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Preliminary Findings

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Abstract

While the existing literature extensively explores the adverse effects of corruption on economic performance, there is limited research on how economic shocks influence corruption and political accountability. To address this gap, we develop a theoretical political model that allows politicians to be corrupt and citizens to punish corruption. In the model, positive economic shocks lead to increased corruption and weakened accountability. We validate these predictions empirically in a series of laboratory experiments conducted with university students in Colombia. Our findings indicate that corruption rates rise significantly during economic booms. Citizens' willingness to punish corrupt politicians remains relatively unchanged across the business cycle. Citizens decide when to punish based on the observed allocation of public goods. Regardless of the state of the economy, low allocations lead to significantly higher punishment than higher allocations, which may lead to the punishment of honest politicians during economic downturns. Additionally, we evaluate the role of expectations in shaping decisions: during positive economic shocks, politicians anticipate reduced punishment, while citizens mistakenly expect a decrease in corruption. These results underscore the need for robust transparency and accountability mechanisms to safeguard governance standards.

Keywords: Rent seeking, Economic Shocks, Corruption, Punishment, Laboratory Experiment
JEL Codes: C91, D9, H30, D31

PRELIMINARY DRAFT[1]
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[1]All estimates are preliminary given that data collection is still underway.

I Introduction

Political corruption disrupts growth (Mauro, 1995; Bardhan, 1997), deepens poverty (Gupta et al., 1998), exacerbates inequality (Olken, 2006), erodes trust between citizens and the state (Keefer and Scartascini, 2022; Khlif and Amara, 2019), and leads to significant economic inefficiencies (Dal Bó and Rossi, 2007; Fisman and Svensson, 2007). Economic and political cycles can intensify or alleviate these harmful effects (Saha and Sen, 2023) and could affect the likelihood of corruption itself.

During economic booms, abundant resources can create more opportunities for corrupt activities (Galbraith, 1997; Leite and Weidmann, 1999). Conversely, recessions can intensify corruption, as the value of rents increases, and public officials may exploit the heightened vulnerability of the populace (Ivlevs and Hinks, 2015; Torsello, 2010). Economic cycles can also affect the perceptions of corruption if citizens assign the downturn to politicians' behavior.

In this paper, we evaluate how economic shocks influence the behavior of politicians when it comes to local corruption[2] and citizens when it comes to the demand for political accountability.[3] To do so, we develop a theoretical model of political corruption and political accountability in the context of taxation and the provision of public goods at the subnational level.[4] To operationalize the economic cycle, we focus on the effect of an exogenous economic shock that reduces (or increases) the construction cost of public goods. This change in prices can affect the politician's choices, the amount of public goods available in the economy, and, henceforth, the decision of citizens to punish the politician.[5] Given that citizens derive utility from public goods (Persson and Tabellini, 2002), negative economic shocks may reduce the allocation of public goods and citizens' well-being. As such, they may decide to punish politicians even in the abscente of corruption.[6]

In our model, a local politician, a national authority, and a citizen interact strategically. In the first stage of the game, nature decides the construction cost of the public good, which is common knowledge, and the citizen pays income taxes that are transferred to the politician. The politician receives the transfer and decides how much to invest in public

[2] In our model, politicians who act as "rent-seekers" rather than "office-seekers" are the ones who frame local corruption (see Persson and Tabellini, 2002)

[3] Our idea of accountability differs from that used in seminal work of political accountability (see Barro, 1973; Przeworski et al., 1999). Instead, we characterize accountability as citizen's willingness to punish politicians while they are in office (Klašnja et al., 2021).

[4] It could be generalized to other contexts.

[5] According to Martínez (2023), royalties from natural resource extraction are another significant source of income for municipalities in Colombia. As a result, fluctuations in construction costs can mirror economic shocks similar to those caused by changes in commodity prices.

[6] We deviate from other studies that employ increments in productivity as the main source of the positive economic shock (see Bai et al., 2017)

goods.[7] Once the politician decides how much to allocate to public goods (and how much to pocket), the national (or higher level) can allocate additional funds to construct public goods. In the last stage of the game, the citizen observes the final allocation of public goods (knowing already the state of the economy), and decides whether to punish or disapprove the politician, which is costly.

In the model, citizens and politicians can have different types. Politicians may have a lower or higher intrinsic motivation for acting with integrity or moral commitment (Martinelli, 2022; Tanner et al., 2022), while citizens may have a differential intrinsic motivation for holding politicians accountable (Adserà et al., 2003; Nannicini et al., 2013).

The presence of a national authority allows us to incorporate two common dimensions: *i)* in most countries, public goods are offered by local and national politicians.[8] *ii)* corruption is facilitated when there is imperfect information about the politician's behavior. Who pays for what and how much is usually not common knowledge for individuals, which creates uncertainty and can reduce accountability (corruption often occurs in secrecy (Shleifer and Vishny, 1993)).

From our theoretical framework, we characterize a signaling equilibrium with two key dynamics. First, politicians who derive higher utility from being honest are less likely to engage in corruption, while citizens who place a lower value on political accountability are less inclined to pay to disapprove of corrupt politicians. Second, when a positive economic shock occurs, politicians become more inclined to engage in corrupt activities, anticipating that citizens will be less vigilant in holding them accountable. This expectation of reduced disapproval increases the expected payoff of being corrupt. Consequently, our model suggests that positive economic shocks not only heighten local corruption but also undermine political accountability.[9]

Given these theoretical findings, and to empirically test our hypotheses, we designed and implemented a series of laboratory experiments with university students in Colombia. In the experiment, participants were assigned to one of two roles: citizens or politicians.[10] Participants were paired using a perfect stranger matching protocol, informed about the game's structure with an emphasis on the importance of public goods, and then engaged in the same activity over multiple rounds. The experimental design featured within-subject

[7] By allowing the politician to decide how much to allocate, we concentrate on "assignment" problems, which are common approaches when thinking about corruption (see Banerjee et al., 2012).

[8] For example, in Colombia, since the 1990s, local and national authorities have shared responsibility for delivering essential public services in the areas of drinking water, sanitation, health, and education (Alesina et al., 2005).

[9] This idea is consistent with the theoretical results developed by Bhattacharyya and Hodler (2010)

[10] Our experimental design uses a loaded framing, where participants were explicitly informed of their role titles. Previous research suggests that framing effects have minimal impact in corruption games (Abbink and Hennig-Schmidt, 2006; Barr and Serra, 2009; Alekseev et al., 2017; Banerjee, 2016).

variation in the construction cost of public goods, which could either be **high cost** or **low cost**, simulating exogenous positive economic shocks. This design allows us to closely examine the impact of economic shocks on political behavior, providing robust empirical evidence for the theoretical framework outlined earlier. Further details of the experimental design are presented in Section III.

In a general framework regarding local political corruption, our preliminary results show that corruption in high-cost environments is approximately 55%.[11] Furthermore, following a positive economic shock, corruption in low-cost environments increases to 62%, reflecting a 7 percentage point increase. Regarding local political accountability, our results show that citizens' willingness to disapprove of politicians stands at 15% in high-cost environments (economic downturns) and 13% in low-cost environments (economic booms). Overall, these point estimates have significant economic implications, suggesting that positive economic shocks lead to an approximate 14*pp* increase in local political corruption and highlight the challenges in sustaining political accountability during periods of economic booms.

Given the structure of the game, the final allocation of public goods also serves as a quality signal of the politician's performance (Mani and Mukand, 2007). Consequently, we examine the impact of the observed public goods allocation on the citizen's willingness to disapprove of the politician (Ferejohn, 1986). Our findings reveal that citizens are willing to incur personal costs to punish corrupt politicians, with a disapproval rate of 33% against those identified as corrupt. In stark contrast, the disapproval rate for honest politicians is a mere 3%, reflecting a strategic approach by citizens: they actively seek to remove corrupt leaders from office while rewarding those who govern with integrity. These results highlight the pivotal role of public accountability mechanisms, suggesting that when citizens are empowered with information and the ability to act, they are not only discerning but also decisive in fostering good governance.

In the economic literature, a substantial body of empirical research has explored the intricate relationship between economic development and corruption.[12] Yet, the nuanced interplay between business cycles and corruption remains less examined, despite its critical importance. As Galbraith (1997) posits, economic booms can amplify corruption opportunities—firms may have greater resources to offer bribes, and politicians might be more eager to exploit the favorable conditions. Empirical evidence by Gokcekus and Suzuki (2011) supports the idea that corruption tends to surge during short-term economic expansions and recede during recessions.

[11] Importantly, the results indicated in this version of the document are preliminary –data collection is still underway

[12] See Mocan (2008); Bai et al. (2017); Treisman (2000); Serra (2006); Ades and Di Tella (1999); Cieślik and Goczek (2018); Huang (2016); Méon and Sekkat (2005); Gründler and Potrafke (2019).

Conversely, an alternate body of literature suggests that economic booms can curtail corruption, while recessions may fuel it.[13] This perspective argues that during downturns, bribes may become more valuable, or that economic crises heighten vulnerability, providing fertile ground for corrupt practices by public officials (Ivlevs and Hinks, 2015). Resolving these conflicting findings is essential, as understanding how economic fluctuations influence corruption could inform more effective policy interventions aimed at reducing corruption across different economic contexts. This paper seeks to fill this gap.

Our paper also contributes significantly to the literature on the relationship between political accountability and economic cycles by exploring how citizens' responses to political corruption vary with economic conditions. Empirical evidence consistently shows that citizens tend to punish corrupt politicians, often resulting in reduced re-election chances for those implicated in corruption (Weitz-Shapiro and Winters, 2013, 2016, 2017; Ferraz and Finan, 2011). However, the propensity to punish corrupt officials during prosperous times presents a nuanced scenario. On one hand, improved economic conditions might lower the relative cost of punitive actions, thereby encouraging increased punishment. On the other hand, the higher opportunity cost of engaging in such actions during times of prosperity may dampen the likelihood of punitive behavior (Lynge and Martinez i Coma, 2022). Furthermore, economic prosperity often enhances overall happiness and tolerance, potentially reducing the public's drive to sanction corrupt activities (Ristei and Gugiu, 2016). Notably, our findings challenge the assumption that economic prosperity uniformly tempers the desire for accountability. Even in low to middle-income countries, where tolerance for corruption is generally higher (Cameron et al., 2009), we observe that citizens are willing to incur personal costs to disapprove of corrupt politicians, regardless of the economic climate. These results underscore the complex interplay between economic conditions and political accountability, highlighting the resilience of civic engagement in the face of corruption.

Lastly, our paper makes an important contribution to the literature on measuring corruption and political accountability in experimental settings.[14] While measuring corruption is notoriously challenging (Armand et al., 2023), we introduce a novel experimental design that effectively measures corruption while maintaining incentives for politicians to avoid detection. Although similar designs have been explored in previous studies,[15] our approach uniquely incorporates scenarios where politicians are either shielded from

[13] For example, some studies suggest that positive income shocks exacerbate corruption (Voors et al., 2011), whereas others find that such shocks mitigate it (Tavares, 2003; Altunbaş and Thornton, 2012; Kéïta and Laurila, 2021)

[14] Corruption observed in lab experiments has been shown to correlate with corruption in participants' home countries (Abbink and Serra, 2012), demonstrating the value of capturing metrics within controlled environments.

[15] See Cubel et al. (2024); Cagala et al. (2019); Abbink et al. (2002); Armantier and Boly (2011); Schulze and Frank (2003); Berninghaus et al. (2013); Martinelli and Esandi (2022); Klašnja and Tucker (2013)

detection, introducing uncertainty, or clearly identified as corrupt or honest, allowing us to assess citizens' willingness to punish under varying economic conditions. Moreover, our experiment isolates the causal effect of economic booms on political corruption while controlling for typical information asymmetries associated with corrupt behavior (Persson et al., 1997).

Building on the existing literature on the willingness to punish corruption in lab settings, our study distinguishes itself by enabling citizens to be fully aware of economic conditions and providing a clear measure of corruption.[16] This innovation allows us to measure the impact of economic booms on political accountability precisely. Furthermore, by incorporating both citizens' and politicians' beliefs regarding corruption and accountability, our study offers a comprehensive and nuanced understanding of these mechanisms, providing valuable insights into the complex interplay between economic shocks and political behavior.

The rest of the paper is organized as follows. In Section II, we establish a theoretical model that provides a framework for our analysis. Section III details our experimental design. Section IV presents our main findings, which shed new light on the interaction between economic conditions and political behavior. In Section V, we offer empirical evidence supporting the mechanisms underlying these results. Section VI concludes.

II Theoretical Model

Consider a model of local corruption involving three agents: a **citizen**, a local **politician**, and a **national authority**. In this setup, all three agents interact within a local municipality. The citizen has an exogenous income $y \in \Re^+$, and the local politician receives a wage $w \in \Re^+$ for serving as a public official. An exogenous tax rate $\tau \in [0, 1]$ is imposed on the citizen's income, resulting in tax revenue for the municipality defined as τy. The politician's responsibility is to decide how much tax revenue to allocate towards the construction of public goods. The politician can choose to be *honest*, allocating the entire budget (τy), or *corrupt*, allocating $(\tau y - r)$, where $r \in (0, \tau y)$ represents the amount of rents extracted while in office.

We define the politician's choice as $h \in \{0, 1\}$ with $h = 1$ meaning that he is *honest* and $h = 0$ meaning he is *corrupt*. Notice that if the politician decides to extract rents, he receives r, and the rest goes to the construction of public goods satisfying the following restriction:

$$\tau y = \boldsymbol{\Theta}(\pi) + r,$$

where $\boldsymbol{\Theta}$ denotes the amount of public goods provided in the municipality, and π denotes

[16] See Sjursen (2023); Martin (2014); Solaz et al. (2019)

the construction cost for each unit of public goods. Specifically, $\pi \in \{\overline{\pi}, \underline{\pi}\} \subset \Re^+$ which means that the municipality may face a *high* or *low* cost, with $\overline{\pi} > \underline{\pi}$. As costs are exogenous, we can think that *higher* costs represent **negative** economic shocks (i.e., exchange devaluation, inflation, etc.), and *lower* costs represent **positive** economic shocks (i.e., exchange revaluation, lower material prices, etc.). Moreover, we say that $\frac{\partial \boldsymbol{\Theta}}{\partial \pi} < 0$, which means that higher costs derive in lower units of public goods.[17] Finally, the construction cost (π) is publicly announced to both the citizen and the politician.

Once the local politician chooses, the **national authority** enters the game by randomly deciding whether to allocate additional resources for public goods in the municipality. We denote the national authority's decision by $\gamma = \{0, 1\}$, where $\gamma = 1$ indicates the allocation of additional resources. Specifically, when the national authority allocates resources, the amount allocated is exactly equal to the rents the politician can extract, meaning the national authority can perfectly offset the politician's decision.[18] Since the national authority's decision is random, we say they allocate resources with probability $\mu \in (0, 1)$, and with probability $(1 - \mu)$, they allocate zero additional resources.[19] Therefore, the national authority acts as a neutral agent in our model, having no specific payoff or strategic choices.

The total amount allocated to construct public goods equals the sum of resources the politician and national authority assign. Additionally, neither the politician's nor the national authority's decision is directly observable to the citizens, who instead observe the final allocation of public goods. Thus, we define the final public provision of public goods in the municipality as:

$$\boldsymbol{\Theta}(\pi, h, \gamma) = \left(\frac{1}{\pi}\right)(\tau y - (1 - h)r + \gamma r), \tag{1}$$

Notice that higher or lower levels of public good allocation provide information to the citizen. For instance, consider a politician that is honest and a national authority that provides resources. In that case, the citizen would observe a **high-allocation** signal $(\boldsymbol{\Theta}^h(\pi)) = \frac{1}{\pi}(\tau y + r)$. Likewise, if the politician is corrupt and the national authority does not provide resources, then the citizen would observe a **low-allocation** signal $(\boldsymbol{\Theta}^l(\pi)) =$

[17] This is consistent with an inverse demand model with $p = a - bQ$ assuming that public goods behave like *normal* goods.

[18] Although this may seem unrealistic, consider an alternative scenario where the national authority allocates $M \in \Re^+$ with $M \neq r$, indicating that different amounts of resources are distributed. However, a significant challenge remains: Citizens often lack precise knowledge of the specific allocations made by each agent. As a result, distinguishing between these allocations becomes inherently difficult due to limited access to information. This informational deficit can be expressed as $M = \epsilon + r$, where $\epsilon \in [-\epsilon, \epsilon]$ represents a parameter that distorts beliefs about resources. This distortion effectively makes the model equivalent to our proposed one, highlighting the practical challenges in resource allocation.

[19] It is essential to mention that $\mu \perp\!\!\!\perp c$, indicating that the national authority's choice is independent of the local politician's decision.

$\frac{1}{\pi}(\tau y - r)$. For completitude, if the politician is corrupt but covered by the national authority or he is honest but do not supported with additional resources, the citizen would observe an **ambiguous-allocation** signal $(\boldsymbol{\Theta}^a(\pi)) = \frac{1}{\pi}(\tau y)$.

Finally, once the **politician** and the **national authority** made their choices, the citizen observes the public's goods allocation $(\boldsymbol{\Theta})$, and then he decides whether to approve or not the politician. We denote the citizen's choice as $\delta \in \{0, 1\}$, with $\delta = 1$, meaning that he decides to disapprove the politician. If the citizen approves the politician, the politician receives his full salary (w), while if the citizen disapproves, then the politician receives a lower salary that is equal to $(w - \eta w)$ with $\eta \in (0, 1)$, being η the severity of the penalty in the municipality. Finally, to disapprove of the incumbent, the citizen has to pay a fixed cost $\kappa \in \Re^+$, representing the private cost of protesting or participating in social unrest. Figure I presents the extensive representation of the model.

[Figure I here]

II.A Agents types

II.A.1 Politician's type

In reality, politicians exhibit a spectrum of behaviors and intentions. Some are genuinely well-intentioned individuals who prioritize public welfare, act with integrity, and derive intrinsic satisfaction from fulfilling their civic duties, while others receive higher benefits from the rents extracted while being in office. To account for this, we define the **politician's type** as ϕ_p where $\phi_p \sim U[0, \widehat{\phi}]$ with $\widehat{\phi} > r$. In particular, the politician's type represents the intrinsic reward for doing the right thing (Martinelli, 2022) or acting with integrity, so the politician privately observes this 'warm-glow' benefit. Finally, he receives this moral reward only when he is *honest* $(h = 1)$.

II.A.2 Citizen's type

Similarly, citizens vary in their propensity to engage in political activism (Chenoweth et al., 2022) and hold their elected officials accountable. Some are inclined to protest and scrutinize politicians relentlessly, irrespective of the circumstances, as they derive a high intrinsic reward from participating in political accountability mechanisms. At the same time, others harbor skepticism regarding the efficacy of their actions in influencing political outcomes. To account for this heterogeneity, we define the **citizen's type** as α_c where $\alpha_c \sim f[0, \overline{\alpha}]$ with $\overline{\alpha} > \max\{\boldsymbol{\Theta}(\underline{\pi}, h, \gamma)\}$. This parameter represents the inherent reward for political accountability or for making the disapproval against politicians salient. Once more, the citizen observes this benefit privately, and he receives this reward only when he disapproves of the politician's mandate.

II.B Payoffs

In our model, the politician derives utility from his public official salary[20] (w), his own 'warm-glow' reward (ϕ_p), and the material payoff for extracting rents while in office (r). Therefore, we can express the politician's payoff as:

$$U_p = w + (1-h)r - \delta\eta w + h\phi_p \tag{2}$$

with $\delta\eta w$ being the monetary punishment received by the disapproval from the citizen.

On the other hand, the citizen derives utility from the public good provision $(\boldsymbol{\Theta})$ and from his non-taxed income $y(1-\tau)$. For simplicity, the public good valuation for each unit is fixed at $\kappa \in \Re^+$. Additionally, notice that the marginal benefit for each unit is equal to the disapproval fixed cost, which means that opting to disapprove of the politician represents a loss of one public good unit.[21] We characterize the citizen's payoff as:

$$U_c = y(1-\tau) + \kappa\boldsymbol{\Theta} + \delta\left((\alpha_c - \boldsymbol{\Theta})\lambda - \kappa\right), \tag{3}$$

where $\lambda \in [0,1]$ denotes the citizen's posterior belief of the politician type once he observes the signal provided by the public goods allocation $(\boldsymbol{\Theta})$. It is worth mentioning that he updates his beliefs in a Bayesian way,[22] and they are consistent with his prior beliefs of corruption $(\beta \in (0,1))$.

In general, citizens may perceive higher returns from protest when public good provision is scarce (Almer et al., 2017; Grossman, 1991). Therefore, higher allocations of public goods act as a reserve utility for citizens. In our model, this reserve utility is represented by $(\alpha_c - \boldsymbol{\Theta})$, where lower allocations of public goods increase the marginal benefit of protest. Additionally, citizens behave in a strategic manner. Therefore, the marginal benefits of non-approval are mediated by the posterior beliefs of corruption (λ). Properly, if a citizen believes with certainty $(\lambda = 1)$ that a politician was corrupt, they would experience the full benefit $(\alpha_c - \boldsymbol{\Theta})$ of disapproval. Conversely, if they believe with certainty that the

[20] While positive economic shocks may influence salaries, we assume that wages remain constant across different settings. Economic shocks might reduce politicians' endowments, potentially decreasing the trust citizens place in them (Barinas-Forero, 2024), or they might increase politicians' salaries, which could lead to a reduction in corruption (Van Rijckeghem and Weder, 2001).

[21] According to Ortiz et al. (2022), social discontent can lead to the devastation of infrastructure and wealth. Images of burning automobiles or buildings are frequently featured in media reports about protests in nations like France, Chile, and Colombia. Consequently, it makes sense to express the cost of protests as the loss of one unit of public goods.

[22] For an specific allocation of public goods, the beliefs updating process follows:

$$\lambda \equiv \Pr\left(\sigma = 0 | \boldsymbol{\Theta}(\pi) = \boldsymbol{\Theta}^m(\pi)\right) = \frac{\Pr\left(\boldsymbol{\Theta}(\pi) = \boldsymbol{\Theta}^m(\pi) | \sigma = 0\right) \times \Pr\left(\sigma = 0\right)}{\Pr\left(\boldsymbol{\Theta}(\pi) = \boldsymbol{\Theta}^m(\pi)\right)} \quad \forall\, m = \{h, a, l\}$$

politician was honest ($\lambda = 0$), they would not benefit from punishment and would only incur the cost of protest.

Figure II summarizes the timeline of the model. The participants type (α_c, ϕ_p), as well as the costs for public goods $\pi = \{\overline{\pi}, \underline{\pi}\}$ are exogenously determined at the beginning of the game. Then, the politician undertakes the policy decision, the national authority randomly decides to provide resources to the municipality, and then the public goods are shown to the citizen. Finally, once the citizen observes the final allocation of public goods, he decides whether to approve the politician or not, and payoffs are realized.

[Figure II here]

II.C Signaling equilibrium

Now, we define strategies, beliefs, and equilibrium for the extensive game of incomplete information played by the citizen and the politician. The information set available for the politician before making his policy choice is characterized by his own type and the public good cost. Therefore, we say that a *strategy for politician* is a mapping σ,

$$\sigma : \mathcal{I}_p \to [0, 1] \quad \textit{where} \quad \mathcal{I}_p \equiv (\phi_p, \pi) \in [0, 1] \times \{\overline{\pi}, \underline{\pi}\},$$

which specifies the probability of adopting the policy decision h as a function of the information received by the politician at the beginning of the game.

Regarding the citizen's behavior, notice that the citizen knows the public good cost, he observes the allocation of public goods $\boldsymbol{\Theta}$ given that cost, and he knows his own intrinsic motivation for disapproval α_c. Thus, we say that a *strategy for the citizen* is a mapping ν,

$$\nu : \{\boldsymbol{\Theta}^h(\pi), \boldsymbol{\Theta}^a(\pi), \boldsymbol{\Theta}^l(\pi)\} \times [0, \overline{\alpha}] \to [0, 1],$$

that goes from the set of possible public goods allocations given a specific cost and the distribution of possible disapproval rates $[0, \overline{\alpha}]$ to a range between $[0, 1]$ that denotes the probability of enforce the punishment against the politician.

Finally, we say that a *belief system* for the citizen is a mapping λ,

$$\lambda : \{\boldsymbol{\Theta}^h, \boldsymbol{\Theta}^a, \boldsymbol{\Theta}^l\} \times \{0, 1\} \to [0, 1]$$

that goes from the observed allocation of public goods $\boldsymbol{\Theta}$ and prior beliefs $\beta \in (0, 1)$ of corruption to a range of updated beliefs of corruption in $[0, 1]$.

Definition 1. *(Signaling Equilibrium) A signaling bayesian equilibrium is given by*

(i) a strategy for the politician (σ)

(ii) a strategy for the citizen (ν)

(iii) a belief system for the citizen (λ) *such that: the citizen strategy* (ν) *is optimal given his beliefs, the citizen beliefs are consistent with the politician strategy; this means that* λ *is derived from prior beliefs* (β) *and the politician strategy using Bayes' rule for every signal, and a politician strategy* (σ) *that is optimal given the citizen strategy.*

II.D Equilibrium analysis

Given the structure and timing of the game, in the final stage of the interaction, the citizen observes the final allocation of public goods and updates his posterior beliefs about corruption in a Bayesian manner. As illustrated in Figure II, the sequential nature of the game allows the politician to forecast the strategic behavior of the citizen in the later stage, so he could decide his optimal choice in the early stage of the game.[23] Therefore, to characterize the equilibrium, we first characterize the citizen's optimal strategy ν and then the politician's optimal strategy σ.

Lemma 1. *In every signal equilibrium, regardless of the cost* (π)*, if the citizen observes a* ***high-allocation*** *signal* $\boldsymbol{\Theta}^h$*, the citizen plays a strategy of no punishment.*

$$\nu(\alpha_c, \boldsymbol{\Theta}^h) = 0$$

Proof. See Online Appendix A.1. □

From Lemma 1, we can establish that regardless of the cost, a high allocation of public goods consistently signals an honest politician, and consequently, even citizens who prioritize political accountability have no incentive to disapprove the incumbent. Overall, this result aligns with the idea that citizens reward good politicians to keep them in office and punish bad politicians to remove them from office.

Definition 2. *(Cutoff strategy). A strategy* ν *is a cutoff strategy if there is some* $\alpha^*(\boldsymbol{\Theta}^m(\pi)) \in (0, \overline{\alpha}]$*, with* $m = \{a, l\}$ *such that:*

$$\nu(\alpha_c, \boldsymbol{\Theta}^m(\pi)) = \begin{cases} 1 & \text{if } \alpha_c \geq \alpha^*(\boldsymbol{\Theta}^m(\pi)) \\ 0 & \text{if } \alpha_c < \alpha^*(\boldsymbol{\Theta}^m(\pi)) \end{cases}$$

Lemma 2. *In every signaling equilibrium, if the citizen observes an* ***ambiguous*** $(\boldsymbol{\Theta}^a(\pi))$ *or* ***low*** *allocation signal* $(\boldsymbol{\Theta}^l(\pi))$*, the citizen plays a cutoff strategy following Definition 2*

Proof. See Online Appendix A.2. □

[23] We employed backward induction rationality introduced by Selten (1965).

From Lemma 2, we say that for each possible $\boldsymbol{\Theta}^m(\pi)$ there is an $\alpha^*(\boldsymbol{\Theta}^m(\pi))$ that defines the citizen's strategy ν. This means that the citizen observes his private intrinsic reward for political accountability, the construction cost, and the final allocation of public goods, and if their intrinsic reward for disapproval is higher than $\alpha^*(\boldsymbol{\Theta}^m(\pi))$, then he would disapprove the politician. Moreover, as citizens receive different information about the allocation of public goods, the cutoff may change according to the construction cost (π) and the observed $\boldsymbol{\Theta}$.

Lemma 3. *In every signaling equilibrium,* $\pi \in \{\overline{\pi}, \underline{\pi}\}$, $\alpha^*(\boldsymbol{\Theta}^l(\pi)) \leq \alpha^*(\boldsymbol{\Theta}^a(\pi))$

Proof. See Online Appendix A.3. □

From Lemma 3, we observe that the deciding cutoff under an ambiguous allocation is always greater than or equal to the deciding cutoff under a low allocation. Thus, to punish under ambiguous allocations, citizens should have a higher reward for intrinsic disapproval than citizens who punish under low allocations. Furthermore, a citizen who punishes a politician under an ambiguous allocation—where uncertainty about corruption exists—will also punish under a low allocation, where there is certainty that the politician was corrupt. Overall, this characterizes the citizen's strategy for each possible cost and observed allocation of public goods.

Given that we have already characterized a citizen's best strategy (ν) that follows a consistent belief system (λ), and in order to characterize a signaling equilibrium presented in Definition 3, it remains to characterize a politician's optimal strategy that is consistent with the citizen's best strategy.

Definition 3. *(Threshold strategy). A strategy* σ *is a threshold strategy if there is some* $\phi^*(\pi) \leq \widehat{\phi}$, *and for every* $\pi \in \{\overline{\pi}, \underline{\pi}\}$ *such that:*

$$\sigma(\phi_p) = \begin{cases} 1 & \text{if } \phi_p \geq \phi^*(\pi) \\ 0 & \text{if } \phi_p < \phi^*(\pi) \end{cases}$$

Lemma 4. *In every signaling equilibrium, the politician enforces a threshold strategy following Definition 3*

Proof. See Online Appendix A.4. □

From Lemma 4, we say that there is a $\phi^*(\pi)$ that defines the politician strategy σ. This means that the politician observes his private intrinsic reward for doing the right thing (ϕ_p), the construction cost, and then he compares the expected payoff of being corrupt

versus being honest. If his intrinsic reward for acting with integrity is higher than $\phi^*(\pi)$, he would be honest and allocate the entire budget to construct public goods.

II.E Impact of Economic Shocks over Political Corruption and Accountability

Regarding the impacts of positive economic shocks on political corruption and political accountability, we first define a positive economic shock as a shift in construction costs from a high cost $(\overline{\pi})$ to a low cost $(\underline{\pi})$. Moreover, these cost changes are randomly determined and announced to citizens and politicians at the beginning of the game, so optimal cutoffs presented in Lemma 2 and Lemma 4 may vary across construction costs. With this in mind,

Theorem 1. *In a signaling equilibrium, and for all* $m = \{a, l\}$*, if* $\overline{\pi} \geq \underline{\pi}$*, then*

$$\alpha^*(\boldsymbol{\Theta}^m(\overline{\pi})) \geq \alpha^*(\boldsymbol{\Theta}^m(\underline{\pi}))$$

Proof. See Online Appendix A.5. □

The main result of our theoretical model is that positive economic shocks, which reduce the construction cost from $\overline{\pi}$ to $\underline{\pi}$, decrease the willingness to punish politicians by raising the optimal cutoff $\alpha^m(\boldsymbol{\Theta})$. This increase in the cutoff applies regardless of the observed allocation (m), indicating a general trend toward less punishment under both low and ambiguous allocations. Consequently, we can also derive the following straightforward corollary:

Corollary 1. *In a signaling equilibrium, and for all* $\boldsymbol{\Theta}^m$ *with* $m = \{a, l\}$*, if* $\overline{\pi} \geq \underline{\pi}$*, then*

$$\int_0^{\alpha^*(\boldsymbol{\Theta}^m(\overline{\pi}))} f(\alpha)\, d\alpha \geq \int_0^{\alpha^*(\boldsymbol{\Theta}^m(\underline{\pi}))} f(\alpha)\, d\alpha$$

Proof. See Online Appendix A.6. □

As a direct consequence of Theorem 1, Corollary 1 demonstrates that, for a given increase in the optimal cutoff points and a given signal $\alpha^*(\boldsymbol{\Theta}^m)$, a politician is more likely to face punishment in high-cost environments compared to low-cost settings.

Figure IV visually illustrates the changes in the probability of punishment. Specifically, it compares the initial pair of cutoffs, $\alpha^*(\overline{\pi}) = \{\alpha^*(\boldsymbol{\Theta}^l(\overline{\pi})), \alpha^*(\boldsymbol{\Theta}^a(\overline{\pi}))\}$ with the new pair of cutoffs $\alpha^*(\underline{\pi}) = \{\alpha^*(\boldsymbol{\Theta}^l(\underline{\pi})), \alpha^*(\boldsymbol{\Theta}^a(\underline{\pi}))\}$, following the cost reduction. The figure demonstrates that, after the positive economic shock, individuals who were previously inclined to punish under a low-allocation signal may no longer do so. Furthermore, those who

were willing to punish under an ambiguous-allocation signal will now only punish under a low-allocation signal, which allows some politicians to be covered by the national authority's choice.

[Figure IV here]

Finally, we need to examine the impact of a positive economic shock on the politician's marginal propensity to engage in corrupt activities.

Theorem 2. *In a signaling equilibrium, if* $\overline{\pi} \geq \underline{\pi}$

$$\phi^*(\overline{\pi}) \leq \phi^*(\underline{\pi})$$

Proof. See Online Appendix A.7. □

Referring back to Corollary 1, it is evident that a positive economic shock results in a decreased probability of punishment for politicians. This reduction in punishment risk intuitively lowers the costs associated with corrupt behavior, thereby enhancing the expected benefits of engaging in such activities. As a direct consequence, the optimal threshold point for assessing a politician's honesty increases, which is explicitly detailed in Theorem 2. This shift in the cutoff point reflects the heightened incentive for corruption following the economic shock.

Corollary 2. *In a signaling equilibrium with* $\phi^*(\underline{\pi}) \in \mathfrak{R}^+$, *if* $\overline{\pi} \geq \underline{\pi}$

$$\int_0^{\phi^*(\overline{\pi})} U(\phi)\, d\phi \leq \int_0^{\phi^*(\underline{\pi})} U(\phi)\, d\phi$$

Proof. This result follows directly from the procedure described in Online Appendix A.6, by changing $\alpha^*(\boldsymbol{\Theta}^m(\pi))$ to $\phi^*(\pi)$. □

Finally, Corollary 2 illustrates a direct implication of Theorem 2: the likelihood of a politician engaging in corruption is greater when construction costs are low compared to when construction costs are high. Figure III visually demonstrates these results. Overall, these findings underscore the significant influence of economic conditions on both corrupt behavior and political accountability.

[Figure III here]

III Experimental Design

Building on these theoretical results, we conducted a series of laboratory experiments using oTree (Chen et al., 2016). The experiments involved 541 college students recruited through the Rosario Experimental and Behavioral Economics Lab (REβEL, Greiner (2015)) at Universidad del Rosario. We collected data from 12 independent sessions, each lasting an average of one and a half hours.

III.A Political Corruption Game (PCG)

The main activity of the experiment was a political corruption game (PCG) that recreates our theoretical model. Participants were randomly assigned to one of two roles: **politician** (P) or **citizen** (C), and this role remained fixed for the entire session. Each citizen received an endowment of 100 experimental points (EP),[24] while each politician had a potential salary of 120 EP. Participants were paired with a member of the opposite role, knowing they would interact under a perfect stranger-matching design.

Once paired, the citizen paid 40 EP in taxes, which were transferred to the politician. The politician's main task was deciding how much to allocate to construct public goods. Specifically, the politician could allocate the entire budget (40 EP) or half of the budget (20 EP) and keep the other half for himself. In this economy, public goods are crucial because they represent additional income for the citizen. Therefore, at the beginning of the experiment, both participants were informed that each unit of public goods constructed would generate an additional income of 30 EP for the citizen, making higher allocations of public goods socially preferable and making salient the public officer duty with the citizen.

In this setup, each unit of public goods has a cost. Participants knew that the construction cost could be either 20 EP (high cost) or 10 EP (low cost), with both occurring with equal probability. Both participants were informed about the public goods cost (π_r) at the beginning of each round, so no information asymmetry about the state of the economy was present. After observing the public goods cost (π_r), and once the politician made their allocation decision, the computer simulated a national authority by randomly deciding whether to allocate additional funds. If the computer allocated resources, 20 EP were added to the construction of public goods; otherwise, only the politician's allocation was employed. Moreover, the computer's choice was private, so citizens only observed the final allocation of public goods rather than the politician's allocation or the computer's contribution. It is worth mentioning that public goods were provided following Equation (1).

[24] Equivalent to \$8 USD. Each EP was valued at \$0.08 USD. Participants received \$3 USD as a show-up fee. Citizens (Politicians) earned an average of \$13.3 USD (\$12.9 USD). Given that the minimum wage in Colombia is \$1.42 USD/hour, the earnings obtained are about nine times the hourly minimum wage.

In the last part of the interaction, the citizen observed the public goods final allocation and decided whether to reduce the politician's salary to 80 EP[25] by paying 30 EP or to approve the politician and allow them to receive their full salary. Once the citizen made their choice, the interaction ended, and no feedback was provided within the round.

III.A.1 Additional details

The described interaction repeats over five decision rounds.[26] In each round, participants were asked their first-order beliefs about others' behavior. For instance, politicians were asked to predict the citizen's choice, and citizens were asked to predict the politician's policy choice. Moreover, both measures were incentive-compatible expectations given that each participant earned 5 EP each time they predicted their partner's decision. Finally, as empirical expectations should be asked before receiving information on others behaviors, Figures V display the experimental timelines for each participant.

[Figure V here]

III.A.2 Treatments

We exploit a *within-subjects* design across all five rounds. Given that the cost of public goods (π_r) is randomly selected by the computer at the beginning of the round and were defined at pair level, we denote the following two states of the economy:

- **High-cost environment (Control)**: Under this setting, the construction cost is set to **20EP**. Therefore, the maximum amount of public goods that can be produced is three and the lower amount of public goods that can be produced is one.
- **Low-cost environment (Treatment)**: Under this setting, the construction cost is set to **10EP**. Therefore, the maximum amount of public goods that can be produced is six and the lower amount of public goods that can be produced is two.

III.B Coordination Game (Social Norms)

Finally, the experimental subjects engage in a Krupka and Weber (2013) coordination game, which is employed to elicit incentive-normative expectations from citizens and politicians

[25] Given the structure of the experiment, the utility functions under the PCG are:

$$U_p = 120 + (1-h)20 - \delta(0.33)120 + h\phi_p$$

$$U_c = 100(1-0.4) + 30\boldsymbol{\Theta} + \delta\left((\alpha_c - \boldsymbol{\Theta})\lambda - 30\right)$$

[26] Players knew that only one randomly selected round counts toward the final experimental payment.

during the PCG.[27] Each participant was required to rate the degree of social appropriateness of the politician's behavior under each possible cost. Hence, each subject must indicate whether allocating the entire budget is extremely improper socially, somewhat unsuitable socially, somewhat socially appropriate, or very socially appropriate. Each subject earns 5 EP each time their normative expectation matches the expectation of the majority of his fellows of his own same type. At the end of the activity, the participants completed a non-incentivized final socio-demographic questionnaire and requested to fill in information for payment. Table I presents the descriptive statistics of our sample.

[Table I here]

IV Results

In this section, we analyze the effect of economic shocks over local political corruption and citizen's willingness to punish local politicians. Pooling participants across all the five rounds, we find that incumbents are corrupt 58% (SD = 0.49) of the time. In particular, 25% of the politicians were always corrupt, while 10% of them were always honest.[28] Regarding political accountability, we find that citizens disapprove of politicians 14% (SD = 0.34) of the time, with 55% of them never punishing politicians and less than 1% of them being always punishers.[29]

IV.A Political Corruption

Initially, we examine the impact of a positive economic shock, defined as a randomly occurring low cost in the construction of public goods, on local political corruption. Figure VI illustrates the percentage of corrupt politicians across rounds, segmented by cost type.

[Figure VI here]

From Figure VI, we observe that the unconditional average corruption rate when the cost is high is 54%, and it increases to 62% when the construction cost is low, making this increment statistically significant at standard levels. This increase represents an almost 14% rise in the probability of engaging in corruption compared with the corruption rate under the high cost environment.

[27] The coordination game was implemented at the end of the experiment, and the identity of the players remained anonymous.

[28] The distribution of the number of times politicians were corrupt is presented in Figure B2 in the Online Online Appendix.

[29] This is consistent with the idea of rational punishment, as citizens should not have incentives to punish honest politicians. We present the distribution of the number of times citizens decide to punish the politician in Figure B3 in the Online Appendix.

IV.A.1 Regression Analysis

In order to measure causal treatment effects on political corruption, we estimate the following model:

$$\text{Corrupt}_{p,r,s} = \alpha_0 + \alpha_1 \text{Cost}_{p,r} + x'_p\gamma + \Lambda_r + \eta_s + \varepsilon_{p,r,s}, \tag{4}$$

where $\text{Corrupt}_{i,r,s}$ is a dummy variable that takes the value of 1 if the politician was corrupt and 0 otherwise. $\text{Cost}_{p,r}$ denotes our treatment, and it is a dummy variable that takes the value of 1 if the construction cost was low and 0 if the construction cost was high. Additionally, we include a set of controls (x'_p) that consider sociodemographic variables, a series of round fixed effects (Λ_r) and session fixed effects (η_s). Considering that there is no feedback on the experimental outcomes during the interaction, there is no reason to think that autocorrelation within the experimental group or session occurs. Furthermore, our participants take multiple choices across rounds, so standard errors $(\varepsilon_{p,r,s})$ are clustered at participant level (Abadie et al., 2023).

[Table II here]

Table II depicts the OLS[30] estimates for Equation (4). From Column (1), observe that a low cost in producing public goods leads to a 7.6*pp* increase in the probability of being corrupt. We add several controls, including the participant's age, sex, stratum, trust measure, preference for risk, patience measure, and whether the participant had participated in experiments before. From Column (2), observe that the effect of a positive economic shock is robust to the inclusion of controls and remains economically significant as it shows a 12% increase in the corruption rate compared with the control group. Lastly, Column (3) presents the treatment effect considering the inclusion of round and session fixed effects, as heterogeneity across rounds and sessions may occur. Observe that the average treatment effect is robust to including these controls as it reflects a 6.3*pp* increase in the probability of being corrupt (p-value = 0.019). Overall, the regression results confirm that positive economic shocks, like exogenous reductions in public goods costs, lead to an increase in local corruption of nearly 12%.

IV.B Citizen's willingness to disapprove politicians

Regarding the citizens' willingness to disapprove of politicians, we analyze the effect of reducing the public good's construction cost over the citizens' disapproval rate. Figure VII depicts the percentage of citizens who disapprove politicians across rounds, segmented by cost type. Under high-cost environments, the disapproval rate is 15%, and once the

[30]The results are robust to other estimation methods. We present logit and probit estimators in Table B1 in the Online Appendix.

positive shock occurs, this rate decreases to 13%, although this difference is not statistically significant.

[Figure VII here]

IV.B.1 Regression Analysis

In order to measure the causal treatment effect of economic shocks on citizen's willingness to punish politicians, we estimate the following model:

$$\text{Punish}_{c,r,s} = \alpha_0 + \alpha_1 \text{Cost}_{c,r} + x_c'\gamma + \Lambda_r + \eta_s + \varepsilon_{c,r,s}, \tag{5}$$

where $\text{Punish}_{c,r,s}$ is a dummy variable that takes the value of 1 if the citizen disapproves the politician and 0 otherwise. The variable $\text{Cost}_{c,r}$ denotes our treatment. We include a set of controls (x_c') that consider sociodemographic variables and a series of round (Λ_r) and session fixed effects (η_s). Similarly to our previous specification, standard errors $(\varepsilon_{c,r,s})$ are clustered at participant level.

[Table III here]

Table III present OLS estimates for Equation (8). From Column (1), notice that the disapproval rate under high-cost environments is 15%. While point estimates reflect a reduction in the likelihood of punishment, we do not find statistically significant differences across cost environments, showing that across all rounds citizens are not willingness to punish more when the costs are lower.

Moreover, Figure VIII depicts the average disapproval rate disaggregated by cost and the observed allocation of public goods. Concerning the punishment rate when observing a low-allocation signal, citizens under high-cost and low-cost settings disapprove 33% and 32% of the time (SD = 0.46), respectively. When observing an ambiguous-allocation signal, the disapproval rate under high-cost and low-cost is 9% and 6%, respectively. Finally, the unconditional disapproval rate under high-cost and low-cost when citizens observe a high-allocation signal is close to 5% and 2%, respectively. (SD = 0.18). Overall, we do not observe statistical variation across costs within public goods allocations.[31]

[Figure VIII here]

[31] We do present OLS estimates for Equation (8) disaggregated by public good allocation observed $(\boldsymbol{\Theta})$ in Table B2 in the Online Appendix. Overall, we do not observe statistical differences across costs, and results are consistent with results presented in Table III, showing that we can not reject the null hypothesis that punishment is not equal across cost environments.

IV.C The signal of politician's quality: Public Goods (Θ)

Having established that cost does not significantly impact the willingness to punish politicians, we evaluate the relevance of public goods' signals in the decision to disapprove them. To this end, we estimate the following model:

$$\text{Punish}_{c,r,s} = \alpha_0 + \alpha_1 \boldsymbol{\Theta_c^a} + \alpha_2 \boldsymbol{\Theta_c^l} + x_c'\gamma + \Lambda_r + \eta_s + \varepsilon_{c,r,s}, \tag{6}$$

where $\boldsymbol{\Theta_c^a}$ denotes a dummy variable that takes the value of 1 if the citizen observes an **ambiguous-allocation** signal, 0 otherwise. Similarly, the variable $\boldsymbol{\Theta_c^l}$ is a dummy variable that takes the value of 1 if the citizen observes a **low-allocation** signal, 0 otherwise. We add several controls, including whether the participant's age, sex, stratum, trust measure, preference for risk, patience measure, experience in previous experiments, and a metric for willingness to protest.[32]

[Table IV here]

Table IV presents the OLS estimates for Equation (8). Consistent with our theoretical model, citizens disapprove politicians the less public goods they observe. From Columns (1) to (3), we estimate the average treatment effect for the entire sample. Regression coefficients show that while punishment is close to 4% when observing a **high-allocation** signal, the disapproval rate increases 4*pp* when there is an **ambiguous-allocation** signal, and 30*pp* when there is a **low-allocation** signal. Columns (4) to (6) depicts estimates under a high-cost environment. As can be seen, under high-cost settings, citizens do not punish differently politicians with high or ambiguous allocations (p-value = [0.15, 0.39, 0.39]). However, once they observe a low allocation of public goods, the disapproval rate increase 26*pp*. Finally, from Columns (7) to (9) we present estimates under low-cost environments. Oberve that the punishment pattern is similar, as disapproval rate increases once the allocation of public goods is lower. Overall, citizens are willing to punish corrupt politicians, even if they have to pay relatively more to do so.

V Mechanisms

Now that we have shown that economic shocks increases local political corruption, it is left to assess the mechanisms behind this result.

[32] We constructed a six-item index from LAPOP questions that measure the willingness to protest on various topics, including inequality, corruption, democracy, better salaries, and a better health system. The distribution of these variables is depicted in Figure B4 in the Online Appendix.

V.A Empirical expectations of punishment

The theoretical framework outlined in Section II suggests that local politicians should expect a reduction in the likelihood of punishment following an economic shock. This anticipated decrease in the expected disapproval rate increases the perceived benefits of engaging in corrupt activities, potentially leading to an increase in corruption. Since politicians first decide on policy choices and then respond to their empirical expectations, they may engage in strategic behavior, knowing their choices affect the final allocation of public goods. In particular, corrupt politicians may anticipate that only low or ambiguous allocations are possible, leading to a higher expected disapproval rate.

To adequately evaluate this potential channel, we present the unconditional expected punishment rate across policy decisions segmented by costs. Figure IX illustrates this behavior pooled across rounds. The left panel shows that honest politicians in high-cost environments have an expected disapproval rate of 10%, compared to 6% in low-cost environments (p-value = 0.065). Similarly, the right panel indicates that corrupt politicians in high-cost environments expect to be punished 33% of the time, while in low-cost environments, they expect a reduction of -8*pp* (p-value = 0.04).

[Figure IX here]

V.A.1 Regression Analysis

To validate this channel, we estimate the following model:

$$\text{ExpPunish}^{h}_{p,r,s} = \beta_0 + \beta_1 \text{Cost}_{p,r,s} + x'_p\gamma + \Lambda_r + \eta_s + \varepsilon_{p,r,s}, \tag{7}$$

where $\text{ExpPunish}^{h}_{p,r,s}$ denotes the politicians' expectations of disapproval. Once again, $\text{Cost}_{p,r,s}$ denotes the public goods construction cost and captures our main treatment. We include the same set of sociodemographic controls presented in estimation of Equation (4). Finally, we estimate each model considering if the politician was honest $(\sigma = 1)$ or corrupt $(\sigma = 0)$. The OLS estimates are depicted in Table V.

From Columns (1) to (3), we present estimates for expectations of punishment when the politician was honest. Observe that honest politicians expect to be punished 10% of the time, which is consistent with the uncertainty of the final allocation of public goods that may result in an **ambiguous-allocation** signal. Regarding the effect of a positive economic shock, the coefficients confirm that politicians expect a reduction of 4*pp* in the likelihood of punishment.

[Table V here]

Likewise, Columns (4) to (6) present the estimates when the politician was corrupt. Notice that the expected disapproval rate is close to 34%, and is statistically different compared to

the disapproval rate when the politician is honest (p-value = 0.000). Finally, regarding the effect of the positive economic shock, corrupt politicians expect a reduction of 7*pp* in the punishment likelihood once the positive economic shock. Moreover, the point estimates demonstrate significant economic implications, indicating that economic booms result in a reduction in the expected disapproval rate ranging from -39% to -21% compared to the control group.

V.B Heterogeneous punishment behavior across corruption beliefs

Regarding political accountability behavior, we exploit the citizen's incentive-compatible empirical expectations to estimate how prior beliefs of corruption affect punishment. To this end, in Figure X, we plot the unconditional disapproval rate across the observed final allocation of public goods segmented by prior beliefs of corruption. From Figure X, observe that when citizens observe a low allocation of public goods and were expecting the politician to be honest, the disapproval rate is 44% while citizens that were expecting the politician to be corrupt disapprove 25% of the time. This represents a reduction of nearly 20*pp*. Additionally, when citizens observe an ambiguous allocation, prior beliefs seem to be not relevant, as disapproval rates show minimal variation and are set to be at 8%. Lastly, notice that when citizens observe a high allocation of public goods and were expecting the politician to be honest, the disapproval rate is 2%, and not statistically different from zero, while when they were expecting the politician to be honest, the disapproval rate is 5%. Although the disapproval rate seems to be higher in the latter, this difference is not statistically significant at standard levels.[33]

[Figure X here]

V.B.1 Regression Analysis

Given that punishment seems to be heterogeneous across prior beliefs of corruption, and in order to formally test this mechanism, we estimate the following model:

$$\text{Punish}_{c,r,s} = \alpha_0 + \alpha_1 \boldsymbol{\Theta}_{\boldsymbol{c}}^{\boldsymbol{a}} + \alpha_2 \boldsymbol{\Theta}_{\boldsymbol{c}}^{\boldsymbol{l}} + \alpha_3 \text{BC} + \beta_1 (\boldsymbol{\Theta}_{\boldsymbol{c}}^{\boldsymbol{a}} \times \text{BC}) + \beta_2 (\boldsymbol{\Theta}_{\boldsymbol{c}}^{\boldsymbol{l}} \times \text{BC}) + \Lambda_r + \eta_s + \varepsilon_{c,r,s}, \tag{8}$$

where BC denotes the citizen's prior beliefs of corruption. Table VI shows results on the heterogeneous effect of prior beliefs across observed allocations. From Column (1), observe that prior beliefs of corruption do not increase political accountability; instead, they diminish the disapproval rate. Moreover, while citizens tend to punish politicians when they observe a low allocation of public goods, the disapproval rate is significantly higher if they expect the politician to be honest (44%) vis a vis when they expect the politician

[33] Figure X depicts unconditional disapproval rates across allocations, costs and beliefs. Overall, we do not find differences

to be corrupt (25%). This behavior, rather than aligning with rational motivations for punishment, is consistent with the finding that if citizens expect poor performance, their willingness to punish it is low (see De la Cuesta et al., 2022).

[Table VI here]

V.C Is it cost affecting prior beliefs of corruption?

Given that prior beliefs of corruption affect the citizen's willingness to disapprove, we then estimate the effect of positive economic shocks over prior beliefs of corruption. Table VII depicts OLS estimates of the average treatment effect of a low construction cost over prior beliefs of corruption. Notice that citizens under low-cost environments expect politicians to be 8*pp* less corrupt than under high-cost environments. Furthermore, point estimates show high economic impacts as reductions in the incentive-compatible empirical expectations are close to the 15%. This result shows that citizens do not anticipate an increase in corruption once the shock occurs; instead, they increase their trust in politicians. Overall, the full mechanism can be explained as follows: Given that positive economic shocks lead to an increase in corruption, low allocations of public goods are more frequent. In this setting, citizens trust politicians, but once they observe a low allocation, they feel betrayed, leading to an increase in the disapproval rate.

[Table VII here]

VI Conclusions

In this study, we set out to explore the impact of economic shocks on political corruption and citizens' willingness to hold politicians accountable. While the literature extensively documents the adverse effects of corruption on economic performance, less attention has been paid to how fluctuations in the economy, particularly positive economic shocks, influence both the prevalence of corruption and the accountability mechanisms available to citizens. By addressing this gap, our research not only provides new insights into the dynamics of political behavior during economic changes but also offers a foundation for developing more effective governance strategies. We achieved this by developing a theoretical model and empirically testing its predictions through a series of laboratory experiments.

Our theoretical model provided key insights into the relationship between economic shocks and political behavior. We found that during positive economic shocks, which reduce the cost of public goods, politicians are more inclined to engage in corrupt activities. This is primarily because they anticipate a lower likelihood of being punished by citizens, who may perceive the overall improvement in economic conditions as a reason to overlook

corruption. Additionally, our model suggests that such economic shocks decrease political accountability, as measured by citizens' willingness to disapprove of corrupt politicians. This indicates a general trend toward less punishment and weaker enforcement of political accountability mechanisms.

Empirically, our experiments corroborated these theoretical findings. We observed that corruption rates were significantly higher in low-cost environments following positive economic shocks, with corruption increasing by approximately 14 percentage points compared to the baseline. Furthermore, in these low-cost settings, politicians anticipated a nearly 7 percentage point reduction in the disapproval rate, contributing to the increase in corruption. In contrast, citizens' willingness to disapprove of politicians remained relatively unchanged across cost settings, as they prioritized punishment based on the observed allocation of public goods (Ferejohn, 1986). Specifically, we find that citizens are willing to punish corrupt politicians nearly 33% of the time. These results underscore the crucial role that economic conditions play in shaping both corrupt behavior and the capacity of citizens to enforce accountability.

Based on these findings, we recommend that policymakers be vigilant about the potential for increased corruption during periods of economic growth. It is crucial to strengthen transparency and accountability mechanisms, particularly in times of economic prosperity, to prevent the erosion of governance standards. Future research could expand on our findings by exploring the long-term effects of economic shocks on corruption across different contexts and by examining the role of information dissemination in mitigating the adverse effects of economic booms on political accountability. Additionally, exploring the interaction between various types of economic shocks and different political systems could provide deeper insights into how to effectively combat corruption under varying economic conditions.

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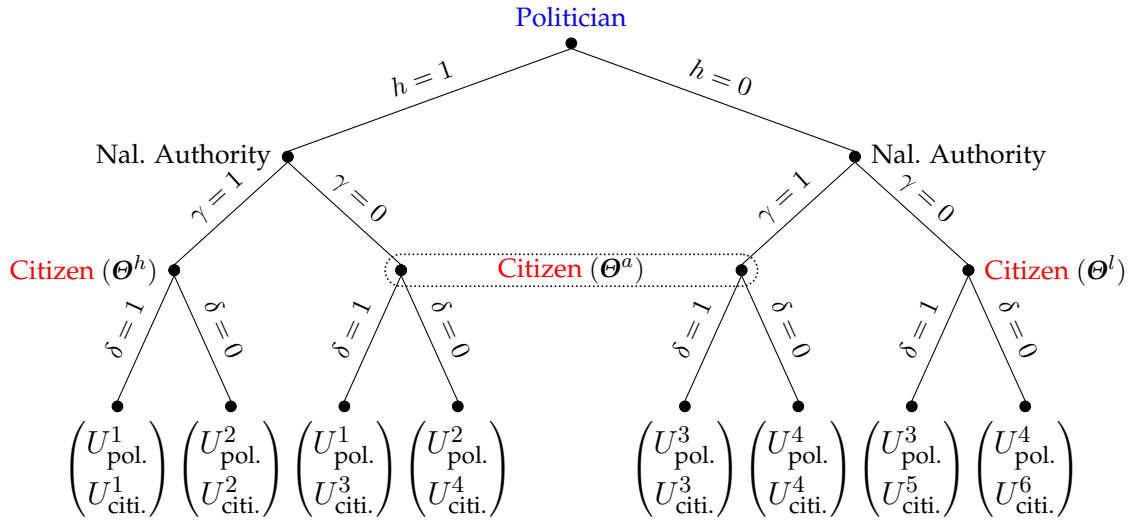
Figures and Tables

Figure I: Extensive Representation of the Political Accountability Game



Notes: We assume that the cost of the public goods was announced at the beginning of the game, and was set to be either $\pi \in \{\overline{\pi}, \underline{\pi}\}$. In the citizen's nodes, and in parenthesis, we present the observed allocation of public goods $\boldsymbol{\Theta}$ given the construction cost. Regarding our experimental setting, we have the following vector of public goods allocations: *Hig-cost* environment: $\left(\boldsymbol{\Theta}^h, \boldsymbol{\Theta}^a, \boldsymbol{\Theta}^l | \overline{\pi} = 20\text{EP}\right) = (3, 2, 1)$ and *Low-cost* environment: $\left(\boldsymbol{\Theta}^h, \boldsymbol{\Theta}^a, \boldsymbol{\Theta}^l | \underline{\pi} = 10\text{EP}\right) = (6, 4, 2)$.

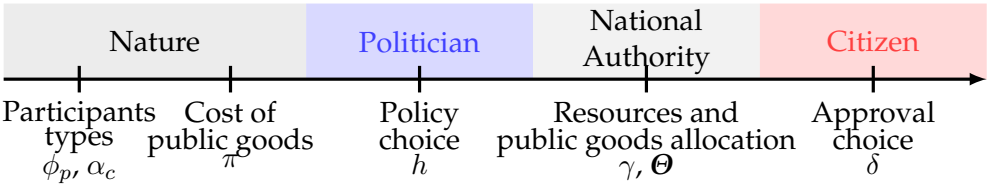
Politician's Payoffs:

$$\begin{pmatrix} U^1_{\text{pol.}} \\ U^2_{\text{pol.}} \\ U^3_{\text{pol.}} \\ U^4_{\text{pol.}} \end{pmatrix} = \begin{pmatrix} w(1-\eta)+\phi_p \\ w+\phi_p \\ w(1-\eta)+r \\ w+r \end{pmatrix}$$

Citizen's Payoffs:

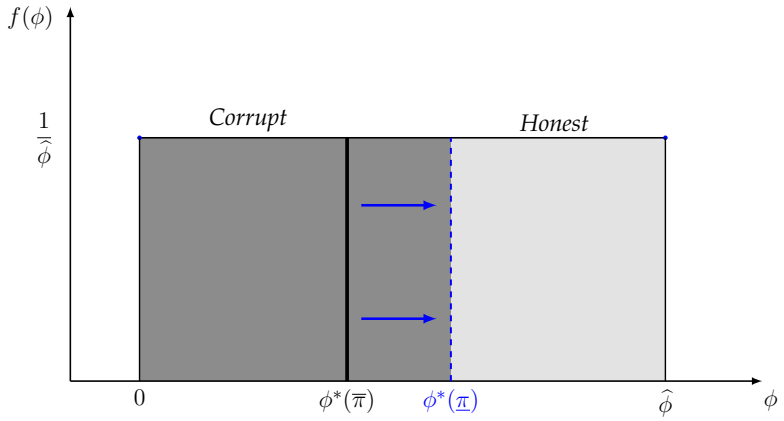
$$\begin{pmatrix} U^1_{\text{citi.}} \\ U^2_{\text{citi.}} \\ U^3_{\text{citi.}} \\ U^4_{\text{citi.}} \\ U^5_{\text{citi.}} \\ U^6_{\text{citi.}} \end{pmatrix} = \begin{pmatrix} y(1-\tau)+\kappa(\boldsymbol{\Theta}^h)-\kappa \\ y(1-\tau)+\kappa(\boldsymbol{\Theta}^h) \\ y(1-\tau)+\kappa(\boldsymbol{\Theta}^a)+((\alpha_c-\boldsymbol{\Theta}^a)\lambda-\kappa) \\ y(1-\tau)+\kappa(\boldsymbol{\Theta}^a) \\ y(1-\tau)+\kappa(\boldsymbol{\Theta}^l)+((\alpha_c-\boldsymbol{\Theta}^l)-\kappa) \\ y(1-\tau)+\kappa(\boldsymbol{\Theta}^l) \end{pmatrix}$$

Figure II: Timeline for the political corruption and accountability model



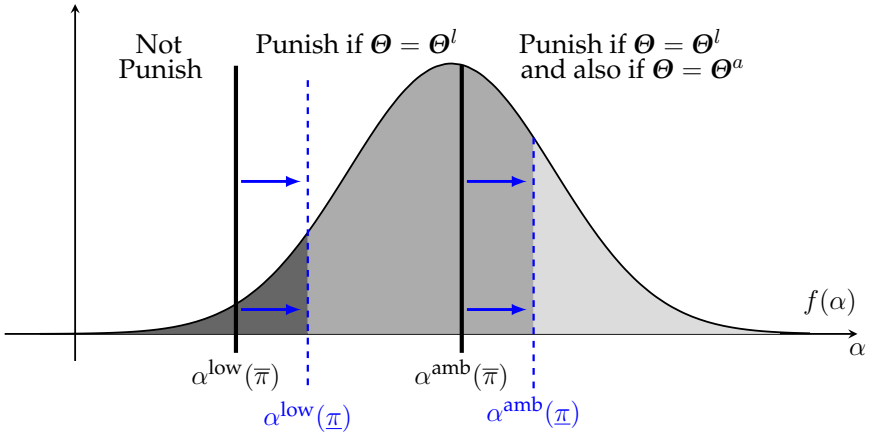
Notes: Participant types are drawn from their corresponding distributions ($\phi_p \sim U[0, \widehat{\phi}]$), ($\alpha_c \sim f[0, \overline{\alpha}]$. The cost of public goods (π) follows a Bernoulli distribution, and $\pi \in \{\overline{\pi}, \underline{\pi}\}$. Finally, the national authority decides to allocate additional resources ($\gamma = 1$) with a probability of $\mu \in (0, 1)$.

Figure III: Politician distribution of types (ϕ) after the economic shock.



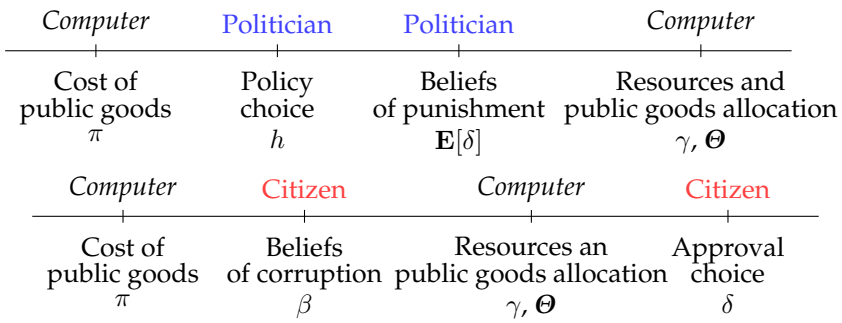
Notes: The figure depicts the distribution of the types ($\phi_p \sim U[0, \widehat{\phi}]$) for the politician. In medium gray, the mass of politicians that are *corrupt*. In light gray, the mass of politicians that are *honest*. In black (solid, $\phi^*(\overline{\pi})$), we present the optimal cutoff under a high-cost setting. In blue (dashed, $\phi^*(\underline{\pi})$), we present the optimal cutoff under a low-cost setting.

Figure IV: Citizen distribution of types (α)



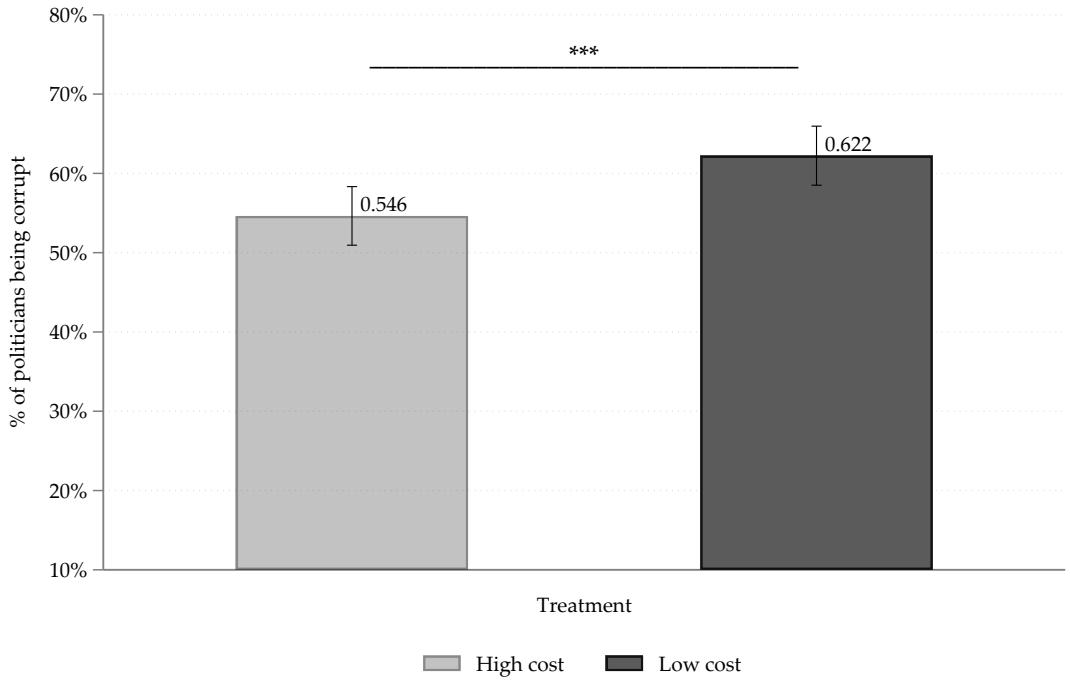
Notes: The figure depicts the distribution of the types ($\alpha_c \sim f[0, \overline{\alpha}]$ for the citizen. In dark gray, the mass of citizens that are *not willing to punish*. In medium gray, the mass of citizens that are *willing to punish* under **low-allocations** of public goods. In light gray, the mass of citizens that are *willing to punish* under *low-allocations* and **ambiguous-allocations** of public goods. In black (solid, $\phi^*(\overline{\pi})$), we present the optimal cutoff under a high-cost setting. In blue (dashed, $\phi^*(\underline{\pi})$), we present the optimal cutoff under a low-cost setting.

Figure V: Experimental Timeline in PCG across participant's types



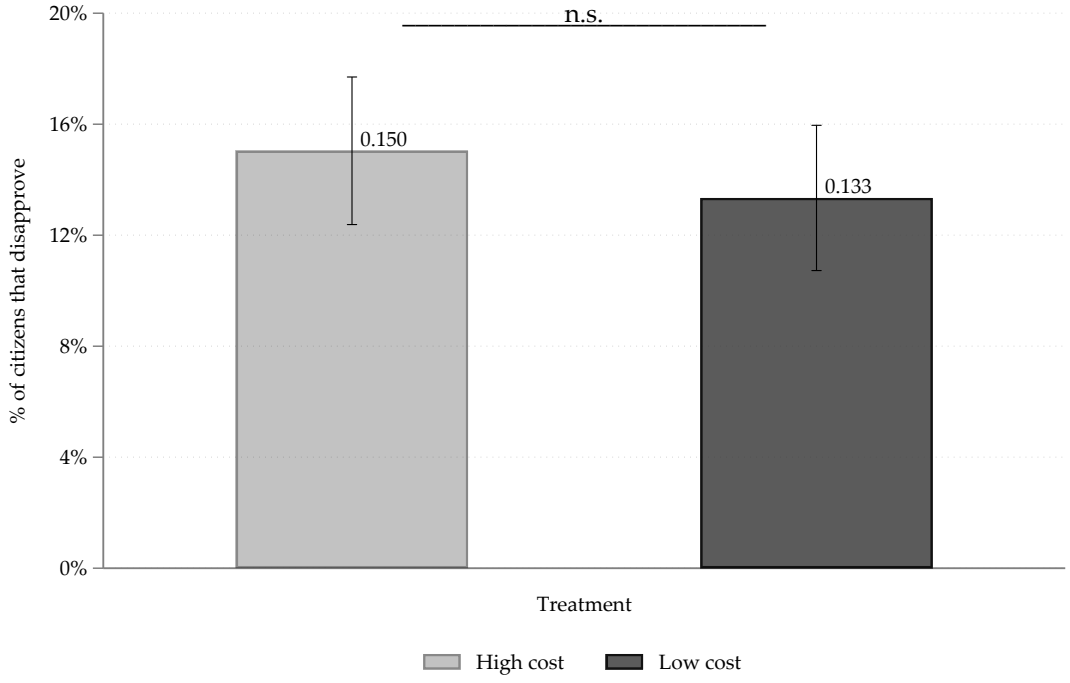
Notes: The figure illustrates the experimental timeline across different participant types. **Beliefs of punishment** refers to the politician's response to the question: "Do you think the citizen would disapprove of you?" **Beliefs of corruption** refers to the citizen's response to the question: "How many resources do you think the politician would allocate?"

Figure VI: Politician corruption segmented by costs (π).



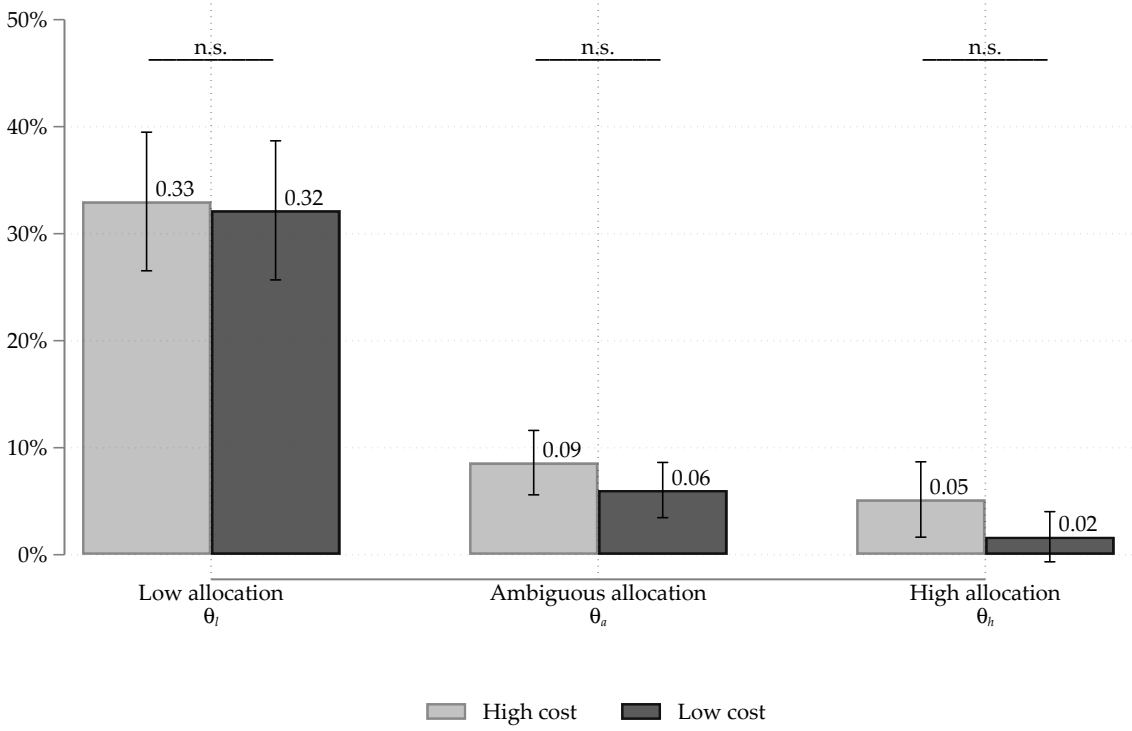
Notes: The figure depicts the average corruption rate by the politician across all rounds, segmented by production costs. **High cost** = 20 EP. **Low cost** = 10 EP. Dark lines show 95% clustered robust confidence intervals. No controls included. $^{***}p < 0.01,^{**}\ p < 0.05,^{*}\ p < 0.1$, n.s $p > 0.1$. Reported significance levels come from hypothesis testing from a fully saturated linear model where the dependent variable is the politician's choice to be honest or corrupt and regressors are dummy variables associated with treatments.

Figure VII: Citizen punishment segmented by costs (π) .



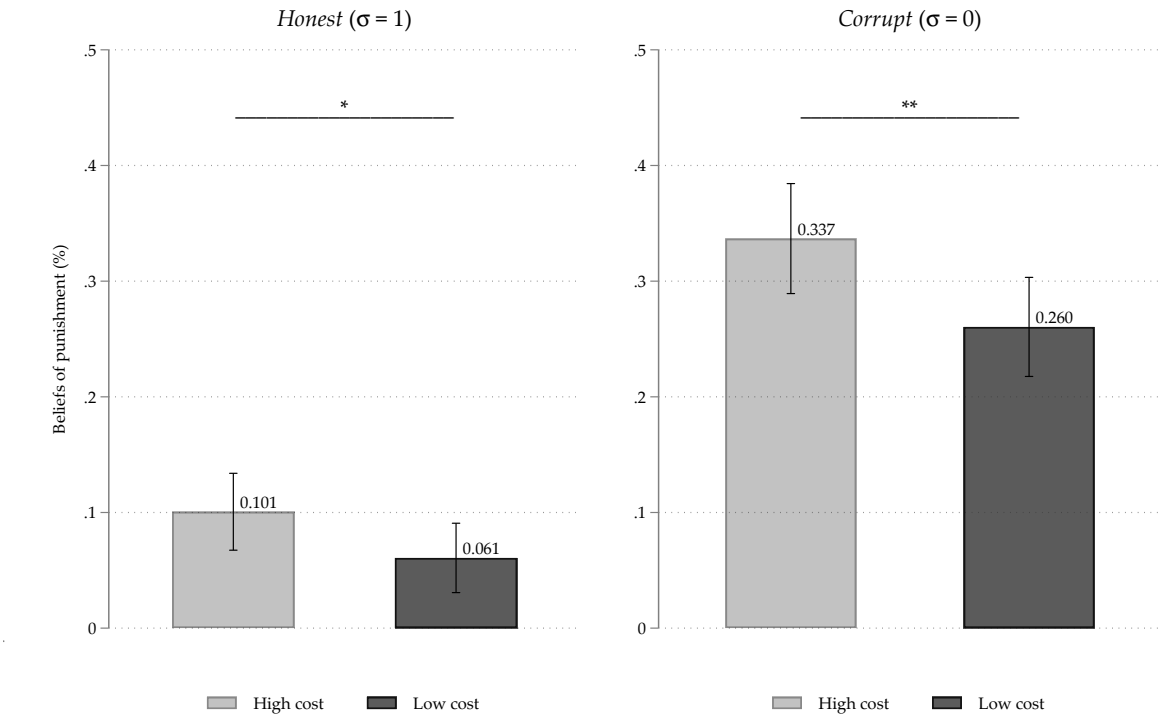
Notes: The figure depicts the average disapproval rate by the citizen across all rounds, segmented by production costs. **High cost** = 20 EP. **Low cost** = 10 EP. Dark lines show 95% clustered robust confidence intervals. No controls included. $^{***}p < 0.01,^{**}\ p < 0.05,^{*}\ p < 0.1$, n.s $p > 0.1$. Reported significance levels come from hypothesis testing from a fully saturated linear model where the dependent variable is the citizen's choice to disapprove the incumbent and regressors are dummy variables associated with treatments.

Figure VIII: Citizen punishment segmented by costs (π) across allocations $(\boldsymbol{\Theta})$.



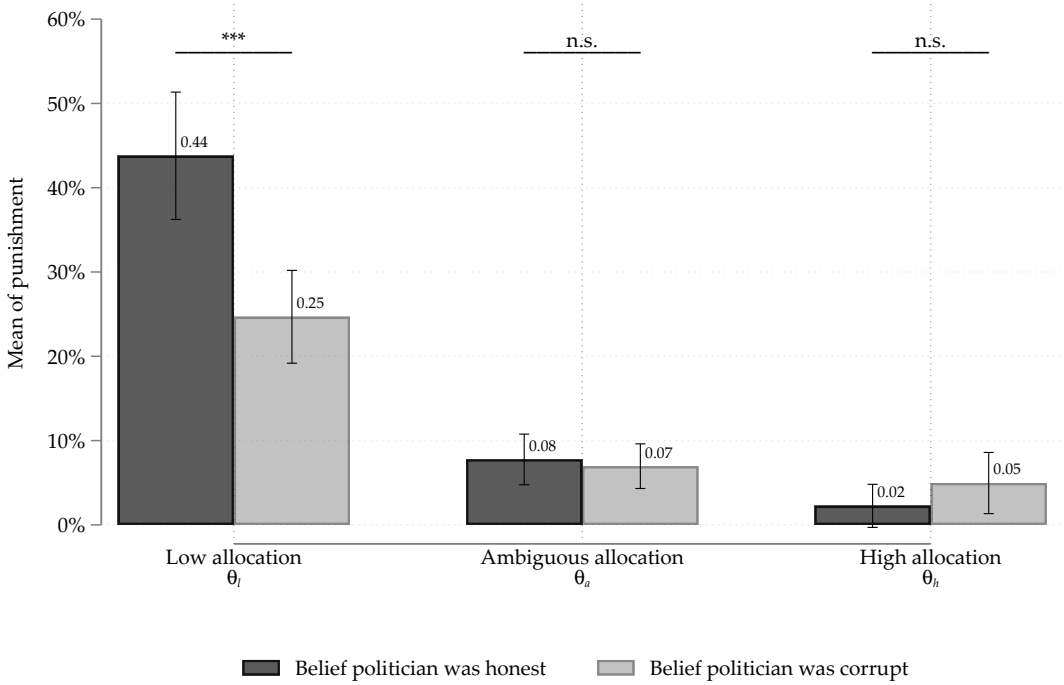
Notes: The figure depicts the average disapproval rate by the citizen across all rounds, segmented by production costs. **High cost** = 20 EP. **Low cost** = 10 EP. Dark lines show 95% clustered robust confidence intervals. No controls included. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$, n.s $p > 0.1$. Reported significance levels come from hypothesis testing from a fully saturated linear model where the dependent variable is the citizen's choice to disapprove of the incumbent, and regressors are dummy variables associated with treatments.

Figure IX: Politician expected punishment segmented by costs (π), and policy choice.



Notes: The figure depicts the average expected disapproval rate by the politician across all rounds, segmented by production costs and policy choices. **High cost** = 20 EP. **Low cost** = 10 EP. Dark lines show 95% clustered robust confidence intervals. No controls included. $^{***}p < 0.01,^{**}\ p < 0.05,^{*}\ p < 0.1$, n.s $p > 0.1$. Reported significance levels come from hypothesis testing from a fully saturated linear model where the dependent variable is the citizen's choice to disapprove the incumbent and regressors are dummy variables associated with treatments.

Figure X: Citizen punishment segmented by prior beliefs (β) across allocations $(\boldsymbol{\Theta})$.



Notes: The figure depicts the average disapproval rate by the citizen across all rounds, segmented by prior beliefs of corruption and the final allocation of public goods. **High cost** = 20 EP. **Low cost** = 10 EP. Dark lines show 95% clustered robust confidence intervals. No controls included. $^{***}p < 0.01,^{**}\ p < 0.05,^{*}\ p < 0.1$, n.s $p > 0.1$. Reported significance levels come from hypothesis testing from a fully saturated linear model where the dependent variable is the citizen's choice to disapprove the incumbent and regressors are dummy variables associated with treatments.

Table I: Descriptive Statistics

Variable	N	Mean	Std	Min	Max
Panel A: Sociodemographic variables					
Age	541	22.52	4.75	0	63
Gender	541	0.55	0.51	0	2
Semester	541	5.23	3.46	0	13
Stratum	541	3.10	1.00	0	6
Mother education	541	3.80	0.93	0	5
Father education	541	3.52	1.31	0	5
Self-perception of wealth (income stair)	541	5.69	1.60	1	10
Panel B: Experimental variables					
Generalized Trust Measure (0: Low - 10: High)	541	4.63	2.24	0	10
Trust in his neighbors	541	2.95	0.64	1	4
Generalized Risk Measure (0: Low - 10: High)	541	6.75	1.91	0	10
Patience measure (1: Low - 5:High)	541	4.04	0.78	1	5
Guess 2/3 of the average	541	37.49	22.07	0	100
Have you participated in experiments before?	541	0.85	0.35	0	1
Panel C: Political opinions					
Expect negative consequences of expressing political opinion	541	0.64	0.48	0	1
Willing to protest for better salaries	541	8.11	2.27	0	10
Willing to protest for better health	541	8.68	2.04	0	10
Willing to protest against climate change	541	7.50	2.81	0	10
Willing to protest for democracy rights	541	7.56	2.46	0	10
Willing to protest against corruption	541	7.84	2.36	0	10
Willing to protest against inequality	541	7.68	2.68	0	10
How likely is for the president to be involved in corruption?	541	6.44	2.73	0	10
How likely is for the congress to be involved in corruption?	541	8.15	1.83	0	10
How likely is for the mayor to be involved in corruption?	541	7.67	1.94	0	10
How likely is for the police to be involved in corruption?	541	8.10	1.96	0	10
How likely is for the judges to be involved in corruption?	541	6.53	2.40	0	10
Political preference (1: Right - 5: Left)	541	3.67	1.44	1	6

Notes: **Self-perception of wealth**: is a categorical variable that denotes the participant's answer to the question: "Imagine a staircase with 10 steps. People with the lowest incomes are placed on step 1 and people with the highest incomes on step 10. Where would you place your family group?". **Trust in neighbors:** denotes the participant's answer to the question: On a scale from 1 to 4, how much do you trust your neighbors?**Patience measure:** denotes the participant's answer to the question: On a scale from 1 (low) to 5 (high), how patient are you? **Guess 2/3 of the average**: denotes the participant's answer to the beauty contest of *Guess 2/3 of the average*. **Political Preference:** On a scale from 1 (right) to 5 (left), where would you place your political preference?.**Expectation of Negative Consequences:** How likely is it that expressing your political opinion will result in negative consequences?. **Willingness to protest for ... :** where 0 denotes "Not willing to", and 10 "Very willing to". **Perception of Corruption in the ...** : How likely do you think it is that ... is involved in corruption? (Scale: 1-10).

Table II: Politicians **Corruption** - Main Results

Dep Var: **Politician Corruption**	OLS		
	(1)	(2)	(3)
Low cost (Treatment)	0.076***	0.065**	0.063**
	(0.03)	(0.03)	(0.03)
Constant	0.546***	0.446**	0.421*
	(0.02)	(0.20)	(0.22)
Mean Dep. Variable	0.55	0.55	0.55
Effect size (%)	13.9	11.9	11.5
Controls		✓	✓
Round FE			✓
Session FE			✓
Observations	1355	1355	1355
Clusters	271	271	271
Adjusted R-squared	0.01	0.05	0.09

Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure, and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The *Effect size (%)* denotes the size of the treatment effect as a percentage compared with the unconditional mean of the control group. Standard errors clustered at individual level presented in parenthesis. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$

Table III: Citizens **disapproval rate** - Main Results

Dep Var: **Citizen Punishment**	OLS		
	(1)	(2)	(3)
Low cost (Treatment)	-0.017	-0.016	-0.014
	(0.018)	(0.018)	(0.018)
Constant	0.150***	0.304***	0.159
	(0.016)	(0.097)	(0.102)
Mean Dep. Variable	0.15	0.15	0.15
Effect size (%)	-11.3	-10.5	-9.0
Controls		✓	✓
Round FE			✓
Session FE			✓
Observations	1350	1350	1350
Clusters	270	270	270
Adjusted R-squared	0.00	0.02	0.04

Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure, and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The *Effect size (%)* denotes the size of the treatment effect as a percentage compared with the unconditional mean of the control group. Standard errors clustered at individual level presented in parenthesis. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$

Table IV: Citizens disapproval rate across allocations ($\boldsymbol{\Theta}$), segmented by cost (π)

Dep Var: **Citizen Punishment**	Public goods cost (π)								
	Full sample			High cost ($\overline{\pi}$)			Low cost ($\underline{\pi}$)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Ambiguous allocation (θ^a)	0.037**	0.033*	0.030*	0.034	0.025	0.023	0.044**	0.044**	0.042**
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
Low allocation (θ^l)	0.289***	0.283***	0.285***	0.278***	0.265***	0.267***	0.305***	0.305***	0.308***
	(0.03)	(0.03)	(0.03)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Constant	0.036***	0.219**	0.100	0.052***	0.100	-0.068	0.017	0.367**	0.307**
	(0.01)	(0.11)	(0.11)	(0.02)	(0.14)	(0.14)	(0.01)	(0.14)	(0.14)
Mean Dep. Variable	0.04	0.04	0.04	0.05	0.05	0.05	0.02	0.02	0.02
Controls		✓	✓		✓	✓		✓	✓
Round FE			✓			✓			✓
Session FE			✓			✓			✓
Observations	1350	1350	1350	698	698	698	652	652	652
Clusters	270	270	270	263	263	263	256	256	256
Adjusted R-squared	0.12	0.14	0.16	0.11	0.12	0.15	0.14	0.17	0.20
p-value H_0: $\theta^a = \theta^l$	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure, and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The p-value $H_0 : \theta^a = \theta^l$ denotes the statistical test of differences across allocations. Standard errors clustered at individual level presented in parenthesis. $^{***}p < 0.01,^{**} p < 0.05,^{*} p < 0.1$

Table V: Politicians expected punishment across cost (π), segmented by policy choice.

Dep Var: **Belief of punishment**	*Politician's decision (σ)*					
	Honest			Corrupt		
	(1)	(2)	(3)	(4)	(5)	(6)
Low cost (Treatment)	-0.040*	-0.042*	-0.042*	-0.076**	-0.075**	-0.072**
	(0.02)	(0.02)	(0.02)	(0.03)	(0.03)	(0.03)
Constant	0.101***	0.404**	0.427**	0.337***	0.397**	0.447**
	(0.02)	(0.17)	(0.18)	(0.03)	(0.20)	(0.22)
Mean Dep. Variable	0.10	0.10	0.10	0.34	0.34	0.34
Effect size (%)	-39.7	-42.0	-41.5	-22.7	-22.4	-21.3
Controls		✓	✓		✓	✓
Round FE			✓			✓
Session FE			✓			✓
Observations	565	565	565	790	790	790
Clusters	203	203	203	242	242	242
Adjusted R-squared	0.01	0.08	0.12	0.01	0.02	0.06

Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure, and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The *Effect size (%)* denotes the size of the treatment effect as a percentage compared with the unconditional mean of the control group. Standard errors clustered at the individual level are presented in parentheses. $^{***}p < 0.01,^{**} p < 0.05,^{*} p < 0.1$

Table VI: Citizens disapproval rate across allocations, by prior beliefs of corruption (β)

Dep Var: **Citizen punishment**	OLS			
	(1)	(2)	(3)	(4)
Ambiguous allocation (θ^a)	0.038**	0.055**	0.048**	0.044**
	(0.02)	(0.02)	(0.02)	(0.02)
Low allocation (θ^l)	0.293***	0.415***	0.403***	0.399***
	(0.03)	(0.04)	(0.04)	(0.04)
Belief Corrupt	-0.055***	0.027	0.025	0.030
	(0.02)	(0.02)	(0.02)	(0.02)
Ambiguous allocation (θ^a) $\times$ Belief Corrupt		-0.035	-0.033	-0.032
		(0.03)	(0.03)	(0.03)
Low allocation (θ^l) $\times$ Belief Corrupt		-0.218***	-0.213***	-0.205***
		(0.05)	(0.05)	(0.05)
Constant	0.065***	0.023*	0.120	-0.003
	(0.01)	(0.01)	(0.10)	(0.11)
Mean Dep. Variable	0.04	0.04	0.04	0.04
Controls			✓	✓
Round FE				✓
Session FE				✓
Observations	1350	1350	1350	1350
Clusters	270	270	270	270
Adjusted R-squared	0.13	0.14	0.16	0.18
p-value H_0: $\theta^a = \theta^l$	0.000	0.000	0.000	0.000

Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The p-value $H_0 : \theta^a = \theta^l$ denotes the statistical test of differences across allocations. Standard errors clustered at the individual level are presented in parentheses. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$

Table VII: Citizens prior beliefs of corruption across cost (π)

Dep Var: **Belief of corruption**	*Prior beliefs (β)*		
	(1)	(2)	(3)
Low cost (Treatment)	-0.092***	-0.091***	-0.085***
	(0.03)	(0.03)	(0.03)
Constant	0.592***	0.311**	0.234
	(0.02)	(0.15)	(0.15)
Mean Dep. Variable	0.59	0.59	0.59
Effect size (%)	-15.5	-15.4	-14.3
Controls		✓	✓
Round FE			✓
Session FE			✓
Observations	1350	1350	1350
Clusters	270	270	270
Adjusted R-squared	0.01	0.04	0.08

Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The *Effect size (%)* denotes the size of the treatment effect as a percentage compared with the unconditional mean of the control group. Standard errors clustered at the individual level are presented in parentheses. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$

Online Appendix

Politicians' Corruption and Citizens' Willingness to Punish under Economic Shocks: A Lab Experiment

Andres Barinas-Forero Carlos Scartascini

August 22, 2024

A Proofs

A.1 Proof Lemma 1

Proof. Under a high-allocation $\boldsymbol{\Theta}^h$, the citizen updates his posterior beliefs of corruption following,

$$\lambda \equiv \Pr\left(\sigma = 0 | \boldsymbol{\Theta}(\pi) = \boldsymbol{\Theta}^h(\pi)\right) = \frac{\Pr\left(\boldsymbol{\Theta}(\pi) = \boldsymbol{\Theta}^h(\pi) | \sigma = 0\right) \times \Pr\left(\sigma = 0\right)}{\Pr\left(\boldsymbol{\Theta}(\pi) = \boldsymbol{\Theta}^h(\pi)\right)} \tag{A1}$$

From Figure I, observe that a higher allocation of public goods only is possible if the politician is honest. Therefore, $\Pr(\boldsymbol{\Theta}(\pi) = \boldsymbol{\Theta}^h(\pi) | \sigma = 0) = 0$. Updating (λ) following Equation (A1), we find that $\lambda = 0$. Under this signal, the optimization payoff presented in Equation (3) can be expressed as:

$$\max_{\delta \in \{0,1\}} \quad y(1-\tau) + \kappa \boldsymbol{\Theta}^h(\pi) + \delta(-\kappa).$$

Finally, notice that any strategy $\nu > 0$ results in a lower material payoff. Intuitively, this occurs because under a high allocation signal, the citizen has no reasons to protest, as the politician was honest. Therefore, under this signal, and regardless of the cost (π), the citizen plays:

$$\nu(\boldsymbol{\Theta}^h(\pi)) = 0 \quad \forall\ \alpha_c \in [0, \overline{\alpha}]$$

□

A.2 Proof Lemma 2

Proof. Under a low-allocation $\boldsymbol{\Theta}^l$, the citizen updates his posterior beliefs of corruption following Equation (A1). Once again, from Figure I notice that a low-allocation of public goods is only possible if the politician was corrupt. Moreover, the updating process of beliefs (λ) results in the following: $\lambda = \frac{(1-\mu)\times\beta}{(1-\mu)(\beta)} = 1$. Under this signal, and with the updated beliefs, the optimization problem for the citizen can be written as:

$$\max_{\delta \in \{0,1\}} \quad y(1-\tau) + \kappa \boldsymbol{\Theta}^l(\pi) + \delta\left((\alpha_c - \boldsymbol{\Theta}^l(\pi)) - \kappa\right)$$

Intuitively, the citizen optimizes by choosing a mixed strategy ν that maximizes her payoff, which depends entirely from: $\Big((\alpha_c - \boldsymbol{\Theta}^l(\pi)) - \kappa\Big)$. From Section II, recall that $\boldsymbol{\Theta}^l(\pi) = \left(\frac{\tau y - r}{\pi}\right)$. Rearranging terms, we find the optimal strategy under a low-allocation signal is:

$$\nu(\alpha_c, \boldsymbol{\Theta}^l(\pi)) = \begin{cases} 1 \quad \text{if} \quad \alpha_c \geq \kappa + \left(\frac{\tau y - r}{\pi}\right) \\ 0 \quad \text{if} \quad \alpha_c < \kappa + \left(\frac{\tau y - r}{\pi}\right) \end{cases} \tag{A2}$$

Moreover, regarding the optimal cutoff under a low-allocation signal, we find that:

$$\alpha^*(\boldsymbol{\Theta}^l(\pi)) = \left\{\kappa + \left(\frac{\tau y - r}{\pi}\right)\right\} \in (0, \overline{\alpha}]$$

Following the same logic, under an ambiguous-allocation $\boldsymbol{\Theta}^a$, the updating beliefs process results in: $\lambda = \frac{\mu\beta}{\mu\beta + (1-\beta)(1-\mu)}$. Under this signal, the optimization problem for the citizen can be expressed as:

$$\max_{\delta \in \{0,1\}} \quad y(1-\tau) + \kappa \boldsymbol{\Theta}^a(\pi) + \delta \left((\alpha_c - \boldsymbol{\Theta}^a(\pi)) \left(\frac{\mu\beta}{\mu\beta + (1-\beta)(1-\mu)} \right) - \kappa \right)$$

Similarly, the citizen chooses a mixed strategy ν that maximizes her payoff, which depends on: $\Big((\alpha_c - \boldsymbol{\Theta}^a(\pi)) \left(\frac{\mu\beta}{\mu\beta + (1-\beta)(1-\mu)}\right) - \kappa\Big)$. Given that $\boldsymbol{\Theta}^a(\pi) = \left(\frac{\tau y}{\pi}\right)$, and rearranging terms, the optimal strategy under an ambiguous-allocation signal is:

$$\nu(\alpha_c, \boldsymbol{\Theta}^a(\pi)) = \begin{cases} 1 \quad \text{if} \quad \alpha_c \geq \kappa \left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta} \right) + \left(\frac{\tau y}{\pi}\right) \\ 0 \quad \text{if} \quad \alpha_c < \kappa \left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta} \right) + \left(\frac{\tau y}{\pi}\right) \end{cases} \tag{A3}$$

Moreover, regarding the optimal cutoff under an ambiguous allocation signal, we find that:

$$\alpha^*(\boldsymbol{\Theta}^a(\pi)) = \left\{\kappa \left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta} \right) + \left(\frac{\tau y}{\pi}\right)\right\} \in (0, \overline{\alpha}]$$

Given that cutoff points determine the citizen's optimal strategy under both signals and regardless of the cost, this proves the lemma. □

A.3 Proof Lemma 3

Proof. Employing Lemma 2, and focusing on a particular $\pi = \{\overline{\pi}, \underline{\pi}\}$ without loss of generality, we can define the citizen's set of optimal cutoffs

$$\alpha^*(\boldsymbol{\Theta}^l, \boldsymbol{\Theta}^a) = \left(\kappa + \left(\frac{\tau y - r}{\pi}\right), \kappa\left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta}\right) + \left(\frac{\tau y}{\pi}\right)\right)$$

Therefore, we compared these cutoffs following:

$$\underbrace{\kappa + \left(\frac{\tau y - r}{\pi}\right)}_{\alpha^*(\boldsymbol{\Theta}^l)} < \underbrace{\kappa\left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta}\right) + \left(\frac{\tau y}{\pi}\right)}_{\alpha^*(\boldsymbol{\Theta}^a)}$$

Rearranging terms,

$$\kappa - \left(\frac{r}{\pi}\right) < \kappa\left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta}\right)$$

Given that $\kappa \in \Re^+$, it is possible to rewrite this last expression as:

$$1 - \left(\frac{r}{\kappa\pi}\right) < \left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta}\right)$$

Simplifying, we obtain

$$1 - \left(\frac{r}{\kappa\pi}\right) < 1 + \left(\frac{(1-\beta)(1-\mu)}{\mu\beta}\right)$$

Given that $r \in (0, \tau y)$, $\kappa \in \Re^+$, and $\pi \in \{\overline{\pi}, \underline{\pi}\} \subset \Re^+$, the expression $\left(\frac{r}{\kappa\pi}\right)$ is always positive. On the other hand, given that $\mu \in (0,1)$, and $\beta \in (0,1)$, the expression $\left(\frac{\mu\beta+(1-\beta)(1-\mu)}{\mu\beta}\right)$ is always positive.

Therefore, the expression

$$1 - \underbrace{\left(\frac{r}{\kappa\pi}\right)}_{\text{Positive}} < 1 + \underbrace{\left(\frac{(1-\beta)(1-\mu)}{\mu\beta}\right)}_{\text{Positive}},$$

is always true. This completes the proof. □

A.4 Proof Lemma 4

Proof. The politician may contemplate a strategy (σ) that aligns with the citizen's strategy ν and the citizen's updated beliefs λ, forming an equilibrium. Hence, once the public good's costs are defined, he compares the expected payoff of each possible action, considering the citizens' behavior, and chooses the highest.

Strategy 1: Expected payoff of being Corrupt

If the politician chooses to be corrupt, there is a probability (μ) that the national authority covers his decision perfectly $(\gamma = 1)$, resulting in the citizen observing an ambiguous allocation signal $\boldsymbol{\Theta}^a$. In this case, the citizen will punish the politician if Equation (A3) holds. Conversely, with a probability of $(1-\mu)$, the national authority does not provide resources $(\gamma = 0)$, leading the citizen to observe a low allocation signal $\boldsymbol{\Theta}^l$, and the citizen will punish if Equation (A2) holds. Therefore, the expected payoff for being corrupt $(h = 0)$ is defined as

$$\mathbb{E}\left[U_p|h=0,\pi\right] = w + r - \mu\left[P\left(\alpha_c > \alpha^*(\boldsymbol{\Theta}^a(\pi))\right)(\eta w)\right] - (1-\mu)\left[P\left(\alpha_c > \alpha^*(\boldsymbol{\Theta}^l(\pi))\right)(\eta w)\right]$$

Given that $\alpha_c \sim f[0,\overline{\alpha}]$, we can rewrite this expression as

$$w + r - \mu\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right)(\eta w) - (1-\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right)(\eta w) \quad \text{(A4)}$$

Strategy 2: Expected payoff of being Honest

If the politician decides to be honest, he knows that with probability (μ), the national authority provides additional resources $(\gamma = 1)$, and the citizen observes a high allocation signal $\boldsymbol{\Theta}^h$. From lemma 1, we know that under this signal the citizen will never punish the politician. On the other hand, with probability $(1-\mu)$, the national authority does not provide resources $(\gamma = 0)$, and the citizen observes an **ambiguous** signal $\boldsymbol{\Theta}^a$ of public goods. Again, under an ambiguous signal, the citizen will disapprove if Equation (A3) holds. Therefore, the expected payoff of being honest $(h = 1)$ is defined as

$$\mathbb{E}[U_p|h=1,\pi] = w + \phi_p - (1-\mu)\left[P\left(\alpha_c > \alpha^*(\boldsymbol{\Theta}^a(\pi))\right)(\eta w)\right]$$

Rewriting this expression, we obtain

$$\mathbb{E}[U_p|h=1,\pi] = w + \phi_p - (1-\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right)(\eta w) \quad \text{(A5)}$$

In order to find an optimal strategy (σ), the politician considers both expected payoffs and chooses the one that maximizes his utility. Under both scenarios, the politician receives his salary (w) and also faces the possibility of punishment under an ambiguous signal. Therefore, he compares the expected utility of being honest over being corrupt, given a particular public goods price (π). This comparison can be expressed as,

$$\underbrace{\phi_p - (1-\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right)(\eta w)}_{\text{Being honest}} \geq$$
$$\underbrace{r - \mu\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right)(\eta w) - (1-\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right)(\eta w)}_{\text{Being corrupt}} \quad \text{(A6)}$$

Factorizing, we obtain

$$\phi_p \geq r + (1-2\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right) - (1-\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right)$$

Therefore,

$$\phi^*(\pi) = r + (1-2\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right) - (1-\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right) \quad \text{(A7)}$$

Finally, only rests to prove that $\phi^*(\pi) < \widehat{\phi}$. First, given that $\mu \in (0,1)$ behaves in a monotonically manner, we can focus on the extreme value cases of μ.

Case 1: $\lim_{\mu \to 0}$

$$\phi^*(\pi) = r + \left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right) - \left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right)$$

From Lemma 3, it follows that $\int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha \leq \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha$, and given that $r < \widehat{\phi}$, we obtain

$$\phi^*(\pi) = r + \left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right) - \left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right) < r < \widehat{\phi}$$

So, when $\lim_{\mu \to 0}$,

$$\phi^*(\pi) < \widehat{\phi}$$

Case 2: $\lim_{\mu \to 1}$

$$\phi^*(\pi) = r - \left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right)$$

Given that $\alpha^*(\boldsymbol{\Theta}^a(\pi)) > 0$, we obtain

$$\phi^*(\pi) = r - \left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right) < r < \widehat{\phi}$$

So, when $\lim_{\mu \to 1}$,

$$\phi^*(\pi) < \widehat{\phi}$$

This completes the proof. □

A.5 Proof Theorem 1

Proof. Case 1: (Low allocation):

$$\alpha^*(\boldsymbol{\Theta}^l(\pi)) = \kappa + \left(\frac{\tau y - r}{\pi}\right)$$

Derivative with respect to π:

$$\frac{d}{d\pi}\alpha^*(\boldsymbol{\Theta}^l(\pi)) = \frac{d}{d\pi}\left(\kappa + \frac{\tau y - r}{\pi}\right) = -\frac{\tau y - r}{\pi^2}$$

Since $\tau y - r$ is a positive constant and π^2 is always positive, $-\frac{\tau y - r}{\pi^2}$ is negative. Therefore, $\alpha^*(\boldsymbol{\Theta}^l(\pi))$ is a decreasing function of π. Since $\alpha^*(\boldsymbol{\Theta}^l(\pi))$ decreases as π increases, it follows that:

$$\alpha^*(\boldsymbol{\Theta}^l(\overline{\pi})) \leq \alpha^*(\boldsymbol{\Theta}^l(\underline{\pi}))$$

whenever $\overline{\pi} \geq \underline{\pi}$.

Case 2: (Ambiguous allocation):

$$\alpha^*(\boldsymbol{\Theta}^a(\pi)) = \kappa\left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta}\right) + \left(\frac{\tau y}{\pi}\right)$$

Derivative with respect to π:

$$\frac{d}{d\pi}\alpha^*(\boldsymbol{\Theta}^a(\pi)) = \frac{d}{d\pi}\left(\kappa\left(\frac{\mu\beta + (1-\beta)(1-\mu)}{\mu\beta}\right) + \frac{\tau y}{\pi}\right) = -\frac{\tau y}{\pi^2}$$

Since τy is a positive constant and π^2 is always positive, $-\frac{\tau y}{\pi^2}$ is negative. Therefore, $\alpha^*(\boldsymbol{\Theta}^a(\pi))$ is a decreasing function of π. Since $\alpha^*(\boldsymbol{\Theta}^a(\pi))$ decreases as π increases, it follows that:

$$\alpha^*(\boldsymbol{\Theta}^a(\overline{\pi})) \leq \alpha^*(\boldsymbol{\Theta}^a(\underline{\pi}))$$

whenever $\overline{\pi} \geq \underline{\pi}$. This completes the proof of Theorem 1. □

A.6 Proof Corollary 1

Proof. From Theorem 1, $\alpha^*(\boldsymbol{\Theta}^m(\overline{\pi})) \geq \alpha^*(\boldsymbol{\Theta}^m(\underline{\pi}))$, then rearranging terms,

$$\int_0^{\alpha^*(\boldsymbol{\Theta}^m(\underline{\pi}))} f(\alpha)\, d\alpha + \int_{\alpha^*(\boldsymbol{\Theta})^m(\underline{\pi})}^{\alpha^*(\boldsymbol{\Theta}^m(\overline{\pi}))} f(\alpha)\, d\alpha \geq \int_0^{\alpha^*(\boldsymbol{\Theta}^m(\underline{\pi}))} f(\alpha)\, d\alpha$$

$$\int_{\alpha^*(\boldsymbol{\Theta})^m(\underline{\pi})}^{\alpha^*(\boldsymbol{\Theta}^m(\overline{\pi}))} f(\alpha)\, d\alpha \geq 0$$

This completes the proof of Corollary 1. □

A.7 Proof Theorem 2

Proof. From Equation (A7), we have that

$$\phi^*(\pi) = r + (1-2\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^a(\pi))} f(\alpha)\, d\alpha\right) - (1-\mu)\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^l(\pi))} f(\alpha)\, d\alpha\right)$$

From Corollary 1, we can readily see that

$$\left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^m(\overline{\pi}))} f(\alpha)\, d\alpha\right) \leq \left(1 - \int_0^{\alpha^*(\boldsymbol{\Theta}^m(\underline{\pi}))} f(\alpha)\, d\alpha\right) \quad \forall m = \{a, l\}$$

Then, it follows that

$$\phi^*(\overline{\pi}) \leq \phi^*(\underline{\pi})$$

□

B Additional Figures and Tables

Table B1: Politicians **Corruption** - Logit and Probit Estimates

Dep Var: **Politician Corruption**	Logit				Probit			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Low cost (Treatment)	0.313***	0.280**	0.284**	0.436***	0.195***	0.171**	0.173**	0.264***
	(0.11)	(0.12)	(0.12)	(0.14)	(0.07)	(0.07)	(0.07)	(0.08)
Corrupt - round before				0.755***				0.465***
				(0.18)				(0.11)
Constant	0.186*	-0.218	-0.839	-0.790	0.116*	-0.145	-0.537	-0.517
	(0.10)	(0.87)	(1.00)	(0.88)	(0.06)	(0.53)	(0.60)	(0.53)
Controls		✓	✓	✓		✓	✓	✓
Round FE			✓	✓			✓	✓
Session FE			✓	✓			✓	✓
Observations	1355	1355	1355	1084	1355	1355	1355	1084
Clusters	271	271	271	271	271	271	271	271
Pseudo R-squared	0.00	0.04	0.07	0.09	0.00	0.04	0.07	0.09

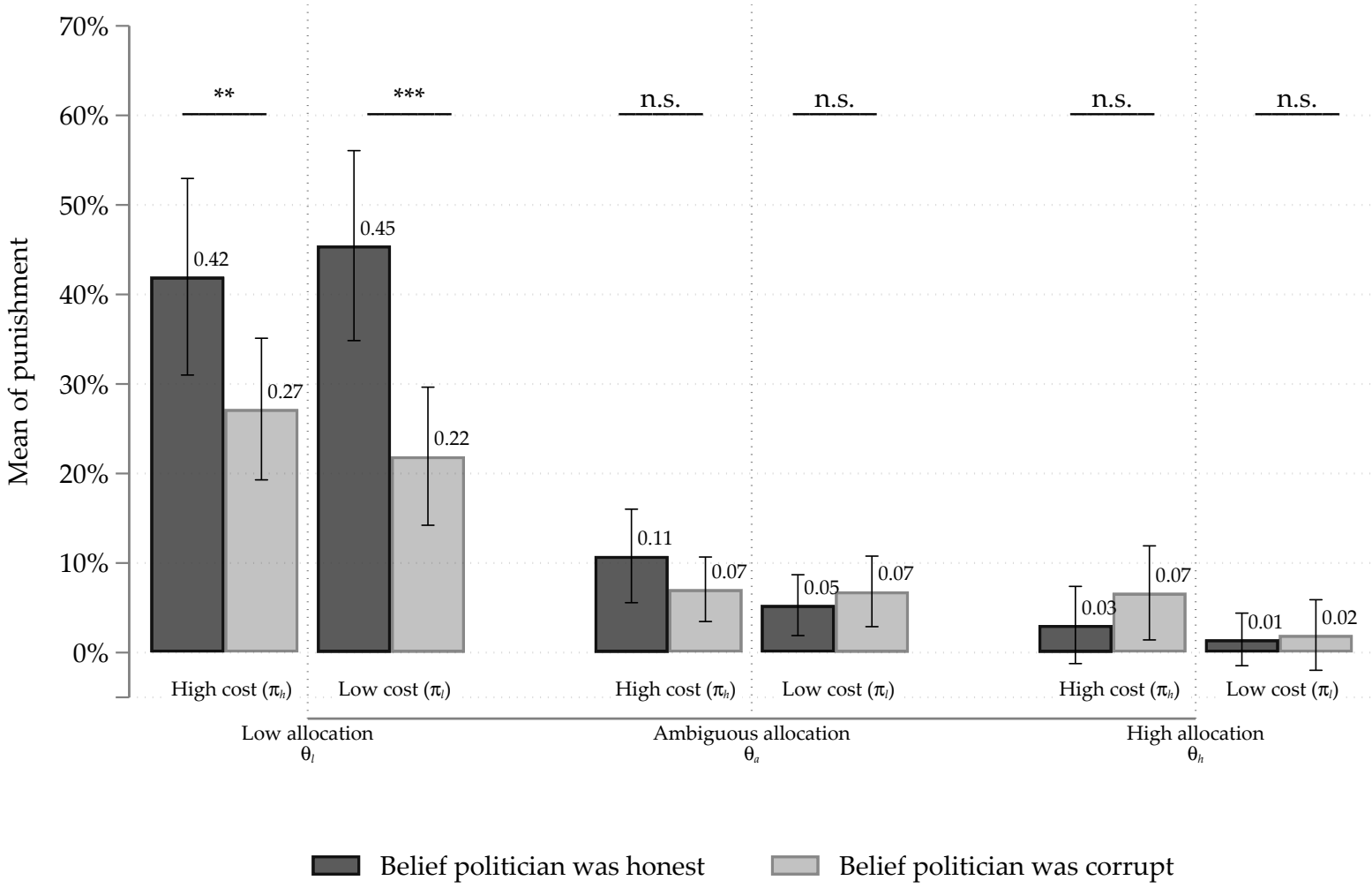
Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The *Effect size (%)* denotes the size of the treatment effect as a percentage compared with the unconditional mean of the control group. Standard errors clustered at individual level presented in parenthesis. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$

Table B2: Citizens **disapproval rate** - Main Results

Dep Var: **Citizen Punishment**	Public goods cost (π)								
	Low allocation (θ^l)			Ambiguous allocation (θ^a)			High allocation (θ^h)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Low cost (Treatment)	-0.008	-0.009	-0.009	-0.026	-0.022	-0.023	-0.035	-0.031	-0.033
	(0.044)	(0.045)	(0.045)	(0.019)	(0.019)	(0.019)	(0.021)	(0.020)	(0.022)
Constant	0.330***	0.546**	0.138	0.086***	-0.038	-0.068	0.052***	0.046	0.004
	(0.036)	(0.222)	(0.259)	(0.017)	(0.106)	(0.103)	(0.018)	(0.104)	(0.112)
Mean Dep. Variable	0.33	0.33	0.33	0.09	0.09	0.09	0.05	0.05	0.05
Effect size (%)	-2.5	-2.6	-2.8	-29.8	-25.5	-26.3	-67.4	-59.5	-63.9
Controls		✓	✓		✓	✓		✓	✓
Round FE			✓			✓			✓
Session FE			✓			✓			✓
Observations	408	408	408	668	668	668	274	274	274
Clusters	227	227	227	263	263	263	180	180	180
Adjusted R-squared	0.00	0.03	0.10	0.00	0.05	0.08	0.01	0.06	0.11

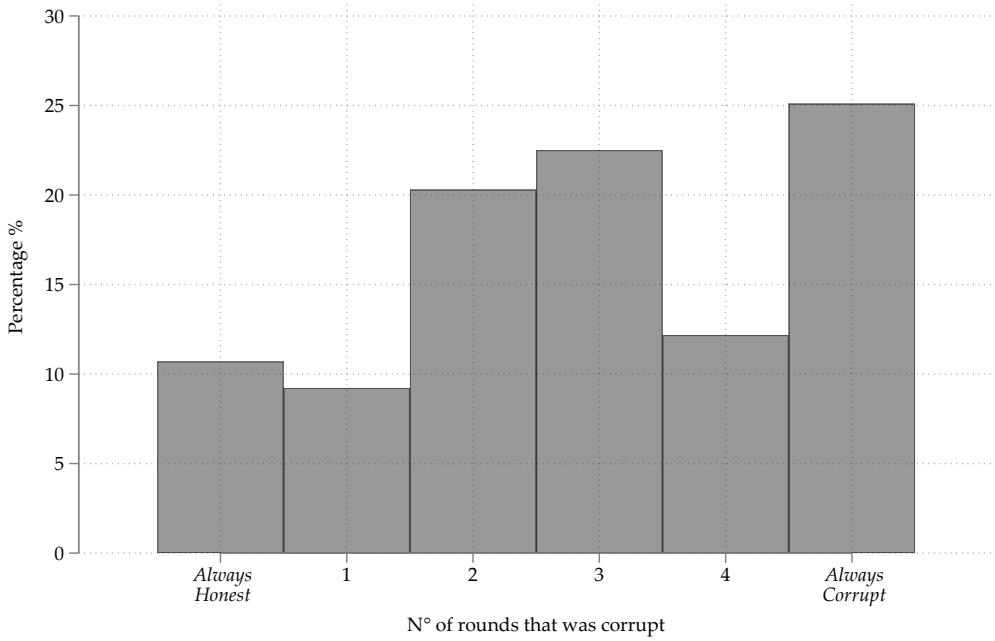
Notes: The set of controls included in ***Controls*** are: age, sex, stratum, trust measure, risk measure, patience measure and previous experience participating in experiments. The *Mean Dep. Variable* express the unconditional control mean of the dependent variable. The *Effect size (%)* denotes the size of the treatment effect as a percentage compared with the unconditional mean of the control group. Standard errors clustered at individual level presented in parenthesis. $^{***}p < 0.01,^{**}p < 0.05,^{*}p < 0.1$

Figure B1: Citizen Punishment in the Corruption Game



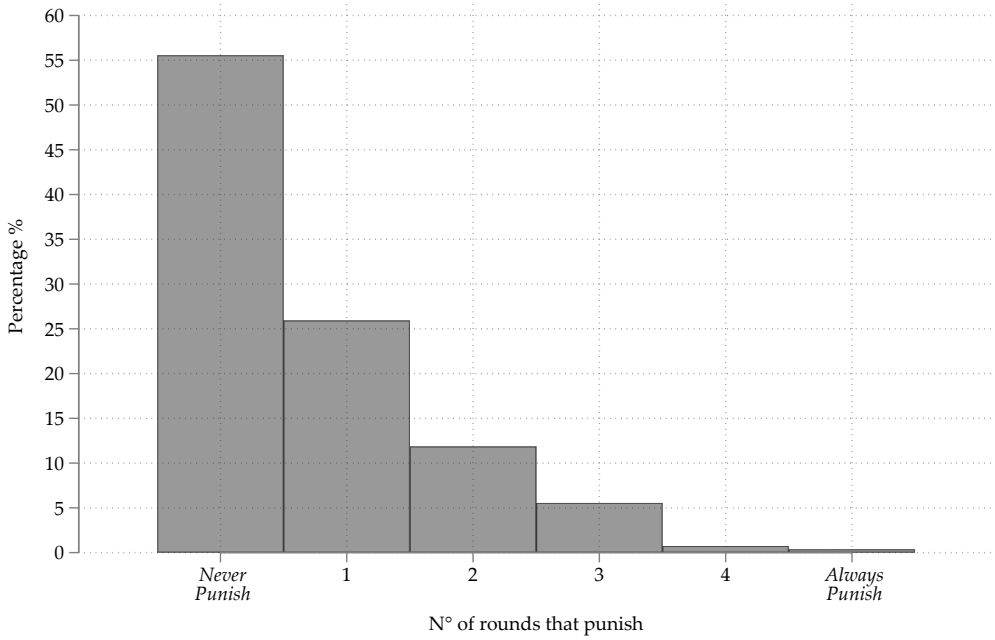
Notes: The figure depicts the average disapproval rate by the citizen across all rounds, segmented by prior beliefs of corruption and the final allocation of public goods. **High cost** = 20 EP. **Low cost** = 10 EP. Dark lines show 95% clustered robust confidence intervals. No controls included. $^{***}p < 0.01, ^{**}p < 0.05, ^{*}p < 0.1$, n.s $p > 0.1$. Reported significance levels come from hypothesis testing from a fully saturated linear model where the dependent variable is the citizen's choice to disapprove the incumbent and regressors are dummy variables associated with treatments.

Figure B2: Distribution of total corruption in the Political Corruption Game (PCG)



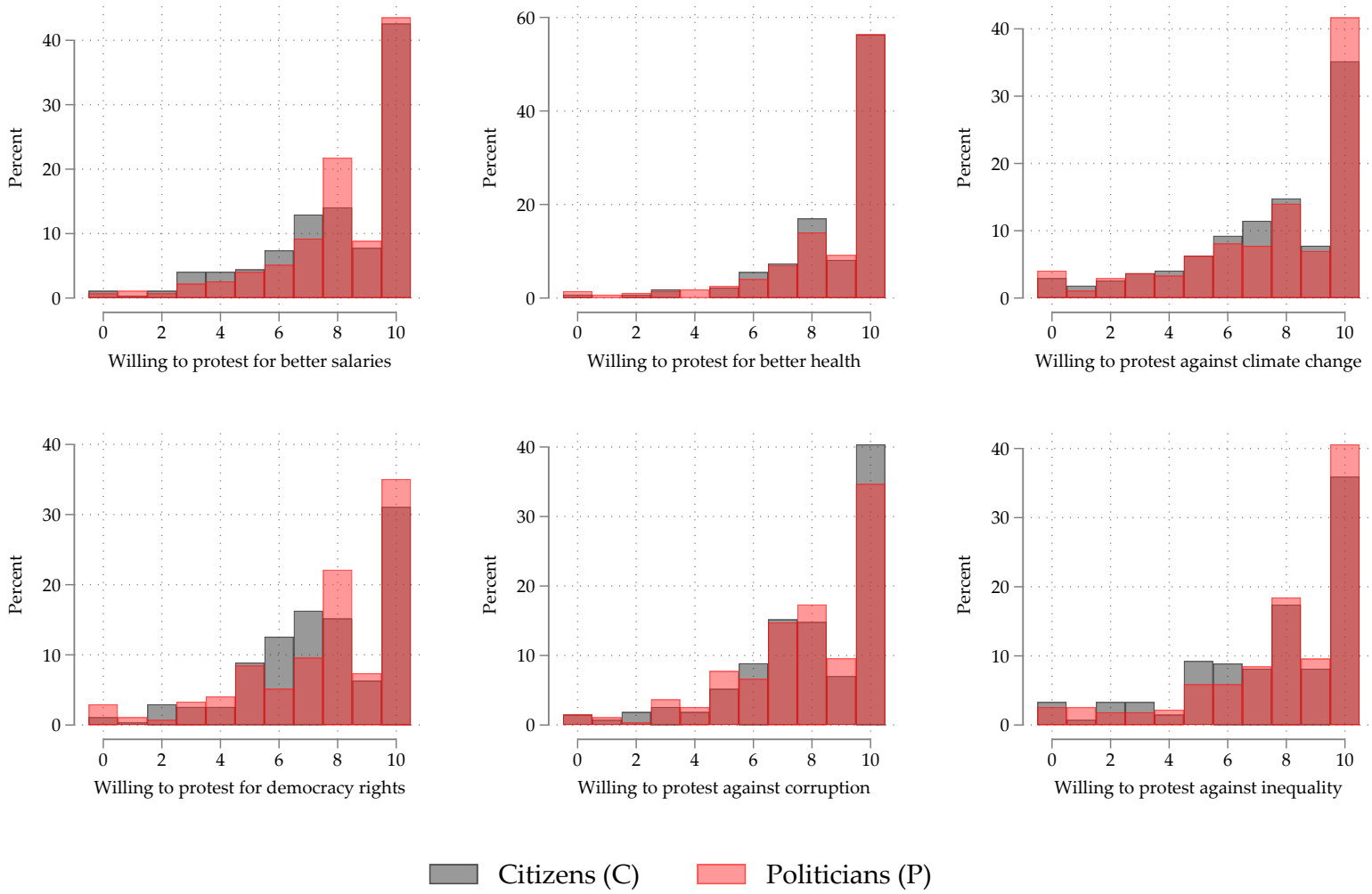
Notes: The figure illustrates the percentage distribution of the number of rounds in which politicians were corrupt during the game. The histogram represents different categories of corruption behavior, ranging from "Always Honest" (0 rounds of corruption) to "Always Corrupt" (5 rounds of corruption).

Figure B3: Distribution of total punishment in the Political Corruption Game (PCG)



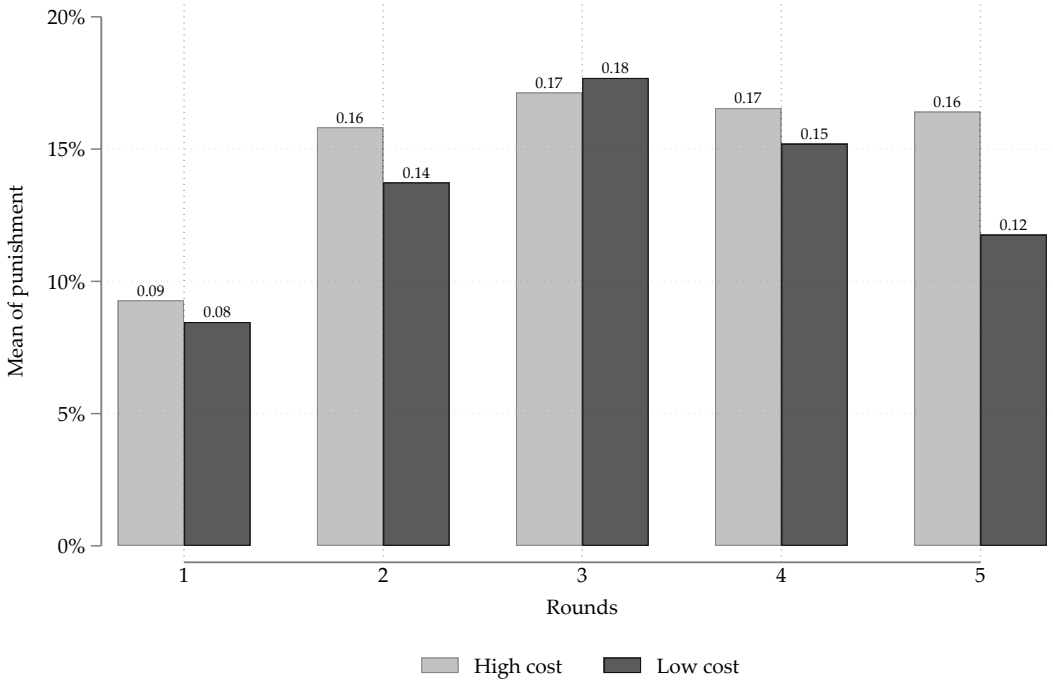
Notes: The figure illustrates the percentage distribution of the number of rounds in which citizens disapprove politicians during the game. The histogram represents different categories of political accountability behavior, ranging from "Never punish" (0 rounds of disapproval) to "Always punish" (5 rounds of political disapproval).

Figure B4: Citizen Punishment in the Corruption Game



Notes: The figure illustrates the willingness of citizens (in gray) and politicians (in red) to protest for various causes, including better salaries, health, climate change, democracy rights, corruption, and inequality. The histogram represent the willingness to protest, scored from 0 to 10.

Figure B5: Citizen Punishment in the Corruption Game

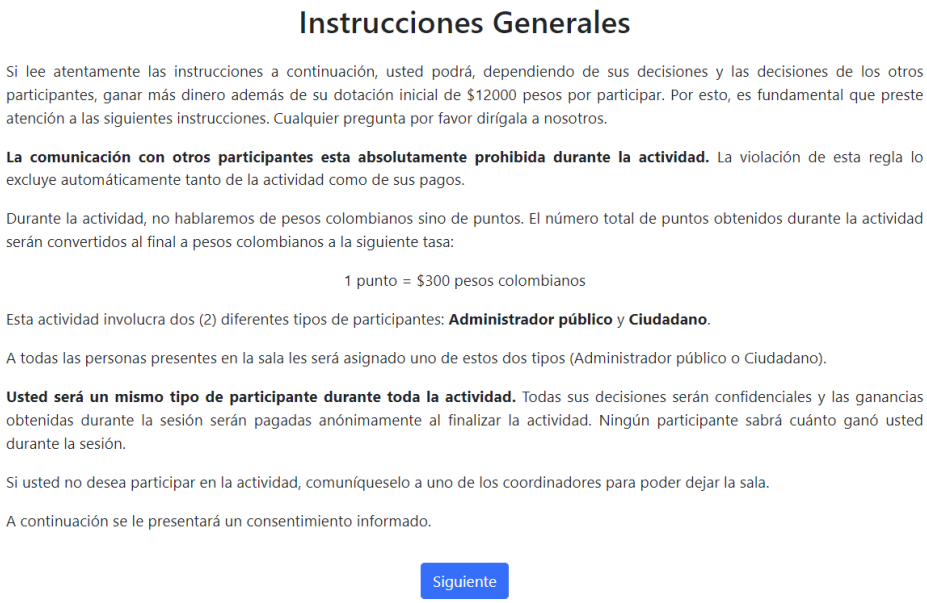


Notes: The figure depicts the average disapproval rate by the citizen across rounds. **High cost** = 20 EP. **Low cost** = 10 EP.

C Experimental Screen Instructions

C.1 *Original instructions in Spanish*

Figure E1: General instructions



Instrucciones Generales

Si lee atentamente las instrucciones a continuación, usted podrá, dependiendo de sus decisiones y las decisiones de los otros participantes, ganar más dinero además de su dotación inicial de $12000 pesos por participar. Por esto, es fundamental que preste atención a las siguientes instrucciones. Cualquier pregunta por favor diríjala a nosotros.

La comunicación con otros participantes esta absolutamente prohibida durante la actividad. La violación de esta regla lo excluye automáticamente tanto de la actividad como de sus pagos.

Durante la actividad, no hablaremos de pesos colombianos sino de puntos. El número total de puntos obtenidos durante la actividad serán convertidos al final a pesos colombianos a la siguiente tasa:

1 punto = $300 pesos colombianos

Esta actividad involucra dos (2) diferentes tipos de participantes: **Administrador público** y **Ciudadano**.

A todas las personas presentes en la sala les será asignado uno de estos dos tipos (Administrador público o Ciudadano).

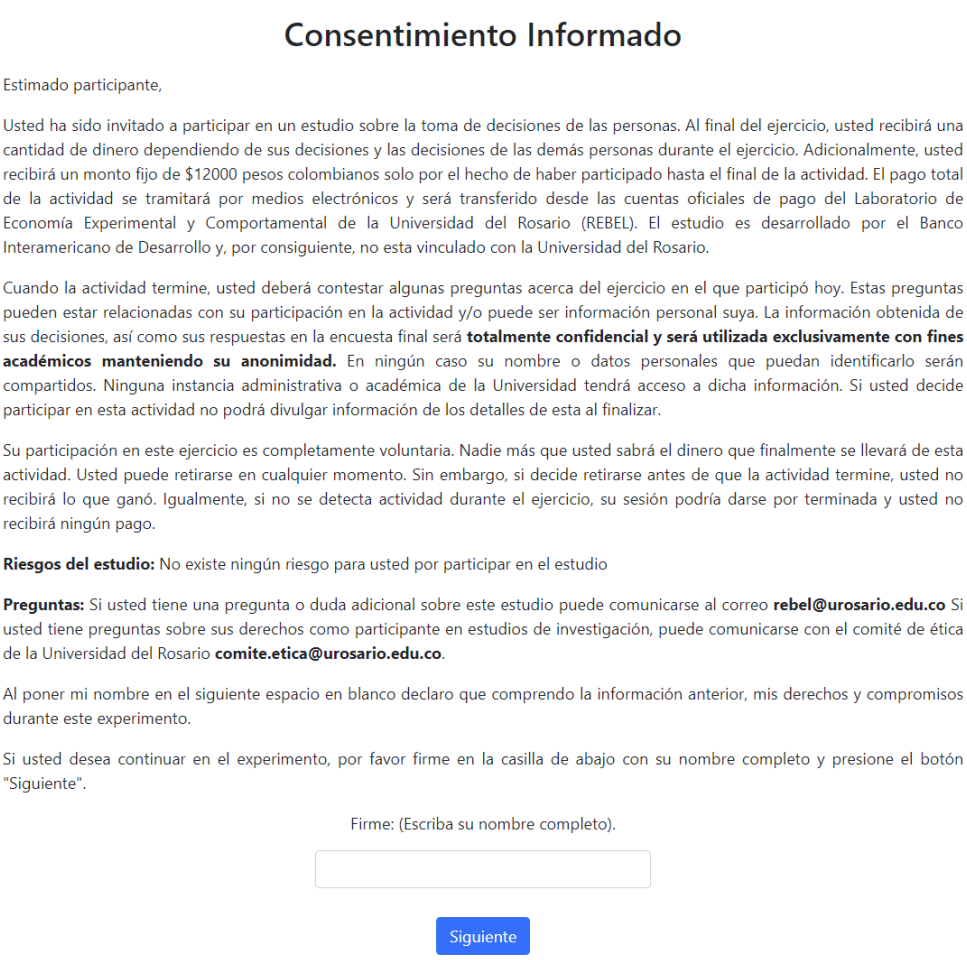
Usted será un mismo tipo de participante durante toda la actividad. Todas sus decisiones serán confidenciales y las ganancias obtenidas durante la sesión serán pagadas anónimamente al finalizar la actividad. Ningún participante sabrá cuánto ganó usted durante la sesión.

Si usted no desea participar en la actividad, comuníqueselo a uno de los coordinadores para poder dejar la sala.

A continuación se le presentará un consentimiento informado.

Siguiente

Figure E2: Informed Consent



Consentimiento Informado

Estimado participante,

Usted ha sido invitado a participar en un estudio sobre la toma de decisiones de las personas. Al final del ejercicio, usted recibirá una cantidad de dinero dependiendo de sus decisiones y las decisiones de las demás personas durante el ejercicio. Adicionalmente, usted recibirá un monto fijo de $12000 pesos colombianos solo por el hecho de haber participado hasta el final de la actividad. El pago total de la actividad se tramitará por medios electrónicos y será transferido desde las cuentas oficiales de pago del Laboratorio de Economía Experimental y Comportamental de la Universidad del Rosario (REBEL). El estudio es desarrollado por el Banco Interamericano de Desarrollo y, por consiguiente, no esta vinculado con la Universidad del Rosario.

Cuando la actividad termine, usted deberá contestar algunas preguntas acerca del ejercicio en el que participó hoy. Estas preguntas pueden estar relacionadas con su participación en la actividad y/o puede ser información personal suya. La información obtenida de sus decisiones, así como sus respuestas en la encuesta final será **totalmente confidencial y será utilizada exclusivamente con fines académicos manteniendo su anonimidad.** En ningún caso su nombre o datos personales que puedan identificarlo serán compartidos. Ninguna instancia administrativa o académica de la Universidad tendrá acceso a dicha información. Si usted decide participar en esta actividad no podrá divulgar información de los detalles de esta al finalizar.

Su participación en este ejercicio es completamente voluntaria. Nadie más que usted sabrá el dinero que finalmente se llevará de esta actividad. Usted puede retirarse en cualquier momento. Sin embargo, si decide retirarse antes de que la actividad termine, usted no recibirá lo que ganó. Igualmente, si no se detecta actividad durante el ejercicio, su sesión podría darse por terminada y usted no recibirá ningún pago.

Riesgos del estudio: No existe ningún riesgo para usted por participar en el estudio

Preguntas: Si usted tiene una pregunta o duda adicional sobre este estudio puede comunicarse al correo **rebel@urosario.edu.co** Si usted tiene preguntas sobre sus derechos como participante en estudios de investigación, puede comunicarse con el comité de ética de la Universidad del Rosario **comite.etica@urosario.edu.co**.

Al poner mi nombre en el siguiente espacio en blanco declaro que comprendo la información anterior, mis derechos y compromisos durante este experimento.

Si usted desea continuar en el experimento, por favor firme en la casilla de abajo con su nombre completo y presione el botón "Siguiente".

Firme: (Escriba su nombre completo).

Siguiente

Figure E3: Welcome

Bienvenido/a

A continuación, daremos inicio a esta actividad.

Usted será un **administrador público** durante toda la actividad.

Siguiente

Figure E4: Initial Instructions

Instrucciones iniciales

La siguiente actividad consta de cinco rondas de interacción.

A lo largo de la sesión usted producirá un pago para cada una de las cinco rondas. Sin embargo, usted **solo** recibirá el pago de **una** de las cinco rondas.

Al finalizar la última ronda, el computador seleccionará aleatoriamente una de las cinco rondas para ser pagada y el pago de dicha ronda será adicionado a su pago por participar de 12000 pesos.

Las cinco rondas tienen la misma probabilidad de salir, así que lo mejor que usted puede hacer es tomar decisiones en cada ronda pensando que dicha ronda será seleccionada para el pago.

A continuación le describimos las instrucciones de la actividad.

Siguiente

Figure E5: Instructions - 1

Instrucciones General

Recuerde que usted es un administrador público

Durante esta actividad, cada **ciudadano** tendrá un ingreso inicial de 80 puntos y cada **administrador público** tendrá un salario inicial de 120 puntos.

Una vez comienza la actividad:

1. El ciudadano pagará **40 puntos** de impuestos y conservará 40 puntos.
2. Usted recibirá los **40 puntos** de impuestos pagados por el ciudadano y su trabajo será decidir qué tantos impuestos utilizar en la construcción de bienes públicos, denotados con la siguiente imagen:

¿Por qué son importantes los bienes públicos en esta actividad?

Los bienes públicos son importantes dado que representan ingresos para el **ciudadano**.

Por cada bien público que usted construya, el ciudadano recibirá **30 puntos** adicionales.

Note que durante la actividad:

Solo el ciudadano recibe ingresos adicionales por la construcción de bienes públicos.

Solo el ciudadano paga impuestos para construir bienes públicos.

Figure E6: Instructions - 2

¿Cuánto cuesta producir un bien público en esta actividad?

Para construir un bien público se debe pagar un costo de producción que se definirá de manera aleatoria al principio de la actividad.

Tanto usted como el ciudadano sabrán el costo de producción del bien público.

En particular, el costo de producción puede ser un:

COSTO ALTO

20 puntos

COSTO BAJO

10 puntos

A continuación, le describimos las etapas y las decisiones de la actividad.

Siguiente

Figure E7: Round stages

Etapas de la ronda

Etapa 1 - Emparejamiento.

En la primera etapa de la ronda, cada administrador público será emparejado aleatoriamente con un ciudadano.

Usted siempre será emparejado con una persona **distinta**. Por consiguiente, usted no interactuará dos veces con la misma persona.

Usted nunca sabrá la identidad de la persona con la que fue emparejado/a.

Etapa 2 - Anuncio del costo de producción de los bienes públicos.

En la segunda etapa de la ronda, se definirá **aleatoriamente** el costo de producción de los bienes públicos. El costo de producción puede ser:

Costo Alto

20 puntos

Costo Bajo

10 puntos

Ambos costos son igual de probables.

Todos los participantes, sin importar su tipo, conocerán el costo del bien público.

Etapa 3 - Decisión política.

En la tercera etapa de la ronda, solo usted toma decisiónes.

En esta etapa, usted recibe los **40 puntos** de impuestos pagados por el ciudadano y deberá decidir si:

- Utiliza **20 puntos** en la construcción de bienes públicos y **conserva 20 puntos para usted.**
- Utiliza **40 puntos** en la construcción de bienes públicos y **no conserva nada para usted.**

Usted puede conservar 20 puntos que se adicionan a su salario de 120 puntos. Si usted decide conservar los 20 puntos, estos se convierten automáticamente en un ingreso adicional para usted.

Figure E8: Round stages - 2

Etapa 4 - Financiamiento adicional.

En la cuarta etapa, solo el computador toma decisiones.

En esta etapa, el computador podrá aleatoriamente dar un financiamiento adicional de **20 puntos** para construir más bienes públicos.

Con 50% de probabilidad, el computador destinará **20 puntos** adicionales y con 50% de probabilidad **no destinará** puntos adicionales.

Una vez el computador haya tomado su decisión, los recursos destinados por el administrador público y por el computador se sumarán y se destinarán en la construcción de bienes públicos.

Si usted destinó **40 puntos** y el computador destinó **20 puntos**, se emplearán **60 puntos** para construir bienes públicos.
Si usted destinó **40 puntos** y el computador destinó 0 puntos, se emplearán **40 puntos** para construir bienes públicos.
Si usted destinó **20 puntos** y el computador destinó **20 puntos**, se emplearán **40 puntos** para construir bienes públicos.
Si usted destinó **20 puntos** y el computador destinó 0 puntos, se emplearán **20 puntos** para construir bienes públicos.

Los recursos sumados se dividirán entre el **costo del bien público** y se construirán los respectivos bienes públicos.

Ningún participante conocerá la decisión del computador.

Al final de la interacción, el ciudadano **solo** observará los bienes públicos construidos.

Etapa 5 - Rendición de cuentas.

En la última etapa, solo el ciudadano toma decisiones.

Una vez el ciudadano observe los bienes públicos construidos, él recibirá **30 puntos** por cada bien público construido y, posteriormente, deberá decidir si:

- **Aprobar** su labor como administrador público, y que usted reciba el salario completo de **120 puntos.**
- **Desaprobar** su labor como administrador público, y que usted reciba un salario de **80 puntos.**

Por último:

Si el ciudadano decide desaprobar su labor como administrador público, él deberá pagar 30 puntos.

Figure E9: Payment

¿Cómo se calcula el pago de la ronda?

Así es como calculamos los pagos del administrador público y el ciudadano:

El pago del **administrador público** es:

Pago = **120 puntos** de salario + 20 puntos de impuestos *[si el administrador público decide conservarlos]* - 40 puntos por desaprobación *[si el ciudadano decide desaprobar al administrador público]*

El pago del **ciudadano** es:

Pago = **80 puntos** de ingreso - **40 puntos** de impuestos + (**30 puntos** x **número de bienes públicos**) - 30 puntos *[si el ciudadano decide desaprobar al administrador público]*

A continuación le presentamos un ejemplo de la actividad.

Siguiente

Figure E10: Control Question A - 1

Ejemplo 1

Información general

El ingreso del ciudadano, antes de pagar impuestos, es de **80 puntos**.

Recuerde que el total de impuestos pagados por el ciudadano es de **40 puntos**.

El salario del administrador público es de **120 puntos**.

Situación hipotética:

Suponga que durante esta interacción, el costo de producción de bienes públicos fue de **10 puntos**, es decir: un costo **bajo**

Recuerde que el administrador público pudo destinar los **40 puntos** de impuestos a la construcción de bienes públicos o destinar solo **20 puntos** de impuestos y conservar 20 puntos para él.

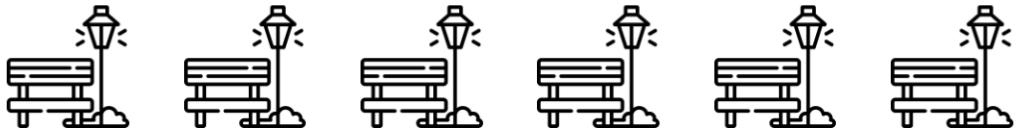
Finalmente, recuerde que el computador pudo dar un financiamiento adicional de **20 puntos** o no dar nada.

Figure E11: Control Question A - 2

A continuación, le presentamos una tabla que resume lo que el ciudadano puede observar en esta interacción

Recursos destinados por:		Recursos totales	Costo del bien público	Número de bienes públicos
Administrador público	Computador			
40 puntos	20 puntos	60 puntos	10 puntos	
40 puntos	0 puntos	40 puntos	10 puntos	
20 puntos	20 puntos			
20 puntos	0 puntos	20 puntos	10 puntos	

Suponga que el **ciudadano** observa que se construyeron seis (6) bienes públicos



¿Qué se puede inferir con la construcción de estos bienes públicos?

- Que el administrador público destinó solo 20 puntos de los impuestos, conservó la otra mitad y el computador SI dio un financiamiento adicional de 20 puntos.
- Que el administrador público destinó todos los 40 puntos de impuestos y el computador SI dio un financiamiento adicional de 20 puntos.
- Que el administrador público destinó todos los 40 puntos de impuestos y el computador NO dio un financiamiento adicional.

Siguiente

Figure E12: Control Question B - 1

Ejemplo 2

Información general

El ingreso del ciudadano, antes de pagar impuestos, es de **80 puntos**.

Recuerde que el total de impuestos pagados por el ciudadano es de **40 puntos**.

El salario del administrador público es de **120 puntos**.

Situación hipotética:

Suponga que durante esta interacción, el costo de producción de bienes públicos fue de **20 puntos**, es decir: un costo **alto**

A continuación, le presentamos una tabla que resume lo que el ciudadano pudo observar en esta interacción

Recursos destinados por:		Recursos totales	Costo del bien público	Número de bienes públicos		
Administrador público	Computador					
40 puntos	20 puntos	60 puntos	20 puntos			
40 puntos	0 puntos	40 puntos	20 puntos			
20 puntos	20 puntos					
20 puntos	0 puntos	20 puntos	20 puntos			

Figure E13: Control Question B - 2

Suponga que el **ciudadano** observa que se construyeron (3) bienes públicos

Recuerde que el ciudadano recibe **30 puntos** por cada bien público construido.

Por consiguiente, él ciudadano recibiría 90 puntos adicionales que se suman a sus **40 puntos** de ingreso después de impuestos.

Hasta este punto, el pago acumulado del ciudadano es de 130 puntos.

Recuerde que el administrador público inicia con un salario de 120 puntos.

Recuerde también que si el ciudadano desaprueba la labor del administrador público, el ciudadano deberá **pagar** 30 puntos y el administrador público recibirá un salario de 80 puntos.

Pregunta

Si el ciudadano decide desaprobar al administrador público, ¿cuál es el pago final de ambos jugadores?

Opciones	Pago del **administrador público**	Pago del **ciudadano**
Opción **A**	80 puntos	130 puntos
Opción **B**	120 puntos	100 puntos
Opción **C**	80 puntos	100 puntos

- ○ **Opción A**
- ○ **Opción B**
- ○ **Opción C**

Siguiente

Figure E14: General instructions

Inicio de la actividad

A continuación, daremos comienzo a la actividad.

Ahora lo vamos a emparejar **aleatoriamente con un ciudadano** de la sesión.

Siguiente

Figure E15: Politician's Decision
Cost $(\pi) = 20$ *EP*

Decisión

Usted es un administrador público

Usted puede emplear 20 o 40 puntos en la construcción de bienes públicos.

Recuerde que con **50% de probabilidad** el computador destinará **20 puntos** adicionales para construir bienes públicos.

Recuerde que el ciudadano **solo** observara los bienes públicos construidos.

Durante esta interacción, el costo de producción de bienes públicos será de **20 puntos**, es decir: un costo **alto**

Su decisión

¿Cuántos puntos quiere emplear en la construcción de bienes públicos?

◯ **40 puntos**, construir 2 bienes públicos y no conservar nada para usted

◯ **20 puntos**, construir 1 bien público y conservar **20 puntos** para usted

Siguiente

Figure E16: Politician's Belief of Punishment
Cost $(\pi) = 20$ *EP*

Sus creencias

A continuación, le pediremos que haga una predicción sobre el comportamiento del ciudadano. Si sus predicciones aciertan con la realidad, usted recibirá **3 puntos adicionales**. Por eso es importante que piense bien esta predicción.

En esta interacción:

1) ¿Cree usted que el **ciudadano** va a **desaprobar** su labor?

Siguiente

Figure E17: Citizen's Belief of Corruption
Cost (π) = *20 EP*

Sus creencias

A continuación, le pediremos que haga una predicción sobre el comportamiento del administrador público. Si su predicción acierta con la realidad, usted recibirá **3 puntos adicionales**. Por eso es importante que piense bien esta predicción.

Durante esta interacción, el costo de producción de bienes públicos fue de **20 puntos**, es decir: un costo **alto**

En esta interacción:

1) ¿Cuántos recursos cree que el **administrador público** asignará para la construcción de bienes públicos?

Siguiente

Figure E18: Citizen's Decision
Cost (π) = *20 EP*

Rendición de cuentas

Durante esta interacción, el costo de producción de bienes públicos fue de **20 puntos**, es decir: un costo **alto**

Con un costo **alto**, usted podría observar:

Si el administrador público destina	Si el computador destina	Recursos totales	Costo del bien público	Número de bienes públicos que usted observa:		
40 puntos	20 puntos	60 puntos	20 puntos			
40 puntos	0 puntos	40 puntos	20 puntos			
20 puntos	20 puntos					
20 puntos	0 puntos	20 puntos	20 puntos			

Figure E19: End of the round

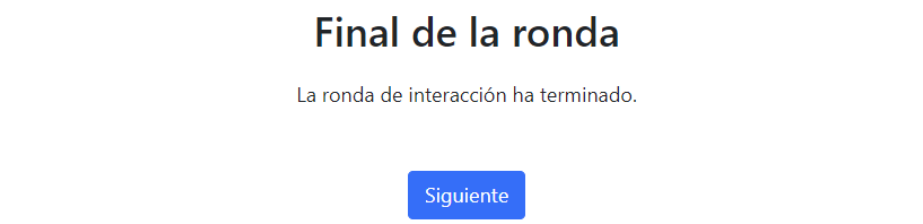


Figure E20: New round screen

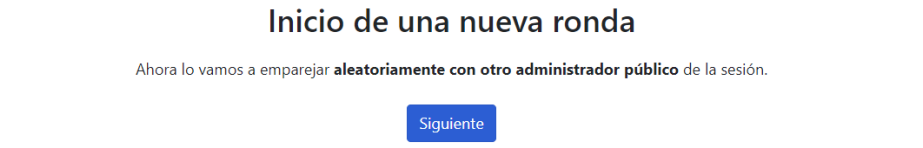


Figure E21: Citizen's Social Norms Screen

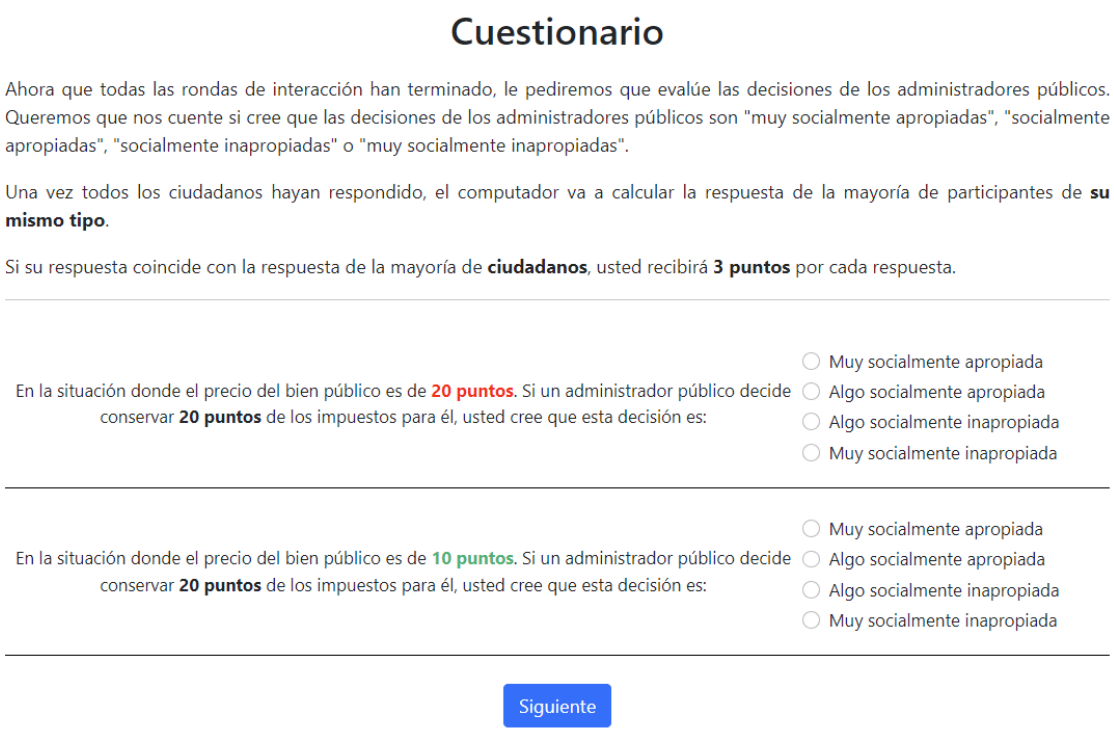


Figure E22: Politician's Social Norms Screen

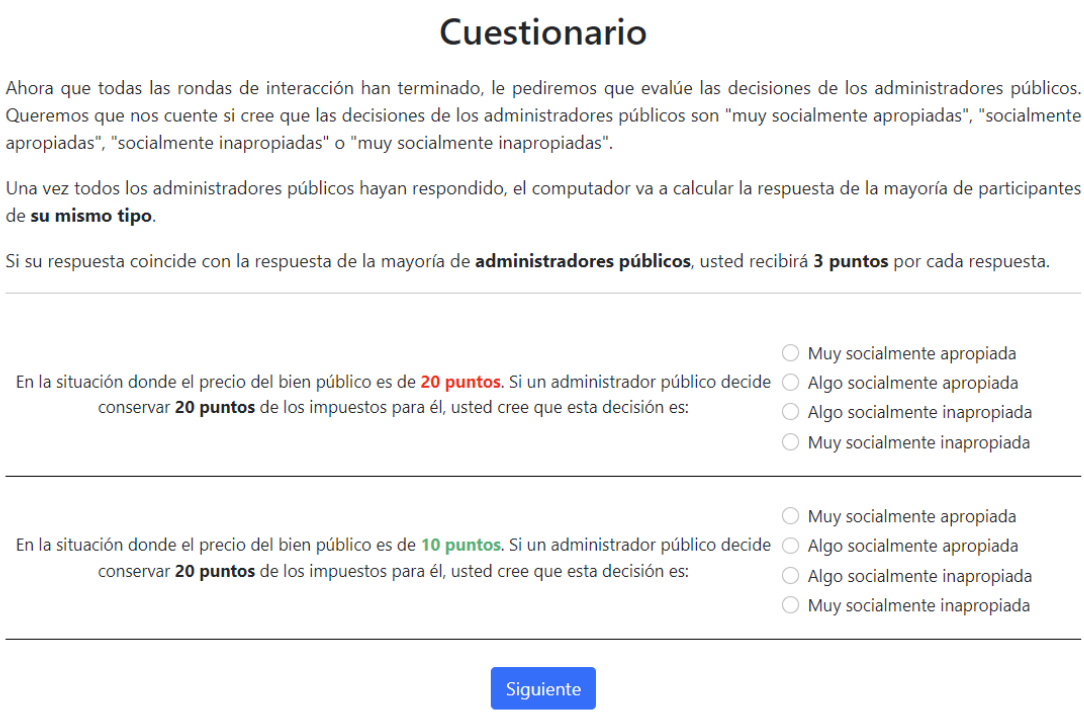
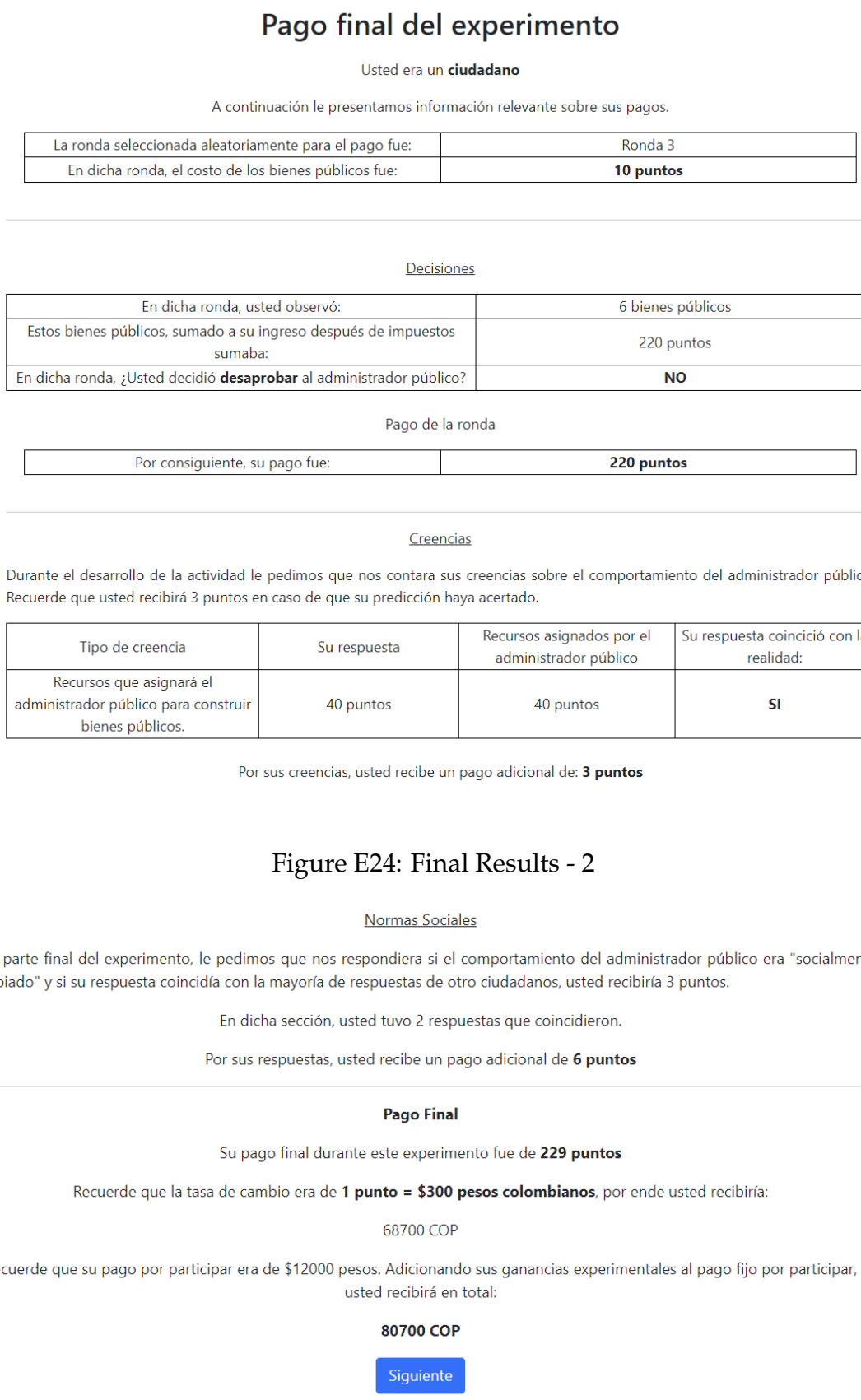


Figure E23: Final Results



Pago final del experimento

Usted era un **ciudadano**

A continuación le presentamos información relevante sobre sus pagos.

La ronda seleccionada aleatoriamente para el pago fue:	Ronda 3
En dicha ronda, el costo de los bienes públicos fue:	**10 puntos**

Decisiones

En dicha ronda, usted observó:	6 bienes públicos
Estos bienes públicos, sumado a su ingreso después de impuestos sumaba:	220 puntos
En dicha ronda, ¿Usted decidió **desaprobar** al administrador público?	**NO**

Pago de la ronda

Por consiguiente, su pago fue:	**220 puntos**

Creencias

Durante el desarrollo de la actividad le pedimos que nos contara sus creencias sobre el comportamiento del administrador público. Recuerde que usted recibirá 3 puntos en caso de que su predicción haya acertado.

Tipo de creencia	Su respuesta	Recursos asignados por el administrador público	Su respuesta coincició con la realidad:
Recursos que asignará el administrador público para construir bienes públicos.	40 puntos	40 puntos	**SI**

Por sus creencias, usted recibe un pago adicional de: **3 puntos**

Figure E24: Final Results - 2

Normas Sociales

En la parte final del experimento, le pedimos que nos respondiera si el comportamiento del administrador público era "socialmente apropiado" y si su respuesta coincidía con la mayoría de respuestas de otro ciudadanos, usted recibiría 3 puntos.

En dicha sección, usted tuvo 2 respuestas que coincidieron.

Por sus respuestas, usted recibe un pago adicional de **6 puntos**

Pago Final

Su pago final durante este experimento fue de **229 puntos**

Recuerde que la tasa de cambio era de **1 punto = $300 pesos colombianos**, por ende usted recibiría:

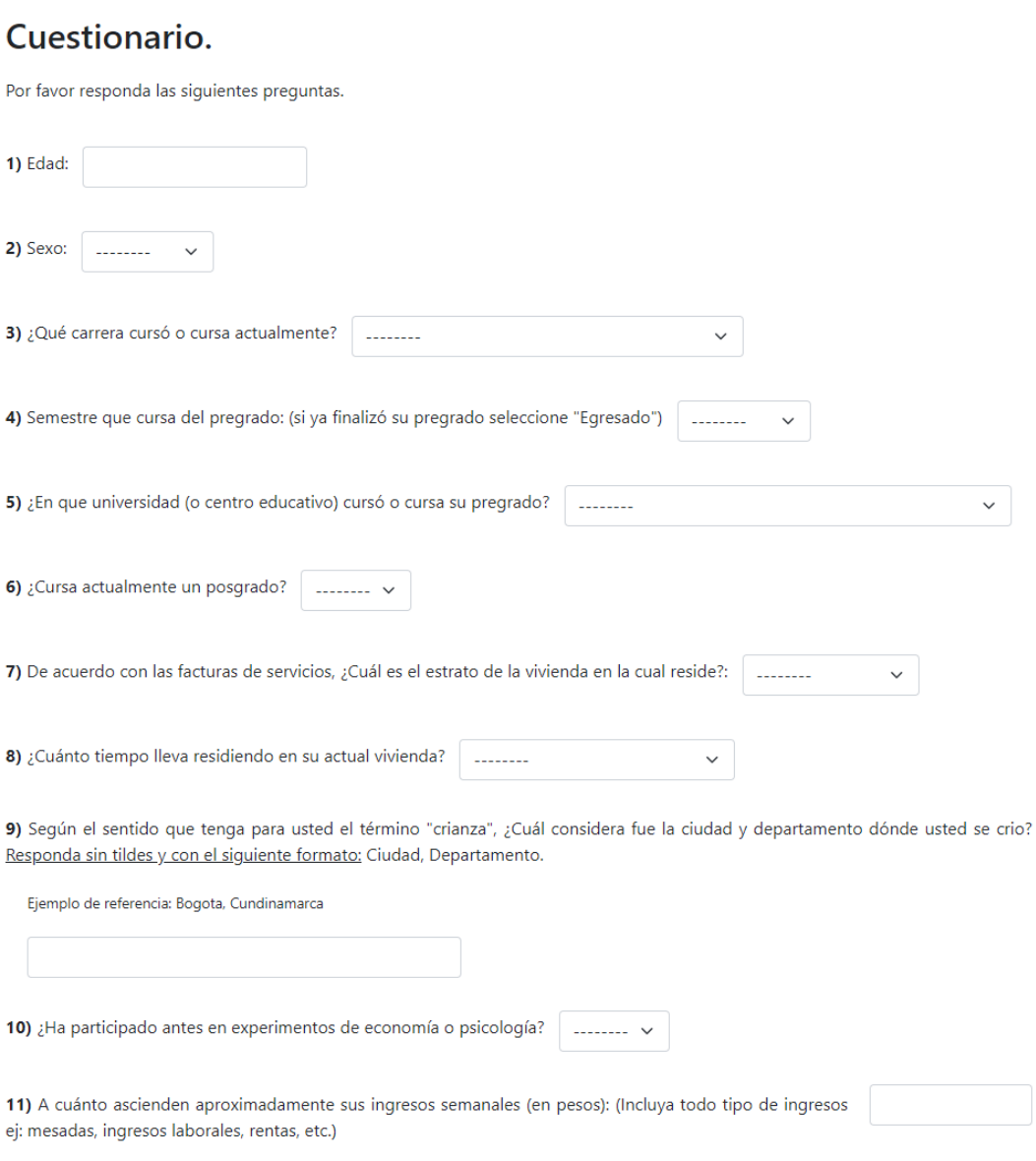
68700 COP

Recuerde que su pago por participar era de $12000 pesos. Adicionando sus ganancias experimentales al pago fijo por participar, usted recibirá en total:

80700 COP

Siguiente

Figure E25: Questionnaire



Cuestionario.

Por favor responda las siguientes preguntas.

1) Edad:

2) Sexo: --------

3) ¿Qué carrera cursó o cursa actualmente? --------

4) Semestre que cursa del pregrado: (si ya finalizó su pregrado seleccione "Egresado") --------

5) ¿En que universidad (o centro educativo) cursó o cursa su pregrado? --------

6) ¿Cursa actualmente un posgrado? --------

7) De acuerdo con las facturas de servicios, ¿Cuál es el estrato de la vivienda en la cual reside?: --------

8) ¿Cuánto tiempo lleva residiendo en su actual vivienda? --------

9) Según el sentido que tenga para usted el término "crianza", ¿Cuál considera fue la ciudad y departamento dónde usted se crio? Responda sin tildes y con el siguiente formato: Ciudad, Departamento.

Ejemplo de referencia: Bogota, Cundinamarca

10) ¿Ha participado antes en experimentos de economía o psicología? --------

11) A cuánto ascienden aproximadamente sus ingresos semanales (en pesos): (Incluya todo tipo de ingresos ej: mesadas, ingresos laborales, rentas, etc.)

12) ¿Cuál es el máximo nivel de educación alcanzado por su madre? --------

13) ¿Cuál es el máximo nivel de educación alcanzado por su padre? --------

14) Imagine una escalera con 10 escalones. Las personas con los ingresos más **bajos** se sitúan en el escalón 1 y las personas con los ingresos más **altos** en el escalón 10. ¿Dónde situarías a tu grupo familiar?

1	2	3	4	5	6	7	8	9	10

15) En una escala del 0 al 10, donde **0 significa que "no está dispuesto(a) a tomar riesgos en lo absoluto"** y **10 significa que "está muy dispuesto(a) a tomar riesgos"**, por favor, dígame, en general ¿qué tan dispuesto (a) está o no está usted a tomar riesgos? Puede usar cualquier número entre 0 y 10 para indicar en qué lugar de la escala se encuentra:

0	1	2	3	4	5	6	7	8	9	10

16) En una escala del 0 al 10, donde **0 significa que "Por lo general, hay que tener mucho cuidado de las personas"** y **10 significa "Por lo general, se puede confiar en la gente"**, ¿usted diría que se puede confiar en la mayoría de la gente o que hay que tener mucho cuidado al tratar con las personas?

0	1	2	3	4	5	6	7	8	9	10

17) ¿Usted diría que la gente de su barrio es "muy confiable", "algo confiable", "poco confiable" o "nada confiable"? --------

18) ¿En su vida personal, ¿en qué medida está dispuesto a renunciar a algo que puede ser beneficioso para usted hoy a cambio de obtener mayores beneficios en el futuro? Para ello utilice la siguiente escala de 1 al 5, donde 1 significa que usted **no está dispuesto** a renunciar a obtener los beneficios hoy y 5 significa que usted está **totalmente dispuesto** a esperar a cambio de beneficios mayores en el futuro

1	2	3	4	5

19) ¿Si usted fuera víctima de un robo o asalto, ¿cuánto confiaría que el sistema judicial castigue al culpable? --------

20) De la siguiente lista de actividades políticas que las personas pueden hacer, le pedimos que indique si: Alguna vez la ha hecho, si alguna vez la haría o si nunca la haría

Firmar una petición --------

Participar en una manifestación autorizada --------

Participar en una manifestación no autorizada --------

Bloquear el tráfico --------

21) Pensando en los políticos, ¿cuántos cree que están involucrados en corrupción? --------

22) Si una persona se enferma, ¿quién debe pagar su tratamiento?
(Puede deslizar la barra indicando quien tiene más responsabilidad en el pago del tratamiento)

El estado debe pagar todo el tratamiento **El paciente debe pagar todo el tratamiento**

23) ¿Si usted expresa libre y abiertamente su opinión sobre los problemas nacionales, cree que esto podría tener consecuencias negativas para usted?

----

24) En una escala de 1 a 10, siendo 1 "no esta dispuesto en lo absoluto" y 10 "completamente dispuesto", ¿Qué tan dispuesto esta a protestar por...

Mejores salarios y mejores condiciones de trabajo --------

Mejor salud y educación --------

Cambio climático --------

Defender los derechos democráticos --------

Pelear en contra de la corrupción --------

Una sociedad más igualitaria --------

25) Imagine que vamos a otorgar un premio de 50.000 COP al ganador del siguiente juego. Usted debe escoger un número entre el 0 y el 100. El ganador será aquel participante de la sala cuyo número elegido sea el más cercano a 2/3 (dos terceras partes) del promedio de los números elegidos por todos los participantes.

¿Qué número escogería?

26) Pensando en lo que más se acerque a su punto de vista, ¿Cómo debería hacer uno para que usted y el país avancen?

----

27) Muchas de las calles de la ciudad están en mal estado. Supongamos que el gobierno va a asignar recursos para su mantenimiento a los barrios donde los vecinos logren reunir por lo menos 500 firmas en una petición. ¿Qué tan probable es que en el barrio donde usted vive se logre reunir las 500 firmas para la petición?

----

28) Si logran juntar en el barrio las 500 firmas necesarias para la petición ¿Qué tan probable es que las autoridades efectivamente solucionen el problema?

----

29) ¿Un oficial de policía le ha pedido un soborno en los últimos doce meses? --------

30) En los últimos doce meses, ¿algún empleado del gobierno le pidió un soborno? --------

31) Qué tanto confía que el gobierno nacional haga lo correcto? --------

32) Siendo 1 "Nada involucrado" y 10 "Totalmente involucrado", ¿Qué tanto cree que están involucrados en corrupción ...

El presidente y los trabajadores de su oficina --------

Los congresistas --------

Los gobernadores --------

Los alcaldes --------

Los policias --------

Los jueces y magistrados --------

La DIAN --------

33) Hoy en día cuando se habla de tendencias políticas, mucha gente habla de aquellos que simpatizan más con la izquierda o con la derecha. Según el sentido que tengan para usted los términos "izquierda" y "derecha" cuando piensa sobre **su punto de vista** político, ¿usted se describiría como de derecha, centro derecha, centro, centro izquierda, o izquierda?

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34) Qué tan de acuerdo está con la siguiente afirmación: **Cada individuo es responsable de su propio bienestar**

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35) Qué tan de acuerdo está con la siguiente afirmación: **El gobierno debe poner en práctica políticas firmes para reducir la desigualdad entre ricos y pobres**

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36) ¿Votó usted en las últimas elecciones presidenciales?

Siguiente