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Changes in Enforcement of Low-Level and Felony Offenses Post-Ferguson: An Analysis of Arrests in St. Louis, Missouri

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ABSTRACT AND ARTICLE INFORMATION

As a result of several highly publicized incidents of police killing unarmed Black suspects, many contend that American police are in the midst of a crisis. Police have faced high levels of public scrutiny that some argue has stifled police activities and led to spikes in violent crime. This phenomenon—coined in the aftermath of the police killing of Michael Brown in Ferguson, Missouri—has become widely known as the Ferguson Effect. This study uses seven years of data and time series analysis to assess whether the events in Ferguson were associated with a reduction in arrests for felonies and low-level offenses in the nearby City of St. Louis, Missouri. We find that there was an initial reduction in low-level arrests of Whites and Blacks in the wake of Ferguson. Enforcement of misdemeanors and ordinance violations then increased and returned to expected levels, but only for Blacks. Post-Ferguson, felony arrests initially dropped for Blacks, but not Whites, and then climbed for both groups. This work adds to the burgeoning literature on police responses in the wake of a high-profile shooting.

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The killing of Michael Brown in August of 2014 sparked civil unrest in the St. Louis region and across the nation. This event, along with several high-profile use of force incidents and unprecedented ‘social media scrutiny’ of police, served as a catalyst for political mobilization against police violence and accelerated the growth of the Black Lives Matter Movement (Shjarback, Pyrooz, Wolfe, & Decker, 2017). Some scholars, policymakers, and police commanders raised concerns that increased public scrutiny of police behaviors would stifle proactive policing activities, embolden offenders, and leave communities unguarded (Hayes, 2015; MacDonald, 2016). FBI Director James Comey voiced similar concerns, stating in 2015 that high-profile police events had led to a “chill wind blowing through American law enforcement over the last year” (as cited in Schmidt & Apuzzo, 2015, paragraph 3). This phenomenon—the increased scrutiny of police followed by de-policing and rising crime rates—has been called the “Ferguson Effect” in the popular media.

Despite wide-ranging claims such as these, much remains to be learned about possible de-policing post-Ferguson, and, more generally, how high profile and controversial events such as police shootings and allegations of excessive use of force influence the manner in which police officers do their work. Aside from a few notable exceptions (Shjarback et al., 2017), there has been limited research that examines how the actions of police in the St. Louis region changed in the wake of Ferguson. This is a surprising gap in the literature given that police in this community faced intense and sustained scrutiny following the shooting of Michael Brown (Institute for Intergovernmental Research, 2015).

Using time series analysis, this study explores whether the events in Ferguson were associated with decreases in custodial arrests in St. Louis City, Missouri, from 2011 to 2017. Arrests for low-level offenses (misdemeanors and ordinance violations), which tend to be more discretionary in nature, were assessed separately from felonies. This study adds to the literature in several ways. First, the research conducted to-date on de-policing in the St. Louis region exclusively examined traffic stops in Missouri counties (Shjarback et al., 2017). Constraining the focus to one type of police activity does not allow for a nuanced exploration into whether the impact of high-profile events is limited to discretionary types of enforcement, such as arrests for low-level offenses, or if it extends to arrests for felonies. This distinction is important because these actions reflect differing resident demands. For example, the events in Ferguson shed light on the fact that minorities in the St. Louis region were being arrested at high rates for relatively

minor offenses (U. S. Department of Justice, 2015; see also Ferguson Commission, 2015). Therefore, reductions in arrests for minor offenses may align with resident demands for policing practices aimed at enhancing safety rather than generating revenue from fines. On the other hand, there likely is less public support for reducing arrests for serious felony offenses.

Second, we examine whether the shooting of Michael Brown had a different impact on arrests of Whites versus Blacks. A growing body of research suggests that law enforcement and citizen behavior in response to high-profile policing events may be racialized (Desmond, Kirk, & Papachristos, 2016; Shjarback et al., 2017). Thus, we assess whether the “chilling effect” of increased scrutiny of law enforcement was more strongly manifested in the policing of Black residents in St. Louis.

Finally, the study incorporates arrest data that covers 2011 through 2017, which allows for the examination of enforcement activity several years before and after the Ferguson incident. Arrests for low-level offenses have been declining since the early 2000s in most major cities, including St. Louis. (e.g., Rosenfeld & Wallman, 2019; Slocum, Huebner, Rosenfeld, & Greene, 2018). We draw on seven years of data to separate short-term variation in enforcement from meaningful sustained change and to assess claims that the events in Ferguson have had “a lasting impact on police and citizens” (Deuchar, Fallik, & Crichlow, 2018, p. 2). We also control for two sentinel events that may have influenced police activity in the region, including the St. Louis County grand jury decision not to indict the police officer who killed Michael Brown, as well as the acquittal of St. Louis City police officer Jason Stockley in 2017, who was accused of shooting a Black man and then planting evidence. Overall, the results highlight the importance of considering the long-term, distinctive effects of high-profile events on arrests for different types of offenses.

Background

On August 9, 2014, Michael Brown was shot and killed by Ferguson, Missouri Police Officer Darren Wilson. News of the shooting quickly spread on social media, leading to impromptu protests against police violence and eventually to more organized and sustained demonstrations that were broadcast across the St. Louis region and the world (Byers, 2014). The after-action assessment report suggested that “social media was the key global driver” of the protests in Ferguson, which lasted for over 17 days (Institute for Intergovernmental Research, 2015, p. xviii). While the Ferguson police department had a tenuous relationship

with the community prior to the death of Michael Brown, the events furthered the divide between Black residents and the predominantly White police response (Institute for Intergovernmental Research, 2015).

In the year following the shooting, violent crime in the City of St. Louis began to climb after several years of decline, leading St. Louis Police Chief Sam Dotson to claim in late 2014 that the increases could be attributed to the “Ferguson Effect.” He and other local police chiefs argued that officers had been stretched thin and were worn out from handling the protests, leading to declines in enforcement (see Byers, 2014). Others, including the director of the FBI James Comey, suggested that officers had become increasingly hesitant to engage with the public following Ferguson because of heightened criticism and out of fear of becoming “the catalyst for the next round of civil unrest” (Dotson, as cited in Hayes, 2015, paragraph 9).

Theoretical Perspectives

Although the Ferguson Effect is a relatively new phenomenon, the notion that police enforcement, particularly discretionary activity, is sensitive to external pressure is not. External control and accountability entities, such as the Department of Justice, have strongly shaped the contemporary proactive policing landscape, in part out of concern for police agencies’ inability to effectively control officers’ behavior (i.e., misconduct) and elevated levels of public distrust of law enforcement. Zero-tolerance and other more aggressive order-maintenance police approaches, such as stop-question-and-frisk, have come under immense public, scholarly, and legal scrutiny. Politicians have also increasingly called for changes to make the police more accountable and transparent. In 2014, President Obama convened a special task force to make recommendations for the reform of law enforcement in America with the explicit goal of improving police legitimacy (President’s Task Force on 21st Century Policing, 2015).

While a complete review of the work documenting the factors that influence police officers’ arrest decisions is beyond the scope of this paper (e.g., Chappell, MacDonald, & Manz, 2006; Klinger, 1994; Kochel, Wilson, & Mastrofski, 2011; Novak, Frank, Smith, & Engel, 2002; Smith & Visher, 1981), we argue that officers’ decisions to disengage from the public in the face of heightened public scrutiny can be viewed as encompassing two general sets of concerns—instrumental and normative. The instrumental perspective, or social exchange theory, views police as rational actors who weigh the costs and benefits of exercising their discretion to make arrests (Blau, 1964/2017; Emerson, 1976). On the positive

side of this ledger, benefits that accrue may be collective and related to the belief that arrests help the community by reducing crime. There might also be personal benefits, some of which are tangible, including promotions, and others that are intrinsic or psychological, such as the positive feelings that come from serving the community or seeing justice done. Interactions with the public, however, also come with potential costs that officers must consider: Lawsuits, public scrutiny, official reprimand, termination of employment, personal injury, and even death are all potential outcomes when officers engage with the public. For example, Novak, Smith, and Frank (2003) found that officers who were aware that their behavior could pose a liability were significantly less likely to initiate encounters with suspects. To reduce the likelihood of becoming entangled in potentially litigious situations, officers often “self-selected” themselves away from riskier environments and encounters (Novak et al., 2003).

Large scale social changes post-Ferguson, such as the increased scrutiny of the police and rise of the Black Lives Matter Movement, as well as actual and perceived changes in the level of organizational and political support officers receive, have likely affected enforcement behavior by shifting both the perceived costs and benefits associated with making arrests (Deuchar et al., 2018; Nix & Wolfe, 2017). Moreover, it is reasonable to expect that arrests for minor offenses should be more sensitive to these changes. Not only are these types of enforcement actions more discretionary than felony arrests, they likely bring fewer rewards and entail similar risks.

In addition to these instrumental concerns, normative considerations may also play a role. Recent attention has been focused on the potential for high profile incidents of police shootings and use of force to damage the public’s view of law enforcement and, in particular, the extent to which police are viewed as legitimate (Culhane, Boman, & Schweitzer, 2016; Matt, 2014). There is also emerging research on how sentinel, negative events and the ensuing public dialog shape officers’ perceptions of their own legitimacy and their belief that they have the right to use force to enforce the law. In their extension of the legitimacy perspective, Bottoms and Tankebe (2012) highlight the dialogic and relational nature of legitimacy and argue that it is negotiated through discourse between the police and public. Just as the public bases their perceptions of legitimacy on what the police say and do, the police center their own views of their legitimacy on the signals they receive and interpret from the public. Therefore, officers may interpret the public outcry following the shooting of Michael Brown as a challenge to their legitimacy and, in turn, may begin to question their own moral authority (Nix

& Wolfe, 2017). As a response to this perceived legitimacy “deficit,” officers are expected to adjust their behavior in an effort to revise their claim to legitimacy. Some of the discourse surrounding Ferguson has focused on the over enforcement of minor offenses, so a potential response from the police to these legitimacy challenges may be to refrain from active enforcement of low-level crimes. In comparison, making felony arrests, which are more likely to be in response to citizen-initiated calls for service and to involve crimes that pose a serious threat to public safety or property, may help to bolster officers’ beliefs in their own legitimacy. Thus, both the instrumental and normative perspectives suggest that any effect of Ferguson on enforcement activity will be more pronounced for less serious arrests.

Given the highly charged role that race played in the controversy over the shooting of Michael Brown, as well as the more general racialized narratives regarding policing in the United States, officers’ decisions pertaining to when and against whom to enforce the law are unlikely to be color blind. They may perceive that enforcement actions taken against Blacks as compared to Whites come with the potential for greater costs and greater harms to their legitimacy (Deuchar et al., 2018). We might expect, therefore, that the decline in enforcement post-Ferguson was, at least initially, greater for Blacks than for Whites.

Empirical Research on De-Policing

There is some research that has explored changes in arrests following high profile police shootings. For example, Shi (2009) examined whether the shooting of an unarmed Black youth in Cincinnati and the ensuing civil unrest influenced arrests. Results indicated that misdemeanor and felony arrests declined after the shooting, but only misdemeanor arrests declined after the riots. The author suggested that the lack of a significant decline in felony arrests may be due to a countervailing force – increases in serious crime that occurred during this time.

Related work considers the effect of federal investigations and oversight on enforcement activity. Stone, Foglesong, and Cole (2009), in their analysis of the outcomes of the 2000 consent decree in Los Angeles, found limited evidence of de-policing. In the two years following the consent decree, arrests declined and crime increased slightly. After 2002, enforcement activity increased, particularly for minor crimes. Chanin and Sheats (2018) examined arrests in ten jurisdictions under investigation by the Department of Justice and obtained similar results: Following investigations, there was a short-term decline in arrests that was not sustained over time. These findings aligned with the notion that officers tend to engage in avoidance behaviors or lay low

during times of strife (Kappeler, Sluder, & Alpert, 1998; Muir, 1977; Paoline, 2004).

Policing in the Post-Ferguson Era

In spite of the widespread media attention to the Ferguson Effect, there have only been a few studies that assess if and how these events were internalized by officers and agencies and their potential impact on police behavior. The Ferguson Effect rests on the assumption that police officers are less likely to engage in proactive policing (Wolfe & Nix, 2016; Valencia, 2015), and studies on changes in crime post-Ferguson provide indirect evidence regarding this phenomenon. Research generally has failed to link the events in Ferguson to significant increases in crime. For example, Pyrooz, Decker, Wolfe, and Shjarback (2016) found no change in violent or property crime in 81 large U.S. cities in the 12 months before and after Ferguson. Substantial fluctuation in crime trends post-Ferguson and the short follow-up period, however, made estimation of true change difficult. The authors contended that if there was de-policing, it occurred largely in cities with historically high levels of violence and primarily in Black communities. Similarly, Rosenfeld and Wallman (2019) examined arrest rates and homicides in 53 large cities from 2010 through 2015 and found no association between reductions in arrests and higher homicide rates. In fact, higher arrest rates of Black persons were associated with increases in homicide. Research focusing specifically on St. Louis also offers mixed evidence: The timing of increases in property crime, but not other types of offenses, was consistent with a Ferguson Effect (Rosenfeld, 2015).

Studies of officers’ perceptions of the policing climate after high profile shootings have been more supportive of a Ferguson Effect. Much of this research aligns with the hypothesis that de-policing post-Ferguson is the result of both shifts in the costs and benefits of engaging with the community, as well as officers’ perceptions of their own legitimacy. For example, using cross-sectional survey data collected from a sample of officers in one Southeastern jurisdiction, Nix and Wolfe (2017) found that officers perceived policing as more dangerous and less enjoyable post-Ferguson and believed that the public’s perceptions of the police had worsened (see also Deuchar et al., 2018; Pew Research Center, 2017; Torres, Reling, & Hawdon, 2018). In addition, about one third of the sample reported that they were less likely to be proactive, were more apprehensive about using force and had lower levels of self-legitimacy (see also Oliver, 2015). Using data from command-level officers in the same region, Nix, Wolfe, and Campbell (2018) also found that most of commanders in the sample believed there was a “war on cops.” In

contrast to line officers, however, they did not feel that public scrutiny led to de-policing. It is unclear if these attitudinal shifts translated into changes in policing behaviors, as research has found that attitudinal factors have only a moderate influence on officers' proactive behavior (Worden, 1989). Furthermore, because pre-test data were not available, there is no way to discern from these studies if police attitudes or behaviors changed markedly as a result of high-profile police shootings.

Some research has directly assessed the effect of Ferguson on police activity. Researchers conducting an ethnographic study in a Southeastern police agency observed that officers were reluctant to engage in proactive policing even when they observed illegal activity (Deuchar et al., 2018). This research was conducted post-Ferguson, so it is not known if this represented a change in enforcement; however, interviews corroborated that many officers perceived a shift in their relationship with the public and a decline in the vigor with which they enforce the law. Other research has examined this issue using longitudinal enforcement data. In a study of Baltimore, Morgan and Pally (2016) found that arrests decreased substantially post-Ferguson and fell even further following the death of Freddie Gray, a young Black man who was lethally injured while being transported by the police. Furthermore, the reductions were most pronounced for less serious offenses. In one of the few examinations of de-policing that focused explicitly on Missouri, results indicated that departments made fewer traffic stops and arrests in 2015 (post-Ferguson) compared to 2014 (pre-Ferguson) (Shjarback et al., 2017).

Evidence also is consistent with the idea that highly publicized police shootings in the post-Ferguson era created a racialized de-policing effect. Although opinions of the police held by both Blacks and Whites generally decline in the wake of high-profile cases of brutality against unarmed Black men (Lasley, 1994; Weitzer, 2002), a study by the Pew Research Center (2017) found that officers believed that recent incidents greatly aggravated tensions between the police and Black residents. Furthermore, Shjarback and colleagues (2017) contended that officers are more likely to avoid discretionary activities in minority communities because of the racially centered nature of recent police shootings, particularly in light of the already strained relationships between the police and persons of color (see also Weitzer, 2014). There is preliminary evidence that supports this idea. Shjarback and colleagues (2017) found that declines in traffic stops and arrests were amplified in predominately Black jurisdictions. Similarly, Shi's (2009) study of the 2001 Cincinnati riot also found greater reductions in arrests

in communities with greater concentrations of Black residents.

Current Study

At the core of the Ferguson Effect is the notion that police have pulled back from pro-active policing in response to increased public scrutiny. Yet this assertion has received very little empirical scrutiny, with much of the research providing indirect tests of this argument. This study provides a direct examination of the de-policing hypothesis by examining monthly changes in arrests for low-level offenses (i.e., misdemeanors and ordinance violations) and felonies pre- and post-Ferguson in St. Louis, Missouri from 2011 to 2017 using interrupted time-series analysis.

In particular, we address three interrelated research questions. First, was there a decline in arrests for low-level offenses and felonies following Ferguson, and was any observed reduction sustained over time? Following prior research (e.g., Chanin & Sheats, 2018; Stone et al., 2009), we hypothesize that arrests immediately declined following the shooting of Michael Brown and then increased over time as the saliency of this event faded from public and police consciousness.

Second, are similar reductions observed for low-level and felony arrests Post-Ferguson? We expect that declines will be greater for arrests involving misdemeanors and ordinance violations relative to felonies. Officers have more discretion when enforcing low-level offenses as compared to felonies, and we hypothesize that the events in Ferguson were less likely to have an effect on the cost-benefit calculations associated with making arrests for serious crimes. Moreover, police may view arrests for minor offenses as contributing to their "legitimacy deficit" (Bottoms & Tankebe, 2012, p. 133), whereas felony arrests constitute "legitimate" police work (Brown, 1981).

Third, were declines in arrests more pronounced for Blacks than Whites following Ferguson? Race plays a central role in the post-Ferguson narrative, and, therefore, we hypothesize that reductions in arrests were more heavily concentrated among Blacks.

St. Louis provides an important context for this research because of its proximity to Ferguson. The City of St. Louis, which has a population of just over 300,000 persons, is an independent county adjacent to St. Louis County, which encompasses dozens of municipalities, including the city of Ferguson. The St. Louis Metropolitan Police Department was a central partner to St. Louis County Police Department during the civil unrest following the shooting of Michael Brown. Moreover, as a result of the shooting, police

practices in the entire metropolitan region came under substantial scrutiny (Ferguson Commission, 2015; U. S. Department of Justice, 2015), placing additional pressure and stress on all local law enforcement agencies (Institute for Intergovernmental Research, 2015).

Blacks make up 50% of the St. Louis population and Whites 44% (U.S. Census, 2017). Similar to many U.S. cities, dimensions of race and economic inequality are intertwined with spatial segregation. The greatest concentration of Black residents and the highest rates of poverty tend to be concentrated on the north side of the city, which also has the highest rates of violent crime. Geographically, the north side is also closer to Ferguson than are other areas of the city.

Method

Data

The dependent variable is the number of custodial arrests made by the St. Louis Metropolitan Police Department (SLMPD) within the City of St. Louis in each of the 84 months from 2011 through 2017. SLMPD provided the data to generate monthly arrest counts, which were broken into two types based on the most serious charge. Lower-level arrests consist of enforcement actions in which the most serious charge was either a misdemeanor offense or an ordinance violation.¹ Misdemeanors and ordinance violations were combined because they are associated with relatively minor crimes.² Arrests in which the most serious charge was a felony are captured by our second dependent variable.³ Each individual's race was recorded by the SLMPD at the time of arrest. In order to assess whether police disengagement was more pronounced for Blacks than Whites, we further disaggregated arrests by the race of the individual arrested. Because most residents of St. Louis identify as either Black or White, we focused on these two groups.

To understand the long- and short-term effects of the events in Ferguson on arrests, we constructed a series of measures designed to capture changes in arrest trends. It is hypothesized that the events in Ferguson led to an immediate reduction in the number of arrests made by the SLMPD. The primary independent variable used to test this is a dichotomous measure (*post-Ferguson*) scored 0 in the months prior to August 2014 and 1 in the month that Michael Brown was shot (August 2014) and all subsequent months. We assessed whether there was a change in the slope of the arrest trend after the shooting by including an independent variable that measures the number of months that passed since Ferguson, scoring all months before this event as 0. To account for long-term trends

in enforcement, we included an independent variable that captures the number of months since the start of the observation period (January 2011). Non-linearity in the underlying arrest trends and the trends post-Ferguson were explored using quadratic terms.

We included several control variables that capture factors likely to influence enforcement activity. Similar to crime, enforcement levels show seasonal fluctuations, peaking in the warmer summer months. Monthly fixed effects were included in the models to adjust for seasonality. Because the population of St. Louis has declined over time, we controlled for the number of residents using data from the U.S. Census.

We also controlled for two high profile events that followed the Ferguson shooting. In November 2014, the grand jury determined there was not enough probable cause to indict Darren Wilson, the officer who shot Michael Brown, and a number of highly visible, and sometimes violent, protests were held throughout the region in late November and early December (Moore, 2014). To account for these events, we included a dichotomous control for the months surrounding the grand jury decision (1 = November or December 2014, 0 = all other months). We also controlled for the acquittal on September 15, 2017 of SLMPD police officer Jason Stockley, who was charged with the first-degree murder of Anthony Lamar Smith. Stockley shot and killed Smith after a police pursuit and attempted apprehension, which was triggered by a suspected drug deal. Although the shooting occurred on December 20, 2011, Stockley was not charged until May 2016, when activists asserted that the killing had been covered up by the police (Currier & Patrick, 2017). Following the acquittal, protests immediately erupted throughout the region and continued for over a month, resulting in hundreds of arrests (Berg, 2017; Petrin, 2017). Unlike the protests following the shooting of Michael Brown and the Wilson grand jury decision, which were centered in St. Louis County, the Stockley protests primarily occurred in St. Louis City. A dichotomous indicator was introduced to account for the civil unrest associated with Stockley's acquittal (1 = September or October 2017, 0 all other months).

Research suggests that changes in enforcement can be driven by fluctuations in resident demand for police services (Rosenfeld, Fornango, & Rengifo, 2007), and there is some evidence to indicate that high profile incidents of police violence dampen the public's willingness to call the police, particularly in predominantly Black neighborhoods (Desmond et al., 2016). For these reasons, we included a measure of the number of calls to 911 in each month. These data came from the SLMPD computer-assisted dispatch (CAD) system. Because our interest was in controlling for events that might trigger arrests, accident-related calls,

calls for illness, and other public service calls were excluded, as were duplicate calls for the same event. We also controlled for changing crime rates using the number of Part 1 crimes recorded by the police in each month.⁴

Analytic Plan

The analysis proceeded in several phases. We began by computing descriptive statistics for felony and low-level arrests for the periods pre- and post-Ferguson, respectively (see Table 1 and Figures 1 and 2). Independent sample t-tests (two-tailed) were used to assess whether the mean monthly number of arrests differed significantly between these two periods.

Simple before- and after- comparisons do not take into account underlying trends in enforcement activity. This is a noteworthy limitation because prior research has found that in St. Louis and elsewhere, police enforcement had been declining relatively steadily since at least 2002 (Rosenfeld & Wallman, 2019; Slocum et al., 2018). Any observed decline simply might be a result of these long-term trends. To assess whether the events in Ferguson had an effect on felony and low-level arrests above and beyond the long-term underlying enforcement trends, we used maximum likelihood time series analysis (Bernal, Cummins, & Gasparrini, 2017; Corsaro, 2018). This type of design is appropriate for testing whether there was a change in the number of arrests and the slope of the arrest trend following the events in Ferguson, controlling for fluctuations in public demand for police services and crime. Because all outcomes were counts, a negative binomial model was used.⁵ Robust standard errors were estimated using the Huber-White sandwich estimator to adjust for non-normality in the residuals. Models for all arrests of each type (i.e., low-level and felony) were estimated first, followed by race-specific arrest models. Hausman tests were conducted using

the Stata 15 (Statacorp, 2017) `suest` and `test` commands to determine if Ferguson had a significantly different effect on arrests of Whites versus Blacks. Finally, to facilitate interpretation of the results, we generated graphs depicting the estimated number of monthly arrests of Blacks and Whites pre- and post-Ferguson using Stata's `margins` command. These figures also include the counterfactual, which estimated the number of arrests expected to occur in each month if the events in Ferguson had not taken place.

Results

Bivariate analyses were first used to describe changes in the mean numbers of low-level and felony arrests per month before and after Ferguson. As presented in Table 1, the mean number of monthly arrests for all comparisons was significantly lower after Ferguson. Prior to August 2014, the mean number of low-level arrests per month was 484.72 ($SD = 82.27$). For the period after Ferguson, this mean declined to 327.68 arrests per month ($SD = 48.86$). Reductions in low-level arrests were observed for both Blacks and Whites, but the percent change was greater for Blacks (-37.6%) than Whites (-17.6%). For Blacks, low-level arrests declined from 359.63 ($SD = 66.83$) to 224.34 ($SD = 35.26$). The comparable pre- and post-Ferguson means for Whites were 123.09 ($SD = 20.88$) and 101.44 ($SD = 21.72$), respectively. Figure 1 presents the observed trends in arrests for low-level offenses separately by race. This figure visually tells the same story as the bivariate comparisons. Despite monthly fluctuations in arrests, the highest peak in arrests of Blacks post-Ferguson was lower than the lowest peak pre-Ferguson. Reductions in low-level arrests of Whites were smaller, and there was a tall peak near the time of the Stockley protests.

Table 1. Comparison of Low-Level and Felony Arrests Before and After Ferguson

	Pre-Ferguson		Post-Ferguson		<i>t</i> -score
	Mean	<i>SD</i>	Mean	<i>SD</i>	
Low-level Arrests					
All	484.72	82.27	327.68	48.86	-10.57***
White	123.09	20.88	101.44	21.72	-4.66***
Black	359.63	66.83	224.34	35.26	-11.52***
Felony Arrests					
All	468.07	82.87	369.24	69.84	-5.9***
White	99.60	19.80	88.02	21.50	-2.57*
Black	366.98	67.18	279.80	51.51	-6.65***

Abbreviations: *SD* = Standard Deviation

Note: *** $p \leq .001$, * $p \leq .05$. Independent sample t-test comparing mean number of arrests per month before and after Ferguson, $df = 82$

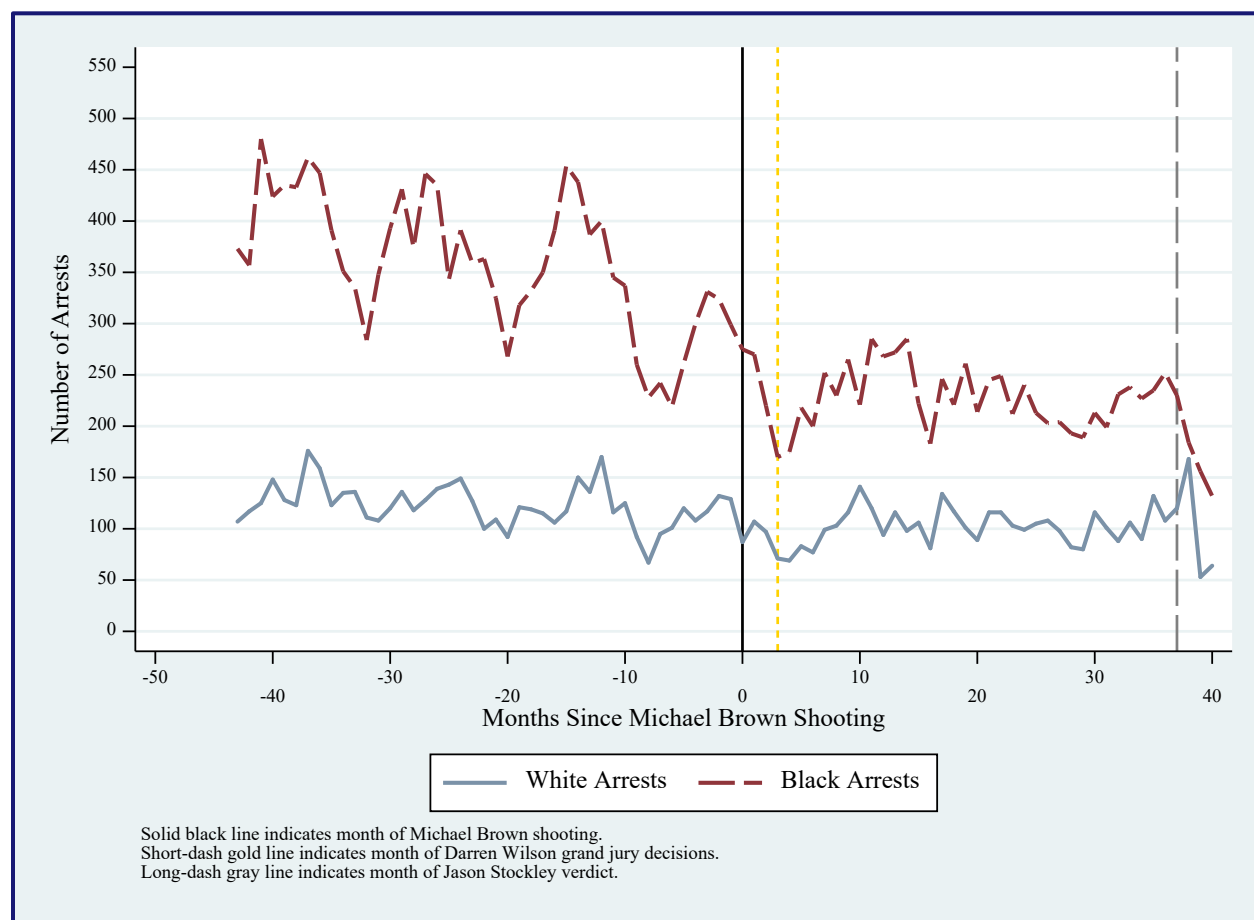


Figure 1. Number of Arrests of Whites and Blacks for Misdemeanors and Ordinance Violations Before and After Ferguson, January 2011 – December 2017 ($N = 84$ Months)

The mean number of monthly felony arrests was also significantly lower following Ferguson. This was true for arrests of Blacks and Whites, and again, the decline was greater for Blacks (-23.8%) than Whites (-11.6%). Before Ferguson, the mean was 468.07 ($SD = 82.87$) compared to 369.24 ($SD = 69.84$) after this event. The mean number of felony arrests of Blacks declined from 366.98 ($SD = 67.18$) per month to 279.80 ($SD = 51.51$), and White felony arrests dropped from 99.60 ($SD = 19.80$) to 88.02 ($SD = 21.50$). The trends for felony arrests of Blacks and Whites are displayed in Figure 2. Similar to low-level arrests, there were notable declines in the number of felony arrests per month for Blacks. Declines in White felony arrests are more difficult to discern visually.

These findings suggest that the SLMPD made fewer arrests post-Ferguson; however, this reduction might simply reflect underlying downward trends in

enforcement. To assess whether there was an abrupt shift in the number of felony or low-level arrests or whether the slopes of these trends changed after the shooting of Michael Brown, we used interrupted time series analyses. The results of these analyses can be found in Table 2 for misdemeanor arrests and ordinance violations and Table 3 for felonies. Results for all arrests are displayed first, followed by race-specific results.

As displayed in Table 2, the negative and significant coefficient for months since January 2011 indicates that arrests for low-level offenses were generally declining over the study period. However, there was an added, significant drop post-Ferguson, which is reflected in the negative significant coefficient. The incident rate ratio (IRR) indicates that after Ferguson, low-level arrests decreased by a factor

of .782. After this initial drop, arrests for these types of offenses increased in a linear fashion.

Other periods of civil unrest also had an effect on low-level arrests. There was a drop in the number of arrests for misdemeanors and ordinance violations in the months surrounding the Wilson grand jury decision, while low-level arrests were significantly higher after the Stockley acquittal. The number of 911 calls, the number of Part 1 crimes recorded in the month, and changes in city population were unrelated to low-level arrests.

The results are presented graphically in Figure 3, which displays the estimated number of arrests before

and after Ferguson based on this model. The dotted line represents the counterfactual and provides an estimate of how many arrests for misdemeanors and municipal violations would be expected if the events in Ferguson had not occurred. Consistent with the results in Table 2, low-level arrests dropped immediately after the shooting of Michael Brown, then increased, before gradually declining. Low-level arrests never reached the number that would be expected based on the counterfactual, and they ended the study period at their lowest expected levels.



Figure 2. Number of Arrests of Whites and Blacks for Felonies Before and After Ferguson, January 2011 – December 2017 (N = 84 Months)

Table 2. Negative Binomial Regression with Month Fixed Effects Estimating the Effect of Ferguson on Arrests for Misdemeanors and Ordinance Violations Disaggregated by Race ($N = 84$)

	All				White				Black		
	Coef.	Robust <i>SE</i>	<i>IRR</i>		Coef.	Robust <i>SE</i>	<i>IRR</i>		Coef.	Robust <i>SE</i>	<i>IRR</i>
Months since January 2011 (X 10)	-0.066***	0.015	0.993		-0.029	0.023	0.997		-0.082***	0.017	0.992
Post-Ferguson	-0.246***	0.054	0.782		-0.304***	0.092	0.738		-0.219***	0.056	0.803
Months since Ferguson (X 10)	0.160**	0.060	1.016		0.202*	0.095	1.020		0.138*	0.061	1.014
Months since Ferguson, squared (X 10)	-0.003	0.002	1.000		-0.007*	0.003	0.999		-0.001	0.001	1.000
Wilson Grand Jury decision	-0.125*	0.049	0.882		-0.155*	0.068	0.857		-0.115	0.060	0.891
Stockley verdict	0.200***	0.051	1.222		0.510***	0.135	1.666		0.026	0.071	1.027
Number of 911 calls (X 10,000)	0.230	0.166	1.000		0.396	0.210	1.000		0.164	0.196	1.000
Part 1 Crimes (X 1,000)	-0.017	0.071	1.000		0.014	0.105	1.000		-0.042	0.081	1.000
Population (X 10,000)	0.040	0.166	1.000		-0.331	0.263	1.000		0.185	0.173	1.000
Constant	4.680	5.281			14.763	8.459			-0.081	5.521	
Pseudo R^2	0.20				0.14				0.21		

Abbreviations: Coef. = Coefficient; *SE* = Standard Error; *IRR* = Incident Rate Ratio

Note: *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$. To ease interpretation, coefficients and robust standard errors for were multiplied by a constant when indicated. *IRRs* were not transformed.

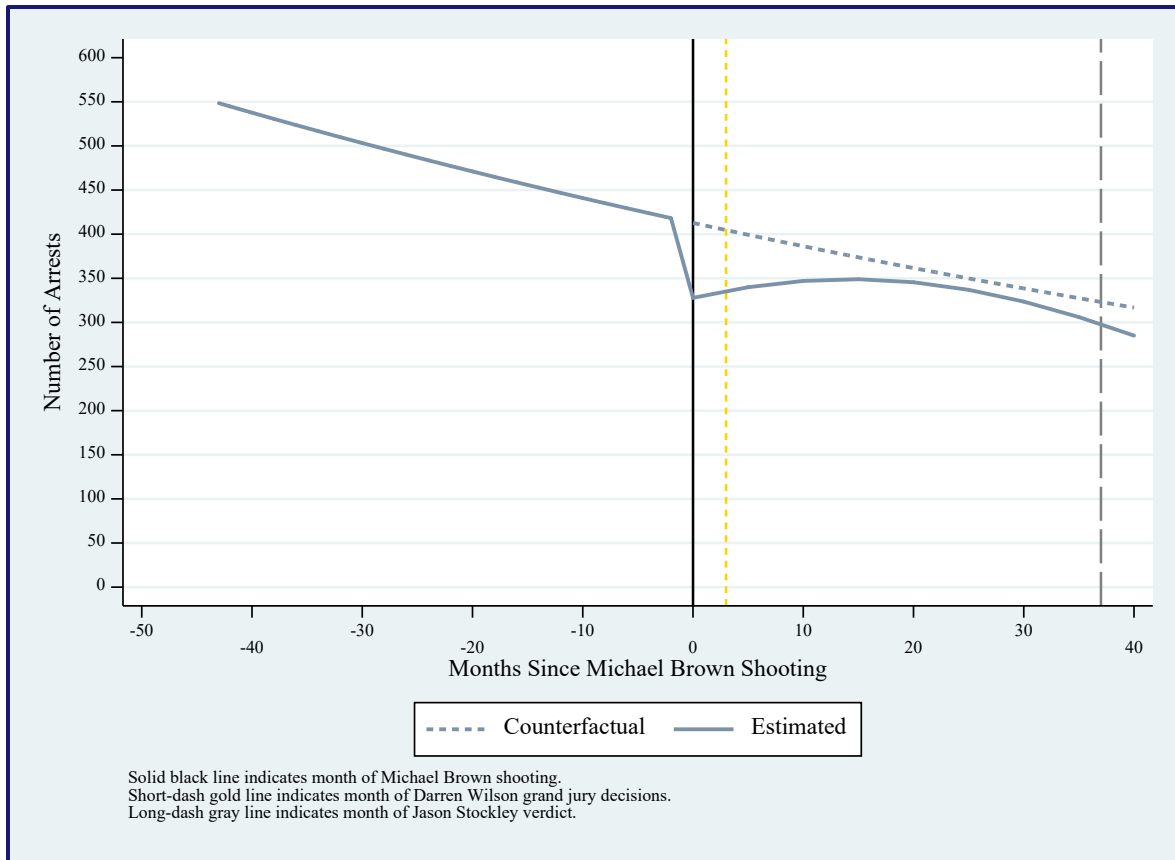


Figure 3. Estimated Number of Arrests for Misdemeanors and Ordinance Violations Before and After the Shooting of Michael Brown

The race specific results tell a somewhat different story. For Blacks, the underlying trend in low-level arrests was negative and statistically significant, while arrests of Whites did not decline significantly over the period. The underlying trends differed significantly by race ($\chi^2(1) = 7.73, p \leq .01$). Following Ferguson, low-level arrests of both Blacks and Whites dropped with arrests of Whites declining by a factor of .738 and of Blacks by .803. Arrests then increased for both groups, but the increase for White arrests diminished over time, as indicated by the significant quadratic term for the number of months post-Ferguson. In comparison, the linear term, but not the quadratic term, was significant for Blacks, signaling that the increase in low-level arrests of Blacks post-Ferguson remained relatively constant. Despite these differences, the extent to which Ferguson had an effect on the number of arrests and arrest trends did not differ significantly by race (level: $\chi^2(1) = .75, p > .05$; linear trend: $\chi^2(1)$

$= .31, p > .05$). Finally, for Whites, low-level arrests decreased after the Wilson grand jury decision but increased after the Stockley verdict. These decisions had no effect on the arrests of Blacks.

Figure 4 provides more insight into the extent and nature of the post-Ferguson trends in arrests for minor offenses. Low-level arrests of Blacks climbed post-Ferguson, and less than two years after the shooting of Michael Brown, they exceeded the levels predicted by the counterfactual. Arrests of Whites for minor offenses, in comparison, increased initially post-Ferguson, then dropped again. They never reached the level that would have been expected if the events in Ferguson had not occurred.

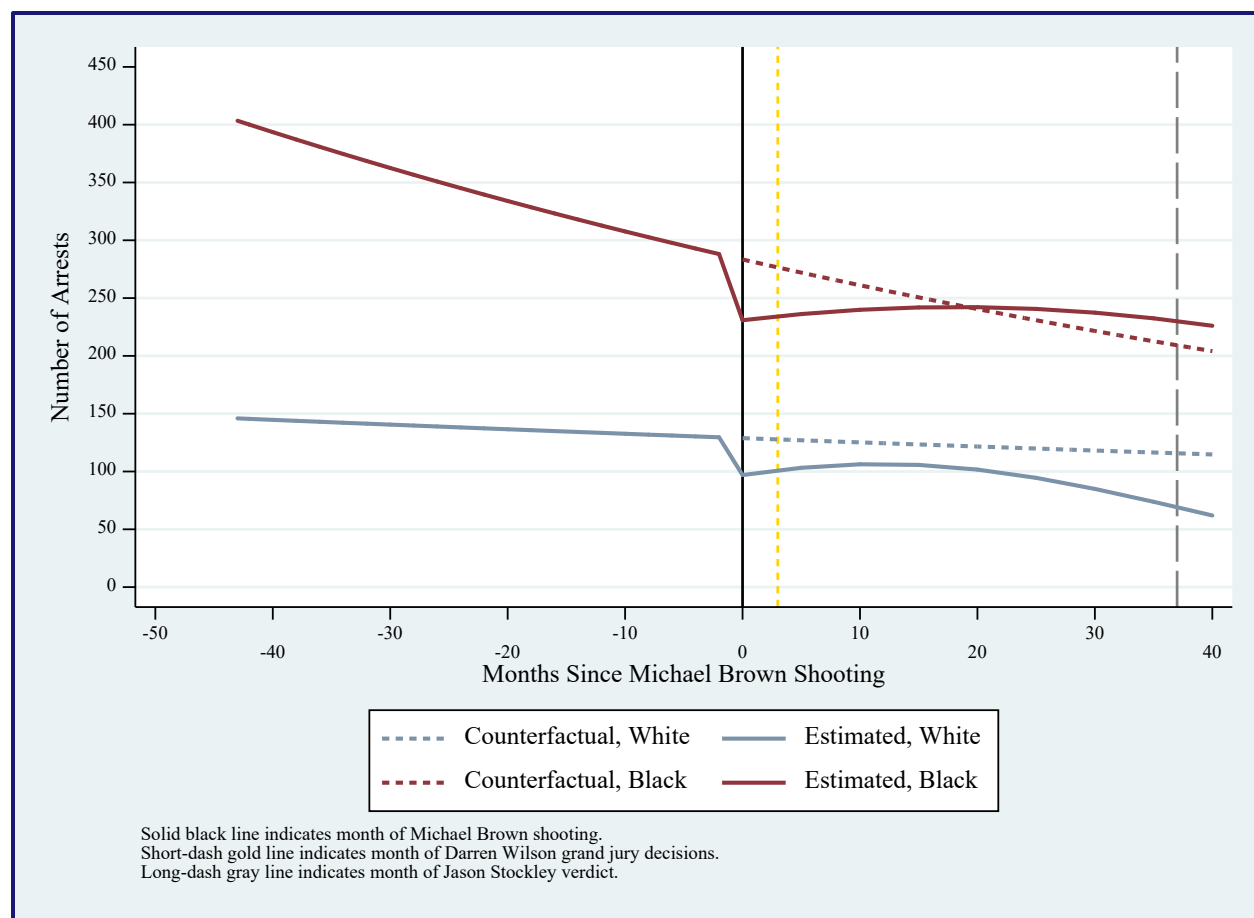


Figure 4. Estimated Number of Arrests of Blacks and Whites for Misdemeanors and Ordinance Violations Before and After the Shooting of Michael Brown

The results for felony arrests are presented in Table 3. Similar to the models for low-level arrests, there was a general downward trend in felony arrests for the study period, and the number of arrests decreased by a factor of .787 post-Ferguson. Following the initial drop, felony arrests trended upward, but at a diminishing rate. Felony arrests declined during the period surrounding the Wilson grand jury decision and the Stockley verdict. Mirroring misdemeanor and municipal arrest results, population changes, 911 calls, and Part 1 crimes were not related to felony arrests.

The estimated counts and counterfactual displayed in Figure 5 indicate that felony arrests

dropped immediately post-Ferguson, then increased, surpassing within a year the number that would have been expected if the events in Ferguson had not occurred. They then declined again, ending the study period at higher than expected levels.

These findings hold for felony arrests of Blacks and Whites as well with one key exception: White felony arrests did not decline significantly after the shooting of Michael Brown, a finding that runs counter to the Ferguson Effect. The magnitude of the post-Ferguson reduction in felony arrests did not vary significantly by race ($\chi^2(1) = .49, p > .05$), but after this event, arrests increased at a faster rate for Whites compared to Blacks ($\chi^2(1) = 5.22, p \leq .05$).

Table 3. Negative Binomial Regression with Month Fixed Effects Estimating the Effect of Ferguson on Felony Arrests Disaggregated by Race (*N* = 84)

	All				White				Black		
	Coef.	Robust <i>SE</i>	<i>IRR</i>		Coef.	Robust <i>SE</i>	<i>IRR</i>		Coef.	Robust <i>SE</i>	<i>IRR</i>
Months since January 2011 (X 10)	-0.083***	0.022	0.992		-0.102***	0.034	0.99		-0.078***	0.022	0.992
Post-Ferguson	-0.239***	0.066	0.787		-0.177	0.096	0.838		-0.252***	0.074	0.777
Months since Ferguson (X 10)	0.315***	0.079	1.032		0.511***	0.103	1.052		0.252**	0.088	1.026
Months since Ferguson, squared (X 10)	-0.005***	0.001	0.999		-0.007***	0.002	0.999		-0.005**	0.002	1.000
Wilson Grand Jury decision	-0.382***	0.047	0.682		-0.481***	0.127	0.618		-0.367***	0.068	0.693
Stockley verdict	-0.352***	0.048	0.704		-0.446***	0.078	0.640		-0.324***	0.049	0.724
Number of 911 calls (X 10,000)	0.240	0.256	1.000		-0.072	0.302	0.999		0.338	0.284	1.000
Part 1 Crimes (X 1,000)	0.002	0.100	1.000		0.029	0.164	1.000		-0.013	0.099	1.000
Population (X 10,000)	-0.082	0.197	1.000		0.250	0.296	1.000		-0.180	0.219	1.000
Constant	8.558	6.241			-3.123	9.493			11.324	6.939	
Pseudo R ²	0.159				0.142				0.157		

Abbreviations: Coef. = Coefficient; *SE* = Standard Error; *IRR* = Incident Rate Ratio

Note: *** $p \leq .001$, ** $p \leq .01$, * $p \leq .05$. To ease interpretation, coefficients and robust standard errors for were multiplied by a constant when indicated. *IRRs* were not transformed.

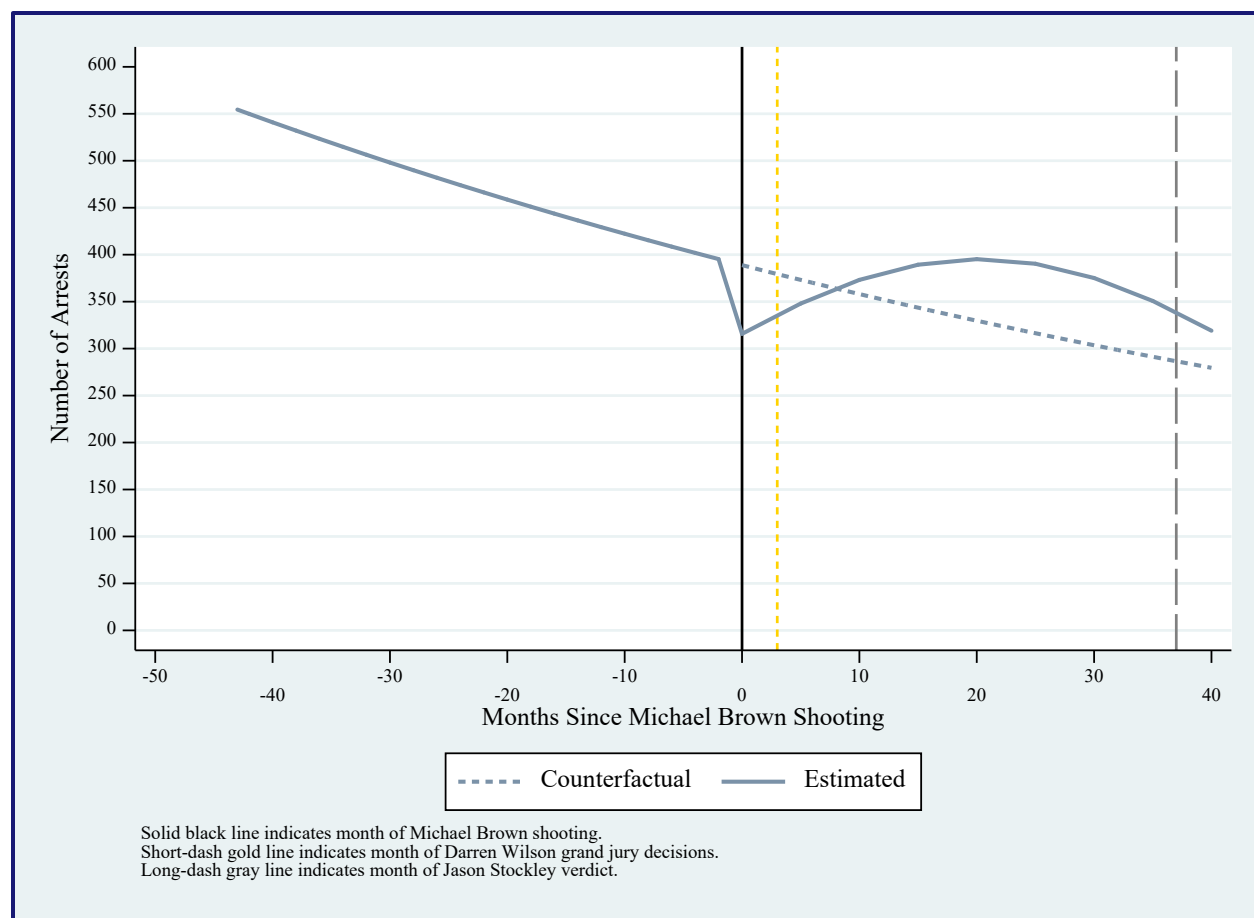


Figure 5. Estimated Number of Felony Arrests Before and After the Shooting of Michael Brown

Figure 6, which displays the estimated number of felony arrests along with the counterfactual, makes clearer the changes in felony arrests of Blacks and Whites that occurred post-Ferguson. For Blacks, the initial post-Ferguson decline was notable. This drop was followed by rising arrests, and approximately a year after Ferguson, there were more felony arrests than expected based on the underlying trend. Felony arrests of Blacks then began to fall and by December 2017 dropped just below expected levels. Felony arrests of Whites followed a different trend. There was little evidence of a decline post-Ferguson, and arrests rose and remained higher than expected.

In supplemental analyses, we created a measure of felony arrests that excluded arrests in which the most serious charge was a drug offense. Drug offenses can be more discretionary in nature, and the laws classifying marijuana offenses changed during the study period. In addition, they are the most prevalent felony charge in St. Louis City (see Slocum et al., 2018). In these analyses, the magnitude of the post-

Ferguson drop is attenuated somewhat, but still statistically significant for arrests of Blacks, but not Whites. After the shooting, non-drug felony arrests of Whites increased linearly, and there was no such significant increase for Blacks.

Discussion

This study sheds light on the impact of increased police scrutiny on enforcement activity by examining changes in arrests in St. Louis City following the killing of Michael Brown in Ferguson, Missouri. Our dual focus on arrests for lower-level offenses and felonies provides for a nuanced exploration of how arrest decision-making is shaped by larger social shifts following controversial use of force incidents. Given the racialized nature of the protests following Ferguson, we also disaggregated arrests by race to assess whether any observed reduction in enforcement activity post-Ferguson was more heavily concentrated among Blacks.

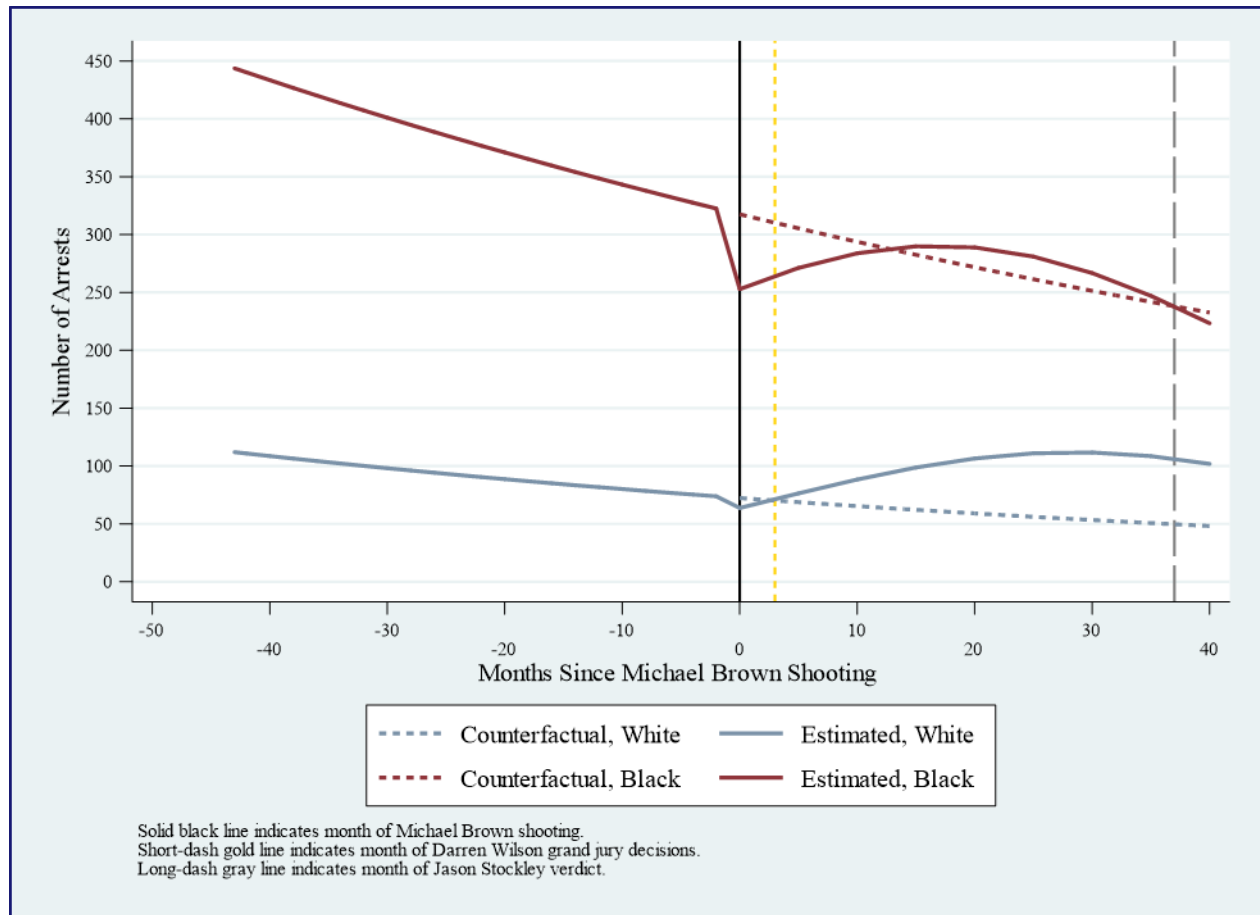


Figure 6. Estimated Number of Felony Arrests of Blacks and Whites Before and After the Shooting of Michael Brown

Several key findings emerged. First, as hypothesized, results from bivariate analyses comparing the number of arrests in periods before and after the shooting of Michael Brown indicate there were fewer enforcement actions after Ferguson. After adjusting for underlying declining arrest trends and controlling for changing demand for police services, we observed a reduction in enforcement for both low-level offenses and felonies in the month Michael Brown was killed. The findings lend credence to the idea of a Ferguson Effect and align with prior research that documented a decrease in traffic stops in Missouri after Ferguson (Shjarback et al., 2017).

We also found that the reductions in enforcement were only sustained for low-level arrests. Arrests for misdemeanors and ordinance violations exhibited relatively small increases post-Ferguson before falling again, and they never reached the levels that would have been expected absent these events. In

comparison, felony arrests climbed more steadily after Ferguson and returned to expected levels within a year. These findings support our hypothesis that declines were greater for low-level offenses compared to felonies. They also comport with other research of this type that suggests government interventions and sentinel events, similar to those in Ferguson, are most likely to have an effect on lower-level enforcement activity for which discretion is more available (Chanin & Sheats, 2018; Morgan & Pally, 2016).

Second, when enforcement actions were disaggregated by the race of the individual arrested, a more complicated picture emerged. For Blacks, the findings are generally consistent with the hypothesis that controversial incidents of police violence are associated with immediate reductions in enforcement that are not sustained over time. After the initial drop following the shooting of Michael Brown, arrests of Blacks for minor offenses and felonies increased,

returning to expected levels within approximately 16 to 20 months.

Similar to Blacks, there was a significant and abrupt post-Ferguson reduction in arrests of Whites for ordinance violations and misdemeanors. Although we hypothesized that this drop would be more pronounced for Blacks, the magnitude did not vary by race. After this decline in enforcement, low-level arrests of Whites initially mirrored those of Blacks and began to increase, but they soon diverged, trending downward to end the study period at lower levels than expected. Thus, to the extent de-policing of low-level offenses occurred, it was only sustained for Whites.

Post-Ferguson felony arrest trends for Whites also differed from those observed for Blacks in important ways. First, felony arrests of Whites did not decline significantly in the month after the shooting of Michael Brown. Second, although felony arrest trends for both groups followed an inverse curve in the months after the shooting, arrests of Whites increased at a faster rate. It is possible that these differences are driven by increases in heroin use for Whites, a factor that has been linked with recent rises in crime (Rosenfeld, Gaston, Spivak, & Irazola, 2017). From 2002 to 2013, heroin use increased by 114% for non-Hispanic Whites, but only nominally for Blacks (Jones, Logan, Gladden, & Bohm, 2015). Because deployment patterns and police practices vary across areas (Klinger, 1997; Smith, 1986), future research could provide additional insight on these observed race differences by examining how the race of individuals arrested interacts with policing context, including crime rates and neighborhood racial composition.

Although this research provides a picture of how SLMPD enforcement activity changed in the wake of Ferguson, much remains to be learned about the underlying mechanisms driving these trends. Traditional interpretations posit that de-policing is due to public criticism of officers and their fear of being involved in the next controversial incident (Shjarback et al., 2017; Wolfe & Nix, 2016). Due to instrumental concerns, police may have made fewer low-level arrests post-Ferguson because the minimal benefits of these arrests no longer outweighed the costs that come with enhanced public scrutiny and perceived decreases in public, organizational, and political support. Alternately, in line with a normative perspective, law enforcement may have focused instead on serious crime, subsequently making fewer minor, discretionary arrests in an attempt to bolster their legitimacy (Bottoms & Tankebe, 2012).

An alternate explanation is that periods of civil unrest draw police away from self-initiated or discretionary activities and force them instead to focus on crisis management and acute community needs.

Protests in St. Louis continued for months following the shooting of Michael Brown, and scholars have documented the physical and emotional toll of these events. Officers worked long shifts, and police agencies did not have resources to fully support their needs (Institute for Intergovernmental Research, 2015). These effects were compounded by declines in the number of officers employed by SLMPD during this time (Slocum et al., 2018). It is therefore possible that officers did not purposefully refrain from engaging with the public, but rather they lacked the time or resources to attend to the broad needs of multiple communities under strife. It is vital that future research attempt to decouple the intentional decision of officers to pull back from the community from the need for police agencies to redirect resources to critical community needs.⁶

The results also highlight the importance of controlling for ‘after shocks’ or other sentinel events that follow a high-profile police incident. This study accounted for two important court actions that followed the events in Ferguson, the Darren Wilson grand jury decision and the Jason Stockley verdict, both of which taxed SLMPD resources albeit in different ways. The Wilson decision pulled city officers out to the county, which was the site of most of the protests. Therefore, it is not surprising that arrests of all types declined sharply as SLMPD resources were diverted outside the city. The protests following the Stockley verdict were centered in the city and efforts were made by protesters to shut down a major interstate, requiring extensive police intervention. In the period surrounding this event, low-level arrests increased, many of which were related to the protests, and there was a concomitant decrease in felony arrests. Because arrests for more serious offenses tend to be less discretionary and therefore less likely to be subject to de-policing, these findings provide support for the idea that declines in enforcement proximal to periods of civil unrest may be due, in some part, to diminished police resources.

Several important limitations should be noted. First, this study focuses on one jurisdiction, whereas over 50 agencies in the St. Louis region provided law enforcement assistance in the wake of Ferguson (Institute for Intergovernmental Research, 2015). Therefore, the findings do not represent the totality of changes in policing occurring across the metropolitan area. Moreover, the extent to which enforcement actions in jurisdictions beyond the St. Louis region were—or were not—affected by the events in Ferguson remains unclear. In addition, our study omits data on traffic stops, which have been the focus of prior work of this type (Shjarback et al., 2017).

Furthermore, there were substantial legal changes post-Ferguson not accounted for. In July of 2015, the

State of Missouri passed Senate Bill 5 (SB5), which substantially limited discretion in municipal courts. SB5 reduced the annual general operating revenue that can be collected from traffic fines from 30% to 20%, capped total fines for minor traffic violations (\$300), and prohibited confinement for traffic violations and for failure to pay fines (RSMO 479.353). Low-level arrests can be triggered by warrants for failing to appear in court or to pay fines, and thus additional research is needed to assess the extent to which legislative changes may have contributed to declining arrests.

A final limitation is that we do not estimate the link between changes in enforcement and crime. As such, we cannot speak to the impact of Ferguson on violence in the region or add to the more general discussion of the extent to which de-policing and the legitimacy crisis may contribute to rising crime rates. However, studies that have addressed these issues, both locally and nationally, have failed to support the notion that Ferguson led to an increase in homicides or crime more generally (Rosenfeld & Wallman 2019; Sharback et al., 2017). The goal of the current work is instead to provide a rigorous, nuanced examination of long-term shifts in police actions post-Ferguson, with sub-analysis by type of enforcement action and race of the individual arrested. This study lays the foundation for future work addressing the broader issue of whether declines in specific types of enforcement actions in St. Louis coincide with increases in crime. The findings also are important in their own right because they speak to how controversial police shootings shift the extent and nature of enforcement, which has implications not only for crime, but community perceptions of police effectiveness and legitimacy as well as how police view themselves.

Conclusion

The results raise a number of important policy issues. First, they highlight the importance of regional collaborations that can be mobilized to facilitate safe and lawful public demonstrations, without disrupting regular operational activities of law enforcement agencies. Although regional officials maintain that such a team was quickly mobilized during the Ferguson protests, much remains to be learned about how to effectively and constitutionally manage large-scale demonstrations of this type, particularly when they continue for many days (Gillham & Marx, 2018; Institute for Intergovernmental Research, 2015). Moreover, multi-agency responses often do not include additional staffing or plans to attend to the routine, daily tasks of law enforcement. Continually enhancing these types of collaborations is particularly important given results of a recent nationally

representative survey that found that police officers believe their departments do not have enough officers to adequately police the communities they serve (Pew Research Center, 2017).

Second, the findings suggest a need for greater community engagement and governance among policing agencies to develop common goals for community safety. For example, the Forward through Ferguson Report (Ferguson Commission, 2015) argued for the development of civilian review boards at the municipal and county levels that would review data from criminal justice agencies and advise stakeholders on how to improve policy and practice. These boards would also provide the public with an active voice in identifying agency goals.

The events in Ferguson also sparked important discussions about the racialized nature of policing in the St. Louis region, particularly the disproportionately high arrest rates in predominately Black communities for bench warrants and other relatively minor offenses (Department of Justice, 2015). Contact with criminal justice system, even for low-level offenses, can “kick-start” a cascade of negative consequences for the accused (Lofstrom, Martin, Goss, Hayes, & Raphael, 2018, p. 5), and it can widen the net of criminal justice control, especially for people of color and those living in poverty (Gau & Brunson, 2010; Jacobs, 2015; Kohler-Hausmann, 2018; Natapoff, 2018; U.S. Department of Justice, 2015; Young & Petersilia, 2016). Being arrested also can tarnish individuals’ perceptions of law enforcement and reduce their willingness to cooperate with the police (Leovy, 2015; Natapoff, 2009; Tyler & Huo, 2002). At the same time, police are perceived by many as key partners in the production of neighborhood safety (Carr, Napolitano, & Keating, 2007), and residents in some cities have raised concerns that, in the wake of protests over police use of force, the police have withdrawn from their neighborhoods, leading to rising rates of crime. Negotiating these competing demands requires transparency and a willingness to engage in an open dialog with the community.

Finally, work of this type highlights the growing sense that the public’s reaction to police tactics matters independent of effectiveness (e.g., Lum & Nagin, 2017). Research suggests that the raw number of arrests may not be the best benchmark for police efficacy. Instead, Owens (2019) suggests that police should work toward focusing on ‘socially efficient’ arrests—those behaviors for which the potential gains to society outweigh the potential harms to police legitimacy. In the post-Ferguson era of increased police scrutiny, it is likely that law enforcement will have to consider the potential impact of enforcement

strategies on community confidence and support as well as public safety.

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Endnotes

¹ Arrests that were made solely because of a bench or fugitive warrant (i.e., warrants that have been issued by municipalities outside the City of St. Louis) were excluded from the analyses. There were a number of municipal court changes post-Ferguson that likely impacted the prevalence of these types of warrants. Trends in these types of arrests may confound changes in police behavior with changes in court behavior.

² Misdemeanors are punishable by a fine and/or county jail time for up to one year and include both person and property offenses. Municipal governments issue ordinance violations for violations of local rules. Some acts are governed by laws at the state and local level. For example, an individual caught in possession of marijuana could be charged with either a misdemeanor or ordinance violation.

³ A number of arrests were recorded as occurring at police headquarters, district headquarters, and the city jail. These arrests were excluded when computing counts because they are less likely to be initiated by the police and thus, are less likely to be a function of de-policing. Also excluded were arrests made outside the city, many of which involved arrests of individuals who were being detained by police in neighboring municipalities for bench warrants in the City of St. Louis.

⁴ The Uniform Crime Reporting (UCR) Program divides offenses that have been reported to the police into two groups, Part I and Part II crimes. Part I offenses include serious violent and property crimes (homicides, rapes, robberies aggravated assaults, burglaries, larcenies, motor vehicle thefts, and arsons).

⁵ Results from likelihood ratio tests comparing the negative binomial to the Poisson model indicated that the negative binomial is the preferred model due to over-dispersion.

⁶ In supplemental analyses, we attempted to separate these issues by including a measure that captures the number of patrol officers employed by SLMPD at the beginning of each month. The number of officers employed by SLMPD declined steadily during this time, and as a result, this measure was highly correlated with the linear trend ($r = .93$). More nuanced measures are needed to tease out the processes described here.