Smuggling and Border Enforcement

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Abstract This article analyzes the efficacy of border enforcement against smuggling. We argue that walls, fences, patrols, and other efforts to secure porous borders can reduce smuggling, but only in the absence of collusion between smugglers and state agents at official border crossings. When such corruption occurs, border enforcement merely diverts smuggling flows without reducing their overall volume. We also identify the conditions under which corruption occurs and characterize border enforcement as a sorting mechanism that allows high-skilled smugglers to forge alternative border-crossing routes while deterring low-skilled smugglers or driving them to bribe local border agents. Combining a formal model and an archival case study of opium smuggling in Southeast Asia, we demonstrate that border enforcement has conditional effects on the routes and volumes of smuggling, depending on the nature of interactions between smugglers and border agents. By drawing attention to the technological and organizational aspects of smuggling, this article brings scholarship on criminal governance into the study of international relations, and contributes to debates on the effects of border enforcement and border politics more generally.

Border enforcement is a highly politicized topic in the twenty-first century. However, official attempts to control the movement of goods and people across borders have prevailed throughout history. In ancient China, the Great Wall's northern frontier passes served as inspection stations to restrict illegal exports. The nineteenth-century British East India Company built what was known as the Indian Customs Hedge, a thousand-mile-long barrier made of dense thorny plants, interspersed with tax stations and guard posts, to prevent the inland smuggling of salt.[1] After the Mexican Revolution, rampant flows of contraband arms prompted the construction of a six-foot-high fence dividing Nogales, a town straddling Arizona and the Mexican state of Sonora.[2] A hundred years later, this border fence remains as a steel-beam fixture that has more than tripled in height, topped with razor wire.

1. Moxham 2001.
2. St. John 2011, 144.

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Such efforts to enforce borders often fail. The Great Wall was infiltrated by smugglers who took silkworm eggs and evaded inspectors, costing China its invaluable trade monopoly over silk, according to one legend.[3] The Indian Customs Hedge was often breached by smugglers who hid their contraband salt from the patrols and bribed customs authorities. By the time it was abandoned in 1879, it was a potent symbol of corruption and unjust fiscal burden in the British Indian empire. Today, the Nogales fence and the nearby Nogales port of entry are infamous sites on the US–Mexico border, where clashes between US officials and migrants from Central America recur, alongside worries about human and drug trafficking.

This article studies the efficacy of border enforcement. When do walls, fences, patrols, and other state efforts to seal breaches along borders work to reduce smuggling, and when do they fail? It depends, we argue, on the possibility of corruption at official border crossings. Border enforcement can reduce smuggling in the absence of corruption, which is determined by the nature of the local interactions between smugglers and border agents. However, when smugglers and border agents are able to collude to share profits from contraband, efforts to enforce borders will merely divert smugglers toward official border crossings, where they will seek to corrupt officials; and the overall volume of smuggling will not be reduced. In other words, border enforcement has conditional effects on the routes and volumes of smuggling, depending on the nature of interactions between smugglers and border agents and the resultant possibility of collusion between them.[4]

Although stylized facts about border walls diverting smuggling or incentivizing corruption abound in academic and policy debates, the mechanisms by which such dynamics occur are not well theorized. This article opens up the black box of border enforcement, and highlights two important features of smuggler–border agent relationships that shape the efficacy of border enforcement more generally. First, smugglers vary in their skills for transporting contraband across borders, including their technological and organizational capacities. Second, border agents are not privy to the skill level of each smuggler, but know only the general characteristics of skills and associated costs for the population of smugglers.

Incorporating this information asymmetry and the variation in smugglers' skills, we develop a simple theoretical framework that models the strategic interactions between smugglers and border agents. Our logic is as follows. Border enforcement sites can operate as *sorting mechanisms* that filter smugglers into different types based on their ability to transport contraband across borders. High-skilled smugglers can traverse borders with low transportation costs, and profitably forge their own unofficial routes to circumvent border enforcement strategies. By contrast, low-skilled smugglers must collude with border agents to traverse the border because they face higher transportation costs for overcoming border patrols, checkpoints,

3. Langerbein 2009, 14.

4. We define "border enforcement" broadly to include physical fortification efforts such as building walls and fences, stationing personnel at official checkpoints, making regular inspections, patrolling unofficial border crossings, and deploying surveillance technology. Following Kenwick and Simmons 2020, 9, such enforcement efforts are a "controlling" type of border orientation.

walls, and fences. Because border officials know only the general characteristics of smugglers' costs, they will set a uniform fee for smugglers who wish to pass via official border crossings. This fee will be kept low enough that it can be profitable for low-skilled smugglers to use the official crossing rather than unofficial routes. As a result, border enforcement does not necessarily reduce the total volume of smuggling but merely diverts low-skilled smugglers to seek safe passage by bribing border agents, when the two nominal adversaries are able to collude. However, in the absence of such collusion, low-skilled smugglers will be deterred from smuggling; only high-skilled smugglers will be able to cross profitably (using their unofficial routes), and overall smuggling volume will be reduced.

What conditions enable collusion between border agents and smugglers? We argue that it depends on both the local bureaucratic environment and human geography. In a permissive local bureaucratic environment, the central government lacks the capacity and/or the will to monitor border agents on the ground, who in turn know that their likelihood of being punished for corruption is low. However, we stress that these parameters alone do not necessarily lead to collusion. Border agents must also be able to anticipate interacting repeatedly with smugglers and value these future interactions sufficiently. Reasons for such predictability may include physical terrain that facilitates both smuggling and its regulation, shared historical knowledge of smuggling routes, or steady demand for contraband across borders. Thus, even when a central government lacks the capacity to detect and punish corruption, local border agents may not be able to engage in corruption if they cannot maintain interactions with smugglers.

Scholars generally recognize that weak state capacity and a lack of political commitment explain why border enforcement against smuggling fails.[5] However, a key contribution of our argument is that it can explain why border corruption and smuggling occur even when states have strong coercive capacity to enforce borders and prioritize anti-corruption. An agent of the US Federal Bureau of Investigation succinctly described the incentives of "bad apples" inspecting cars crossing the border in San Diego: "If you're an inspector and you are legitimately waving through ninety-seven out of one hundred cars anyway … and you realize you can make as much as your annual salary by letting the ninety-eighth car go by, it can be easy to rationalize that."[6] Our micro-logic approach sheds light on how the incentives of border agents in such situations are shaped by interacting with illegal actors, and how those local interactions can influence the efficacy of enforcement against smuggling. In addition to drugs and contraband goods, our argument can extend to a wide range of cross-border activities, including the smuggling of humans.

Theoretically, this article adds to a growing research program in international relations on border politics and globalization, which addresses the determinants and consequences of border walls, patrols and policing, and other border enforcement

5. Andreas 2003; Gallien 2020; Shelley 2018.
6. Federal Bureau of Investigation 2010.

strategies for trade, human welfare, and security.[7] We advance recent studies by exploring variation in smuggler types based on their skills and identifying a novel sorting mechanism that sheds light on why border enforcement does not necessarily reduce smuggling volumes. In taking seriously the technological and organizational aspects of smuggling, this article brings into international relations a useful body of interdisciplinary scholarship on criminal governance and border corruption.

Our analysis has clear policy implications: policies for controlling illegal flows across borders and for preventing corruption among border agents must go hand in hand. In the absence of accompanying anti-corruption measures, simply building walls and fences, stationing more personnel, and other border enforcement measures will increase incentives for rent-seeking for border agents because colluding with smugglers will be more lucrative for border agents. Policies that disrupt regular contact between border agents and smugglers, such as rotating the agents stationed at official border crossings, can aid border enforcement aimed at reducing smuggling.

Clandestine and illegal activities present well-known challenges to data collection.[8] Our approach combines formal and qualitative methods to build an empirically grounded theoretical framework for understanding smuggling and border corruption. We complement the strengths of formal modeling in systematically depicting the micro-level interactions of actors and generating theoretical predictions with a historical case study of opium smuggling in Southeast Asia based on original archival research. We exploit a rich set of declassified records from colonial archives that give privileged insight into actors' motives and calculations and the dynamics of corruption and smuggling, which are difficult to access in contemporary records. In addition to tracing the process through which our model's collusive equilibrium between a smuggler and border officials obtains in the real world, this case study illustrates our predictions about the impact of border enforcement on smuggling routes and volume.

In the conclusion, we consider future directions for a broader research agenda on border politics. We discuss how our focus on local-level dynamics and the implementation side of border policies can be extended to theorize higher-level interactions between border agents and central authorities. We also consider the applicability of our framework for studying the effects of border enforcement on other types of outcomes.

Border Enforcement and Criminal Governance

While borders have long preoccupied theorists and historians of international relations, renewed attention is being paid to physical acts of border enforcement.[9] Since 1800, sixty-two border walls have been built, of which twenty-eight were

7. On border determinants, see Bissonnette and Vallet 2020; Carter and Goemans 2011; Carter and Poast 2017; Hassner and Wittenberg 2015; Kenwick and Simmons 2020; Simmons 2005. On border effects, see Getmanski, Grossman, and Wright 2019; Laughlin 2019; Linebarger and Braithwaite 2020; Massey, Durand, and Pren 2016.

8. Gallien 2020; Jancsics 2019; Roitman 1990.

9. Kahler and Walter 2006; Simmons 2019.

erected after 2000.[10] Scholars have charted and explained this trend in light of the greater economic role borders have assumed since the end of the Cold War, aimed at stemming flows of illegal goods and unsanctioned immigration. This finding is especially striking against the backdrop of influential globalization studies which posited that greater economic integration, trade, and labor mobility would render exclusive borders obsolete.[11] The proliferation of border walls and the rise of aggressive strategies to fortify international boundaries and police cross-border mobility have given reason for scholars to revise expectations and rethink the nature of the sovereign state and global order.

A first wave of research revised traditional understandings of borders, especially international territorial borders, which had focused on military and political functions. Beth Simmons provided an influential reconceptualization of borders as more than just dividing or delimiting lines for national jurisdictions, but "agreements that embody jurisdictional rules that are analogous to constitutional rules within a society."[12] Scholars now recognize borders as institutions that can provide states with joint gains in terms of reducing external challenges to their legitimate authority and serving coordinating functions to reduce jurisdictional and policy uncertainty, as well as communicative and performative roles of demonstrating political will and state power.[13]

A second wave of studies has examined the determinants and effects of such borders, focusing especially on walls, fences, and other fortification schemes, which are recognized as "among the most aggressive strategies" to enforce borders.[14] Hassner and Wittenberg find that since 1945, most of the states that have built fortified barriers for border enforcement are wealthy states seeking to restrict unsanctioned migration, especially from Muslim-majority states.[15] Rosière and Jones and Carter and Poast explain the construction of border walls in light of economic disparities between bordering states that incentivize cross-border illegal migration and smuggling of black market goods.[16] Focusing squarely on border-wall effects, recent work has shown that such fortifications can reduce the risk of terrorist attacks, the diffusion of violent militancy, and trade flows between neighboring countries, and increase undocumented migration and violence, as well as alter the nature of smuggling activity and the behavior of involved criminal organizations.[17]

Yet within this growing literature, surprisingly little is known about the *mechanisms* through which physical border fortifications, and enforcement efforts more generally, generate these outcomes. Analytically, the border wall is a black box because

10. Carter and Poast 2017, 240.
11. Ohmae 1990.
12. Simmons 2005, 827.
13. Andreas 2003; Atzili and Kadercan 2017; Brown 2020; Carter and Goemans 2011; Rosière and Jones 2012.
14. Carter and Poast 2017, 240.
15. Hassner and Wittenberg 2015.
16. Carter and Poast 2017; Rosière and Jones 2012.
17. Avdan and Gelpi 2017; Getmanski, Grossman, and Wright 2019; Laughlin 2019; Linebarger and Braithwaite 2020; Massey, Durand, and Pren 2016.

scholars tend to presume rather than analyze the behaviors and interactions of actors involved in illegal and illicit activities. As a result, studies sidestep important questions about the mechanisms through which border enforcement works. How do efforts to seal porous borders shape the behaviors of smugglers who try to traverse them, and border agents tasked with guarding them? How do these actors mutually adjust expectations, calculate costs and benefits, and assess risks; and how do such choices and interactions affect the efficacy of border enforcement? While micro-level ties between smugglers and border agents are the most basic unit and the proximate level affected by border walls, fences, patrolling, surveillance, and other enforcement strategies, we lack an explicit theorization of their logic of interaction, which in turn leads to speculative rather than systematic explanations of why efforts at border enforcement fail (or succeed).

Borders are sites of negotiation between the state officials who guard them and smugglers who try to traverse them. Smuggling is the act of transporting goods or people in violation of state-imposed restrictions in pursuit of opportunities for profit. While specific operations for smuggling may vary, the organization of transportation is a common task. It is also an important task on which the arbitrage profits from smuggling, and its success or failure, hinge. We aim to systematically unpack the basic decisions and skills necessary to move contraband across a border.

Organizing cross-border transportation is hardly simple. Smugglers must anticipate not only physical costs (including manpower, fuel, and vehicles and their maintenance) but also the political costs of bribes, permits, and other means of securing safe passage across a border. Smugglers will be willing to pay extra political costs to gain passage at official border crossings, where physical transportation costs less than forging unofficial crossings. "Official" border crossings are tunnels, gates, bridges, ferry crossings, and other places with permanent state presence and often favorable geography for surveillance, such as mountain passes and natural choke points in rivers. "Unofficial" border crossings are sites that are unsanctioned by the state; they often traverse more difficult terrain or artificially fortified territory.

Smugglers have variable skills for transporting contraband across borders, which affect how they interact with border agents. Moreover, their calculations are altered in the face of higher walls, longer fences, or more law enforcement agents of the state, which in turn shapes the calculations of the latter. Negotiations between the two sides abound and recur locally at border crossings, affecting the direction and quantity of contraband flows as well as when border agents will seek bribes instead of enforcing the law.

Our approach to the micro-level strategic interactions between smugglers and border agents builds on a rich interdisciplinary literature on criminal governance that recognizes how state actors forge collusive relationships with nonstate actors, including criminal organizations.[18] Following Charles Tilly's famous analogy

18. Gambetta 1996; Lessing 2021; Magaloni, Franco-Vivanco, and Melo 2020; Volkov 2002; Yashar 2018.

likening the modern state to racketeers who "produce both the danger and, at a price, the shield against it,"[19] scholars have identified varieties of state-sponsored protection rackets that range from high corruption and patron–client relationships binding politicians to leaders of mafias and gangs, to petty forms of cooperation, co-optation, and extortion that link low-level state officials to individuals or groups involved in illegal, illicit, and informal markets.[20] Many recent works stress that the willingness of state actors to enforce the law against illegal activities can vary, not necessarily because they lack effective capacity but because *not* extending territorial control or forbearance makes more strategic and political sense.[21] Studies of criminal governance have similarly shown how gangs, smugglers, and other specialists in illegal activities can effectively establish arrangements for governing, such as taxation, public goods provision, policing violence, and security,[22] which do not "necessarily have to occur in competition with states, or under their radar."[23]

Theoretical Framework

In our model, we characterize the smuggler's choice between using a costly unofficial border crossing to evade border agents and using an official crossing while paying border agents for safe passage. After identifying the conditions that support collusive equilibria, we examine comparative statics to generate predictions about the volume of smuggling and the routes smugglers take. We present the baseline model in the main text and defer extensions that capture variation in border governance to the online supplement.

In this framework, border agents must be seen as exercising considerable autonomy in deciding whether to enforce border policies. Consistent with a rich literature on local bureaucratic politics, we view much of the action involving border corruption and smuggling as occurring without the central government's knowledge, and even when the center is aware of such problems, it cannot necessarily solve them at will.[24] A focus on the local implementation side of border policies is also a realistic approach to understanding border enforcement because central government policies toward borders seldom change in response to the behavior of individual border agents but are more often decided at higher levels of bureaucratic politics.

19. Tilly 1985, 171.
20. Alvarez-Villa and Guardado 2020; Koivu 2016; Magaloni, Franco-Vivanco, and Melo 2020; Snyder and Duran-Martinez 2009; Tajima 2018.
21. Holland 2016; Slater and Kim 2015.
22. Barnes 2017; Duran-Martinez 2017; Moncada 2016. 23.
23. Gallien 2020, 494.
24. On street-level bureaucrats and local discretion, see Kim 2020; Lipsky 1980; Pepinsky, Pierskalla, and Sacks 2017.

Thus, we treat border agents as price-takers vis-à-vis the central government. Our model allows for a broad range of scope conditions that vary in both the capacity and willingness of central authorities to control local corruption. That is, it parameterizes contexts in which the state's capacity to regulate its border agents can be either strong or weak, as well as contexts in which the state may be either willing or unwilling to exercise control over corruption.

Model

Consider a border across which there is a difference in the price of an illicit good. There is a population of smugglers S_i, where $i \in \{1, ..., n\}$, who can capture an arbitrage payoff of $w > 0$ from transporting this good across the border. Smugglers can transport their contraband via either the *official crossing* or the more costly *unofficial crossing*. The official crossing is established by the state at a location along the border that minimizes physical transportation costs, which is guarded by a border agent, B. Note that the state is not a player in this game, and the location of the official crossing is given. For simplicity, the border agent enjoys full control over the official crossing, so that she discovers all contraband that S_i attempts to transport via that route. Although in reality border agents at official crossings may be unable to discover contraband with certainty, this assumption reflects their relatively higher capacity to discover contraband along official versus unofficial routes, while allowing us to focus on the smuggler's choice between the two types of routes and the agent's incentives to enforce the border or to engage in corruption.

In contrast, the state exercises weaker control over the unofficial route, so that agents posted along that route are able to interdict only S_i's contraband with probability $p \in [0, 1)$. When S_i is interdicted, she loses the value of the contraband, w. The probability p that the state is able to discover smugglers' contraband reflects the state's capacity to enforce its border along the unofficial route. A state that has invested greater long-run resources in enforcement will have a higher p.

While the chances of successfully evading detection are better along unofficial routes, S_i's transportation costs are significantly greater, by $\tau_{it}w$, where $\tau_{it} > 0$. The parameter τ_{it} reflects the skill level of each individual smuggler S_i in transporting contraband across the border during a given period, in addition to the costs from barriers and terrain that can affect transportation. High-skilled smugglers will have lower transportation costs (τ_{it}), and low-skilled smugglers will have higher costs. τ_{it} is a random variable, drawn at the beginning of each period from a uniform distribution with support over $[\tau - h, \tau + h]$, where τ is the mean transportation cost factor for all i and t via the unofficial route and h is a parameter for the range of the transportation costs.[25] In each period, the τ_{it} are reset, capturing random changes that affect

25. This distribution is useful since it has support over a finite range and the mean, variance, and other shape parameters are orthogonal to each other. This orthogonality makes it possible to manipulate the mean

smuggling decisions, such as weather and other environmental changes, or momentary advantages smugglers may acquire by developing new smuggling routes or using technology. This allows a realistic depiction of the dynamic nature of smuggling, which often resembles a cat-and-mouse game between border agents and smugglers.[26]

The cumulative distribution function for τ_{it} at a given threshold x is

$$\Phi_{\tau_{it}}(x) = \begin{cases} 0 & \text{if } x < \tau - h \\ \frac{x-(\tau-h)}{2h} & \text{if } \tau - h < x < \tau + h \\ 1 & \text{if } x > \tau + h \end{cases} \quad (1)$$

A state that makes long-term investments in border fortifications can raise the mean transportation costs, τ, that smugglers face along the unofficial route, shifting the cumulative distribution function of τ_{it} to the right. The parameters p and τ are assumed to be determined by the terrain and the state's investments in interdiction efforts and border fortifications, respectively. From the perspective of border agent B, p and τ are assumed to be exogenous, since B has no influence over the state's high-level border control policy. That is, although the border agent is a player, the state is *not* a player in the game and enters into the game only by shaping its parameters. While the general population characteristics p and τ are common knowledge to both B and S_i, the individual parameter τ_{it} is known only to S_i and not B, introducing asymmetric information on S_i's transportation costs. Since τ_{it} is drawn anew at the beginning of each period, any information B gains about S_i's transportation costs in one period becomes irrelevant in the next period.

Although the state's official policy is to prevent illicit goods from crossing the border, we do not assume that the border agent will dutifully block all contraband. Instead we examine her incentives to enforce the border. Under what conditions does B have an incentive to confiscate the contraband, versus accepting a bribe to allow S_i to cross with her contraband?

If S_i transports her contraband via the official border crossing, she is effectively declaring her goods to B, since they will be discovered with certainty. In this scenario, B can either seize the goods or charge a fee for safe passage. B's payoff for seizing the contraband is its value, w. If B chooses to collude with S_i, B receives a fixed fee, fw,

transportation costs without changing the fundamental shape of the distribution, allowing comparative statics that generate predictions of smuggling flows. Finitely bounded distributions typically change with the mean, precluding *ceteris paribus* comparisons. In the online supplement, we also use the raised cosine distribution, which also has orthogonal parameters. The main results are unchanged.

26. Although smugglers' type (τ_{it}) could have both persistent and ephemeral (idiosyncratic) elements, the independent and identically distributed assumption simplifies the analysis by effectively assuming that the temporary shocks are more significant than the possibility of learning across periods. While greater persistence in transportation costs would capture learning dynamics, this simplification allows us to focus on the central dynamic of our theory, namely the nature of the relationships between border agents and smugglers.

where $f \in (0, 1)$, but risks incurring a penalty if she is caught.[27] Note that if B seizes the contraband, it is equivalent to charging a fee of 1. Thus, B's decision effectively reduces to determining the level at which to set the fee $f \in (0, 1]$. B's expected cost from colluding is qsw, where $q \in [0, 1]$ is the probability that the border agent will be caught for corruption and $s \geq 0$ is the penalty factor B incurs if she is discovered to have engaged in corruption.[28] If B is caught, she incurs a penalty of sw. We scale B's penalty by the value of the contraband, w, to capture the idea that the penalties for corruption should be proportional to the value of the contraband (higher-value contraband will incur greater penalties). Thus, qs can be viewed as the expected penalty factor, which scales with the contraband value, w.

The probability, q, that B will be caught for corruption reflects the *state's capacity to police its own agents*, such that states with stronger capacities are more likely to detect corruption among their agents. Notice that we distinguish between two aspects of state capacity: the capacity to detect smugglers, p, and the capacity to detect corruption among its agents, q.[29] While the state's ability to detect corruption among its agents reflects both the state's capacity *and* preferences for investing in such capacities, the penalty s that the state imposes on B for corruption captures the *state's preferences* on corruption. From a revealed preferences perspective, a heavy penalty would indicate a strong preference against corruption by its agents, while a light penalty would indicate relative tolerance. In the latter case, bribes may be viewed by the state as a way to subsidize agents' incomes or ensure the buy-in of its agents or even nonstate actors. Thus, our framework allows that states can be either strong or weak in their *capacity* to detect corruption, and that they can vary in their *preferences* over opposition to or tolerance of corruption.[30]

We assume that the probability that B's corruption is detected and the penalties the state imposes are exogenous to the agent. Although there may be strategic interactions between individual agents and their immediate supervisors at the middle management level, q and s can be realistically viewed as exogenous since they reflect high-level policies that are designed and implemented by the central state in setting national border enforcement institutions and policies that shape border agents' incentives. In this way, individual acts of corruption do not affect q and s on their own. Rather, it is the local bureaucratic environment that affects them. Moreover, bureaucracies are sticky and cannot change their policies in response to individual incidents of corruption. We believe this is a realistic way to treat the policies setting the monitoring and policing of agents. For example, between October

27. A fixed fee is equally profitable to B as random fees if smugglers are risk neutral and more profitable than random fees if smugglers are risk averse. We present the proof in the online supplement.

28. To capture situations where states may try to deter corruption with severe punishments, s is allowed to be greater than 1.

29. We follow Berwick and Christia 2018 and Morgan and Orloff 2017 in disaggregating state capacity in terms of the different challenges of extraction, coordination, and compliance.

30. A state can build capacity to detect corruption by investing in monitoring infrastructure, adopting new surveillance technologies, adding investigative personnel, or conducting more frequent or thorough audits.

2004 and February 2018, the US Customs and Border Patrol reported 210 separate incidents of corruption among its agents, *not* including investigations for which there was insufficient evidence to warrant disciplining officers.[31] An assumption that q and s are endogenous to agent behavior would imply that the Customs and Border Patrol altered its policies in response to individual incidents, rather than the overall pattern of hundreds of reported incidents, as well as others that were investigated but not reported.

For simplicity, we evaluate B and S_i as risk-neutral actors. Thus, B's expected payoff for charging a fee for safe passage is $fw - qsw$, while S_i's payoff is $w - fw$. S_i's participation constraint for bribing B for safe passage is

$$w - fw > 0 \tag{2}$$

S_i's other option is to attempt to evade the border authorities via the unofficial route.[32] If S_i traverses the unofficial route safely, she will receive a payoff of $w - \tau_{it}w$. If she is caught (with probability p), she will not receive the arbitrage value but will still incur transportation costs $\tau_{it}w$.[33] Thus, S_i's expected profit from attempting to cross via the unofficial route is $w - E[c_i]$. We can express S_i's expected costs on the unofficial route as

$$E[c_i] = (1 - p)\tau_{it}w + p(\tau_{it}w + w) = (p + \tau_{it})w \tag{3}$$

We can summarize a single interaction between the border agent and the smuggler in a given period as follows.

1. Nature N draws $\tau_{it} \in [\tau - h, \tau + h]$.
2. S_i decides whether to attempt to smuggle contraband.
3. S_i chooses either to evade (via the unofficial route) or to declare the contraband and pay the fee for safe passage (via the official route).
4. B chooses either to seize the contraband or to charge a fee fw, where $f \in (0, 1)$, for safe passage (collude).
5. If S_i chooses the unofficial route, Nature N determines whether the smuggler is caught, with probability p.

Figure 1 presents the stage game in extended form. For each outcome, the payoffs for S_i followed by B are presented in parentheses.[34]

We begin with whether S_i can profitably smuggle contraband across unofficial routes in contexts where crossing via official routes is not viable. The unofficial

31. Customs and Border Patrol 2018.

32. The unofficial route can be extended to include transportation through the official border crossing, but using costlier methods to hide contraband.

33. p is independent and identically distributed across all smugglers.

34. In Appendix A.2 (in the online supplement), we examine an extension in which the smuggler can bribe a second border agent along the unofficial route. The main findings remain qualitatively unchanged.

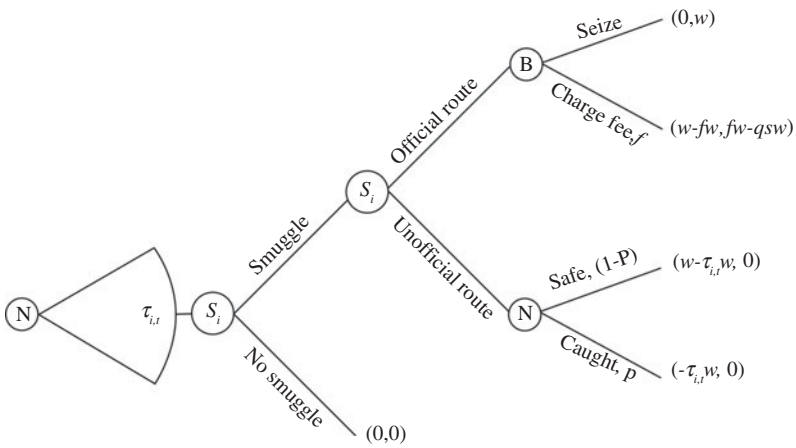

FIGURE 1. *Stage game of smuggling interaction*

route is profitable when $p + \tau_{it} < 1$, which gives S_i a positive expected payoff. Thus the threshold below which smugglers' transportation costs τ_{it} are low enough for smuggling across the unofficial route to be profitable is $\tau_{it} < 1 - p$. Based on $\Phi(x)$ from equation (1), the proportion of smugglers for whom smuggling on the unofficial route is profitable is

$$\Gamma = \begin{cases} 0 & \text{if } p + \tau - h > 1 \\ \frac{1-p-\tau+h}{2h} & \text{if } p + \tau - h \leq 1 \text{ and } p + \tau + h \geq 1 \\ 1 & \text{if } p + \tau + \mathrm{h} < 1 \end{cases} \tag{4}$$

If it is not possible for S_i to collude with B to cross via the official route, then Γ will be equivalent to the total proportion of smugglers who can smuggle. Notice that for distributions of smugglers for whom even the highest-skilled smugglers (low τ_{it}) cannot profitably cross the border (that is, $p + \tau - h > 1$), the volume of smugglers will be zero. However, if transportation costs are reduced such that at least the high-skilled smugglers can profitably cross ($p + \tau - h \leq 1$), there will be a nonzero proportion of smugglers who can profitably take the unofficial route. Here, since $\frac{\partial \Gamma}{\partial p} < 0$ and $\frac{\partial \Gamma}{\partial \tau} < 0$, decreases in p and τ will result in a higher volume of smugglers across the unofficial route, until all smugglers can cross where $p + \tau + h < 1$. Where no smugglers or all smugglers can cross, marginal changes in p or τ will not change the volume of smugglers who cross. Thus:

Proposition 1 Effect of border enforcement on smuggling flows via unofficial routes: If smugglers are able to cross borders via unofficial routes only, a marginal increase (decrease) in interdiction probability p or mean transportation costs τ will

cause a decrease (increase) in the proportion of smugglers who can profitably cross the border if $p + \tau - h \leq 1$ *and* $p + \tau + h \geq 1$. *Otherwise, the proportion of smugglers who can profitably cross the border will be unresponsive to marginal changes in* p *or* τ.

We now turn to the official route. Assuming that B will collude if S_i chooses the official route, S_i will choose the official route if the net payoff S_i would receive from corrupting the agent is at least the expected payoff of using the unofficial route. Thus, S_i will choose the official route if the expected costs from the unofficial route are greater than the costs from the official route, $E[c_i] > fw$. S_i's expected costs on the unofficial route are $E[c_i] = (p + \tau_{it})w$, while the costs on the the official route will be fw. Comparing these payoffs, S_i will prefer the official route if $p + \tau_{it} \geq f$. The intuition here is that in order for the official route to be preferable to S_i, the expected losses due to interdiction and transportation costs must be greater than the fee. Thus, S_i will prefer the official route when

$$p + \tau_{it} \geq f \tag{5}$$

In a one-time interaction, if S_i chooses the official route, it is sequentially rational for B to confiscate the contraband, which would maximize her payoffs given that there would be no prospect of collusive payments in the future. In other words, B cannot credibly commit to not seizing S_i's contraband. Recognizing this time inconsistency problem, S_i will choose the unofficial route. Thus:

Lemma 1. Non-collusion in one-time interaction: In a one-time interaction between a border agent and smuggler, a collusive subgame perfect equilibrium does not exist.

Collusive Equilibria in the Repeated Game

When the game is repeated, equilibria that result in either collusion or evasion are both possible. Collusive equilibria exist in which B can entice smugglers to take the official route by setting f low enough to make it more profitable for smugglers than on the unofficial route, as in Inequality (5). B's commitment to collude with smugglers is made credible by the future stream of profits that B would forgo from defecting.

We employ subgame perfect equilibrium as the solution concept to determine the conditions that would support collusion over time. Let a_B be a strategy from the set of all of B's possible strategies, A_B; a_{S_i}, a strategy from the set of S_i's possible strategies, A_{S_i}, for a given smuggler S_i; and $a = (a_B, a_{S_1}, \ldots, a_{S_n})$, the strategy profile that results when these strategies are played by the agent and each of the smugglers. Since each smuggler is privy to only her own interactions with the agent, S_i's interactions with B can be treated independently from the other smugglers. That is, the game is a series of independent dyadic interactions between B and each of the smugglers, S_i.

Thus we can focus on the nature of interactions between B and a representative S_i. The discounted expected payoffs for B and S_i are $V_B(f, a, q, s) \equiv \sum_{t=0}^{\infty} \pi_{B,t}\delta^t$ and $V_{S_i}(f, a) \equiv \sum_{t=0}^{\infty} \pi_{S_i,t}\delta^t$, respectively, given the fee f, strategy profile a, and discount factor δ, which applies to all actors. Here, B's payoff in period t is $\pi_{B,t} \in \{0, w(f - qs), w\}$. S_i's payoff in period t is $\pi_{S_i,t} \in \{0, w(1 - f), w(1 - p - \tau_{it})\}$. The specific payoffs in each period are determined by the strategy profile a and the fee f. We define the *average payoffs* of the infinite sequence of payoffs for B and S_i as $\overline{V}_B(f, a, q, s) \equiv (1 - \delta)V_B(f, a, q, s)$ and $\overline{V}_{S_i}(f, a) \equiv (1 - \delta)V_{S_i}(f, a)$, respectively. For a given strategy profile a, $\overline{V}_B$ will be increasing in f (that is, $\partial\overline{V}_B/\partial f > 0$) and decreasing in q or s (that is, $\partial\overline{V}_B/\partial q < 0$ and $\partial\overline{V}_B/\partial s < 0$), since the average payoff will be a linear combination of the possible cooperative payoffs, $w(f - qs)$. Moreover, $\overline{V}_{S_i}$ will be decreasing in f ($\partial\overline{V}_{S_i}/\partial f < 0$), since the average payoff is a linear combination of the possible cooperative payoff, $w(1 - f)$, for S_i.

Following the Folk Theorem, as long as the discounted stream of payoffs from cooperation for a given f and a exceeds the stage-game Nash equilibrium payoffs for B and S_i, such a cooperative arrangement can form a subgame perfect equilibrium. For B, this incentive compatibility constraint results from comparing the stream of cooperative payoffs with the one-time seizure of contraband, which can be written as

$$\frac{\overline{V}_B(f, a, q, s)}{1 - \delta} \geq w \tag{6}$$

S_i's stream of expected payoffs from exclusively using the unofficial route is $\frac{(1-p)(w-\tau w)-p\tau w}{1-\delta}$, which simplifies to $\frac{w(1-p-\tau)}{1-\delta}$.[35] Her payoffs from cooperative arrangements with B that use the official route would be $\frac{\overline{V}_{S_i}(f, a)}{1-\delta}$. Comparing the stream of payoffs from cooperation on the official route with those of the unofficial route yields S_i's incentive compatibility constraint:

$$\overline{V}_{S_i}(f, a) \geq w(1 - p - \tau) \tag{7}$$

We can now state the following lemma.

Lemma 2. Existence of collusive equilibrium: In a repeated game between border agent B and smuggler S_i, a collusive strategy profile a and fee $f \in [0, 1)$ can form a subgame perfect equilibrium under the following conditions:

$$\delta \geq 1 - \frac{\overline{V}_B(f, a, q, s)}{w} \tag{8}$$

35. Here, these payoffs include τ, since we are interested in the expected payoffs across smuggler types.

$$p + \tau \geq 1 - \frac{\overline{V}_{S_i}(f, a)}{w} \tag{9}$$

The first condition implies that B must value future interactions with S_i highly enough to collude instead of seizing the contraband. A higher fee (f), lower probability (q) of being caught for collusion, lower penalty (s) for being caught for collusion, higher discount factor (δ), or a strategy profile (a) that produces a higher average expected payoff ($\overline{V}_B(f, a, q, s)$) will be more likely to induce B to accept bribes for safe passage. Although B's discount factor may be a reflection of her individual weighting of future periods, it can also be affected by how much she expects to interact with S_i in the future. Thus, if B can expect to interact frequently with S_i, her discount factor will be higher. Importantly, if the state wants to drive down B's discount factor, it could choose to disrupt B's interactions with S_i by frequently rotating B out of staffing the official crossing.

The second condition implies that S_i's probability of interdiction (p) and expected transportation costs (τ) on the unofficial route must be high enough relative to costs from cooperation to incentivize S_i to cooperate with B. For a given strategy profile a, an increase in f will reduce S_i's average payoff for cooperating, making it less likely that S_i's incentive compatibility condition holds.

That is, collusive equilibria exist if the fee is high enough to compensate B for the risk of being caught and incurring penalties, as well as to make it credible to S_i that B would not confiscate the contraband and forgo future bribes. At the same time, the fee must be low enough to make cooperation on the official route more attractive to the smuggler than exclusively using the unofficial route. The range of fees that support collusion along the official route narrows when (1) expected costs on the unofficial route decrease (for example, from lower transportation costs or lower interdiction rates), (2) border agents have shorter time horizons, (3) collusion between agents and smugglers is discovered at a higher probability, or (4) penalties for collusion increase. Notice that a state that has invested in the capacity to detect corruption among its agents and has strong preferences against corruption can decrease the range of fees that would allow collusive arrangements to occur. While a relatively permissive environment for corruption that results from weak state capacity or a lack of will, as exhibited by low penalties for corrupt agents, is a necessary condition for collusion to emerge, those conditions do not guarantee that corruption will occur if agents do not sufficiently value future interactions with smugglers.

The Fee for Crossing by the Official Route

The effect of border enforcement on smuggling flows is mediated by the fee that B will charge smugglers in exchange for safe passage at the official border crossing. Thus, we now turn to determining the fee that maximizes B's payoffs, given the population of smugglers.

To make the exposition more tractable, we limit our focus to a trigger strategy for S_i. As long as B does not seize the contraband on the official route, S_i will take the official route whenever the expected costs on the unofficial route exceed the fee on the official route: $\tau_{it} + p \geq f$ (Inequality (5)). S_i will take the unofficial route in periods when the fee on the official route exceeds her expected costs on the unofficial route. If B defects by seizing the contraband, S_i will use the unofficial route indefinitely.[36] In a context with abundant reasons for smugglers to distrust agents, such a harsh punishment for defection may be reasonable.

Turning to the border agent, recall that while S_i knows her own individual transportation costs, τ_{it}, B knows only the mean transportation costs, τ, for the population of smugglers, but not for any particular smuggler, since they reset in each period. That is, any information B has gained from whether S_i accepted the fee in the previous period does not confer any insights on S_i's current transportation costs. Due to this information asymmetry, B can usefully set a fee for only the population of smugglers, rather than price discriminating to extract greater rents according to the transportation costs of individual smugglers. We will show that there exist cooperative equilibria in which B charges a fixed fee $f \in (0, 1)$ in exchange for safe passage for smugglers playing a trigger strategy.

We begin by determining the probability that it would be more profitable for smugglers to pay a fee for passage on the official route rather than to take the unofficial route. From Inequality (5), the threshold for the minimum transportation costs on the unofficial route that would compel S_i to take the official route is

$$\tau_{\min} \equiv f - p \tag{10}$$

Given $\tau_{\min}$ and the distribution of τ_{it} (Equation (1)), we can express the expected proportion (Ψ) of smugglers who would prefer the official route as a function of f:

$$\Psi(f) = \begin{cases} 1 & \text{if } f < p + \tau - h \\ \frac{p+\tau+h-f}{2h} & \text{if } p + \tau - h \leq f \leq p + \tau + h \\ 0 & \text{if } f > p + \tau + h \end{cases} \tag{11}$$

We plot the proportion of smugglers on the official route, $\Psi(f)$, in panels A and B of Figure 2 for two values of h and given p and τ.[37] For a higher value of h in panel A, the rate at which the proportion of smugglers on the official route declines for higher fees f is slower than for lower values of h in panel B.

We now turn to determining the agent's incentive compatibility constraint. Given that S_i plays a trigger strategy, B's discounted stream of payoffs for cooperation with

36. In Appendix A.4, we examine the maximization problem over the whole strategy space.

37. We use $\tau = 0.25$, $p = 0.25$, $qs = 0.1$ for all panels; $h = 0.25$ for panels A and C; and $h = 0.1$ for panels B and D.

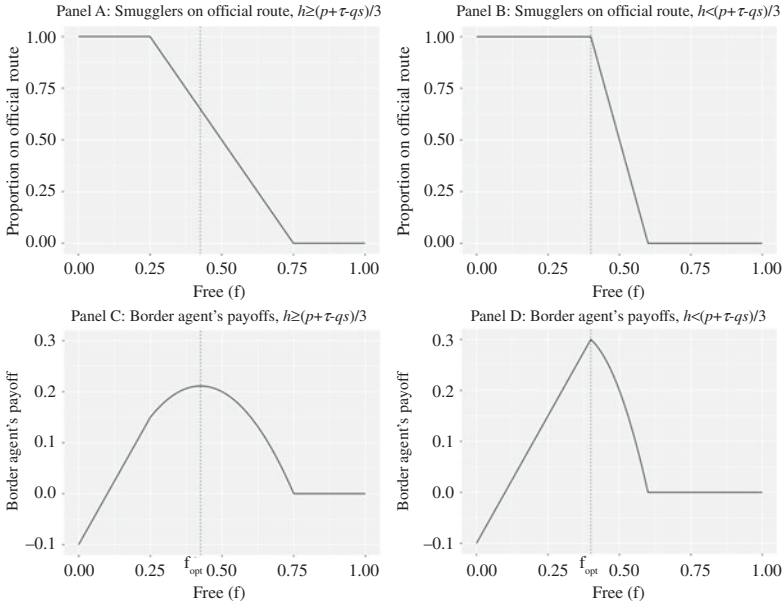

FIGURE 2. *Proportion of smugglers on official route and agent payoffs*

S_i must be at least as much as the one-time payoff from defection:

$$\sum_{t=0}^{\infty} \Psi(f)(f - qs)w\delta^t \geq w \tag{12}$$

In the online supplement, we use Equations (11) and (12) to show that B's incentive compatibility constraint is satisfied for the following values of f:

$$f \in \left[\frac{p + \tau + h + qs}{2} - R,\ \frac{p + \tau + h + qs}{2} + R\right] \tag{13}$$

where

$$R \equiv \frac{\sqrt{(p + \tau + h + qs)^2 - 4(qs(p + \tau + h) + 2h(1 - \delta))}}{2} \tag{14}$$

Notice that, because B's expected payoffs are concave, it is possible for cooperation to be incentive compatible for B only for real values of R. This implies that it is possible for B to credibly commit to cooperating (that is, not confiscating) when

$$\delta \geq \delta_{\min} \tag{15}$$

where $\delta_{\min} \equiv (-(p+\tau+h+qs)^2 + 4qs\,(p+\tau+h) + 8h)/8h$. That is, border agents who sufficiently value future interactions with smugglers are able to credibly commit to not confiscating their contraband. It is also possible to rearrange this incentive compatibility constraint in terms of B's expected penalties:

$$qs \leq \mathrm{EP}_{\max} \tag{16}$$

where $\mathrm{EP}_{\max} \equiv p+\tau+h-\sqrt{8h(1-\delta)}$ is the maximum expected penalty that supports collusion. In other words, a sufficiently low expected penalty for corruption, qs, is necessary for B to engage in corruption.

From Equation (7), we can determine S_i's incentive compatibility constraint, in which the expected payoffs for cooperation under the trigger strategy are at least as high as the expected payoffs for the unofficial route:

$$\Psi(f)(1-f) + (1-\Psi(f))(1-p-\tau_u) \geq 1-p-\tau \tag{17}$$

where τ_u is the average transportation cost when smugglers prefer to use the unofficial route (that is, $p+\tau_{it} \geq f$). In the online supplement, we show that S_i's incentive compatibility constraint reduces to

$$f \leq p+\tau+h \tag{18}$$

The upper bound of τ_{it} is $p+\tau+h$, so as long as the fee for passing via the official route is less than the highest expected cost on the unofficial route, the cooperative equilibrium is preferable to defecting (that is, taking the unofficial route indefinitely), since it gives S_i a cheaper option when costs are too high on the unofficial route.

We can express the existence of a collusive equilibrium as

Lemma 3. Existence of collusive equilibrium (trigger): A repeated game in which border agent B charges a fee $f \in (0, 1)$ for passage on the official route and smuggler S_i plays a trigger strategy can form a subgame perfect equilibrium for $\delta \geq \delta_{min}$, or equivalently $qs \leq EP_{max}$, and $f \leq p+\tau+h$.

We now turn to B's problem of determining the optimal fee, f_{opt}, that maximizes B's payoffs in a cooperative equilibrium. This optimization problem will be the same in each period, since smugglers' transportation costs will be drawn anew in each period from the uniform distribution, and smugglers who are in a collusive equilibrium with the agent will face the same incentives in each period. We can express B's optimization problem in each period as

$$\begin{aligned} &\max_f \quad \Psi(f)(f-qs)w \\ &\text{subject to} \quad f \in \left[\tfrac{p+\tau+h+qs}{2} - R,\ \tfrac{p+\tau+h+qs}{2} + R\right] \end{aligned} \tag{19}$$

From Lemma 3, for a high enough discount factor $\delta \geq \delta_{\min}$, the constraint constitutes a nonempty set, and therefore cooperation is possible. Since $\Psi(f)$ is declining in

f and $(f - qs)w$ is increasing in f, the optimization problem of setting f entails balancing the volume of smugglers using the official route, $\Psi(f)$, against the fees collected per smuggler. In the online supplement, we show that B's optimal fee is

$$f_{\text{opt}} = \begin{cases} p + \tau - h & \text{if } h < \frac{p+\tau-qs}{3} \\ \frac{p+\tau+h+qs}{2} & \text{if } h \geq \frac{p+\tau-qs}{3} \end{cases} \tag{20}$$

For sufficiently wide distributions of τ_{it}, where $h \geq \frac{p+\tau-qs}{3}$, B's payoffs are maximized by setting f_{opt} at a point that induces less than 100 percent of smugglers to take the official route, that is, on the declining slope in panel A of Figure 2. This is because a marginal increase in fees collected per smuggler to the left of f_{opt} will raise B's payoffs more than the associated loss in smugglers opting for the official route (panel C). To the right of f_{opt}, marginal increases in fees collected per smuggler are outweighed by the loss in volume of smugglers.

For narrow distributions of τ_{it}, where $h < \frac{p+\tau-qs}{3}$, the optimization problem results in all smugglers opting for the official route (panel B). That is, any marginal loss in the volume of smugglers outweighs the associated marginal gains from higher fees collected from each smuggler. Under those conditions, B's optimal fee is the highest fee that ensures 100 percent use of the official route. Thus, from Equation (11), B would set the fee at $f = p + \tau - h$. We illustrate B's payoffs under this scenario in panel D.

In both cases, increases in the mean cost of transportation and probability of interdiction raise B's optimal fee, since $\partial f_{\text{opt}}/\partial p > 0$ and $\partial f_{\text{opt}}/\partial \tau > 0$.[38] Intuitively, this is because increased probability of interdiction or increased transportation costs from border enforcement activities on the unofficial route provide B greater leverage to charge higher fees on the official route.

If the expected costs on the unofficial route are so high that the optimal fee would be greater than the arbitrage value of the goods ($f_{\text{opt}} > 1$), B would simply set the proportional fee f just below 1 to ensure that it is worthwhile for smugglers to continue to cross the border via the official route and so keep collecting fees. B does not have an incentive to charge the full value of the contraband, w, as that would stop the flow of smugglers across the official route altogether. With agents able to charge higher fees, stricter border enforcement will make it more tempting for them to enter into collusive relationships with smugglers.

Lemma 4. Effect of border enforcement on bribes: If smugglers and the agent are colluding, which is possible only if $\delta \geq \delta_{\min}$, *or equivalently* $qs \leq EP_{\max}$, *an increase*

38. These partial derivatives do not include $f = p + \tau - h$ and $f = p + \tau + h$, where there is a non-differentiable kink in the function $\Psi(f)$.

in interdiction probability p or mean transportation costs τ along the unofficial route will increase the optimal fee, f_{opt}, charged for safe passage on official routes, where

$$f_{\text{opt}} = \begin{cases} p + \tau - h & \text{if } h < \frac{p+\tau-qs}{3} \\ \frac{p+\tau+h+qs}{2} & \text{if } h \geq \frac{p+\tau-qs}{3} \end{cases} \tag{21}$$

Note that any fee that deviates from f_{opt} is less preferable for B, so B will fix the fee at f_{opt}.

Smuggling Flows

What then is the effect of increased border enforcement on the flow of smuggling across a border? Here, we show that border enforcement has a sorting effect in which high-skilled smugglers will be undeterred, but low-skilled smugglers will be unable to cross unless the conditions supporting collusive relations with border agents hold.

Recall from Lemma 3 that collusive relations are possible when there are repeated interactions, high discount factors, and sufficiently low expected penalties. As long as these conditions prevail, the official route will remain an option for all smugglers to pass through profitably, since the net payoff for the official crossing is always positive, $w(1 - f_{\text{opt}}) > 0$. Thus, *if these conditions supporting collusion are met, fortifying borders to cut off unofficial crossings will not reduce the total volume of smuggling*, since smugglers who cannot profitably traverse unofficial routes will simply cross by bribing their way through official routes. The underlying mechanism for this follows from the asymmetry of information between smugglers and agents. Since only smugglers know their own costs in a given period, border agents are unable to price discriminate to maximize the rents they capture from smugglers. Instead, agents can charge only a uniform fee for all smugglers who choose the official route, which must leave some net profit for smugglers, to entice them to use the official route.

When the conditions that support collusion prevail—that is, agents face low expected penalties for corruption ($qs \leq EP_{\max}$) or sufficiently value future interactions with smugglers ($\delta \geq \delta_{\min}$)—reinforcing borders affects only the *routes* that different types of smugglers choose, rather than the overall *volume* of smugglers. Following Inequality (5), *high-skilled smugglers* (those who have low expected costs along unofficial routes, such that $p + \tau_{it} < f_{\text{opt}}$) will choose the unofficial route. In contrast, *low-skilled smugglers* with high expected costs ($p + \tau_{it} > f_{\text{opt}}$) will opt for collusion along the official route because they are unable to profitably use the unofficial route but can still receive the payoff of $w(1 - f_{\text{opt}})$ along the official route. Thus, a fortified border acts as a *sorting mechanism*, diverting low-skilled smugglers to official crossings where they seek out collusive relations, while only high-skilled smugglers opt for unofficial crossings.

Since the effect of border enforcement on the routes smugglers choose is mediated by the fee, we can now obtain the flows in equilibrium over the official route:

$$\Psi(f_{\text{opt}}) = \begin{cases} 1 & \text{if } h < \frac{p+\tau-qs}{3} \\ \frac{p+\tau+h-qs}{4h} & \text{if } h \geq \frac{p+\tau-qs}{3} \end{cases} \tag{22}$$

From this, we can see that an increase in the probability of interdiction p, increase in transportation costs τ on the unofficial route, or decrease in B's expected penalties qs will increase the proportion of smugglers on the official route, since $\partial\Psi/\partial p > 0$, $\partial\Psi/\partial\tau > 0$, $\partial\Psi/\partial q < 0$, and $\partial\Psi/\partial s < 0$ for $h \geq \frac{p+\tau-qs}{3}$. If $h < \frac{p+\tau-qs}{3}$, all smugglers will opt for the official route, so marginal changes in p, τ, q, or s will not affect the equilibrium proportion of smugglers on the official route until $h \geq \frac{p+\tau-qs}{3}$. Combined with Lemma 3, this yields

Proposition 2. Effect of border enforcement on smuggling flows via official routes: If (a) border agents and smugglers interact repeatedly; (b) border agents sufficiently value these future interactions ($\delta \geq \delta_{\min}$), or equivalently the expected penalties for corruption are sufficiently low ($qs \leq EP_{\max}$); and (c) for sufficiently wide distributions ($h \geq \frac{p+\tau-qs}{3}$), the equilibrium proportion of smugglers via the official route will be increasing in p and τ and decreasing in q and s, but the volume of smuggling will be unresponsive to changes in p, τ, q, and s. If conditions (a) and (b) do not jointly hold, smuggling will be limited to unofficial routes.

Since it is more theoretically interesting to examine cases in which smugglers may use official or unofficial routes, rather than only official routes, we will focus on cases in which the distribution of transportation costs is sufficiently wide—condition (c). Based on Propositions 1 and 2, we summarize the conditional effects of border enforcement on smuggling flows in four stylized pie charts (Figure 3), which depict the relative proportions of the smuggler population that will be deterred by enforcement (checkered fill) or will traverse the border through either official crossings (dark gray) or unofficial crossings (light gray). The vertical axis depicts variation in the strictness of enforcement of unofficial border crossings. The horizontal axis depicts variation in the degree to which agents are penalized for corruption and have high discount factors or lack either of these factors required to credibly commit to colluding with smugglers. The figures illustrate how enforcing borders generates a sorting mechanism among high-, medium-, and low-skilled smugglers.

When borders are strictly enforced, as in quadrants III and IV, only high-skilled smugglers (dark gray) will be able to use unofficial crossings, while low- and medium-skilled smugglers (light gray in quadrant III; checkered in quadrant IV) will not. If border agents have low expected penalties and high discount factors, then low- and medium-skilled smugglers will be able to bribe their way through official crossings (quadrant III). If agents' expected penalties for corruption are high or

discount factors are low, then low- and medium-skilled smugglers will be deterred by border enforcement (quadrant IV), reducing the volume of smugglers who can cross the border. Note that the proportion of smugglers deterred in quadrant IV may differ from the proportion who would use the official route in quadrant III if collusion is possible, since the former is determined only by the profitability of the unofficial route, while the latter is determined by both the profitability on the unofficial route and the incentives the agent faces.

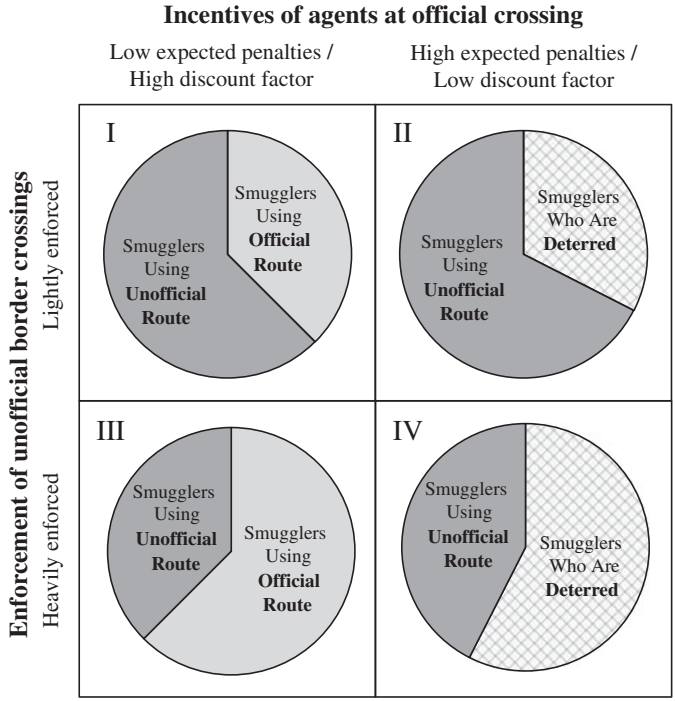

FIGURE 3. *Summary of effects of border enforcement on smuggling flows*

When borders are lightly enforced, as in quadrants I and II, the costs of traversing the unofficial route are lower, enabling both medium- and high-skilled smugglers to use them. Low-skilled smugglers, however, will still be unable to do so. If agents have low expected penalties and a high discount factor (quadrant I), low-skilled smugglers will be able to bribe their way through official crossings. Otherwise, low-skilled smugglers will be deterred (quadrant II). As in the comparison between quadrants III and IV, the proportion deterred in quadrant II and the proportion using the official route in quadrant I may differ across the two scenarios.

Strict border enforcement, combined with high expected penalties or low discount factors, will let the fewest smugglers cross the border (quadrant IV), followed by light

enforcement with high expected penalties or low discount factors (quadrant II). If agents have low expected penalties and high discount factors (quadrants I and III), all smugglers will be able to cross the border, regardless of the level of enforcement. From the perspective of the smugglers, the lightly enforced borders with low expected penalties and high discount factors (quadrant I) provide the greatest share of rents, since only low-skilled smugglers will have to bribe their way across the border and agents will be able to charge only a relatively low fee. For corrupt border agents, however, the most lucrative scenario is when there are low expected penalties and high discount factors, combined with a heavily enforced border (quadrant III), which increases both the fee and the volume of smugglers who pay it. In this way, stricter border enforcement can create greater incentives for border agents to engage in corruption.

To facilitate empirical tests of our theory, we express the movement between each of these quadrants as four propositions. Each presumes sufficient variation in transportation costs ($h \geq \frac{p+\tau-qs}{3}$) that not all smugglers will use the official route in equilibrium.

Conditional Effects of Border Enforcement

Proposition 3: *Given sufficient variation in transportation costs ($h \geq \frac{p+\tau-qs}{3}$), if agents have low expected penalties for corruption, high discount factors, and repeated interactions with smugglers, increased (decreased) border enforcement will increase (decrease) the number of smugglers using the official route, but will not affect total smuggling volumes, ceteris paribus (quadrant I $\longleftrightarrow$ III).*

Proposition 4: *Given sufficient variation in transportation costs ($h \geq \frac{p+\tau-qs}{3}$), if agents have high expected penalties for corruption, low discount factors, or do not interact repeatedly with smugglers, increased (decreased) enforcement will decrease (increase) smuggling volumes (quadrant II $\longleftrightarrow$ IV).*

A key implication of these two propositions is that stricter border enforcement is likely to merely divert and not reduce smuggling flows, unless agent–smuggler interactions are also disrupted. A good example is the impact of a border wall between Israel and the West Bank, which was constructed incrementally in 2002 and closed off smuggling routes for stolen cars from Israel that were transported illegally to chop shops in the West Bank to be dismantled into parts and sold back to Israeli car shops. The Israeli government built the wall primarily to deter terrorist attacks and other security concerns.[39] Neither anti-corruption border policies nor changes in border policing practices were introduced. Getmansky, Grossman, and Wright demonstrate that the overall volume of vehicle smuggling did not decrease but only became unevenly distributed along the border, as car theft rates fell in localities

39. Oberholzer 2015.

where the wall was present but rose in localities where it had not yet gone up.[40] As the border wall sealed off unofficial border crossings, such as unmonitored and unpaved roads, smugglers transported vehicles through the heavily guarded checkpoints on main roads, effectively displacing smuggling and related crimes.

Conditional Effects of Addressing Border Corruption

Proposition 5: *Given sufficient variation in transportation costs* ($h \geq \frac{p+\tau-qs}{3}$), *if unofficial border routes are lightly enforced, increasing the expected costs of corruption from* $qs \leq EP_{\max}$ *to* $qs > EP_{\max}$ *or lowering agent discount factors from* $\delta \geq \delta_{\min}$ *to* $\delta < \delta_{\min}$ *will reduce smuggling volumes. Conversely, lowering the expected costs of corruption or raising agent discount factors across those thresholds will increase smuggling volumes, ceteris paribus (quadrant I* $\longleftrightarrow$ *II).*

Proposition 6: *Given sufficient variation in transportation costs* ($h \geq \frac{p+\tau-qs}{3}$), *if unofficial border routes are heavily enforced, increasing the expected costs of corruption from* $qs \leq EP_{\max}$ *to* $qs > EP_{\max}$ *or lowering agent discount factors from* $\delta \geq \delta_{\min}$ *to* $\delta < \delta_{\min}$ *will reduce smuggling volumes. Conversely, lowering the expected costs of corruption or raising agent discount factors across those thresholds will increase smuggling volumes, ceteris paribus. These changes in volume will be greater than for a lightly enforced border (quadrant III* $\longleftrightarrow$ *IV).*

A key implication of these two propositions is that policies or events that disrupt interactions between smugglers and agents are key to reducing smuggling volumes, and the size of the effect on smuggling flows is a function of how intensive the enforcement on alternative routes is. The experience of Mexico in 2006 illustrates how this scenario may play out. The presidential election that brought Felipe Calderón and the National Action Party (PAN) to power was followed by a war on drugs that disrupted the collusive ties between drug smugglers and local officials affiliated with PAN's rival, the Institutional Revolutionary Party (PRI).[41] Melissa Dell shows that in municipalities where PAN took over, the number of illegal drug confiscations fell, suggesting lower smuggling volumes.[42] An important caveat is that such decreases were temporary. Smugglers diverted illegal drug flows away from sites where PRI–smuggling interactions were no longer possible toward alternative routes, including those where the PAN government allocated policing resources that opened new opportunities for collusion.

In the next section, we provide a detailed case study that establishes the empirical plausibility of our model and theoretical predictions. We focus on demonstrating actors' calculations and how a collusive equilibrium between a smuggler and

40. Getmanski, Grossman, and Wright 2019.
41. Snyder and Duran-Martinez 2009.
42. Dell 2015.

border agent emerges and operates in reality (Lemma 2), along with the conditional effects of border enforcement, which are especially important for understanding how borders serve as sorting mechanisms (Propositions 2 and 3).

Case Study

To demonstrate the empirical plausibility of our model we use a case study of opium smuggling across the Burma–Thailand border in 1935. It involved a man named Sao Hpom Lu, from the Shan State of Kengtung (in today's Burma). He illegally transported 9.3 tons of opium across the border by striking a deal with Thai border agents who turned a blind eye to the contraband in exchange for a share of the profits.

Accurate evidence about illegal activities is notoriously difficult to obtain, especially when it implicates state actors. We use an unusually rich set of archival records concerning a smuggling episode that multiple agencies documented, which give privileged insight into the actors' calculations and interactions. These sources include court records and witness testimony by the smuggler, his accomplices and family, and witnesses to the event, as well as official reports and confidential private correspondence, court records, and witness testimonies produced by different entities: the governments of Thailand and Burma, the media, the smuggler and his family, and the League of Nations.[43] In addition to providing fine-grained detail about the economics and organization of cross-border smuggling, this type of multi-source archival record is valuable because it enables us to triangulate different accounts of "what actually happened" that are difficult to ascertain from a single archive.

First, we show how the smuggler Sao Hpom Lu chose between official and unofficial border crossings based on probability of detection (p), transportation costs (τ_{it}), and likely payoffs from successfully transporting illegal goods across a border ($(1-f)w$ or $(1-p-\tau_{it})w$, respectively). In turn, the border agents decided whether or not to collude by weighing the relative payoffs from seizing the illegal goods (w) versus charging fees ($(f-qs)w$). Then, we demonstrate how collusion between these two parties occurred when both anticipated repeated interactions to share rents ($f \leq p+\tau_{it}$), the future stream of which was lucrative enough to make it credible that the border agent would not renege ($f \geq 1-\delta+qs$). In addition, we briefly consider our model's predictions regarding how border enforcement affects the volume of smuggling, by tracing shifts in quantities of opium flows and their routes over time.

Strategic Environment

The Burma–Thailand border in the 1930s approximates the strategic environment of our model. The two sides of the border had different regulatory systems for opium,

43. We rely largely on archival records collected in London in the India Office Records (IOR) at the British Library, while also consulting digitized sources accessible online from the US National Archives.

which incentivized smuggling. In the early twentieth century, Southeast Asia had legal opium markets. States claimed monopolies over the domestic supply of opium, and collected tax revenue from its popular consumption.[44] In general, opium was imported from the British colony of India. However, poppy fields capable of producing opium also flourished in the northern Shan States of Burma, a territory under British indirect rule that abutted the far northern edge of Thailand, an independent country.[45] The British permitted poppy cultivation and opium production for this specific area,[46] while Thailand banned all non-Indian opium imports and tightly controlled nonstate opium production.[47] Thus, opium was often abundant on the Shan side of the border, but scarce on the Thai side.

Public knowledge was widespread about the profitability of smuggling. According to Sao Hpom Lu, who was from Kengtung, the largest of the northern Shan States, everyone knew that selling opium in Thailand could be "fabulously profitable with something like 100 percent gain."[48] At the local bazaar of Kengtung's major town in 1935, Shan opium sold for around 2.5 ticals per unit. An enterprising smuggler could take this product, cross the border into Thailand, and sell it on the black market in the capital city of Bangkok. The Thai government's official retail price for imported Indian opium ranged from fifteen to twenty-three ticals per unit, which amounted to nearly one-third of the monthly wage of an average laborer. This extraordinarily expensive drug was in high demand: in Bangkok alone, the state counted 110,000 people who smoked opium; most were Chinese "coolie" laborers believed to "probably spend 50 percent of his total earnings on opium or dross [the residue from smoked opium] or both."[49] Unable to afford the government's legal product, many Thai opium consumers turned to illegal Shan opium, which had a black market price of six to eight ticals per unit. If successful, smugglers could see the value of their contraband nearly quadruple.[50]

However, crossing the border into Thailand was not a simple task, with transportation challenges due to geography and the presence of state authorities. The topography of the Shan States east of the Salween River was complex, featuring elevated plateaus, high mountain peaks, dense jungles, and gorges.[51] At the time of Sao Hpom Lu's journey, there was only one major paved road connecting Kengtung to Thailand.

44. Kim 2020; McCoy 1972.
45. Maule 2002, 205–10.
46. The British allowed limited amounts of poppy cultivation and opium production in the trans-Salween states of East Manglon and Kengtung, and North Hsenwi's Kokang District. See Ronald Harris, "Note on Opium Position in the Shan States" (3 March 1937), IOR/M Series (Burma Office Records) /3/22.
47. League of Nations 1931, 281–82.
48. "From Sao Sai Moeng to Sister" (21 November 1936), IOR/M/3/22.
49. International Labour Office 1935, 33.
50. "Royal Siamese Commission Investigation Report (12 May 1936), chaired by Prince Varnvaidyakara Varavarn" (hereafter Varavarn Report 1936), 4, IOR/M/3/22; League of Nations 1931, vol. 2, 252; "Annual Report of Siam for 1935 by British Legation in Bangkok" (hereafter Annual Report of Siam 1935), 16–17; International Labour Office 1935, 33.
51. Sai 2009, 31.

Crossing the border also required crossing the Mae Sai River, which served as a natural boundary. The major bridge over the river, on the only paved road between Kengtung and Thailand, was well guarded by agents of the Thai Excise and Customs Department.

Still, smuggling opium across the Mae Sai was hardly impossible, given the regulatory and political environment in which border officials operated. Those stationed at the bridge were low-level administrators of the Thai Excise and Customs Department, who had considerable discretionary power in enforcing the law against opium smugglers. While Thai law explicitly banned bringing Shan opium into Thailand, local administrators had many reasons to choose not to enforce this law. Their salaries were meager, barely more than what the average wage laborer in Bangkok would make; and the opium smuggling they were tasked with halting was famously lucrative.[52] Also, as the three border officials who colluded with Sao Hpom Lu would later reveal, they had little reason to fear penalties from their direct superior. Luang Narubesr Manit, the director-general of the Excise and Customs Department in 1935, had once been a lowly opium administrator himself. He was familiar with the political economy of smuggling that linked Thailand to Kengtung, and well connected to "certain highly placed officials and their wives who … had for years cast covetous eyes on the cheap Shan opium."[53] Put differently, rent seeking at the northern Burma–Thailand border was tacitly sanctioned by central authorities, and thus wayward local officials could reasonably anticipate monetary rewards with little risk of punishment.

In sum, the border between the Shan State of Kengtung in Burma and northern Thailand generated opportunities for smuggling due to the higher price of illegal opium in Thailand (w). Transporting opium across the border was a challenging operation, given the complex geographical terrain, including jungles, unpaved roads, and rivers, which entailed high transportation costs (τ). These difficulties were aggravated by the presence of Thai customs and excise officers stationed along official routes and the main bridge that facilitated border crossings. However, the surveillance capacity of the Thai state was unevenly distributed—there were also many unofficial routes across the border that eluded the gaze of the border officials, who could not be stationed everywhere, so there was less chance of being interdicted along the unofficial route (p). Moreover, although combating opium smuggling was an official policy of the Thai government, local officials stationed in this border area had weak expectations for effective law enforcement and faced low penalties for petty corruption (qs).

52. G.S. Hardy, "Report by the Representative of India on the League of Nations Opium Advisory Committee on the Illicit Transaction of January 1935 between Kengtung and Siam" (10 June 1936), IOR/M/3/22 (hereafter Hardy Report 1936), 2.

53. Ibid.

The Smuggler's Choices

The main smuggler, Sao Hpom Lu, was a thirty-one-year-old Shan man, described by his family members as "clever … with greed and avarice."[54] He had often traveled from Kengtung Town to Bangkok, where he enjoyed gambling and was once implicated in coin counterfeiting.[55] In late 1934, he decided to try his luck with opium.

There were two possible routes for the smuggler (Figure 4). The quicker route used the official border crossing at the Mae Sai bridge, with a fee to the border officials. It would take less than three days to travel over 1,000 kilometers. The paved road from Kengtung to Taichilek, the last town on the Burma side of the border, was around 150 kilometers long, and linked to another 300-kilometer road to the Thai town of Lampang, which had the nearest railroad station that connected directly to Bangkok, 600 kilometers away. Sao Hpom Lu calculated the transportation costs: in addition to paying for trucks, fuel, and labor, "we had to pay twenty [baht] a day demurrage" at the Lampang train station, where he reserved two train wagons to store the opium before loading it onto the train, which could travel overnight to arrive in Bangkok early the next morning.[56]

The other route avoided the Mae Sai bridge and fees to the border officers. It was a longer and less predictable journey that would deviate from the Kengtung–Taichilek road onto unpaved paths through jungle-covered hills. On reaching the banks of the Mae Sai River, smugglers would need to have brought their own boats—or, as was more typical for those bringing contraband into Thailand at the time, travel further east to the larger, busier Mekong River, where it was easy to hire and hide on boats to avoid border agents. Once in Thailand proper, smugglers could not enjoy the convenience of the Lampang–Bangkok railroad, but would need to either use roads or one of the "countless waterways on which there [was] very intensive traffic."[57]

In sum, from Sao Hpom Lu's perspective, it was not necessary to use the Mae Sai bridge to smuggle opium into Thailand, but it was appealing for its lower transportation costs (τ_{it}). However, using this official route, one was almost certain to meet border agents, who would have to be bribed, which would reduce the smuggler's profits, $(1-f)w$. By contrast, the unofficial route carried higher transportation costs, which could change season by season, not least due to weather, shifting terrain, and other contingencies. But if the smuggler could evade the border agents (with probability p)—and for this it helped to avoid the Mae Sai bridge—such transport expenses and the expected losses from interdiction were the costs that cut into the profits by $(p+\tau_{it})w$.

54. "From Sao Sai Moeng to Sister," 21 November 1936.

55. Government of India, "Shan States and Karenni, List of Chiefs and Leading Families" (1943), 7, IOR/V (Official Publication Series) /27/70.

56. "From Sao Hpom Lu to Sawbawgyi of Kengtung" (7 January 1935); "Statement by Sao Hpom Lu" (20 March 1935), IOR/M/3/22.

57. League of Nations 1931, vol. 2, 273.

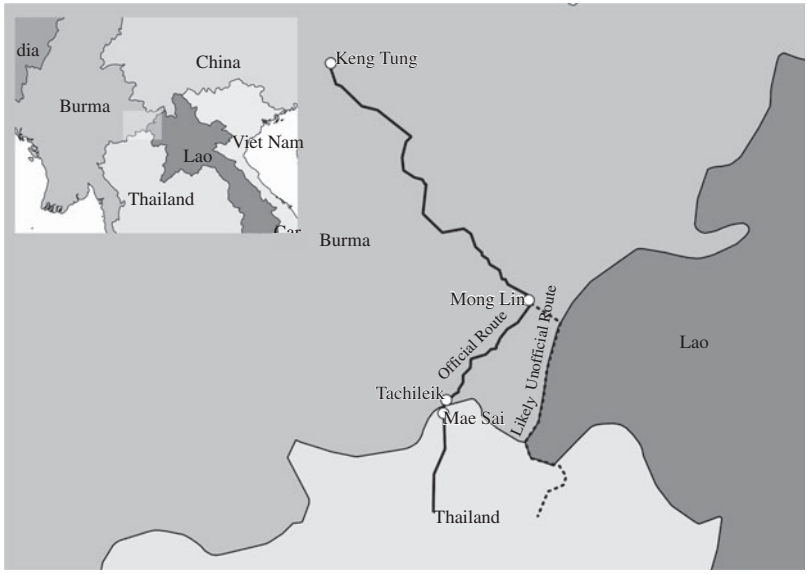

FIGURE 4. *Official and unofficial routes from Kengtung (Burma) into Thailand*

The Border Officials' Choices

There were three officers of the Thai Customs and Excise Department stationed at the Mae Sai bridge on 9 January 1935.[58] These men were poorly paid, with little fear of being penalized for taking petty bribes (low expected penalties, *qs*). They also had weak expectations that smuggling would cease even if they properly enforced the law. "It is estimated that 93 percent of the total smuggling into the Shan States escapes seizure," attested third-party observers at the time, knowing that "existing conditions make its suppression well-nigh impossible."[59] Faced with pervasive smuggling that he doubted would ever totally cease, a pragmatic border agent had reason to strike deals with smugglers, rather than engage in futile law enforcement against them.

The corruptible agents of the Thai state had at least two ways of profiting from opium smuggling. One was to seize the contraband and sell it themselves on the black market. The other option was to allow the smugglers to cross the border with their opium, for a fee. Both were viable options. Standing on the Mae Sai bridge, the border agents could inspect every individual, cart, or truck that came over this official border crossing, which capitalized on the narrowest and shallowest part of the river, "about thirty yards broad and two feet deep, with a very strong

58. "Statement by Sao Hpom Lu," 20 March 1935.
59. League of Nations 1931, vol. 2, 273.

current and pebbly bottom."[60] Confiscated opium from the Shan States could be sold surreptitiously in Bangkok, where varieties of non-Indian opium were sold in defiance of the Thai government's monopoly. Or the officials on the bridge could turn a blind eye to opium-laden vehicles and charge a fee for safe passage. In essence, it was a promise to collude and share the expected profits (w) from successfully smuggling opium across the border.

In sum, from the perspective of the Thai officials stationed at the border, colluding with smugglers like Sao Hpom Lu was an appealing choice, but not their only way of profiting from opium smuggling. By seizing the contraband, they stood to gain a large sum from the value of the contraband. By colluding with the smuggler, they would receive a fee and internalize the possible penalties from being caught by their superiors ($(f - qs)w$).

A Collusive Equilibrium

Under what conditions and through what interactions did the Shan smuggler and Thai border agents come to collude? "I now wish to tell the whole truth," Sao Hpom Lu began.[61] He had struck an agreement with the Thai officials, agreeing to yield around 25 percent of the contraband opium's expected total value on the Bangkok black market. The plan was for Sao Hpom Lu's men, on 9 January 1935, to drive nine trucks filled with 9.3 tons of raw opium across the Mae Sai bridge in plain sight, which the border officers would let pass unchecked. After the contraband's safe arrival and sale in Bangkok, the smuggler and the border agents would divide the profits.[62] The fee was lower than the expected costs on the unofficial route, creating an incentive for the smuggler to enter into the agreement. According to Lemma 2, the penalties for colluding were low enough, and the fee high enough, to make the stream of payments more attractive to the border officials than seizing the contraband.

Nine months earlier, the two parties had settled on the terms of this agreement during a secret meeting in a private car. In Sao Hpom Lu's own words, a Thai officer "asked me about the output of opium in Kengtung, and I told him how we used to formerly supply opium to Siam."[63] It is likely that from his perspective, the illegality of the opium trade defined by the Thai state did not reflect Shan visions of law and morality, and indeed, interfered arbitrarily in the economic lives of Kengtung's inhabitants. So, "when he asked me whether we could supply as before," Sao Hpom Lu replied affirmatively: "I told him that I thought we should be able to."[64]

60. Scott and Hardiman 1901, 257.
61. "Statement by Sao Hpom Lu," 20 March 1936.
62. See "Witness Testimony by Hpaya Kawn," 3 (2 April 1936); Annual Report of Siam 1935, 17–19; "From Director General of the [Siamese] Excise Department to State Councillor for Finance," 3 (11 July 1935), IOR/M/3/22. For alternative accounts that depict the border agents' involvement as a legal seizure, see Varavarn Report 1936, 4–9.
63. Sao Hpom Lu, 20 March 1936.
64. Ibid.

The Thai officials issued fake documents describing the 9.3 tons of opium as an authorized purchase by the director-general of the Excise and Customs Department aimed at "stopping contraband from coming into Siam" and sent them to Sao Hpom Lu.[65] The smuggler was aware of the fraudulent nature of the documents, which were "typewritten on plain office paper without any seals" and merely meant to serve as an extra form of insurance, just in case he ran into other Thai officers unaware of the agreement.[66] But "I did not mind what was written so long as we got the money soon," Sao Hpom Lu stated explicitly, indicating that the document itself was not why he had confidence that the border agents would uphold their end of the agreement.[67]

Rather, the agreement was credible because of the regularity of the opium harvest, which enabled both parties to anticipate interacting with each other on a yearly basis, or perhaps even more frequently. Every winter, Kengtung and its environs flushed white and red with poppy flowers, launching a predictable cycle of extracting a milky sap from ripe pods (called "tapping"), which was dried in the hot sun, wrapped in banana leaves, and then congealed as raw opium. In the trans-Salween Shan States, harvesting opium was not a one-time event but took place multiple times between December and March because adept poppy farmers could tap a single pod several times and collect opium until early spring. Local production nearly always exceeded what Shan inhabitants consumed, so surplus opium was a fact of the Shan State political economy known to all. The seasonality of opium production thus guaranteed repeated interactions over opium smuggling.[68]

"I believed him," Sao Hpom Lu said,[69] referring to the Thai border officer; and the planned timing of the actual transport of opium helps explain why. It was scheduled to occur at the harvest season's beginning (in January), rather than its end (in March). If the border agents at the Mae Sai bridge broke their promise and confiscated the smuggler's opium, he could still plan a second or even third trip using an unofficial border crossing, evading the border agents, who would miss opportunities to profit from opium smuggling that were certain to continue over the next few months. According to Sao Hpom Lu, he thus believed his partners when they said "it will be beneficial to both sides," and thought, "if there is no trouble … perhaps they would continue taking large quantities of opium from us."[70]

Compared with Sao Hpom Lu, the voices of the Thai border officers are quiet in the archival record. However, their mutual confidence in the smuggler and the rent-

65. Ibid. See comparison of "True Copy" Original Agreement, 30 August 1934, and "Second Agreement" Substituted Copy (30 August 1934). IOR/M/3/22.

66. Sao Hpom Lu, 20 March 1936.

67. Ibid.

68. For a detailed description of the seasonality of the Shan State poppy harvest, see "Northwest Thailand: Geographic Factors Affecting the Illicit Movement of Opium from Burma's Shan State" (1 March 1973), FOIA/CIA-RDP85T00875R000600010001, US National Archives, College Park, MD [retrieved from the CIA Records Search Tool, <https://www.cia.gov>, 5 May 2021].

69. Sao Hpom Lu, 20 March 1936.

70. "From Sao Hpom Lu to Sawbwagyi of Kengtung," 7 January 1935.

sharing agreement can be understood in light of the very large quantity of opium that was smuggled into Thailand and how, despite ample opportunities to renege on the agreement, they did not. "It is certain that the smugglers would not attempt to bring in a huge consignment in motor lorries unless they had some guarantee that the lorries would get through," wrote later investigators of the episode.[71] Sao Hpom Lu and his accomplices' testimonies corroborate this point repeatedly: only without the threat of confiscation at the Mae Sai bridge could they plan to transport 9.3 tons of opium at once.

Moreover, there were multiple moments at which the border officials could have simply seized the opium. For one, as one of Sao Hpom Lu's men explained, "There are about six to seven police stations between Taichilek and Lampang, but we were not stopped at a single one of these stations." It was clear that "all the Siamese [Thai] police were obviously warned that this opium should pass through freely."[72] Indeed, the Thai officers went to additional lengths to ensure that all 9.3 tons of opium were safely transported to Bangkok. "When the caravan got within some [8 km] of Lampang," according to another smuggling accomplice, "Nai Hpra Pin [one of the Thai border officials] stopped it and told Hpaya Singha [another smuggler] and me to go on … as our presence would raise suspicion if we accompanied the caravan to the railway station."[73] The circumspect border official proceeded to escort the trucks to Lampang himself, and helped store the opium, which was "loaded in rail prison vans" at the train station.[74]

Also, the Thai officers could have charged more than the 25 percent share first agreed on. There had been a minor mishap in the process of transporting the opium: a man named Chek Miao Sing saw the nine trucks driving across the Mae Sai bridge and reported the suspicious activity to local police authorities not privy to the deal.[75] Worried that the private collusion would become a public scandal, the border officials invented a paper trail that relabeled the cross-border transportation of opium a legal seizure. A few weeks later, in February 1935, Sao Hpom Lu received a letter from the Thai director-general asking him to discard the old document, which called their deal a purchasing agreement, and accept a new document that affirmed it as a reward to informants—the Shan smugglers—who had helped with a successful seizure.

But in fact, according to Sao Hpom Lu, "There was no seizure of the consignment whatever before it got to Bangkok. The whole story was invented when the opium got back to Bangkok."[76] The two parties waited a few months before disposing of the opium on the black market, during which time this small fortune sat in the warehouse of the Thai Excise and Customs Department. Given that the opium was no longer in

71. "From H.H. Craw to Undersecretary of State for India" (23 December 1936), IOR/M/3/22.
72. Witness testimony by Hpaya Singha, 1 April 1936.
73. Hpaya Kawn, April 1936.
74. Sao Hpom Lu, 21 March 1936.
75. "From Director General of the [Siamese] Excise Department to State Councillor for Finance," 2 (11 July 1935); Varavarn Report 1936, 12–13; Annual Report, Siam 1935, 18.
76. Sao Hpom Lu, 20 March 1936.

the smuggler's hands, the Thai officials could have easily reneged on the agreement or insisted on a larger share of the profits. But they did not. By November of the same year, Sao Hpom Lu and his accomplices had received their money, as did the Thai officials at the Mae Sai bridge, just in time for the new poppy harvest season.[77] Thus, despite opportunities to renege, a collusive equilibrium was achieved between smuggler and border agents, which was incentivized by sharing a stream of the larger arbitrage rents made possible by the lower transportation costs of the official crossing.

Increased Border Enforcement and Smuggling Volumes

Smuggling continued in and out of Shan State. For decades to come, contraband opium flowed across the Mae Sai bridge, and the Burma–Thailand border more generally, with a rhythm that offers suggestive evidence for the predictions of our model. Consistent with Propositions 2 and 3, improved border enforcement that did not disrupt collusive relationships between border officials and smugglers resulted in greater rather than smaller smuggling volumes.

After 1935, the smuggler's world for people like Sao Hpom Lu began to change as the presence of state agents increased in the Shan State of Kengtung. In the wake of the Mae Sai bridge episode, neighboring countries vowed to improve surveillance over illicit activities. In 1936, efforts were made to improve telegraphic communication and information sharing among Thai officers in Chieng Mai, British officers in Kengtung, and French authorities stationed across the Mekong River to the east, in northern Laos.[78] However, that trans-border smuggling increased rather than decreased when official presence was heightened was hardly surprising to those familiar with the collusive ties between smugglers and officials on the ground. As one British colonial officer had anticipated:

> The weakness of the scheme lies in the circumstance that the principal smugglers of opium in Northern Siam are believed to possess a great deal of influence both with the various local officials, and in high circles in Bangkok also. One cannot be sure therefore, that action is always taken upon the information supplied; it is not impossible, moreover, that the delinquents may receive upon occasion a timely hint that our own suspicions have been aroused, which will enable them to cover their operations.[79]

In other words, with improved technologies for border enforcement, opportunities for collusion also increased. Indeed, in 1936, one Thai district officer estimated that the volume of opium smuggled into his jurisdiction from Kengtung had increased and

77. "From H.H. Craw to Secretary to the Government of India, Finance Department" (25 April 1936), IOR/M/3/22.
78. "From Luang Pradist to Josiah Crosby" and accompanying memorandum (15 July 1936), IOR/M/3/22.
79. "From Josiah Crosby to British Legation in Bangkok" (17 September 1935), IOR/M/3/22.

only 15 percent was being seized.[80] Into the 1940s, collusion over smuggling and intensified state presence continued to go hand in hand, and with renewed vigor, as this Shan State saw an influx of officers stationed along its borders. During World War II, large numbers of new forces were stationed in this territory under both the Thai government and the Japanese imperial army. An upswing in opium smuggling and poppy cultivation occurred during these wartime years, under the Japanese army's administrative officials who controlled the borders with Thailand.[81]

A familiar pattern of tighter border enforcement and continued opium smuggling also characterized Kengtung after 1949, when it was occupied by three divisions of the Chinese Nationalist army ousted by the Communists. Over two thousand soldiers settled in exile in Kengtung and were stationed along the Thai border between 1950 and 1953, a period during which the infamy of the Golden Triangle region as a global drug trafficking hub emerged, with this Shan State at its core.[82] The Nationalist soldiers' colluding with smugglers and collecting fees for safe passage became a common and almost normal way of border control. Into the 1970s, US intelligence reports on Southeast Asia would continue to note the same routes that Sao Hpom Lu had once used to smuggle opium into Thailand: "Route 1," noted one CIA report in 1971, "passes through Mae Sai, Chiang Rai, and Lampang," that is, Thailand's major north–south highway, where "officials of the RTA [Royal Thai Army], BPP [Border Patrol Police], and Customs at the several checkpoints on the route to Bangkok are usually bribed."[83] In sum, there is an observable pattern of increasing state presence and increasing corruption and smuggling across the Burmese–Thai border that recurs over time.

Conclusion

This article joins a rapidly growing research tradition within international relations on border politics. Our main finding is that efforts to secure porous borders—building higher, better-policed walls and fences, stationing more officers, increasing surveillance—only serve to divert smuggling without reducing its overall volume, unless the interactions between smugglers and border agents are disrupted. We further identify a sorting mechanism through which such diversion occurs, by filtering smugglers based on their skills at transporting contraband and circumventing border agents.

Our argument has important implications for the heated policy debates over the efficacy of border enforcement. A key point of disagreement is whether more muscular approaches to enforcing borders can help solve problems or will backfire and worsen the situation. Our theory suggests that such approaches to fortifying

80. "Extract from Report by Consul Oldham," n.d., IOR/M/3/22.
81. Maule 2002; Trager 1971. 82.
82. McCoy 1972; Sai 2009, 307.
83. "Opium Production and Movement in Southeast Asia" (1 January 1971), CIA-BGI GR75-5, National Archives and Records Administration, College Park, MD.

borders are likely to fail unless accompanied by policies that disrupt regular smuggler–agent interactions by undermining their ability to credibly commit to profit sharing. Unless these interactions are disrupted, border fortification will likely fail to stem smuggling, particularly of high-value contraband, since the rents can tempt wayward agents.

Alternative policies that are more likely to succeed at reducing smuggling flows are those that reduce opportunities for such collusive ties to emerge, such as rotating border agents stationed at official border crossings and performing rigorous background checks that can filter out border agents with ties to smugglers. Such policies are likely to be most effective in combination with efforts at reducing the arbitrage value of contraband or, in the case of human smuggling, reducing wage differentials across borders by improving economic opportunities in source countries.

Our analytical framework for studying border enforcement opens avenues for advancing future research on border politics. First, our micro-level approach to local dynamics of bureaucratic corruption and the implementation side of border policies can be scaled up. The model can be extended to incorporate a third strategic player, such as the central government or higher-level bureaucrats. Moreover, understanding how local bureaucratic actors interact with illegal actors in response to central government policies can help delineate the constraints on implementing border policies and in turn inform analyses of meso- and macro-level dynamics for policy formation and reform.

Finally, by identifying a sorting mechanism through which border enforcement diverts smuggling, this article helps advance recent scholarship on the causal impact of border fortifications and other enforcement strategies on smuggling, as well as outcomes that include the behavior of criminal organizations, incidence of crime and violence, trade relations, and diffusion of violent militancy.[84]

Our analysis also provides an example of how to use archival records and historical case studies that allow micro-level tracing of interactions between state and illegal actors, as well as access to declassified sources that are richly informative on crime and policing dynamics. Such evidence can help generate fine-grained data for testing hypotheses and theorizing mechanisms through which scholars may empirically demonstrate the joint effects of border enforcement and disruption of border agent–smuggler interactions on smuggling flows.

Supplementary Material

Supplementary material for this article is available at <https://doi.org/10.1017/S002081832200011X>.

84. Dell 2015; Getmanski, Grossman, and Wright 2019; Osorio 2015.

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