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ABSTRACT

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Around the world, policymakers and news reports have warned that domestic violence (DV) could increase as a result of the COVID-19 pandemic and the attendant restrictions on individual mobility and commercial activity. However, both anecdotal accounts and academic research have found inconsistent effects of the pandemic on DV across measures and cities. We use high-frequency, real-time data from Los Angeles on 911 calls, crime incidents, arrests, and calls to a DV hotline to study the effects of COVID-19 shutdowns on DV. We find conflicting effects within that single city and even across measures from the same source. We also find varying effects between the initial shutdown period and the one following the initial re-opening. DV calls to police and to the hotline increased during the initial shutdown, but DV crimes decreased, as did arrests for those crimes. The period following re-opening showed a continued decrease in DV crimes and arrests, as well as decreases in calls to the police and to the hotline. Our results highlight the heterogeneous effects of the pandemic across DV measures and caution against relying on a single data type or source.

JEL Classification:	I18, J12, J16, K14, K42
Keywords:	domestic violence, COVID-19, pandemic, crime reporting, police data

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1. INTRODUCTION

This paper uses high-frequency, real-time data from Los Angeles (LA), California, to study how domestic violence (DV) has been affected by the COVID-19 pandemic. We focus on LA because it is unique among major US cities in providing data on multiple DV measures from both police and non-police sources. We address two main aims. The first is an empirical determination of what impacts the pandemic and pandemic-related shutdown polices had on DV in LA. The second is epistemic, about the value and limitations of using readily available real-time administrative data to learn about the ongoing pandemic.

The study is motivated by the widespread concern that the COVID-19 pandemic, and especially that government-mandated restrictions on economic activity and personal mobility, would increase DV and trap victims with their abusers. The concern has featured prominently in news coverage of the pandemic going back to the first lockdown in China (Graham-Harrison, Athens, and Ford 2020; Vanderklippe 2020; Allen-Ebrahimian 2020; Taub 2020; Townsend 2020) and in policy responses to the pandemic by international organizations (UN Women 2020; FIFA, EC and WHO 2020) and governments around the world (Kottasová and Di Donato 2020). In the US, the Coronavirus Aid, Relief, and Economic Security (CARES) Act, passed on March 27, 2020, included $47 million of supplemental funding to support public policy responses to DV under the 1984 Family Violence Prevention and Services Act (FVPSA; Title III of P.L. 98-457) Program, an increase of 24% relative to appropriations from FY2020 and FY2019 (Fernandes-Alcantara and Sacco 2020).[1] The expectation that shutdowns in particular will increase DV has also been cited as a reason against imposing them (Friedman 2020; Lomborg 2020).

This attention to DV within the scope of COVID-19 analysis and policy is natural given the significant economic and social costs of DV (Fearon and Hoeffler 2014; Garcia-Moreno and Watts 2011; Max et al. 2004) and the risks that the pandemic could increase violence. The COVID-19 pandemic in the US has already been shown to affect a range of behaviors and outcomes that could affect DV, including mortality risk (Weinberger et al. 2020), unemployment and economic distress (Bitler, Hoynes, and Schanzenbach 2020), and gender equality (Alon et al. 2020). It is

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[1] The FVPSA allocation entailed $45 million to formula grants for shelters and support services for DV survivors (26% increase) and $2 million to the National Domestic Violence Hotline (17% increase), but no funding for the Domestic Violence Prevention Enhancement and Leadership Through Alliances (DELTA) program. The CARES Act also included a moratorium on evictions of certain tenants, including some covered under the 1994 Violence Against Women Act (VAWA; Title IV of P.L. 103-322), though it did not provide funding for VAWA programs or for crime victim support under the 1984 Victims of Crime Act (VOCA; P.L. 98-473).

predicted to have severe mental health consequences as well (Pfefferbaum and North 2020; Galea, Merchant, and Lurie 2020). Prior economics research on DV suggests that these factors might increase DV incidence (Card and Dahl 2011; Berg and Tertilt 2012).

A further concern is that the pandemic increased the costs to victims of reporting crimes to authorities or leaving the household and made it more difficult for victims to access support services. Lower reporting rates could exacerbate the risk of abuse (Miller and Segal 2019) and make it difficult for authorities to detect and respond to an increase in violence. If DV increases but reporting rates are significantly depressed by the pandemic, it is unclear if we should expect official reports of DV to increase or decrease, and how we should interpret either finding. As a result, both increases and decreases in reported DV rates could be troubling: the increase in cases is taken as a sign of increased prevalence while the decrease is a sign of depressed reporting (e.g., Stone, Mallin, and Gutman, 2020, Li and Schwartzapfel 2020).

This difficulty is not limited to the pandemic. Rather, under-reporting is a persistent challenge for studying and mitigating DV. When possible, researchers have employed two main strategies to address the measurement challenge. They have either focused on fatal outcomes, such as homicide and suicide, that are reported nearly universally (Stevenson and Wolfers 2006; Miller and Segal 2019; Iyengar 2009; Aizer and Dal Bó 2009) or they have relied on data from other sources, primarily medical records (Aizer 2010; Miller and Segal 2019) and victimization surveys (Stevenson and Wolfers 2006; Miller and Segal 2019). These sources tend to be distributed only with substantial time delays (on the order of a year or two), so are not feasible for guiding current policy.[2] Studies relying on police reports have typically assumed no effects on either reporting (Card and Dahl 2011) or on incidence (Iyer et al. 2012; Muchow and Amuedo-Dorantes 2020) to interpret results. Unfortunately, neither assumption is plausible in this setting.

The interpretation of data on reported crimes is further complicated by the fact that it is not necessary that the pandemic and associated policy responses will increase DV or that they will lower reporting rates. For example, shutdowns may have lowered violence among ex-partners and couples who are not cohabiting, by reducing their time spent together. The pandemic may have

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[2] These sources also have important limitations when they are available. Fatal outcomes are relatively rare and may miss substantial variation in non-fatal outcomes. Even larger surveys tend to have relatively few observations of crime and injury outcomes, preventing any conclusive analysis of smaller metropolitan or non-metropolitan areas. There may also be concerns that the COVID-19 pandemic is altering survey response rates or inducing additional recall bias for past crimes. The COVID-19 could also induce changes in rates at which DV victims seek medical care, which would bias data from hospital or medical records.

also slowed the rate of formation of new relationships, which could also lower (or delay) violence. There could be a deterrence effect if the expected cost to abusers increased, either because of the risk of contracting the virus in jail if arrested or because of higher costs to them from having the relationship end. Reporting rates could have also increased because of increased public attention to the issue of DV in news articles, such as the ones cited above, and also advertisements and the dissemination of information about DV risks and support services in official federal, state and local public health resources related to the pandemic. Reporting by neighbors or other witnesses may have also increased if they became more aware of, or concerned about, continuing violence during the shutdown. The potential presence of these offsetting effects implies that the overall impact of the pandemic in any location will be an average across individuals in that location for whom the effects may have opposite signs.

This theoretical ambiguity is also reflected in the inconsistency in the observed effects of the pandemic on DV. Some cities experienced increases in DV measures, while others saw decreases (Taub 2020). Emerging academic studies of the pandemic and DV using different outcomes, data sources, and locations tend to report increased rates of DV during the pandemic: Leslie and Wilson (2020) and Sanga and McCrary (2020) show increased domestic calls to police in pooled samples of US cities; Agüero (2021) and Perez-Vincent et al. (2020) show increased calls to DV hotlines in Peru and Argentina, respectively; Ravindran and Shah (2020) finds increased DV complaints in India; and Piquero et al. (2020) shows increased domestic incidents in Dallas. However, the findings have not been universal and studies have reported decreases in DV crime rates in particular cities (e.g., Bullinger, Carr, and Packham 2020); Silverio-Murillo, Balmori de la Miyar, and Hoehn-Velasco (2020) finds significant drops in both hotline calls for DV legal aid and in DV police reports across the 16 municipalities in Mexico City.

This paper is the first to use multiple measures of DV, including police and non-police sources, from a single major US city to determine whether variation in findings is coming from differences across measures or just differences across cities. Our police measures are DV calls for service, crime incidents, and arrests; our non-police measure is calls to the county DV hotline. We depict daily variation these outcomes between January 1 and August 24 in the years 2018, 2019 and 2020 using figures that show the three key time periods of pandemic shutdown policy. We estimate the effects of the shutdown using difference-in-differences comparing average changes in 2020 between the pre-shutdown period, the initial shutdown (March 19 – May 28), and the

period following initial re-opening (May 29 – August 24), to changes in prior years, controlling for variation across months and by day of the week. We focus on shutdowns for our explanatory variables because they have been the primary state and local policy responses to the pandemic that are predicted to affect DV.[3]

We find significant effects of the initial shutdown on DV, but the direction differs across the outcomes: DV calls to police and the hotline both increased, but DV crimes decreased. This divergence within a single city suggests that extreme caution is warranted before extrapolating from a single outcome measure. Bullinger et al. (2020) examines two DV measures from police data in Chicago (calls and crimes) and also finds conflicting effects between the two outcomes. Outside the US, Ivandic et al. (2020) finds increases in both DV calls and crimes in London police data, but a decrease in crimes involving ex-partners (consistent with expectations). Perez-Vincent et al. (2020) studies calls to a Buenos Aires DV hotline and finds an increase in calls from DV victims, but a decrease in calls from police.

To our knowledge, this paper is also the first to separately measure the effects of the two initial phases of COVID-19 pandemic policy: shutdown and re-opening. If the economy recovered somewhat and individual stress levels decreased, we should expect the initial effects of the shutdown to diminish after restrictions are lifted. To the extent that reporting was suppressed during the shutdown, there may be a short-term burst of delayed reports after re-opening. Although we find significant changes between the initial shutdown and the period after initial re-opening in LA, they are all reductions, which does not support increased reporting. The previous growth in calls to police and to the hotline recedes during reopening, while the decline in DV crimes further deepens.

In addition to studying overall effects, we also examine different categories of police calls and crimes to examine variation in DV severity. We find that the increase in police calls is

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[3] Shutdowns limited mobility, business and social activity, and coincided with school closures. Each of these could affect DV and DV reporting. As public health guidance shifted on the value of face coverings, mask mandates were also introduced in several states, mainly in summer of 2020. By October 1, 2020, 34 states and DC had implemented statewide mask mandates and only one of those (in Mississippi, on September 30) had been removed. California imposed a mask mandate on June 18, 2020 for indoor settings outside the home. We do not study mask policies because they are unlikely to directly affect DV. They may contribute indirectly by reducing transmission rates for a given level of economic activity, and therefore by enabling relaxation of other restrictions. As a result, our examination of mechanisms in Section 4.4 may capture some effects of mask mandates by including measures of infection rates and economic activity.

primarily driven by calls for less severe crimes. The estimated drop in crimes is larger in absolute terms for less serious crimes, but not in proportion to their baseline rates in the prior years.

Finally, we examine mechanisms related to the pandemic and policy responses that contribute to the total effects by adding contextual variables to our regression models that measure key factors associated with the pandemic that could have contributed to the overall effects on DV. We find that school closures significantly increase all of our measures of DV in LA. The effects of recent COVID-19 cases are mixed, increasing 911 calls and crimes, but not hotline calls, and lowering arrests (per population and per crime), consistent with policing intensity dropping in response to disease risk, but not to shutdown policy itself. Political protests also have mixed effects, increasing crimes but decreasing hotline calls, with insignificant effects on 911 calls and arrests. The mobility drop that preceded the shutdown by 5 days is negative and significant for DV crimes, showing that the decline started before the shutdown. Higher unemployment increases hotline calls, but not the police measures.

Although each mechanism is operative on some outcomes, accounting for them leaves most of the effects of the shutdown unexplained. In some cases (crimes and calls in the post-shutdown period), the mechanisms go against the direction of the overall effect, so accounting for them increases the size of the effect, making the unexplained impact larger than the total. Several studies have estimated heterogeneous effects, by location characteristics or timing of reporting, to investigate potential subgroups that are more or less affected by the shutdown (Bullinger, Carr, and Packham 2020; Ivandic, Kirchmaier, and Linton 2020). However, we are not aware of prior studies that have used contextual variables to decompose the effects of pandemic shutdowns.

2. DATA DESCRIPTION

We focus on LA because of its importance and the depth of publicly available real-time data on measures of DV. Nearly 4 million people live in the city and an additional 6 million are in the surrounding county. Relative to the rest of the country, LA experienced early exposure to the COVID-19 pandemic and responded quickly with strict restrictions. One of the earliest confirmed COVID-19 cases in the US was in LA in late January (Fox11 News 2020). On March 19th, California implemented a stay-at-home order and closed all non-essential businesses (California 2020). The city of LA also publishes real-time data from the LA Police Department (LAPD) on individual 911 calls, crime incidents and arrests that allows researchers to distinguish between

domestic and non-domestic cases, and to categorize both DV calls and crimes by severity. In addition to the police data, we also obtained a measure of DV in LA that we were not able to obtain for other cities: calls to a DV hotline. This measure captures DV cases that are not necessarily reported to police.

2.1   *Police Dispatches*

Our data source for LAPD dispatches (also referred to as 911 calls or calls for service) is the Los Angeles Open Data Portal.[4] The data are updated weekly and include dispatch-level information on call type, dispatch date and time, reporting district, and area of occurrence. We use call type codes and textual information on call type descriptions to identify domestic-related dispatches. Specifically, we define a domestic-related call as any call for which the description contains the phrases "Dom Viol" or "Family." Within the set of domestic-related calls, we are able to further identify the nature of calls using call type codes. Domestic-related calls with codes 245 indicate aggravated assault, 242 indicates simple assault, and 620 indicates dispute. We use this information to create four variables: all domestic-related 911 calls, domestic and family dispute calls, domestic aggravated assault calls, and domestic simple assault calls. Call counts are aggregated at the daily level and presented per 100,000 people within the LAPD jurisdiction. Data on population served are from the Uniform Crime Report's 2018 Law Enforcement Officers Killed and Assaulted (LEOKA).

2.2   *Crime Incidents and Arrests*

Our data source for LAPD crime incidents and arrests is also the Los Angeles Open Data Portal.[5] The data are at the incident-level and are updated weekly. For each incident, we observe up to four different crime codes, the date the incident was reported, and modus operandi (MO) codes. We make use of all available information to determine if a crime is domestic (i.e., using all four crime codes plus the MO code). We categorize the severity of incidents by type of crime based on the most severe crime reported for each incident.

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[4] The calls for service data used in this analysis is publicly available at <https://data.lacity.org/A-Safe-City/LAPD-Calls-for-Service-2020/84iq-i2r6>. Data presented here were downloaded on September 14, 2020.

[5] The crime incident data used in this analysis is publicly available at <https://data.lacity.org/A-Safe-City/Crime-Data-from-2010-to-2019/63jg-8b9z> and <https://data.lacity.org/A-Safe-City/Crime-Data-from-2020-to-Present/2nrs-mtv8>. Data presented here were downloaded on September 14, 2020. To the extent that arrest information is added with some delay, arrest outcomes at the end of our sample period may not reflect ultimate outcomes for those incidents.

Based on conversations with the LAPD, we have determined that there are two ways that domestic incidents will appear in the data. The first is with a DV-specific crime code: DV aggravated assaults are code 236 and DV simple assaults are code 626. The second is using the MO code of 2000. An MO code of 2000 accompanied by a crime code of 230 indicates DV aggravated assault, while an MO code of 2000 and a crime code of 624 or 625 indicates DV simple assault. We also observe non-assault crimes with the MO code 2000. We split these crimes into two groups: crimes that are more severe than assault and crimes that are less severe than assault. The more severe crimes are homicide, rape, robbery, and kidnapping. The less severe category includes thefts, vandalism, threats, and other misdemeanor crimes. We group these crimes into a category of crimes less severe than assault.

We use this information to create six variables: all DV crimes, DV assault crimes, DV aggravated assault, DV simple assault, more severe DV crimes, and less severe DV crimes. Crime incident counts are aggregated at the daily level and presented per 100,000 people within the LAPD jurisdiction. We also track whether crimes resulted in an arrest and examine arrest rates per population, as well as per incident, for various types of DV crimes. Finally, we compare DV assaults to non-DV assaults. The non-DV assaults are defined as crimes with code 230, 624, or 625 that do not have an MO code of 2000. We divide DV assault crimes by the total number of assault crimes to obtain the share of assaults that are domestic.

2.3   *DV Hotline Calls*

The LA County Domestic Violence Hotline, housed within the LA County Department of Public Health, acts as a switchboard to connect domestic violence victims with local agencies (i.e., shelters, legal aid, etc.). Callers to the hotline are prompted to enter their zip code. This information is then used to transfer their call to a designated DV agency in their area. The hotline is completely computer operated; callers only speak directly with a person after they are connected with a local agency. We have data from the hotline on hourly call counts going back to January 2018.[6] Because the hotline serves the entire county, we use the county population to compute our measure of calls per 100,000 population.[7]

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[6] We are missing hotline data from April 1-7 and July 1-14 in 2018.
[7] Note that 911 call and crime incident data is for the city of Los Angeles, while the Hotline serves both the city and the county of Los Angeles.

Descriptive statistics for our outcome variables are presented in Table 1. We provide means and standard deviations for outcome variables in 2018 and 2019 to show the pre-pandemic rates.

2.4   *Explanatory and Contextual Variables*

Our primary explanatory variables for this analysis are the dates of initial shutdown (March 9) and re-opening (May 29). We pool together the period from May 29 to August 24 as following the initial shutdown, though we note that there was another shutdown on July 13, followed by re-opening on September 2, right after our sample period. The additional contextual variables used to study mechanisms are from several sources. We use data from the *New York Times* on daily county-level counts of new COVID-19 infections to create a measure of new infections in the prior 14 days in LA County.[8] Our data on school closures are from the Los Angeles Unified School District instructional calendars. We measure MSA-level unemployment for non-institutionalized civilians aged 16 and older from the CPS monthly files (Flood et al. 2020). Because the reference week for the CPS is generally the calendar week that contains the 12th day of the month, we match the first 18 days of the month with the prior month's CPS and the rest of the days with the current month. We control for the change in mobility, following the coding in Sanga and McCrary (2020), with an indicator for the date of the major initial national decline in mobility on March 14, 2020. Finally, we control for political protests and violence using data from the US Crisis Monitor data compiled by the Armed Conflict Location & Event Data Project (ACLED).[9] Our measure captures the total number of demonstrations (protests and riots) in the county, over the prior 14 days, scaled to county population.

3. EMPIRICAL APPROACH

Our main analysis centers on the measuring variation in two discrete time periods in the course of pandemic shutdown policy. The first period is the initial shutdown, when substantial restrictions to business and personal activity were imposed, which was on March 19, 2020 in LA. The second period we define is the one following the easing of the restrictions associated with the initial shutdown. We call the period from May 29 to August 24, 2020 the post (initial) shutdown period.

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[8] <https://github.com/nytimes/covid-19-data>
[9] Accessed at <https://acleddata.com/special-projects/us-crisis-monitor/> on October 14, 2020.

The pandemic itself could affect economic, social and psychological outcomes, and that could influence DV incidence or reporting. COVID-19 illness and mortality in a household could certainly affect DV outcomes, as could heightened fear and anxiety or behavioral responses to the risk. While it is possible to control for the measured disease burden and implied risk in a local area using data on new cases (and we do this in our exploration of mechanisms in Section 4.4), it is difficult to measure the subjective perceptions that individuals hold about those risks. Although California was among the first states to experience local COVID-19 transmission and deaths, the cumulative reported case numbers were still below 2.5% of the county population by the end of our sample period (August 24, 2020). This means that the direct effect of cases may be less likely to affect DV outcomes than the responses to increased disease risk. Because of that, and the fact that shutdown policies could shift perceptions about risk and seriousness and increase the salience of the pandemic in the population, even without changes in cases, it is empirically difficult to isolate the impact of shutdowns from changes in risk. Rather than attempting to do that, we focus on estimating the impact of shutdown policy variation, with the understanding that the mandates can have both direct effects by proscribing certain activities as well as indirect effects related to shifting perceptions.

Our basic empirical model takes a day as the unit of analysis and regresses various DV outcomes, scaled to population, on indicators for days that follow the start of the initial shutdown (*InitialShutdown$_t$*) or that follow the initial re-opening (*PostInitialShutdown$_t$*). The estimation equation is:

(1) $\text{DV}_t = \beta_1 InitialShutdown_t + \beta_2 PostInitialShutdown_t + \boldsymbol{y_t} + \boldsymbol{m_t} + \boldsymbol{d_t} + \varepsilon_t$

The β_1 coefficient is a difference-in-differences estimate of the average change in outcomes between the initial shutdown in 2020 and the earlier part of the same year, compared to the average seasonal variation between those periods in the two prior years. The β_2 coefficient is the difference-in-differences estimate for the change in the post-shutdown period, relative to the initial shutdown period, between 2020 and the two prior years. We include a vector of year fixed effects $\boldsymbol{y_t}$ and account for seasonal and within-week variation with month ($\boldsymbol{m_t}$) and day of week ($\boldsymbol{d_t}$) fixed effects.

Our basic model considers each shutdown period as a whole, notwithstanding the variation in restrictions during the initial period and following the initial re-opening. We therefore supplement our regressions with figures that plot daily variation in outcomes and to depict the

variability within each of the three main time periods. The figures show smoothed (7-day moving average) measures of each of our outcomes of interest over the period from January 1 to August 24. The bold red line in each figure is for 2020. Data from two prior years (2019 and 2018) are shown (in black and grey) to provide a benchmark for seasonal variation the figures. Vertical lines depict the start and end of the initial shutdown period.

After presenting the overall effects of the pandemic shutdowns, using figures and regressions, we then expand our regression analysis to explore the mechanisms underlying the overall effects. We do this using data related to potential pathways for the COVID-19 pandemic policy to affect DV outcomes and then assessing their contributions to the overall impacts we find. In particular, we estimate an expanded version of equation 1:

$$(2)\ DV_t = \ \beta_1 InitialShutdown_t + \ \beta_2 PostInitialShutdown_t + \boldsymbol{\beta_3 X_t} + \boldsymbol{y_t} + \boldsymbol{m_t} + \boldsymbol{d_t} + \ \varepsilon_t$$

The second model is the same as the first, with the addition of a vector of controls $\boldsymbol{X_t}$ containing these elements: indicator for school closure, including weekends and holidays; MSA-level monthly unemployment rate; indicator for dates after the initial national mobility drop on March 14, 2020; number of new COVID-19 cases in the county over the prior 14 days, scaled to population; and the number of political protests and riots in the county over the prior 14 days, per 100,000 people. The interpretation of the β_1 and β_2 coefficients in this model is shifted from the overall effect of the pandemic policies (in equation 1) to the *unexplained* portion of the effect that is not attributable to variables in the included $\boldsymbol{X_t}$ controls.

4. ESTIMATED EFFECTS OF THE COVID-19 PANDEMIC ON DV IN LA

4.1 *Overall Effects by DV Outcome*

This section presents estimates for the total effects on of the shutdown policies on measures of each of the four types of DV outcomes we observe for LA. These are: (1) 911 calls, (2) crime incidents and (3) arrests from LAPD data, and (4) calls to the DV hotline. This section contains the high-level examination of all calls and crimes related to DV; we later examine calls and crimes separately by severity. For arrests, we first consider total daily DV arrests per population and then examine arrest propensities at the level of individual DV crime incidents.

We start with DV-related calls for service. Similar to prior papers, we find an increase in calls to police related to DV following the initial shutdown in LA. The volume of DV-related

service calls was initially lower in 2020 than in the two earlier years, but there was a clear relative increase following the initial shutdown (Figure 1, Panel A). However, the initial increase in calls was followed by a larger decrease in the period immediately following the initial shutdown.

This pattern is also present in the regression results from equation (1), using the number of DV-related 911 calls to the LAPD, scaled to population 100,000 people served, reported in column 1 of Table 2. Calls increased by 0.54 per day (s.e. 0.08; a 13% increase relative to the 2018-2019 mean of 4.06 in Table 1) during the initial shutdown period and then declined by 0.69 (s.e. 0.08) from that relative peak. Comparing the post-shutdown period to the period before the initial shutdown, we find a significant ($p = 0.05$, reported in the final row of Table 2) decrease in call volume of 0.15, corresponding to 4% of the prior years' mean. This result highlights the importance of examining evolving public policy and of measuring effects beyond the immediate shock. The initial impact of the pandemic on DV police calls in LA was not reflective of the long-term or overall effects.

The contrast between the estimates for 911 calls and the next results for crime rates highlights the importance of studying multiple types of data. We find conflicting effects even within a single city, over the same time periods, and from the same data source. DV calls to police increased during the initial shutdown period (Figure 1, Panel A), but DV crimes decreased (Panel B). Furthermore, Panel A shows a reversal of the effect in the post-shutdown period of the effect on calls, while Panel B shows a continuation of the effect for crimes. Crime rates were initially similar across the three years (2018-2020), but there was a significant relative decline in 2020 starting in late March that persisted over the summer. The regression estimates in Table 2 (column 2) show a drop of 0.12 (s.e. 0.02) in the initial shutdown period, with a further incremental drop of 0.08 (s.e. 0.03) afterward. The total change in the post-shutdown period (relative to the pre-shutdown period) is a drop of 0.21 crimes ($p < 0.001$), corresponding to a 15% reduction in DV crimes compared to the 2018-2019 average of 1.34 in Table 1.

The effects on DV arrests, scaled to population, echo those on DV crimes. Panel A of Figure 2 shows a relative decline in 2020 during the initial shutdown that increased in size during the post-shutdown period. The regression estimates in Table 3, column 1, show a small and statistically insignificant decline of 0.01 (s.e. 0.02) in DV arrests during the initial shutdown, followed by a significant drop of 0.09 (s.e. 0.02) in the post-shutdown period.

The pattern for calls to the hotline is closer to the pattern for police calls than for crime incidents. Figure 3 shows a substantial increase in hotline call volume during the initial shutdown period with no counterpart in the prior years. The call level continued to grow during the shutdown period and then decreased sharply around the time of the initial re-opening. In contrast to the pattern in Figure 1 for police calls, however, the level of hotline calls remained well above average through the month of August. Regression estimates in Table 2 (column 3) confirm the significant increase of 0.22 calls (s.e. 0.02), the significant drop of 0.08 calls (s.e. 0.03) and the persistence of the elevated calls level in the post-shutdown period relative to the pre-shutdown period (0.22-0.08 = 0.14, significant at $p < 0.000$). The size of the initial increase corresponds to a 152% increase relative to the mean of .15 calls in 2018-2019 (Table 1). Even the smaller 0.14 increase in the post-shutdown period reflects 98% more daily calls than the average in the prior two years.

The estimated effects of the COVID-19 shutdowns in LA differ dramatically across the outcomes we considered. When comparing calls to police or to shelters, the magnitudes of estimates are quite different, particularly relative to the average rates of each call type, but the general directions are the same: first an increase and then a decrease. For crimes, however, the initial shutdown estimate has the opposite sign and the post-shutdown period shows an amplification of the initial effect rather than a reversal of it.

These stark differences, within a single city, highlight the limitation of relying on a single type or even a single source of data to measure the total impact of the COVID-19 shutdowns on DV. Nevertheless, these may still be consistent with more subtle impact of the shutdowns on DV. In the next sections, we use detailed information on DV calls and crimes available from the LAPD to examine variation within severity categories as we explore the forces driving the divergence between the two outcomes.

4.2   *Analysis of Severity of DV Calls and Crimes*

One way to reconcile the initial increase in DV calls and with no corresponding increase in DV crimes is that increase in calls came from disturbances or conflicts that were not actually criminal incidents. This could happen, for example, if there was increased reporting of DV to police by third parties (such as neighbors) who have limited information about the events inside the home (e.g., as found Ivandic, Kirchmaier, and Linton 2020 in London). They might have been more likely to call police during the shutdown because they are spending more time at home or because

of exposure to informational campaigns about the danger of increased DV during the pandemic. Another possibility is that increased publicity around the issue of DV (or heightened concern about being shut-in with a potential abuser) increased the propensity of first-time (or low severity) victims to report incidents to police before they escalated to criminal incidents, consistent with heterogeneous effects found in Leslie and Wilson (2020) and Sanga and McCrary (2020). In that case, effective police intervention could lower rates of future crimes.

Both of these stories would result from more 911 calls coming from less severe incidents. Because we are unable to observe data on the underlying incident when a criminal incident report is not filed, we first examine severity information contained in the initial service call. The information could be erroneous for various reasons,[10] but it should also be systematically related to the underlying severity of the incident. We therefore split 911 calls, based on LAPD classifications, into the broad categories of domestic disputes and DV assaults and examine each outcome separately with figures and regressions.

As shown in Panel A of Figure 4, there is a clear increase in calls for domestic disputes during the shutdown, followed by a dramatic decline after re-opening. This is consistent with the changes in domestic calls coming from less severe incidents. However, Panel B of Figure 4 also shows a relative increase in DV calls classified as assaults during the initial shutdown period. The trendline for DV assaults in 2020 started at a much lower baseline than the lines for the prior two years. During the shutdown, the 2020 line increased to a level more similar to the prior two years, and then it declined again following re-opening. If we assume that the earlier baseline would have persisted absent the pandemic, then there is also a clear increase in calls classified as assaults.

The estimates for these categories of DV calls are in Table 4. The first column repeats the overall estimate from Table 2, while the next two columns decompose the estimate into contributions from domestic disputes (column 2) and assaults (column 3). Both show significant increases during the initial shutdown, but the magnitude of the increase in disputes is larger than the one for assault in both absolute terms (0.41 versus 0.13) and relative to the 2018-2019 baseline mean for that variable (in Table 1; 16% versus 8.4%).

When we further subdivide calls classified as assaults into simple and aggravated DV assaults, we find that the increase in assaults is coming from an increase in simple assaults. Column

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[10] For example, violence may escalate between the 911 call and time that police arrive at the scene, or third-party callers may misunderstand the situation.

4 of Table 4 shows an increase in simple assaults of 0.13 (s.e. 0.04) during the initial shutdown (that is reversed afterward), while column 5 shows an increase in aggravated of only 0.003 (s.e. 0.017). Although calls for simple DV assaults are significantly more common than those for aggravated DV assaults (Table 1), the estimated increases during the shutdown are proportionally much larger for simple (10%) than for aggravated (0.8%). This pattern is similarly reflected in Figure 6, where simple DV assaults are in Panel A and aggravated DV assaults are in Panel B.

We also examine the severity of crimes recorded by the LAPD and find declines in both assaults (Panel A of Figure 5) and non-assault DV crimes (Panel B of Figure 5). The point estimates are negative and significant in both periods for both overall DV assaults and simple assaults. The point estimates for DV aggravated assaults (-0.020 and -0.018) are smaller than those for DV simple assaults (-0.055 and -0.059), and not statistically significant. This is reflected in Figure 6, where Panel A shows a clear decline in DV simple assaults and Panel B for aggravated DV assaults is much noisier. Despite their lack of significance, the estimated effects for aggravated assaults are proportionally larger. Relative to average crime levels in 2018-2019, DV aggravated assaults initially declined by 9.5% and then by a further 8.6%, while simple assaults declined by 6.5% and then 6.9%. In columns 5 and 6 of Table 5, we split non-assault DV crimes into those less severe than assault and more severe than assault. We find significant declines in those outcomes during the initial shutdown period with no additional change in re-opening. The point estimates are larger for less severe crimes, but the effects are proportionally larger for more severe (24.2%) than for less severe (13.8%) crimes. Overall, these results show reductions in both more and less severe crimes, with generally larger proportional effects in the more severe categories.

4.3   *Interpretation of Overall Effects on DV Outcomes in LA*

The results in the previous sub-section indicate that the increase in calls is coming primarily, but not exclusively, from less severe DV. This could either happen if less severe crimes are more responsive to the pandemic or if reporting rate increased more for those crimes. Evidence from victimization surveys shows that reporting rates are higher when the incident is more severe (e.g., Miller and Segal 2019, Appendix Table 2C). If the pandemic only lowered the severity threshold for reporting, it should shift the distribution of reported incidents toward less severe cases. To the extent that increase in calls is from cases that are less severe than the threshold for a crime, it is possible to reconcile increased calls with no corresponding increase in crimes.

But why are reported crime rates falling? One possibility is that crime incidence is declining. This could happen as a result of increased reporting (or even the expectation of a higher reporting rate on the part of potential abusers), even of non-crime DV incidents, if police interventions are effective at deterring escalation or if police assist victims in accessing supportive social and legal resources in the community.[11]

Community advocacy resources can also be accessed directly by calls to DV shelters through the hotline we study. In addition to the increase in general publicity around the issue of DV during the pandemic, there was special attention to the issue of emergency shelter housing for victims and a well-publicized initiative in the city to provide support services and hotel rooms as needed to supplement emergency shelter beds. The program, called Project Safe Haven, was announced by the LA mayor Eric Garcetti in his daily briefing on April 29, 2020 and funded in part by a $4.2 million donation from the singer Rihanna and Twitter CEO Jack Dorsey.[12] To the extent that the increased hotline calls in our data also reflect greater use of non-police community resources, there may be a natural relationship between hotline calls and lower crime. Under this interpretation of the data in LA, the policy implication is that there was capacity to improve DV outcomes in the city, through initiatives that increase reporting to police and non-police public services. The pandemic may have been an impetus in LA and other cities to pay more attention to DV victims and crime incidence may have decreased.

In contrast to this optimistic interpretation, it is also possible to explain the pattern in calls and overall crimes as coming from a decrease rather than an increase in reporting rates, coupled with an even larger increase in the incidence of violence. If reporting rates were depressed more for more serious crimes, perhaps among victims with fewer resources to exit the relationship and access police or other services, we might see an increase in calls for less serious incidents but a decline for more serious cases. It is impossible to use the publicly available data from LA to determine how the distribution of calls by severity maps into crime incidents by severity or DV coding and the extent to which this mapping is affected by the pandemic. It would be possible if

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[11] This could happen, for example, through the Domestic Abuse Response Team (DART) partnership program between the LAPD and local victim advocacy organizations.

[12] See local news coverage at <https://losangeles.cbslocal.com/2020/04/09/rihanna-twitter-ceo-donate-4-2m-to-shelter-domestic-violence-victims-amid-coronavirus-pandemic/>.

LA provided a common identifier with which to merge the calls and crimes data, but they declined our request for this information.[13]

Another troubling possibility is that crime rates increased, and that is what drove the increase in reporting, but that police were less responsive and less likely to record domestic incidents as crimes in official data. Here again, data that tracks DV calls into various outcomes could shed light on the relevance of the story, but the data are not available to us. One possibility that we can explore is the effect on arrests.

One reason that police might avoid recording DV incidents as crimes is that they are reluctant to arrest abusers. This could be to protect offenders from the increased risk of COVID-19 infections in jails (Hawks, Woolhandler, and McCormick 2020) or from a desire to minimize their own exposure to potentially infected individuals. DV arrests per population declined somewhat during the initial shutdown (in Figure 3, Panel A and Table 3, column 2), consistent with less policing, but this decline could come from a decrease in crimes. We therefore examine policing intensity using incident level data on arrests to test if the pandemic depressed arrest rates, conditional on crime incidents. The incident-level regression estimates for all DV crimes are in column 2 of Table 3; Figure 2, Panel B shows similar information with the daily (7-day moving average) share of DV crimes leading to arrests. Neither shows any evidence of lower arrest rates during the initial shutdown. To examine if the decline is being masked by a shift in the mix of cases, we also estimate the incident-level arrest model for each of our sub-categories of DV crimes. The estimates are in the remaining columns of Table 3: assaults in column 3, simple assaults in column 4, and non-assault crimes in column 5. We see no decline in arrests for any of these outcomes and the coefficients are generally positive (and insignificant). The initial decrease in DV crimes is therefore unlikely to be explained by less intensive policing of DV overall. However, we do find negative estimates for arrest rates in the post-shutdown period, which suggests that less intensive policing might contribute to the persistence of the decrease in crime rates in the second period. We return to this in the next section on mechanism.

Before turning to mechanism, we first place the estimated decline in DV crimes in the broader context of violent crimes in the city. To increase comparability, we focus on assaults. Column 2 of Table 6 reports estimated effects of the pandemic on assaults that are not coded as

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[13] We also requested records from internal reports maintained by the department on domestic incidents that are not considered crimes, but that request was also denied.

DV and column 1 repeats the estimates for DV assaults (from column 2 of Table 5). The decrease in DV assaults is also present for non-DV assaults in the initial shutdown period, and the effect is substantially larger in magnitude. As a result, the share of assaults attributable to DV actually increased during the initial shutdown, despite the drop in DV crimes, as shown in column 3. In the period after the shutdown, DV assaults continued to decrease, while non-DV assaults increased back toward their pre-shutdown levels (but still lower by 0.17, $p = 0.003$). During that period, the DV share among assaults declined and was not significantly different from the pre-pandemic level. Figure 7 shows this pattern clearly in the smoothed data.

4.4 *Examination of Mechanisms*

As described above in Section 4.2, and shown in Panel A of Table 2, estimation of the model in equation 1 revealed significant overall effects of the pandemic on DV calls to police, crimes and hotline calls. The initial shutdown is associated with increases in DV calls to both the LAPD and the county hotline but with decreases in DV crimes. This section discusses results from estimation of equation 2 that includes measures of different components of the pandemic and associated policy response.

The estimates for total domestic 911 calls, DV crimes and hotline calls from the expanded model are presented in columns 4-6 of Table 2.[14] Panel B of Tables 3, 4, and 5 show the estimates for arrests and outcomes measuring subsets of DV calls or crimes. Columns 4-6 in Table 6 show non-DV assaults and the DV share among assaults.

School closure has a significant positive effect on the four total measures of DV: calls to police or the hotline, crimes, and arrests. It also increases DV calls of all types except for aggravated assault (where there was no overall effect of the pandemic) and DV assault crimes overall and simple assault. School closure has no estimated impact on non-DV assaults (column 5 of Table 6). This suggests that stress or other factors associated with having children at home lead to increased DV incidence or reporting. Because the initial shutdown increased the frequency of school closures, this channel contributes to the increased 911 and hotline calls but does not explain the decrease in DV crimes.

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[14] We also estimated an expanded version of these models with an indicator for observations after the initial re-opening ended and second shutdown started, on July 13. Because that indicator was not itself significant and did not alter the estimated effects of the other shutdown or contextual variables for any of the outcomes, we focus on the more parsimonious model in the tables.

The other variables have less consistent effects on the DV outcomes. Increased unemployment in the metropolitan area is not statistically related to any of the 3 main police outcomes, but it is positively associated with more calls to the DV hotline (and with more non-assault DV crimes). The mobility drop on March 14 is not significantly related to DV calls to police or the hotline, but it has a negative and significant point estimate for DV crimes (and for aggravated DV assaults). This indicates that some of the decline in reported DV crimes preceded the formal shutdown. COVID-19 cases (per population; new cases in the prior 2 weeks) in the county are significantly associated with increased DV 911 calls and crimes (as well as with increased non-DV assaults), but the coefficient on for hotline calls is negative and insignificant.

Political protests in the county (per 100,000 population) are associated with more DV crimes (overall, assaults and other DV crimes), but not with non-DV assaults or with DV police calls or DV arrests (per population or per incident), except for non-assault DV crimes. The estimate for hotline calls is also significant, but negative. Because protests increased primarily in the post-shutdown period, the negative effect for hotlines helps explain the decrease in calls in that period. For crimes, however, the protest effect goes against the continued decrease in crimes in the post shutdown period.

Accounting for the various mechanisms reduces the size of the initial increase in 911 DV calls by 41% (a 0.22 decline from a base of 0.54) and in hotline calls by 45% (a 0.10 drop from a base of 0.22), leaving more than half of the overall effect unexplained. For DV crimes, the mechanisms tend to go against the direction of the overall effect, so accounting for them produces a larger residual effect of the shutdown than otherwise: the estimate increases by 17% (0.02 from a base of 0.12). The post-shutdown declines in DV police calls and crimes grow larger in magnitude after accounting for the mechanisms, but the estimate for hotline calls is cut in half.

5. CONCLUSIONS

We find large effects of the COVID-19 pandemic on DV outcomes in LA, using high-frequency, real-time data from the LAPD and from the county's DV hotline. These effects vary over time, with the phases of the public policy response, and they vary across outcome measures. The initial shutdown increased DV calls to police and to the hotline, but decreased DV crimes and arrests for those crimes. The re-opening period showed a continued decrease in DV crimes and arrests, as well as decreases in calls to police and to the hotline. However, while the increase in DV calls to

police from the shutdown period was entirely reversed in the next period, calls to the hotline remained elevated.

These types of variation, over time and across outcome measures, within a single city highlights the challenge that researchers face in attempting to measure the impact of an ongoing pandemic, or other emergency, on DV rates. Because of the heterogeneous effects within LA, we caution against using our results to predict effects in other cities.

Instead, we believe that our analysis highlights the need for greater transparency and distribution of police data in US cities. We focused on LA largely because of the relatively rich data provided by the authorities. Other cities that provide public data often provide less detailed information about calls (e.g., not distinguishing DV assaults from domestic disputes) and crimes (e.g., only reporting the most severe crime in an incident, only identifying assaults as domestic crimes) and many other departments provide no real-time public data. Without better data, researchers and policymakers have a weak evidentiary foundation on which to base their policy choices and resource allocations in response to the current ongoing pandemic or to future crises.

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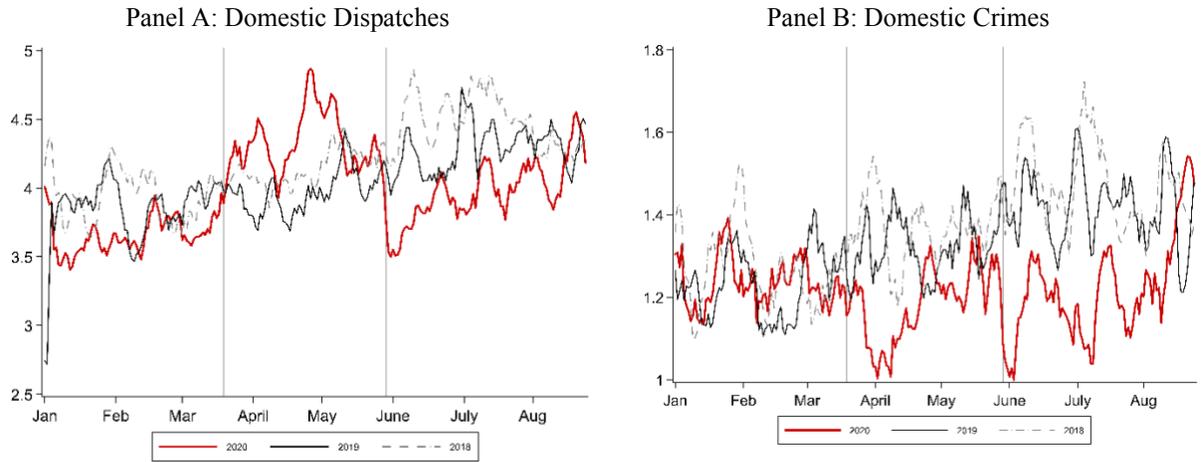
Figure 1: LAPD Domestic Dispatches and Domestic Crimes

Notes: Panel A shows LAPD dispatches for domestic-related 911 calls between January 1 and August 24 in 2020, 2019, and 2018. Panel B shows domestic crime incidents recorded by the LAPD over the same period. Calls and crimes are presented as 7-day moving averages per 100,000 population served by the LAPD. Vertical lines indicate the timing of the initial shutdown: beginning March 19th and ending May 28th.
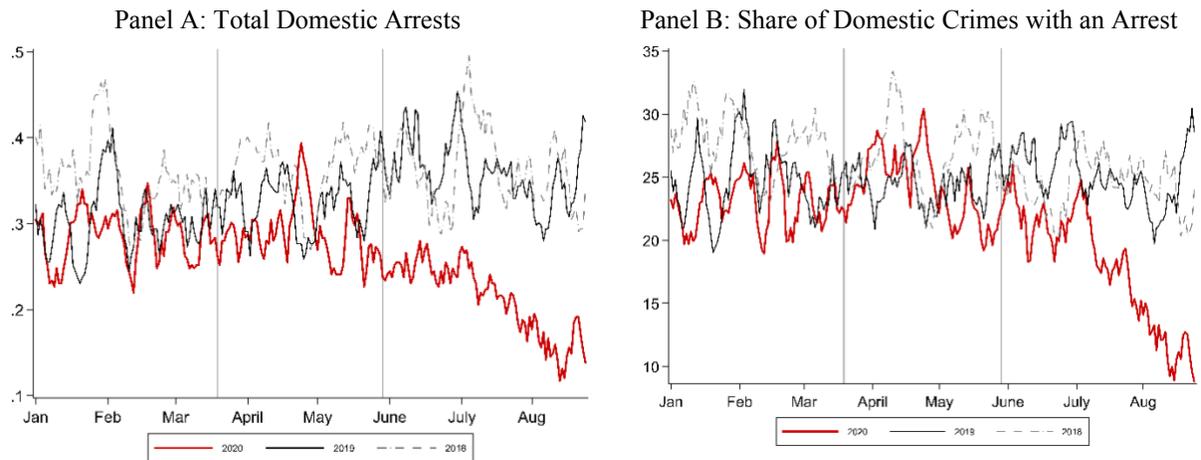
Figure 2: LAPD Arrests for Domestic Crimes

Notes: Panel A shows total LAPD arrests for domestic crimes between January 1 and August 24 in 2020, 2019, and 2018. Panel B shows the domestic crimes over the same period that resulted in an arrest. Arrests in Panel A are presented as 7-day moving averages per 100,000 population served by the LAPD. Shares in Panel B are also 7-day moving averages. Vertical lines indicate the timing of the initial shutdown: beginning March 19th and ending May 28th.
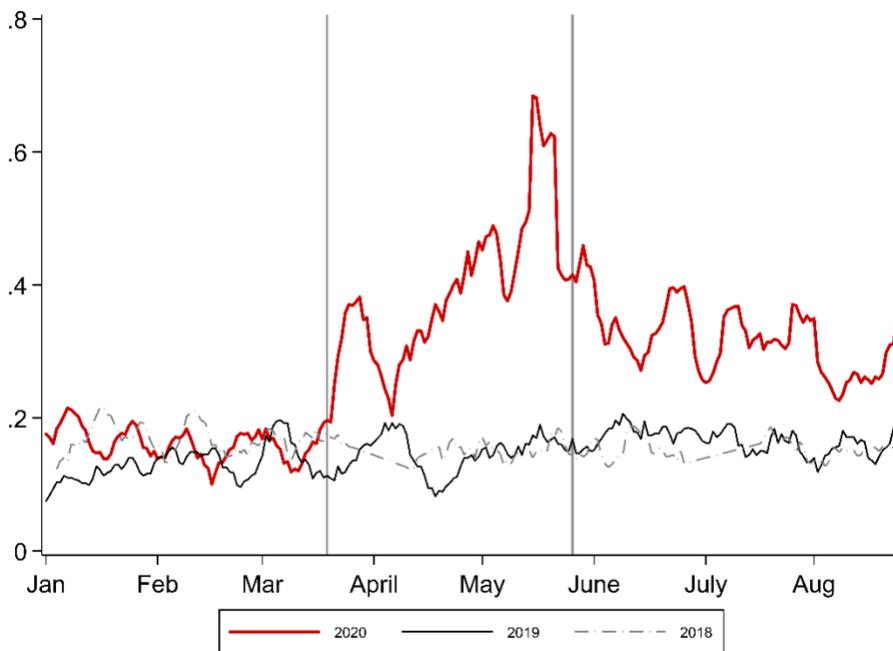
Figure 3: LA County Domestic Violence Hotline Calls

Notes: The figure shows daily calls to the LA County Domestic Violence Hotline between January 1 and August 24 in 2020, 2019, and 2018. Calls are presented as 7-day moving averages per 100,000 population in Los Angeles County Vertical lines indicate the timing of the initial shutdown: beginning March 19th and ending May 28th.

Panel A: Domestic Disputes

Panel B: Domestic Assaults
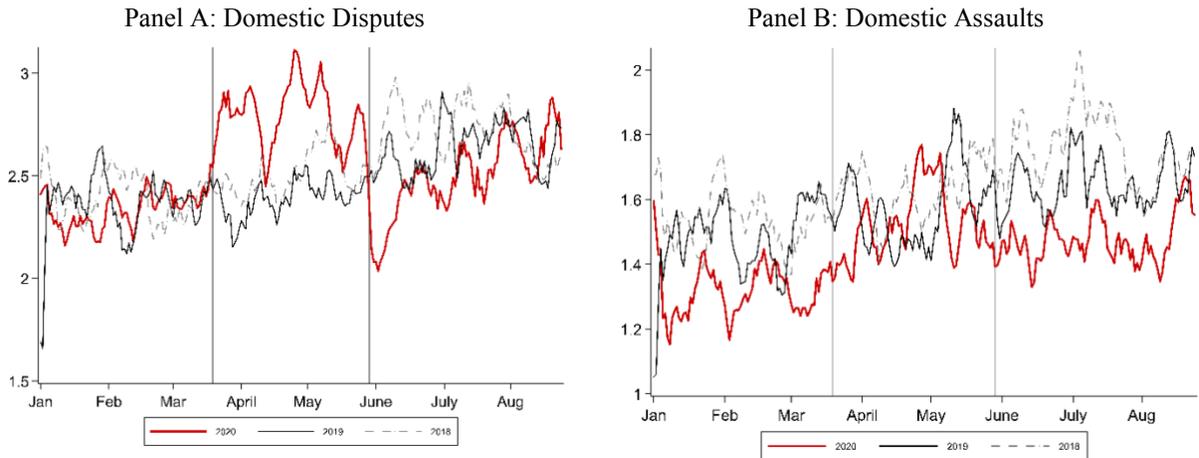
Figure 4: LAPD Dispatches for Domestic Disputes and Domestic Assaults

Notes: Panel A shows LAPD dispatches for domestic dispute and family fight calls between January 1 and August 24 in 2020, 2019, and 2018. Panel B shows LAPD dispatches for domestic assault calls over the same period. Calls are presented as 7-day moving averages per 100,000 population served by the LAPD. Vertical lines indicate the timing of the initial shutdown: beginning March 19th and ending May 28th.

Panel A: Domestic Assaults

Panel B: Non-Assault Domestic Crimes
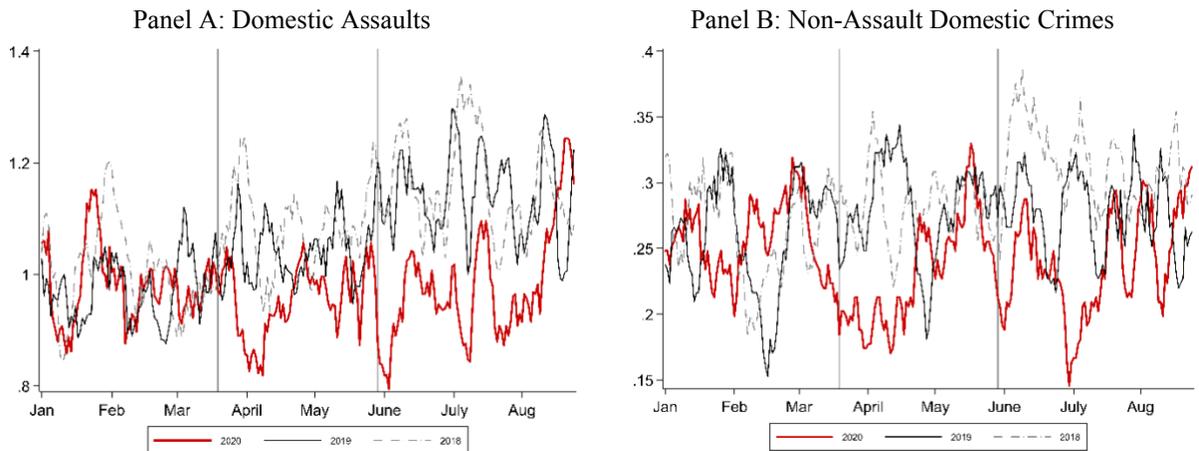
Figure 5: LAPD Domestic Assault and Non-Assault Crimes

Notes: Panel A shows domestic assault crime incidents recorded by the LAPD between January 1 and August 24 in 2020, 2019, and 2018. Panel B shows non-assault domestic crime incidents over the same period. Crimes are presented as 7-day moving averages per 100,000 population served by the LAPD. Vertical lines indicate the timing of the initial shutdown: beginning March 19th and ending May 28th.

| Panel A: Domestic Simple Assaults | Panel B: Domestic Aggravated Assaults |
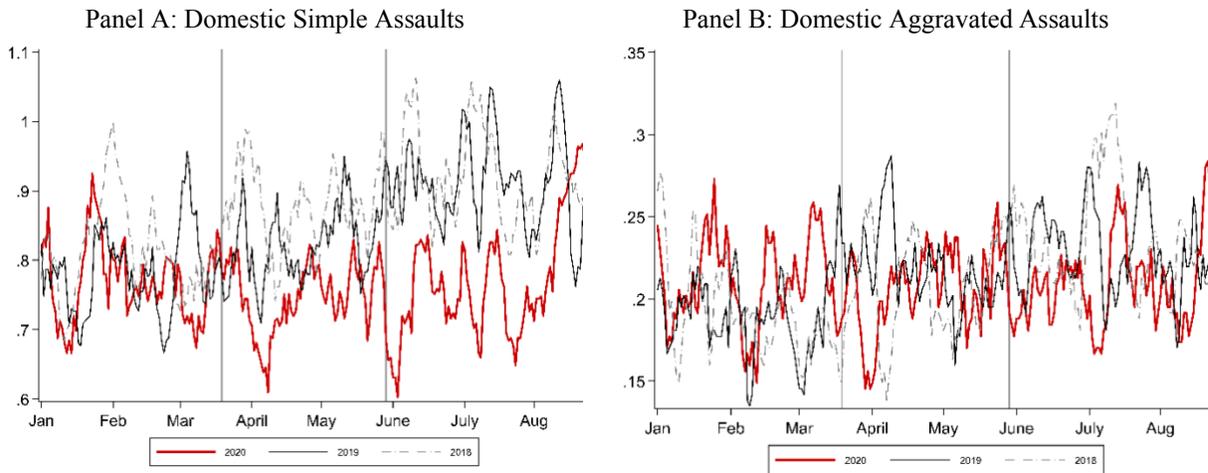
Figure 6: LAPD Domestic Simple and Aggravated Assault Crimes

Notes: Panel A shows domestic simple assault crime incidents recorded by the LAPD between January 1 and August 24 in 2020, 2019, and 2018. Panel B shows domestic aggravated assault crime incidents over the same period. Crimes are presented as 7-day moving averages per 100,000 population served by the LAPD. Vertical lines indicate the timing of the initial shutdown: beginning March 19th and ending May 28th.

| Panel A: DV Assaults | Panel B: Non-DV Assaults |
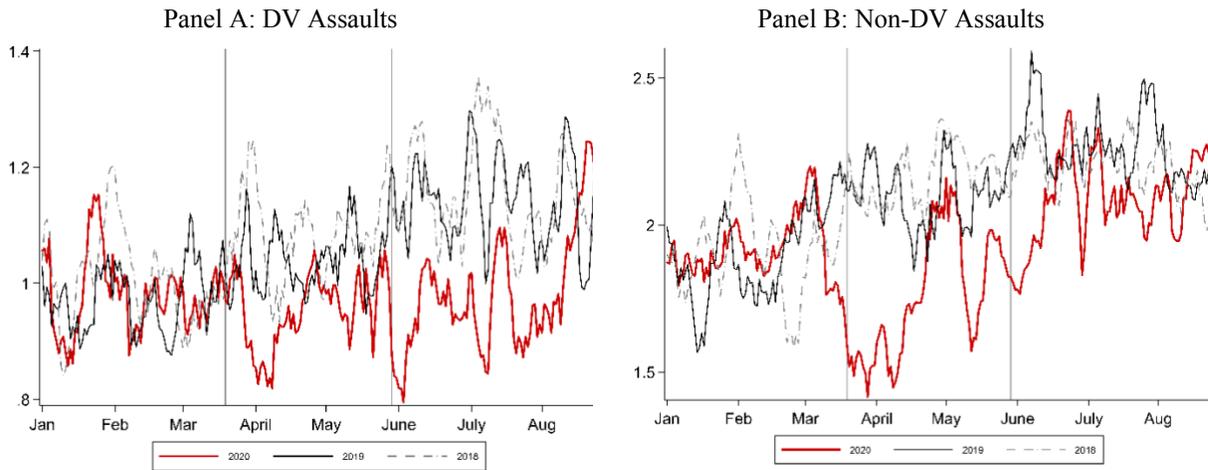
Figure 7: LAPD Domestic Assault and Non-Domestic Assault Crimes

Notes: Panel A shows domestic assault crime incidents recorded by the LAPD between January 1 and August 24 in 2020, 2019, and 2018. Panel B shows non-domestic assault crime incidents over the same period. Crimes are presented as 7-day moving averages per 100,000 population served by the LAPD. Vertical lines indicate the timing of the initial shutdown: beginning March 19th and ending May 28th.

TABLES

Table 1: Summary Statistics for Los Angeles

	Mean	Std. Dev.
	2018-2019	
911 calls to police		
All DV calls	4.06	0.61
DV assault calls	1.59	0.33
DV aggravated assault calls	0.32	0.10
DV simple assault calls	1.27	0.28
Domestic dispute calls	2.47	0.38
Non-DV assault calls	6.40	0.93
Non-DV aggravated assault calls	3.26	0.58
Non-DV simple assault calls	3.15	0.48
Crime incidents		
All DV crime	1.34	0.25
DV assaults	1.06	0.22
DV aggravated assaults	0.21	0.079
DV simple assaults	0.85	0.19
Other DV crime	0.27	0.083
DV crime, more severe than assault	0.054	0.037
DV crime, less severe than assault	0.22	0.08
Non-DV assaults	2.10	0.34
DV share of assaults	0.35	0.05
DV arrests	0.34	0.11
DV hotline calls	0.15	0.073
Contextual variables for all years		
Monthly MSA unemployment rate	0.043	0.0044
Public schools closed	0.49	0.50
	2020	
Contextual variables in 2020		
New COVID-19 Cases, Prior 14 Days	0.069	0.092
Political Protests and Violence, Prior 14 Days	0.13	0.22

Notes: Data on 911 calls, crime incidents, and arrests are from the LAPD and computed as daily rates per 100,000 city population. Hotline calls are daily per 100,000 county population and from the LA county public health department. Unemployment rate is MSA-level from the CPS. Public school closure is a daily indicator for public K-12 schools not being in session. COVID-19 case data are at the county-level from the *New York Times* and scaled to county population. Political protest data are a county-level sum over the past 14 days, scaled to 100,000 population, from the Armed Conflict Location & Event Data Project. Sample period is from January 1 to August 24.

Table 2: COVID-19 Shutdown Effects on DV Police Calls, Crimes and Hotline Calls in LA

	(1) 911 Calls	(2) Crimes	(3) Hotline Calls	(4) 911 Calls	(5) Crimes	(6) Hotline Calls
Initial shutdown	0.540***	-0.119***	0.223***	0.319**	-0.139***	0.123***
	[0.0834]	[0.0374]	[0.0247]	[0.149]	[0.0530]	[0.0307]
Post initial shutdown	-0.691***	-0.0876**	-0.0806***	-0.936***	-0.428***	-0.0429
	[0.0829]	[0.0407]	[0.0272]	[0.207]	[0.0974]	[0.0641]
School closed				0.179***	0.0827***	0.0250***
				[0.0550]	[0.0258]	[0.00875]
Unemployment				-0.125	0.230	1.199***
				[0.956]	[0.391]	[0.305]
Mobility drop				0.0923	-0.0914**	-0.00805
				[0.125]	[0.0454]	[0.0197]
COVID-19 recent cases				2.078**	1.715***	-0.152
				[0.817]	[0.394]	[0.201]
Political protests				0.0941	0.357***	-0.121**
				[0.224]	[0.104]	[0.0612]
Observations	709	709	709	709	709	709
R-squared	0.495	0.324	0.588	0.513	0.359	0.619
Pr(shutdown + post) = 0	0.054	0.000	0.000	0.0157	0.000	0.261

Notes: Unit of observation is a day. Outcomes are scaled to 100,000 population in city (columns 1, 2, 4,5) or county (columns 3, 6). Sample includes January 1 to August 24 in years 2018, 2019 and 2020. Initial shutdown date is March 19, 2020. Post-initial shutdown is May 29, 2020. All regression models include fixed effects for month, year and day-of-week. Models in columns 4-6 also include contextual variables for school closure, unemployment, mobility drop (March 14, 2020), and county level COVID-19 cases (scaled to population) and number of political protests (per 100,000 population) in the prior 14 days. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 3: Effects of COVID-19 Shutdowns on DV Arrests and Arrest Rates in LA

		Arrest for DV Incidents				
	DV Arrests	All	Assaults	Simple Assaults	Aggravated Assaults	Other DV Crimes

Panel A: Overall Effects, No Contextual Variables

	(1)	(2)	(3)	(4)	(5)	(6)
Initial shutdown	-0.00835	0.0181	0.0169	-0.000037	0.0228	0.0209
	[0.0171]	[0.0116]	[0.0132]	[0.0315]	[0.0143]	[0.0243]
Post initial shutdown	-0.0923***	-0.0395***	-0.0451***	-0.0357	-0.0460***	-0.0192
	[0.0166]	[0.0109]	[0.0124]	[0.0301]	[0.0133]	[0.0228]
Observations	709	37,279	29,643	6,047	23,596	7,636
R-squared	0.324	0.005	0.006	0.011	0.006	0.005

Panel B: With Contextual Variables

	(7)	(8)	(9)	(10)	(11)	(12)
Initial shutdown	-0.0202	0.0133	0.0162	-0.0475	0.0293	0.00297
	[0.0338]	[0.0306]	[0.0336]	[0.0863]	[0.0358]	[0.0731]
Post initial shutdown	-0.0444	0.0500	0.0345	-0.0773	0.0610	0.106
	[0.0332]	[0.0399]	[0.0442]	[0.108]	[0.0478]	[0.0930]
School closed	0.0214*	-0.000574	-0.00415	-0.00107	-0.00389	0.00877
	[0.0119]	[0.00710]	[0.00807]	[0.0198]	[0.00868]	[0.0148]
Unemployment	-0.00906	-0.0794	-0.0918	-0.165	-0.0830	0.0158
	[0.188]	[0.128]	[0.144]	[0.338]	[0.157]	[0.278]
Mobility drop	0.00769	0.0255	0.0232	0.0660	0.0176	0.0280
	[0.0330]	[0.0292]	[0.0322]	[0.0830]	[0.0341]	[0.0698]
COVID-19 recent cases	-0.326**	-0.532***	-0.500***	0.0498	-0.642***	-0.625***
	[0.135]	[0.0958]	[0.107]	[0.256]	[0.116]	[0.216]
Political protests	0.0291	-0.0370	-0.0139	-0.0278	-0.0107	-0.126*
	[0.0492]	[0.0334]	[0.0381]	[0.0885]	[0.0420]	[0.0679]
Observations	709	37,279	29,643	6,047	23,596	7,636
R-squared	0.334	0.006	0.007	0.012	0.007	0.006

Notes: In columns 1 and 7, the unit of observation is a day and outcome is DV arrests per 100,000 population. All other columns have a DV crime incident as the unit of observation and the outcome is an indicator for an arrest. Sample includes January 1 to August 24 in years 2018, 2019 and 2020. Initial shutdown date is March 19, 2020. Post-initial shutdown is May 29, 2020. All regression models include fixed effects for month, year and day-of-week. Models in Panel B also include contextual variables for school closure, unemployment, mobility drop (March 14, 2020), and county level COVID-19 cases (scaled to population) and number of political protests (per 100,000 population) in the prior 14 days. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 4: Effects of COVID-19 Shutdowns on DV Police Calls by Type in LA

	All	Disputes	Assaults	Simple Assaults	Aggravated Assaults
Panel A: Overall Effects, No Contextual Variables					
	(1)	(2)	(3)	(4)	(5)
Initial shutdown	0.540***	0.406***	0.133***	0.130***	0.00252
	[0.0834]	[0.0585]	[0.0451]	[0.0401]	[0.0168]
Post initial shutdown	-0.691***	-0.534***	-0.156***	-0.130***	-0.0262
	[0.0829]	[0.0631]	[0.0420]	[0.0378]	[0.0172]
Observations	709	709	709	709	709
R-squared	0.495	0.330	0.463	0.425	0.193
Panel B: With Contextual Variables					
	(6)	(7)	(8)	(9)	(10)
Initial shutdown	0.319**	0.290***	0.0284	0.0812	-0.0529*
	[0.149]	[0.106]	[0.0827]	[0.0828]	[0.0284]
Post initial shutdown	-0.936***	-0.758***	-0.173*	-0.141*	-0.0320
	[0.207]	[0.167]	[0.0941]	[0.0856]	[0.0380]
School closed	0.179***	0.117***	0.0639**	0.0556**	0.00828
	[0.0550]	[0.0377]	[0.0322]	[0.0282]	[0.0114]
Unemployment	-0.125	-0.394	0.249	0.199	0.0497
	[0.956]	[0.706]	[0.470]	[0.433]	[0.177]
Mobility drop	0.0923	0.0479	0.0459	-0.00220	0.0481*
	[0.125]	[0.0873]	[0.0799]	[0.0812]	[0.0263]
COVID-19 recent cases	2.078**	1.790***	0.284	0.151	0.133
	[0.817]	[0.661]	[0.370]	[0.328]	[0.147]
Political protests	0.0941	0.0915	-0.00521	0.0284	-0.0336
	[0.224]	[0.191]	[0.108]	[0.0979]	[0.0489]
Observations	709	709	709	709	709
R-squared	0.513	0.355	0.468	0.430	0.197

Notes: Unit of observation is a day. Outcomes are scaled to 100,000 population. Sample includes January 1 to August 24 in years 2018, 2019 and 2020. Initial shutdown date is March 19, 2020. Post-initial shutdown is May 29, 2020. All regression models include fixed effects for month, year and day-of-week. Models in Panel B also include contextual variables for school closure, unemployment, mobility drop (March 14, 2020), and county level COVID-19 cases (scaled to population) and number of political protests (per 100,000 population) in the prior 14 days. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Effects of COVID-19 Shutdowns on DV Crimes by Type in LA

	All	Assaults	Simple Assaults	Aggravated Assaults	Less Severe than Assault	More Severe than Assault

Panel A: Overall Effects, No Contextual Variables

	(1)	(2)	(3)	(4)	(5)	(6)
Initial shutdown	-0.119***	-0.076**	-0.055*	-0.020	-0.0305**	-0.0131*
	[0.037]	[0.034]	[0.029]	[0.014]	[0.0134]	[0.00689]
Post initial shutdown	-0.088**	-0.077**	-0.059*	-0.018	-0.00579	-0.00500
	[0.041]	[0.036]	[0.030]	[0.014]	[0.0137]	[0.00681]
Observations	709	709	709	709	709	709
R-squared	0.324	0.320	0.302	0.101	0.087	0.046

Panel B: With Contextual Variables

	(7)	(8)	(9)	(10)	(11)	(12)
Initial shutdown	-0.139***	-0.127**	-0.116**	-0.011	-0.0103	-0.00168
	[0.053]	[0.054]	[0.046]	[0.020]	[0.0334]	[0.0113]
Post initial shutdown	-0.428***	-0.277***	-0.217***	-0.060*	-0.122***	-0.0289**
	[0.097]	[0.094]	[0.076]	[0.033]	[0.0286]	[0.0141]
School closed	0.083***	0.088***	0.078***	0.009	-0.00293	-0.00194
	[0.026]	[0.023]	[0.020]	[0.009]	[0.00893]	[0.00430]
Unemployment	0.230	-0.083	-0.193	0.110	0.339***	-0.0260
	[0.391]	[0.357]	[0.303]	[0.149]	[0.124]	[0.0691]
Mobility drop	-0.091**	-0.018	0.013	-0.031*	-0.0612*	-0.0121
	[0.045]	[0.048]	[0.041]	[0.018]	[0.0335]	[0.0115]
COVID-19 cases	1.715***	1.123***	0.897***	0.226*	0.458***	0.134**
	[0.394]	[0.364]	[0.290]	[0.129]	[0.122]	[0.0584]
Political protests	0.357***	0.236**	0.207**	0.028	0.108**	0.0127
	[0.104]	[0.103]	[0.097]	[0.041]	[0.0420]	[0.0214]
Observations	709	709	709	709	709	709
R-squared	0.359	0.348	0.331	0.108	0.117	0.053

Notes: Unit of observation is a day. Outcomes are scaled to 100,000 population. Sample includes January 1 to August 24 in years 2018, 2019 and 2020. Initial shutdown date is March 19, 2020. Post-initial shutdown is May 29, 2020. All regression models include fixed effects for month, year and day-of-week. Models in Panel B also include contextual variables for school closure, unemployment, mobility drop (March 14, 2020), and county level COVID-19 cases (scaled to population) and number of political protests (per 100,000 population) in the prior 14 days. Robust standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1.

Table 6: Effects of COVID-19 Shutdowns on DV and Non-DV Assaults in LA

	(1) DV Assaults	(2) Non-DV Assaults	(3) DV Share of Assaults	(4) DV Assaults	(5) Non-DV Assaults	(6) DV Share of Assaults
Initial shutdown	-0.076**	-0.385***	0.030***	-0.127**	-0.438***	0.030**
	[0.034]	[0.058]	[0.009]	[0.054]	[0.066]	[0.012]
Post initial shutdown	-0.077**	0.216***	-0.044***	-0.277***	-0.042	-0.057***
	[0.036]	[0.062]	[0.009]	[0.094]	[0.139]	[0.021]
School closed				0.088***	0.007	0.017***
				[0.023]	[0.036]	[0.005]
Unemployment				-0.083	1.723***	-0.237**
				[0.357]	[0.651]	[0.102]
Mobility drop				-0.018	-0.130**	0.009
				[0.048]	[0.060]	[0.011]
COVID-19 recent cases				1.123***	1.393***	0.078
				[0.364]	[0.538]	[0.080]
Political protests				0.236**	0.013	0.051**
				[0.103]	[0.183]	[0.026]
Observations	709	709	709	709	709	709
R-squared	0.320	0.278	0.115	0.348	0.295	0.138

Notes: Outcomes are scaled to 100,000 population in city. Sample includes January 1 to August 24 in years 2018, 2019 and 2020. Initial shutdown date is March 19, 2020. Post-initial shutdown is May 29, 2020. All regression models include fixed effects for month, year and day-of-week. Models in columns 4-6 also include contextual variables for school closure, unemployment, mobility drop (March 14, 2020), and county level COVID-19 cases (scaled to population) and number of political protests (per 100,000 population) in the prior 14 days. Robust standard errors in brackets. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.