

Warriors and Vigilantes as Police Officers: Evidence from a field experiment with body-cameras in Rio de Janeiro

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Abstract

We present the first randomized experiment on police body-cameras in a high-violence setting: Brazil. Camera assignment -regardless of whether police turned it on -reduced stop-and-searches and other forms of potentially aggressive interactions with civilians. Cameras also produced a strong de-policing effect, where police wearing cameras were significantly less likely to engage in any form of activity, including responding to requests of help. These changes in police behavior took place even when most officers disobeyed the protocol that required them to turn their cameras on when interacting with civilians. To address this problem, we randomly assigned cameras to supervisors during part of the study. When officers' supervisors wore a camera, policing activities and camera usage increased. Police surveys, interviews and focus groups strengthen the finding that technological advances can only have a limited impact in so far an organizational culture that perpetuate lack of compliance with internal protocols and violence persist.

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“If you give body-cameras to my officers, this will stop them from doing their job.”

–Interview with a Police Unit Commander in Rio de Janeiro

Police violence is a complex phenomenon resulting from a combination of individual, societal, and institutional factors. In recent years, the academic debate in the U.S. has increasingly concentrated on structural racism and implicit racial biases (Gelman et al., 2007; Glaser et al., 2014; Legewie, 2016; Knox et al., 2020; Antonovics and Knight, 2009; Streeter, 2019; Fryer Jr, 2019). In Brazil, Cano (2010) also finds evidence of racial bias in the use of lethal force by police.

Another line of investigation traces police violence to societal preferences. Caldeira (2002) talks about the persistence of strong popular support to police violence in Brazil and how societal preferences perpetuate an oppressive institution. In Latin America, fear of crime and “ideology” (Godoy, 2006) as well as “anger” (Garcia Ponce et al., nd) have been found to generate popular support for excessive use of police force, lynching, and other forms of extra-legal actions that violate human rights. González (2019) argues that authoritarian police corporations in the region have persisted in democratic societies. Her explanation for this persistence focuses on societal preferences over police. When police reform proponents are fragmented and politically weak, pushing the reform brings little electoral gain to politicians and risk alienating a powerful bureaucracy.

Police behavior further results from in-group socialization, institutions, and organizational culture (Skolnick and Fyfe, 1993). Institutional factors allow police violence, including the way in which police departments reward police violence and how criminal justice systems fail to punish it (Mummolo, 2018; Skolnick and Fyfe, 1993; Brinks, 2007). According to this line of investigation, a main culprit of police misconduct is related to agency problems stemming from an incapacity to supervise frontline officers (Brehm and Gates, 1997). In this paper we follow this approach, focusing on police misconduct as a result of agency dilemmas and organizational culture.

In recent years, one of the most prominent interventions seeking to address agency problems has been body-worn cameras. It is believed that body-cameras can curb police violence through two main mechanisms. First, body-cameras are likely to increase supervisors' monitoring capacity, which presumably can increase compliance with protocols and induce more restraint on the part of police. Second, due to their ability to produce higher quality and more reliable evidence, body-cameras can increase the probability that police are prosecuted and convicted in courts for unlawful or abusive behavior (Ariel et al., 2015). This deterrence channel may operate both by restraining police officers' abusive behavior and by reducing aggressive behavior toward the police in their interactions with civilians (Ariel, 2016; Jennings et al., 2015).

Thus far, most available evidence on the effects of body-cameras come from a series of randomized control trials (RCTs) conducted in the U.S. Some pioneer studies found that body-cameras reduce complaints against police officers and the police's use of force (Ariel et al., 2015, 2016; Jennings et al., 2015). Other studies are less optimistic, highlighting problems related to the administrative difficulties of managing recordings/images and the body-camera's lack of acceptability among police officers (Lum et al., 2015, 2019). A last set of studies point to the critical importance of monitoring interactions. In a study in Los Angeles, McCluskey et al. (2019) find that body-cameras improved procedural justice, which they monitor using systematic social observation of police-civilian interactions. The authors found that for body-cameras to properly work to improve procedural justice, police departments need to explicitly incorporate measurement and monitoring of behaviors associated with procedural justice. In the case of Rio, use of force is not registered as a set of behaviors that should exhibit a gradual escalation of force –e.g., the police might use hand cups, restrain the subject, use a baton, a taser or fire a weapon. Only the last behavior is registered, which means that superiors possess no way to monitor use of force broadly speaking, let alone procedural justice.

Our study contributes to this body of research by conducting the first field experiment on this subject in a high-violence, developing world setting: Brazil. Our experiment was

implemented from December 2015 to November 2016 and included the random assignment of cameras to more than 8,500 shifts and 470 police officers in Rocinha, a large *favela* (irregular urban sprawl) of around 120,000 inhabitants. A critical question we seek to address is whether body-cameras can induce comparable effects in contexts such as Rio, where despite efforts to de-militarize the police and to introduce a community-oriented policing approach through the Unifying Police Units (UPPs), police continue to use tactics and equipment more associated with wartime than peacetime.

We find evidence that in around 70% of the registered “occurrences”, also called BOPMs for the Portuguese acronym, officers disobeyed the camera protocol, which required them to record the event. Despite widespread resistance to record, when officers were assigned a camera, just the fact of wearing it led to a 46% reduction in various kinds of “proactive” enforcement activities, including pedestrian stop-and-searches and other encounters with residents. For many residents who experience encounters with police as oppressive the result might be considered positive. Favela residents complain of being “frisked for no reason,” “slapped on the face,” “pulled by the hair,” and being “treated with arrogance” by UPP officers (Magaloni et al., 2020). There is evidence, however, that assignment to a camera was also responsible for a strong de-policing effect, inducing a 69% reduction in the probability that the police would act upon requests of help by community members, and a 43% reduction in the probability that offices would be deployed to answer calls received at the Operation Center.

An important question is why police changed their behavior when using a camera despite the fact that for the most part they did not turn it on. This reduction could be considered like a “placebo” effect and reflects that cameras can induce changes in police behavior without generating much footage for superiors to monitor. We believe that two factors explain these results. First, interviews and focus groups pointed to a psychological effect where frontline officers felt deeply scrutinized by the fact that the military police’s High Command chose to assign cameras to them. Second, officers were aware that the camera protocols required them to record their interactions with civilians. Most officer

simply chose not to engage in events so as not to have to record these. Importantly, when we model the difference between recorded and not recorded interactions, the de-policing effect disappears: police who recorded their interactions with civilians engaged in significantly more BOPMs.

Using surveys and minutes police recorded, we also explore the factors associated with police using their cameras to record. We demonstrate that police recorded more when they reported being supervised frequently on camera usage. Moreover, police chose to turn the cameras on because they saw them as an instrument to protect themselves from residents. They recorded more when they reported suffering aggressive behaviors from the community – including stoning, the throwing of water and urine, and verbal and physical attacks – all of which are manifestations of the toxic police-community relationships that persist in Rio’s favelas. By contrast, when police reported having wounded someone in the past “once or many times”, they were significantly less likely to record. These results suggest that the cameras might have generated a paradoxical equilibrium where officers chose to record interactions to protect themselves and refused to record likely because they were afraid the footage could be negative for them.

Low levels of compliance suggest that this technology in itself is no solution to police brutality. If the camera is off, there is no reason that officers be afraid of being punished for their misbehave. Moreover, if body-cameras discouraged police from performing policing activities, we would not recommend scaling the program until institutional reforms are enacted to fully integrate the cameras into the organization’s protocols. This would require, among others, more proactive supervision on the camera protocols such that officers are effectively sanctioned for disobeying. Moreover, in line with [McCluskey et al. \(2019\)](#) the police would need to monitor the images to observe police-civilian interactions and establish behavioral norms police need to follow such that abusive forms of police behavior are sanctioned. None of these took place during our study.

Supervisors appear to have sabotaged the experiment by refusing to punish officers who disobeyed the protocols even when their superiors in the military police strongly

endorsed the study. To try to resolve the problem with compliance, we randomly assigned cameras to supervisors during part of the study. There are only two supervisors monitoring the activities of all units in Rocinha. When supervisors wore a camera, the probability of a BOPM increased drastically, from .02 to .06. These results could be interpreted in two ways. On the one hand, When supervisors wore cameras, they felt more compelled to do a better job of supervising their officers. The other possibility is that police felt their actions were recorded when their supervisors wore cameras even when they refused to use their own cameras to record.

Lastly, using extensive interviews with police, the paper explores the cultural and organizational factors explaining why police and supervisors resisted the introduction of body-cameras as a system of accountability. Our interviews uncover an unsettling "killing consensus" similar to the setup uncovered by [Willis \(2015\)](#)' path-breaking ethnography of homicide detectives in São Paulo. Police in Rocinha's UPP sustain an organizational culture where officers conceive their role as "exterminating criminals" with absolute disregard to the value of human life. Given this consensus, frontline officers and supervisors considered the cameras as an obstacle to "doing their jobs". In the violent and hostile context where they operate, police believe that doing their job necessitates rough and often "illegal actions", which obviously would be hard to record without incriminating them.

Police in Rio de Janeiro

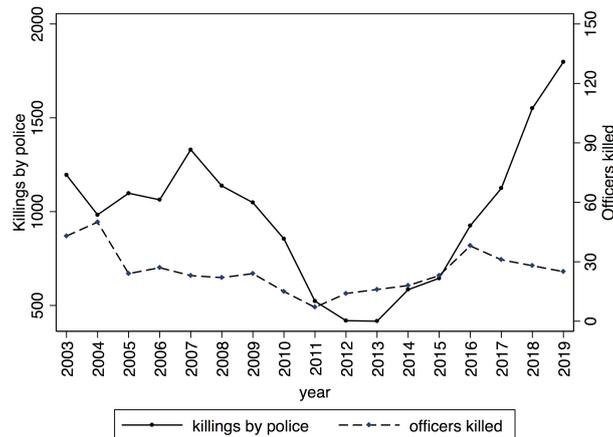
Rio provides a unique social laboratory to gain insight into the bureaucratic and organizational challenges entailed in reforming a large corporation of more than 40,000 police officers and composed of more than forty territorial battalions and a variety of specialized units, each with a unique culture and organizational practices. The military police of Rio is one of the deadliest police forces in the world. Data on homicides from the State's Institute of Public Security (ISP) show that Rio's police killed at least 19,865 people between

2003 and 2019. Roughly 20% of all registered homicides in that period took place at the hands of on-duty officers. The military police has justified these killings on the basis of self-defense or “resistance to arrest” (*auto de resistência*). The criminal justice system practically never investigates or punishes these killings (Brinks, 2007). Since the 1980s, drug trafficking groups began to fill the governance vacuum in the favelas (Dowdney, 2005). In tandem, militias made up of former police officers, firemen, and prison guards emerged across the city, promising to remove drug gangs and provide security to citizens (Cano and Duarte, 2012).

The military police, in charge of crime prevention and patrolling, came to increasingly rely on special operation units such as the Battalion of Special Operations (BOPE), trained in urban warfare, as well as tactical teams operating inside the territorial battalions, known as GTTPs, in order to fight a war with drug trafficking factions. The war on drugs has produced exorbitant levels of violence. In the 1990s, a “bravery bonus” was introduced to pay officers that killed drug-traffickers. The policy had the effect of increasing police violence, including extrajudicial killings (Cano and Santos, 2007). It was reversed but the culture of police violence remains.

Starting in 2008 the Rio government introduced a wide-reaching policing project, the Pacifying Police Units (UPPs) (Willis and Prado, 2014; Lessing, 2015; Magaloni et al., 2020). The goal was to foster a new policing mentality based on notions of “proximity policing”. The first UPP was introduced in December of 2008 and the program gradually expanded to cover 160 favelas with over 10,000 police officers deployed. The expansion of the UPPs halted in 2014.

Figure 1: **Police killings**



Notes: Data from the Institute of Public Security (ISP).

Between 2008 and 2013 there was a sharp reduction of more than 60% in fatal police shootings, though this tendency reversed thereafter, as can be seen in Figure 1. Moreover, fatal police shootings significantly escalated with the economic recession of 2015, which also brought an increase in crime. In 2018, Rio de Janeiro elected Governor Wilson Witzel, who promised to “slaughter” armed suspects once he took office. The total number of police killings continued to increase after his election.

Rocinha: context of study site

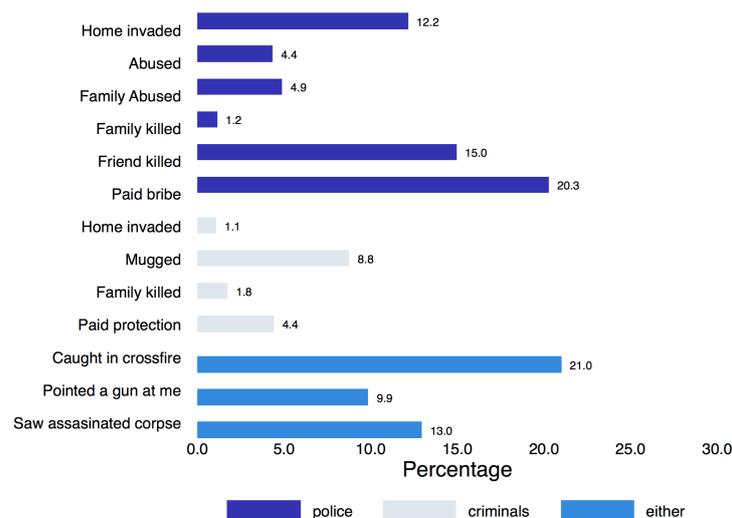
The study site was chosen by the General Commander of Operations of the military police. Rocinha is one of the most valuable territories for drug trafficking because of its size and geographic location, near the wealthiest neighborhoods. Rocinha received a UPP in 2012. For a year, the UPP was well received, until the Amarildo scandal in the summer of 2013, when Rocinha’s UPP was implicated in the torture and killing of Amarildo de Souza, a bricklayer from the favela. De Sousa’s death occurred in a police building which had CCTV cameras around it. The footage showed De Sousa entering the police station. The commander of the unit claimed that he had left the police building

by a door with a broken camera.¹ The Amarildo scandal severely damaged the UPP’s reputation and soon after this took place, the police lost control of the local situation.

In November 2015 we collected a representative survey (n = 1,873) about perceptions of security and the police among favela residents in Rocinha.² Figure 4 reports the percentage of respondents who were victimized by police and by criminal groups. Victimization by police appears to be more prevalent than victimization by criminal groups.

In our fieldwork, residents also reported being victims of disrespect, systematic and aggressive low-level arrests and police stops, and extortion. Not surprisingly, when residents were asked whether they considered police more violent than criminal groups vs. the community, 47% agreed and 20% disagreed, with the rest in between. The majority (51%) responded that they would rather “have the UPP leave their favela.”

Figure 2: Survey on Community Victimization



Notes: Notes: Percentage of residents who reported being a victim at the hands of police, criminals, or either of them during the last six months. “Paid bribe” to police and “paid protection” to criminals were asked while referring to someone the respondent knows.

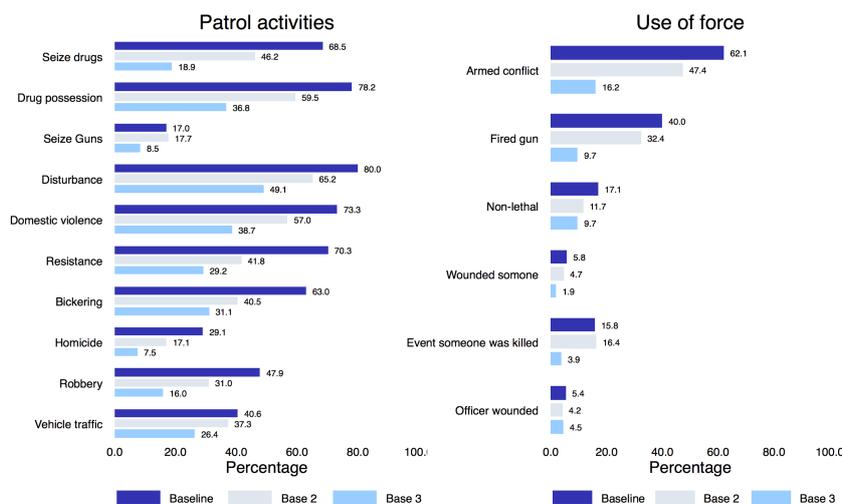
Unlike the community survey that could not be collected again due to resource limitations, we were able to collect three rounds of surveys with police officers. The baseline

¹During this period Google Ideas and the Igarapé Institute ran a small body-camera pilot program in this unit. The pilot included very few cameras and was not designed as an RCT, nor was it evaluated with systematic data.

²Details relating to our collection methods are provided in the Online Appendix.

survey was collected in November 2015 and rounds 2 and 3 were collected in June-August and October-November of 2016, respectively.³ Figure 3 reveals that during our study, there seems to be a systematic decline in patrol activities (figure on the left). Moreover, there is a dramatic decline in self-reported Use of Force (figure on the right). It should be noted that the decline in the use of force does not seem to be associated with a higher propensity among officers to get wounded.

Figure 3: Police actions

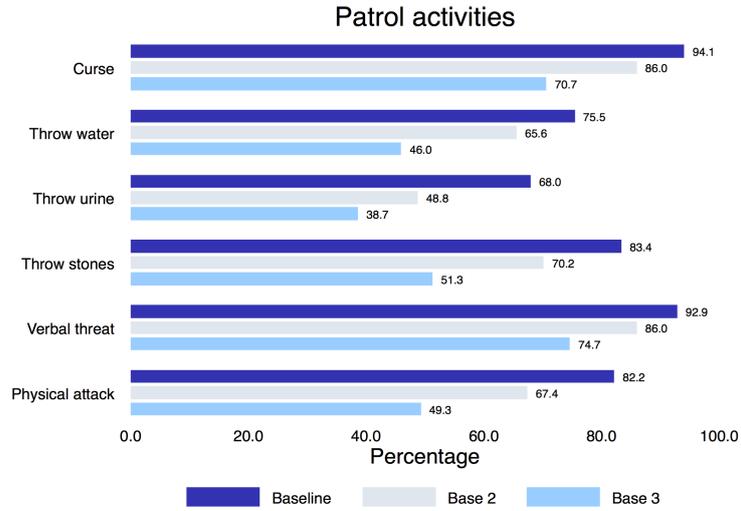


Notes: Percentage of officers who reported performing these actions. For the specific wording of our questions, please consult the Online Appendix.

Residents throw water, urine, and stones at the police, and will curse and physically attack officers. Changes in police behavior, including reductions in use of deadly force, might partly be responsible for the drastic reductions in community hostility that officers report, which can be seen in Figure 4. We can not attribute these changes to the body-cameras but, as we will demonstrate below, these had a significant effect dissuading the police to engage in direct interactions with residents. Many of these interactions tend to be aggressive and violent and their reduction might have contributed to a decline in community aggression toward the police.

³We collected 268, 235, and 171 responses, respectively.

Figure 4: **Community aggression toward the police**



Notes: These data come from three rounds of police surveys collected during the study.

Study Design

We considered five types of units. For most units, the shift randomization was made at the unit level (e.g., all or none of the officers received cameras in each shift). The units in the study were:

GTPPs: these are tactical units that often engage in armed confrontations. GTPPs are not deployed to fixed geographic areas but are deployed to locations where special operations take place. There were three GTPPs units during the length of the study, each with five to seven officers each.

GPPs/Visibilidades: these units are assigned to fixed geographic areas and carry out foot patrolling. GPPs perform “proximity” policing functions. Most units have two to three officers working shifts of twelve hours.

GPPs/Bases: these are deployed to fixed geographic areas and also carry out regular patrolling functions. Nevertheless, they have more police officers (four to five) and have shifts of 24 hours.⁴

⁴Later in the study, these units were called Patrullamentos.

Supervisors: there are only two supervisors in the UPP and work 24 hours shifts. They are in charge of monitoring the UPP’s operations. For supervisors, we randomized the days (full weeks) when they received a camera from February to July.

Radio/Patrolhas: these were included in March at the request of the UPP Commander. They are smaller units (two officers) with two patrols units that are deployed with vehicles to fixed geographic areas. We exclude them from the analysis because of the limited data they generated on the treatment group.

Some of the treated units received a camera during every shift, but other officers received a camera during only some shifts. This strategy allowed us not only to compare treated and control units, but also to compare officers *within* the same unit at different points in time with and without cameras, as shown in Figure A2 of the Online Appendix. Our study originally varied the treatment (camera assignment) within treated units across two dimensions:

Coverage: Some treated units were randomly provided cameras for all police officers working that shift (“full team”), while the rest of the treated units were provided cameras for only half of their officers (“half team”). In this later scenario, cameras within a unit were randomly assigned among officers during each shift. The objective of this variation was to assess whether all or only some officers needed to be equipped with a camera in order to observe an impact on their behavior.

Usage Protocol: officers in some units were randomly assigned to the protocol that asked to turn their cameras on during their entire shifts (“always on mode”). Other units were randomly required to turn on their cameras only when interacting with citizens (“interactive mode”), which is the prevalent practice in the U.S. Our intuition was that it would be more difficult for officers to refuse to turn on their cameras if they were asked to record their interactions all the time. Unfortunately, the “always on mode” had to be abandoned in the middle of the study, as we report next.

Each officer assigned to a camera received a copy of the protocol they were expected to follow along with the official publication of the document. Each day, cameras were

distributed by Rocinha's Armament's Reserve. Thirteen docking stations to recharge the body-cameras and to download recordings were also placed. Every day, officers in charge of distributing and registering equipment would provide a camera to each of the officers assigned to the experiment. Additionally, the Armament's Reserve displayed a printed copy of both protocols outside of its glass window. Several training sessions were conducted on how to use the cameras and how to best follow the protocols.

Changes in the design of the study

Conducting a field experiment in a highly volatile and violent setting was challenging. The original study had to be re-designed in three ways. In February we had to drop the "half team" variation of the treatment. At first, to assign cameras to half or full teams we collected information relating to police officers' monthly shifts. Armament Reserve's officers received a monthly assignment spreadsheet and distributed the equipment accordingly. After a few months, we realized that officers were often moved to different shifts daily, which meant that we needed to collect information on officers' shifts every day to improve compliance with the randomization and treatment assignment. Notably, after we began collecting officers' shifts daily, compliance with camera assignment improved to more than 90% (as can be seen in Figure A4 of the Online Appendix). On the previous night, Armament's Reserve officers received the researchers' assignments for the next day.

The second change came in May 2016 when there was a change in Rocinha's UPP commander, who implemented substantial changes to the size of the units as well as to their territorial distribution. Some units previously allocated to the study were disbanded and new units were added. These changes affected five of the ten original GPPs-Visibilidade units, which merged into three new units that were assigned to the control group. The territoriality of the other GPP-Visibilidade, GPP-Base, and GTPP units remained unchanged.

The last major change came in July 2016, after the military police organized group

conversations with police officers in the study to discuss the importance of the cameras and reinforce the protocol. It was clear from those conversations that police officers felt extremely uncomfortable with the full-time (“always on”) protocol, and that efforts to improve compliance among officers assigned to this treatment were unsuccessful. Consequently, we adjusted our study and dropped this variation of the treatment.

Table 1: **Number of shifts by unit type**

	Treatment	Control	Total
BASE/PATRULHAMENTO	877	581	1,458
GPP/VISIBILIDADE	5,002	2,472	7,474
GTPP	518	557	1,075
RADIO PATRULHA	1,250	129	1,379
Total	7,647	3,739	11,386

Table 1 shows the number of shifts in the control and treatment groups by type of unit. Bases (GPPs 24 hours) assignment was constant across the study (two units in the control group and two units in the treatment group). Two of the three GTPP units were always assigned to the treatment group. Nevertheless, we varied the months in which each unit was assigned to each of these groups. The higher percentage of shifts in the treatment group for GPPs/Visibilidade reflects the creation of new units after the start of the study and the existence of smaller GPP units that were assigned to the treatment group during the length of the study.

Policing Activities: “BOPMS”

Our first dependent variable is “occurrences”, also called BOPMs. According to official records, about 710 occurrences were reported in Rocinha during the study. Each occurrence is reported by the leader in charge of the unit that was involved in the incident. Occurrences are classified by the police according to their source and crime code. This generates the following types of occurrences, shown in Table 2. More than half of occurrences (57%) originated from the Operations Center and include all calls to 911 and

other request made to the police. Calls included in this category concern triggered security alarms (e.g., potential thefts), robberies, domestic violence incidents, loud noise complaints, street fights, gunshot reports, drug seizures, and police operations more generally. “Requests” originate in response to a petition made directly to an officer by a citizen in the street, a colleague officer, or other security agent. This category mostly comprises street incidents, traffic accidents, hospital transports, and medical emergencies. Although we lack data for other UPPs or territorial battalions, the level of police activity seems to be very low. Drawing from [Magaloni et al. \(2020\)](#), we suggest that the fact that in many favelas drug lords rather than police enforce local order and sanction common crime might explain why there appears to be so little policing activity. We note, moreover, that in Rocinha most favela residents experience the police, more than the criminals, as agents of oppression and for this reason they often do not report crimes to this institution.

For the purpose of the study, we will consider four types of BOPMs: 1) Total BOPMs; 2) BOPMs related to “Requests”; 3) BOPMs initiated at the “Operations Center”; and 4) BOPMs that involve direct interactions with residents. These include “*abordagens*” (stop-and-search); “encounters” that consist of all the “unexpected” interactions or events police officers experience during their regular patrols; interactions with “suspicious individuals”; events where suspects “initiate the aggression”; and events that are said to “disrupt the peace.” For the analysis, we group this in a new category, “Stops and other interactions”.

Table 2: **Types of Occurrences (BOPMS)**

	GPP/ Base	GPP/ Visibilidade	GTPP	Radio Patrulha	Other	Total
Operation Center	5	165	33	134	17	354
Request	4	59	8	16	3	90
Abordagens	5	15	21	2	15	58
Encounters	3	59	20	20	17	119
Suspicious person	4	19	24	2	4	53
Public disturbance	2	39	0	23	0	64
Drug trafficking	0	5	7	3	3	18
Crimes against women	1	25	0	7	1	34
Transport to the hospital	0	37	0	20	0	57
Alarm Trigger	0	25	1	34	7	67
Total BOPMs	17	298	82	172	53	622

Effects of assignment to body-cameras on BOPMs

In this section, we assess the effect of cameras on the probability that any police officers in a shift are involved in a BOPM. Given that BOPMs are reported at the unit/shift level and not at the individual officer level, our unit of analysis are GPPs/Visibilidade, GPP/Bases and GTPPs. The former two are grouped together because both are similar and perform “proximity policing” functions.

Given that 70% of shifts that registered a BOPM did not record it, the analysis in this section will focus on Intention to Treat (ITT) effects. We consider a shift treated when one or more police officers in a shift are assigned to a camera regardless of whether they turned it on or not. We contrast the behavior of these shifts with those that did not get cameras during their shifts. In this sense, the “treatment” consists of *wearing a camera* regardless of whether officers record or not.

Table 3 shows the coefficients of logit models on the probability of an occurrence during a particular unit-shift. For each type of BOPMs we ran two models: the first isolates effects of camera assignment controlling for type of unit and the second interacts the assignment with type of unit. GTPPs serve as the base category. All models are logits where we code as 1 when there is any event in the shift and 0 otherwise. As robustness tests we ran OLS regressions (shown in the Online Appendix) with the same zero-one

specification and with the total number of BOPMs.

Table 3: **Effect of Body-Cameras on Occurrences (BOPMS)**

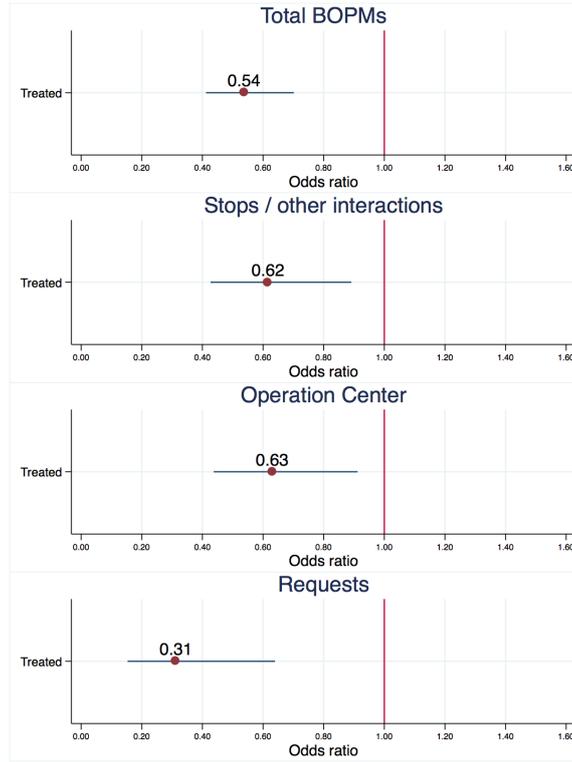
	Total BOPMs		Stops Interactions		Operation Center		Requests	
	1	2	3	4	5	6	7	8
Assigned camera	-0.621*** (0.1359)		-0.483** (0.1878)		-0.460** (0.1876)		-1.161*** (0.3645)	
GPPs	-1.167*** (0.1396)		-1.346*** (0.1880)		-0.872*** (0.2077)		-0.263 (0.4065)	
GTPP X Camera		0.232 (0.2417)		0.135 (0.3140)		0.367 (0.3744)		0.185 (0.7665)
GPP X Control		-0.672*** (0.1973)		-0.967*** (0.2585)		-0.379 (0.3103)		0.336 (0.5971)
GPP X Camera		-1.740*** (0.2517)		-1.832*** (0.3329)		-1.154*** (0.3625)		-1.236* (0.7320)
cons	-2.191*** (0.1314)	-2.605*** (0.1832)	-2.855*** (0.1746)	-3.156*** (0.2343)	-3.205*** (0.1989)	-3.631*** (0.2925)	-4.485*** (0.3914)	-5.037*** (0.5792)
N	8970	8970	8970	8970	8970	8970	8970	8970

Notes: Coefficients from logit models and robust standard errors in parentheses. *** : $p < 0.01$, ** : $p < 0.05$, * : $p < 0.1$.

The results for models 1, 3, 5, and 7 demonstrate that when officers are assigned a camera during a shift, the probability of a BOPM reduces significantly. To explore the magnitude of the effects, Figure 5 presents the results expressed as odds ratios. The results reveal substantial reductions of policing activities. The predicted probability of a BOPM reduces by 46%⁵ when officers are assigned a camera. The probability that police stop or have other type of direct interaction with residents drops by 37%. The effect of using a camera translates into 43% reduction of BOPMs originating from the “operation center” and a 69% reduction that the police would respond to “requests” made to them in the street.

⁵Calculated as $1 - 0.54$.

Figure 5: **Predicted effects of camera assignment on BOPMs**



Notes: Estimated effects and their 95% confidence intervals come from logit Models 1, 3, 5, and 7 of Table 3. Effects are calculated as odd ratios.

Models 2, 4, 6, and 8 in Table 3 interact the treatment with specific units. Across these models, we find that cameras do not reduce policing activities by GTTPs, but they strongly discourage GPPs to engage in BOPMs. Marginal predicted effects for the interactive models are presented in the Online Appendix, section 3. We speculate that the differential effects of body-cameras among type of units stem from differences in their engagement with the community and how they are supervised. GPPs have the most direct interaction with residents, and as can be seen in Table 2, they generate most of the BOPMs. Instead, GTTPs are deployed directly by the UPP commander to perform special operations, and they generate fewer BOPMs. The UPP commander supervises more directly GTTPs than GPPs. The latter are supervised by two individuals who oversee all the operations of these and other units in the entire favela.⁶

⁶Another factor to highlight is that we have fewer BOPMs by GTTPs, and when estimating marginal effects for this unit, the confidence intervals are too large and indistinguishable from one another, as shown in the Online Appendix.

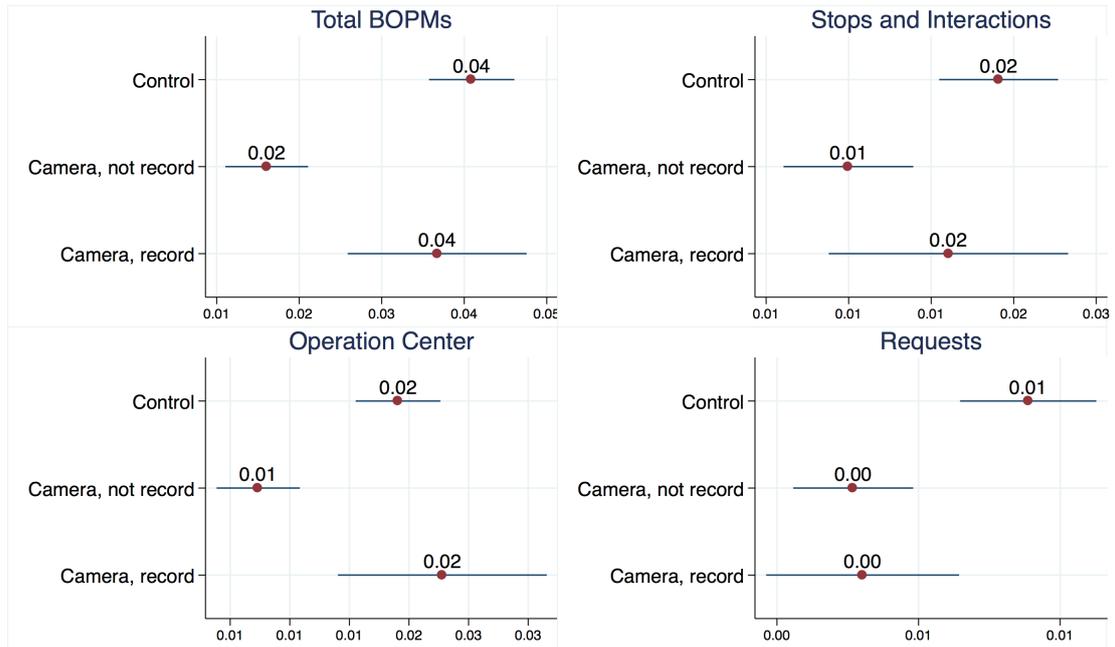
In the Online Appendix section 4 we elaborate on the results driven by cross-unit variation or by within-unit variation. The models suggest that within-unit variation over-time is as important as cross-unit variation.

Effects of camera usage on BOPMs

We highlight that the fact of wearing a camera rather than its footage induced police to engage in fewer BOPMs. Of more than 3,300 BOPMs registered in shifts that were assigned cameras, only 30% recorded the event. In this section we analyze treatment effects focusing on camera usage on the probability of a BOPM. As before we use a zero-one specification of the dependent variables and logit models, reported in section 5 of the Online Appendix. We present estimated effects in Figure 6. In the case of total BOPMs, the probability of registering BOPM is significantly smaller when shifts are assigned a camera and police refuse to record. By contrast, when police record their interactions, the probability of a BOPM increases significantly - it becomes almost the same as the control group's. The result is similar for BOPMs originated at the Operation Center and for "Stops and interactions", although in the latter case the confidence intervals are much larger, which makes it hard to distinguish between those who turned their cameras and those who did not. For "Requests" we find that the estimated probability of registering a BOPM is the same for shifts that recorded and not recorded.

When lack of compliance is systematic, we believe that a paradoxical equilibrium emerges where mostly "good" interactions get recorded or because, as we explore next, they believe the images can protect them from a hostile community. The low level of compliance implies that body-cameras are no solution to policy brutality. Officers might engage in fewer BOPMs and refuse to respond to calls for help, but if the camera is off, there is no reason that officers be afraid of being punished for their misbehavior.

Figure 6: **Estimated marginal effects of turning the camera on to record**



Notes: Estimated effects and their 95% confidence intervals come from logit Models presented in the Online Appendix, section 5 Table A3

Modality of treatment and supervision

We model the probability of an occurrence for each treatment modality focusing again on Intention to Treat Models (e.g., camera assignment.) For the purpose of reporting the results in one single table, we group in row one what we label here “half treatments.” These correspond to the following modalities: “some officers”, “interactive mode” and “supervisors with no camera.” In row two we group “full team” “always on mode” and “supervisors with camera.” Data for each treatment modality is from the time such modality was in effect: Coverage (November to February), Protocol (November to July), and Supervisors (February to July). As before we use logit models where the dependent variable is coded as one-zero reflecting the presence or absence of an occurrence during a shift, respectively. In the Online Appendix, we present robustness tests using OLS regressions.

Table 4: **Modality of Treatment and Probability of an Occurrence**

VARIABLES	T1: Coverage Some officers full team		T2: Protocol On interactions or always on		T3: Cameras Assigned to Supervisors yes/no	
	1	2	3	4	5	6
Half	-0.151 (0.4043)		-0.669*** (0.1982)			
Full	-0.574* (0.3423)		-0.476** (0.2328)		1.204*** (0.3705)	
Half X No Camera		0.371 (0.6439)		0.00249 (0.4515)		
Half X Camera		-0.328 (0.4706)		-0.747*** (0.2088)		-0.953 (0.8266)
Full X No Camera		0.383 (0.6113)		-0.542 (1.0151)		1.103** (0.4313)
Full X Camera		-0.755** (0.3744)		-0.470** (0.2372)		0.55 (0.4491)
GPPs	-2.310*** (0.3026)	-2.248*** (0.3096)	-1.817*** (0.1769)	-1.804*** (0.1780)	-1.385*** (0.2122)	-1.568*** (0.2233)
const	-1.638*** (0.2854)	-1.679*** (0.2907)	-1.633*** (0.1709)	-1.643*** (0.1718)	-3.124*** (0.3874)	-2.665*** (0.4506)
N	1893	1893	4905	4905	3012	3012

Notes: Coefficients are from logit models and robust standard errors in parenthesis. Data is from the time the modality of treatment was in effect. T1 (November to February), T2 (November to July). T3 (February to July). *** : $p < 0.01$, ** : $p < 0.05$, * : $p < 0.1$.

Model 1 in Table 4 shows the effects of Coverage on the probability of a BOPM. When cameras are assigned to “full teams”, the probability of a BOPMs decreases, although this is only significant at the 10% level, probably because of the small number of observations. The “half team” treatment is also negative but statistically insignificant. Model 3 shows the effect of the Protocol. Officers assigned to the “interactive” and the “always-on mode” are significantly less likely to engage in a BOPM than the control group. We note that the negative coefficient for the “interactive mode” is larger in magnitude than the “always-on” mode. Lastly, model 5 shows that when supervisors are randomly assigned a camera, the probability of a BOPM significantly increases, relative to when they are not wearing a camera.

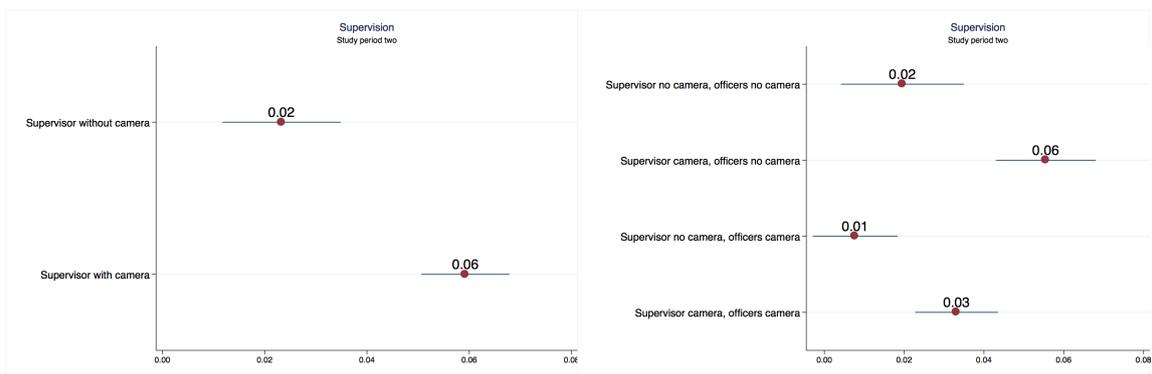
Models 2, 4 and 6 interact the treatment modality with whether officers are randomly assigned a camera during a shift. Our interest here is to know how these treatment modalities impact police behavior when wearing cameras or not. Model 2 shows that

when “full teams” are wearing a camera, they register significantly fewer BOPMs. The “half team” mode is not statistically significant when interacted with camera assignment. In terms of Protocol, Model 4 suggest that when officers are wearing a camera regardless of whether they are in the “interactive” or “always on” mode, they register fewer BOPMs. The negative coefficient is larger in magnitude for the “interactive” modality, which seems to have dissuaded more officers from registering BOPMs than the “always on mode”.⁷

The most notable effect was assigning cameras to supervisors. Figure 7 below estimates the marginal effects for Model 5. These effects are substantial and, in the context of Rio, point to the critical importance of local supervision on the way cameras influence police behavior. The results show that when officers are not wearing cameras but the supervisors are randomly assigned a camera, the probability of a BOPM increases from .02 to .06, a very significant increase. Furthermore, when police are wearing a camera, the probability of a BOPM increases from .01 to .03 when the supervisor is randomly assigned a camera. These results could be interpreted in two ways. On the one hand, when supervisors wore cameras, they could have felt more compelled to do a better job of supervising their officers. The other possibility is that police felt more scrutinized when their their supervisors wore a camera. Supervisors appear to have sabotaged the study because it was necessary to have cameras on them to make them do their jobs. Moreover, as we have argued, they refused to sanction officers who disobeyed the camera protocol even when our study had strong support from the military police’s High Command and the UPP’s General Command.

⁷It is important to highlight that when we estimate marginal effects for these two treatment modes interacted with cameras, the confidence intervals are too large to confidently distinguish between them.

Figure 7: **Estimated marginal effects of supervisors randomly assigned cameras**

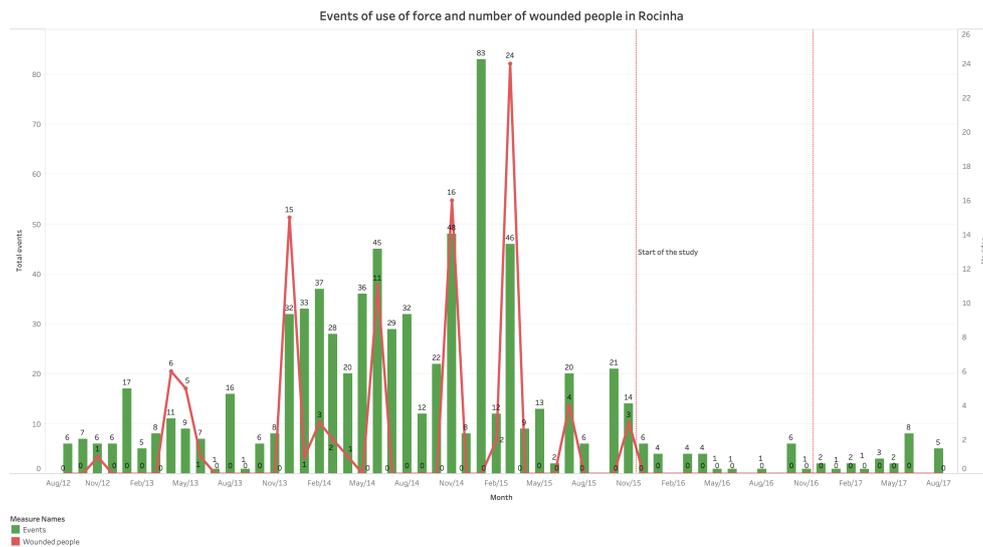


Notes: Estimated effects and their 95% confidence intervals come from logit Models 5 and 6 of Table 4.

Use of deadly force

Figure 8 shows the number of events involving gunshots and wounded persons in Rocinha since the creation of the UPP in 2012. The Amarildo scandal took place in the summer of 2013, and shortly after that event there is a clear escalation of armed confrontations in Rocinha. The military police lost control of the situation, and in 2015 it deployed to Rocinha the special operations battalion, BOPE. After the BOPE left, and there is a change of the local UPP commander, police violence begins to decline.

Figure 8



Notes: Number of events involving gunshots and number of reported wounded people. Source: UPP Rocinha.

From September 2012 to just before the experiment started, there were 711 events involving use of deadly force, for which 8508 bullets were fired. In 2014 and 2015, the police registered 350 and 232 events that involved the use of deadly force. During these events, officers used 4,527 and 3,035 bullets, respectively. During our study, we observed only 27 events when police fired their weapons, during which they used 489 bullets in total. The number of wounded people dropped from an appalling 93 to none during our study.

To assess whether cameras had an effect in the reduction of use of deadly force, we confront the challenge that there was a very small number of events when police fired their weapons during our experiment. Table 5 presents the number of bullets fired during these events by treatment and control groups and by type of unit. There were a total of 364 bullets fired when police were not wearing cameras and 154 when they were wearing cameras. It is important to note that GPPs fired *all* of their 162 bullets when they were not wearing a camera and Radio Patrulhas also fired all of their 9 bullets without cameras. The tactical unit, GTPPs fired significantly more bullets. Although GTPPs fired a significant number of bullets (154) when they were wearing a camera, still they fired more bullets (193) when they were not wearing a camera. We do not present statistical models because of the challenge of using such a small number of events to make sound statistical inferences. Hence, our evidence that camera assignment discouraged use of deadly force must be considered incomplete and preliminary.

Table 5: **Bullets fired by unit type and treatment status**

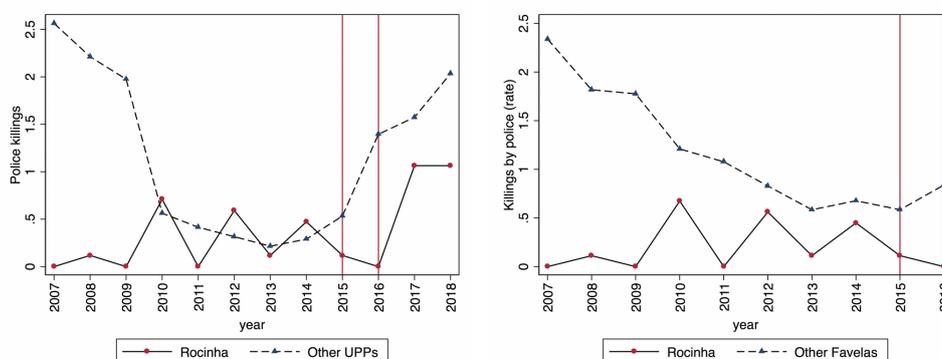
Units	Control	Treated
GPPs	162	0
GTPPs	193	154
Radio Patrulhas	9	0
Total	364	154

Notes: Excludes the "out of shift" and "out of experiment" bullets.

The fact that during 2016 Brazil hosted the Olympics in Rio might have led the police to behave in a less confrontational manner during our study to create an image of "peace" to the outside world. We use evidence beyond the experiment to question if there is a

systematic decline in use of deadly force beyond Rocinha during the study. If this is the case, the Olympics might have driven the reduction of use of force in our study site. We focus on police killings in other UPPs and in the entire universe of favelas, since these are more comparable to Rocinha. Figure 9 shows that during our study (between the vertical lines), police killings are decreasing in Rocinha and sharply increasing in the rest of the UPPs and favelas. After our study ended, there was a drastic increase in police killings in Rocinha (left figure).

Figure 9: **Killings by the police in Rocinha, the rest of the UPPs and the rest of Rio’s favelas**



Notes: Police killing rates per 100,000. Data on UPPs (left figure) comes from the Institute of Public Security (ISP). Data on favelas is from [Magaloni et al. \(2020\)](#). The vertical lines indicate the period of the study.

Organizational Culture

In this section, we aim to gain insight into how organizational culture and police mentality shaped the adoption of body-cameras. We report from the police survey, interviews, and focus groups.⁸ Drawing from our police surveys, we find that although 80% reported being “aware of punishments for not using the cameras,” only 9% said they had received a warning for disobeying. Importantly, only 35% reported that they were “frequently” or “sometimes” supervised regarding camera usage. In essence, there was no clear en-

⁸We collected interviews with the Military Police High Command, the General Command of the UPPs, Rocinha’s UPP Commanders and supervisors, officers from the Armament’s reserve, police in charge of supervising the images, as well as three rounds of focus groups with frontline UPP officers.

dorsement to the cameras by local supervisors and the UPP commander. Like the UPP commander in the epigraph, the other two local UPP commanders assigned to Rocinha during our study also believed that body-cameras would “prevent officers from doing their jobs.” It is hence worth reflecting on what precisely police in Rocinha’s UPP believe their job to be.

In the baseline survey, we asked officers to choose among three options concerning what the main goal of the UPP should be. A staggering 71% responded that it was to “combat drug trafficking.” Only 21% said it was to “reduce violence” and 8% to “service the community.” This “war” orientation toward crime-fighting, which distorts policing from its function as a guarantor of law and order to combat criminals in “war”, leads officers to act in rough and often unlawful manners. Officers explained that, in the violent environment in which they are immersed, it is often not possible to respect the laws. An officer articulated why: “criminals will most certainly try to shoot us to kill if they have the chance. Although the “correct” action is to enter an operation without shooting before any shots are heard coming from the other side, we cannot afford to do this.” He added that as the popular saying goes, “those who shoot to kill must be shot at to die.”

Other officers justified their rough actions based on the risks armed confrontations pose to their lives. An officer said: “Everyone here has a story of being very close to death. The risk of dying and leaving our families behind, or of becoming invalid, is very real. Then, you think ten times if it is worth it to run after a criminal and risk your life, or if you should just shoot and walk the other way.” Responding to this comment, a peer added: “If I am in a position like that, I’ll shoot until the guy stops.”

Most officers spoke to what they saw as “the unfeasibility” of expecting police to run after criminals during an operation instead of shooting. But a few others manifested a further desire to bring “justice” when the laws fail to punish criminals. An officer made the following malicious and cruel comment: “Good-for-nothings (*vagabundos*) are all the same. It does not matter if they are eight or ten years old. If I can do it [shoot to kill], I will ... the laws are not on our side. You arrest a criminal today and tomorrow he is back

on the streets.” Adding to this comment, another officer told us: “The judicial system is what needs to be changed. Once, I arrested the same guy twice in one week.” Another police officer then added: “This is why it is often better to kill than to arrest.” Officers stated that death occurrences are customary in their jobs. “When officers kill a civilian, the Sergeant comes after us, then the Commander. We must go to the police station, where the police chief interrogates you. Then you go to the CPP (Central Headquarters of the UPP). Once this is all done, you have already lost one of your days off.”

This last comment is incredibly telling about the level of “numbness to killing” some officers have achieved. Here, he talks about the stress involved in having to go through all the administrative steps when you kill someone, but not about the actual stress that taking a life must cause. The effort to substitute the warrior and vigilante tactics and mentalities with the creation of a community-oriented police force failed. As a UPP officer told us: “There is a duality inside the corporation. They teach us one thing but expect something different.” Even though UPP officers were supposed to engage more with the community, they are still trained and expected to act like soldiers as they wage “a war against crime.” It is clear in many of these comments that, if body-cameras were to be used properly, they would indeed generate images that could be extremely prejudicial to the officers. An officer bluntly expressed his resistance to the cameras: “Nobody is obligated to generate proof against themselves ... but that happens with the police officer when he is wearing a camera.”

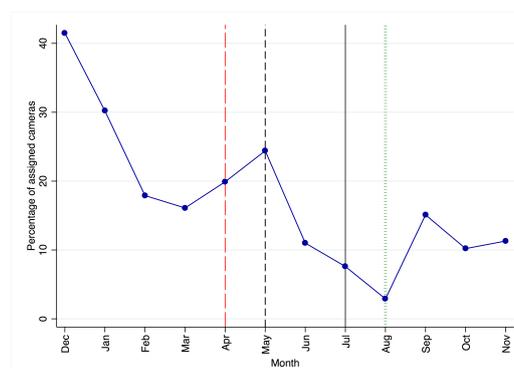
The police building of Rocinha’s UPP is just a small office made from metal. A policeman told us: “We are in the enemy’s territory and we have been completely abandoned [by the state].” Officers pointed to the numerous bullet holes the building has taken and underscored the extent to which the state left them “right in the wolf’s mouth.” Reflecting on the broader institutional context, a policeman told us: “You do not see anything in here ... no basic sanitation, no schools, no universities, no health centers. Only the police are here, and we are always seen as the villains in the story.” The tragedy is that favela residents are caught in between two enemies at war. In our surveys, 85% told

us that residents frequently or sometime refuse to cooperate with the police, and 65% told us they feel “that their physical well-being is threatened by residents.” Interestingly, police saw a benefit to turning on their cameras in order to protect themselves from residents’ aggressive behaviors. An officer reflected on the utility of the body-cameras with the following words: “I think some people look at the camera and think: ‘I better not try anything. He is filming everything.’” Another officer added: “They [favela residents] think that we are filming at all times ... some of them even avoid walking in front of us.”

Camera usage

Figure 10 shows the percentage of cameras that were turned on during a shift in the study period. At the beginning of the study there is high compliance, with 40% turning their cameras on at least once during a shift. This number drops to less than 5% in August and after that usage increases to around 10%. Moreover, the number of minutes cameras were turned on was very small – average usage across all cameras was 1.4 minutes per hour. Those cameras that were turned recorded an average of 7.5 minutes per hour.

Figure 10: **Percentage of assigned cameras that were turned on**



Notes: Long-dashed line: footage management moved to the 23rd Battalion. Dashed line: PM publishes order that every Occurrence must be recorded. Solid line: “always on” mode is eliminated. Dotted line: monthly body-cameras usage reports are distributed to officers.

Our first attempt to have a team of policemen work on the footage at the Central Headquarters of the UPPs (CPP) ultimately failed. After three rounds of training and numerous discussions about the recording process, we concluded that moving the infras-

structure of footage management to Rocinha's UPP—with a room, supervisor, and team only dedicated to performing this task—was necessary. By the end of April, the footage was physically allocated to Rocinha, which comprised a full-time coordinator and six officers working under the supervision of Rocinha's sub-commander. As can be seen in Figure 10, moving the footage management to Rocinha created the impression that the images were being monitored and considerably increased camera usage between April and May.

We implemented other actions to improve camera usage. We negotiated with the military police's High Command to publish a protocol in its Official Bulletin introducing a new rule, starting in May 2016, to reinforce the fact that every police report (BOPM) generated by an officer using a camera *had to be recorded*. The document provided procedures for penalizing officers who refused to turn their cameras on when interacting with residents and registering an Occurrence. As can be seen in Figure 10, this change in protocol increased camera usage in May. However, because local supervisors in Rocinha did not report officers who disobeyed, usage began to decline precipitously after May.

Researchers implemented two more measures aimed at improving camera use. In August, we began to distribute reports on daily camera use to police officers. Upon the collection of their cameras at the station, each officer received a printed copy of an individual report showing his or her daily camera usage during that month. Moreover, we created a monthly procedure to identify the worst performing officers. Given the high level of non-compliance, we randomly selected four officers from among those with less than two minutes of recording; these officers were then called upon by their superiors to explain their low usage. Camera usage increased in September after these measures, although it remained low until the end of the study because, as our interviews revealed, supervisors did not prioritize enforcing the camera protocols.

Factors associated with camera usage

This section provides systematic evidence about the factors associated with officers' willingness to turn their cameras on. We merged the data on camera usage with our police officer surveys, with the procedure that we detail in the Online Appendix. We were able to match a total of 416 surveys out of 674. The Online Appendix shows that the matched reduced sample and the entire sample are mostly balanced. We use the following covariates:

- **Community hostility index:** A composite index of answers to six questions about different types of aggressive community behaviors against officers, which were reported in Figure 4. Our index has a Cronbach's alpha of 0.88, which suggests that this measure has internal consistency. The higher the perceived community hostility, the more we expect police to turn their cameras on.
- **Armed confrontation index:** A composite index of three questions, also reported in Figure 3: firing a gun, engaging in armed conflict, and participating in an event where someone was killed. Our Cronbach's alpha is 0.75. Higher levels of the index are expected to induce less camera usage.
- **Supervision:** A dummy variable indicating if the officer reports being supervised regarding camera usage. We expect this variable to have a positive effect on camera usage.
- **Officer wounded:** A dummy variable indicating whether the officer had been wounded with a gun while in service. We expect this variable to have a negative effect.
- **Wounded someone:** A dummy variable indicating whether the officer has wounded someone "one or many times" with a firearm while in service. We expect this variable to discourage police to record their interactions. These last two variables are also reported in Figure 3.

Table 6: **Factors Associated with Camera Usage**

	M1	M2	M3	M4	M5	M6
Community aggression index	0.0149*** (0.0037)					0.0150*** (0.0046)
Armed confrontation index		0.0142** (0.0054)				0.0153** (0.0061)
Supervision			0.00879** (0.0034)			0.00740** (0.0034)
Officer was wounded				-0.00661 (0.0055)		-0.0104 (0.0075)
Officer wounded persons					-0.00716* (0.0042)	-0.0164*** (0.0049)
cons	0.0215 (0.0205)	0.0312 (0.0206)	0.0227 (0.0212)	0.0341 (0.0209)	0.0317 (0.0204)	0.0185 (0.0223)
N	263	259	240	256	257	231
r ²	0.073	0.0604	0.0539	0.0517	0.0467	0.113

Notes: Coefficients from OLS models and robust standard errors in parentheses. Errors are clustered at the unit/shift level. All models control for age, education and type of unit. *** : $p < 0.01$, ** : $p < 0.05$, * : $p < 0.1$.

We use an OLS regression where the dependent variable is the number of minutes the officer turned his camera normalized by the number of minutes that the officer was assigned a camera. This is calculated from the beginning of our study to when the survey was collected. For officers who answered more than one survey, we calculate camera use until the moment of the collection of the survey so as not to double count. Our models control for officers' demographics (age, education, race) and unit. Errors are clustered at the unit-shift level. To ensure our results are not driven by outliers, we exclude three instances of very high camera use of camera. In the Online Appendix we also show a robustness test using inverse hyperbolic sine transformations. Results are robust.

Reported in Table 6, our results support the conclusion that police who reported experiencing more aggressive behaviors from the community turned their cameras on more often. Contrary to our expectations, the higher the armed confrontation index, the more police turned on their cameras. The more that officers reported being supervised on the use of the cameras, the more they turned them on. Police who have wounded someone in the past "one or many times" resisted recording their interactions at higher rates.

Conclusion

Despite the fact that only 30% of the reported police-civilian interactions were recorded, the very fact of wearing a camera strongly dissuaded officers from engaging in interactions with civilians. Many police-civilian interactions in Rocinha tend to be aggressive: residents report of being “frisked”, “abused” and “treated with disrespect”. In this sense, a reduction of policing activity could be considered a positive outcome by residents who experience the police as oppressive, and as we report in the Online Appendix, this depolicing effect did not induce an increase in crime during the study. Furthermore, during the study, police report suffering increasingly less hostility from the community, which could be the result of changing officer-resident dynamics induced by the cameras. In a worrisome manner, however, camera assignment also discouraged a broader set of necessary policing activities, including acting upon requests of help from residents.

It is intriguing that body-worn cameras induced changes in police behavior even when these were seldom turned on. We suggested that these behavioral changes could have been driven by an indirect psychological effect where police felt more scrutinized simply because the military police’s High Command decided to introduce the cameras as a system of accountability in Rocinha. The camera protocol obliged officers to record every interaction with civilians, and we have shown that many officers decided to abstain from these interactions likely because they did not want to record these. The paradoxical result is that police who chose not to record were the ones whose interactions with civilians are more likely to be more abusive. By contrast, police who chose to record either wanted to use the footage to inhibit aggressive behaviors against them from the community, as our results on camera usage demonstrate, or might be officers who are more respectful with civilians.

In this case of general disobedience with the camera protocols, body-cameras would hardly work to restrain police misconduct. If police-civilian interactions are not recorded, officers have no reason to be afraid of being punished for their abusive behavior. A big

limitation of body-cameras is hence that they give too much freedom to police to activate them. Given the strong problem with compliance, we believe that to work cameras would need to be activated from the main station, withdrawing this decision from frontline officers. This technology already exists and might be something to consider in places where there is an organizational culture of disobedience. However, it is important to highlight that if the decision to turn the cameras on were to be delegated to supervisors, these necessarily would need to fully endorse the cameras as an instrument to control police violence or otherwise the question would become: who monitors the supervisors? In our study, supervisors did not endorse the cameras voluntarily and we had to assign them cameras to compel them to do a better job supervising officers. Indeed, when we randomly assigned cameras to supervisors, the results demonstrate that officers significantly increased both their policing activities and their camera usage.

Moving forward, the motivating question on how best to control police violence brings us back to the epigraph where a police commander warned us that police would refuse to do their jobs if they wore cameras. This comment summarizes well some of this study's findings, and furthermore, speaks to the intrinsically broken and systematically violent organization that is policing in Brazil ([Caldeira, 2002](#); [Willis, 2015](#); [Costa, 2011](#); [Magaloni and Cano, 2015](#)). We observe a culture so ingrained in the construction of policing that introducing systems of accountability would lead police officers to stop doing their job. This, then, raises a similarly interesting question: what exactly is their job? As this paper revealed, police conceive their job as to wage "war with criminals," to shoot first and think later. In this ensuing battle, the very communities police are supposed to protect are seen as hostile forces.

Our study is on body-cameras but our findings are broader than that. The study reveals the messiness of policy implementation and difficulties with police reform. We uncover how it is important to change police culture and organization so that technological advances can be made. Without changing the culture and organization, policy changes such as mandating body-cameras can only have a more limited impact on changing police

behavior.

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