

# Political Corruption and Minority Capture

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## Abstract

This paper provides a model for political corruption in which a briber can choose between either bribing only the majority and accepting the monitoring of the minority, or alternatively, bribing also the minority, which gives up to its control role and increases the probability of success of the illicit action. Minorities can exploit their typical monitoring role in modern democracies either to gain a reputational premium or to get involved in bribing and raise higher stakes. Thus, policy-makers face a sort of paradox when attempting to strengthen the control role of minorities and reduce corrupt behavior because this may cause the opposite effect of inducing the minorities to get involved into the illicit activity and, eventually, spread the corruption disease. The model suggests that the "minority capture" especially regards affairs of significant dimension, which are all typical issues of modern and developed economies. In the long-run, if the electorate tends to forget and/or forgive, the minority capture is very likely and can persist for a long time, eventually causing an institutional decay of political institutions.

**Keywords:** Bribing; political corruption; monitoring; rent seeking; minority; political reputation.

**JEL:** D72; D73; K42.

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# 1 Introduction

The following analysis builds on the several cases of political corruption, in which private individuals, groups, or firms influence through illicit conducts the state institutions' decision-making process. The distinctive trait of political corruption is the interaction between private and public actors through which a collective good is 'illegitimately converted into private-regarding payoffs' (Heidenheimer and Johnston, 2002). The main element characterizing the illicit conduct is the payment of money or other utilities to corrupt public officials in exchange of some private advantage against the public interest. This situation occurs in a variety of forms and touches upon several state institutions such as the legislative assemblies, the executive power, and the judiciary (Klitgaard, 1988). For instance, private interests can bend legislative assemblies to their will by corrupting elected politicians. In particular, modern elective assemblies consist of a majority, which has the decisional power in the choice and design of laws, rules and regulations, and a minority, which exerts a control over the majority's actions and can become majority in future elections. In general, the minority has the interest to expose any misconduct of the majority, especially if this could jeopardize public interest through corrupt activities, and gain reputation in front of the public opinion.

Our analysis is placed exactly in this context. This paper provides a theoretical analysis on the conditions in which a briber can choose between either "buying" only the majority and accepting the control role of the minority, or alternatively, buying also the minority, which gives up to its control role thereby increasing the probability of success of the illicit action. The theoretical idea draws on the literature of corruption in hierarchies (Bac 1996a, Bac 1996b), in which a subordinate can potentially deliver a "corrupt service" to a corrupter, and a supervisor can prevent the subordinate's corrupt behavior because of misaligned goals. The subordinate can also corrupt the supervisor and generate a collusion (Tirole, 1986; Calvo, 1987). However, in the following setting we address several questions regarding political corruption with actors operating according to typical political drives. Does stronger control power to minorities reduce corruption? Or, rather, does a stronger control role to minorities increases minority's bargaining power *vis-à-vis* the briber? Under which conditions does the briber prefer to corrupt only the majority or, rather, buy the minority and thereby reducing the risk? What are the most suitable policies to address the possible failure in the minority's control role and possibly exploit the wedge in the conflicting political goals between minority and majority?

From a policy-maker viewpoint to answer these questions is very important. The policy-maker may face a sort of paradox when attempting to strengthen the role of minorities and reduce corrupt behavior because this may give the opportunity to the minorities to rip off high stakes and cause the opposite effect by inducing the minorities to get involved into the illicit activity.

The model suggests that the "minority capture" especially regards affairs of significant dimension (i.e., protection of monopoly power, allocation of industrial subsidies, destination of conspicuous public expenditure), which are all typical

issues of modern and developed economies (Amundesen, 1999). In the long-run, if the electorate tends to forget and/or forgive, the minority capture is very likely and can persist for a long time, eventually causing an institutional decay of political institutions.

The article is organized as follows. The next section introduces the model and study the possible bribes and the corruption equilibria. Section 3 provides a welfare analysis and the policies needed to reduce the negative impact of corruption. Section 4 introduces the dynamics into the model. Section 5 concludes.

## 2 The model

A potential briber  $B$  can obtain a rent,  $r$ , by corrupting political parties. We assume only two political parties, the majority  $X$ , which has decisional power, and the minority  $Y$ , which has the power to monitor  $X$ 's activities and help detecting possible corrupt activities involving  $X$ .<sup>1</sup> The briber can obtain the rent by choosing between two different scenarios: 1) bribing only  $X$  and incurring in  $Y$ 's monitoring that increases the probability to be detected and punished, or 2) bribing both  $X$  and  $Y$  to avoid  $Y$ 's monitoring.<sup>2</sup>

In the *first scenario*,  $Y$  decides which level of monitoring,  $m$ , to exert. Regardless of  $Y$ 's level of monitoring, there exists an exogenous positive probability,  $\underline{\pi}$ , that the corrupt activities can be detected and punished. The term  $\underline{\pi}$  is given and depends on the fixed effort level exerted by independent institutions (e.g., police, judiciary, antitrust agencies, consumers' associations, etc.), which are assumed to be incorruptible. Therefore, the probability function  $\pi(\cdot)$  of detection and punishment is such that  $\pi(m) : R_+ \cup \{0\} \rightarrow [\underline{\pi}, \bar{\pi}(< 1)[$  with  $\pi'(m) > 0$ ,  $\pi''(m) < 0$ ,  $\pi(0) = \underline{\pi}$ , and  $\lim_{m \rightarrow \infty} \pi(m) = \bar{\pi}$ .  $Y$  incurs a cost of monitoring  $c(m) : R_+ \cup \{0\} \rightarrow R_+$ , with  $c'(m) > 0$ ,  $c''(m) > 0$ , and  $c(0) = 0$ . If corruption is detected,  $B$  and  $X$  are punished and each incurs a fine  $f$ , while  $Y$  obtains a reputational premium  $p$  because it has not been involved in bribing.<sup>3</sup>

In the *second scenario*, both  $X$  and  $Y$  accept the bribes. Therefore, there is no monitoring and the probability to be punished and detected is at its minimal level,  $\underline{\pi}$ . If corruption is detected,  $B$ ,  $X$ , and  $Y$  are all involved and each incurs a fine  $f$ .

Hence, we consider under which conditions  $B$  bribes only  $X$  and accepts  $Y$ 's monitoring, or  $B$  bribes both  $X$  and  $Y$ .

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<sup>1</sup>Monitoring can occur through participation in parliamentary activities and committees or any other relevant means by which the minority exerts its control role. The minority has also a watchdog role when informing the public about goings-on in the political or governmental choices.

<sup>2</sup>Trivially, a necessary condition for  $B$  to obtain  $r$  is to bribe  $X$ .

<sup>3</sup>This reputational or credibility premium does not stem directly from  $Y$ 's monitoring activity.

## 2.1 The expected utility

By assumption if no bribe occurs the utility of each agent is zero. All agents are considered risk-neutral. For simplicity, we assume that detection and punishment occur after the illicit transaction takes place, that is after  $B$  receives  $r$ , and  $X$  or both  $X$  and  $Y$  receive their bribes. This implies that in case of detection and punishment, the corrupt political parties must give up to their bribes and  $B$  must refund the state institutions for the illicit rent acquired. This must occur on top of the sanction  $f$ . Finally, we assume that  $X$  can deliver  $r$  at no cost. In the following, the subscripts 1 and 2 refer to the first scenario (i.e., bribing involves only  $X$ ) and the second scenario (i.e., bribing involves both  $X$  and  $Y$ ), respectively.

The expected utility functions of the briber in each scenario are  $EU_{B1}$  and  $EU_{B2}$ , where:

$$EU_{B1} \equiv [1 - \pi(m^*)] (r - b_{x1}) - \pi(m^*)f,$$

$$EU_{B2} \equiv (1 - \underline{\pi}) (r - b_{x2} - b_{y2}) - \underline{\pi}f. \quad (1)$$

Wherein  $b_{x1}$  is the bribe given to  $X$  in the first scenario,  $b_{x2}$  and  $b_{y2}$  are the bribes given to  $X$  and  $Y$ , respectively, in the second scenario, and  $m^*$  is the optimal level of monitoring exerted by  $Y$  in the first scenario.<sup>4</sup>

The expected utility functions of the majority are  $EU_{X1}$  and  $EU_{X2}$ , where:

$$EU_{X1} \equiv [1 - \pi(m^*)]b_{x1} - \pi(m^*)f, \quad (2)$$

$$EU_{X2} \equiv (1 - \underline{\pi}) b_{x2} - \underline{\pi}f. \quad (3)$$

Finally, the expected utility functions of the minority are  $EU_{Y1}$  and  $EU_{Y2}$ , where:

$$\begin{aligned} EU_{Y1} &\equiv [1 - \pi(m)] [-c(m)] + \pi(m) [p - c(m)] \\ &= \pi(m)p - c(m), \end{aligned} \quad (4)$$

$$EU_{Y2} \equiv (1 - \underline{\pi}) b_{y2} - \underline{\pi}f. \quad (5)$$

Notice that since the exogenous probability of being detected and punished,  $\underline{\pi}$ , is positive, a zero-level optimal monitoring,  $m^* = 0$ , implies  $EU_{Y1} = \underline{\pi}p > 0$ . If corruption hits and  $X$  gets involved,  $Y$  has positive expected gains in terms of relative reputation from the detection and punishment of  $X$  even if  $Y$  did not or could not provide direct monitoring.<sup>5</sup> Thus,  $EU_{Y1} = \pi(m^*)p - c(m^*) > \underline{\pi}p \forall m^* > 0$ .

<sup>4</sup>If the corrupt activity is fully successful, we assume that  $b_{x1}$  is not reinvested by  $X$  to acquire further political consensus.

<sup>5</sup> $Y$  increases its reputation in front of public opinion and electorate simply because it has clean hands relative to  $X$ . Monitoring increases the chances to unveil possible  $X$ 's misconducts and eventually the  $Y$ 's probability to obtain the reputational premium.

**Lemma 1** *A necessary condition to be in the second scenario is that  $m^* > 0$ .*

This simple Lemma requires that  $Y$  is involved in bribing only if its monitoring activity has an impact on the probability of detection, and thus negatively influences  $B$ 's expected utility. Otherwise, if  $m^* = 0$ , bribing both  $X$  and  $Y$  can never occur.

## 2.2 The bribe

In the first scenario  $X$  will find it profitable to be engaged in the illegal action provided that  $EU_{X1} \geq 0$ . So that  $b_{x1}^{ask}$  must be such that:

$$b_{x1}^{ask} \geq \frac{\pi(m^*)}{1 - \pi(m^*)} f. \quad (6)$$

Likewise, the maximum bribe  $B$  is willing to offer must satisfy the individual rationality constraint  $EU_{B1} \geq 0$ . Thus,  $b_{x1}^{bid}$  must be such that:

$$b_{x1}^{bid} \leq r - \frac{\pi(m^*)}{1 - \pi(m^*)} f. \quad (7)$$

The following condition must hold:

$$b_{x1}^{bid} \geq b_{x1}^{ask}. \quad (8)$$

In the second scenario, the bribe asked by  $X$  must satisfy the condition that  $EU_{X2} \geq 0$ . So that  $b_{x2}^{ask}$  must be such that:

$$b_{x2}^{ask} \geq \frac{\pi}{1 - \pi} f. \quad (9)$$

The bribe asked by  $Y$  must satisfy the condition  $EU_{Y2} \geq EU_{Y1}(m^*) > 0$ , for a given  $m^* > 0$ . Thus,  $b_{y2}^{ask}$  must be such that:

$$b_{y2}^{ask} \geq \frac{\pi}{1 - \pi} f + \frac{\pi(m^*)p - c(m^*)}{1 - \pi}. \quad (10)$$

In case  $B$  bribes both  $X$  and  $Y$  then the inequality  $b_{y2}^{ask} > b_{x2}^{ask}$  occurs. In other words, if bribed,  $Y$  asks more than  $X$  because the former has an expected positive payoff from remaining clean *vis-à-vis*  $X$ .  $Y$  can trigger its entitlement to monitoring so to increase the probability that the corrupt practice is detected and punished, and eventually obtain  $p$  by exposing  $X$ 's misconduct to public opinion. In this perspective,  $X$  can only ask to be compensated by the expected cost of being caught and punished.<sup>6</sup>

The maximum bribe  $B$  is willing to offer must satisfy the individual rationality constraint  $EU_{B2} \geq 0$ . Thus,  $b_{xy}^{bid} \equiv b_{x2}^{bid} + b_{y2}^{bid}$  must be such that:

$$b_{xy}^{bid} \leq r - \frac{\pi}{1 - \pi} f.$$

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<sup>6</sup>Notice that by assumption  $X$  delivers  $r$  at no cost.

Therefore, the following condition must hold:

$$b_{xy}^{bid} \geq b_{x2}^{ask} + b_{y2}^{ask}. \quad (11)$$

For simplicity, we assume no bargaining, such that  $B$  can drive the bribes to their minimal amount. Consequently:

$$\begin{aligned} b_{x1}^* &= b_{x1}^{ask} = \frac{\pi(m^*)}{1 - \pi(m^*)} f, \\ b_{x2}^* &= b_{x2}^{ask} = \frac{\underline{\pi}}{1 - \underline{\pi}} f, \\ b_{y2}^* &= b_{y2}^{ask} = \frac{\underline{\pi}}{1 - \underline{\pi}} f + \frac{\pi(m^*)p - c(m^*)}{1 - \underline{\pi}}. \end{aligned}$$

In the first scenario, the bribe  $b_{x1}^*$  is proportional to the fine  $f$ , and since the risk of detection and punishment increases in  $m^*$ ,  $b_{x1}^*$  is increasing in  $m^*$ . In the second scenario,  $b_{x2}^*$  does not depend on  $m^*$  but simply depends on the risk  $\underline{\pi}$  of incurring a fine, and for any  $m^* > 0$ , this is the lowest bribe that  $X$  can achieve. On the contrary,  $m^*$  influences positively  $b_{y2}^*$  and identifies the potential threat that  $Y$  can move against the positive ending of corruption through its impact on  $\pi(m^*)$ .  $B$  incurs a cost for removing this threat, which is proportional to the expected potential profit of  $Y$  in case of monitoring. In addition and in the same way as  $X$ ,  $Y$  must also be covered against the risk of being detected and punished. As a consequence, in the second scenario,  $Y$  obtains a higher bribe than  $X$ , which is due to the potential threat of  $Y$ 's monitoring over  $X$ . Therefore, the minority can exploit to its own interest - by profiting from corrupt practices - its monitoring role that is originally assigned to increase the democracy rate within a specific context, such as a legislative assembly.

### 2.3 Equilibria

As a first step consider the maximization problem of  $Y$  in the first scenario in order to find the optimal monitoring level  $m^*$ . In particular, the following argmax function includes the set of monitoring levels that maximize  $Y$ 's expected utility:

$$m^*(\underline{\pi}, \bar{\pi}, p) = \arg \max_{m \in \mathbb{R}_+ \cup \{0\}} \pi(m)p - c(m) \quad (12)$$

**Lemma 2** *The optimal monitoring function  $m^*(\underline{\pi}, \bar{\pi}, p)$  is increasing in  $p$  and  $\bar{\pi}$ , and decreasing in  $\underline{\pi}$ .*

**Proof.** See the Appendix. ■

Consider that any changes in  $\underline{\pi}$  or  $\bar{\pi}$  modifies the probability function  $\pi(m)$ . This makes further inference on the impact of changes in  $\underline{\pi}$  or  $\bar{\pi}$  on the equilibria particularly complex. Therefore, if not differently stated, we consider  $\pi(m)$

fixed with  $\underline{\pi}$  and  $\bar{\pi}$  as given. Consequently, the optimal monitoring function  $m^*(\underline{\pi}, \bar{\pi}, p)$  would change only for changes in the reputational premium  $p$ .

Consider the following functions, which derive from the compatibility conditions of the bribes (8) and (11):

$$r \geq 2 \frac{\pi(m^*)}{1 - \pi(m^*)} f \equiv r_1(m^*), \quad (13)$$

$$r \geq 3 \frac{\pi}{1 - \underline{\pi}} f + \frac{\pi(m^*)p - c(m^*)}{1 - \underline{\pi}} \equiv r_2(m^*). \quad (14)$$

The frontier  $r_1(m^*)$  includes all the allocations  $(m^*, r)$ , with  $m^* \geq 0$ , such that  $B$  is indifferent between bribing or not bribing only  $X$  (i.e.,  $EU_{B1} = 0$ ). Similarly to  $r_1(m^*)$ , the frontier  $r_2(m^*)$  includes all the allocations  $(m^*, r)$ , with  $m^* > 0$ , such that  $B$  is indifferent between bribing or not bribing both  $X$  and  $Y$  (i.e.,  $EU_{B2} = 0$ ). Notice that when  $m^* = 0$ ,  $r_2(m^*)$  is not defined because the second scenario does not arise. As mentioned above, changes in  $m^*$ , which describe the two frontiers, are simply due to changes in  $p$ .

The two functions  $r_1(m^*)$  and  $r_2(m^*)$  help to define three areas in the set of couples  $(m^*, r)$ , or likewise  $(\pi(m^*), r)$ , for which  $B$  (i) has no convenience to pay bribes, (ii) finds it profitable to corrupt only  $X$ , (iii) finds it profitable to corrupt both  $X$  and  $Y$ . The second and third area can overlap. The following proposition holds.

**Proposition 1** *For a given  $m^* > 0$ , i) if  $r < \min[r_1(m^*), r_2(m^*)]$ , then no bribing occurs; ii) if  $r > \min[r_1(m^*), r_2(m^*)]$ , then bribing occurs; iii) if  $r_2(m^*) > r > r_1(m^*)$  or  $r_1(m^*) > r > r_2(m^*)$ , then  $B$  bribes only  $X$  or both  $X$  and  $Y$ , respectively; iv) if  $r > r_2(m^*) > r_1(m^*)$  or  $r > r_1(m^*) > r_2(m^*)$  then  $B$  bribes only  $X$  iff  $EU_{B1} > EU_{B2}$ , otherwise  $B$  bribes both  $X$  and  $Y$ .*

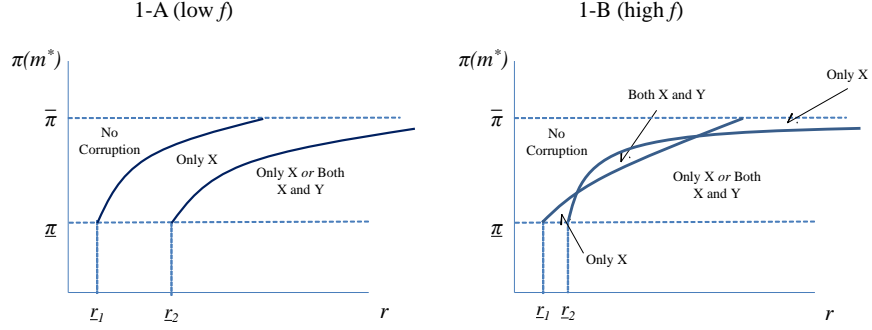
**Proof.** See the Appendix. ■

It is important to understand under which circumstances  $r_2(m^*) > r_1(m^*)$  or vice-versa. This will help us to find the equilibria. The upper and lower bounds of the two functions  $r_1(m^*)$  and  $r_2(m^*)$  are the following:

$$\begin{aligned} \underline{r}_1 &= \lim_{m^* \rightarrow 0} r_1(m^*) = 2 \frac{\pi}{1 - \pi} f, \\ \underline{r}_2 &= \lim_{m^* \rightarrow 0} r_2(m^*) = 3 \frac{\pi}{1 - \pi} f + \frac{\pi p}{1 - \pi} = 3 \frac{\pi}{1 - \pi} f \text{ as } p \rightarrow 0, \\ \bar{r}_1 &= \lim_{m^* \rightarrow +\infty} r_1(m^*) = 2 \frac{\bar{\pi}}{(1 - \bar{\pi})} f, \\ \bar{r}_2 &= \lim_{m^* \rightarrow +\infty} r_2(m^*) = 3 \frac{\pi}{(1 - \pi)} f + \frac{\bar{\pi} p}{1 - \pi} = +\infty \text{ as } p \rightarrow +\infty.^7 \end{aligned}$$

**Corollary 1** *The following inequalities hold: a)  $\bar{r}_1 > \underline{r}_1$ ; b)  $\bar{r}_2 > \underline{r}_2$ ; c)  $\underline{r}_2 > \underline{r}_1$ ; d)  $\bar{r}_2 > \bar{r}_1$ .*

Figure 1: Different scenarios according to the optimal monitoring and corruption rents



**Proof.** Trivial. ■

**Proposition 2**  $r_1(m^*)$  and  $r_2(m^*)$  are both increasing in  $m^*$ .

**Proof.** See the Appendix. ■

Corollary (1) and Proposition (2) imply that for low levels and high levels of  $m^*$ ,  $r_2(m^*)$  is always higher than  $r_1(m^*)$ . Consequently, if  $r_1(m^*)$  crosses  $r_2(m^*)$ , it will occur twice, unless they are tangent to each other. Thus, two different cases can occur: 1)  $r_1(m^*) < r_2(m^*) \forall m^*$ ; 2) given  $m_1^* \leq m_2^*$ ,  $r_1(m^*) \geq r_2(m^*) \forall m^* \in [m_1^*, m_2^*]$ .

**Condition 1**  $r_1(m^*) \geq r_2(m^*)$  iff  $\frac{2\pi(m^*) - 3\pi + \pi(m^*)\pi}{1 - \pi(m^*)} f \geq \pi(m^*)p - c(m^*)$ .

It is easy to check that as  $\pi(m^*) \rightarrow \pi$  (or equivalently  $p \rightarrow 0$ ) or  $\pi(m^*) \rightarrow \bar{\pi}$  (or equivalently  $p \rightarrow +\infty$ ) then  $r_1(m^*) \not\geq r_2(m^*)$ . For intermediate values of  $\pi(m^*)$ , such that  $\pi(m^*) > \frac{3\pi}{2+\pi}$  and  $\pi(m^*) \rightarrow \bar{\pi}$ , higher values of  $f$  would make  $r_1(m^*) > r_2(m^*)$ .

The following figures in the plane  $[r, \pi(m^*)]$  depict two different cases: one in which  $f$  is low such that  $r_1(m^*) < r_2(m^*) \forall m^*$ , and another in which  $f$  is relatively high such that  $r_1(m^*) \geq r_2(m^*) \forall m^* \in [m_1^*, m_2^*]$ . Consider that  $\pi(m^*)$ ,  $r_1(m^*)$  and  $r_2(m^*)$  are all increasing in  $m^*$ . Therefore, we expect that the lines depicting  $r_1(m^*)$  and  $r_2(m^*)$  are increasing in  $r$ . This means that as  $m^*$  increases,  $r$  should increase in order to trigger some form of corruption either with or without the involvement of the minority. This increasing feature is due to the control role given to minorities. Notice that as  $m^* \rightarrow +\infty$ , and consequently as  $\pi(m^*)$  approaches  $\bar{\pi}$ , the rent from corruption that is required to activate the first scenario is finite. On the contrary, no rent is high enough to trigger the second scenario as  $m^* \rightarrow +\infty$ . Figure 1-A applies to low levels of  $f$ , whereas Figure 1-B applies to high levels of  $f$ . Consider that as  $f$  increases, the levels of  $r$  that make corruption profitable must increase accordingly.



In both figures, the set of allocations  $(\pi(m^*), r)$ , such that  $r > \min[r_1(m^*), r_2(m^*)]$ , allow  $B$  to bribe in at least one of the two scenarios. In Figure 1-A, from the no corruption area (i.e.,  $r < r_1(m^*)$ ), as  $r$  increases, corruption is possible only by involving  $X$  (i.e.,  $r_1(m^*) < r < r_2(m^*)$ ). For further increases in  $r$ , then  $B$  has the option to involve also  $Y$  on corrupt activities (i.e.,  $r_1(m^*) < r_2(m^*) < r$ ). This situation does not depend on  $m^*$ . To put it simply, when the stake is not high enough but it is sufficiently high to trigger some form of bribing, then the minority is not involved and pursues its control role. Higher stakes may cause a full capture of the decisional as well as the control roles.

In Figure 1-B, the situation is very similar for levels of  $\pi(m^*)$  relatively close to  $\underline{\pi}$  and  $\bar{\pi}$ , as shown from 1. On the one hand, if  $Y$ 's monitoring does not have a significant impact on the probability of detection and punishment (i.e.,  $\pi(m^*)$  close to  $\underline{\pi}$ ), then the briber may be induced to corrupt also  $Y$  only if the stake is rather high. On the other hand, if  $Y$ 's monitoring is very high such that its impact is at its utmost (i.e.,  $\pi(m^*)$  close to  $\bar{\pi}$ ), the cost of bribing  $Y$  can become prohibitive. However, if  $Y$ 's optimal monitoring levels are not extreme, such that  $\pi(m^*)$  is neither close to  $\underline{\pi}$  nor to  $\bar{\pi}$ , then  $B$  can find it very convenient to corrupt  $Y$  and reduce the associated risk of detection and punishment. In this circumstance, as  $r$  increases, corrupting both  $X$  and  $Y$  may represent the only available option (i.e.,  $r_2(m^*) < r < r_1(m^*)$ ). Since  $f$  is high, the bribes in both scenarios ( $b_{x1}^*$  and  $b_{xy}^*$ ) are correspondingly high. On the one hand, for intermediate values of  $\pi(m^*)$ , the expected gains from avoiding  $Y$ 's monitoring exceed the expected costs to ensure the avoidance. On the other hand, as  $\pi(m^*) \rightarrow \underline{\pi}$  the risk reduction from avoiding  $Y$ 's monitoring is too low to compensate for the expected cost of its reduction, whereas as  $\pi(m^*) \rightarrow \bar{\pi}$ , even if the expected gains from risk reduction are considerable high, they are still insufficient to compensate for the increase of  $b_{y2}^*$ .

From Figure 1 we already can infer that the allocations  $(\pi(m^*), r)$  in which only one type of scenario occurs are equilibria, whereas we need further investigation to find which equilibria exist when both scenarios coexist in the same allocation, that is when  $r > \max[r_1(m^*), r_2(m^*)]$ . The following **2** defines which equilibria occur in the overlapping scenarios.

**Condition 2** If  $r > \max[r_1(m^*), r_2(m^*)]$ ,  $EU_{B1} \gtrless EU_{B2}$  iff  $\frac{r-r_1(m^*)}{r-r_2(m^*)} \gtrless \frac{1-\pi}{1-\pi(m^*)}$ .

From Condition **(2)**,  $\forall m^*$  such that  $r_2(m^*) < r_1(m^*) < r$ , as in Figure 1-B,  $EU_{B1} < EU_{B2}$  holds. Thus, both  $X$  and  $Y$  will be involved in corrupt practices. If  $r_1(m^*) < r_2(m^*) < r$ , we need to distinguish different cases. If  $r$  is very close to  $r_2(m^*)$ , then  $EU_{B1} > EU_{B2}$ , thus only  $X$  will be bribed, as  $r$  increases then bribing also  $Y$  becomes preferable. If  $\pi(m^*)$  is close to  $\bar{\pi}$ , then  $r_2(m^*) \gg r_1(m^*)$ . This implies that  $EU_{B1} > EU_{B2}$  until  $r$  gets very large. If  $\pi(m^*)$  is close to  $\underline{\pi}$ , then  $r_2(m^*) > r_1(m^*)$ . Again, this implies that  $EU_{B1} > EU_{B2}$  until  $r$  gets very large. As a matter of fact, when  $Y$ 's monitoring does not produce a significant impact on the risk level,  $B$  prefers to bribe only  $X$ . Figure 2 depicts all the equilibria according to the allocations  $(\pi(m^*), r)$ .

Figure 2: Figure 2. Equilibria according to different levels of bribe

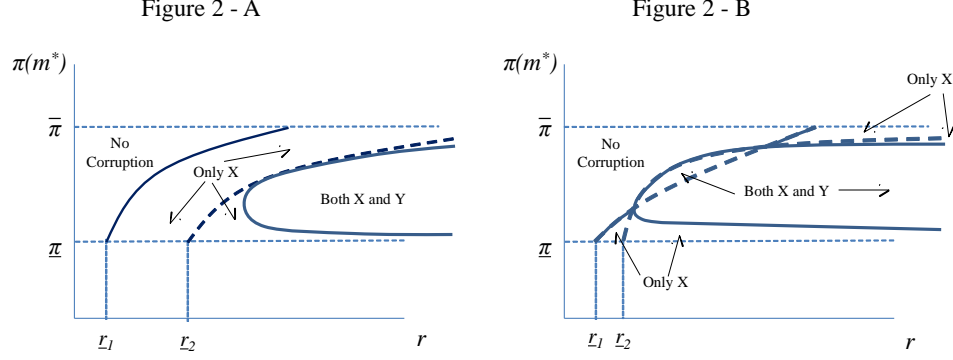


Figure 3: Equilibria according to the optimal monitoring and corruption rents

The economic intuition of the equilibria behind **2** can be easily understood if we interpret the inequality in the same condition as the shift from the riskiest scenario (i.e.,  $\pi(m^*)$ ) to the scenario in which  $Y$ 's monitoring is sterilized and the risk is at its lowest level (i.e.,  $\underline{\pi}$ ). We rewrite  $EU_{B1} \gtrless EU_{B2}$  as follows: (mettere numeretto)

$$E [b_{x2}^* + b_{y2}^*] - E [b_{x1}^*] \gtrless (1 - \underline{\pi})r - [1 - \pi(m^*)]r - (\underline{\pi} - \pi(m^*))f.$$

Where:

$$\begin{aligned} E [b_{x2}^* + b_{y2}^*] &= (1 - \underline{\pi})(b_{x2}^* + b_{y2}^*) = 2\underline{\pi}f + [\pi(m^*)p - c(m^*)]; \\ E [b_{x1}^*] &= [1 - \pi(m^*)] \frac{\pi(m^*)}{1 - \pi(m^*)} f. \end{aligned}$$

The LHS of [numeretto] is the increase in the expected bribe moving from scenario 1 to scenario 2 (i.e., cost of risk reduction). The RHS is the sum of the increase in the gross rent of corruption moving from scenario 1 to scenario 2 (i.e., increase in the expected gains from corruption) and the consequential benefit from a lower expected fine (i.e., decrease in the expected fine). Therefore, **2** simply states that for a given  $\pi(m^*)$  the difference between the expected gains from risk reduction and its costs drives the choice of the briber. In sum, if  $\pi(m^*)$  is very close to  $\underline{\pi}$ , the expected gains from risk reduction are very low so it is not convenient to pay two bribes. If  $\pi(m^*)$  is very close to  $\bar{\pi}$ , even if the expected gains are very high, the cost of the bribes is higher.

### 3 Policies

In this section we focus on the policies that can reduce the negative externalities of corruption.

First of all, we provide a definition for negative externalities. Trivially, if corruption does not occur, negative externalities are zero ( $E_0 = 0$ ). This can be considered as a first-best. Negative externalities  $L(r) (> 0)$  occur in the first or in the second scenarios only if corruption is *not* detected and punished, and reasonably, it is increasing in  $r$ . Thus, the expected negative externality functions are the following:<sup>8</sup>

$$\begin{aligned} E_0 &= 0 \text{ no corruption scenario,} \\ E_1 &= [1 - \pi(m^*)]L(r) \text{ first scenario,} \\ E_2 &= (1 - \underline{\pi})L(r) \text{ second scenario.} \end{aligned}$$

Trivially,  $\forall m^* \geq 0, E_2 \geq E_1 > E_0$ .<sup>9</sup> Thus, for a given  $r, E_2 \geq E_1$ .<sup>10</sup>

The policy-maker can implement policies that influence the variables  $f, \underline{\pi}$ , and  $p$ , in order to reduce the expected negative externalities. The following table presents the main factors affecting these three variables.

| Table 1           | <i>Factors affecting the variables</i>  |
|-------------------|---|
| $p$               | Press freedom (+)<br>General tolerance to corruption (-)<br>Electoral system favoring political turnover (+)<br>Electoral proximity between $X$ and $Y$ (+)<br>Magnitude of $r$ (+)   |
| $\underline{\pi}$ | Financial resources devoted to fighting corruption (+)<br>Judiciary and prosecutors independence from political power (+)<br>Extension of corruption (-)<br>Effectiveness of policing and prosecution systems and judiciary (+) |
| $f$               | Magnitude of $r$ (+)<br>Social and political pressure (+)<br>Anti-corruption campaign from government (+)   |

In general, the policy-maker can influence directly  $\underline{\pi}$  and  $f$ , and mainly indirectly  $p$ . In particular, we can distinguish three different tools:

<sup>8</sup>For simplicity, we assume that the cost of detection and punishment by the exogenous institutions is zero.

<sup>9</sup>As a matter of fact, the negative externality  $L(r)$  of second scenario is likely to be higher than that of the first scenario because of the pervasiveness of corrupt practices occurring when minority is also captured. Thus, *a fortiori*, the strict inequality  $E_2 > E_1$  should hold.

<sup>10</sup>Note that  $E_2$  decreases in  $\underline{\pi}$  and does not change for changes in  $p$ . Differently, given 2,  $E_1$  is decreasing in  $p$  and  $\bar{\pi}$ , and increasing in  $\underline{\pi}$ . However, the value of the expected negative externalities depends on which equilibria occur.

*i)* The *punitive system*, which is the set of laws and rules that provides the sanctionary framework to corrupt practices. Governments can modify the legislative framework towards more indulgent or repressive contrasting measures against corruption. In turn, governments can also be influenced by moral pressures coming from the electorate towards stricter sanctions. Thus, this system can influence the level of  $f$ , that is how heavy the sanction for corruption crimes can be (e.g., low  $f$  or high  $f$ ).

*ii)* The *judiciary and prosecution service*, which regards the effectiveness of the institutional bodies delegated to the control of corruption such as the investigative and policing system, the prosecutors, and the courts of law. The amount of resources devoted to these agencies and their relative independence from the executive power can considerably influence the effectiveness of their roles, and consequently the level of  $\underline{\pi}$ .

*iii)* The *democracy and transparency rate*, which has to do with the incentives of minorities to gain reputation and consequently to adhere to their control role. In particular, democracy refers to the type of electoral system and to a large extent the prospect of political turnover, whereas transparency is related to the access to political acts, and to a large extent, the degree of political accountability. Both eventually affect the magnitude of the reputational premium  $p$ . Note that transparency rates can also influence the cost of monitoring (i.e.,  $c(m)$ ). A higher rate of transparency means a lower monitoring cost and, *ceteris paribus*, a higher expected gain to  $Y$ .

According to our model, these three tools can affect the equilibria of corruption. To analyze the effects of these policies on the equilibria and the externality levels, we introduce a mathematical simulation of the model.<sup>11</sup> The results of this investigation are summarized in the graphs in Figure 3A,B,C,D. We distinguish the three equilibria by using different colors: 1) the green area depicts the no corruption equilibria, and consequently the first-best for the policy-maker; 2) the blue area depicts the equilibria in which only  $X$  is corrupted (i.e., the second-best); 3) finally, the red area shows the third-best equilibria in which  $Y$  is also captured. The figure reports four graphs according to two different levels of  $f$  (i.e., high and low) and two different levels of  $\underline{\pi}$  (i.e., high and low). For each of these graphs, we show the equilibria according to the levels of  $r$  and  $p$ .

[FIGURE 3A,B,C;D]

The results can be summarized as follows:

1) According to the economic intuition, by increasing the severity of the punitive system on corruption crimes a greater deterrence is achieved (especially for relatively low levels of  $r$ ). However, the expected negative externalities existing when the minority is captured becomes more prominent (especially for relatively high levels of  $r$ ). This is not surprising, stiffening the penalties against corruption makes discovered corruption so costly such that equilibria turn out

<sup>11</sup>We assume  $\pi(m) = \bar{\pi} - e^{-m}(\bar{\pi} - \underline{\pi})$  and  $c(m) = \frac{1}{2}m^2$ . These functional forms entirely preserve the characteristics required by the model.

to be polarized: either corruption becomes no convenient or corruption requires to hold the risk as low as possible (i.e., zero  $Y$ 's monitoring).

2) A more effective judiciary and prosecution service increases the second-best equilibria to the detriment of third-best equilibria with no important impacts on the fully deterrence area, the no corruption equilibria.

3) The cumulative policy of stricter sanctions and more effective control of corruption (figura 4b) would achieve a higher deterrence without incurring in the setbacks arising by implementing exclusively the first tool, thereby limiting the worst scenario.

4) Changes in the reputational premium  $p$  have ambiguous effects. An improvement in the democracy and transparency rates would increase the level of  $p$ . This would generally provide positive spillovers over the corruption equilibria by shifting from worse to better scenarios (i.e., from the third best to the second best or, even directly, the first best, and from the second best to the first best). However, if corruption rents are relatively high and the policy-maker observes a rather low reputational premium, a policy oriented to improve the democracy and transparency rates can cause negative effects. The resulting higher inducement to monitoring would lead the briber to protect the relatively high rents by capturing the minority and sterilizing its control role. Clearly, increasingly higher levels of  $p$  would require consequently higher costs of capture and the briber would hardly buy the minority.

## 4 Corruption dynamics and political outcome

So far the reputational premium  $p$  has been considered a constant. Recall that both the general public feelings against corruption and the electoral proximity between majority and minority have an important impact on the levels of  $p$ . On the one hand, people's sentiments and mood can be very sensitive to political corruption so to punish during the electoral polls the political parties involved in past corrupt episodes. The sensitiveness would depend on the press freedom, which helps to convey and amplify these episodes, on the general attitude of the population towards corruption (e.g., indignation), and can vary according to the frequency of the episodes. On the other hand, the electoral distance between majority and minority would affect the incentive to monitoring by the minority: close percentages increase the minority's incentive to exert monitoring effort. Although improperly in definition terms, this element has been correctly incorporated into the reputational premium.

These two elements introduce dynamics into the model when the reputational premium is left free to vary and evolve over time ( $p_t$ ). Thus,  $p_t$  could depend on *i*) the corruption sensitiveness of the population ( $A_t$ ) and *ii*) the minority's electoral gap ( $B_t$ ):

$$p_t = A_t + B_t.$$

In turn,  $A_t$  depends on the memory persistence of discovered corrupt episodes:

$$A_t = f(\pi_t, \pi_{t-1}, \dots, \pi_{t-n}, a),$$

where  $\pi_t$  is the probability of detection and punishment in period  $t$  such that  $\frac{\partial A_t}{\partial \pi} > 0$ ,  $n \in [0, t] \in \mathbb{N}$  is the level of memory persistence (i.e., high  $n$  means more persistence), and finally  $a > 0$  is the level of sensitiveness of the population.

Finally,  $B_t$  can be defined as follows:

$$B_t = f(g_t, b),$$

where  $g_t$  is the electoral share of the minority such that  $\frac{\partial B_t}{\partial g_t} > 0$  and  $b > 0$  is the weight of this element in  $p_t$ .<sup>12</sup>

#### 4.1 Long term memory persistence

Long term memory persistence means that the memory of corrupt episodes, once discovered, is perpetual and each episode exacerbates the indignation of the population (i.e.,  $n = t$ ).

**Proposition 3** *The higher  $r$  the more persistent over time is the second scenario.*

**Corollary 2** *The second scenario is unstable and will evolve either in the first scenario or in the no corruption scenario.*

This result is clear from Figures 4a and 4b. Due to less efficient tribunals (i.e., low  $\pi$ ), the pervasiveness of corruption (i.e., second scenario) also occurs for low levels of corruption rents by allowing the briber to pay both political parties. However,  $p$  is monotonously increasing over time; at some point, this will make  $Y$ 's bribe unaffordable to  $B$ . This process depends on the level of  $r$ : the higher  $r$  the slower the process.

**Proposition 4** *The electoral supports of  $X$  and  $Y$  converge only in the presence of the first scenario.*

**Corollary 3** *The higher  $r$ , the slower the convergence in the electoral supports across political parties.*

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<sup>12</sup>In the simulations  $B_t$  is function of  $\frac{g_t}{1-g_t}$  with  $g_0 = 0.05$  and  $g_t =$

$$\begin{cases} g_{t-1} & \text{in the no corruption scenario} \\ g_{t-1} + Pm_t & \text{in the first scenario if } X \text{ is detected} \\ g_{t-1} - PM_t & \text{in the first scenario if } X \text{ is not detected} \\ g_{t-1} & \text{in the second scenario} \end{cases}$$

where  $Pm_t(p_{t-1})$  is the electoral premium to  $Y$  and  $PM_t(b_{x1_{t-1}}^*)$  is the electoral premium to  $X$  obtained by transforming the bribe into electoral consensus.

According to our assumptions, only the first scenario allows for a change in electorate support, and since  $p$  is monotonously increasing over time as population memory is persistent and indignation rolls over in future periods, convergence and turnover will necessarily occur. In the second scenario, the electoral support of both parties does not change. According to Corollary 2, this scenario will eventually end up either in the first scenario or in the no corruption scenario. In particular, if  $r$  is below a certain threshold and law is rather strict, the increase in  $p$  will eventually achieve no corruption and convergence will not occur, whereas high  $r$  will drive to the first scenario and convergence.

**Proposition 5** *If  $r$  is below a certain threshold, then no corruption is a long term equilibrium and the electoral gap will persist. The higher  $f$  the higher is the threshold of  $r$ .*

**Proposition 6** *As  $\underline{\pi}$  increase, the long term equilibria in the first scenario or in the no corruption scenario are quicker to achieve.*

The results of Proposition 5 and Proposition 6 can be easily inferred in Figures 4 a,b,c, d.

In sum, if population preserves memory over corruption episodes, the following results occur: *i)* a corruption rent below a certain threshold, which increases as punishment gets harsher, brings about long term equilibria with no corruption and a persistent electoral gap; *ii)* a corruption rent above a certain threshold, which increases as punishment gets harsher, brings about long term equilibria with only majorities being involved in corrupt practices, with the associated consequence of a long-term political turnover; *iii)* more effective levels of prosecution activities do not change substantially the long term equilibria, however for corruption rents above a certain threshold the final equilibrium with only majorities being involved in corrupt practices associated with political turnover is achieved quicker.

## 4.2 Short term memory persistence

A short term population memory implies that only recent corruption episodes are recalled by the electorate during elections. Simulations are presented in Figures 5 a,b,c,d. The results can be summed up as follows:

*i)* A corruption rent above a certain threshold brings about a semi-stable equilibrium in the second scenario, meaning that first and second scenarios alternate.

*ii)* More effective levels of prosecution activities makes the second scenario more stable.

*iii)* A corruption rent below a certain threshold brings about either long term equilibria with only majorities being involved in corrupt practices or no corruption equilibria.

*iv)* Convergence across parties' electoral supports occurs in stable first scenario equilibria associated with a corruption rent and punishment levels below a certain threshold.

Hence, introducing short memory affects the stability of equilibria, with the risk to fall into a severe pervasiveness of corruption for long periods, and reduces political turnover.

## 5 Conclusions

This analysis investigates a political corruption model that builds on previous literature on corruption in hierarchies. Our investigation enriches the literature on corruption emphasizing the contrasting role of the political minorities. On the one hand, the minority can reduce corruption behavior due to their control role; on the other hand, this role provides bargaining power *vis-à-vis* the briber. In particular, the more important the control role of the minority the higher the bribes that it can receive from the briber. If the briber wants to capture the minority and reduce the risk to be caught and punished, the briber must offer a bribe to the minority that takes into account both the detection and punishment risk and the loss of gains from reputation in the circumstance in which only the majority were punished (i.e., reputational premium).

The policy-maker faces a sort of paradox when attempting to strengthen the role of minorities to reduce corrupt behavior because this may give the opportunity to the minorities to rip off higher bribes. This situation can especially occur where the rents from corruption are substantial, such as in developed economies. In addition, in a democratic and economically developed systems, the existence of freedom of speech and the presence of several watchdogs increase the expected reputational premium of those in charge of a control role. Paradoxically, the feelings of moralization against political corruption may generate a serious setback because the minority can use the potential reputational premium to its own advantage in corruption episodes.

Coherently with the economics intuitions, high rents from corruption can facilitate to extend corruption to the minority. Therefore, the investigative authorities should increase the spectrum of the controls to all politicians in the presence of potential high stakes from corruption.

The model has been extended to include dynamics. The memory persistence of a population about the corrupt episode is crucial in the stability of the equilibria. Long term memory persistence determines increasingly high social indignation and, consequently, high reputational premiums that eventually can be exploited by the minority to overtake the majority. Therefore, the scenario in which both majority and minority are involved in corrupt practices is unstable and does not arise in the long run. On the contrary, short memory persistence such as electorates that rapidly tend to forgive may fall into a severe pervasiveness of corruption for long periods, in which both majority and minority are altogether involved in a criminal partnership. In this last circumstance, the convergence across electoral supports does not occur.

Finally, this model may apply to the phenomenon of regulatory or state capture where the briber is a lobby attempting to capture the regulator/legislator in the form of an influence that is exerted through licit but obscure forms of



pressures, which are never overt (Bardhan and Mookherjee, 2000), and the minority is one or more consumers' associations or independent watchdogs, which expose lobbies and politicians to the public opinion on specific issues but which could eventually be captured by the lobbies themselves.

## Appendix

**Proof Lemma 2.** The first order condition of the objective function is  $\pi'(m^*)p - c'(m^*) = 0$ . This is an implicit function in  $(m^*, \underline{\pi}, \bar{\pi}, p)$ . Using the implicit function theorem, and given the conditions on  $\pi(\cdot)$  and  $c(\cdot)$ , the partial derivatives  $m^*$  with respect to the three parameters will be the following:

$$\begin{aligned}\frac{\partial m^*}{\partial p} &= -\frac{\pi'(m^*)}{\pi''(m^*)p - c''(m^*)} > 0; \\ \frac{\partial m^*}{\partial \underline{\pi}} &= -\frac{\frac{\partial \pi'(m^*)}{\partial \underline{\pi}} p}{\pi''(m^*)p - c''(m^*)} < 0; \\ \frac{\partial m^*}{\partial \bar{\pi}} &= -\frac{\frac{\partial \pi'(m^*)}{\partial \bar{\pi}} p}{\pi''(m^*)p - c''(m^*)} > 0.\end{aligned}$$

It is easy to check that  $\frac{\partial \pi'(m^*)}{\partial \underline{\pi}} < 0$  and  $\frac{\partial \pi'(m^*)}{\partial \bar{\pi}} > 0$ . ■

**Proof Proposition 1.** The proof derives straightforwardly from the compatibility conditions of the bribes (8) and (11). ■

**Proof Proposition 2.**

$$\frac{\partial r_1(m^*)}{\partial m^*} = 2 \frac{\pi'(m^*)}{[1 - \pi(m^*)]^2} f > 0.$$

Consider that for a given couple  $(\underline{\pi}, \bar{\pi})$ ,  $m^*$  changes only if  $p$  changes. Thus,  $\frac{\partial r_2(m^*)}{\partial m^*} = \frac{\partial r_2(m^*)}{\partial p}$ . Further, apply the envelope theorem to the value function  $\pi(m^*)p - c(m^*)$ . Hence,

$$\frac{\partial r_2(m^*)}{\partial p} = \frac{\partial \left[ \frac{\pi(m^*)p - c(m^*)}{1 - \underline{\pi}} \right]}{\partial p} = \frac{\pi(m^*)}{1 - \underline{\pi}} > 0.$$

■

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Figure 3. Equilibria according to different levels of  $f$  and  $\underline{\pi}$

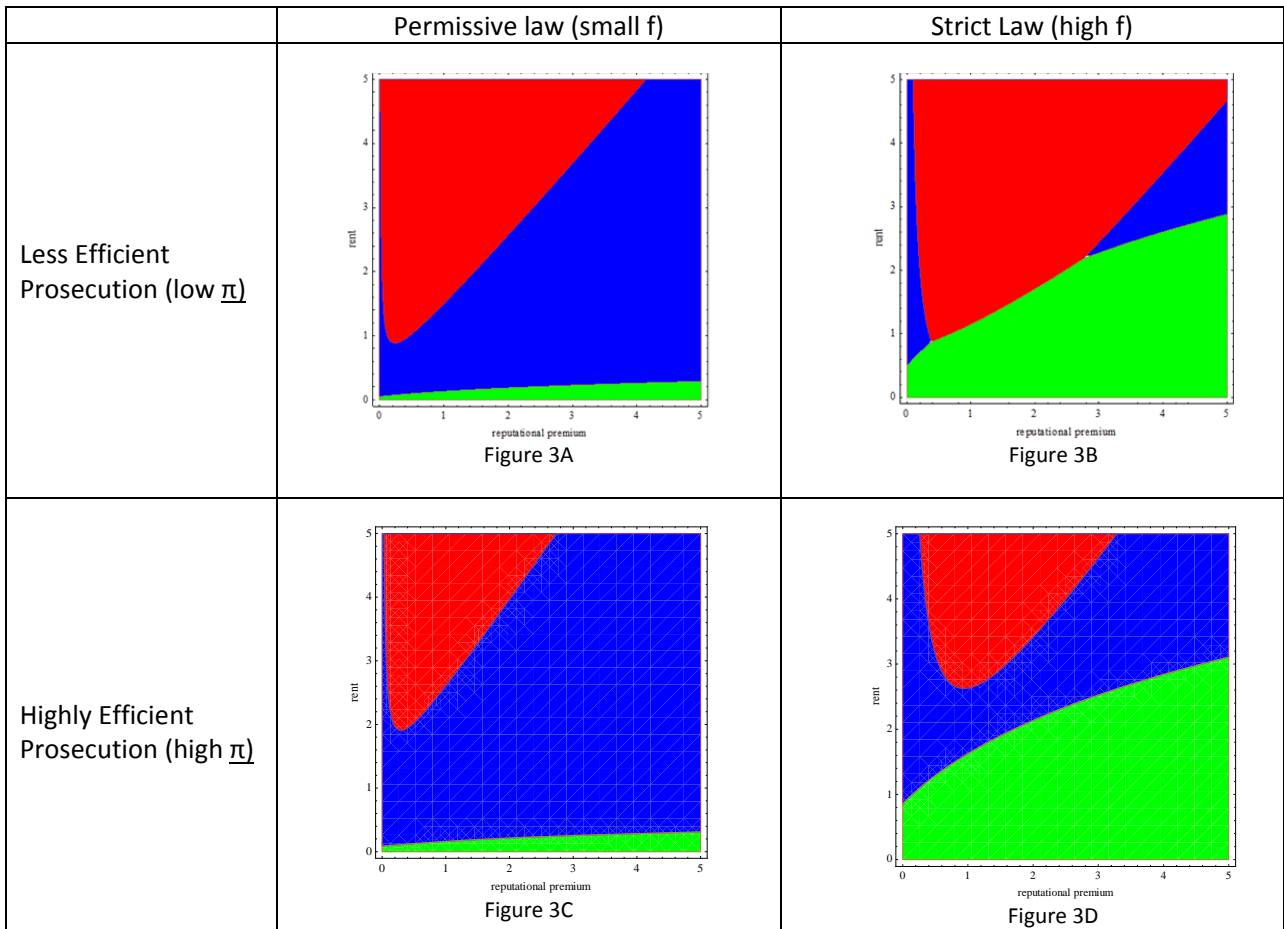


Figure 4a. Population's *LONG* term memory: low  $f$  and low  $\pi$

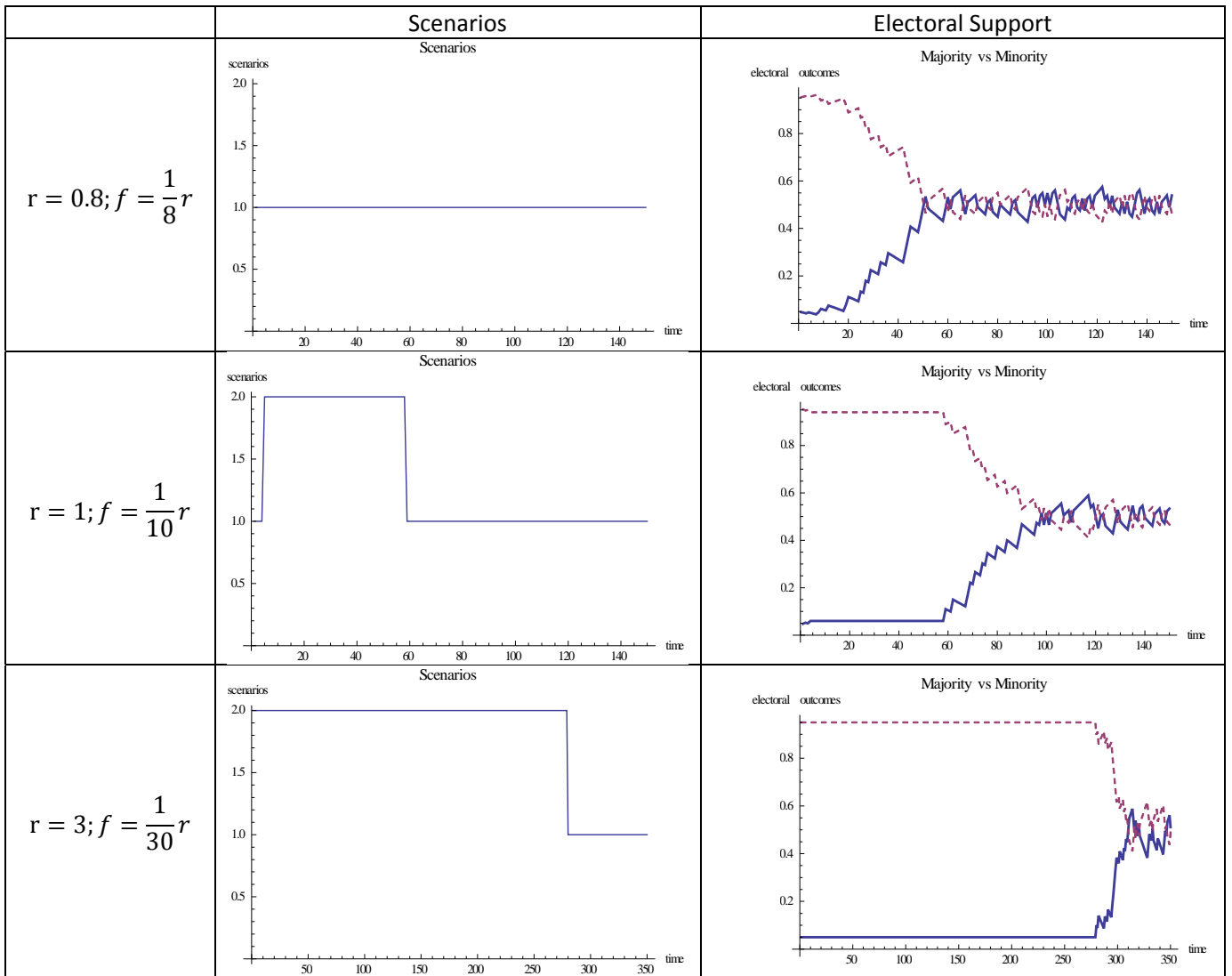


Figure 4b. Population's *LONG* term memory: high  $f$  and low  $\underline{\pi}$

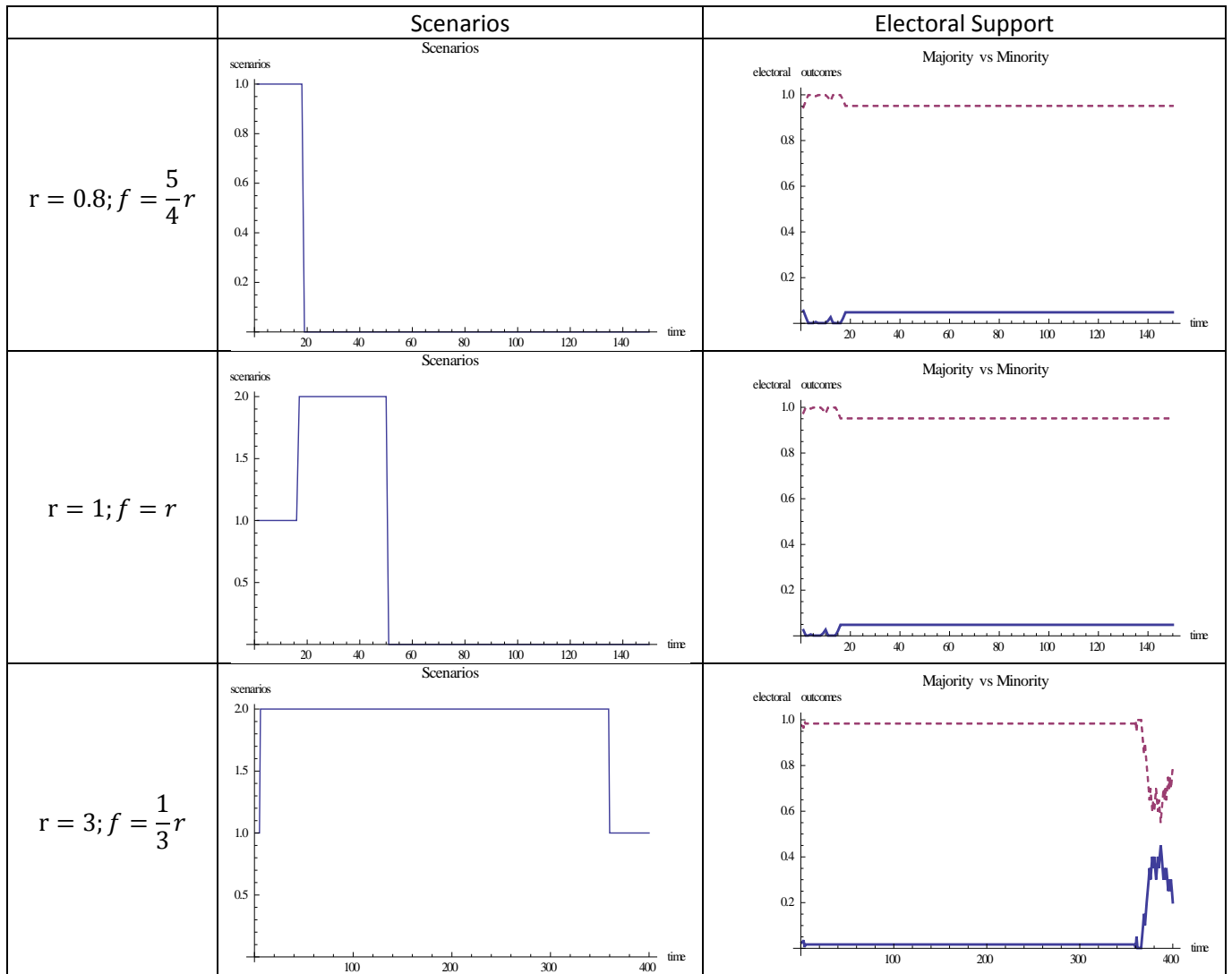


Figure 4c. Population's *LONG* term memory: low  $f$  and high  $\underline{\pi}$

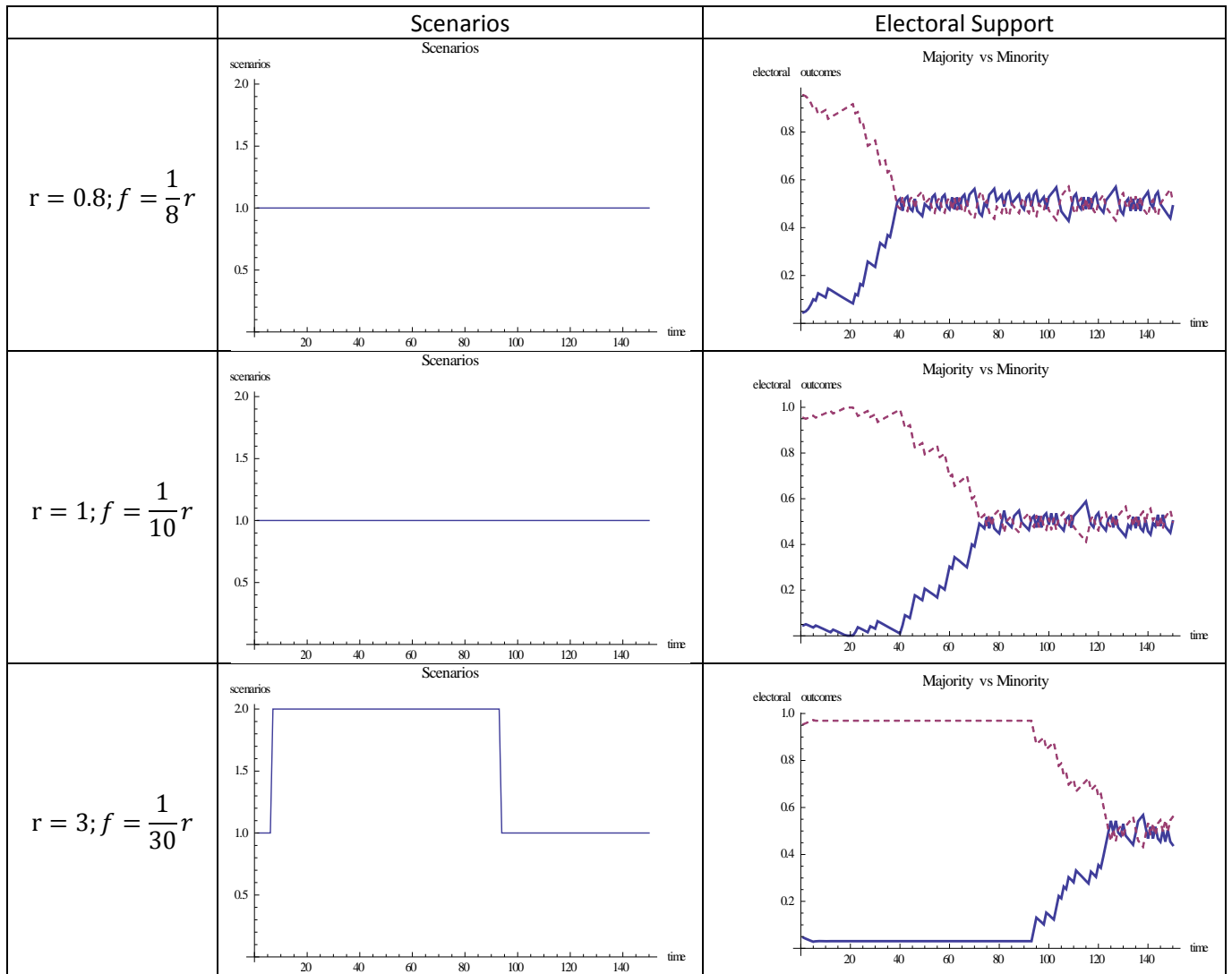


Figure 4d. Population's *LONG* term memory: high  $f$  and high  $\pi$

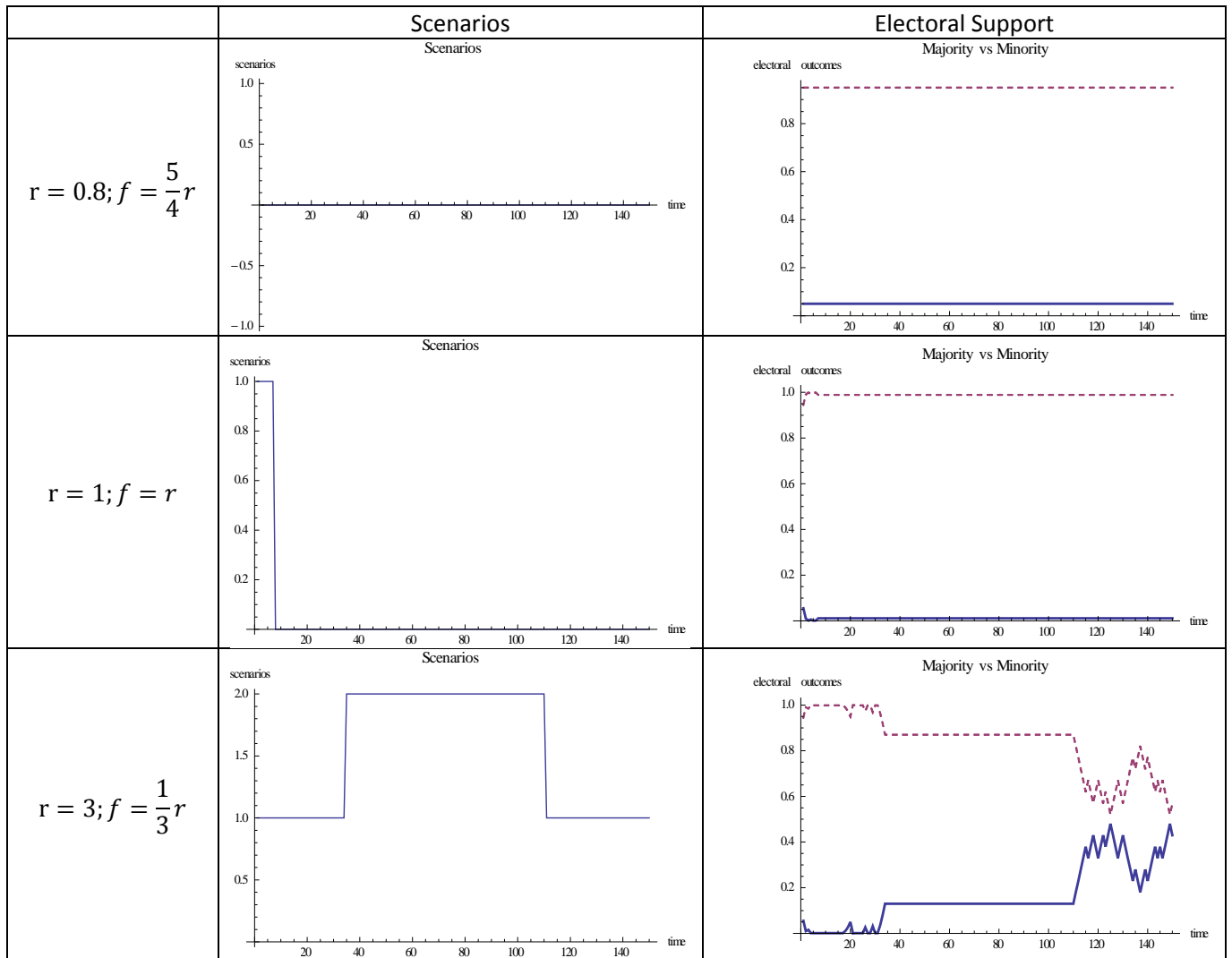




Figure 5a. Population's *SHORT* term memory: low  $f$  and low  $\pi$

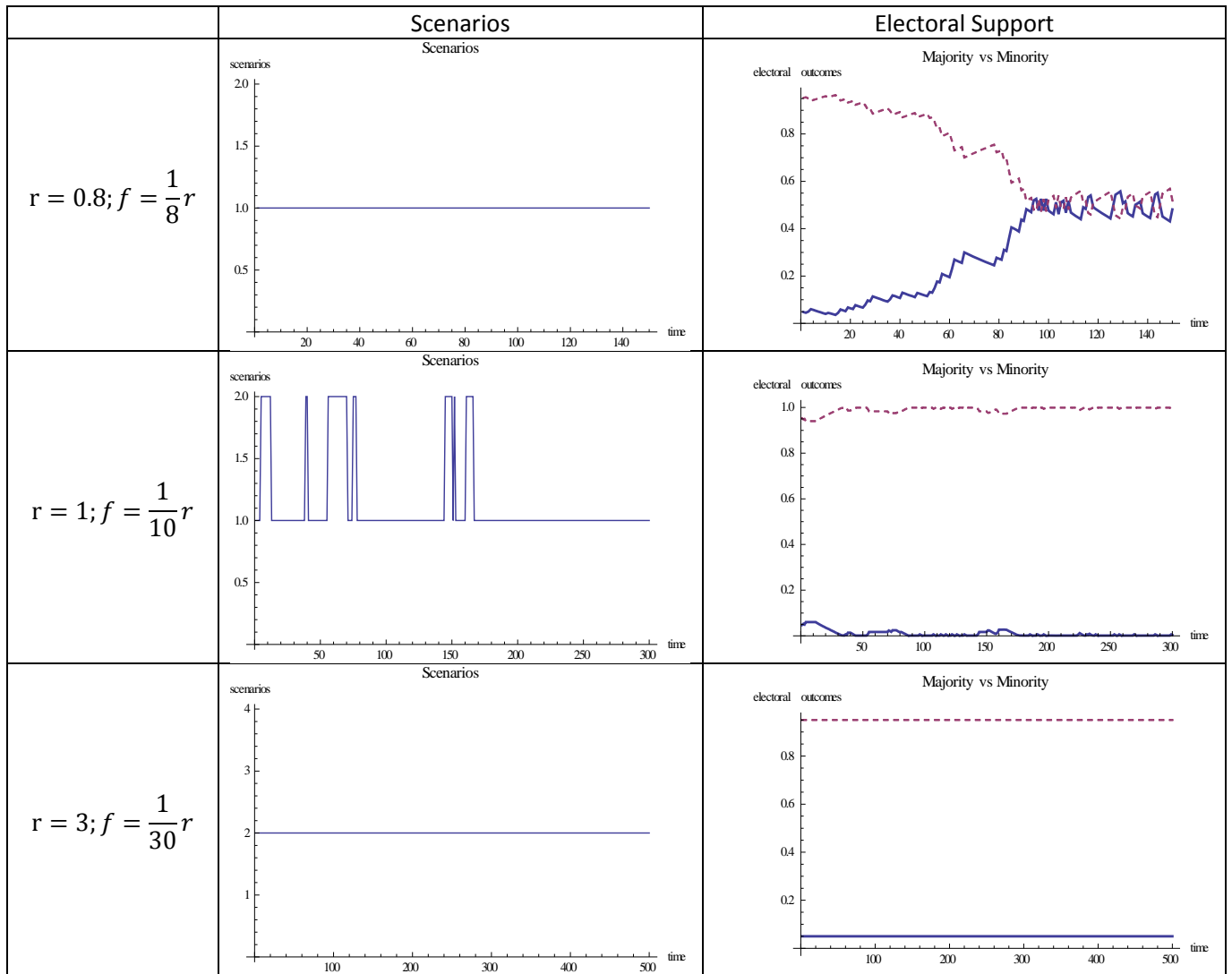


Figure 5b. Population's *SHORT* term memory: high  $f$  and low  $\pi$

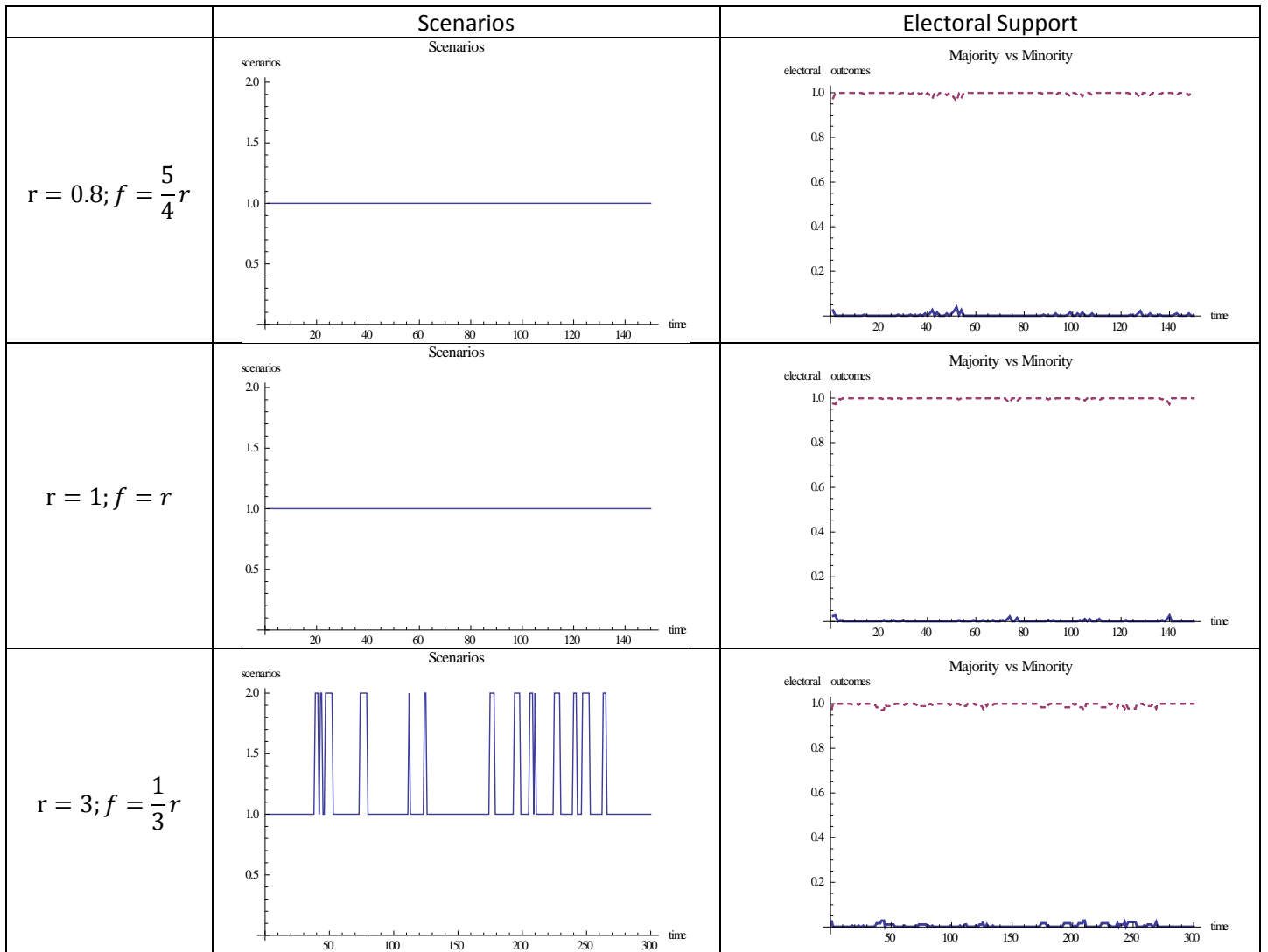


Figure 5c. Population's *SHORT* term memory: low  $f$  and high  $\pi$

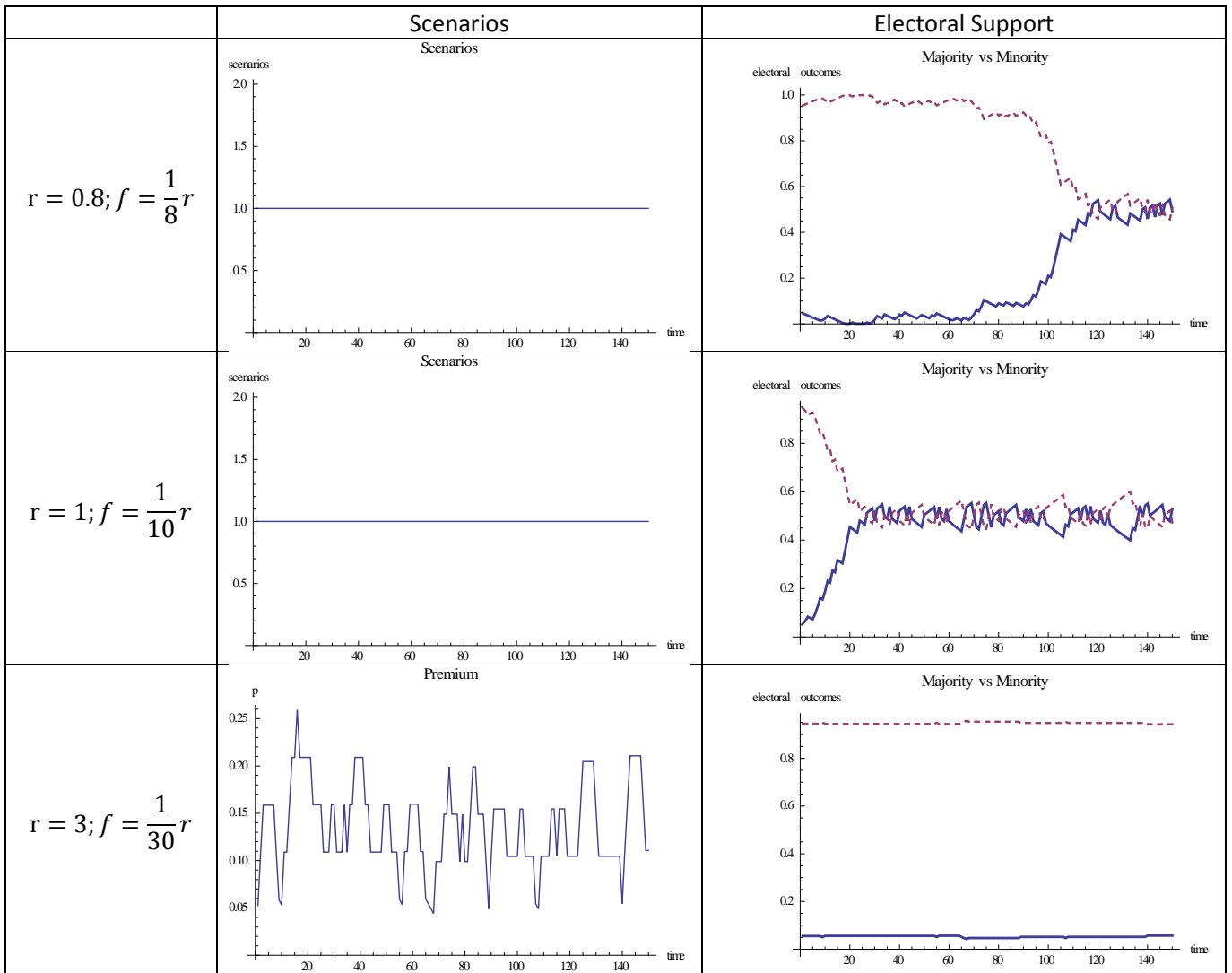


Figure 5d. Population's *SHORT* term memory: high  $f$  and high  $\underline{\pi}$

