

# The COVID-19 Pandemic, Domestic Violence and the Riskiness of Alcohol Consumption\*

Aaron Chalfin<sup>1</sup>, Shooshan Danagoulian<sup>2</sup>, and Monica Deza<sup>3</sup>

<sup>1</sup>Department of Criminology, University of Pennsylvania

<sup>2</sup>Department of Economics, Wayne State University

<sup>3</sup>Department of Economics, City University of New York – Hunter College

January 22, 2022

## Abstract

A large body of evidence documents a link between alcohol consumption and household violence. Recent scholarship suggests that since the onset of the COVID-19 pandemic and subsequent stay-at-home orders, there has been a marked increase in violence between family members. This research contributes to the understudied link between the venue of alcohol consumption and domestic violence, exploiting the sudden increase in residential alcohol consumption during the COVID-19 lockdown. We combine 911 call data with newly-available high-resolution microdata on visits to bars and liquor stores in Detroit, MI. We regress the daily number of violent incidents in a community on the number of visits to two different types of alcohol outlets – bars and liquor stores – net of a set of granular interacted fixed effects. We find that the strength of the relationship between visits to alcohol outlets and domestic violence more than doubles starting in March 2020. On the other hand, we find considerably more limited evidence with respect to non-domestic assaults. Beyond providing novel evidence about the transmission of household violence during the COVID-19 pandemic, these results support a more enduring conclusion – that it is not alcohol consumption *per se* but alcohol consumption at home that is a principal driver of domestic violence. An implication of this research is that while regulations that raise the cost of nonresidential drinking may lead to net declines in violence, they may yield unintended consequences for household violence to the extent that they push drinking indoors.

*Keywords:* Alcohol consumption, domestic violence, residential alcohol use, residential violence, exposure to household members, household risks

---

\*Correspondence: Shooshan Danagoulian, Department of Economics, Wayne State University, Detroit, MI 48202. E-Mail: [fr4523@wayne.edu](mailto:fr4523@wayne.edu).

The authors would like to thank Richard Berk, David Cutler, Kosali Simon, and participants of the NBER “COVID-19 and Health Outcomes” conference for helpful comments.

# 1 Introduction

The statistics on domestic violence are grim: 1 in every 4 women in the United States will experience violence at the hands of an intimate partner during her lifetime (Alhabib et al., 2010). The consequences of domestic violence include not only the shorter-term physical injuries (Le et al., 2001; Plichta, 2004; Sheridan and Nash, 2007; Ellsberg et al., 2008) and mental harms (Roberts et al., 1998; Tolman and Rosen, 2001; Humphreys and Thiara, 2003) that are the immediate consequences of abuse, but also longer-term medical issues such as chronic pain (Wuest et al., 2008), depression (Dienemann et al., 2000), sexually-transmitted diseases (Martin et al., 1999), and post-traumatic stress disorder (Jones et al., 2001). Given that approximately half of all domestic violence occurs in households where children under the age of 12 are present (Fantuzzo and Fusco, 2007), domestic violence imposes a terrible burden, not only on the victim of the abuse, but also on children who witness it (Holt et al., 2008; Bair-Merritt et al., 2010). Given the psychosocial malleability of children, domestic violence has profound implications for their cognitive and social development (Huth-Bocks et al., 2001; Koenen et al., 2003; Ybarra et al., 2007; Enlow et al., 2012). Sadly, this burden compounds itself generation after generation, potentially becoming an engine for the intergenerational transmission of violence (Simons et al., 1995; Simons and Johnson, 1998; Ehrensaft et al., 2003; Currie et al., 2018).

Alcohol use is implicated in approximately 50 percent of all violent crimes and sexual assaults in industrialized nations (Heinz et al., 2011). It is therefore unsurprising that a large literature in economics, criminology and public health establishes a correlational and, more recently, a causal link between problematic drinking and violence. Research shows that both the perpetration of violence (Kypri et al., 2014; Carpenter and Dobkin, 2015; Gatley et al., 2017) and victimization (Chalfin et al., 2019) increase discretely at age 21, the age at which individuals can legally drink in the United States.<sup>1</sup> There is likewise evidence that policy levers such as Sunday liquor laws (Heaton, 2012; Han et al., 2016), “wet laws” that expand the footprint of drinking establishments (Anderson et al., 2017), underage driving laws (Carpenter, 2007), and alcohol excise taxes (Markowitz and Grossman, 1998,

---

<sup>1</sup>Similar findings are available in Germany — see Dehos (2022).

2000; Cook and Durrance, 2013) can have important impacts on public safety as well as morbidity (Carpenter and Dobkin, 2017) and mortality rates (Carpenter and Dobkin, 2009). The relationship between alcohol consumption and violence seems to be driven, in particular, by “extreme” drinking (Carpenter et al., 2016), including drinking that is fueled by “college party culture” (Lindo et al., 2018).

Owing to its effects on aggression (Bushman, 2002; Heinz et al., 2011) and the ease with which it can change the nature of routine activities among members of the same household (Livingston, 2010; Roman and Reid, 2012), alcohol consumption has been linked, in particular, to violence between family members (Markowitz and Grossman, 1998, 2000), including intimate partners (Luca et al., 2015).<sup>2</sup> Given the large volume of alcohol consumed by the heaviest drinkers (Watts, 2020) and the frequency of contact between intimate partners, even a modest relationship between alcohol consumption and aggression can lead alcohol to be among the primary drivers of domestic violence.

The COVID-19 pandemic and its many accompanying disruptions to economic and social life have changed the world both unexpectedly and dramatically. Consistent with the expectations of many observers (Taub, 2020), recent scholarship has documented a notable increase in domestic violence after March 2020 in the United States (Boserup et al., 2020; Leslie and Wilson, 2020; Piquero et al., 2020, 2021) and in other countries including Uganda (Mahmud and Riley, Mahmud and Riley), Peru (Aguero, 2020), Mexico (Silverio-Murillo and De La Miyar, 2020), and India (Ravindran and Shah, 2020). Scholars have proposed numerous mechanisms for this increase, including the stress brought about by job loss and material deprivation, as well as the dramatic increase in opportunities for violence given that lockdowns have caused individuals to spend more time at home together (Peterman et al., 2019; Hsu and Henke, 2021). Research undertaken prior to the COVID-19 pandemic establishes a mechanical link between exposure to an intimate partner and domestic violence, which is well documented in a number of countries including Bangladesh (Mobarak and Ramos, 2019), Rwanda (Sanin, 2021) and the United States (Dugan et al.,

---

<sup>2</sup>There is also a litany of more correlational research that demonstrates a nexus between problematic drinking and domestic abuse. See, e.g., Foran and O’Leary (2008), Caetano et al. (2001) and Thompson and Kingree (2006).

2003). Thus, the increased exposure to an intimate partner during lockdown may be a potential mechanism driving the observed increase in domestic violence.

The nature and volume of alcohol consumption is another potential mechanism through which changing household conditions during the pandemic may have affected domestic violence. Stay-at-home orders dramatically reduced the degree to which people drink in bars or restaurants, thus pushing alcohol consumption into residential settings (Usher et al., 2020). The majority of recent studies suggest that alcohol consumption increased after March 2020 (Biddle et al., 2020; Brenner, 2020; Lechner et al., 2020; Pollard et al., 2020; Rodriguez et al., 2020; Usher et al., 2020).<sup>3</sup> To the extent that residential and non-residential alcohol consumption are differentially conducive to violence — especially domestic violence — the COVID-19 pandemic provides an unfortunate but unique opportunity to better understand the extent to which *venue* of alcohol consumption, in addition to the volume of alcohol consumption, affects violence.

This research considers whether alcohol consumption became *riskier* during the pandemic and the associated stay-at-home orders. By riskier, we refer to the propensity of drinking to lead to violence. To study the relationship between alcohol consumption and household violence, we merge public microdata on 911 calls for police service in Detroit, Michigan, with newly available – and remarkably detailed – geo-location data that allows us to measure daily visits to bars and liquor stores. Aggregating the data to the zip-code-by-day level allows us to observe relationships between community violence and visits to establishments that sell alcohol across space and time.

We focus on Detroit for several reasons. First, Detroit provides publicly-available microdata on 911 calls with detailed information which makes it possible to distinguish domestic and non-domestic assaults. Second, Detroit is representative of the many US cities which restricted the sale of alcohol in bars during the COVID-19 pandemic. At the time of the lockdown, Michigan, as most other US states, only allowed specially permitted venues to sell alcohol for take-out or curbside pick-up, essentially preventing the vast majority of bars

---

<sup>3</sup>While it remains inconclusive whether total alcohol consumption increased, as some research indicate a decline in alcohol consumption (Chodkiewicz et al., 2020; Kim et al., 2020; Rehm et al., 2020), the venue of alcohol consumption was drastically displaced from restaurants or bars to residential consumption.

and restaurants from selling alcohol during the lockdown. While this law was changed on July 1, 2020 to allow a wider sale of mixed drinks and other open containers, during the lockdown these venues were allowed to sell unopened bottles of beer, wine, and other spirits to generate revenue. Detroit was also similar to other cities across the US in its treatment of liquor stores and other points of sale of alcohol for off-premise consumption during the lockdown: liquor stores were allowed to remain open (along with 47 states), deemed as essential (along with 39 states) and allowed delivery of unopened bottles of alcohol (along with 33 states).<sup>4</sup>

Though we use natural variation in visits to alcohol outlets to identify a treatment effect, by using a series of highly granular fixed effects, our analysis allows us to account for a broad array of potentially confounding variables such as time-invariant neighborhood characteristics, daily shocks to the crime environment that differ between high- and low-crime zip codes, adverse economic impacts of the pandemic at the city and zip code level, and changing adherence to stay-at-home orders and associated day-to-day routines. We likewise condition on visits to restaurants and food stores both as a key falsification check and in order to account for broader trends in economic activity and the use of public space. Thus, while the stressful conditions of living during a global pandemic may exert an independent effect on community violence, by disambiguating between the effects of alcohol consumption on domestic violence and other types of violence and by separately studying lockdown and post-lockdown periods, we are able to net out the more general effects of the pandemic.

Our main results can be summarized as follows. First, during the period in which cities imposed binding lockdowns on venues that serve alcohol, the relationship between visits to alcohol venues — including bars and liquor stores — and domestic violence strengthened considerably. This effect is especially large for visits to liquor stores which became the source of the majority of alcohol purchased during the lockdown. On the other hand, the relationship between visits to alcohol venues and non-domestic assaults did not change during the lockdown period. Importantly, we do not find evidence that visits to restaurants

---

<sup>4</sup>Overall, Michigan laws regarding alcohol sales for on-premise consumption and off-premise consumption were in line with most states and hence representative of the rest of the country.<sup>5</sup>

or grocery stores affect domestic violence during the lockdown period, which indicates that estimates are unlikely to be driven by daily changes in social or economic life as the effects of the pandemic have ebbed and flowed. Second, after lockdown period ended, the relationship between visits to venues where alcohol is sold and domestic violence returned to pre-lockdown levels. Taken together, the fact that lockdown strengthened the relationship between visits to alcohol venues and domestic violence — but not other violence — is consistent with the idea that the discrete shift from on-premises to residential alcohol consumption during lockdown has a particularly close nexus to domestic violence.

The remainder of the paper is organized as follows. In Section 2 we present our data and empirical methods. Section 3 presents our findings and Section 4 concludes.

## 2 Data and Methods

### 2.1 Data

#### 2.1.1 Customer Visit Data

We measure the number of visits to establishments that sell alcohol using data from SafeGraph’s *Patterns* platform, which organizes location data for points of interest (POIs) relevant to business. The SafeGraph data, generously made available at no cost to researchers, consists of high-resolution cellular device location data that link tracked devices to specific commercial establishments in space and time. The data combine information on more than 4 million points of interest in the United States with visit patterns by cellular device holders collected by SafeGraph using location tracking apps. The data contain information on POI location name, address, North American Industry Classification System (NAICS) code, brand association, and business descriptor categories as well as the volume of daily visits to each establishment. We restrict the data to visits to points of interest within Detroit determined by zip code. Using NAICS codes, we further restrict the data to visits to venues of sale or service of alcohol: bars and restaurants with an explicit focus on

alcoholic beverages (NAICS 722410, 722511)<sup>6</sup>; and beer, wine, and liquor stores (NAICS 445310, henceforth liquor stores). We also include grocery stores (NAICS 445110, 445120, 445210, 445220, 445230, 44591, 445292)<sup>7</sup> and full service restaurants excluding bars (NAICS 722511) as venues capturing larger economic activity, but which also sell or serve alcohol.

While the data allow us to identify foot traffic to alcohol outlets with remarkable granularity, they are subject to three limitations. First, the data do not enable us to track every cellular phone in Detroit. Since companies like SafeGraph collect location information from cellular device users using a variety of downloaded apps, this could potentially lead to selection bias. On this point, we note that SafeGraph has explored the potential selection bias of tracked users by comparing their geography, education, and household income to census data, finding a high correlation, implying that the sample of users is representative of the population at the census block group level.<sup>8</sup> Second, and related, these data neither constitute a comprehensive count of visits to a particular POI, as they are not based on the universe of cellular devices, nor do they capture visits by individuals without cellular devices. To address this limitation, our analysis focuses on *changes* in the volume of visits, rather than the number of visits. Third, visits to alcohol outlets do not allow us to observe the amount of alcohol purchased or when it was consumed, which makes them an imperfect proxy for alcohol consumption. While this is a notable limitation, our estimates — which relate violence to the number of visits to alcohol outlets — nevertheless constitute *prima facie* evidence that violence is sensitive to the timing and location of alcohol purchases.

Finally, we note that even if there is imperfect correspondence between the visit data and alcohol consumption, and as long as errors in the data are uncorrelated with community violence conditional on fixed effects, this generates a conservative bias in our estimates.<sup>9</sup> Under the assumption of conditionally random errors in the Safegraph data, our estimates

---

<sup>6</sup>Because NAICS 722410 only includes establishments that serve alcohol but no food, we extended the definition of bars to include full-line restaurants with the following terms in their business descriptor categories: “Bar or Pub”, “Cocktail”, “Sports Bar”, “Dive Bar”, “Brewery”.

<sup>7</sup>Full-line grocery stores in Michigan may be licensed to sell all alcohol. Our definition of grocery extends beyond full-line grocery stores, including specialty stores that may carry alcohol as well.

<sup>8</sup>More detail on SafeGraph analysis can be found at: <https://www.safegraph.com/blog/what-about-bias-in-the-safegraph-dataset>.

<sup>9</sup>As has long been appreciated, random errors in a right-hand side variable decrease the signal-to-noise ratio, which attenuates the resulting regression coefficient toward zero (Fuller, 2009).

can be thought of as a reduced form effect where we study the relationship between visits to alcohol outlets and violence understanding that the effect of alcohol *consumption* will be proportionately larger than the estimates we report, depending on the relationship between visits and consumption. In an auxiliary analysis we empirically account for the possibility of consumption spillovers to subsequent days and find modest evidence that visits to alcohol outlets have a lagged effect on violence.

### 2.1.2 Domestic Violence Data

Domestic violence is thought to be notoriously underreported to law enforcement ([Felson and Paré, 2005](#); [Voce and Boxall, 2018](#)), a feature which is often thought to be a persistent confounder of research on the topic. According to victim surveys, approximately 55 percent of nonfatal incidents of domestic violence are reported to the police ([Truman and Morgan, 2014](#)). However, while this figure may appear low to a casual observer, it is, in fact, higher than the reporting rate of violent victimizations perpetrated by strangers (49 percent) or casual acquaintances (39 percent). Accordingly, while under-reporting remains a problem for measuring the prevalence of domestic violence, this is an issue that pervades crime research in general and is not unique to studies on domestic violence.

There are two types of data on domestic violence known to law enforcement: 911 emergency calls for assistance and crime complaints — that is, the official count of domestic assaults recorded by a local police department. Typically, victims report domestic violence to law enforcement by dialing 911 to request police services. Because victims may refuse to answer the door when police arrive or may recant an accusation they have made and because police may decide that there is insufficient evidence of a crime, only a subset of 911 calls for service will ultimately be found in administrative crime data. While some domestic violence emergency calls will invariably be an artifact of false or inaccurate reporting, 911 data capture a far larger universe of reported violence than crime complaints, including many incidents which will officially be classified as unreported to police. For this reason, 911 calls for emergency service remain the most comprehensive source of administrative data on domestic violence and, accordingly, are a mainstay of domestic violence research



(Datner et al., 1999; Miller et al., 2020; McCrary and Sanga, 2020).

Other sources of data on domestic violence are sporadically collected — for instance, data from emergency departments and victim service providers. However, while these data provide some useful information about the nature and extent of “hidden” domestic violence, they likely provide far less comprehensive coverage than administrative data. With respect to hospital data, while 45 percent of domestic violence victimizations yielded an injury to at least one victim, nearly 90 percent of injuries were for cuts or bruises and fewer than 1 in 5 victims received formal medical care (Truman and Morgan, 2014). Of these, only a relatively small fraction are admitted to the emergency department at a hospital. This problem is compounded by the fact that domestic violence often remains unrecorded by hospital staff who assign ICD codes, either because victims are reluctant to indicate the reason for their injuries or because of inevitable lapses in recording practices. In our review of emergency department data from Detroit hospitals, only 0.03 percent of hospital admissions are associated with an ICD code for abuse and assault.<sup>10</sup>

Some victims seek help from either municipally-funded or private service providers rather than the police. However, just 21 percent of victims ultimately receive services (Truman and Morgan, 2014). Furthermore, when they do, these services may be received from one of any number of service providers, some of which specialize in serving survivors of domestic violence and others which provide more general services. While data from treatment providers is an important source of data about the unmet needs of victims, given the under-provision of treatment resources, it is an unworthy substitute for administrative data.

We measure violence known to law enforcement using 911 call data from the City of Detroit Open Data Portal, which was launched as an initiative to increase transparency between the city government and the people it serves. The 911 calls for service dataset compiles all 911 calls requiring law enforcement response as well as officer-initiated calls for service in the City of Detroit. Between January 1, 2019 and July 4, 2020 there were

---

<sup>10</sup>Assault defined as any diagnostic language including the term “assault” or ICD10 codes starting with X92 X93 X94 X95 X96 X97 X98 X99 Y00 Y01 Y02 Y03 Y04 Y07 Y08 Y09. Abuse is defined using ICD10 diagnostic codes Z04.4, Z04.7, T74, and T76.

1,471,211 calls for emergency service. The dataset includes two types of calls: (1) emergency response calls, which result from people requesting police services by calling 911 directly, and (2) officer-initiated calls, which document policing activities such as traffic stops, street investigations, and other situations where a police officer initiates the response.

For each call, we observe the responding agency, the zip code of incident, information about the agency (precinct, responding unit), date of incident, information about response to the incident (time on scene, total response time, total time, travel time, intake time), and information regarding the nature of the call (call code number, call description). We use a combination of call code numbers and call descriptions to identify which assault calls can be attributed to domestic violence and which cannot. We define non-domestic assault as either felonious assault <sup>11</sup> or assault and battery <sup>12</sup>. We define domestic violence as calls concerning inter-partner and intra-household violence, including child or adult abuse with or without a weapon, with or without a report.<sup>13</sup> We sum domestic violence calls and assaults to the uniquely identified zip code, year, month, and day. Our analysis is based on 26 zip codes tracked across 552 days, totalling 14,256 zip code observations per day.

As noted, domestic violence is underreported to law enforcement ([Felson and Paré, 2005](#); [Voce and Boxall, 2018](#)). Compounding this empirical regularity, there is evidence that the propensity to report domestic violence to police may have fallen discretely, beginning in March 2020 ([Sorenson et al., 2021](#)). If true, then an analysis of 911 calls to police may yield an underestimate in the degree to which domestic violence may have risen during the pandemic. We note that a level change in the propensity to report domestic violence to the police during the pandemic does not bias our estimates which condition on date fixed effects and study variation in visits to alcohol outlets across space and time. That is, our research design tests whether an unusually high number of visits to alcohol outlets in a particular community predicts an unusually high volume of 911 calls for domestic and non-domestic violence *in that community on that day*. Level changes in reporting are addressed through the inclusion of fixed effects.

---

<sup>11</sup>Call code numbers 343010, 343020, 343040

<sup>12</sup>Call code numbers 347010, 347020, 347021, 347040

<sup>13</sup>Call code numbers 393010, 393030, 395010, 395030, 396010, 396030, 397010, 397030.

## 2.2 Empirical Methods

We study the effect of community-level alcohol sales on violence using natural variation in the measured number of visits to alcohol outlets. We focus, in particular, on two types of alcohol outlets: bars and liquor stores. We likewise focus on two types of violence: domestic violence involving an assault where the perpetrator is either an intimate partner or a family member of the victim, and assaults that are not of a domestic nature. In order to estimate the proportional change in violence with respect to visits to alcohol outlets, we estimate Poisson regression models of the count of 911 calls made in a zip code on a date is  $Y_{it}$ .<sup>14</sup> Here,  $Y_{it} \sim \text{Poisson}(\gamma_{it})$ , is regressed on the number of measured visits to each type of alcohol establishment. In order to account for changing behavior introduced by stay-at-home orders, we interact the number of measured visits for each type of alcohol establishment with an indicator for the post-March 10 period. We define the post-COVID period flexibly, dividing it into a March 10-May 25 period, when the stay-at-home was in effect, and a May 26-July 4 period, when the order was lifted.

$$\begin{aligned} \log(\gamma_{it}) = & \alpha + \sum_{j=1}^4 \xi^j [\ln(VISITS)_{it}^j] + \\ & + \sum_{j=1}^4 \beta^j [\ln(VISITS)_{it}^j \times POST_{it}] + \\ & + \rho X_{it-1} + \lambda_i + \delta_t \end{aligned} \tag{1}$$

In (1),  $VISITS_{it}^j$  is the daily number of measured visits in a given zip code to an establishment of type  $j$ : bars, liquor stores, restaurants, and grocery stores. The post March 2020 period is identified using  $POST_{it}$  indicator and interacted with the visit terms separated by establishment type. In practice, we separate the pandemic into two periods,  $POST1_{it}$  and  $POST2_{it}$ , which are equal to one for the time periods between March 10-May 25 (lockdown) and May 26-July 4 (post-lockdown), and zero for pre-pandemic time periods. The  $e^{\xi^j}$  terms represent the estimates for the pre-pandemic period and the  $e^{\beta^j}$  terms are the estimates for the pandemic period. These coefficients provide an estimate of the elasticity

---

<sup>14</sup>As a robustness check, we also estimate models via ordinary least squares.

of violence with respect to visits to each type of establishment. In auxiliary models, we allow for temporal spillovers in the effect of alcohol consumption by including various lags for each of the visit variables.

In all models, we condition on  $X_{it-1}$ , which is the number of shootings in a given zip code in the previous day, a proxy for serious community violence experienced recently. We include zip code fixed effects,  $\lambda_i$ , in order to absorb time-invariant characteristics across zip codes in Detroit. We also include day-by-month fixed effects and year fixed effects,  $\delta_t$ , in order to account for daily variation in citywide crime trends.<sup>15</sup> In practice, we utilize an additional innovation, allowing  $\delta_t$  to vary according to whether a zip code’s baseline crime rate is above or below the median in the data. We thus allow for daily changes in 911 calls to have different effects in different types of communities in Detroit. These interacted fixed effects serve an important purpose — by allowing shocks to alcohol consumption and violence differ across high- and low-crime areas of Detroit, we control for any factors that vary on a daily basis and have different effects on high- versus low-crime communities.

Together the interacted fixed effects account for a number of challenges to causal identification, including fixed neighborhood characteristics and daily shocks to citywide crime rates due to weather variation or other time-varying characteristics of the urban environment. For example, to the extent that negative news about the pandemic circulates in Detroit, this may raise stress levels and induce both more drinking and more violence. To the extent that these impacts are felt across the entire city (or especially so in higher crime or lower crime communities), these impacts are captured by the date fixed effects. Any remaining confounding variables — for example, the death or illness of a prominent community member in a given date and area— would need to be correlated with both visits to alcohol outlets and family violence within that date and area rather than in high-crime neighborhoods as a whole.

In all models, standard errors are clustered at the zip code level to account for both heteroskedasticity and arbitrary serial correlation in the error terms for observations in the same geographic unit measured at different time periods (Bertrand et al., 2004).

---

<sup>15</sup>In a series of robustness checks, we estimate models using several different variations on the fixed effects.

## 3 Results

### 3.1 Descriptive Analysis

Panel A of Figure 1 presents unadjusted trends in domestic assaults (solid lines) compared to the share of visits to alcohol venues –bars and liquor stores– attributed to liquor stores (dashed lines) for the months of January to July, where the thin lines correspond to 2019 and the respective thick lines correspond to 2020. Panel B presents unadjusted trends in non-domestic assault.

During 2019 and early 2020, the relative share of visits to liquor stores was remarkably stable at approximately 30 percent. As stay-at-home orders closed bars and restaurants, liquor stores became the main venue of alcohol sales. For this reason, it is not surprising that the pandemic has led to a large and discrete shift in patterns of alcohol consumption. By May 2020, liquor stores accounted for over 65 percent of all visits to alcohol outlets. Both panels provide evidence of substantial seasonal variation in violence, with both domestic and non-domestic assaults increasing during summer months and reaching their lowest points between January and March. While non-domestic assaults in summer 2020 were slightly lower than in summer 2019, they shared a similar trend. On the other hand, domestic assaults in 2020 lagged only in the earlier spring months and eventually surpassed the 2019 rate. In accordance with emerging literature on this topic ([Aguero, 2020](#); [Boserup et al., 2020](#); [Leslie and Wilson, 2020](#); [Mahmud and Riley, Mahmud and Riley](#); [Ravindran and Shah, 2020](#); [Silverio-Murillo and De La Miyar, 2020](#)), the figure thus provides suggestive evidence that, unlike non-domestic assault, domestic violence has increased during the pandemic, even after taking seasonal trends into account. Taken together, the two series suggest that the change in the trend of domestic violence between 2020 and 2019 follows the the drastic change in the trend of prevalence of venue of alcohol consumption.

Next, we present summary statistics for our zip-code-by-date analytic dataset. Table 1 summarizes the visit data. We report descriptive statistics for the entire city (Panel A) as well as for zip codes with a higher than median (Panel B) and a lower than median (Panel C) number of per capita 911 calls. As there are 26 zip codes in the city, each of the latter

two groups comprises 13 zip codes. We report summary statistics separately for the pre-pandemic, lockdown, and post-lockdown periods. With respect to pre-pandemic visits, we observe 235 daily visits to restaurants, 99 daily visits to food stores, 90 daily visits to bars, and 35 daily visits to liquor stores in an average zip code. As the SafeGraph data allow us to observe only a fraction of all visits, these numbers do not have a direct interpretation. However, ratios between bars and liquor stores are highly instructive. In the pre-pandemic period, there were 2.6 visits to bars for every visit to a liquor store. After the onset of the pandemic and resulting lockdowns, this ratio fell dramatically — during the lockdown period, visits there were 1.5 visits to liquor stores for every visit to a bar.<sup>16</sup>

Overall, during the lockdown period (column (2)), there was a notable decline in the number of visits to alcohol outlets. However, while visits to bars declined by 83 percent, visits to liquor stores declined by 34 percent. These declines are consistent with an overall decline in consumer activity, as evidenced from large declines in the number of customer visits to restaurants (-65 percent) and food outlets (-42 percent). Throughout our subsequent analyses, we control for visits to restaurants and food outlets in order to account for the large secular decline in economic activity that was caused by the pandemic. After the lockdown period ended, the number of visits recovers somewhat for all establishments. While visits continue to be well below pre-pandemic levels, bars, liquor stores, restaurants, and grocery stores all see a modest rebound in visits. Panels B and C consider how these dynamics differ between high- and low-crime communities.

Finally, before proceeding with the main analysis, we consider whether greater *access* to alcohol was associated with rising violence during the lockdown period.<sup>17</sup> We explore this by estimating equation (1) using the number of establishments — bars, liquor stores, restaurants, and food outlets — in a zip code as treatment variables. These models consider whether violence rose more in zip codes which had a greater numbers of liquor stores prior to the pandemic. The results of this analysis are presented in Table 2. We find that, during

---

<sup>16</sup>While lockdown orders mandated that bars be closed to customers, news coverage indicates that some bars and restaurants that serve alcohol remained open for pickup orders, including sale of unopened bottles of alcohol.

<sup>17</sup>Table A1 reports the number of establishments by type in the pre-pandemic period for the entire city, as well as separately for high- and low-crime zip codes.

the lockdown, zip codes with more pre-existing liquor stores experience larger increases in domestic assaults than zip codes with fewer liquor stores. Notably, this relationship does not exist for other types of establishments. While these results could be explained by other features of these communities, these regressions provide a descriptive basis for further investigation. By leveraging highly-granular daily variation in visits to local establishments, we mitigate the effect of potential confounders at the neighborhood level.

### 3.2 Main Results

Our principal estimates on the effect of visits to alcohol outlets on community violence are presented in Table 3. In each column, we report estimates from equation (1) for domestic and non-domestic assault. We likewise present estimates separately for 1) the pre-pandemic period (the  $\xi^j$  terms), 2) the initial lockdown period and 3) the re-opening period (represented by the  $\beta^j$  terms). We present estimates for each of four types of establishments: bars, liquor stores, restaurants, and food outlets.

There is little evidence that domestic violence is related to either bar or liquor store visits prior to the COVID-19 pandemic. However, domestic violence calls rise with the number of visits to both bars and liquor stores during the lockdown period. The elasticity of domestic violence calls with respect to visits increases by approximately 0.049 for bars and 0.064 for liquor stores. While these effects are modest, we note that they are reduced forms and do not account for temporal spillovers in alcohol consumption. Critically, in the post-lockdown period, the relationship returns to pre-pandemic levels as the relationship between visits to alcohol outlets and domestic violence is no different than in the pre-pandemic period. This finding provides support for the inference that it is the lockdowns in particular rather than the effects of the pandemic, in general, that led to a strengthening of the relationship between alcohol consumption and domestic violence.

In contrast to domestic assaults, non-domestic assaults increase with visits to both bars and liquor stores in the pre-pandemic period. However, this effect does not strengthen significantly during the lockdown period. That the pandemic effect is smaller for non-domestic than domestic assaults is consistent with the idea that stay-at-home orders are

leading people to do more drinking at home and less drinking around individuals with whom they do not live. As such, even though alcohol consumption may interact positively with pandemic-induced stress, this has not led to an increase in alcohol-induced violence more generally. Interestingly, when the lockdowns ended, the relationship between visits to bars and non-domestic assaults declined relative to the pre-pandemic period, potentially an artifact of binding constraints on the number of customers imposed by policymakers.

While we condition on a granular set of fixed effects as well as linear time trends, concerns about omitted variable bias may remain. In order to test for the possibility that the effects we observe are part and parcel of broader trends in economic activity and the movement of people in a community, we consider whether violence is impacted by visits to restaurants and food stores. As expected, we do not find evidence of a positive relationship between restaurants or food outlets and violence, whether residential or non residential, in the pre-pandemic or the lockdown periods.<sup>18</sup> In the post-lockdown period, we observe that violence falls with visits to restaurants and rises with visits to food outlets, a marker of the return to pre-pandemic routine activities.

### **3.3 Extensions**

In this section, we explore heterogeneity in the main effects and consider several important extensions.

#### **3.3.1 Heterogeneity**

To explore heterogeneity in these estimates, we next consider whether our estimates are different according to per capita crime levels, poverty, and housing density. Because each of these variables varies systematically by zip code, we increase the granularity of our data, focusing on the Census tract level. For each moderating variable, we divide Census tracts according to whether they are above or below the median value.

We present these estimates in Table 4. Several findings are noteworthy. First, our main

---

<sup>18</sup>While estimates for restaurants and food outlets are presented in the spirit of a falsification check, we note that there are reasons for a negative relationship between these types of visits and domestic assaults as time spent outside the home lowers exposure to domestic violence.



estimate of the elasticity of domestic violence with respect to visits to liquor stores during the lockdown period is very similar when we estimate the same model at the Census tract level.<sup>19</sup> Second, when we estimate the model at the Census tract level, the bars-domestic violence elasticity falls during the post-lockdown period, an effect which is consistent with the expectation that, upon re-opening people returned to consuming alcohol outside the home which creates fewer risks for domestic violence. As we do not observe this effect in the more aggregated data, we are careful not to over-interpret this finding as it could also be an artifact of spatial spillovers with people traveling to adjacent Census tracts to visit a bar. With respect to heterogeneity, while significance levels vary, effect sizes are broadly similar in high vs. low crime, and in high vs. low housing density Census tracts. However, the increase in the domestic violence-liquor store visit elasticity during the pandemic is concentrated heavily in the highest poverty Census tracts.<sup>20</sup>

### 3.3.2 More crime or more crime reporting?

Building on our Census tract level analysis, we next consider whether our principal finding — that the relationship between domestic assault calls for service and visits to alcohol outlets grew stronger during the pandemic — might be an artifact of changes in crime reporting. In particular, prior research has suggested that domestic assault calls for service may have risen during the pandemic due to an increase in third party reporting by neighbors who were more likely to be at home to witness domestic violence (Bullinger et al., 2020; Ivandic et al., 2020; Miller et al., 2020). While third party reporting could potentially affect our estimates as well, we note that the threat of confounding in our context is more remote. In particular, a secular increase in the probability of domestic assault reporting after the pandemic would be netted out by our time fixed effects (which we also interact with an indicator for whether or not a zip code is a higher or lower than median crime neighborhood). Nevertheless we provide a suggestive test for this concern.

We cannot test the hypothesis of third party callers directly as we do not have data on

---

<sup>19</sup>We continue to prefer zip code-level regressions as our preferred specification as these regressions are less sensitive to the possibility of spatial spillovers at a smaller level of geography.

<sup>20</sup>We repeat this analysis at the zip code level, results in Appendix Table A2.

the identity of 911 callers. Instead our proposed test leverages an insight from [Bullinger et al. \(2020\)](#) and [Ivandic et al. \(2020\)](#) that if a change in calls for service is driven by third-party reporting then service calls should rise more in denser than less dense areas, particularly areas with a large number of multi-unit dwellings. Referring back to Table 4, we note that when we stratify the results by the density of housing in a Census tract, we find that the elasticity is very similar for both lower and high than median tracts. If anything, the effect is slightly larger in the low-density housing tracts, indicating that there is little evidence that our principal finding is an artifact of greater third party reporting. We conclude that though increased third party reporting of domestic assault may be occurring, it is not especially concentrated among domestic assault that has a nexus to alcohol consumption.

### **3.3.3 Temporal Spillovers**

Because alcohol purchased at a liquor store can be consumed for a period of time after its purchase, we next consider whether there is a lagged effect of alcohol purchases. Failure to capture temporal spillovers arising from lagged alcohol consumption would mean that the estimates reported in Table 3 are too small. To address this concern, we run an auxiliary model in which we augment equation (1) to include the first and second lags of visits to each type of establishment in the time period studied. These terms allow us to observe dynamic correlations between violence and alcohol purchases made in the prior two days. We present these results in Table 5. In the table, we present the cumulative effect of three consecutive days of visits by summing coefficients on concurrent and two lagged effects for bars and liquor stores only. In order to perform inference on this cumulative estimate that folds in temporal spillovers we test whether the sum of the coefficients differs significantly from zero using the estimated variance-covariance matrix.

For bars, the estimates presented in Table 5 are twice as large as those in Table 3, offering evidence in favor of temporal spillovers. Similarly, for liquor stores, the estimates in Table 5 are approximately 50 percent larger than those in Table 3. While the estimate for liquor stores becomes marginally significant as the standard errors are larger too, the evidence is consistent with the idea that the elasticities reported in Table 3 which do not account

for temporal spillovers are conservative estimates of the effect of alcohol consumption on domestic violence.

### 3.3.4 Alternative Specifications

In the appendix to the paper, we provide a number of additional robustness checks. In Appendix Table A3, we re-estimate our preferred specification using a two-way fixed-effects Poisson specification, two-way fixed-effects ordinary least squares, and two-way fixed effects ordinary least squares with zip code fixed effects interacted by high- and low-crime indicator. In Appendix Table A4 we estimate our preferred specification using date specific fixed effects, and find effects of similar magnitude for visits to liquor stores and bars. In all cases, estimates remain substantively similar to those from our preferred specification. In Appendix Table A5, we condition on the period from February 25th to March 9th, recognizing that the period just prior to the lockdowns may have induced differential pre-trends. We note that we find no statistically significant changes in relationship between visits to bars or liquor stores on domestic or non-domestic assault in this pre-lockdown period. Finally, in Appendix Table A6, we re-estimate our primary specification, clustering standard errors at the level of the week, zip code  $\times$  year, and zip  $\times$  higher vs. lower than median crime zip code. Using these heuristics, the standard errors are, in fact, smaller meaning that our primary specification is conservative.

## 4 Policy Implications

Using data from Detroit, MI, we show that the relationship between visits to alcohol outlets and domestic violence — but not other forms of violence — grew stronger during the COVID-19 lockdown period but returned to baseline after the lockdowns ended. As such, we provide evidence that, regardless of the overall level of alcohol consumption, the COVID-19 pandemic and the associated lockdowns has made alcohol consumption riskier with respect to domestic violence. Our conclusions are based on newly-available data provided by SafeGraph that allow us to estimate daily changes to the number of visitors to establishments

selling alcohol. Due to the remarkable resolution of the data, we are able to construct a daily proxy for alcohol consumption in each community, a measure that researchers have long wished to use but which has, until recently, been impossible to collect due to technological limitations.

Why has alcohol consumption become riskier during pandemic-induced lockdowns? We offer several reasons. First, the location of alcohol consumption appears to have changed markedly during stay-at-home orders. Whereas liquor stores accounted for only 28 percent of visits to alcohol outlets in the pre-pandemic period, during the lockdown period, this proportion more than doubled to nearly 60 percent. Second, stay-at-home orders have mechanically increased the amount of time that people are spending at home ([Peterman et al., 2019](#)). As such, the opportunity for problematic drinking to lead to family violence has increased. At the same time, we observe little evidence that the relationship between alcohol and other types of violence has changed since the COVID-19 pandemic. As such it appears as though the pandemic has caused a substitution of violence away from acquaintances and strangers and toward family members. Finally, while the COVID-19 pandemic has led to job loss, economic hardship, and a great deal of stress as families struggle to cope with considerable disruptions to their daily lives, increases in the riskiness of alcohol consumption are limited to the lockdown period. This finding suggests that this is more likely to be an artifact of the lockdowns themselves than pandemic-induced stresses which, sadly, have continued long after the lockdowns ended.

Beyond developing a deeper understanding of the effects of the COVID-19 pandemic, this research contributes to the growing literature that studies geo-spatial correlations between the location of alcohol outlets and violence ([Gruenewald et al., 2006](#); [Franklin et al., 2010](#); [Grubestic and Pridemore, 2011](#); [Roman and Reid, 2012](#); [Kearns et al., 2015](#)). By leveraging highly granular visit data and exploiting changes in the density of visits over time, we are able to draw stronger causal inferences about the relationship between alcohol outlets and community violence. Our estimates suggest that regardless of the COVID-19 pandemic, visits to bars and liquor stores lead to increased violence, providing more credible evidence that prior evidence is not merely correlational.

This research likewise helps to deepen our understanding of the nature of domestic violence, suggesting that the venue of alcohol consumption, rather than merely the volume of alcohol consumed may be a principal driver of household violence. The idea that venue may be an important characteristic of alcohol consumption features speculatively in research on the minimum legal drinking age ([Chalfin et al., 2019](#)) and is likewise implicated in research that suggests that family violence is triggered by frustration such as that which is generated by an unexpected football loss ([Card and Dahl, 2011](#)). However, thus far, this has been mostly a topic of speculation and has been subject to little empirical testing. Our principle finding — that the relationship between alcohol purchases and domestic violence but not other forms of violence — has grown considerably stronger since the pandemic, is among the most direct evidence, to date, that venue matters.

With respect to public policy, we note that while prior research suggests that Sunday liquor laws which restrict weekend liquor sales can reduce overall violence ([Han et al., 2016](#)), these laws do not appear to affect domestic crimes specifically ([Heaton, 2012](#)). Likewise, while “wet laws” which legalize the sale of alcohol to the general public for on-premises consumption appear to be a driver of overall violence ([Anderson et al., 2017](#)), prior research does not disambiguate between domestic and non-domestic assault. The present study suggests that while wet laws may, on net, be violence-creating, by pushing drinking outside of the home, it remains possible that such laws might ultimately have a protective effect on domestic violence. Given the lack of specificity in the prior literature, our principal finding — that the domestic violence is sensitive, in particular, to the venue of alcohol consumption — suggests that policymakers should consider the possibility that efforts to reduce drinking outdoors might have the unintended consequence of driving up household violence.

## References

- Aguero, J. (2020). Covid-19 and the rise of intimate partner violence. *Unpublished manuscript*.
- Alhabib, S., U. Nur, and R. Jones (2010). Domestic violence against women: Systematic review of prevalence studies. *Journal of Family Violence* 25(4), 369–382.
- Anderson, D. M., B. Crost, and D. I. Rees (2017). Wet laws, drinking establishments and violent crime. *Economic Journal* 128(611), 1333–1366.
- Bair-Merritt, M. H., S. Shea Crowne, D. A. Thompson, E. Sibinga, M. Trent, and J. Campbell (2010). Why do women use intimate partner violence? a systematic review of women’s motivations. *Trauma, Violence, & Abuse* 11(4), 178–189.
- Bertrand, M., E. Duflo, and S. Mullainathan (2004). How much should we trust differences-in-differences estimates? *The Quarterly Journal of Economics* 119(1), 249–275.
- Biddle, N., B. Edwards, M. Gray, and K. Sollis (2020). Alcohol consumption during the covid-19 period: May 2020. *COVID-19 Briefing Paper*.
- Boserup, B., M. McKenney, and A. Elkbuli (2020). Alarming trends in us domestic violence during the covid-19 pandemic. *The American Journal of Emergency Medicine*.
- Brenner, J. (2020). Alcohol sales increase 55 percent in one week amid coronavirus pandemic.
- Bullinger, L. R., J. Carr, and A. Packham (2020). Covid-19 and crime: Effects of stay-at-home orders on domestic violence. *National Bureau of Economic Research WP27667*.
- Bushman, B. J. (2002). Effects of alcohol on human aggression. In *Recent Developments in Alcoholism*, pp. 227–243. Springer.
- Caetano, R., J. Schafer, and C. B. Cunradi (2001). Alcohol-related intimate partner violence among white, black, and hispanic couples in the united states. *Alcohol Research & Health* 25(1), 58.
- Card, D. and G. B. Dahl (2011). Family violence and football: The effect of unexpected emotional cues on violent behavior. *The Quarterly Journal of Economics* 126(1), 103–143.
- Carpenter, C. (2007). Heavy alcohol use and crime: evidence from underage drunk-driving laws. *The Journal of Law and Economics* 50(3), 539–557.
- Carpenter, C. and C. Dobkin (2009). The effect of alcohol consumption on mortality: regression discontinuity evidence from the minimum drinking age. *American Economic Journal: Applied Economics* 1(1), 164–82.
- Carpenter, C. and C. Dobkin (2015). The minimum legal drinking age and crime. *The Review of Economics and Statistics* 97(2), 521–524.
- Carpenter, C. and C. Dobkin (2017). The minimum legal drinking age and morbidity in the united states. *The Review of Economics and Statistics* 99(1), 95–104.

- Carpenter, C. S., C. Dobkin, and C. Warman (2016). The mechanisms of alcohol control. *Journal of Human Resources* 51(2), 328–356.
- Chalfin, A., B. Hansen, and R. Ryley (2019). The minimum legal drinking age and crime victimization. Technical report, National Bureau of Economic Research.
- Chodkiewicz, J., M. Talarowska, J. Miniszewska, N. Nawrocka, and P. Bilinski (2020). Alcohol consumption reported during the covid-19 pandemic: The initial stage. *International Journal of Environmental Research and Public Health* 17(13), 4677.
- Cook, P. J. and C. P. Durrance (2013). The virtuous tax: lifesaving and crime-prevention effects of the 1991 federal alcohol-tax increase. *Journal of Health Economics* 32(1), 261–267.
- Currie, J., M. Mueller-Smith, and M. Rossin-Slater (2018). Violence while in utero: The impact of assaults during pregnancy on birth outcomes. Technical report, National Bureau of Economic Research.
- Datner, E. M., F. S. Shofer, K. Parmele, S. A. Stahmer, and C. C. Mechem (1999). Utilization of the 911 system as an identifier of domestic violence. *The American Journal of Emergency Medicine* 17(6), 560–565.
- Dehos, F. T. (2022). Underage access to alcohol and its impact on teenage drinking and crime. *Journal of Health Economics* 81, 102555.
- Dienemann, J., E. Boyle, D. Baker, W. Resnick, N. Wiederhorn, and J. Campbell (2000). Intimate partner abuse among women diagnosed with depression. *Issues in Mental Health Nursing* 21(5), 499–513.
- Dugan, L., D. S. Nagin, and R. Rosenfeld (2003). Exposure reduction or retaliation? the effects of domestic violence resources on intimate-partner homicide. *Law & Society Review* 37(1), 169–198.
- Ehrensaft, M. K., P. Cohen, J. Brown, E. Smailes, H. Chen, and J. G. Johnson (2003). Intergenerational transmission of partner violence: a 20-year prospective study. *Journal of Consulting and Clinical Psychology* 71(4), 741.
- Ellsberg, M., H. A. Jansen, L. Heise, C. H. Watts, C. Garcia-Moreno, et al. (2008). Intimate partner violence and women’s physical and mental health in the who multi-country study on women’s health and domestic violence: an observational study. *The Lancet* 371(9619), 1165–1172.
- Enlow, M. B., B. Egeland, E. A. Blood, R. O. Wright, and R. J. Wright (2012). Interpersonal trauma exposure and cognitive development in children to age 8 years: a longitudinal study. *Journal of Epidemiology & Community Health* 66(11), 1005–1010.
- Fantuzzo, J. W. and R. A. Fusco (2007). Children’s direct exposure to types of domestic violence crime: A population-based investigation. *Journal of Family Violence* 22(7), 543–552.
- Felson, R. B. and P.-P. Paré (2005). The reporting of domestic violence and sexual assault by nonstrangers to the police. *Journal of Marriage and Family* 67(3), 597–610.

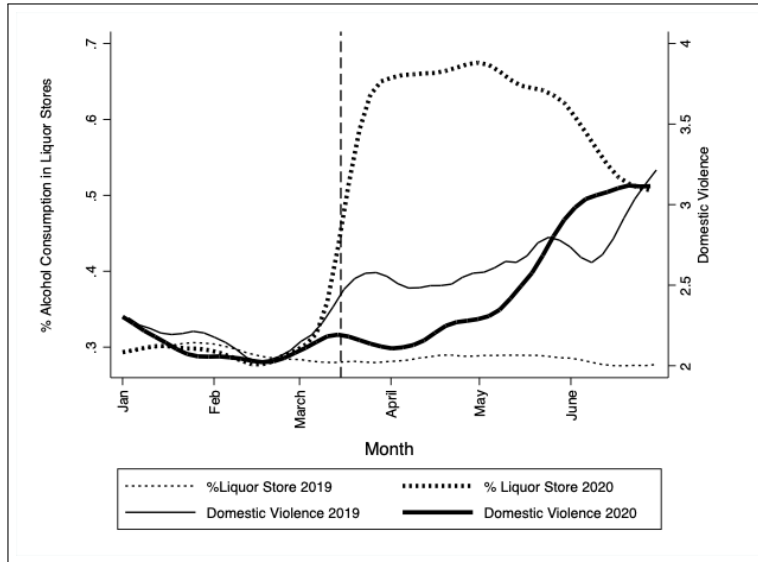
- Foran, H. M. and K. D. O’Leary (2008). Alcohol and intimate partner violence: A meta-analytic review. *Clinical Psychology Review* 28(7), 1222–1234.
- Franklin, F. A., T. A. L. II, D. W. Webster, and W. K. Pan (2010). Alcohol outlets and violent crime in washington dc. *Western Journal of Emergency Medicine* 11(3), 283.
- Fuller, W. A. (2009). *Measurement error models*, Volume 305. John Wiley & Sons.
- Gatley, J. M., M. Sanches, C. Benny, S. Wells, and R. C. Callaghan (2017). The impact of drinking age laws on perpetration of sexual assault crimes in canada, 2009–2013. *Journal of Adolescent Health* 61(1), 24–31.
- Grubestic, T. and W. Pridemore (2011). Alcohol outlets and clusters of violence. *International Journal of Health Geographics* 10(30).
- Gruenewald, P. J., B. Freisthler, L. Remer, E. A. LaScala, and A. Treno (2006). Ecological models of alcohol outlets and violent assaults: crime potentials and geospatial analysis. *Addiction* 101(5), 666–677.
- Han, S., C. C. Branas, and J. M. MacDonald (2016). The effect of a sunday liquor-sales ban repeal on crime: a triple-difference analysis. *Alcoholism: Clinical and Experimental Research* 40(5), 1111–1121.
- Heaton, P. (2012). Sunday liquor laws and crime. *Journal of Public Economics* 96(1-2), 42–52.
- Heinz, A. J., A. Beck, A. Meyer-Lindenberg, P. Sterzer, and A. Heinz (2011). Cognitive and neurobiological mechanisms of alcohol-related aggression. *Nature Reviews Neuroscience* 12(7), 400–413.
- Holt, S., H. Buckley, and S. Whelan (2008). The impact of exposure to domestic violence on children and young people: A review of the literature. *Child abuse & Neglect* 32(8), 797–810.
- Hsu, L.-C. and A. Henke (2021). Covid-19, staying at home, and domestic violence. *Review of Economics of the Household* 19(1), 145–155.
- Humphreys, C. and R. Thiara (2003). Mental health and domestic violence: ‘i call it symptoms of abuse’. *The British Journal of Social Work* 33(2), 209–226.
- Huth-Bocks, A. C., A. A. Levendosky, and M. A. Semel (2001). The direct and indirect effects of domestic violence on young children’s intellectual functioning. *Journal of Family Violence* 16(3), 269–290.
- Ivandic, R., T. Kirchmaier, and B. Linton (2020). Changing patterns of domestic abuse during covid-19 lockdown.
- Jones, L., M. Hughes, and U. Unterstaller (2001). Post-traumatic stress disorder (ptsd) in victims of domestic violence: A review of the research. *Trauma, Violence, & Abuse* 2(2), 99–119.



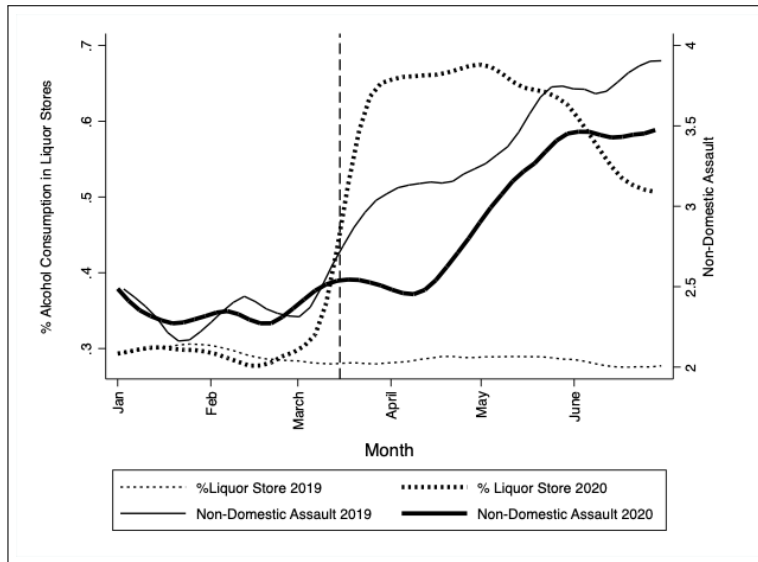
- Kearns, M. C., D. E. Reidy, and L. A. Valle (2015). The role of alcohol policies in preventing intimate partner violence: A review of the literature. *Journal of Studies on Alcohol and Drugs* 76(1), 21–30.
- Kim, J. U., A. Majid, R. Judge, P. Crook, R. Nathwani, N. Selvapatt, J. Lovendoski, P. Manousou, M. Thursz, A. Dhar, et al. (2020). Effect of covid-19 lockdown on alcohol consumption in patients with pre-existing alcohol use disorder. *The Lancet Gastroenterology & Hepatology* 5(10), 886–887.
- Koenen, K. C., T. E. Moffitt, A. Caspi, A. Taylor, and S. Purcell (2003). Domestic violence is associated with environmental suppression of iq in young children. *Development and Psychopathology* 15(2), 297–311.
- Kypri, K., G. Davie, P. McElduff, J. Connor, and J. Langley (2014). Effects of lowering the minimum alcohol purchasing age on weekend assaults resulting in hospitalization in new zealand. *American Journal of Public Health* 104(8), 1396–1401.
- Le, B. T., E. J. Dierks, B. A. Ueek, L. D. Homer, and B. F. Potter (2001). Maxillofacial injuries associated with domestic violence. *Journal of Oral and Maxillofacial Surgery* 59(11), 1277–1283.
- Lechner, W. V., K. R. Laurene, S. Patel, M. Anderson, C. Grega, and D. R. Kenne (2020). Changes in alcohol use as a function of psychological distress and social support following covid-19 related university closings. *Addictive Behaviors* 110, 106527.
- Leslie, E. and R. Wilson (2020). Sheltering in place and domestic violence: Evidence from calls for service during covid-19. Available at SSRN 3600646.
- Lindo, J. M., P. Siminski, and I. D. Swensen (2018). College party culture and sexual assault. *American Economic Journal: Applied Economics* 10(1), 236–65.
- Livingston, M. (2010). The ecology of domestic violence: the role of alcohol outlet density. *Geospatial Health* 5(1), 139–149.
- Luca, D. L., E. Owens, and G. Sharma (2015). Can alcohol prohibition reduce violence against women? *The American Economic Review* 105(5), 625–29.
- Mahmud, M. and E. Riley. Household response to an extreme shock: Evidence on the immediate impact of the covid-19 lockdown on economic outcomes and well-being in rural uganda. *Working Paper*.
- Markowitz, S. and M. Grossman (1998). Alcohol regulation and domestic violence towards children. *Contemporary Economic Policy* 16(3), 309–320.
- Markowitz, S. and M. Grossman (2000). The effects of beer taxes on physical child abuse. *Journal of Health Economics* 19(2), 271–282.
- Martin, S. L., L. S. Matza, L. L. Kupper, J. C. Thomas, M. Daly, and S. Cloutier (1999). Domestic violence and sexually transmitted diseases: the experience of prenatal care patients. *Public Health Reports* 114(3), 262.

- McCrary, J. and S. Sanga (2020). The impact of coronavirus lockdown on domestic violence. *SSRN Scholarly Paper ID 3612491 Rochester NY: Social Science Research Network*.
- Miller, A., C. Segal, and M. Spencer (2020). Effects of th covid-19 pandemic on domestic violence in los angeles. *National Bureau of Economic Research WP 28068*.
- Mobarak, M. and A. Ramos (2019). The effects of migration on intimate partner violence: Evidence for the exposure reduction theory in bangladesh. Technical report, Working paper, accessed March 19, 2020: <https://sistemas.colmex.mx> . . . .
- Peterman, A., A. Potts, M. O'Donnell, K. Thompson, N. Shah, S. Oertelt-Prigione, and N. van Gelder (2019). Pandemics and violence against women and children. *Center for Global Development Working Paper*(528).
- Piquero, A. R., W. G. Jennings, E. Jemison, C. Kaukinen, and F. M. Knaul (2021). Domestic violence during the covid-19 pandemic - evidence from a systematic review and meta-analysis. *Journal of Criminal Justice* 74, 101806.
- Piquero, A. R., J. R. Riddell, S. A. Bishopp, C. Narvey, J. A. Reid, and N. L. Piquero (2020). Staying home, staying safe? a short-term analysis of covid-19 on dallas domestic violence. *American Journal of Criminal Justice* 45(4), 601–635.
- Plichta, S. B. (2004). Intimate partner violence and physical health consequences: Policy and practice implications. *Journal of Interpersonal Violence* 19(11), 1296–1323.
- Pollard, M. S., J. S. Tucker, and H. D. Green (2020). Changes in adult alcohol use and consequences during the covid-19 pandemic in the us. *JAMA Network Open* 3(9), e2022942–e2022942.
- Ravindran, S. and M. Shah (2020). Unintended consequences of lockdowns: Covid-19 and the shadow pandemic. Technical report, National Bureau of Economic Research.
- Rehm, J., C. Kilian, C. Ferreira-Borges, D. Jernigan, M. Monteiro, C. D. Parry, Z. M. Sanchez, and J. Manthey (2020). Alcohol use in times of the covid 19: Implications for monitoring and policy. *Drug and Alcohol Review*.
- Roberts, G. L., J. M. Lawrence, G. M. Williams, and B. Raphael (1998). The impact of domestic violence on women's mental health. *Australian and New Zealand Journal of Public Health* 22(7), 796–801.
- Rodriguez, L. M., D. M. Litt, and S. H. Stewart (2020). Drinking to cope with the pandemic: The unique associations of covid-19-related perceived threat and psychological distress to drinking behaviors in american men and women. *Addictive Behaviors* 110, 106532.
- Roman, C. G. and S. E. Reid (2012). Assessing the relationship between alcohol outlets and domestic violence: routine activities and the neighborhood environment. *Violence and Victims* 27(5), 811–828.
- Sanin, D. (2021). Paid work for women and domestic violence: Evidence from the rwandan coffee mills. Technical report, Technical report, Working Paper.

- Sheridan, D. J. and K. R. Nash (2007). Acute injury patterns of intimate partner violence victims. *Trauma, Violence, & Abuse* 8(3), 281–289.
- Silverio-Murillo, A. and B. De La Miyar, Jr. (2020). Covid-19, domestic violence, and alcohol consumption. Technical report, Working Paper.
- Simons, R. L. and C. Johnson (1998). An examination of competing explanations for the intergenerational transmission of domestic violence. In *International Handbook of Multigenerational Legacies of Trauma*, pp. 553–570. Springer.
- Simons, R. L., C.-i. Wu, C. Johnson, and R. D. Conger (1995). A test of various perspectives on the intergenerational transmission of domestic violence. *Criminology* 33(1), 141–172.
- Sorenson, S. B., L. Sinko, and R. A. Berk (2021). The endemic amid the pandemic: Seeking help for violence against women in the initial phases of covid-19. *Journal of Interpersonal Violence* 36(9-10), 4899–4915.
- Taub, A. (2020). A new covid-19 crisis: Domestic abuse rises worldwide. *The New York Times*.
- Thompson, M. P. and J. B. Kingree (2006). The roles of victim and perpetrator alcohol use in intimate partner violence outcomes. *Journal of Interpersonal Violence* 21(2), 163–177.
- Tolman, R. M. and D. Rosen (2001). Domestic violence in the lives of women receiving welfare: Mental health, substance dependence, and economic well-being. *Violence against Women* 7(2), 141–158.
- Truman, J. L. and R. E. Morgan (2014). Nonfatal domestic violence. *Washington, DC: US Department of Justice, Bureau of Justice Statistics*.
- Usher, K., N. Bhullar, J. Durkin, N. Gyamfi, and D. Jackson (2020). Family violence and covid-19: Increased vulnerability and reduced options for support. *International Journal of Mental Health Nursing*.
- Voce, I. and H. Boxall (2018). Who reports domestic violence to police? a review of the evidence. *Trends and Issues in Crime and Criminal Justice* (559), 1–16.
- Watts, M. (2020). America’s heaviest drinkers consume almost 60% of all alcohol sold. *Newsweek*.
- Wuest, J., M. Merritt-Gray, M. Ford-Gilboe, B. Lent, C. Varcoe, and J. C. Campbell (2008). Chronic pain in women survivors of intimate partner violence. *The Journal of Pain* 9(11), 1049–1057.
- Ybarra, G. J., S. L. Wilkens, and A. F. Lieberman (2007). The influence of domestic violence on preschooler behavior and functioning. *Journal of Family Violence* 22(1), 33–42.



(a) Domestic Violence



(b) Assault

**Figure 1:** Liquor store share of visits to alcohol outlets and violence

Note: Figure plots the time-path of the liquor store share of visits to alcohol outlets (the dotted lines) against the daily number of emergency calls for domestic assaults (Panel a) and other assaults (Panel b). Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. 14,256 observations of 26 zip codes.

Table 1: Summary Statistics

	Pre-Pandemic		Lockdown		Post-Lockdown	
	(1)	(2)	(2) - (1)	(3)	(3) - (1)	
	Mean	Mean	Difference	Mean	Difference	Std. Err.
<b>A. Entire City</b>						
Bars	89.63	15.05	-74.59 ***	22.19	-67.44 ***	(7.598)
Liquor Stores	35.47	22.29	-13.18 ***	26.80	-8.66 ***	(0.895)
Restaurants	235.05	82.75	-152.30 ***	126.09	-108.96 ***	(10.307)
Food Outlets	99.41	59.69	-39.72 ***	57.86	-41.55 ***	(6.487)
Bar to Liquor Store	2.78	1.73	-1.05 ***	1.88	-0.89 ***	(0.197)
<b>B. High-Crime Zip Codes</b>						
Bars	120.73	19.76	-100.96 ***	26.89	-93.83 ***	(15.306)
Liquor Stores	53.01	33.34	-19.68 ***	39.74	-13.27 ***	(1.344)
Restaurants	244.83	91.63	-153.20 ***	150.68	-94.15 **	(18.196)
Food Outlets	110.42	67.73	-42.68 ***	61.44	-48.97 ***	(13.254)
Bar to Liquor Store	1.87	2.21	0.34	2.10	0.24	(0.283)
<b>A. Low-Crime Zip Codes</b>						
Bars	62.98	11.00	-51.98 ***	18.16	-44.82 ***	(4.926)
Liquor Stores	20.43	12.82	-7.60 ***	15.72	-4.71 ***	(0.717)
Restaurants	226.67	75.14	-151.54 ***	105.01	-121.66 ***	(11.081)
Food Outlets	89.98	52.79	-37.19 ***	54.79	-35.19 ***	(3.966)
Bar to Liquor Store	3.55	1.31	-2.24 ***	1.70	-1.86 ***	(0.270)

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. 13,286 observations of 26 zip codes, of which 6,132 are in zip codes with above , and 7,154 below, the median per capita violence calls.  
 Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 2:** Domestic and Non-Domestic Assault By Number of Establishments

	Number of Establishments	
	Domestic Assaults	Non-Domestic Assaults
Bars * Lockdown	0.029 ( 0.0221 )	-0.047 ( 0.0314 )
Liquor Stores * Lockdown	0.084 * ( 0.0484 )	0.0709 ( 0.0565 )
Restaurants * Lockdown	-0.0708 ( 0.0767 )	-0.0951 ( 0.0661 )
Food Outlets * Lockdown	-0.0075 ( 0.0534 )	0.0319 ( 0.0601 )
Bars * Post Lockdown	-0.0324 ( 0.0273 )	-0.0602 ** ( 0.025 )
Liquor Stores * Post Lockdown	-0.0229 ( 0.069 )	0.046 ( 0.0388 )
Restaurants * Post Lockdown	0.0017 ( 0.069 )	-0.046 ( 0.0388 )
Food Outlets * Post Lockdown	0.1225 ** ( 0.0596 )	0.0612 ( 0.0414 )
N of Obs.	14300	14300
N of Zips	26	26

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in a zip code on the number of establishments of bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes count of establishments, interacted with indicator for March 10 - May 25 period, and interacted with indicator for May 25 onward period. Each model conditions on indicator for lockdown and post-lockdown, zip code and year fixed effects, and month-day fixed effects stratified according to whether a zip code is above or below median of per capita violence calls. Standard errors are clustered at the zip code level. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 3:** Main Estimates: Domestic and Non-Domestic Assaults

	Number of Visits	
	Domestic Assaults	Non-Domestic Assaults
Bars	-0.0075 ( 0.015 )	0.034 ** ( 0.0146 )
Liquor Stores	0.0226 ( 0.0211 )	0.0633 *** ( 0.024 )
Restaurants	-0.0016 ( 0.0156 )	0.0234 ( 0.0208 )
Food Outlets	-0.0039 ( 0.0197 )	0.0059 ( 0.0223 )
Bars * Lockdown	0.0482 *** ( 0.0155 )	-0.0339 ( 0.022 )
Liquor Stores * Lockdown	0.0638 ** ( 0.032 )	0.049 ( 0.0351 )
Restaurants * Lockdown	-0.0716 ( 0.045 )	0.0026 ( 0.0474 )
Food Outlets * Lockdown	-0.025 ( 0.0261 )	-0.0065 ( 0.0398 )
Bars * Post Lockdown	0.0212 ( 0.0184 )	-0.0379 ** ( 0.0165 )
Liquor Stores * Post Lockdown	-0.0088 ( 0.0387 )	0.011 ( 0.0303 )
Restaurants * Post Lockdown	-0.0988 ** ( 0.0387 )	-0.0433 ( 0.0303 )
Food Outlets * Post Lockdown	0.086 ** ( 0.0366 )	0.0545 ** ( 0.0217 )
N of Obs.	14300	14300
N of Zips	26	26

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in a zip code on the number of visits to bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes count of visits, interacted with indicator for March 10 - May 25 period, and interacted with indicator for May 25 onward period. Each model conditions on indicator for lockdown and post-lockdown, zip code and year fixed effects, and month-day fixed effects stratified according to whether a zip code is above or below median of per capita violence calls. Standard errors are clustered at the zip code level. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table 4:** Domestic Assaults at Census Tract Level Stratified by Crime, Housing Density, and Poverty

	Domestic Assault							
	Entire City		Crime		Housing Density		Poverty	
	(1) All	(2) Low High	(3) High	(4) Low High	(5) High	(6) Low High	(7) High	
Bars	-0.0026 (0.0160)	-0.0073 (0.0214)	0.0041 (0.0238)	-0.0150 (0.0195)	0.0064 (0.0244)	0.0059 (0.0215)	-0.0087 (0.0237)	
Liquor Stores	-0.0113 (0.0146)	-0.0185 (0.0278)	-0.0098 (0.0171)	-0.0387** (0.0171)	0.0387 (0.0246)	-0.0185 (0.0181)	-0.0035 (0.0221)	
Restaurants	-0.0021 (0.0108)	0.0147 (0.0157)	-0.0121 (0.0139)	-0.0080 (0.0134)	0.0032 (0.0179)	0.0060 (0.0157)	-0.0136 (0.0152)	
Food Outlets	0.0135 (0.0131)	0.0102 (0.0228)	0.0144 (0.0156)	0.0065 (0.0163)	0.0187 (0.0226)	0.0135 (0.0171)	0.0099 (0.0208)	
Bars * Lockdown	0.0017 (0.0208)	0.0209 (0.0301)	-0.0159 (0.0271)	0.0269 (0.0253)	-0.0215 (0.0319)	-0.0095 (0.0344)	0.0128 (0.0223)	
Liquor Stores * Lockdown	0.0391**	0.0334	0.0469**	0.0405*	0.0353	0.0139	0.0633***	
Restaurants * Lockdown	(0.0157)	(0.0267)	(0.0199)	(0.0226)	(0.0228)	(0.0243)	(0.0196)	
Food Outlets * Lockdown	-0.0258*	-0.0051	-0.0389**	-0.0208	-0.0322	-0.0284	-0.0225	
	(0.0136)	(0.0256)	(0.0164)	(0.0176)	(0.0221)	(0.0215)	(0.0165)	
	-0.0067	-0.0065	-0.0054	-0.0196	0.0106	0.0042	-0.0124	
	(0.0113)	(0.0185)	(0.0149)	(0.0148)	(0.0183)	(0.0182)	(0.0138)	
Bars * Post Lockdown	-0.1484***	-0.2066**	-0.1119*	-0.1420**	-0.1819**	-0.0878	-0.2108**	
	(0.0546)	(0.0814)	(0.0674)	(0.0695)	(0.0909)	(0.0561)	(0.0971)	
Liquor Stores * Post Lockdown	0.0278	-0.0987	0.1272**	-0.0294	0.1102*	-0.0177	0.0679	
	(0.0408)	(0.0725)	(0.0510)	(0.0492)	(0.0649)	(0.0561)	(0.0571)	
Restaurants * Post Lockdown	-0.0218	0.0351	-0.0560	-0.0437	0.0243	-0.0255	-0.0190	
	(0.0345)	(0.0652)	(0.0427)	(0.0440)	(0.0598)	(0.0518)	(0.0450)	
Food Outlets * Post Lockdown	0.0145	-0.0677	0.0774*	-0.0122	0.0569	0.0474	-0.0072	
	(0.0351)	(0.0545)	(0.0439)	(0.0442)	(0.0579)	(0.0498)	(0.0496)	
N of Observations	147393	73143	74250	73693	73700	74793	72600	
N of Census Tracts	268	133	135	134	134	136	132	

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. American Community Survey, 2019 Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in census tract on the number of visits to bars, alcohol outlets, restaurants and food outlets in that census tract. Each model includes count of visits, interacted with indicator for March 10 - May 25 period, and interacted with indicator for May 25 onward period. Each model conditions on indicator for lockdown and post-lockdown, census tract and year fixed effects, and month-day fixed effects stratified according to whether a census tract is above or below median of per capita violence calls. High crime census tracts are those with above median per capita 911 calls for violence. High housing density are census tracts with above median share of multi-unit housing constructions. High poverty are census tracts with above median poverty rate. Standard errors are clustered at the census tract level. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



**Table 5:** Main Estimates, Domestic and Non-Domestic Assaults with Lagged Visits

	Bars	Liquor Stores
	$\beta_j + \beta_{Lj} + \beta_{L2j}$ (se) p-value	$\beta_j + \beta_{Lj} + \beta_{L2j}$ (se) p-value
<b>A. Entire City</b>		
Domestic Assaults	0.1029*** (0.0309) 0.001	0.0938* (0.0568) 0.099
Non-Domestic Assaults	0.0128 (0.0259) 0.620	0.0510 (0.0460) 0.267
<b>B. High-Crime Zip Codes</b>		
Domestic Assaults	0.0857** (0.0374) 0.022	0.2231 (0.0795) 0.005
Non-Domestic Assaults	-0.0023 (0.0325) 0.942	0.1468 (0.0911) 0.108
<b>C. Low-Crime Zip Codes</b>		
Domestic Assaults	0.1451*** (0.0488) 0.003	0.0089 (0.0704) 0.898
Non-Domestic Assaults	0.0372 (0.0568) 0.512	-0.0551 (0.0574) 0.337

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. 14,300 observations of 26 zip codes. Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in a zip code on the number of visits to bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes daily visits, visits interacted with indicator for March 10 - May 25 period, visits interacted with indicator for May 25 onward period; one day lag for visits and post-interacted visits to bars and alcohol outlets; and two day lag for visits and post-interacted visits to bars and alcohol outlets. Reported are the sum of coefficients for the March 10 - May 25 period for contemporaneous, one day lag, and two day lag effects. Panel A includes data for all of Detroit during the January 2019-July 2020 period. Panel B includes zip codes where the per capita violence calls are above, and Panel C below, the median in the sample. In each model, we condition on zip code and year and month-day fixed effects; in Panel A, we allow the month-day fixed effects to vary according to high and low crime categories above. Standard errors are clustered at the zip code level and estimated using the Delta method. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## A Appendix

**Table A1:** Number of Establishments by Type Prior to the Pandemic

	Entire City	High-Crime Zip Codes	Low-Crime Zip Codes
Bars	7.692	8.75	6.79
Liquor Stores	5.731	7.58	4.14
Restaurants	23.038	23.50	22.64
Food Outlets	10.346	10.17	10.50

Source: SafeGraph Patterns Data, 2019-2020. 12,324 observations of 26 zip codes, of which 5,688 are in zip codes with above , and 6,636 below, the median per capita violence calls.

**Table A2:** Visits and Assaults in High vs. Low Crime Neighborhoods

	Low Crime		High Crime	
	Domestic Assaults	Non-Domestic Assaults	Domestic Assaults	Non-Domestic Assaults
Bars	-0.0259 (0.0230)	0.0508** (0.0207)	0.0087 (0.0155)	0.0243 (0.0210)
Liquor Stores	-0.0028 (0.0370)	0.0143 (0.0222)	-0.0055 (0.0254)	0.0793** (0.0371)
Restaurants	-0.0231 (0.0453)	0.0122 (0.0566)	0.0069 (0.0181)	0.0190 (0.0253)
Food Outlets	0.0143 (0.0398)	0.0475 (0.0318)	-0.0125 (0.0212)	-0.0235 (0.0378)
Bars * Lockdown	0.0350 (0.0290)	-0.0812** (0.0388)	0.0650*** (0.0148)	-0.0076 (0.0167)
Liquor Stores * Lockdown	0.0797* (0.0434)	0.0261 (0.0422)	0.1656*** (0.0446)	0.1220 (0.0945)
Restaurants * Lockdown	-0.0025 (0.0520)	0.0985** (0.0479)	-0.1692*** (0.0606)	-0.0818 (0.0846)
Food Outlets * Lockdown	-0.0684 (0.0532)	-0.0333 (0.0468)	0.0146 (0.0286)	0.0282 (0.0540)
Bars * Post Lockdown	-0.0624* (0.0345)	0.0093 (0.0195)	0.0380*** (0.0136)	-0.0496*** (0.0160)
Liquor Stores * Post Lockdown	-0.0292 (0.0678)	0.0025 (0.0456)	-0.0178 (0.0376)	-0.0026 (0.0403)
Restaurants * Post Lockdown	0.0048 (0.0823)	-0.1114* (0.0651)	-0.1099*** (0.0305)	-0.0222 (0.0386)
Food Outlets * Post Lockdown	0.1466** (0.0735)	0.0383 (0.0465)	0.0691** (0.0282)	0.0464** (0.0190)
N of Obs.	7700	7700	6600	6600
N of Zips	14	14	12	12

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in a zip code on the number of visits to bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes count of visits, interacted with indicator for March 10 - May 25 period, and interacted with indicator for May 25 onward period. Each model conditions on indicator for lockdown and post-lockdown, zip code, year, and month-day fixed effects. A high crime zip codes are those with above, while low crime zip codes are those below, the median per capita violence calls. Standard errors are clustered at the zip code level. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A3:** Robustness of Estimates: Alternate Specification

	Bars			Alcohol Outlets			Restaurants			Food Outlets		
	Main	Inter		Main	Inter		Main	Inter		Main	Inter	
<b>A. Domestic Assaults</b>												
2WFE Poisson	-0.0028 (0.0144)	0.0465*** (0.0143)	0.0142 (0.0226)	0.0669** (0.0271)	-0.0070 (0.0145)	-0.0731 (0.0328)	-0.0052 (0.0215)	-0.0230 (0.0256)				
2WFE OLS	-0.0050 (0.0109)	0.0312*** (0.0110)	0.0096 (0.0163)	0.0171* (0.0096)	0.0168 (0.0116)	-0.0194 (0.0120)	0.0198 (0.0179)	-0.0304** (0.0110)				
2WFE OLS + Interactive FE	0.0086 (0.0155)	0.0283** (0.0120)	0.0241 (0.0222)	0.0143 (0.0099)	0.0101 (0.0128)	-0.0092 (0.0099)	-0.0043 (0.0168)	-0.0276** (0.0123)				
<b>B. Non-Domestic Assaults</b>												
2WFE Poisson	0.0390** (0.0157)	-0.0271 (0.0217)	0.0609*** (0.0233)	0.0479 (0.0298)	0.0311 (0.0206)	-0.0293 (0.0438)	0.0040 (0.0260)	-0.0022 (0.0397)				
2WFE OLS	0.0393** (0.0155)	-0.0427* (0.0230)	0.0361** (0.0172)	0.0411** (0.0156)	0.0411*** (0.0137)	-0.0039 (0.0211)	0.0088 (0.0248)	-0.0169 (0.0236)				
2WFE OLS + Interactive FE	0.0497* (0.0250)	-0.0437* (0.0232)	0.0661** (0.0291)	0.0346* (0.0176)	0.435* (0.0247)	0.0186 (0.0174)	-0.0037 (0.0344)	-0.0181 (0.0260)				

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. 14,256 observations of 26 zip codes. Note: Estimates are from regressions of the daily count of 911 calls for assault in a zip code on the number of visits to bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes daily visits, visits interacted with indicator for March 10 - May 25 period, visits interacted with indicator for May 25 onward period. Only estimates for daily visits, visits interacted with indicator for March 10 - May 25 period are reported. Specification 2WFE Poisson are estimates from Poisson regression with year, month-day, and zip code fixed effects. Specification 2WFE OLS are estimates of a linear regression with year, month-day, and zip code fixed effects. 2WFE OLS + Interactive FE are estimates from a linear regression with zip, year, and month-day fixed effects which vary by high- and low-crime zips. Includes data for all of Detroit during the January 2019-July 2020 period. In all models, standard errors are clustered at the zip code level. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A4:** Domestic and Non-Domestic Assault with Date Fixed Effects.

	Domestic Assaults	Non-Domestic Assaults
Bars	-0.0018 (0.0147)	0.0413*** (0.0146)
Liquor Stores	0.0305 (0.0208)	0.0555*** (0.0196)
Restaurants	0.0124 (0.0165)	0.0321 (0.0203)
Food Outlets	0.0066 (0.0228)	0.0075 (0.0251)
Bars * Lockdown	0.0471*** (0.0160)	-0.0318 (0.0219)
Liquor Stores * Lockdown	0.0570** (0.0289)	0.0462 (0.0342)
Restaurants * Lockdown	-0.0885** (0.0435)	-0.0226 (0.0488)
Food Outlets * Lockdown	-0.0145 (0.0259)	0.0076 (0.0395)
Bars * Post Lockdown	0.0197 (0.0179)	-0.0318** (0.0153)
Liquor Stores * Post Lockdown	-0.0102 (0.0394)	0.0042 (0.0300)
Restaurants * Post Lockdown	-0.0903** (0.0363)	-0.0526 (0.0327)
Food Outlets * Post Lockdown	0.0850** (0.0376)	0.0567** (0.0229)
N of Obs.	14300	14300
N of Zips	26	26

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in a zip code on the number of establishments of bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes count of establishments, interacted with indicator for February 25 - March 9, interacted with indicator for March 10 - May 25 period, and interacted with indicator for May 25 onward period. Each model conditions on indicator for lockdown and post-lockdown, zip code, and date fixed effects. Standard errors are clustered at the zip code level. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A5:** Domestic and Non-Domestic Assault Including February 2020 Pre-period.

	Number of Visits	
	Domestic Assaults	Non-Domestic Assaults
Bars	-0.0050 (0.0146)	0.0376** (0.0166)
Liquor Stores	0.0101 (0.0201)	0.0577** (0.0245)
Restaurants	0.0005 (0.0164)	0.0225 (0.0219)
Food Outlets	-0.0045 (0.0181)	0.0074 (0.0272)
Bars * Pre Lockdown	0.0200 (0.0456)	0.0219 (0.0324)
Liquor Stores * Pre Lockdown	-0.0250 (0.0475)	0.0730 (0.0683)
Restaurants * Pre Lockdown	-0.0496 (0.0518)	0.0089 (0.0922)
Food Outlets * Pre Lockdown	0.0709 (0.0696)	-0.0682 (0.0575)
Bars * Lockdown	0.0468*** (0.0159)	-0.0374 (0.0240)
Liquor Stores * Lockdown	0.0671** (0.0323)	0.0539 (0.0387)
Restaurants * Lockdown	-0.0724 (0.0462)	0.0095 (0.0502)
Food Outlets * Lockdown	-0.0221 (0.0264)	-0.0062 (0.0429)
Bars * Post Lockdown	0.0190 (0.0180)	-0.0318** (0.0155)
Liquor Stores * Post Lockdown	-0.0083 (0.0408)	-0.0018 (0.0313)
Restaurants * Post Lockdown	-0.0948** (0.0384)	-0.0539 (0.0334)
Food Outlets * Post Lockdown	0.0873** (0.0373)	0.0551** (0.0229)
N of Obs.	14300	14300
N of Zips	26	26

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in a zip code on the number of establishments of bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes count of establishments, interacted with indicator for February 25 - March 9, interacted with indicator for March 10 - May 25 period, and interacted with indicator for May 25 onward period. Each model conditions on indicator for lockdown and post-lockdown, zip code and year fixed effects, and month-day fixed effects stratified according to whether a zip code is above or below median of per capita violence calls. Standard errors are clustered at the zip code level. Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

**Table A6:** Clustering Standard Errors by Week, Zip-High Crime, Zip-Year

	Week		Zip-Crime		Zip-Year	
	(1)	(2)	(3)	(4)	(5)	(6)
	Domestic Assaults	Non-Domestic Assaults	Domestic Assaults	Non-Domestic Assaults	Domestic Assaults	Non-Domestic Assaults
Bars	-0.0048 (0.0134)	0.0379*** (0.0110)	-0.0048 (0.0142)	0.0379** (0.0163)	-0.0048 (0.0135)	0.0379** (0.0150)
Liquor Stores	0.0096 (0.0227)	0.0589*** (0.0198)	0.0096 (0.0202)	0.0589** (0.0239)	0.0096 (0.0213)	0.0589** (0.0281)
Bars * Lockdown	0.0461** (0.0186)	-0.0382** (0.0167)	0.0461*** (0.0158)	-0.0382 (0.0234)	0.0461*** (0.0156)	-0.0382* (0.0210)
Liquor Stores * Lockdown	0.0681*** (0.0190)	0.0532** (0.0257)	0.0681** (0.0325)	0.0532 (0.0382)	0.0681** (0.0276)	0.0532 (0.0324)
Bars * Post Lockdown	0.0184 (0.0120)	-0.0326* (0.0169)	0.0184 (0.0177)	-0.0326** (0.0154)	0.0184 (0.0158)	-0.0326** (0.0154)
Liquor Stores * Post Lockdown	-0.0072 (0.0363)	-0.0026 (0.0221)	-0.0072 (0.0408)	-0.0026 (0.0309)	-0.0072 (0.0395)	-0.0026 (0.0278)
N of Obs	14300	14300	14300	14300	14300	14300
N of Zips	13	13	13	13	13	13

Source: SafeGraph Patterns Data, 2019-2020. City of Detroit Open Data Portal 911 Calls for Service, 2019-2020. Note: Estimates are from Poisson regressions of the daily count of 911 calls for assault in a zip code on the number of visits to bars, alcohol outlets, restaurants and food outlets in that zip code. Each model includes the number of visits interacted with indicator for March 10 - May 25 period, and interacted with indicator for May 25 onward period. Each model conditions on indicator for lockdown and post-lockdown, zip code and year fixed effects, and month-day fixed effects stratified according to whether a zip code is above or below median of per capita violence calls. Standard errors are clustered at the week level ((1)-(2)), zip code high/low crime level ((3)-(4)), and zip year level ((5)-(6)). Significance: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .