

Bribe-Financed Policing*

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Abstract

Bribes can finance police effort when state support is costly. Detected offenders bargain with police over concealment. The resulting bribe both rewards detection and acts as the effective sanction faced by the offender. Under bribe-financed policing, police revenue comes from detected offenders. Bribe-financed policing therefore depends on continued crime. Suppressing bribery without replacing police incentives can increase crime. The availability of bribe-financed policing crowds out small investments in state-financed capacity until the state can replace the informal system, producing a discrete transition. When a police hierarchy rewards recorded cases, stronger case pressure eventually shifts effort from genuine enforcement to fabricated cases, while the recorded case count continues to rise and crime increases. Successful reform must replace the police incentives that anti-corruption measures remove.

Keywords: police corruption, law enforcement, organizational design, state capacity, institutional reform.

JEL codes: D23, D73, K42, H11.

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1 Introduction

Bribes can become part of the incentive system through which policing operates. In Mexico City, *la mordida*, a small payment to a police officer to resolve an encounter without formal enforcement, was long regarded as the most visible form of police corruption. Bribery and extortion were especially common in exchanges between traffic police and civilians, while officers frequently supplemented their official incomes through bribes. Reforms beginning in the early 2000s sought to replace this arrangement by creating new police units with higher salaries, new recruitment and training, monitoring, and official rewards for arrests that led to convictions (Anozie et al., 2004; Jackson, 2014).¹ The experience illustrates a basic institutional tension. Payments from those subjected to enforcement can give police a return from detecting offences, while clean enforcement requires the state to supply a viable legal source of incentives and organizational support.

A related problem arises when corrupt protection becomes embedded across the enforcement system. China’s 2018 campaign to Sweep Away Black and Eliminate Evil explicitly targeted the “protection umbrellas” within police and other political-legal institutions that shielded organized crime. The Sun Xiaoguo case became emblematic. Bribes and abuses of formal procedure helped reduce his punishment and secure his early release, after which he led an organized criminal group. The case was reopened during the campaign, and officials across the public-security, court, and prison systems who had protected him were punished (Greitens, 2020; Cao, 2019). Revenue dependence can also reshape incentives within the police hierarchy. In Kinshasa, case quotas imposed within the police hierarchy increased unofficial revenue and unverifiable allegations without improving enforcement of verifiable traffic rules (Sánchez de la Sierra et al., 2024).

These examples raise three broader questions. When can payments retained by police support more effective enforcement than a nominally clean force whose legal incentives are weak? How does the availability of such an informal system affect the timing and form of the transition to state-financed policing, and why may suppressing corrupt payments fail unless their incentive role is replaced? Finally, when a hierarchy rewards recorded cases or unofficial revenue, how does pressure within the hierarchy affect the division of effort between genuine enforcement and revenue-producing allegations?

This paper addresses these questions in a simple model of offenders, an organized police body, and a fiscally constrained government. Bribes both deter offenders and reward detection. They therefore generate police effort without public expenditure. Under bribe-financed policing, police revenue comes from detected offenders. Bribe-financed policing therefore depends on continued crime.² We show that whenever bribe-financed policing outperforms an unsupported clean force, suppressing bribery without replacing police incentives increases

¹Other widespread roadside payment systems include routine payments to Georgia’s pre-reform traffic police and more than 6,000 illegal payments observed on 304 truck journeys through Aceh, Indonesia (World Bank, 2012; Olken and Barron, 2009).

²Nigeria illustrates how unofficial payments can sustain police operations when official resources are inadequate: payments were reported to finance fuel and investigations (Human Rights Watch, 2010). In Rio de Janeiro, police extraction coexists with regulation of illicit drug markets rather than their simple suppression (Hirata and Grillo, 2019).

crime.³ The availability of the informal system can also delay investment in state-financed capacity until the state can replace it, producing a discrete institutional transition.⁴ Case pressure within the police hierarchy can eventually shift effort from genuine enforcement to fabricated cases, while the recorded case count continues to rise and crime increases, as the Kinshasa episode illustrates. The results also clarify why reforms that seek to replace corrupt incentives often combine anti-corruption control with public funding and organizational change. Ecuador’s security reforms, for example, combined increased funding and police pay with reorganization of community policing, personnel changes, crime-information systems, and wider justice reform (Brotherton and Gude, 2018).

The model compares two governance structures. Under *bribe-financed policing*, detected offenders finance the police organization’s marginal return to enforcement, and the organization becomes the residual claimant on apprehension revenue. Under *state-financed policing*, the government bears the fiscal and administrative cost of inducing and monitoring effort, but retains control over formal processing and sanctions. Bargaining over concealment endogenizes the bribe. Formal punishment determines the surplus available to the police and offender even when that punishment is not imposed in equilibrium.

The paper first reinterprets routine bribery as an enforcement-financing arrangement. Flatters and MacLeod (1995) show that collector–taxpayer collusion can motivate discovery effort when legal compensation is constrained. Their effort does not reduce the tax base. In our model, the corrupt payment is also the offender’s sanction, and enforcement therefore shrinks the activity that finances it. This feedback explains dependence on continued crime, why suppressing bribery can increase crime, and when the state replaces the informal system. Legal performance pay offers a state-financed counterpart (Khan, Khwaja and Olken, 2016). Relatedly, Marjit and Shi (1998) show that corrupt officials with endogenous effort may preserve crime. We interpret that preservation as an organizational consequence of assigning the police the residual claim to enforcement revenue.

The second contribution concerns institutional replacement. Besley and McLaren (1993) and Mookherjee and Png (1995) study the compensation and control of corruptible officials, while Polinsky and Shavell (2001) analyse bribery, extortion, framing, and anti-corruption policy. An informal financing system can keep investment in state-financed capacity at zero until state-financed policing can replace the informal system, and anti-corruption control may have to be introduced together with legal support for enforcement. This connects to the state-capacity literature. Whereas Besley and Persson (2009, 2010) study investments that expand feasible public policies, we identify an informal substitute that leaves incremental investment operationally valueless until a replacement threshold is crossed.

The paper also examines the internal organization of policing. The hierarchy rewards a measurable case count, while genuine enforcement and fabricated cases compete for officers’ effort. The resulting threshold distortion is in the spirit of multitask incentive problems

³In late-1990s Mexico City, anti-corruption reforms involving mandatory lie-detector tests and deployment restructuring triggered a police strike, after which crime rates immediately jumped (Jackson, 2014).

⁴Mexico City later pursued gradual replacement through Community Protection Units, while Georgia replaced its traffic police more abruptly. Both reforms combined personnel change with pay, training, and organizational support (Jackson, 2014; World Bank, 2012).

(Holmström and Milgrom, 1991). It is also related to Echazu and Garoupa (2010), who show that corruption distorts the allocation of law-enforcement effort towards tasks that create bribe opportunities. In our model, hierarchical pressure first improves genuine enforcement and then reverses its effect. The agency becomes more active by its own measure while crime worsens. The quota scheme documented in Kinshasa illustrates this possibility.

More broadly, Méndez (2014), Gamba, Immordino and Piccolo (2018), and Abbink, Ryvkin and Serra (2020) give distinct reasons why corruption need not mechanically reduce compliance. Our contribution instead compares systems of financing and governing police effort and shows how the informal system changes the level, timing, and internal composition of enforcement and reform.

Sections 2 to 4 set out the organizational setting, develop the model, and characterize static regime choice. Sections 5 and 6 study reform lock-in and police incentives under anti-corruption reform. Section 7 examines hierarchy and the composition of police effort, and Section 8 relates the results to enforcement systems and reform. Section 9 concludes. Proofs, robustness results, and corner cases are collected in the Appendix.

2 Organizational setting and timing

Our focus is police corruption in which officers retain payments from detected offenders in exchange for forgoing formal processing. The government need not explicitly instruct officers to accept bribes. Toleration may instead take the form of chronic underfunding, weak internal control, and refusal to dismantle a revenue system on which the police organization has come to depend.

The two regimes differ in the allocation of residual claims and control. Under bribe-financed policing, the police organization retains enforcement revenue and chooses effort, while the state relinquishes formal processing of detected offences. Under state-financed policing, the government finances the arrangements that induce effort and retains control over legal processing. The main model treats the police hierarchy as a single organization that maximizes its joint payoff, as under revenue pooling or upward sharing. Section 7 allows higher levels of the hierarchy to reward a measurable case count and street-level officers to divide effort between genuine enforcement and fabricated cases.⁵

The police organization sets enforcement intensity before potential offenders decide whether to offend. The timing is:

1. The government chooses the enforcement regime and, under state-financed policing, the arrangements used to implement additional police effort.
2. The police organization sets enforcement intensity e .
3. Potential offenders observe or correctly anticipate e and decide whether to commit crime.

⁵Appendix B.1 gives a decentralized benchmark in which police units do not internalize the effect of their effort on the aggregate bribe base.

4. Detection occurs. Under bribery, a detected offender and the police bargain over concealment. Under state-financed policing, the case is processed formally.

When setting enforcement intensity, the police organization anticipates that stronger enforcement reduces crime and therefore shrinks the pool of offenders from whom bribes can be collected.

3 Model

3.1 Offenders and enforcement

There is a unit mass of potential offenders indexed by i . Individual i receives private benefit v_i from committing a crime, where

$$v_i \sim U[0, 1].$$

The upper bound of one normalizes the scale of criminal benefits. The uniform distribution gives the linear crime-rate expression below and keeps the main results in closed form. Appendix B.2 allows a general distribution and shows that the dependence of bribe-financed policing on a continuing pool of offenders does not rely on uniformity.

Each crime imposes fixed net social harm $H > 0$. Treating harm as common across offences abstracts from heterogeneity in offence severity and focuses the analysis on the incidence of crime and the financing of enforcement. Police effort $e \in [0, 1]$ equals the probability that an offender is detected.

A detected offender who is formally processed bears effective sanction P . We normalize the largest criminal benefit to one and take $P \geq 1$, which makes complete deterrence technologically feasible. Formal processing gives the police organization a return $m \in [0, P)$, such as career credit, occupational satisfaction, or a minimum organizational reward. We refer to m as the return from formal processing.

3.2 The bribe as a bargaining outcome

Under bribe-financed policing, the police can conceal a detected offence in exchange for a bribe. If bargaining fails, the offender pays P and the police obtain m . If agreement is reached at bribe b , the offender pays b and the police receive b but forgo m . Let $\sigma \in (0, 1)$ denote the police share of the bargaining surplus. Nash bargaining solves

$$\max_{b \in [m, P]} (b - m)^\sigma (P - b)^{1-\sigma}.$$

Here $b - m$ is the police gain from concealment and $P - b$ is the offender's gain, with σ determining how the surplus is divided. The unique solution is

$$b = m + \sigma(P - m), \quad m < b < P. \tag{1}$$

The bribe is a weighted average of the police fallback m and the formal sanction P . The statutory sanction therefore disciplines the bribe even when it is not imposed, while greater

police bargaining power shifts the payment towards P .

3.3 Crime and police effort

Let $s > 0$ denote the effective sanction borne by an offender conditional on detection. Following the standard expected-sanction logic (Becker, 1968), an individual facing enforcement intensity e and sanction s commits crime if

$$v_i - es \geq 0.$$

The product es is the expected sanction and, under the uniform distribution, the fraction of potential offenders deterred. For an interior outcome, the crime rate is therefore

$$n(e, s) = 1 - se.$$

Thus enforcement and sanctions enter deterrence multiplicatively. Under bribe-financed policing, $s = b$, while formal processing gives $s = P$. The police organization retains the bribe from each detected offender and bears effort cost $e^2/2$. Anticipating offenders' response, it chooses effort to maximize

$$U_B(e) = be n(e, b) - \frac{e^2}{2} = be(1 - be) - \frac{e^2}{2}. \quad (2)$$

The first term is bribe revenue from detected offenders. The second expression displays the central trade-off: more effort raises detection but also deters potential payers and shrinks the revenue base. Under bribe-financed policing, the state incurs no fiscal cost of inducing police effort.⁶ The government's operating loss is therefore

$$L_B(e) = Hn(e, b), \quad (3)$$

which is the government's criterion for the regime-choice problem, not a measure of total social welfare. It records the harm from crime but assigns no fiscal cost to police effort because that effort is financed by payments from detected offenders rather than by government expenditure. Section 4.1 adds social costs of corrupt policing that the government does not bear.

Under clean policing with no additional state support, the police obtain the return from formal processing m from every formally processed detection. They choose effort to maximize

$$me(1 - Pe) - \frac{e^2}{2}.$$

Here m rewards police activity and P deters offenders, separating the two functions that bribery bundles together. The resulting unsupported clean effort and crime rate are

$$e_0 = \frac{m}{1 + 2Pm}, \quad n_0 = 1 - Pe_0 = \frac{1 + Pm}{1 + 2Pm}. \quad (4)$$

⁶Evidence from Nigeria illustrates the broader financing premise. Human Rights Watch documents police units lacking resources for fuel and investigations, with police officers and civil-society respondents describing bribes, extortion, and payments from complainants as means of financing such basic activities (Human Rights Watch, 2010).

Thus e_0 is the effort sustained by m alone, while Pm summarizes unsupported clean deterrence. The government can raise effort above e_0 . Let

$$K(e, \kappa) = \frac{\kappa}{2}(e - e_0)^2, \quad e \geq e_0, \quad \kappa > 0,$$

be the minimum fiscal and administrative cost of implementing effort e . It is zero at e_0 and rises convexly with additional effort. The cost is a least-cost reduced form rather than a literal payment per apprehension. It may capture reliable pay, career incentives, supervision, verifiable records, and the organizational support needed to implement effort above e_0 .⁷

The parameter κ summarizes the state's difficulty in implementing additional clean enforcement with its existing institutional capacity. It is high when financing, personnel incentives, monitoring, record keeping, or case processing make extra police effort costly to support. We expect κ to tend to be higher in poorer developing countries, where fiscal and administrative capacity is often weaker, although κ is not income itself. Section 5 endogenizes this operating difficulty by defining installed state-financed enforcement capacity as $I = 1/\kappa$. Fiscal-administrative development z is conceptually different: it determines how costly it is to build that capacity.

The government chooses effort to minimize

$$L_S(e) = H(1 - Pe) + \frac{\kappa}{2}(e - e_0)^2.$$

The two terms are residual crime harm and the resource cost of supporting effort above e_0 , the state-financed counterpart to (3).

Assumption 1. $\kappa > HP^2/n_0$.

Assumption 1 keeps the state-financed solution interior. At lower κ , state-financed policing reaches full deterrence and is strictly preferred to bribe-financed policing.⁸

4 Bribe-financed enforcement and regime choice

The police objective in (2) is strictly concave. Its optimal effort is

$$e_B^* = \frac{b}{1 + 2b^2}, \tag{5}$$

which implies

$$n_B^* = \frac{1 + b^2}{1 + 2b^2}. \tag{6}$$

These expressions reflect the trade-off in (2): a larger bribe strengthens the return from detection but also deters potential payers, leaving a continuing crime base.

Under state-financed policing, the government chooses

$$e_S^* = e_0 + \frac{HP}{\kappa}.$$

⁷Appendix B.3 gives a hard-budget interpretation of this implementation cost.

⁸Appendix B.4 reports the full-deterrence case.

State support adds HP/κ to e_0 : more harmful crime and stronger formal punishment raise additional effort, while a higher implementation cost lowers it. The government obtains

$$n_S^* = n_0 - \frac{HP^2}{\kappa}, \quad L_S^* = \ell_0 - \frac{H^2P^2}{2\kappa}, \quad \ell_0 \equiv Hn_0. \quad (7)$$

Relative to unsupported clean policing, state support lowers both crime and government loss, with larger gains when clean effort is easier to implement. The government's minimized operating loss under bribe-financed policing is

$$\ell_B \equiv L_B^* = Hn_B^* = H \frac{1+b^2}{1+2b^2}.$$

Comparing this with the unsupported clean loss gives

$$\ell_0 - \ell_B = H \frac{b^2 - Pm}{(1+2Pm)(1+2b^2)}. \quad (8)$$

Its sign depends only on $b^2 - Pm$, the difference between the deterrence indices under bribe-financed and unsupported clean policing. Bribery is therefore viable only when $b^2 > Pm$. In that case, define

$$\kappa^* \equiv \frac{H^2P^2}{2(\ell_0 - \ell_B)} = \frac{HP^2(1+2Pm)(1+2b^2)}{2(b^2 - Pm)}.$$

At κ^* , the gain from additional state-financed enforcement exactly offsets bribery's operating advantage over unsupported clean policing. For $\kappa > \kappa^*$, the government prefers bribe-financed policing.

Proposition 1 (Bribe-financed enforcement). *Under Assumption 1:*

- (i) $e_B^* > 0$ and $n_B^* > 1/2$.
- (ii) If $b^2 \leq Pm$, the government strictly prefers state-financed policing for every κ . If $b^2 > Pm$, the government prefers state-financed policing below κ^* and bribe-financed policing above κ^* , with indifference at κ^* .
- (iii) If $b^2 > Pm$, bribe-financed policing produces less crime than state-financed policing if and only if $\kappa > 2\kappa^*$.

Under bribe-financed policing, police revenue comes from detected offenders. Bribe-financed policing therefore requires a continuing base of crime. An organized police body recognizes that stronger deterrence reduces this base and therefore restrains effort. The bound $n_B^* > 1/2$ is specific to the uniform-quadratic specification, but the dependence on continued crime is more general.

The condition $b^2 > Pm$ also determines whether suppressing bribery without additional state support increases crime. Using the bargaining solution (1), the viability condition can be written as

$$\sigma > \sigma_0 \equiv \frac{\sqrt{m}}{\sqrt{P} + \sqrt{m}}. \quad (9)$$

Thus σ_0 is the minimum police bargaining power required for the informal system to outperform unsupported clean policing.

When $b^2 > Pm$, Proposition 1 divides states into three regions. When $\kappa < \kappa^*$, the government can implement additional clean effort sufficiently cheaply and chooses state-financed policing. When $\kappa^* < \kappa < 2\kappa^*$, it tolerates bribery to avoid public expenditure even though state-financed policing would deliver less crime. When $\kappa > 2\kappa^*$, the nominally clean system receives such inadequate support that bribe-financed policing delivers both lower government loss and a lower crime rate. The comparison is with underfunded clean policing, not effective state-financed enforcement.

The comparison turns on who finances the marginal return to detection. Under bribery, the payment by a detected offender both constitutes the effective sanction and provides the police reward. Under state-financed policing, the state must create and administer the additional reward. A government for which additional state-financed effort is sufficiently costly may therefore obtain more actual enforcement from an imperfect informal arrangement than from a clean agency with insufficient operating resources.

The bribery component of Mexico City's *mordida* provides a close institutional parallel to this financing mechanism. A person facing police action could make an informal payment in place of formal enforcement, while officers used such payments to supplement official income. The example does not establish that bribery improved deterrence or that the government deliberately selected it, but it shows how a payment from the person policed can simultaneously dilute formal punishment and create a return to police from enforcement. New units later received higher pay, recruitment and training, monitoring, and legal performance rewards rather than being asked simply to refuse bribes (Anozie et al., 2004; Jackson, 2014).

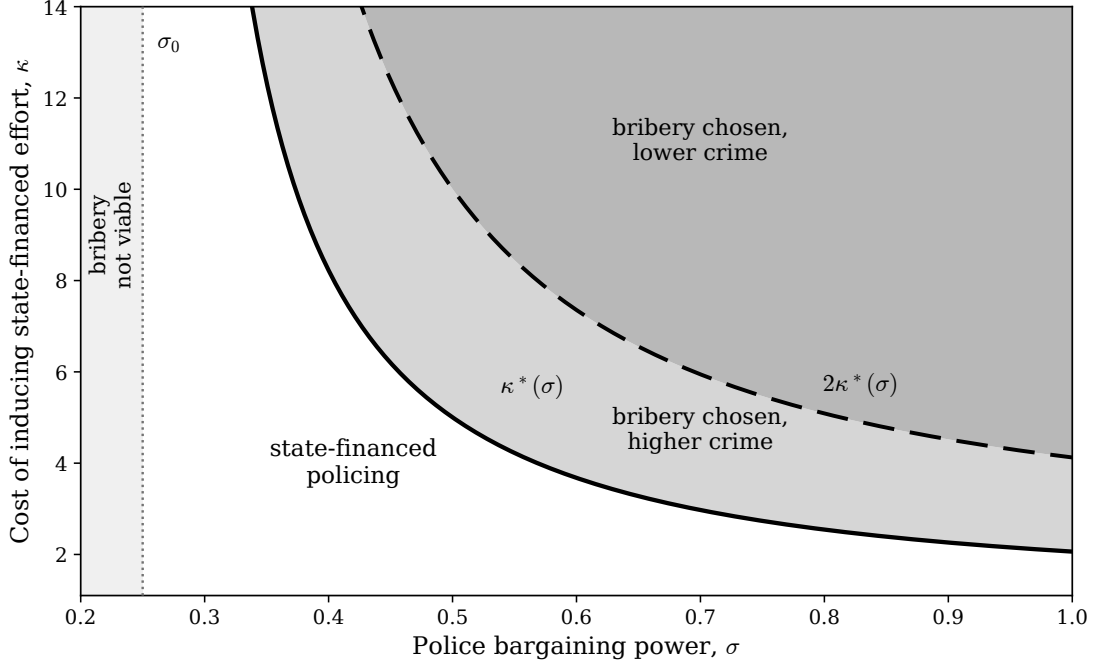


Figure 1: Static regime choice. The illustration fixes $H = P = 1$ and $m = 1/9$. This gives $b = 1/9 + (8/9)\sigma$, while Assumption 1 requires $\kappa > 11/10$. Bribe-financed policing is viable only for $\sigma > \sigma_0 = 1/4$. For $\sigma > \sigma_0$, the solid curve is $\kappa^*(\sigma)$, where the government switches from state-financed to bribe-financed policing, and the dashed curve is $2\kappa^*(\sigma)$, above which bribery also produces less crime than state-financed policing. Higher and lower crime are relative to state-financed policing at the same parameter values.

Figure 1 shows how bargaining power and the cost of state-financed enforcement jointly determine regime choice. Higher κ means that existing institutions make additional clean enforcement harder to implement. It is distinct from fiscal-administrative development z , which governs the cost of building capacity in Section 5. Once bribery is viable, greater police bargaining power raises b and lowers both $\kappa^*(\sigma)$ and $2\kappa^*(\sigma)$, expanding the regions in which the informal system is selected. A stronger formal sanction has competing effects. It raises the bribe that can be extracted, improves unsupported clean deterrence through Pm , and raises the productivity of additional state-financed effort. Its overall effect on regime selection is consequently ambiguous.

A larger bribe always lowers crime in this specification, but its effect on effort is non-monotone:

$$\frac{\partial e_B^*}{\partial b} = \frac{1 - 2b^2}{(1 + 2b^2)^2}.$$

At low b , a larger bribe raises the return from detection. At high b , its deterrent effect shrinks the pool of paying offenders sufficiently to reduce effort. This is another implication of dependence on continued crime.

4.1 Government choice and social welfare

The government's comparison assigns no fiscal cost to bribe-financed effort because the police return is financed by detected offenders. The implementation cost in L_S^* represents the real resource cost of state-financed enforcement. Let $D \geq 0$ denote additional social costs of bribe-financed policing, relative to state-financed policing, that the government does not bear, including concealment and transaction costs, fabricated cases, violence, or unequal treatment. Social losses are therefore

$$W_S = L_S^*, \quad W_B = \ell_B + D.$$

D leaves the government's fiscal comparison unchanged but shifts the social comparison against bribery. When $W_B < \ell_0$, define

$$\kappa^W \equiv \frac{H^2 P^2}{2(\ell_0 - W_B)}. \quad (10)$$

Thus κ^W is the planner's switching threshold, while κ^* is the government's. Their difference measures the wedge between fiscal toleration and social desirability.

Corollary 1 (Fiscal versus social toleration). *Suppose $b^2 > Pm$. If $W_B < \ell_0$, the planner prefers state-financed policing below κ^W and bribe-financed policing above κ^W , with indifference at κ^W . Moreover, $\kappa^W \geq \kappa^*$, with strict inequality if $D > 0$. If $W_B \geq \ell_0$, state-financed policing is strictly preferred throughout the interior range.*

Hence a fiscally motivated government tolerates bribe-financed policing over a weakly larger range than a social planner. The analysis explains governmental toleration rather than the social optimality of bribery.

Rio de Janeiro illustrates why enforcement financed by payments from those policed can be fiscally attractive while imposing substantial social costs. Ethnographic work describes *arrego*, a payment functioning as a business licence for drug markets, alongside *mineira*, in which police invade sales points or detain dealers to extract payments. Police extraction can coexist with, and help regulate, the illicit market rather than simply suppress it (Hirata and Grillo, 2019). Such revenue can sustain police activity while generating violence, protection, unequal treatment, and direct losses that enter D but not the government's narrow fiscal comparison.

5 Reform lock-in and the development transition

The previous section takes the difficulty of state-financed enforcement as given. We now ask how bribe-financed policing affects investment in capacity that makes clean enforcement easier to implement. Small investments may fail to change the chosen policing regime, delaying reform until the state can build enough capacity to replace the informal system.

Suppose $b^2 > Pm$. Bribe-financed policing then improves on the unsupported clean force. Let $I \geq 0$ denote installed state-financed enforcement capacity, normalized as the reciprocal

of the implementation-cost parameter:

$$\frac{1}{\kappa(I)} = I. \quad (11)$$

Section 3 takes κ as given. Here the government can build capacity that lowers it. Capacity does not directly reduce crime, but makes additional clean effort cheaper to implement. At $I = 0$, the state can sustain only the unsupported clean effort e_0 .

As in Section 4, the government minimizes crime harm and the fiscal and administrative cost of state-financed enforcement. For a given I , let $C(I)$ denote its minimized operating loss. Define

$$a \equiv \frac{H^2 P^2}{2}, \quad I_F \equiv \frac{n_0}{HP^2} = \frac{\ell_0}{2a}.$$

a is the rate at which capacity initially lowers clean operating loss, while I_F is where state-financed policing first reaches complete deterrence. The operating loss is

$$C(I) = \begin{cases} \ell_0 - aI, & 0 \leq I \leq I_F, \\ \frac{n_0^2}{2P^2 I}, & I > I_F \end{cases}.$$

Below I_F , additional capacity lowers crime. Above I_F , crime is zero and capacity only lowers the cost of sustaining the least fully deterrent effort $1/P$. The first branch follows by substituting (11) into (7).

Building capacity costs

$$\Phi(I, z) = \frac{I^2}{2z}, \quad z > 0.$$

z measures fiscal-administrative development in building state enforcement capacity. Higher z lowers the cost of financing and administering a given capacity level. It may reflect fiscal resources, the tax base, personnel and monitoring systems, or the ability to coordinate organizational reform. Poorer and less administratively developed countries should generally have lower z , although z is not income itself. Whereas κ measures the current difficulty of operating clean enforcement, z measures the ability to build capacity that reduces that difficulty. Weak inherited capacity can therefore coexist with strong reform capacity, or the reverse.

The government now chooses I , pays $\Phi(I, z)$, and then uses the policing system with lower operating loss. Bribe-financed policing remains available at ℓ_B . The government therefore solves

$$\min_{I \geq 0} \left\{ \frac{I^2}{2z} + \min\{\ell_B, C(I)\} \right\}. \quad (12)$$

The key comparison is between $C(I)$ and ℓ_B . If $C(I)$ does not fall below ℓ_B , investment costs money without displacing bribery. Since $n_B^* > 1/2$ and $n_0 \leq 1$, we have $\ell_B > \ell_0/2$. The crossing therefore occurs before full deterrence. The operating break-even scale is

$$\hat{I} \equiv \frac{\ell_0 - \ell_B}{a} < I_F.$$

We refer to $\hat{I}$ as the minimum viable replacement scale. Every $I \in (0, \hat{I}]$ is dominated by $I = 0$. At $\hat{I}$, the operating losses are equal, but investment is costly. Thus reform has a minimum replacement scale even though smaller investments would improve clean policing if it were already in use.

To isolate the effect of the outside option, first remove bribe-financed policing. Let $z_F \equiv I_F/a$. Conditional on state-financed policing, optimal capacity is

$$I_C(z) = \begin{cases} az, & z \leq z_F, \\ \left(\frac{n_0^2 z}{2P^2}\right)^{1/3}, & z > z_F \end{cases}. \quad (13)$$

Capacity then rises smoothly with fiscal-administrative development. Any replacement discontinuity therefore comes from the outside option, not from the capacity technology.

For a simple closed-form transition, impose

$$\ell_B > \frac{3}{4}\ell_0. \quad (14)$$

This restriction only ensures replacement before full deterrence and does not generate crowd-out.⁹ On the first branch, total government loss at $I_C(z) = az$ is $\ell_0 - a^2 z/2$. The replacement threshold, where this equals ℓ_B , is

$$z^* \equiv \frac{2(\ell_0 - \ell_B)}{a^2}. \quad (15)$$

At the threshold,

$$I_C(z^*) = az^* = \frac{2(\ell_0 - \ell_B)}{a} = 2\hat{I}.$$

The government therefore does not switch at the operating break-even scale $\hat{I}$. It waits until z justifies a larger capacity package and then switches discretely.

Proposition 2 (Reform lock-in). *Suppose $b^2 > Pm$ and $\ell_B > 3\ell_0/4$. With bribe-financed policing available, $I^* = 0$ below z^* and $I^* = I_C(z)$ above z^* . At z^* , $I = 0$ and $I = 2\hat{I}$ are both optimal. Without bribe-financed policing, $I_0^* = I_C(z) > 0$ for every $z > 0$.*

Thus bribe-financed policing completely crowds out small investments in state-financed capacity and produces a discrete reform jump at z^* . The threshold z^* is a fiscal-administrative development threshold for institutional replacement. Below it, building a viable state-financed alternative is too costly, even though additional capacity would be productive if clean policing were already in operation. Once fiscal-administrative development reaches z^* , the optimal capacity package is large enough to replace bribe-financed policing, and the transition is discrete rather than incremental. Here lock-in means a delayed transition, not necessarily a permanent trap. If feasible investment is bounded above by $\bar{I}$, a literal trap arises when $\bar{I} \leq \hat{I}$. Feasible incremental improvements then never reach the region in which state-financed policing displaces the informal system. External finance or a sufficiently large fiscal improvement can

⁹Appendix B.5 considers the case in which this restriction does not hold.

have a discontinuous effect by allowing the state to cross the threshold.

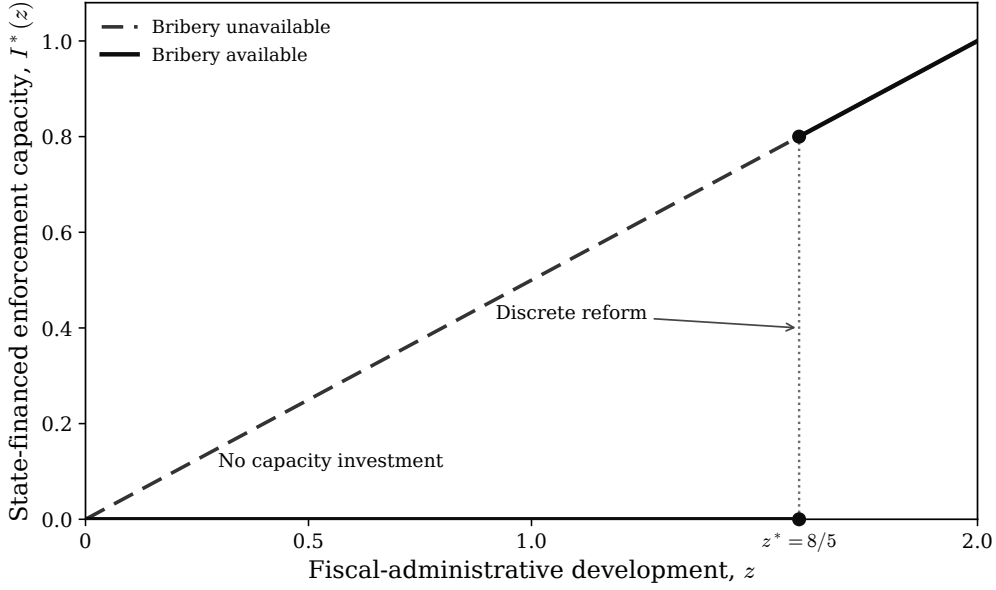


Figure 2: Investment crowd-out and discrete reform. The illustration fixes $H = P = 1$, $m = 0$, and $\sigma = 1/\sqrt{3}$. Hence $b = 1/\sqrt{3}$, $\ell_0 = 1$, $\ell_B = 4/5$, $a = 1/2$, $\hat{I} = 2/5$, $z^* = 8/5$, and $I_F = 1$. The figure shows the interior branch through the full-deterrence boundary $z_F = 2$. Without bribery, state-financed capacity rises continuously. With bribe-financed policing available, capacity remains at zero below z^* . At z^* , both $I = 0$ and $I = 4/5 = 2\hat{I}$ are optimal, shown by the filled points, and capacity follows the upper branch above the threshold.

The complete crowd-out of investments below the replacement scale does not rely on the linear first branch of $C(I)$. For any decreasing state-financed operating-loss function with $C(0) > \ell_B$, every positive investment satisfying $C(I) \geq \ell_B$ is dominated by zero investment. It incurs a cost without delivering a lower operating loss than bribe-financed policing. The capacity technology is used to obtain the closed-form transition and jump size.

Mexico City's reform illustrates replacement through a coordinated institutional package. Authorities created Community Protection Units through a coordinated package of salaries, recruitment, training, monitoring, and working conditions, and pursued gradual replacement of the incumbent force rather than changing one incentive in isolation (Jackson, 2014). Georgia's traffic-police reform was more abrupt but similarly combined personnel replacement, pay, centralized administration, new fine-payment arrangements, and monitoring (World Bank, 2012). These episodes do not identify the threshold in Proposition 2, but they illustrate why reform may operate through a package that changes the policing system rather than through a sequence of immediately productive marginal adjustments.

Using (1) and (15), the replacement threshold can be written

$$z^* = \frac{8(n_0 - n_B^*)}{H^3 P^4} = \frac{8(b^2 - Pm)}{H^3 P^4 (1 + 2Pm)(1 + 2b^2)}.$$

The first expression shows that a larger operating advantage of bribe-financed policing delays replacement. Greater police bargaining power raises b , improves the informal outside option,

and raises z^* . A stronger formal sanction affects both enforcement systems. It raises the bribe available under concealment, improves unsupported clean deterrence, and makes additional state-financed capacity more productive. Its overall effect on the transition threshold is therefore ambiguous.

6 Anti-corruption reform and police incentives

Bribery both sanctions the offender and rewards police detection. This section compares bribe-financed policing, clean policing without additional state support, and clean policing with additional state support. Separating the police return from the offender's sanction shows why suppressing bribery can weaken enforcement unless its police incentive is replaced.

To make this comparison, let $r \geq 0$ denote the police organization's return from a resolved detection and $s > 0$ the sanction borne by the offender. As in the main model, the police organization sets effort before potential offenders act. It chooses effort to maximize

$$re(1 - se) - \frac{e^2}{2}.$$

r motivates police activity, while s determines how strongly that activity deters offenders. The resulting effort and crime rate are

$$e(r, s) = \frac{r}{1 + 2rs}, \quad n(r, s) = \frac{1 + rs}{1 + 2rs}. \quad (16)$$

The product rs is the deterrence index: r supplies the police incentive and s the sanction. Crime is strictly decreasing in it. Setting $(r, s) = (m, P)$ reproduces e_0 and n_0 in (4). The reduced-form schedule $K(e, \kappa)$ can be understood as the lower envelope of the fiscal and administrative costs of supplying an additional return from formal processing and the complementary support needed to implement higher effort.

The bargaining model gives a precise interpretation of r and s in each case. Under bribe-financed policing, a concealed case yields return b to police and sanction b to the offender. The return from formal processing m is forgone:

$$(r_B, s_B) = (b, b).$$

If bribery is suppressed without additional state support, the case is formally processed:

$$(r_0, s_0) = (m, P).$$

With additional state support $w \geq 0$, formal processing gives

$$(r_F, s_F) = (m + w, P).$$

The three pairs isolate the reform problem. Bribery bundles reward and sanction in b . Suppressing bribery without additional support restores P but leaves police with only m ,

while state support also raises the police return. The parameter w need not be a cash bounty. It is a reduced-form measure of the pay, monitoring, career, and organizational arrangements that make formal police activity worthwhile.

Proposition 3 (Bundled reform). *Suppressing bribery without additional state support increases crime if and only if $b^2 > Pm$. With support w , state-financed policing produces less crime than bribe-financed policing if and only if $w > \hat{w} \equiv b^2/P - m$. When $b^2 > Pm$, $\hat{w} > 0$.*

When $b^2 > Pm$, suppressing bribery without increasing crime requires additional state support for police effort. The inequality $b^2 > Pm$ is also the viability condition in Proposition 1. $b^2 > Pm$ therefore governs both regime choice and the effect of suppressing bribery without additional state support. Avoiding a rise in crime requires replacing the police incentive supplied by the informal system.

By (9), suppressing bribery without additional state support raises crime exactly when police bargaining power exceeds the threshold σ_0 that makes bribe-financed policing viable. The risk is greatest when the return from formal processing is weak and police have substantial bargaining power over offenders. Proposition 3 also clarifies the reform jump in Proposition 2. A small reform that merely weakens bribe collection can reduce the effectiveness of the existing system without creating a viable state-financed alternative.

A related transitional pattern appeared during the reform of the Buenos Aires provincial police beginning in 1997. The provincial government placed the force under civilian control, removed hundreds of senior officers, and dissolved specialist brigades that had become implicated in the crimes they were meant to police (Human Rights Watch, 1999). Contemporary reporting estimated that the provincial crime rate rose by about 30 percent after the reforms began, while also noting that crime was rising elsewhere in Argentina and that the reform pursued several objectives simultaneously (Rotella, 1999). The episode does not establish that anti-corruption reform caused the increase. It illustrates the risk of disrupting a corrupt enforcement structure before an effective replacement is fully operational.¹⁰

Suppressing a bribe removes both an informal sanction on the offender and a return to police detection. A successful transition must replace the lost police return while restoring deterrence through legal sanctions. Ecuador illustrates such bundling. Its security reforms combined a doubling of the national-security and crime-prevention budget, a reported fourfold increase in police salaries, reorganization and expansion of community policing, removal of unsuitable officers, increased use of crime information, and wider justice-system reform (Brotherton and Gude, 2018). The reforms coincided with a substantial homicide decline, although the source does not isolate the effect of any one component. The transition combined anti-corruption control with funding and organizational reform rather than relying on prohibition alone.

China's campaign against protective umbrellas illustrates a broader version of the replacement problem. It combined criminal investigation with party discipline and coordinated action

¹⁰A similar coincidence occurred during Ukraine's 2015–16 police reform. New patrol officers were introduced as a visible break with entrenched corruption and pledged to forgo the bribes associated with the old force (Reuters, 2015). National Police officials later reported a 23 percent increase in recorded crime and emphasized that several other forces were at work, including economic deterioration, prisoner releases, low police motivation, and more complete crime registration (Ukrainska Pravda, 2016a,b).

across the police, procuratorate, courts, and justice institutions. The campaign therefore illustrates why dismantling corrupt protection may require intervention across the enforcement system rather than a prohibition directed at individual officers alone (Greitens, 2020; Cao, 2019).

7 Hierarchy and the composition of effort

The main model treats the police hierarchy as a single organization. In practice, higher levels may pressure officers to produce recorded cases or unofficial revenue. Kinshasa’s case-quota system raised unofficial revenue and unverifiable allegations without improving enforcement of verifiable traffic rules, illustrating how such incentives can distort the composition of police effort (Sánchez de la Sierra et al., 2024). This section asks how stronger pressure for measurable output affects genuine enforcement when enforcement itself reduces the supply of real cases.

To study this question, suppose a street-level officer divides effort between genuine enforcement, denoted by $g \geq 0$, and case fabrication, denoted by $x \geq 0$. Genuine effort detects actual offenders and deters crime. Effort x creates a fabricated or weakly founded case that is recorded by the organization but does not reduce crime.

Genuine effort g leaves crime rate

$$n(g) = 1 - bg$$

and generates $g(1 - bg)$ genuine cases. The officer receives the direct bribe b from a genuine case. Each recorded case also carries an additional shadow value $\tau \geq 0$ for the officer, whether the case is genuine or fabricated. The parameter τ is the reduced-form private value to the officer of a recorded case. It summarizes case quotas, promotion pressure, penalties for failing to deliver cases, and the officer’s share of revenue passed through the hierarchy. The officer’s payoff is

$$u(g, x, \tau) = (b + \tau)g(1 - bg) + \tau x - \frac{(g + x)^2}{2}. \quad (17)$$

Genuine cases provide both the direct bribe and the case-based return τ . Fabricated cases provide the case-based return τ , but no separate direct bribe b and no genuine deterrence. The two activities compete through the common effort cost. At $\tau = 0$ and $x = 0$, (17) reduces to the bribe-financed police problem in (2).

If fabrication is not used, optimal genuine effort is

$$g_0(\tau) = \frac{b + \tau}{1 + 2b(b + \tau)}. \quad (18)$$

Fabrication enters when its marginal return, $\tau - g_0(\tau)$, becomes positive. Define

$$\bar{\tau} \equiv \frac{\sqrt{b^2 + 2} - b}{2},$$

which is the unique positive solution to $2\tau(b + \tau) = 1$. Define recorded output as $Y(g, x) =$

$$g(1 - bg) + x.$$

Proposition 4 (Hierarchy and the composition of effort). *The officer's unique choice is*

$$(g^*, x^*) = \begin{cases} \left(\frac{b + \tau}{1 + 2b(b + \tau)}, 0 \right), & 0 \leq \tau \leq \bar{\tau}, \\ \left(\frac{1}{2(b + \tau)}, \tau - \frac{1}{2(b + \tau)} \right), & \tau > \bar{\tau} \end{cases}.$$

Below $\bar{\tau}$, g^ rises and crime falls. Above $\bar{\tau}$, g^* falls, x^* rises, and crime rises. Recorded output $Y(g^*, x^*)$ rises throughout.*

When case pressure is modest, genuine offenders are the cheapest source of measurable output, and the hierarchy elicits more genuine enforcement. As genuine effort rises, however, deterrence shrinks the supply of real cases. Fabrication does not face this base-erosion constraint. Once the quota value crosses $\bar{\tau}$, the officer begins to manufacture cases, and further pressure reallocates effort away from genuine enforcement.

Recorded output nonetheless continues to rise. A hierarchy evaluated on recorded cases or unofficial revenue therefore receives no internal signal that stronger pressure has become counterproductive. The organization's own performance measure improves while genuine enforcement falls and crime increases.

The Kinshasa traffic-police scheme illustrates the institutional possibility captured by the model. Station leadership required street teams to escort drivers to stations, where unofficial payments were extracted. The quota scheme generated a large share of unofficial revenue and disproportionately increased allegations that were difficult to verify, while quota reductions improved traffic management without weakening enforcement of verifiable traffic rules (Sánchez de la Sierra et al., 2024). The episode does not identify the threshold in Proposition 4, but it shows why recorded cases or unofficial revenue can be misleading performance measures when a hierarchy can induce officers to produce the measure itself.

The mechanism is related to the multitask incentive problem of Holmström and Milgrom (1991). A strong incentive on an imperfectly measured output can divert effort towards activities that raise the measure rather than the principal's objective. It also complements Echazu and Garoupa (2010), where corruption reallocates enforcement towards tasks offering greater bribe opportunities. In our model, the direction of the response changes at a threshold. Moderate case pressure can initially improve actual enforcement. Sufficiently strong case pressure then makes the organization more productive by its own accounting while making society less safe.

8 Enforcement systems and reform

This section uses the model to organize how we interpret policing systems and reform episodes. The incidence of bribery alone is not enough. The model directs attention to what unofficial payments finance, when a viable replacement becomes operational, whether recorded police output reflects genuine enforcement, and how statutory sanctions differ from police bargaining

power.

Consider first what unofficial payments finance. In Nigeria, underfunded police units reported relying on bribes, extortion, and payments from complainants for fuel and investigative activity (Human Rights Watch, 2010). Mexico City’s replacement units were supported not only by higher pay, but also by recruitment, training, monitoring, and official performance rewards (Anozie et al., 2004; Jackson, 2014). These examples point beyond individual wages to whether operating budgets are reliable, whether officers receive returns from formal processing, whether supervision and equipment are adequate, and who retains enforcement revenue.

The model also shifts attention from the date on which bribery is prohibited to the date on which a viable replacement becomes operational. In Buenos Aires, major anti-corruption restructuring was followed by a substantial increase in the provincial crime rate during the transition. Ukraine experienced a similar coincidence in recorded crime during its 2015–16 reform. Neither episode isolates a causal effect of anti-corruption measures (Human Rights Watch, 1999; Rotella, 1999; Reuters, 2015; Ukrainska Pravda, 2016a,b). Mexico City, Georgia, and Ecuador instead illustrate reform packages that combined anti-corruption measures with changes in pay, personnel, monitoring, administration, or wider organizational support (Jackson, 2014; World Bank, 2012; Brotherton and Gude, 2018). For studying reform, the economically relevant date may therefore be when the replacement organization can actually operate, not when anti-corruption measures are announced.

Internal performance measures create a different measurement problem. In Kinshasa, tighter case quotas raised unofficial revenue and unverifiable allegations without improving enforcement of verifiable traffic rules (Sánchez de la Sierra et al., 2024). Total cases, police contacts, or unofficial revenue can therefore be misleading measures of effective enforcement. The composition of activity matters: verifiable and unverifiable cases, genuine violations and weak or fabricated allegations, and recorded output and direct measures of public service may move in different directions.

Finally, statutory sanctions and police bargaining power have different institutional meanings. A higher statutory sanction raises formal deterrence and the bargaining surplus available under concealment, while greater police bargaining power strengthens only the informal system. Stronger bargaining power also raises the value of the informal outside option and delays replacement. An increase in statutory penalties should therefore not be interpreted as strengthening only the clean system. The bargaining formulation instead distinguishes reforms that change the legal stakes faced by offenders from changes in the bargaining environment faced by police.

9 Conclusion

Bribe-financed policing assigns the police organization a residual claim on payments from detected offenders. It can create deterrence and effort without public expenditure, but it depends on continued crime because enforcement reduces the base from which police revenue is drawn. Whenever bribe-financed policing outperforms the unsupported clean force, suppressing bribery without replacing police incentives also increases crime.

The informal system also changes institutional development. Small investments have no operating return until they are large enough to replace bribe-financed policing, and successful reform must substitute legal support for the incentives being removed. Within the hierarchy, case pressure can eventually shift effort towards fabricated cases even while recorded activity rises.

These mechanisms appear in different forms across policing systems. Mexico City's *mordida* illustrates how payments from those policed can become part of officers' incentives, while its reforms and Ecuador's broader package show why replacement requires legal support and organizational change. China's campaign against protective umbrellas highlights the difficulty of dismantling corrupt protection once it spans several enforcement institutions. Kinshasa shows how internal case pressure can raise recorded activity and unofficial revenue without improving genuine enforcement. Taken together, these cases illustrate how the model helps explain institutional patterns across different policing systems by identifying the financing and incentive mechanisms linking bribery, enforcement, reform, and recorded police activity.

A Proofs of formal results

Proof of Proposition 1. Part (i) follows from (5) and (6). For part (ii), (8) shows that $\ell_B \geq \ell_0$ when $b^2 \leq Pm$. Under Assumption 1, $L_S^* < \ell_0$. The government therefore strictly prefers state-financed policing in that case. When $b^2 > Pm$, the condition $L_S^* \leq \ell_B$ can be written as

$$\frac{H^2 P^2}{2\kappa} \geq \ell_0 - \ell_B,$$

which gives $\kappa \leq \kappa^*$. For part (iii), $n_B^* < n_S^*$ requires

$$n_0 - n_B^* > \frac{HP^2}{\kappa},$$

which gives

$$\kappa > \frac{HP^2}{n_0 - n_B^*} = 2\kappa^*.$$

□

Proof of Corollary 1. The planner compares L_S^* with W_B . If $W_B < \ell_0$, the state-financed condition is

$$\ell_0 - \frac{H^2 P^2}{2\kappa} \leq W_B,$$

which gives (10). Since $W_B \geq \ell_B$, we have $\ell_0 - W_B \leq \ell_0 - \ell_B$. Hence $\kappa^W \geq \kappa^*$. The inequality is strict when $D > 0$. If $W_B \geq \ell_0$, then $L_S^* < \ell_0 \leq W_B$ throughout the interior range. □

Proof of Proposition 2. For $0 < I \leq \hat{I}$, $C(I) \geq \ell_B$. The objective in (12) is therefore $\ell_B + I^2/(2z) > \ell_B$, the value at $I = 0$. Such investments are strictly dominated.

Conditional on state-financed policing and $I \leq I_F$, the objective is $\ell_0 - aI + I^2/(2z)$, whose minimizer is $I = az$. For $I > I_F$, it is $n_0^2/(2P^2I) + I^2/(2z)$, whose minimizer is $I = (n_0^2 z / (2P^2))^{1/3}$. The two branches meet smoothly at $z_F = I_F/a$, which gives (13).

Under (14), $z^* < z_F$. Substituting the definitions of z^* and z_F , this inequality reduces to

$$\frac{2(\ell_0 - \ell_B)}{a^2} < \frac{\ell_0}{2a^2},$$

which is exactly $\ell_B > 3\ell_0/4$. The relevant conditional optimum at the transition is therefore $I = az$. Its minimized value is $\ell_0 - a^2z/2$. The government prefers state-financed policing to zero investment when

$$\ell_0 - \frac{a^2z}{2} \leq \ell_B,$$

which is equivalent to $z \geq z^*$. At $z = z^*$,

$$az^* = \frac{2(\ell_0 - \ell_B)}{a} = 2\hat{I}.$$

Without bribe-financed policing, the government chooses the positive conditional optimum $I_C(z)$ for every $z > 0$. The crowd-out result follows. $\square$

Proof of Proposition 3. By (16), crime is decreasing in rs . Under bribe-financed policing the deterrence index is b^2 . After bribery is suppressed without additional state support it is Pm . With additional state support it is $P(m + w)$. The claims follow by direct comparison. $\square$

Proof of Proposition 4. The objective in (17) is strictly concave in (g, x) . The optimum is therefore unique. If $x = 0$, the first-order condition for g gives (18). Fabrication becomes profitable when its marginal return at $x = 0$ is positive, which requires $\tau > g_0(\tau)$, equivalently $\tau > \bar{\tau}$. For $\tau \leq \bar{\tau}$,

$$g'_0(\tau) = \frac{1}{[1 + 2b(b + \tau)]^2} > 0.$$

When $x > 0$, the first-order condition for x gives $g + x = \tau$. Substitution into the first-order condition for g yields

$$g^*(\tau) = \frac{1}{2(b + \tau)}, \quad x^*(\tau) = \tau - \frac{1}{2(b + \tau)}.$$

Hence $g^{*'}(\tau) < 0$ and $x^{*'}(\tau) > 0$ above the threshold. Since crime is $1 - bg^*$, it moves in the opposite direction from genuine effort. Below the threshold, $Y = g_0(1 - bg_0)$ and $Y' > 0$. Above it,

$$Y(\tau) = \tau - b[g^*(\tau)]^2 = \tau - \frac{b}{4(b + \tau)^2},$$

which gives $Y'(\tau) = 1 + b/[2(b + \tau)^3] > 0$. $\square$

B Corner solutions and robustness

B.1 A decentralized police benchmark

The main model lets the police organization set enforcement intensity before offenders act and internalize its effect on aggregate crime. As a decentralized benchmark, suppose instead that atomistic police take the crime rate n as given when choosing effort. Their best response is

$e = bn$, while offenders respond according to $n = 1 - be$. Solving these two conditions jointly gives

$$e_B^{\text{sim}} = \frac{b}{1 + b^2}, \quad n_B^{\text{sim}} = \frac{1}{1 + b^2}.$$

Effort is higher and crime is lower than in the main model because individual police do not internalize the erosion of the aggregate bribe base. Bribe-financed policing still depends on payments from continuing crime, but the sharp bound $n_B^* > 1/2$ is specific to the main model.

B.2 A general distribution of criminal benefits

Let criminal benefits have continuously differentiable distribution F with density $f > 0$. Under bribe-financed policing,

$$n_B(e) = 1 - F(be),$$

and police revenue net of effort cost $c(e)$ is

$$U_B(e) = be[1 - F(be)] - c(e).$$

An interior optimum satisfies

$$b[1 - F(be)] - b^2ef(be) = c'(e).$$

The first term is the direct revenue gain from a higher probability of detection. The second is the loss of the revenue base caused by additional deterrence. If $c'(e) > 0$ for every $e > 0$, positive effort financed solely by bribes requires a positive mass of potential payers. The exact bound $n_B^* > 1/2$ is special to the uniform-quadratic specification, but dependence on continued crime is general.

B.3 A hard-budget interpretation

The reduced-form cost $\kappa(e - e_0)^2/2$ can be interpreted through a hard enforcement budget. Suppose implementing effort above e_0 requires spending $\kappa(e - e_0)^2/2$ and the agency has budget M . The maximum feasible clean effort is

$$\bar{e}_S(M, \kappa) = e_0 + \sqrt{\frac{2M}{\kappa}},$$

capped at $1/P$. A severe budget constraint leaves the agency close to the unsupported clean effort e_0 . As M rises or κ falls, the maximum feasible clean effort rises and the corresponding clean crime rate falls. For a sufficiently large budget, feasible clean policing can produce less crime than bribe-financed policing.

B.4 Full deterrence under state-financed policing

If $\kappa \leq HP^2/n_0$, the interior expression $e_S^* = e_0 + HP/\kappa$ implies $Pe_S^* \geq 1$. The government then chooses the least effort that fully deters crime,

$$e_S^* = \frac{1}{P},$$

and its loss is

$$L_S^* = \frac{\kappa}{2} \left(\frac{1}{P} - e_0 \right)^2 = \frac{\kappa n_0^2}{2P^2}.$$

At $\kappa = HP^2/n_0$, the full-deterrence loss equals $\ell_0/2$ and joins the interior solution continuously. For lower κ , state-financed policing attains full deterrence and the government strictly prefers it to bribe-financed policing.

B.5 The reform transition and full deterrence

At I_F , state-financed policing first reaches full deterrence, with $C(I_F) = \ell_0/2$. Since $n_B^* > 1/2$ and $n_0 \leq 1$, we have $\ell_B > \ell_0/2$. Hence $C(I)$ crosses ℓ_B before I_F , implying $\hat{I} < I_F$. The stronger condition (14) ensures that the optimal jump $2\hat{I}$ also lies below I_F . It is used only to obtain the closed-form threshold in Proposition 2. If it fails, all positive investments at or below $\hat{I}$ remain dominated and the transition remains discrete, but the switch may occur on the full-deterrence branch of $C(I)$.

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