Fire Alarms for Police Patrols: Experimental Evidence on Co-Production of Public Safety

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Abstract

Governments of developing countries frequently struggle to deliver goods and services to citizens. Research highlights the importance of co-production, wherein citizens provide information which authorities then use to allocate resources efficiently. We contend that in the Global South, search costs which impede citizens' abilities to share information constitute a critical and understudied impediment to co-production. We explore the role of search costs by experimentally evaluating a police hotline in a rural province of the Philippines. As in many areas of the Global South, the primary means by which citizens contact the police is by traveling to a station in-person, a costly endeavor. We randomize the roll-out of a voice and SMS hotline which dramatically reduces the costs of reporting, and compare it against both the status-quo (control) and an alternative intervention which builds trust but does not affect search costs. The hotline increased the likelihood of reporting crimes by 19 percentage points, even after accounting for the impact of trust-building. Improvements in public safety are limited and appear to depend on police priorities, consistent with the co-production model. Our findings suggest that addressing search costs is a necessary but not sufficient step to public service delivery in developing contexts, potentially explaining why policy best practices imported from developed countries often fail to achieve results in the Global South.

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*The intervention, experimental design, and main analyses below were pre-registered. Some secondary analyses were not preregistered and are noted as such in-text.

What affects the state's ability to deliver services in developing contexts? Effective governance relies on co-production (Ostrom 1996), or joint action by citizens and the authorities. Co-production is a two-stage process. In the first stage, citizens must be willing and able to provide information to the authorities. In the second stage, authorities must then be willing and able to use the information to deploy scarce resources. Whether repairing potholes, identifying corruption, or or fighting crime, citizen-provided information allows authorities to devote resources to fixing problems rather than finding them.

Because much of the research on the first stage of co-production is done in developed contexts, scholars focus on citizen willingness to cooperate with authorities, taking for granted that citizens in these settings are able to provide information with little or no search or transactions cost (Skogan and Hartnett 1997; Sunshine and Tyler 2003; Tyler 2003). But this assumption does not square with the realities developing contexts, where less-developed infrastructure impedes transportation and communication (Stasavage 2010; Laitin and Ramachandran 2016; Blair et al. 2019). We argue that search costs, or costs accrued to citizens from contacting the authorities, represent an additional key impediment to public goods provision in the Global South. Search costs which attenuate state-society interactions could prevent even well-intentioned governments from serving citizens efficiently, and cause institutions built for developed contexts to flounder in the Global South.

We study the role of search costs in public service delivery by experimentally evaluating a police initiative designed to reduce the cost to citizens of contacting the police. Our study takes place in a rural province of the Philippines, an area typical of many developing countries in that the most common way citizens report information to the police is by traveling in person to a station, oftentimes a prohibitively costly endeavor. We partnered with the provincial police to randomize the roll-out of a telephone hotline which citizens can use to call or text the police through a single, centralized number. The hotline is a simple version of the emergency phone lines ubiquitous in the developed world but frequently absent from the Global South. During the intervention, police officers blanketed 99 randomly-selected

villages with 55,000 stickers containing the hotline number. To isolate the effects of search costs from any impact the police's presence may have had on trust or perceived capacity, we implemented a parallel trust-building treatment in an additional 99 randomly selected villages. There, officers visited selected villages, engaged in informal interactions with citizens in which they encouraged them to contact the police if they ever needed help, and distributed 55,000 placebo stickers that did not include the hotline number. A final 100 villages in the control condition received policing as usual. Approximately six months later, we surveyed 10 randomly-selected civilians in each village and asked about crime victimization, crime reporting, and attitudes towards the police.

Results show that search costs are indeed an important impediment to the first stage of co-production. Areas that received the hotline advertisement experienced significantly higher rates of crime reporting compared, even after accounting for the impact of trust-building. However, we find little evidence that reducing search costs or building trust through community policing made any difference at the second-stage of co-production. Civilians in treated villages report significantly less crime by organized groups like extortion and intimidation. However, we find no effect on armed robbery, burglary, assault, or drug-pushing. We propose that the most likely explanation is that while the hotline addressed the first-stage problem of co-production, it did little to change authorities' incentives for action in the second stage. In our case, police acted disproportionately on information that they viewed as a priority, leading to a breakdown in the second stage of co-production.

This research makes three primary contributions. First, we highlight the obstacle that search costs pose for public goods provision in the Global South. Despite important work on the role of transaction costs in state formation (Stasavage 2010; Zhang and Lee 2020), research on search costs and the co-production of public goods is limited. The pervasiveness of search costs in the Global South compared to their near-absence in wealthy countries implies that institutions which function efficiently in developed contexts may be ill-suited for developing ones.

To that end, we also contribute to a burgeoning political science literature on community policing, which builds on a more established literature on the same topic from criminology and sociology (Kelling et al. 1981; Skogan 1986; Weisburd and Green 1995; Skogan and Hartnett 1997; Haim et al. 2021; Blair et al. 2020). Research on community policing is often ambiguous about the mechanisms through which community-based initiatives should improve public safety. We show that in a developing context, simply reducing the costs to citizens of reporting information increases information flows. The substantial difference in barriers to reporting information could explain why trust-building community policing measures, which are widely shown to improve citizen-police relations in developed countries, have little effect in the Global South (Blair et al. 2020).

Third, we contribute to knowledge on the use of technology in reducing search costs in government service delivery (Duflo et al. 2012; Shapiro and Weidmann 2015; Aker et al. 2017; Callen et al. 2020). The substantial increase in citizen willingness to contact the police was achieved using widely available technology which cost only a few hundred dollars. Yet, for a citizen living in a peripheral village far from the nearest municipal station, the ability to send an SMS message to the police could save the better part of a day needed to travel to the station, report information, and return home. This inexpensive application of technology is easily adopted for to a wide range of settings world-wide.

Co-Production of Public Goods

Co-production of public services depends on two stages (Ostrom 1996). In the first stage, citizens share information with the state which contributes to society's legibility, allowing the government to identify needs and allocate resources efficiently (Scott 1998; Lee and Zhang 2017). Canonical literature on institutional organization identifies two mechanisms of information-gathering, "police patrols" and "fire alarms" (McCubbins et al. 1987). In a police patrol model, the institution proactively monitors behavior and attempts to identify problems. A fire alarm allows affected parties to bring problems to the responsible author-

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ities' attention, for instance by filing a whistle-blower report or calling 911 to report a fire. The former approximates police officers patrolling streets at random in hopes of deterring crime or encountering a crime in progress, while the latter reflects the fire department's method of waiting at the station until a citizen reports a fire.

A wide range of institutions attempt to harness the efficiency of fire alarms, which allow governments to focus on solving problems rather than on finding them. For example, in many municipalities citizens can report potholes or broken streetlights by filling out a web form or calling city hall. Despite the label, the police rely heavily on fire alarms to identify and deter crime. Police departments rarely have sufficient resources to monitor their entire jurisdiction. Citizen reports of crimes or suspicious activities help police allocate scarce resources efficiently (Skogan 1986; Weitzer and Tuch 2006). Similarly, governments fighting insurgencies depend on citizen-provided information (Berman and Matanock 2015). and create formal mechanisms through which citizens can report rebel activities (Shapiro and Weidmann 2015).

Fire alarms' effectiveness depend on citizens' willingness to proactively share information. Citizens decide to share information based on the expected benefits of the government response, along with costs associated with reporting information. When citizens expect the information they share will contribute to the provision of services they desire like road maintenance, trash removal, and crime prevention, they will interact with the state.

Costs accrue to citizens from a wide range of sources. Corrupt officials may extort citizens seeking services, or abusive police officers may harm citizens they perceive as disrespectful. Mundane costs like travel or waiting time, administrative fees, language barriers, and a lack of procedural knowledge also impact engagement and are extremely widespread. An important literature links these obstacles, which we refer to as "search costs," with a range of governance outcomes, including the development of democratic assemblies (Stasavage 2010), procurement of marriage licenses (Zhang and Lee 2020), and socioeconomic development (Laitin and Ramachandran 2016). Search costs fundamentally shape state-society

interactions. Stasavage (2010) notes that work linking institutions with governance implicitly assumes that once created, institutions operate efficiently as intended. Yet, as he demonstrates with regard to representative assemblies in Europe, this assumption rarely holds true. As Zhang and Lee (2020, 1003) write, "Focusing only on institutions while ignoring interactions risks misunderstanding the nature of state development and state power, which in turn has implications for policy interventions to improve state capacity." Search costs interrupt state-society interactions and impede citizen participation in co-production.

Once citizens engage with the state, the impact of that engagement on goods provision depends on the second stage of co-production, government action. When well-intentioned, high capacity government agents act on citizen information, they can deliver services effectively. However, this second stage of co-production may break down if the government is unwilling or unable to act on citizen-provided information. Bureaucrats may fail to follow up on tips due to laziness or corruption, or may lack the capacity to follow up on tips effectively. Of course, citizens are unlikely to incur search costs of reporting unless they *expect* that bureaucrats will follow up on the information. Authorities might also respond only to a subset of citizen information. For example, resource constraints preclude the police from fully investigating every incident. Even in well-resourced departments, it is typical to dispatch a forensics team to collect evidence from the scene of a murder, but not from the scene of a petty theft. Authorities frequently prioritize which issues warrant their resources and attention. Divergence between the preferences of citizens and the authorities can therefore lead to a breakdown in the second stage of co-production.

Enhancing Co-Production in Public Safety

Citizen information sharing is particularly important for public safety. Police departments rarely have sufficient resources to patrol every street, business, and home at all times, meaning they cannot rely on a "police patrol" model of information gathering. The version of policing used in most of the world, in which the majority of police action originates with

citizen requests for service, represents a fire alarm model. Thus, a major challenge for policing, as with public goods provision in general, is to increase citizens' willingness to engage with authorities.

Much of the existing research on citizen-police cooperation focuses on citizens' expected benefits of engagement. "Community policing" aims to enhance public safety by improving citizen-police cooperation (Skogan 1986; Weisburd and Green 1995; Skogan and Hartnett 1997). Collaboration between citizens and police to identify and solve problems helps the police allocate resources more efficiently, reducing crime.[1]

The overwhelming majority of research on citizen-police cooperation focuses on citizens' expected benefits from engaging with the police. Citizens are expected to share information with the police when they hold greater trust in their intentions and abilities (Tyler 2003; Sunshine and Tyler 2003). Positive attitudes about police intentions and capacity may be achieved through a variety of mechanisms, including foot patrols (Kelling et al. 1981), de-fortification of police stations (Bayley 2008), enhanced personal ties between citizens and officers (Haim et al. 2021), and group-based representation (Nanes 2019).

Because these studies come overwhelmingly from developed contexts, they tend to assume that the search costs of reporting information are negligible. In the United States, nearly every citizen has access to a phone with reliable service, calling 911 is free, and an operator typically answers the call within a matter of seconds. Yet, the costs of reporting information are often much higher in the Global South. The emergency hotlines ubiquitous in developed countries are rare in developing countries. Police in the Global South commonly do not have a centralized or reliably-staffed emergency hotline, or citizens may be unaware of its availability. In many places, the modal method through which citizens report information to the police or request help from them is by traveling to the police station in person. The search costs associated with in-person reporting can be prohibitively expensive, particularly in rural areas where substandard transportation infrastructure makes travel difficult (Blair

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[1]Bureau of Justice Assistance (1984), *Understanding Community Policing: A Framework for Action.* https://www.ncjrs.gov/pdffiles/commp.pdf

et al. 2019). In-person reporting also may entail missed work or family duties, and comes with substantial uncertainty about how long the process may take.

Search costs associated with citizen-police engagement likely contribute to crime in the Global South. They might also explain why community policing appears to be ineffective at changing attitudes or reducing crime in the Global South, despite its widely-hailed success in wealthy countries (Deosaran 2002; Mohanty and Mohanty 2014; Blair et al. 2020). We view both a moderate level of citizen trust in the police and reasonable search costs as necessary but not sufficient for citizens to contact the police. If citizens have extraordinarily low trust in the police, whether due to perceptions of police capacity or intentions, reducing search costs is unlikely to meaningfully improve citizen reporting. At the same time, if search costs are prohibitively expensive for most citizens, no amount of trust-building will induce citizens to contact the police in many cases.

Community policing programs often incorporate mechanisms which reduce search costs, for example foot patrols which increase contact between citizens and officers. However, our understanding of the role of search costs is limited by two factors. First, many programs rely on direct, personal connections between officers and citizens to enhance contact. An over reliance on personal ties affects some citizens differently than others, is often prohibitively resource-intensive, and risks alienating unconnected citizens (Haim et al. 2021). Second, by making cost-reducing initiatives just one part of a basket of interventions, studies of community policing conflate the effects of search costs, trust, and other mechanisms which may be working in parallel. This complexity makes it difficult to identify the independent effect of any given mechanism on public safety, raising the possibility that departments might waste resources constructing a holistic community policing program when a limited, inexpensive initiative may have met their needs.

Reporting Hotlines

Reporting hotlines through which citizens can call or text information to the authorities are one way in which governments reduce search costs associated with information provision. Making a phone call takes substantially less time and incurs lower monetary costs compared to traveling to a police station in person. Relative to calling the local police station, also a common method of reporting in the Global South, a central hotline provides citizens with a single phone number which is useful regardless of where they happen to be. Centralization also allows the police staff the hotline with trained operators 24 hours per day, ensuring that citizens' calls are answered reliably.

The ability to send an SMS message further reduces citizens' costs. Sending a text message is usually cheaper and faster than making a voice call, and does not require as reliable a cell signal. Citizens can send text messages covertly, allowing them to report crimes in progress without alerting those around them. Text-based reporting obviates the need to speak with an authority figure and feels less intrusive, potentially reducing citizens' discomfort and reducing hesitance when citizens are unsure whether their information is really an emergency. SMS hotlines provide benefits for the authorities as well. Whereas operators must take voice calls one at a time, they can quickly scan SMS messages and prioritize their responses based on urgency.

The value of low-cost citizen reporting mechanisms extends beyond the police. Anti-corruption interventions frequently use SMS hotlines to receive information from citizens.[2] In a study with a similar design to our own, Aker et al. (2017) distributed 10,000 leaflets with information about an SMS hotline for reporting election irregularities to randomly-selected locations in Mozambique. Treated areas exhibited higher voter turnout and higher perceived rates of ballot fraud. Hotlines also play a roll in conflict zones, where government forces use them to gather information critical to identifying and combating insurgents. The Coalition Provisional Authority in Iraq established a voice-call hotline for reporting insurgent activity

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[2]https://www.pna.gov.ph/articles/1122975

in 2006 and spent $9.9 million US advertising the number (Shapiro and Weidmann 2015). Authorities credit the hotline with the discovery of 19 car bombs, 175 roadside bombs, 66 mortars, and 139 arrests between February 1 and October 21, 2006.[3]

Hypotheses

Our overarching theory is that, especially in developing contexts, search costs substantially inhibit information flows from citizens to the police. We do not suggest that trust and procedural justice are unimportant, but rather that managing search costs should affect citizens' willingness to provide information to the police independently of these other factors. We expect that citizen access to and knowledge of an emergency hotline will sufficiently reduce search costs to improve information flows from citizens to the authorities.

Hypothesis 1: Increased exposure to an emergency hotline will increase crime victims' likelihood of reporting their issue to the police.

Public safety is the product of joint citizen and police behavior. The hotline's impact on crime depends not just on whether citizens transmit information but also on how the police use that information. As discussed above, many factors may interrupt the translation of information flows into public safety. Despite these caveats, we expect that in the context we describe below the hotline will cause measurable improvements in public safety.

Hypothesis 2: Increased exposure to an emergency hotline will improve public safety.

The mechanisms we associate with search costs operate separately from widely theorized links involving trust and perceived legitimacy. Thus, while we provide evidence on

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[3]Semple, Kirk. "U.S. Backs Hot Line in Iraq to Solicit Tips About Trouble." *New York Times* 5 November 2006. `https://www.nytimes.com/2006/11/05/world/middleeast/us-backs-hot-line-in-iraq-to-solicit-tips-about-trouble.html`

our treatment's impacts on trust, legitimacy, and perceived capacity, we do not formally test hypotheses about these outcomes. However, we engage with issues of trust and legitimacy in the conclusion.

Empirical Context

We conduct our study in Sorsogon, one of 83 provinces in the Philippines. Located on the southern tip of Luzon, the Philippines' most populous island, Sorsogon hosts a population of about 850,000 citizens. Most of the province is rural, with rice paddies and dense forests sitting against a mountainous backdrop, though a large proportion of Sorsogon's population resides in the provincial capital, Sorsogon City. Sorsogon Province is divided into 15 municipalities which encompass 541 barangays. A barangay, the smallest administrative unit in the Philippines, is akin to a village in rural areas or a neighborhood in urban areas. In Sorsogon, the median barangay has about 850 residents. Barangays serve as our study's primary unit of analysis.

We selected Sorsogon for several reasons. First, the Philippines in general, and Sorsogon in particular, is geographically and demographically diverse, allowing us to study a broad cross section of individuals living in a range of contexts. This diversity, which includes significant economic inequality, is illustrative of much of the developing world. On average, Sorsogon is sufficiently developed that citizens have a reasonable expectation of government service provision, yet development indicators like education, healthcare, and infrastructure lag far behind those in OECD countries where search costs are minimal. We also selected Sorsogon due to our ability to partner with the police to implement the RCT discussed below. All three authors had worked in the province previously, allowing us to build local connections which led to this partnership. The provincial police chief believed strongly in evidence-based approaches to policy, and was enthusiastic about partnering with us to refine and evaluate the intervention described below. Finally, as we discuss below and in greater detail in the supporting information, the preexisting relationship between the police in Sor-

sogon and local residents, and the local police's commitment to both service provision and the protection of human rights, gave us confidence in our ability to partner with the police ethically.

The Philippine National Police (PNP) is a full-service police force under the authority of the national government. The PNP are relatively well-equipped compared to most police departments in the Global South. The Sorsogon Provincial Police Office (PPO) has about 850 officers distributed across 16 municipal stations, for a police-citizen ratio of about 1:1,000. While not as well-resourced as typical departments in OECD countries, PNP officers have reliable access to vehicles, weapons, and radios, allowing them to carry out their duties effectively. PNP presence is distributed unevenly; officers are omnipresent in urban centers but rarely patrol beyond the main highway in rural areas. In our survey, more than 45% of respondents say they see a PNP officer once per month or less. Still, the Sorsogon Police depend heavily on citizens to provide information. More than twice as many entries in police crime blotters come from citizen reports (fire alarms) as from police operations (police patrols). Before the start of our study, the majority of those reports were made in person at a station.[4]

Citizens of Sorsogon face a range of threats to public safety. Crime is subdivided roughly between serious crimes like murder, assault, and large-scale illegal logging, and minor crimes like public intoxication, juvenile delinquency, and disputes. While citizens can report all illegal activity to the PNP, minor crimes like petty theft or disputes are handled by barangay-level safety officers called tanods, while the PNP is responsible for investigating and preventing major crimes.

Sorsogon's residents are also threatened by the activities of the New People's Army (NPA), a communist rebel group which has challenged the national government's authority since the 1960s. Violent altercations are relatively rare today, and anti-state violence that oc-

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[4]According to blotters we collected covering January 2016 through February 2017, reports came through the following channels: police operations, including intelligence-gathering, investigations, and cultivated informants (30.7%), citizens in-person at the police station (43.3%), phone calls (16.0%), SMS messages (5.7%), and voluntary surrenders (4.3%).

curs is directed primarily against the military and police. The group rarely targets civilians. However, the NPA is entrenched in the fabric of many communities in Sorsogon Province and competes with the state for citizens' loyalty. It also engages in peripheral criminal activities like extortion, racketeering, and other profit-generating behavior, which represent the primary immediate threat to public safety for citizens living in Sorsogon. Thus, while the NPA is typically characterized as an insurgent group, its impact on ordinary citizens is more similar to that of an organized criminal organization rather than a stereotypical rebel group. Furthermore, as is often the case with organized crime, the victims of the NPA's extortion are often aware that the perpetrator is linked with the group, changing the nature of the police's investigation. Thus, in our analysis below, we differentiate between the ordinary crimes mentioned above and those perpetrated by "organized armed groups." While the military takes primary responsibility for active combat against insurgents, the PNP participates in logistical support, routine patrols, and other deterrence measures, and the PNP are primarily responsible for investigating the NPA's criminal activities.

The NPA's presence in Sorsogon both complicates and contributes to our analysis. The diversity in threats to public safety raises the possibility that reduced search costs may not impact all types of public safety in the same manner, whether because of differences in citizen reporting or in the government's response. On the other hand, the threats posed by organized groups, including mafia-like organizations which extort civilians and insurgent organizations which challenge government legitimacy, are common across the globe. These groups' presence often drive the police to use an extreme "fire alarm" model, remaining in fortified stations until called and minimizing patrols or interactions with citizens which make officers vulnerable (Bayley 2008). Thus, search costs are particularly relevant to state-society relations in the shadow of insurgency. Finally, conducting research in a setting where such a group is active provides a hard test of our theory, in that search costs are relevant but not the *only* impediment to state-society cooperation on public safety. If reducing search costs has a measurable effect on either information reporting or crime prevention in this difficult

setting, we can be confident that search costs likely impede co-production of public goods across a wide range of contexts.

Officers in Sorsogon recognize the importance of citizen-provided information. Before beginning our experiment, we surveyed nearly every officer in the province. Officers rated their trust in citizen-provided information an average score of 79.1 on a 100-point scale, with a plurality (26.8%) of officers selecting "100." Officers selected an average response of 84.3 in agreement with the statement, "Most things that people report to the police are worth taking seriously" and 93.5 to the statement that information from community members is important for them to do their job.

Table 1: Most important public safety issues according to officers and citizens

Issue	PNP	Citizens	Difference
Public Intoxication	15.4%	37.2%	-21.8%
Theft	22.1%	36.5%	-14.4%
Illegal Gambling	30.1%	39.5%	-9.4%
Police Abuse	2.6%	4.3%	-1.7%
Sexual Harassment	9.1%	10.7%	-1.6%
Robbery	4.7%	5.8%	-1.1%
Vehicle Theft	2.9%	3.7%	-0.8%
Vehicle Accidents	55.5%	55.3%	0.2%
Illegal Guns	6.1%	1.8%	4.3%
Domestic Abuse	12.7%	4.6%	8.1%
Murder	36.6%	26.5%	10.1%
Illegal Drug Use	61.1%	48.8%	12.3%
Rape	41.5%	16.1%	25.4%
Observations	*773*	*2,983*	

Citizens and officers were each presented with the above list of public safety issues and asked to choose which three were the most important concerns in their municipality. The listed percentages show how often each issue was included in a respondent's top three.

Nevertheless, the police disagree with citizens about which threats to public safety are the most important. Our survey of police officers and citizens asked each respondent which out of a list of issues they considered to be the top 3 most important public safety concerns in their assigned municipality (PNP officers) or home barangay (citizens). Table 1

shows civilians are far more likely than the police to consider public intoxication, theft, and illegal gambling to be important. The police prioritize rape, illegal drug use, and murder. More than 61% of officers listed drug crimes as one of their top three most important issues. However, these responses may reflect social desirability bias, as our study coincided with President Duterte's "war on drugs" and it was clear to all officers that police leadership in Manila wanted the institution to focus on drug-related crimes.

Ethics

Our partnership with the Sorsogon Police entailed several important ethical considerations. The study occurred during the Philippine government's "drug war," a major initiative launched in late 2016 which led to at least 27,000 deaths through May 2020, including more than 5,600 at the hands of the police.[5] Increasing contact between citizens and police officers would be deeply problematic if it led to increased violence. Our decision to proceed with the project was shaped by the fact that virtually no drug- or anti-drug violence occurred in Sorsogon Province. ACLED's dataset on the Philippine Drug War recorded only five drug-related deaths in Sorsogon Province between Duterte's election and the initiation of our project, and none in the nine months preceding the intervention. According to Sorsogon's Provincial Police Chief, one of the primary motivations for implementing community policing was to convey to citizens that their police were focused on issues other than drugs. To further ensure our partnership did not contribute to violence, members of our civilian research team accompanied all PNP barangay visits that were part of the program, and were instructed to report any instances of suspected abuse to the PIs and our on-site research manager.

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[5]Talabong, Rambo. "Kill or arrest? SC's Carpio pins down what PNP means by 'neutralize.'" *Rappler* 21 November 2017, https://www.rappler.com/nation/189126-pnp-ejk-philippines-supreme-court-war-on-drugs-neutralize-carpio and Human Rights Watch, "Our Happy Family is Gone: Impact of the 'War on Drugs' on Children in the Philippines." https://www.hrw.org/report/2020/05/28/our-happy-family-gone/impact-war-drugs-children-philippines

NPA presence also posed important ethical challenges. We worked with the PNP and the 9th Infantry Division of the Armed Forces of the Philippines (AFP) to identify barangays in which we could implement and evaluate our intervention without placing participants in unsafe situations. We excluded areas that the AFP designated "NPA-controlled." We ruled out several additional barangays after consulting with community leaders and our local research manager. Our enumerators received advance clearance from barangay and municipal political leadership before carrying out any research activities. In the Appendix, we detail a number of additional possible ethical concerns as well as the steps we took to guard against these concerns. All intervention procedures and surveys were approved by the authors' university Institutional Review Board.

As with many real-world randomized interventions, our design provided a potentially beneficial policy to only a subset of Sorsogon's residents. However, we did not withhold policing services from anyone. The control condition described below was status-quo policing; patrols and requests for service continued uninterrupted. Furthermore, anyone in the province could use the hotline regardless of location; we simply randomized its advertisement. Finally, our intervention was a staggered rollout. After we collected endline data, the police advertised the hotline in control locations, just as they had previously done in treatment locations.

Study Design and Data Collection

We conducted our study in the 298 of Sorsogon's 541 barangays which we identified as being safe for civilian research staff and PNP to visit, using the procedure described above. Of these, we randomly assigned 99 barangays to receive the primary treatment, an emergency hotline. An additional 99 randomly-selected barangays received an alternative trust-building treatment, while the remaining 100 barangays served as control. Barangays are an appropriate unit of treatment assignment because citizens' experiences with crime are best described in terms of their immediate surroundings. Crime rates in one part of a

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municipality may not reflect the level of security among citizens in another part of the same municipality. Police leadership also viewed barangay-level assignments to be operationally expedient, as officers are frequently assigned to barangay-level beats.

The hotline treatment consisted of an information campaign around a voice and SMS reporting hotline. The Sorsogon Provincial Police Office created the hotline in the months immediately before our study began but had not yet advertised it to citizens. At the start of our study, on a typical day the hotline did not receive any calls or texts, compared to dozens of daily walk-in reports and calls to each station's unique phone number.[6] We printed 55,000 stickers containing the hotline number and, with the cooperation of the Sorsogon PNP leadership, directed officers to post the stickers throughout the treatment barangays (Figure 1). Stickers were placed in public locations (cafes, exterior walls of shops, baragay halls) and inside private businesses and homes (with the owners' permission). Due to the system's technological simplicity, the hotline is not anonymous: dispatchers can view the sender's number. In practice, we are not aware of any instances in which the police linked the number to a name or location unless the sender provided it, and indeed leadership lamented frequency of SMS tips which did not provide a location. Furthermore, a citizen wanting to send an anonymous tip could easily purchase a SIM card not linked to their name.

The hotline advertisement was designed to reduce search costs. However, the procedures for advertising it may also have impacted citizens' trust in the police, for example by fostering informal contacts between officers and citizens during distribution. Related, the sticker distribution may have affected citizens' perception of police capacity. Perceived capacity might increase reporting if citizens think the police are better able to follow up on tips, or citizens may fear retaliation if the police learn that they did not cooperate. To isolate the impact of search costs from these alternative mechanisms, an additional 99 randomly-selected barangays received an alternative treatment, a community engagement program that replicated all procedures of the hotline treatment except for advertising of the hotline

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[6]Phone lines at municipal stations are staffed haphazardly, and each of the 16 stations has a different phone number.

itself. Officers distributed 55,000 stickers similar to the hotline advertisements but lacking the phone number (Figure 1). In both treatment versions, officers went to the assigned community, introduced themselves, answered questions about policing, and generally attempted to build trust with citizens.[7] These dual treatments alongside the control condition allowed us to test whether the hotline treatment measurably impacted reporting and crime even after controlling for the impacts of increased citizen-police contact. After the four-month intervention period, we surveyed 10 randomly-selected citizens in each study barangays (see Supporting Information for sampling information). We used civilian enumerators associated with a widely-known research company, and made it clear to respondents that the police were not involved in the survey and would not have access to individual results.

Figure 1: Community Policing Sticker

(A) Hotline Treatment   (B) Community Engagement Treatment


While we make no formal predictions about the effects of the alternative trust-building treatment, our general theory is that moderate levels of trust and search costs are each necessary for state-society interactions. Thus, when search costs are prohibitively high, improvements in trust are unlikely to significantly increase reporting.

The stickers had several advantages over other possible methods of communicating the hotline information. First, they were inexpensive: enough stickers to completely blanket

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[7]Officers were trained and provided with a sample script for conversations with citizens.

Figure 2: Map of Treated and Untreated Barangays in Sorsogon Province
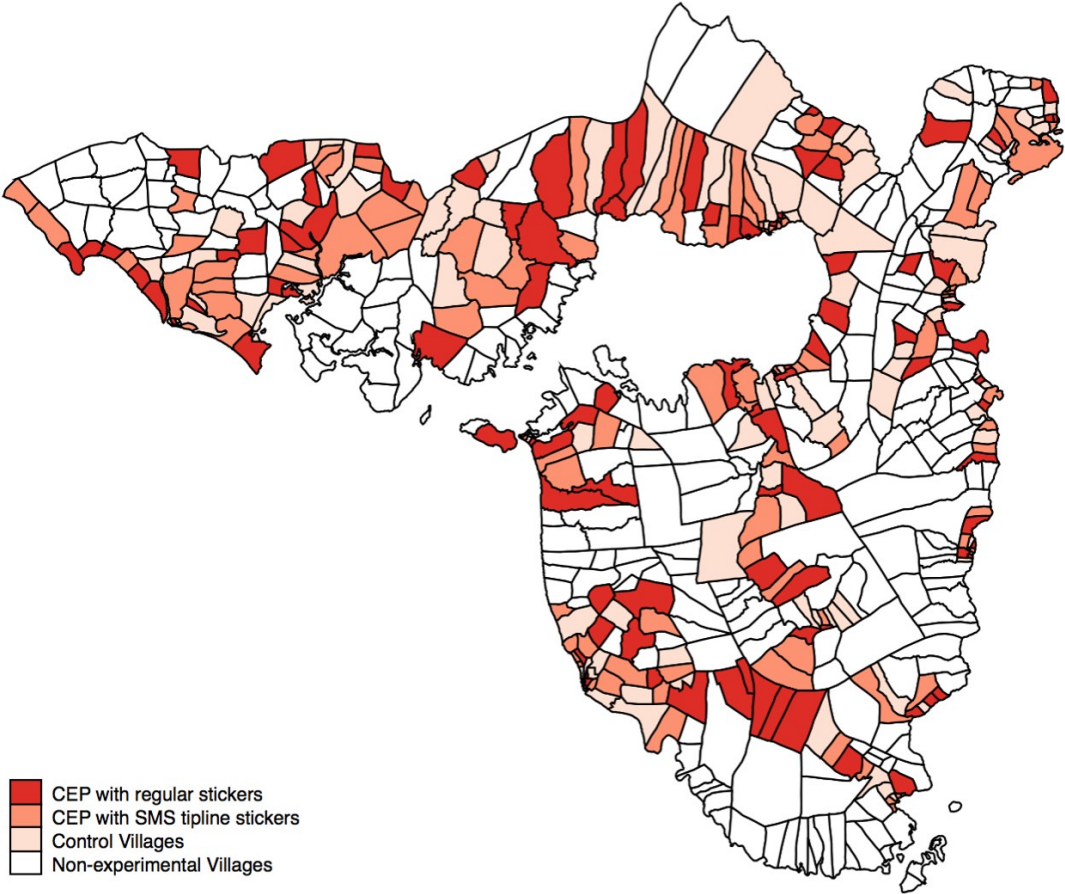
the treated villages cost only a few hundred dollars, and costs per affected individual would decrease if the intervention were scaled up. These costs compare favorably with the $9.9 million US spent advertising the tip line in Iraq. Second, the decentralized nature of the information makes it harder for criminals or insurgents to target the advertisements, compared to advertising through a small number of large billboards which are easily vandalized or destroyed. Small posters or pamphlets would likely have had a similar impact, but the self-adhesive stickers proved easiest for officers to distribute.

The potential for spillovers is an important consideration for our study. Due to the design of the study, blinding was generally not possible: local officials and police officers were involved in implementation, and enumerators were aware of each barangay's treatment status. While survey respondents were not informed about their barangay's treatment sta-

tus, it is possible that residents in control and alternative treatment barangays had some exposure to the hotline stickers. We explore geographic spillovers in the supporting information, and find no evidence that they systematically impacted outcomes. To the extent that spillovers occurred, they would likely bias the effects of the hotline treatment downwards, as respondents in control barangays exposed to the hotline advertisements would become more likely to report information to the police.

In addition to the survey measuring outcomes, we collected crime logs (called "blotters") from each municipal station in Sorsogon. These computerized logs track all incidents and alleged crimes brought to the police's attention, and include the incident's date, a short narrative describing it, the way in which the police received the information, information about the victim, and the status of the case. We collected blotters covering January 2016 through February 2019 which contained 14,100 entries, 98.9% of which listed the way in which the police learned of the information. We categorized contacts into "personally came to the police station" (40.1%), police operations including patrols and checkpoints (34.1%), telephone calls (17.5%), SMS messages (6.1%), and voluntary surrender (2.1%). The blotter data does not distinguish whether voice calls came via the centralized hotline or the preexisting municipal station phone number. Across all barangays in Sorsogon, SMS messages to the police increased by nearly 50% during and immediately following the intervention (March 1 - December 31, 2017), from 5.25% of reports to 7.65%, compared to the same period in the previous year. The proportion of reports via phone call increased from 13.8% to 17% over the same period.

While illustrative, blotter data is ill-suited to evaluate the hotline's impact on reporting or crime. First, a large portion of blotter entries are identified only at the municipality level, making it impossible to determine whether the sender was in a treatment or control barangay. Second, administrative data on crime are biased because the number and type of crimes about which the police are aware is conditional on *both* public safety and willingness to report to the police. As citizens' willingness to report crimes increases, the police become

aware of a higher proportion of actual crimes that occur, creating the appearance in official statistics that crime has increased. Administrative data might provide an unbiased count of reports to the police, but without knowing how many opportunities citizens had to report crimes those counts are not useful. Finally, in our experience the PNP fail to log tips which do not require interaction with the tipster, for example reports of insurgent activity in the area. Thus, our analysis below follows existing research (Banerjee et al. 2012) in utilizing individual-level survey data to measure whether any given individual experienced a crime independently of whether they reported a crime.

Results

The tables below present regressions testing our hypotheses. Unless otherwise stated, all models use OLS with standard errors clustered by barangay, the unit of treatment assignment. We control for several pre-treatment variables that may be correlated with outcomes, including the respondent's age, level of education, length of time residing in the barangay, and self-reported household income. Enumerators also coded the number of minutes walking that the respondent lives from the barangay hall, since individuals on the periphery of town may be more susceptible to crime and less likely to report it to the authorities due to their isolation. Despite enumerators' best efforts to conduct surveys in private, oftentimes bystanders could not be avoided. An enumerator-coded dummy variable records whether bystanders were present. We discuss the possibility of response bias in detail in the appendix. There is no indication that the apparent relationship between the hotline treatment and crime reporting differed depending on the presence of bystanders.

The intervention procedures described above and the tests of the SMS hotline on citizen reporting conducted below were pre-registered in [redacted].

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Reporting

Table 2 tests the hypothesis that the hotline increased willingness to report information to the police. *Hotline* is the key independent variable, coded 1 if the barangay received the stickers with the hotline number, otherwise 0. *Community Pol.* is a dummy variable indicating barangays that received any intervention involving sticker distribution or enhanced police presence. Thus, the coefficient on *hotline* is the effect of the hotline advertisement plus police engagement, controlling for the independent effect of police engagement, compared to control.

Models 1 and 2 test the relationship between treatment condition and the number of reports to the police in a barangay during the previous six months. The outcome is a standardized index of several measures of crime reporting.[8] The index allows us to consider various types of crime reporting simultaneously without concern for Type I error due to multiple hypothesis testing. It includes information on major crimes that typically fall under the PNP's purview, but not minor crimes usually handled by barangay community safety officers (tanods). We provide more detail on the variable construction in the appendix.

We limit observations to respondents who reported that they were aware of at least one crime in their community during the preceding six month period. Those who were not aware of crimes should have no reason to report information to the police. 6.3% of respondents report personally experiencing at least one of the crime types included in our index during this time, while 25.7% were aware of at least one crime in their community. Conditioning the sample on those affected by crime could bias our results if the subset of respondents affected by crime have different baseline likelihoods of reporting. We address this possibility extensively in the appendix. We show, for instance, that the analyzed subsample is balanced between hotline and non-hotline on all observed pre-treatment variables, suggesting that it

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[8]For each of several types of crimes, we calculate each respondent's deviation from the control-group mean on the number of times they reported the crime to the police, standardized by the control-group standard deviation for the same variable. We then take the mean of each of these standardized deviations across each crime type. For the regressions, we normalize by taking the natural log of the index.

is plausible they are also balanced on (unobservable) baseline likelihood of reporting. When retaining the full survey sample regardless of victimization, coefficients on *Hotline* remain similar but standard errors increase consistent with attenuation from the hotline resulting in fewer opportunities to report crimes.

Table 2: Effects of Hotline on Crime Reporting

	(1) Index	(2) Index	(3) Personal	(4) Community
Hotline	0.102**	0.104**	0.114*	0.192**
	(0.0498)	(0.0494)	(0.0676)	(0.0925)
Community Pol.	-0.0706	-0.0608	-0.0704	-0.0531
	(0.0527)	(0.0533)	(0.0756)	(0.0865)
Age		-0.00129	-0.00302	-0.000141
		(0.00138)	(0.00287)	(0.00246)
Education		0.0531***	0.0301	0.0434*
		(0.0135)	(0.0243)	(0.0231)
Income		56.70	-26.76**	96.51
		(41.57)	(10.48)	(72.75)
Decades Resided		0.0000111	0.0422*	-0.00935
		(0.00860)	(0.0224)	(0.0147)
Bystanders		-0.0324	-0.0369	-0.0886
		(0.0402)	(0.0625)	(0.0644)
Dist. from Ctr.		-0.00400	0.0518	-0.0156
		(0.0235)	(0.0410)	(0.0397)
Constant	0.217***	0.155*	0.0681	0.621***
	(0.0387)	(0.0927)	(0.142)	(0.147)
Observations	716	698	179	771
R^2	0.008	0.046	0.059	0.022

OLS with barangay-clustered SE in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$

Model 1 tests the conditional relationship between the hotline treatment and the crime reporting index, controlling for the community engagement elements of the treatment (*Community Pol.*). We observe a positive and significant relationship between the hotline and

reporting. In other words, individuals aware of crimes living in barangays which received the hotline sent more reports of crime to the police compared to those living in control barangays, even controlling for the non-hotline aspects of community policing like enhanced officer presence or individual contacts with officers. In Model 2, we add the respondent-level controls listed above. After controlling for these potential confounds, the coefficient on *Hotline* remains positive and significant. We again fail to find evidence of a conditional relationship between community engagement without the hotline and crime reporting.

We use different measures of reporting for Models 3 and 4. Model 3 reports the effect of treatment on the number of crimes that respondents personally reported to the authorities, conditional on the respondent experiencing a crime. The conditional effect of the hotline treatment is again positive and marginally significant despite the small number of qualifying respondents. Model 4 uses as the dependent variable the number of crimes in the community that the respondent believes were reported to the authorities, among respondents aware of a crime. Again, the conditional effect of the hotline treatment is positive and significant. Overall, the evidence suggests that the hotline increased citizens' willingness to report crimes to the police, and that this increase was caused by the hotline itself and not by any increase in police activity or engagement with citizens. Conditional effects are substantively large, with increases in reporting of 10-19% difference between the control and hotline conditions, after accounting for the impacts of increased officer contact.

An alternative explanation might be that the intervention signaled police strength, leading citizens to cooperate with them for fear of getting in trouble otherwise. However, it is difficult to see why the hotline treatment but not the trust-building measures would have had such an effect. In the supporting information, we explore heterogeneous effects of the hotline on different sub-populations by interacting the treatment indicator with each pre-treatment control variable. The treatment had a weaker (though still positive) impact on respondents living farther from the barangay center. We might have expected the treatment to be stronger in remote areas, as these citizens pay the highest cost of traveling to a

police station to report a crime. We speculate that the treatment was not implemented as thoroughly in these remote areas, as PNP officers may have been reticent to travel so far to distribute stickers. Encouragingly, the presence of bystanders did not appear to affect the treatment's impact. Though people surveyed with bystanders present were less likely to say crimes were reported overall, the interaction between the hotline and bystanders indicators is not significant, alleviating concerns about response bias.

Public Safety

Co-production depends on *both* citizen and state action. Reduced search costs enhance citizen engagement with the state, but do not alone guarantee improvements in service delivery. Subsequent reductions in crime will only occur if officers act effectively on that information. Regressions in Table 3 test the relationship between the treatment and whether respondents experienced any of several types of public safety issues in the last six months.[9] We selected issues that the PNP is most likely to deal with based on interviews with police officers and citizens. Reported victimization rates for this six month period range from 0.27% (armed robbery) to 3.66% (assault).

Results show no apparent relationship between the hotline treatment and incidences of armed robbery, burglary, assault, or drug-pushing, after controlling for the effects of the non-hotline intervention. Only victimization by the NPA exhibited a perceptible decline in SMS hotline barangays.[10] Surprisingly, we observe a *positive* effect of non-hotline community policing on assaults (relative to control). On average, older people were somewhat less likely to experience crimes, while more educated people were more likely to experience burglary or organized crime.

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[9]Unlike the regressions above on citizen reporting, the tests below of crime victimization were not pre-registered. We pre-registered tests of the combined community policing intervention (i.e. aggregated hotline and trust-building barangays, compared to control) on crime [citation redacted], the results of which are presented in [citation redacted].

[10]As we discuss above, the NPA's primary impact on citizens comes via extortion and harassment; insurgent-style violence is rare in Sorsogon and directed overwhelmingly at soldiers and police.

These results are robust to several alternative tests. In the supporting information, we fail to find a relationship between the hotline treatment and clearance rates, or the percentage of issues about which the police are aware that they successfully resolved. Using an alternative survey outcome which asks "how much of a problem is [type of crime] in your community," only NPA activities, but not other types of crimes, are impacted by the hotline.

Table 3: Effects of Hotline on Crime Victimization

	(1) Armed Robbery	(2) Burglary	(3) Assault	(4) Drugs	(5) NPA
Hotline	0.0000753	0.000666	0.00896	-0.00946	-0.00818**
	(0.00246)	(0.00774)	(0.00933)	(0.00601)	(0.00391)
Community Pol.	0.000998	0.00676	0.0202**	0.00618	0.00265
	(0.00212)	(0.00661)	(0.00781)	(0.00606)	(0.00489)
Age	-0.000113	-0.000174	-0.000743***	-0.000468***	-0.000236*
	(0.0000738)	(0.000197)	(0.000235)	(0.000179)	(0.000130)
Education	0.00102	0.00548**	0.000755	0.00212	0.00471***
	(0.000659)	(0.00228)	(0.00250)	(0.00165)	(0.00135)
Income	2.933	19.30	66.11**	-3.942	7.160
	(4.948)	(21.56)	(25.79)	(3.998)	(9.075)
Decades Resided	0.0000946	-0.0000874	-0.000562	0.0000502	-0.000222
	(0.000153)	(0.000768)	(0.000897)	(0.000584)	(0.000443)
Bystanders	0.00405	0.00336	0.0114	-0.00137	-0.00152
	(0.00290)	(0.00657)	(0.00909)	(0.00526)	(0.00309)
Dist. from Ctr.	0.00110	-0.000797	-0.00555	-0.000355	0.000850
	(0.00104)	(0.00286)	(0.00371)	(0.00288)	(0.00179)
Constant	0.00251	0.0179	0.0576***	0.0347***	0.0122
	(0.00352)	(0.0129)	(0.0162)	(0.0114)	(0.00791)
Observations	2918	2918	2919	2868	2862
R^2	0.004	0.005	0.016	0.006	0.012

OLS with barangay-clustered SE in parentheses.
* $p < .10$, ** $p < .05$, *** $p < .01$

To better understand the impact of the treatment and the cause of these patterns, Table 4 tests the treatment's impact on citizens' attitudes towards the police in terms of

satisfaction with the police (self-reported change over the past 6 months), perceived police legitimacy, perceived police responsiveness to citizens' needs, and trust. While the hotline alone was not designed to improve attitudinal outcomes, effective service delivery by the police resulting from increased information sharing could create a positive feedback loop in which citizens' attitudes towards the police improved due to improved outcomes. However, given the widespread lack of results on crime, we should not expect such improvements in attitudes. Indeed, the results in Table 4 indicate no systematic relationship between treatment condition and citizens' evaluations of police legitimacy, responsiveness, or trustworthiness, and we find a marginally significant negative effect on satisfaction with the police. Finally and most surprisingly, we find a negative and significant conditional effect of the hotline on citizen satisfaction with the police's handling of NPA-related issues.

Table 4: Effects of Hotline on Attitudes Towards Police

	(1) Satisfaction)	(2) Legitimacy	(3) Responsiveness	(4) Trust	(5) Satisfaction (NPA)
Hotline	-0.0896*	-0.00702	0.0808	-0.0564	-0.186**
	(0.0478)	(0.0409)	(0.0513)	(0.0454)	(0.0724)
Community Pol.	0.0666	0.00237	-0.0409	0.0120	0.144*
	(0.0533)	(0.0419)	(0.0549)	(0.0471)	(0.0765)
Age	-0.00176	-0.00645***	0.00350**	0.00435***	-0.00416**
	(0.00146)	(0.00115)	(0.00146)	(0.00121)	(0.00173)
Education	0.0336**	0.0470***	-0.0218	-0.0470***	-0.00174
	(0.0153)	(0.0121)	(0.0137)	(0.0124)	(0.0189)
Income	132.8***	-70.90**	130.5***	76.86**	300.1***
	(39.51)	(34.18)	(43.68)	(34.09)	(90.79)
Decades Resided	-0.00486	-0.00410	0.00298	-0.00232	-0.0114
	(0.00737)	(0.00439)	(0.00680)	(0.00643)	(0.00930)
Bystanders	0.0877**	0.0541	-0.0691	-0.0460	0.123**
	(0.0417)	(0.0359)	(0.0449)	(0.0374)	(0.0581)
Dist. from Ctr.	-0.0339	-0.0143	0.0149	-0.0175	0.0139
	(0.0244)	(0.0175)	(0.0212)	(0.0195)	(0.0274)
Constant	0.589***	0.641***	-0.158*	3.219***	-0.139
	(0.0965)	(0.0816)	(0.0888)	(0.0780)	(0.124)
Observations	2849	2892	2901	2882	2720
R^2	0.009	0.031	0.008	0.016	0.013

OLS with barangay-clustered SE in parentheses.

* $p < .10$, ** $p < .05$, *** $p < .01$

Table 5: Possible Interruptions in Crime Co-Production

Interruption	Impact of Reporting on Public Safety	Impact on Citizen Attitudes	Present in Research Context
Citizens report low-quality information	None	None	No
Citizens selectively report some issues but not others	Greatest impact on threats citizens report	Improve	Maybe
Tips' usefulness varies across threats	Greatest impact where information is useful	Improve	Maybe
Police do not follow up: laziness, corruption	None	Worsen	No
Police cannot follow up effectively: capacity	None	Worsen	No
Police follow up on some issues but not others	Greatest impact on threats police prioritize	Worsen	Maybe

Table 5 summarizes six potential sources of breakdown in co-production which could lead to these results. The first possibility is that the tips citizens report are not useful. We surveyed nearly every PNP officer in the municipality about a year after the end of the treatment. 77.7% of officers in Sorsogon Province said they relied on phone calls by citizens for information about problems in the community, and 69.1% said they relied on in-person reports, by far the two most common sources of information officers claimed to find useful. Furthermore, the reduction in NPA-related activities in treated areas is inconsistent with this explanation.

Second, citizen tips might be *more useful* for countering insurgency than for other issues. Existing research highlights the critical role that citizen tips play in reducing insurgent-related violence (Berman et al. 2011). Howewever, there is similarly robust evidence of the importance that citizen tips play in preventing ordinary crimes (Skogan 1986; Weitzer and Tuch 2006; Nanes 2019). It seems unlikely, therefore, that tips would measurably impact insurgency but not other types of crimes, all else being equal.

Third, citizens may have provided more tips about insurgent activity than about ordinary crimes. One reason for such a pattern might be that SMS messages are easier for citizens to send under duress. For example, if a citizen observes insurgents setting a trap for the police, he may worry that insurgents might hear him make a phone call or see him leave to go to the police station. Our survey did not ask respondents whether they had reported information about the NPA, as we do not expect respondents to provide accurate answers to such a sensitive question.[11] However, administrative data from the police crime blotter does not bear out such a pattern. Figure 1 in the online appendix shows the police did not log phone or SMS reports of insurgent activity in any of the treated barangays during our intervention. Granted, the police often fail to log reports that do not require follow-up with the reporting citizen, so we do not claim that *no* reports were made, but there is no evidence that citizens used the hotline disproportionately to report on the NPA. Furthermore, there

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[11]People are understandably reticent to admit to reporting insurgent behavior on surveys (Nanes and Haim Forthcoming).

is a noticeable increase in the proportion of murders, assaults, and burglaries reported via phone or SMS from pre- to post-treatment in treated barangays, but not in control barangays.

Fourth, the police may have declined to follow up on tips due to laziness or corruption. Based on months of fieldwork, including interactions with police officers as well as interviews with citizens, we had no indication that these are widespread problems in our study area. Fifth, and similarly, the police may have been unable to follow up effectively on tips due to insufficient capacity. However, as we discussed earlier, the PNP in Sorsogon is relatively well-equipped by Global South standards. Ineffectiveness is also inconsistent with the apparent success against insurgents, which requires substantial effort and capacity. Furthermore, if the police were known to be lazy, corrupt, or incompetent, citizens should not bother reporting tips to them in the first place.

Sixth and finally, the police may have followed up selectively on information about insurgency but not on information about other crimes. It is normal for departments to prioritize some issues over others, for example dispatching a forensics team to the site of a murder but not a convenience store robbery. While our survey of police officers did not ask specifically about the NPA, we know from interviews, news reports, and existing research that the PNP view counterinsurgency as a particular priority. The militarization of the PNP with long rifles and barricaded checkpoints speaks to this focus, as does their tendency to enforce laws from secure bases in the city center rather than venturing into rural areas on regular patrols (an extreme version of the Fire Alarm model). Government rhetoric clearly places a high priority on counterinsurgency over ordinary crime prevention, and it stands to reason that police officers would follow this lead.

The results on attitudinal outcomes in Table 4 help parse whether our pattern of results comes from selective information reporting or selective police action. If citizens primarily provided information about the NPA, then the resulting decrease in insurgent activity should have improved citizens' attitudes, as they observed effective police action. The null and negative effects of the hotline on attitudes are consistent with the scenario in

which citizens provided information about all types of crime, but the PNP only acted on tips related to issues they prioritized.

The reduction in NPA activity specifically (as opposed to the expected overall decrease in crime) was an unintended consequence of our project. We did not expect ex-ante that the police would focus so heavily on NPA-related tips, and we did not intend for our experiment to tip the scales of the conflict. In retrospect, we should have thought more carefully about the potential impacts of the treatment on the balance of power in this political conflict. We return to this point at length in our discussion of ethics in the appendix. Thankfully, there is no evidence that the reduction in NPA activities led to any additional violence. Our outcome asked civilians whether they had been the victim of an "armed rebel group" in the past six months, which in context was understood to mean not just violence but also coercion and extortion. The negative impact on this variable indicates a reduction in victimization; it does not necessarily correlate with an increase in police-insurgent violent encounters. We are not aware of any systematic changes in the police's level of engagement with the NPA during or following our study. This pattern is consistent with existing research, which posits that citizen cooperation with the authorities should lead to a peaceful equilibrium as insurgents, aware of the cooperation, reduce their activity to avoid capture (Berman et al. 2011).

Discussion and Conclusion

Our information campaign around a little-used emergency hotline substantially increased information flows to the police. This increase in reporting occurred independently of any non-hotline aspects of the community policing like increased police presence or trust-building interactions, suggesting that search costs independently impacted how much information authorities receive from citizens. This result provides new evidence on the specific mechanisms linking the policy bundle of community policing with citizens' behaviors, and differs notably from existing research that emphasizes the primacy of procedural legitimacy. We do not suggest that trust, legitimacy, and other attitudinal factors are unimportant in

for citizen-state interactions. Rather, we propose that reasonable search costs are likely a precondition for the relevance of these other mechanisms. Attempts to transplant policies from wealthy contexts which focus on trust but ignore search costs are unlikely to have the desired impact in much of the Global South. Regardless of government intentions or citizen perceptions, state-society interactions are negatively impacted by search costs pervasive in these developing contexts.

On the other hand, our results on crime emphasize that state-society interactions are a two way street. Co-production of public services succeeds only when citizens and the state both play their part. Selective responsiveness represents a key point at which co-production may fail. Not only does selective action fail to harness citizens' efforts in some areas, it risks further disenfranchising citizens and eroding their trust in the authorities, compounding the negative effects. Recent research from a police feedback program in India finds that citizens who make official complaints at a police station initially report high levels of satisfaction with the process. However, when re-interviewed 2–4 weeks later, the majority report being unsatisfied, perhaps because their efforts yielded few results (Kruks-Wisner Forthcoming). Indeed, our hotline caused citizens to become *less* satisfied with the police, as presumably they became frustrated by police inaction. Over the long term, initiatives that ask citizens to contribute to public safety but fail to reward them with tangible results may leave citizen-police relations worse-off than they were before.

Our evidence on both stages of co-production speak to the importance of state-society interactions in goods provision. As Zhang and Lee (2020) note, these interactions form the backbone of governance. They are defined not just by institutions, but also by the context in which institutions operate. Massive differences in transaction costs characterize the Global South compared to wealthy countries. We show that appropriately-designed institutions can overcome those costs.

Finally, this article speaks to the way that technology can improve bureaucratic capacity at minimal cost. Government agencies operating under constrained resources should

employ technological solutions that allow them to deploy existing resources more efficiently. A basic voice and SMS hotline requires little more than a cell phone in a dispatcher's hands, yet it allows that dispatcher to receive and prioritize information far more efficiently than requiring citizens to make reports in person, and more efficiently than the "police patrol" model endemic in the Global South. Similarly, making tens of thousands of people aware of the hotline cost only a few hundred dollars. Together, these measures allowed hundreds of thousands of citizens to become the police's 'eyes and ears.' This strategy need not be limited to the police. Other service-providing government agencies can harness similar technological solutions by making it easier for citizens to alert them to problems, serving as a force multiplier that allows for more efficient governance.

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