \in [\lambda_2, 1]$, and the unique PBE that survives the intuitive criterion for this pair. For any fixed λ_1 and λ_2, with an increase in C:*

1. *The voter's expected utility increases when $\lambda_2 \notin [\hat{\mu}_2(\lambda_1), \bar{\mu})$, and when $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, it remains constant at* $\lim_{\epsilon^v \to 0}[V(t^{\lambda_1}, \lambda_1) + \epsilon^v]$.

2. *The voter's optimal effort remains constant when $\lambda_2 \notin [\hat{\mu}_2(\lambda_1), \bar{\mu})$, and increases otherwise.*

3. *The expected corruption remains constant when $\lambda_2 \notin [\hat{\mu}_2(\lambda_1), \bar{\mu})$, and increases otherwise.*

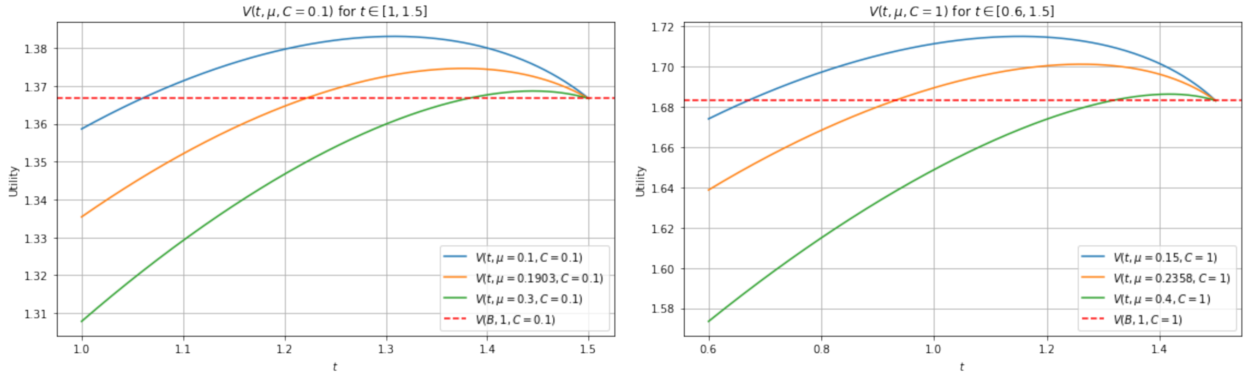
Furthermore, $\hat{\mu}_2(\lambda_1)$ and $\bar{\mu}$ are increasing in C.

A Numerical Example: Functions: $u(C + t) = (C + t)^{\beta}$; $\quad R(e, B - t) = e^{\theta}[(B - t) + r]^{1-\theta}; c(e) = e^2$.

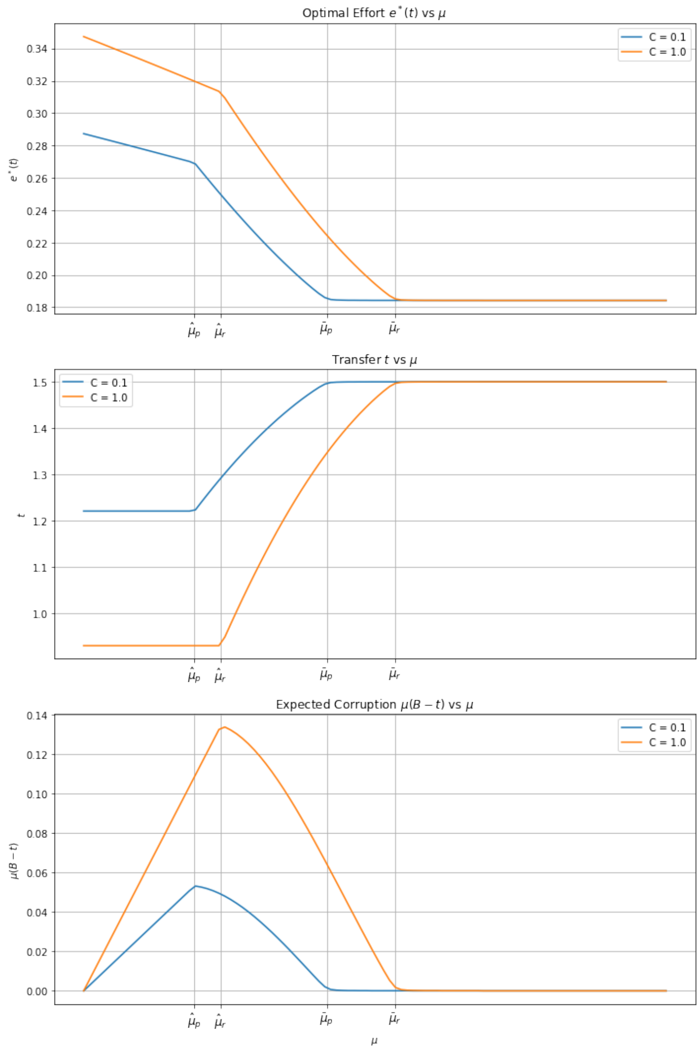
Parameters: $\lambda_1 = 1$. $\quad B = 1.5$; $\quad r = 0.1$; $\quad \beta = \theta = 0.5$; $\quad \delta = 1$. $C_p = 0.1$ and $C_r = 1$.

For $C = 0.1$: $\quad \hat{t} = 1.2206$, $\hat{\mu}(\lambda_1) = 0.1903$, $\bar{\mu} = 0.4174$.

For $C = 1$: $\quad \hat{t} = 0.9298$, $\hat{\mu}(\lambda_1) = 0.2358$, $\bar{\mu} = 0.5345$.



$V(t, \mu, C = 0.1)$ for $t \in [1, 1.5]$
Utility
t
$V(t, \mu = 0.1, C = 0.1)$
$V(t, \mu = 0.1903, C = 0.1)$
$V(t, \mu = 0.3, C = 0.1)$
$V(B, 1, C = 0.1)$
$V(t, \mu, C = 1)$ for $t \in [0.6, 1.5]$
$V(t, \mu = 0.15, C = 1)$
$V(t, \mu = 0.2358, C = 1)$
$V(t, \mu = 0.4, C = 1)$
$V(B, 1, C = 1)$



Optimal Effort $e^*(t)$ vs μ
$e^*(t)$
C = 0.1
C = 1.0
$\hat{\mu}_p$ $\hat{\mu}_r$ $\bar{\mu}_p$ $\bar{\mu}_r$
Transfer t vs μ
t
Expected Corruption $\mu(B-t)$ vs μ
$\mu(B-t)$
μ

7 Conclusion

This paper develops a novel political economy model that elucidates how perceptions of corruption influence private economic behavior through a belief-driven mechanism affecting effort and investment. We demonstrate that in environments where private effort and public infrastructure are complementary, uncertainty about the reliability of state provision due to corruption leads rational voters to discount future returns and reduce their effort. This effect operates even when individuals are fully rational and forward-looking, highlighting an indirect but powerful channel through which corruption impedes development.

Our analysis of electoral competition under asymmetric information about political types reveals that multiple equilibria arise, but applying the intuitive criterion yields a unique pooling equilibrium in which beliefs and prior perceptions critically shape outcomes. We find the relationship between expected corruption and prior beliefs to be non-monotonic: intense electoral competition among candidates perceived as similarly corrupt can reduce ex-post corruption, yet simultaneously depress public good provision and private initiative. Conversely, when corruption beliefs differ markedly, voters tend to favor the less suspected candidate, allowing greater rent extraction by the corrupt winner.

Moreover, the model uncovers how political uncertainty and corruption affect the effective time preferences of voters, rationally lowering their valuation of future private returns and thereby trapping societies in low-effort, underdeveloped equilibria. Importantly, our framework highlights the self-reinforcing nature of pessimistic beliefs, where even reformist candidates struggle against entrenched expectations, suggesting that political trust is central to breaking development traps.

More broadly, the analysis invites reflection on how beliefs about political integrity evolve and embed themselves in economic behavior. While the model holds priors fixed, in reality, such beliefs may emerge from lived experience, social interactions, or inherited pessimism. Over time, expectations about governance may blur into perceptions of what effort itself can achieve. In such settings, even rational agents may come to see low productivity not as conditional, but as intrinsic, trapping societies in cycles where distrust, underinvestment, and weak institutions reinforce one another. Understanding how these expectations form and persist may be crucial for designing interventions that restore both state capacity and private initiative.

These insights contribute to the broader literature on political corruption, governance, and economic development by formally linking electoral incentives, policy credibility, and individual behavior. The findings imply that anti-corruption efforts and the restoration of political credibility could have profound effects not only on public good provision but also on incentivizing private investment through improved expectations.

Future research could extend this model by allowing dynamic updating of beliefs, heterogeneous voters, and institutional reforms that enhance commitment credibility. Understanding the evolution of corruption perceptions and their interplay with political competition remains a vital area for designing effective governance interventions aimed at fostering sustained economic development.

Appendix A

Proof of Proposition 1.

The optimal effort e^* is increasing in $B - t$.

First, let us consider the optimization problem of choosing effort for any given $\langle t, \mu \rangle$:

$$\begin{aligned} \frac{\partial \pi}{\partial e} &= \delta[(1-\mu)R_1(e, B-t) + \mu R_1(e, 0)] - c'(e) = 0 \\ \frac{\partial^2 \pi}{\partial e^2} &= \delta[(1-\mu)R_{11}(e, B-t) + \mu R_{11}(e, 0)] - c''(e) \end{aligned}$$

Given Assumption 1 part (iii) and (iv), SOC is satisfied; so at the optimal e^*, we have

$$\delta[(1-\mu)R_1(e^*, B-t) + \mu R_1(e^*, 0)] = c'(e^*). \tag{4}$$

For notational brevity, let us denote $R_{ij}(e^*, B-t)$ by R_{ij}^{B-t} and $R_{ij}(e^*, 0)$ by R_{ij}^0.

Now, to consider the change in e^* in response to a change in public good $B - t$, we differentiate both sides of (4) with respect to $B - t$:

$$\begin{aligned} \frac{\partial e^*}{\partial (B-t)} &= -\frac{\delta(1-\mu)R_{12}^{B-t}}{\delta[(1-\mu)R_{11}^{B-t} + \mu R_{11}^0] - c''(e^*)} \\ &> 0 \end{aligned}$$

where the last inequality comes from Assumption 1: the numerator is positive as $R_{12} > 0$ and the denominator is negative as $R_{11} < 0$ and $c'' > 0$. Therefore, the optimal effort increases with the amount of public good.

The optimal effort e^* is decreasing in the posterior belief μ.

To see the change in optimal effort with a change in μ, we differentiate both sides of (4) with respect to μ:

$$\begin{aligned} \frac{\partial e^*}{\partial \mu} &= \frac{\delta[R_1(e^*, B-t) - R_1(e^*, 0)]}{\delta[(1-\mu)R_{11}^{B-t} + \mu R_{11}^0] - c''(e^*)} \\ &< 0 \end{aligned}$$

the last inequality comes from Assumption 1 part (iii), (iv) and (v): due to part (iii) and (iv), the denominator is negative, and as $B - t > 0$ due to part (v), we have $R_1(e^*, B-t) - R_1(e^*, 0) > 0$. □

Definition 1. We provide a formal statement of the definition after proving the following claim.

Claim 4. *Suppose Assumption 1 hold. Then, for any given posterior belief μ, V is strictly concave in t. Furthermore, for any given transfer t, V is decreasing in μ.*

Proof. For any given μ, $V(t)$ is strictly concave in t.

We differentiate $V(t)$ twice with respect to t

$$\begin{aligned}
\frac{\partial V}{\partial t} &= u'(C+t) + \frac{\partial \pi}{\partial t} \\
\frac{\partial^2 V}{\partial t^2} &= u''(C+t) + \frac{\partial^2 \pi}{\partial t^2} \\
\text{where } \frac{\partial \pi}{\partial t} &= -\delta(1-\mu)R_2(e^*, B-t) + \left[\delta[(1-\mu)R_1(e^*, B-t) + \mu R_1(e^*, 0)] - c'(e^*)\right] \frac{\partial e^*}{\partial t}
\end{aligned}$$

By the Envelope theorem

$$\delta[(1-\mu)R_1(e^*, B-t) + \mu R_1(e^*, 0)] - c'(e^*) = 0.$$

$$\text{Therefore, } \frac{\partial \pi}{\partial t} = -\delta(1-\mu)R_2(e^*, B-t) \tag{5}$$

$$\text{And, } \frac{\partial^2 \pi}{\partial t^2} = -\delta(1-\mu)[R_{21}^{B-t}\frac{\partial e^*}{\partial t} - R_{22}^{B-t}]$$

$$\text{Now, differentiating (4) we get } \frac{\partial e^*}{\partial t} = \frac{\delta(1-\mu)R_{12}^{B-t}}{\delta[(1-\mu)R_{11}^{B-t} + \mu R_{11}^{0}] - c''(e^*)} < 0 \tag{6}$$

By Young's theorem $R_{12} = R_{21}$

$$\begin{aligned}
\text{Therefore,} \quad & R_{21}^{B-t}\frac{\partial e^*}{\partial t} - R_{22}^{B-t} \\
= \quad & \frac{\delta(1-\mu)[\left(R_{12}^{B-t}\right)^2 - R_{11}^{B-t}R_{22}^{B-t}] - \mu R_{11}^{0}R_{22}^{B-t} + c''(e^*)R_{22}^{B-t}}{\delta[(1-\mu)R_{11}^{B-t} + \mu R_{11}^{0}] - c''(e^*)}
\end{aligned}$$

Note that the denominator is negative as $R_{11}^{B-t} < 0$, $R_{11}^{0} < 0$, and $c'' > 0$. Now we argue that the numerator is also negative . For that observe that as R is strictly concave in both arguments we have $R_{11} < 0$ and

$$\begin{vmatrix} R_{11} & R_{12} \\ R_{21} & R_{22} \end{vmatrix} > 0 \quad \Rightarrow R_{11} \cdot R_{22} - R_{12}^2 > 0 \tag{7}$$

As $R_{11} < 0$, (7) implies $R_{22} < 0$.

Therefore, (7) implies $\left(R_{12}^{B-t}\right)^2 - R_{11}^{B-t}.R_{22}^{B-t} < 0$, and $\mu R_{11}^{0}R_{22}^{B-t} > 0$ (since $R_{11}^{0} < 0$ and $R_{22}^{B-t} < 0$) and $R_{22}^{B-t} \cdot c'' < 0$ (since $R_{22}^{B-t} < 0$ and $c'' > 0$). This leads to the numerator being strictly negative for any $\mu \in [0,1]$. This implies

$$\frac{\partial^2 \pi}{\partial t^2} < 0.$$

As $u'' < 0$, this implies

$$\frac{\partial^2 V}{\partial t^2} = \quad u''(C+t) + \frac{\partial^2 \pi}{\partial t^2} < 0.$$

Hence, V is strictly concave in t as claimed.

<u>For any given t, V is decreasing in μ.</u>

Differentiating V with respect to μ we get

$$\frac{\partial \pi}{\partial \mu} = -\delta[R(e^*, B-t) - R(e^*, 0)] + \left[\delta[(1-\mu)R_1(e^*, B-t) + \mu R_1(e^*, 0)] - c'(e^*)\right] \frac{\partial e^*}{\partial \mu}$$

using Envelope Theorem which boils down to

$$-\delta[R(e^*, B-t) - R(e^*, 0)] < 0$$

where the inequality comes from Assumption 1 part (v) that $R_{12} > 0$.

□

Therefore, for any posterior belief μ, there exists a unique amount of transfer that maximizes the voter's *ex ante* utility. We call that ideal transfer and denote it by t^μ. Formally,

Definition 4. *Consider any C, B and $\mu \in [0,1]$, let the ideal transfer t^μ be the transfer which maximizes the voter's payoff.*

$$t^\mu = 0: \quad \text{if } u'(C) \leq -\frac{\partial}{\partial t}\pi(B) \tag{8}$$

$$t^\mu = B: \quad \text{if } u'(C+B) \geq -\frac{\partial}{\partial t}\pi(0). \tag{9}$$

For any C and $\mu \in [0,1]$, $t^\mu \in (0, B)$ if and only if

$$u'(C+t)\Big|_{t=t^\mu} = -\frac{\partial}{\partial t}\pi(t)\Big|_{t=t^\mu} \tag{10}$$

Observation 2. *For any given B, t^μ is weakly increasing in μ. It is strictly increasing if $t^\mu \in (0, B)$.*

Proof. First, we consider interior t^μ. Recall (5):

$$\frac{\partial \pi}{\partial t} = -\delta(1-\mu)R_2(e^*, B-t).$$

We differentiate both sides of (10) with respect to μ we get

$$\frac{\partial t}{\partial \mu}\Big|_{t=t^\mu} = \frac{-\delta R_2(e^*, B-t) + \delta(1-\mu)R_{21}^{B-t}\frac{\partial e^*}{\partial \mu}}{u''(C+t) + \delta(1-\mu)R_{22}^{B-t}}\Bigg|_{t=t^\mu}$$

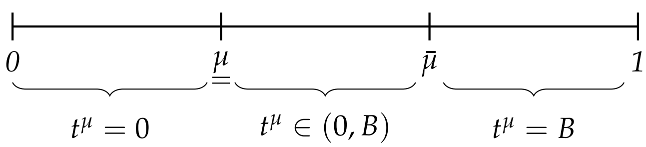
given the second part of Proposition 1, we know that $\frac{\partial e^*}{\partial \mu} < 0$. Thus, both the numerator and the denominator of the R.H.S. of the above equation are negative. Hence, we must have $\frac{\partial t}{\partial \mu}\Big|_{t=t^\mu} > 0$.

Next, we consider the cases $t^\mu = \{0, B\}$; observe the L.H.S. of (9) or (8) is independent of μ and the R.H.S is decreasing in μ; therefore, if at any μ, (9) is satisfied, then it remains satisfied for all higher μ, so t^μ continues to be B. On other hand, if at any μ, (9) is satisfied, then for a higher μ either it remains satisfied in which case t^μ continues to be zero, or if it gets violated then $t^\mu > 0$ proving the observation. $\square$

Given the observation, it is now immediate that if at any μ, (8) is satisfied, then it remains satisfied at any lower μ, other hand, if at any μ, (9) is satisfied, then it remains satisfied at all μ higher than that. Accordingly, we provide a formal definition of the thresholds of posterior belief introduced in Definition 1, part (ii):

Definition 5. *1. $\underline{\underline{\mu}}$ is the highest μ such that $t^\mu = 0$, i.e. at all $\mu > \underline{\underline{\mu}}$, (8) does not hold and hence, $t^\mu > 0$ and at all $\mu \leq \underline{\underline{\mu}}$, (8) holds and hence $t^\mu = 0$. If at $\mu = 0$, (8) does not then $\underline{\underline{\mu}} = 0$.*

2. $\bar{\mu}$ is the lowest μ such that $t^\mu = B$, i.e. at all $\mu < \bar{\mu}$, (9) does not hold and hence, $t^\mu < B$ and at all $\mu \geq \bar{\mu}$, (9) holds and hence $t^\mu = B$. If at $\mu = 1$, (9) does not then $\bar{\mu} = 1$.



Proof of Observation 1.

The ideal transfer t^μ is increasing in the posterior belief μ.: See the proof of Observation 2.

The ideal transfer t^μ is decreasing in private consumption endowment C. We first consider interior t^μ, and differentiate (10) with respect to C

$$\frac{\partial t}{\partial C}\bigg|_{t=t^\mu} = \frac{-u''(C+t^\mu)}{-\frac{\partial}{\partial t^2}\pi^2(t) - u''(C+t)}\bigg|_{t=t^\mu} < 0$$

this is because given the concavity of u, the numerator is negative and the denominator is positive as both π and u are concave.

Suppose $t^\mu = B$, then by (8), we have

$$u'(C) \leq -\frac{\partial}{\partial t}\pi(B).$$

When C increases, the LHS decreases. So, the inequality continues to hold and $t^\mu = 0$.

Suppose $t^\mu = B$, then by (9), we have

$$u'(C+B) \geq -\frac{\partial}{\partial t}\pi(0).$$

When C increases, the LHS decreases. So, either the inequality still holds, in which case t^μ remains equal to B; or it no longer holds, in which case t^μ must be decreased such that (10) is satisfied.

The expected utility from t^μ, $V(t^\mu)$ is decreasing in μ. See the first part of the proof of Claim 4.

At any μ, $V(t^\mu)$ is increasing in C. We prove it for internal t^μ, that is when $t^\mu \in (0, B)$. It can be proved for $t^\mu = \{0, B\}$ using similar logic.

Suppose $t^\mu \in (0, B)$, we differentiate $V(t^\mu, \mu)$ with respect to C and apply Envelope condition we get:

$$\begin{aligned}
&\frac{\partial V(t^\mu, \mu)}{\partial C} \\
=&u'(C+t^\mu) + [u'(C+t^\mu) - \delta(1-\mu)R_2(e^*(t^\mu, \mu), B - t^\mu)]\frac{\partial t^\mu}{\partial C} \\
=&u'(C)
\end{aligned}$$

where the last equality due to the fact that $[u'(C+t^\mu) - \delta(1-\mu)R_2(e^*(t^\mu, \mu), B - t^\mu)] = 0$ at t^μ.

The thresholds of the posterior belief $\underline{\underline{\mu}}$ and $\bar{\mu}$ are increasing in C. Recall that at $\mu = \underline{\underline{\mu}}$

$$u'(C) = -\frac{\partial}{\partial t}\pi(B) = \delta(1-\mu)R_2(e^*, B)$$

and, at $\mu = \bar{\mu}$

$$u'(C+B) = \delta(1-\mu)R_2(e^*, 0)$$

L.H.S. of both are decreasing in C and R.H.S. are decreasing in μ:

$$\left.\frac{\partial^2 \pi}{\partial t \partial \mu}\right|_{t=t^\mu} = -\delta R_2(e^*, B-t) + \delta(1-\mu)R_{21}^{B-t}\left.\frac{\partial e^*}{\partial \mu}\right|_{t=t^\mu} < 0.$$

Therefore, the thresholds must increase with C. □

Proof of Claim 1. Suppose not, and let Party i, if of the corrupt type, announce t_i^c and if of the benevolent type, announce $t_i^b \neq t_i^c$. Thus, these announcements reveal its type fully to the voter.

First, we argue that $t_i^b = \hat{t}$. Since the voter's utility is maximized at $\hat{t}$, Party i would win with probability one by announcing $\hat{t}$ whenever Party j announces $t_j^* \neq \hat{t}$ or the voter is uncertain that

Party j is of benevolent type. Furthermore, the benevolent party's utility is maximized when it wins and announces $\hat{t}$, which maximizes the voter's payoff.

Therefore, if Party j announces any $t_j^* \neq \hat{t}$, or if the voter does not know with certainty that Party j is benevolent, the best response of the benevolent type of Party i is to announce $\hat{t}$. And if Party j announces $t_j^* = \hat{t}$ while the voter does know with certainty that Party j is benevolent, then Party i can win (with positive probability) only if it also announces $\hat{t}$. Therefore, t_i^b must be equal to $\hat{t}$.

Now we turn to the corrupt type of Party i:

Case 1. $t_i^c > \hat{t}$: Even if the corrupt type wins with probability one, it has an incentive to deviate to $\hat{t}$, as in that case it still wins with probability one and can misappropriate $B - \hat{t} > B - t_i^c$.

Case 2. $t_i^c < \hat{t} < B$: (a) Suppose Party i wins with probability one. Then Party j has an incentive to deviate to some $t_j \in (t_i^c, B)$ which ensures Party j's win with certainty.

(b) Suppose Party i wins with probability zero. Then it has an incentive to deviate to $\hat{t}$, as the voter would then believe it to be the benevolent type and hence it would win with positive probability.

(c) Suppose Party i wins with probability $p \in (0, 1)$. Since the voter randomizes, she must be indifferent between the two parties. Party i then has an incentive to deviate to $t = t_i^c + \epsilon$ and win with probability one. $\square$

Proof of Claim 2. By Definition 2, we have

$$u(C + \underline{t}) + \delta[(1 - \lambda_2)R(e^*, B - \underline{t}) + \lambda_2 R(e^*, 0)] - c(e^*) = V(t^{\lambda_1}) \tag{11}$$

$$u(C + \bar{t}) + \delta[(1 - \lambda_2)R(e^*, B - \bar{t}) + \lambda_2 R(e^*, 0)] - c(e^*) = V(t^{\lambda_1}) \tag{12}$$

1. Given Observation 1, we know that $V(t^{\lambda_1})$ is decreasing in λ_1. Thus, $V(\underline{t}_2(t^{\lambda_1}))$ and $V(\bar{t}_2(t^{\lambda_1}))$ must decrease with an increase λ_1. Now, $\underline{t}_2(t^{\lambda_1}) < t^{\lambda_2} < \bar{t}_2(t^{\lambda_1})$. Therefore, $\underline{t}_2(t^{\lambda_1})$ must decrease and $\bar{t}_2(t^{\lambda_1})$ must increase with an increase in λ_1.

   When $t_1 = B$, voter's utility from voting for Party 1 is $V(B)$. Now $\bar{t}_2(t_1) > t^{\lambda_2}$, and $V(t)$ is decreasing in t for all $t > t^{\lambda_2}$ and becomes equal to $V(B)$ at $t = B$.

2. We differentiate (11) with respect to λ_2 and applying Envelope theorem we have
$$\frac{\partial \underline{t}}{\partial \lambda_2} = \frac{\delta[R(e^*, B - \underline{t}) - R(e^*, 0)]}{u'(C + \underline{t}) - \delta(1 - \lambda_2)R_2(e^*, B - \underline{t})}$$
   The numerator is positive given Assumption 1 part (v); and, denominator is positive as $\underline{t} < t^{\lambda_2}$. Therefore, $\underline{t}_2(t_1)$ is increasing in λ_2.

Similarly, by differentiating (12) with respect to λ_2 and applying Envelope theorem we get

$$\frac{\partial \bar{t}}{\partial \lambda_2} = \frac{\delta[R(e^*, B-\bar{t}) - R(e^*, 0)]}{u'(C+\bar{t}) - \delta(1-\lambda_2)R_2(e^*, B-\bar{t})}$$

Though the numerator is positive, the denominator is negative as $\bar{t} > t^{\lambda_2}$. Therefore, $\bar{t}_2(t_1)$ is decreasing in λ_2.

3. (11) with respect to λ_2 and applying Envelope theorem we have

$$\frac{\partial \underline{t}}{\partial C} = -\frac{u'(C+\underline{t})}{u'(C+\underline{t}) - \delta(1-\lambda_2)R_2(e^*, B-\underline{t})}$$

The numerator is positive as u is increasing; and, denominator is positive as $\underline{t} < t^{\lambda_2}$. Thus, $\underline{t}_2(t_1)$ is decreasing in C. □

Proof of Proposition 2.

1. **The voter**'s expected utility, by the definition of $\underline{t}_2(t^{\lambda_1})$ and $\bar{t}_2(t^{\lambda_1})$, is strictly higher from voting for party 2. So she does not have any incentive to deviate.

   Party 2 wins with probability one by announcing t_2^*.

   If it instead announces any other $t \notin [\underline{t}_2(t^{\lambda_1}), \bar{t}_2(t^{\lambda_1})]$, it loses with probability one.

   Now announcing $t = \underline{t}_2(t^{\lambda_1})$ is strictly dominated by $\underline{t}_2(t^{\lambda_1}) + \epsilon$, as that increases the probability of winning from a fraction to one, so for small ϵ, the gain from slightly higher amount to be misappropriated is lower than the gain from higher probability of winning (and misappropriating a slightly lower amount).

   Finally, announcing $t = \underline{t}_2(t^{\lambda_1})$ is strictly dominated by $\underline{t}_2(t^{\lambda_1}) + \epsilon$, as probability of winning as well as the amount which can be misappropriated is strictly higher.

   Party 1 continues to lose with certainty by deviating to any other t, so it does not have any incentive to deviate.

2. It is now obvious to see that no one has any incentive to deviate. □

Proof of Claim 3.

$\hat{\mu}_2(\lambda_1) > 0$:

$$\lambda_1 > 0 \quad \Rightarrow V(t^{\lambda_1}) < V(\hat{t}) \quad \Rightarrow V(\underline{t}_2(t^{\lambda_1})) = V(t^{\lambda_1}) < V(\hat{t}) \quad \text{and, } \underline{t}_2(t^{\lambda_1}) = \hat{t}.$$

$\underline{\hat{\mu}_2(\lambda_1) < \lambda_1}$: As $\lambda_1 > 0$, $t^{\lambda_1} > \hat{t}$. Now

$$V(\hat{t}, \hat{\mu}(\lambda_1)) = V(t^{\lambda_1}, \lambda_1)$$

thus, $\hat{\mu}_2(\lambda_1)$ must be lower than λ_1.

$\underline{\hat{\mu}_2(\lambda_1) \equiv \hat{\mu} \text{ is increasing in } \lambda_1}$: Note that $\underline{t}_2(t^{\lambda_1}) = \hat{t}$ and $V(\underline{t}_2(t^{\lambda_1})) = V(t^{\lambda_1})$.

$$\begin{aligned} V(t^{\lambda_1}) =& u(C+\hat{t}) + \delta[(1-\hat{\mu})R(e^*(\hat{t},\hat{\mu}), B-\hat{t})) + \hat{\mu}R(e^*(\hat{t},\hat{\mu}),0)] - c(e^*(\hat{t},\hat{\mu})) \\ \Rightarrow \quad \frac{\partial V(t^{\lambda_1})}{\partial \lambda_1} =& \left[\delta[(1-\hat{\mu})R_1(e^*(\hat{t},\hat{\mu}), B-\hat{t})) + \hat{\mu}R_1(e^*(\hat{t},\hat{\mu}),0)] - c'(e^*(\hat{t},\hat{\mu}))\right] \frac{e^*(\hat{t},\hat{\mu})}{\partial \hat{\mu}} \frac{\partial \hat{\mu}}{\partial \lambda_1} \\ & -\delta[R(e^*(\hat{t},\hat{\mu}), B-\hat{t})) - R(e^*(\hat{t},\hat{\mu}),0)] \frac{\partial \hat{\mu}}{\partial \lambda_1} \end{aligned}$$

Due to the Envelope condition, which boils down to

$$\frac{\partial \hat{\mu}}{\partial \lambda_1} = -\frac{\partial V(t^{\lambda_1})/\partial \lambda_1}{\delta[R(e^*(\hat{t},\hat{\mu}), B-\hat{t})) - R(e^*(\hat{t},\hat{\mu}),0)]} \tag{13}$$

Now, from Observation 1 we know that $V(t^{\lambda_1})$ is decreasing in λ_1 when $\lambda_1 < \bar{\mu}$. And from Assumption 1 part (v), the denominator of R.H.S. is positive. Therefore, the L.H.S. must be positive.

$\underline{\hat{\mu}_2(\lambda_1) \text{ remains constant at } \hat{\mu}_2^{\max} \text{ when } \lambda_1 \geq \bar{\mu}}$. Consider (13). When $\lambda_1 \geq \bar{\mu}$, the numerator of the R.H.S. is zero, hence, $\frac{\partial \hat{\mu}}{\partial \lambda_1} = 0$.

$\underline{\hat{\mu}_2(\lambda_1) \text{ is increasing in } C}$.

$$V(t^{\lambda_1}, \lambda_1) = V(\hat{t}, \hat{\mu}(\lambda_1)) = u(C+\hat{t}) + \delta[(1-\hat{\mu})R(e^*(\hat{t},\hat{\mu}), B-\hat{t})) + \hat{\mu}R(e^*(\hat{t},\hat{\mu}),0)] - c(e^*(\hat{t},\hat{\mu}))$$

Differentiating both the sides with respect to C and applying Envelope condition, we get

$$\frac{\partial \hat{\mu}}{\partial C} = \frac{u'(C+\hat{t})}{\delta[R(e^*(\hat{t},\hat{\mu}), B-\hat{t}) - R(e^*(\hat{t},\hat{\mu}),0)]} > 0$$

where the inequality comes from the facts that u is increasing and $R_{12} > 0$ as depicted in Assumption 1 part (v). Hence, the result. □

Proof of Proposition 3.

1. $\lambda_2 < \hat{\mu}_2(\lambda_1)$. Given the definition of $\hat{\mu}_2(\lambda_1)$ and Claim 2 Part 1., we have $\underline{t}_2(t^{\lambda_1}) < \hat{t}$. $\underline{\text{Consider any PBE at which } t_2^* \in (\underline{t}_2(t^{\lambda_1}), \hat{t})}$. What should be the reasonable belief $\mu_2^{**}(t_2)$ if the voter observes $t_2 = \hat{t}$?

Conditional on winning, the benevolent type strictly prefers $\hat{t}$ to t_2^*. If $\mu_2^{**}(\hat{t}) = 0$, then upon observing the off-equilibrium announcement $\hat{t}$, the voter would vote for Party 2 with certainty. Anticipating this, the benevolent type would announce $\hat{t}$ and not t_2^* under reasonable beliefs. Hence, if the voter observes t_2^*, she would reasonably infer that the announcement must come from the corrupt type, and therefore, she would vote for Party 1 with certainty. Knowing this, the corrupt type would not announce t_2^* and would instead announce $\hat{t}$. Thus, the reasonable belief when $t_2 = \hat{t}$ is $\mu_2^{**}(\hat{t}) = \lambda_2$.

As $\lambda_2 < \hat{\mu}_2(\lambda_1)$ and $\underline{t}_2(t^{\lambda_1}) < \hat{t} < t^{\lambda_2} < \bar{t}_2(t^{\lambda_1})$, it follows that $V(\hat{t}, \lambda_2) > V(t^{\lambda_1}, \lambda_1)$. Therefore, under reasonable beliefs, the voter votes for Party 2 with certainty upon observing $\hat{t}$. Consequently, no announcement $t_2^* \in (\underline{t}_2(t^{\lambda_1}), \hat{t})$ survives the intuitive criterion.

Consider any PBE at which $t_2^* \in (\hat{t}, \bar{t}_2(t^{\lambda_1}))$. Conditional on winning, both prefer $\hat{t}$ to t_2^*. Therefore, if the voter observes off-equilibrium announcement $\hat{t}$, the reasonable belief would be just the prior, $\mu_2^{**}(\hat{t}) = \lambda_2$. Moreover, since $V(\hat{t}, \lambda_2) > V(t^{\lambda_1}, \lambda_1)$, under reasonable beliefs, the voter votes for Party 2 with certainty upon observing $\hat{t}$. Consequently, no announcement $t_2^* \in (\hat{t}, \bar{t}_2(t^{\lambda_1}))$ survives the intuitive criterion.

2. Consider any PBE at which $t_2^* \in (\underline{t}_2(t^{\lambda_1}), \bar{t}_2(t^{\lambda_1}))$. Conditional on winning, Party 2, irrespective of its type, prefers t_2 to be as low as possible. Therefore, at the PBE that survives the intuitive criterion, Party 2, irrespective of its type, offers $t_2^* = \lim_{\epsilon \to 0} \underline{t}_2(t^{\lambda_1}) + \epsilon$. The voter votes for Party 2 with certainty.

3. Both parties, irrespective of type, announce B. The voter's *ex post* utility is the same regardless of which party wins. As she is *ex post* indifferent, we impose the restriction that she randomizes between the parties with equal probability. Hence, the result. □

Proof of Proposition 4. Fix λ_2

1. Voter's welfare is $V(t_2^*, \lambda_2)$.

$$\frac{\partial V}{\partial \lambda_1} = \frac{\partial V}{\partial t_2^*}\frac{\partial t_2^*}{\partial \lambda_1}$$
$$= \begin{cases} \dfrac{\partial V}{\partial t_2^*}\dfrac{\partial \hat{t}}{\partial \lambda_1} = 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\[2em] \dfrac{\partial V}{\partial t_2^*}\dfrac{\partial \underline{t}_2(t^{\lambda_1})}{\partial \lambda_1} < 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\[2em] \dfrac{\partial V}{\partial t_2^*}\dfrac{\partial B}{\partial \lambda_1} = 0 & \text{if } \lambda_2 \geq \bar{\mu} \end{cases}$$

Recall, when $\lambda_2 \in (0, \hat{\mu}_2(\lambda_1))$, $t_2^* = \hat{t}$ and $\hat{t}$ is independent of λ_1, therefore, the voter's utility remains constant. When $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, $t_2^* = \lim_{\epsilon \to 0}[\underline{t}_2(t^{\lambda_1}) + \epsilon]$. Now, from Claim 2, Part 1., we know that $\underline{t}_2(t^{\lambda_1})$ is decreasing in λ_1, but it remains lower than t^{λ_2}, therefore, $\dfrac{\partial V}{\partial t_2^*} > 0$. Therefore, $\dfrac{\partial V}{\partial \lambda_1} < 0$. Finally, when $\lambda_2 \geq \bar{\mu}$, $t_2^* = B$ which is again independent of λ_2.

2. Voter's effort choice is $e^*(t_2^*, \lambda_2)$.

$$\frac{\partial e^*(t_2^*, \lambda_2)}{\partial \lambda_1} = \frac{\partial e^*(t_2^*, \lambda_2)}{\partial t_2^*}\frac{\partial t_2^*}{\partial \lambda_1}$$
$$= \begin{cases} \dfrac{\partial e^*}{\partial t_2^*}\dfrac{\partial \hat{t}}{\partial \lambda_1} = 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\[2em] \dfrac{\partial e^*}{\partial t_2^*}\dfrac{\partial \underline{t}_2(t^{\lambda_1})}{\partial \lambda_1} > 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\[2em] \dfrac{\partial e^*}{\partial t_2^*}\dfrac{\partial B}{\partial \lambda_1} = 0 & \text{if } \lambda_2 \geq \bar{\mu} \end{cases}$$

From Proposition 1, we know $\dfrac{\partial e^*}{\partial t_2^*} < 0$. The rest follows from logic discussed in Part 1.

3. Expected Corruption is $EC = \lambda_2[B - t_2^*]$.

$$\begin{aligned}\frac{\partial EC}{\partial \lambda_1} &= - \lambda_2 \frac{\partial t_2^*}{\partial \lambda_1}\\ &= \begin{cases} \lambda_2 \dfrac{\partial \hat{t}}{\partial \lambda_1} = 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\ \\ \lambda_2 \dfrac{\partial \underline{t}_2(t^{\lambda_1})}{\partial \lambda_1} > 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\ \\ \lambda_2 \dfrac{\partial B}{\partial \lambda_1} = 0 & \text{if } \lambda_2 \geq \bar{\mu} \end{cases}\end{aligned}$$

It follows directly from the discussion above. □

<u>*Proof of Proposition 5.*</u> Fix λ_1

1. Voter's welfare is $V(t_2^*, \lambda_2)$.

$$\begin{aligned}\frac{\partial V}{\partial \lambda_2} =& \frac{\partial V}{\partial t_2^*}\frac{\partial t_2^*}{\partial \lambda_2} + \frac{\partial V}{\partial \lambda_2}\\ =& \begin{cases} \dfrac{\partial V}{\partial t_2^*}\dfrac{\partial \hat{t}}{\partial \lambda_2} + \dfrac{\partial V}{\partial \lambda_2} < 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\ \\ 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\ \\ \dfrac{\partial V}{\partial t_2^*}\dfrac{\partial B}{\partial \lambda_1} + \dfrac{\partial V}{\partial \lambda_2} = 0 & \text{if } \lambda_2 \geq \bar{\mu} \end{cases}\end{aligned}$$

This is because both $\hat{t}$ and B are constant, and $\dfrac{\partial V}{\partial \lambda_2} < 0$ when $\lambda_2 < \bar{\mu}$.

V remains constant when $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, because it remains constant at $\lim_{\epsilon^v \to 0}[V(t^{\lambda_1}, \lambda_1) + \epsilon^v]$. Recall at this range $t_2^* = \lim_{\epsilon \to 0}[\underline{t}_2(t^{\lambda_1}(+\epsilon]$.

2. Voter's effort choice is $e^*(t_2^*, \lambda_2)$.

$$\frac{\partial e^*(t_2^*,\lambda_2)}{\partial \lambda_2} = \frac{\partial e^*(t_2^*,\lambda_2)}{\partial t_2^*}\frac{\partial t_2^*}{\partial \lambda_2} + \frac{\partial e^*(t_2^*,\lambda_2)}{\partial \lambda_2}$$
$$= \begin{cases} 0 + \dfrac{\partial e^*(t_2^*,\lambda_2)}{\partial \lambda_2} < 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\ \\ \dfrac{\partial e^*}{\partial t_2^*}\dfrac{\partial \underline{t}_2(t^{\lambda_1})}{\partial \lambda_2} + \dfrac{\partial e^*(t_2^*,\lambda_2)}{\partial \lambda_2} < 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\ \\ \dfrac{\partial e^*}{\partial t_2^*}\dfrac{\partial B}{\partial \lambda_2} + \dfrac{\partial e^*(t_2^*,\lambda_2)}{\partial \lambda_2} = 0 & \text{if } \lambda_2 \geq \bar{\mu} \end{cases}$$

From Proposition 1, we know that $\frac{\partial e^*(t_2^*,\lambda_2)}{\partial \lambda_2} < 0$ when $\lambda_2 < \bar{\mu}$ and $\frac{\partial e^*(t_2^*,\lambda_2)}{\partial \lambda_2} = 0$ otherwise; and $\frac{\partial e^*}{\partial t_2^*} < 0$. From Claim 2, we have $\frac{\partial \underline{t}_2(t^{\lambda_1})}{\partial \lambda_2} > 0$.

3. Expected Corruption is $EC = \lambda_2[B - t_2^*]$.

$$\frac{\partial EC}{\partial \lambda_2} = B - t_2^* - \lambda_2 \frac{\partial t_2^*}{\partial \lambda_2}$$
$$= \begin{cases} B - t_2^* > 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\ \\ B - t_2^* - \lambda_2 \dfrac{\partial \underline{t}_2(t^{\lambda_1})}{\partial \lambda_2} \gtreqless 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\ \\ B - B - 0 = 0 & \text{if } \lambda_2 \geq \bar{\mu}. \end{cases}$$

Hence, the result.

$\hat{\mu}_2(\lambda_1)$ is (weakly) increasing in λ_1.: See Claim 3. □

Proof of Proposition 6. Fix λ_1 and λ_2

1. Voter's welfare is $V(t_2^*, \lambda_2)$.

$$\begin{aligned}\frac{\partial V}{\partial C} =& u'(C+t_2^*) + \frac{\partial u(C+t_2^*)}{\partial t_2^*}\frac{\partial t_2^*}{\partial C} + \frac{\partial \pi(t_2^*, \lambda_2)}{\partial t_2^*}\frac{\partial t_2^*}{\partial C} \\ >& \begin{cases} 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\ \\ 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\ \\ 0 & \text{if } \lambda_2 \geq \bar{\mu} \end{cases}\end{aligned}$$

This is because both $\hat{t}$ and B are constant, and $u' > 0$. And, when $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, utility is slightly higher than $V(t^{\lambda_1}, \lambda_1)$ and shown in Observation 1, $V(t^{\lambda_1}, \lambda_1)$ increases with C.

2. Voter's effort choice is $e^*(t_2^*, \lambda_2)$.

$$\begin{aligned}\frac{\partial e^*(t_2^*, \lambda_2)}{\partial C} =& \frac{\partial e^*(t_2^*, \lambda_2)}{\partial t_2^*}\frac{\partial t_2^*}{\partial C} \\ =& \begin{cases} 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\ \\ \dfrac{\partial e^*}{\partial t_2^*}\dfrac{\partial \underline{t}_2(t^{\lambda_1})}{\partial C} > 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\ \\ 0 & \text{if } \lambda_2 \geq \bar{\mu} \end{cases}\end{aligned}$$

As $\hat{t}$ and B are independent of C, so we get zero when $\lambda_2 \notin [\hat{\mu}_2(\lambda_1), \bar{\mu})$. Now, when $\lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu})$, the optimal $t_2^* = \lim_{\epsilon \to 0}[\underline{t}_2(t^{\lambda_1}) + \epsilon]$. Now recall, from Claim 2 Part 3. $\underline{t}_2(t^{\lambda_1})$ decreases with C. And, from Proposition 1, we know that e^* increases with $B - t_2^*$ and hence decreases with t_2^*.

3. Expected Corruption is $EC = \lambda_2[B - t_2^*]$.

$$\begin{aligned}\frac{\partial EC}{\partial C} =& \lambda_2 \frac{\partial t_2^*}{\partial C} \\ =& \begin{cases} 0 & \text{if } \lambda_2 \in (0, \hat{\mu}_2(\lambda_1)), \\ \\ > 0 & \text{if } \lambda_2 \in [\hat{\mu}_2(\lambda_1), \bar{\mu}), \\ \\ 0 & \text{if } \lambda_2 \geq \bar{\mu}. \end{cases}\end{aligned}$$

The logic is similar to what we discussed above. Therefore, we skip it here.

$\hat{\mu}_2(\lambda_1)$ and $\bar{\mu}$ are increasing in C.: See Claim 3 and Observation 1. $\square$

Appendix B

A strategy for political party i specifies, for each possible type of the party (corrupt and benevolent), a probability distribution over the feasible set of transfers $t_i \in [0, B]$. Formally, this is a pair of conditional distributions, with densities on $[0, B]$ given by

$$\sigma_i^{\text{corrupt}}(t_i) \equiv \sigma_i(t_i|\text{corrupt}) : [0, B] \to \mathbb{R}_+, \text{ with } \int_0^B \sigma_i^{\text{corrupt}}(t_i)dt_i = 1,$$
$$\text{and } \sigma_i^{\text{benevolent}}(t_i) \equiv \sigma_i(t_i|\text{benevolent}) : [0, B] \to \mathbb{R}_+ \text{ with } \int_0^B \sigma_i^{\text{benevolent}}(t_i)dt_i = 1.$$

Given the announcements of both political parties, t_i and t_j, as a part of their strategies $\sigma_i \equiv \langle \sigma_i^{\text{corrupt}}, \sigma_i^{\text{benevolent}} \rangle$ and $\sigma_j \equiv \langle \sigma_j^{\text{corrupt}}, \sigma_j^{\text{benevolent}} \rangle$, the voter's strategy is a probability distribution:

$$\sigma(\cdot|t_i, t_j) : \{\text{vote for political party } i, \text{vote for political party } j\} \to [0, 1]$$

with

$$\sigma(\text{vote for political party } i|t_i, t_j) + \sigma(\text{vote for political party } j|t_i, t_j) = 1.$$

The expected payoff of party i, if of the corrupt type, from announcing t_i while following strategy $\sigma_i(\cdot|\text{corrupt})$, when party j plays strategy σ_j and the voter plays $\sigma(t_i, t_j)$ is

$$U_i(t_i; \sigma_i, \sigma_j, \sigma|\text{corrupt}) = \int_0^B \tilde{\sigma}_j(t_j) \cdot \sigma(t_i, t_j) \cdot [W + (B - t_i)]dt_j,$$
$$\text{where } \tilde{\sigma}_j(t_j) := \lambda_j \cdot \sigma_j(t_j \mid \text{corrupt}) + (1 - \lambda_j) \cdot \sigma_j(t_j \mid \text{benevolent}).$$

The expected payoff of party i, if of the benevolent type, from announcing t_i while following strategy $\sigma_i(\cdot|\text{benevolent})$, when party j plays strategy σ_j and the voter plays $\sigma(t_i, t_j)$ is

$$\begin{aligned} &U_i(t_i; \sigma_i, \sigma_j, \sigma|\text{benevolent}) \\ &= \int_0^B \tilde{\sigma}_j(t_j) \cdot \Big\{ \sigma(t_i, t_j) \cdot \Big[W + \alpha\big(u(C + t_i) + \delta R(e^*(t_i; \sigma_i), B - t_i) - c(e^*(t_i, \mu_i(t_i); \sigma_i))\big) \Big] \\ &\qquad + \big(1 - \sigma(t_i, t_j)\big)\, \alpha\, V(\sigma_j; t_j) \Big\} dt_j. \end{aligned}$$

Appendix B

Definition 1. *A profile of strategies* $\sigma^* \equiv \langle \{\sigma_i^{corrupt^*}(t_i), \sigma_i^{benevolent^*}(t_i)\}_{i=1,2}, \sigma_v^*(t_1, t_2) \rangle$ *and a system of beliefs* $\{\mu_i^*(t_i)\}_{i=1,2}$ *constitutes a* **Perfect Bayesian Equilibrium (PBE)** *if*

1. σ_v^* *is sequentially rational,*

2. $\mu_i^*(t_i)$ *is derived from* $\{\sigma_i^{corrupt^*}(t_i), \sigma_i^{benevolent^*}(t_i)\}$ *by Bayes rule, as in (1), whenever possible.*

Definition 2. *A PBE, consisting of a profile of strategies* $\sigma^* \equiv \langle \{\sigma_i^{corrupt^*}(t_i), \sigma_i^{benevolent^*}(t_i)\}_{i=1,2}, \sigma_v^*(t_1, t_2)\rangle$ *and a system of beliefs* $\{\mu_i^*(t_i)\}_{i=1,2}$*, satisfies* **Intuitive Criterion** *if*

A. $\mu_i^*(\tilde{t}_i) = 0$ *for any* $\tilde{t}_i$ *is such that*

   (i) $\sigma_i^{corrupt^*}(\tilde{t}_i) = \sigma_i^{benevolent^*}(\tilde{t}_i) = 0,$

   (ii) *for all* $\sigma_v(\tilde{t}_i, t_j^*)$ *we have*

$$U_i^{corrupt}(\tilde{t}_i; \sigma_j^*, \sigma_v(\tilde{t}_i, t_j^*)) < U_i^{corrupt}(t_i^*; \sigma_j^*, \sigma_v^*(t^*, t_j^*))$$

   where

$$U_i^{corrupt}(t_i; \sigma_j, \sigma_v(\tilde{t}_i, t_j)) = \int_0^B \tilde{\sigma}_j(t_j) \cdot \sigma_v(t_i, t_j) \cdot [W + (B - t_i)] dt_j,$$
$$\text{such that } \tilde{\sigma}_j(t_j) := \lambda_j \cdot \sigma_j^{corrupt}(t_j) + (1 - \lambda_j) \cdot \sigma_j^{benevolent}(t_j).$$

   (iii) *for some* $\sigma_v(\tilde{t}_i, t_j^*)$ *we have*

$$U_i^{benevolent}(\tilde{t}_i; \sigma_j^*, \sigma_v(\tilde{t}_i, t_j^*)) < U_i^{benevolent}(t_i^*; \sigma_j^*, \sigma_v^*(t^*, t_j^*)).$$

B. $\mu_i^*(\tilde{t}_i) = \lambda_i$ *for any* $\tilde{t}_i$ *is such that*

   (i) $\sigma_i^{corrupt^*}(\tilde{t}_i) = \sigma_i^{benevolent^*}(\tilde{t}_i) = 0,$

   (ii) *for some* $\sigma_v(\tilde{t}_i, t_j^*)$ *we have*

$$U_i^{corrupt}(\tilde{t}_i; \sigma_j^*, \sigma_v(\tilde{t}_i, t_j^*)) < U_i^{corrupt}(t_i^*; \sigma_j^*, \sigma_v^*(t^*, t_j^*)).$$
$$\text{and } U_i^{benevolent}(\tilde{t}_i; \sigma_j^*, \sigma_v(\tilde{t}_i, t_j^*)) < U_i^{benevolent}(t_i^*; \sigma_j^*, \sigma_v^*(t^*, t_j^*)).$$

Proposition 7. *Consider a median voter and two political parties, 1 and 2, with prior beliefs that they are corrupt with probabilities* λ_1 *and* λ_2*, respectively, with* $\lambda_1 \geq \lambda_2$*. At any parametric condition, multiple PBEs exist:*

1. **Pooling Equilibrium.** *(i) If* $\lambda_2 < \min\{\lambda_1, \bar{\mu}\}$*: Party 1, irrespective of type, announces* $t_1^* = t^{\lambda_1}$ *and Party 2, irrespective of type, announces* $t_2^* = t \in (\underline{t}_2(t^{\lambda_1}), \bar{t}_2(t^{\lambda_1}))$*. The posterior beliefs of the voter is* $\mu_i(t_i^*) = \lambda_i$*, and for any* $t_i \neq t_i^*$*,* $\mu_i(t_i) = 1$*, for* $i = 1, 2$*. The voter votes for party 2 with certainty upon observing* $\langle t_1^*, t_2^*\rangle$*.*

   (ii) If $\lambda_1 = \lambda_2 \in [0, 1]$ *or* $\bar{\mu} \leq \lambda_2 \leq \lambda_1$*: Both paries, irrespective of type, announce* $t_1^* = t^{\lambda_1} = t^{\lambda_2} = t_2^*$*. The posterior beliefs of the voter are* $\mu_i(t_i^*) = \lambda_i$ *and for any* $t_i \neq t_i^*$*,* $\mu_i(t_i) = 1$*, for* $i = 1, 2$*. The voter randomizes, voting for Party 1 with probability* $\sigma_v(t_1^*, t_2^*) \in [0, 1]$*, and for Party 2 with the complementary probability.*

2. **Hybrid Equilibrium.** *The corrupt type, of party i, announces $t_i^* = t_i^m$ with probability θ_i and $t_i^* = B$ with probability $1 - \theta_i$. The benevolent type of party i announces $t_i^* = t_i^m$ with certainty. The posterior beliefs of the voter are*

$$\mu_i(t_i^* = B) = 1, \quad \mu_i(t_i^* = t_i^m) = \frac{\lambda_i \cdot \theta_i}{\lambda_i \cdot \theta_i + (1 - \lambda_i)}, \quad \mu_i(t_i \neq t_i^*) = 1.$$

The pair $\{t_i^m, \theta_i\}$ is such that the voter is indifferent between both parties:

$$V(t_1^*) = V(t_2^*).$$

The voter votes for Party 1 with probability $\sigma_v(t_1^*, t_2^*)$ and for Party 2 with the complementary probability, such that the corrupt types of both parties are indifferent between announcing t_i^m with probability θ_i and B with probability $1 - \theta_i$.

Proof. 2. The indifference conditions of corrupt type of Party 1 and 2 determine the equilibrium probabilities with which the voter votes.

The indifference condition of corrupt type of Party 1:

$$\sigma_v(t_1^m, t_2^m)[W + (B - t_1^m)] = \sigma_v(B, t_2^m)W$$
$$\sigma_v(t_1^m, B)[W + (B - t_1^m)] = \sigma_v(B, B)W$$

$$\Rightarrow \frac{\sigma_v^{m,m}}{\sigma_v^{B,m}} = \frac{\sigma_v^{m,B}}{\sigma_v^{B,B}} = \frac{W}{W + B - t_1^m} \tag{14}$$

where $\sigma_v^{1,2}$: $i = m$, where $i = \{1, 2\}$ if Party i announces t_i^m and $i = B$ if Party i announces B.

The indifference condition of corrupt type of Party 2:

$$(1 - \sigma_v^{m,m})[W + (B - t_2^m)] = (1 - \sigma_v^{m,B})W$$
$$(1 - \sigma_v^{B,m})[W + (B - t_2^m)] = (1 - \sigma_v^{B,B})W$$

$$\Rightarrow \frac{1 - \sigma_v^{m,m}}{1 - \sigma_v^{m,B}} = \frac{1 - \sigma_v^{B,m}}{1 - \sigma_v^{B,B}} = \frac{W}{W + B - t_2^m} \tag{15}$$

From (14) and (15) we get

$$\sigma_v^{B,m} > \max\{\sigma_v^{m,m}, \sigma_v^{B,B}\} \geq \min\{\sigma_v^{m,m}, \sigma_v^{B,B}\} > \sigma_v^{m,B}.$$

The indifference condition of the voter determines the probabilities with which they mix $\{\theta_1, \theta_2\}$ and the announcements with which they pool $\{t_1^m, t_2^m\}$ with the benevolent type.

The voter's indifference condition:

$$\text{When she observes the announcements } \{t_1^m, t_2^m\}: \quad V(t_1^m) = V(t_2^m) \tag{16}$$

$$\text{When she observes the announcements } \{t_1^m, B\}: \quad V(t_1^m) = V(B) \tag{17}$$

$$\text{When she observes the announcements } \{B, t_2^m\}: \quad V(B) = V(t_2^m) \tag{18}$$

$$\text{When she observes the announcements } \{B, B\}: \quad V(B) = V(B) \tag{19}$$

which boils down to

$$t_1^m = \underline{t}_1(t_2^m) = \underline{t}_1(B), \text{ and } \quad t_2^m = \underline{t}_2(t_1^m) = \underline{t}_2(B).$$

And, the posterior beliefs are given by

$$\mu_i(t_i^* = B) = 1, \quad \mu_i(t_i^* = t_i^m) = \frac{\lambda_i \cdot \theta_i}{\lambda_i \cdot \theta_i + (1 - \lambda_i)}, \quad \mu_i(t_i \neq t_i^*) = 1.$$

Finally, we check for the incentive constraints of the benevolent type of both the parties.

The incentive constraint of benevolent type of Party 1:

$$\begin{aligned}
& \sigma_v^{m,m}\,[W + \alpha[u(C + t_1^m) + \delta R(e^*(t_1^m), B - t_1^m) - c(e^*(t_1^m))]] + (1 - \sigma_v^{m,m})V(t_2^m) \\
> \quad & \sigma_v^{B,m}[W + V(B)] + (1 - \sigma_v^{B,m})V(t_2^m) \\
\text{And, } & \sigma_v^{m,B}\,[W + \alpha[u(C + t_1^m) + \delta R(e^*(t_1^m), B - t_1^m) - c(e^*(t_1^m))]] + (1 - \sigma_v^{m,B})V(B) \\
> \quad & \sigma_v^{B,B}[W + V(B)] + (1 - \sigma_v^{B,B})V(B)
\end{aligned}$$

The incentive constraint of benevolent type of Party 2:

$$\begin{aligned}
& \sigma_v^{m,m}\,[W + \alpha[u(C + t_2^m) + \delta R(e^*(t_2^m), B - t_2^m) - c(e^*(t_2^m))]] + (1 - \sigma_v^{m,m})V(t_1^m) \\
> \quad & \sigma_v^{m,B}[W + V(B)] + (1 - \sigma_v^{m,B})V(t_1^m) \\
\text{And, } & \sigma_v^{B,m}\,[W + \alpha[u(C + t_2^m) + \delta R(e^*(t_2^m), B - t_2^m) - c(e^*(t_2^m))]] + (1 - \sigma_v^{B,m})V(B) \\
> \quad & \sigma_v^{B,B}[W + V(B)] + (1 - \sigma_v^{B,B})V(B)
\end{aligned}$$

$\square$

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