

# ONLINE APPENDIX

## Social Distancing, Stimulus Payments, and Domestic Violence: Evidence from the U.S. during COVID-19

Bilge Erten \*

Pinar Keskin †

Silvia Prina ‡

December 11, 2021

---

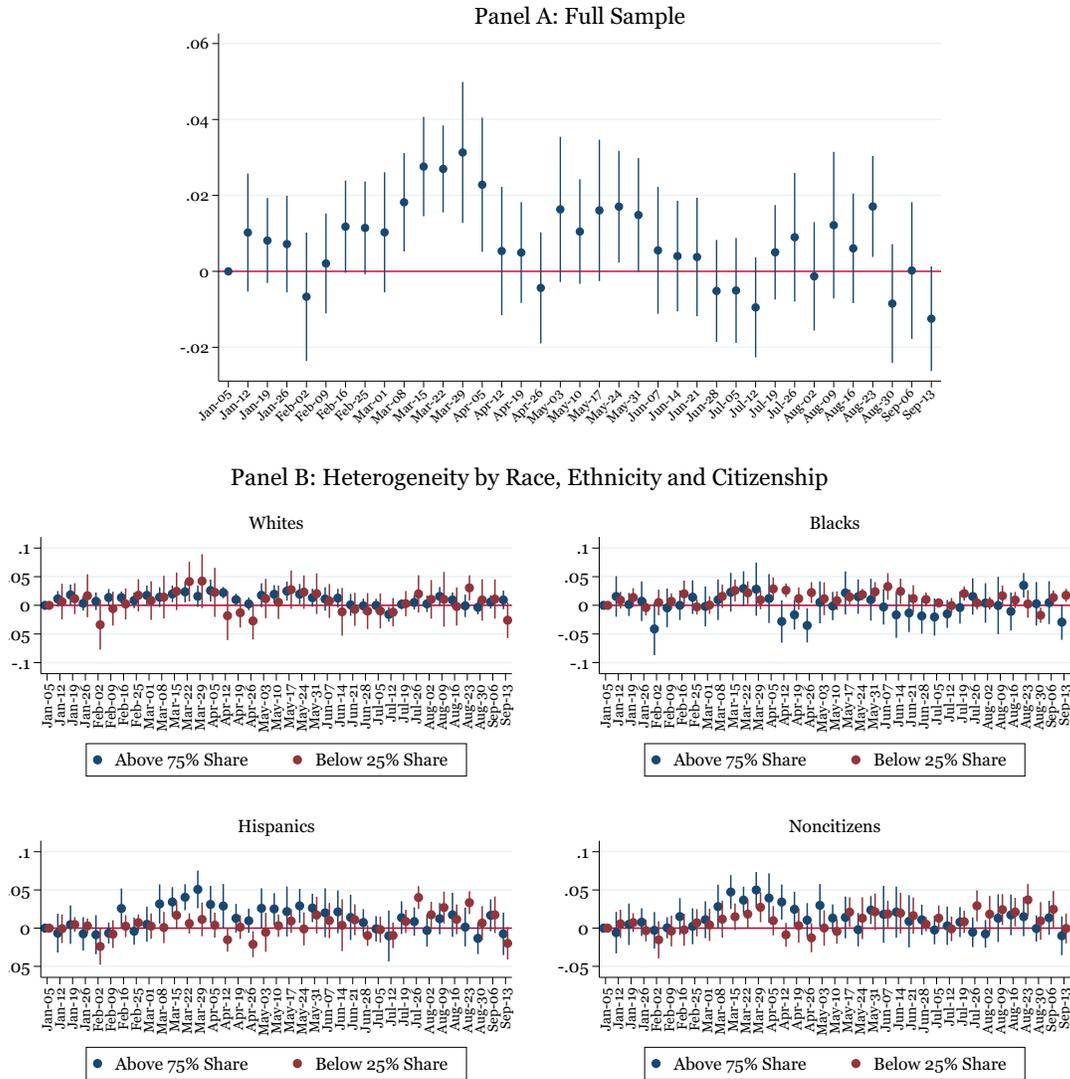
\*Address for Correspondence: Northeastern University and IZA. Department of Economics, 312A Lake Hall, 360 Huntington Avenue, Boston, MA 02115, United States. E-mail: b.erten@northeastern.edu.

†Wellesley College. Department of Economics, Pendleton East, 106 Central Street, Wellesley, MA 02481. E-mail: pinar.keskin@wellesley.edu.

‡Northeastern University, Department of Economics, 310A Lake Hall, 360 Huntington Avenue, Boston, MA 02115, United States. E-mail: s.prina@northeastern.edu.

# Appendix A Additional Figures and Tables

FIGURE A1: EVENT STUDY: DOMESTIC VIOLENCE CALLS IN 2020 RELATIVE TO 2019



*Note:* Panel A plots the estimated coefficients from Eq. 1 for the full sample of 31 cities where the outcome is the number of domestic violence calls at the census tract-by-day level. Panel B plots the estimated from Eq. 1 for census tracts above 75<sup>th</sup> percentile and below 25<sup>th</sup> percentile for the shares of Whites, Blacks, Hispanics, and noncitizens in population. The time period spans the first 37 weeks of 2019 and 2020, ending by the second week of September. The vertical lines for each estimate show 95% confidence intervals. The standard errors are clustered at the city level.

TABLE A1: THE LIST OF CITIES, TIME PERIOD, STATE SAH ORDERS AND REOPENING DATES, AND DOMESTIC VIOLENCE TERMS IN PD DATA

City <sup>a</sup>	First Date	Last Date	SAH Order Date <sup>b</sup>	Reopening Date <sup>c</sup>	Domestic Violence Parsing Terms <sup>d</sup>
Albany, GA	1/1/2019	9/13/2020	4/3/2020	4/24/2020	-
Billings, MT	1/1/2019	9/12/2020	3/28/2020	4/26/2020	-
Cedar Rapids, IA	1/1/2019	9/13/2020	-	-	-
Chandler, AZ	1/1/2019	9/13/2020	4/1/2020	5/8/2020	"Domestic Disturbance/Fight"
Charleston, SC	1/1/2019	9/13/2020	4/8/2020	4/20/2020	"Dom Disturb/Viol" "Family" "Domestic"
Cincinnati, OH	1/1/2014	9/13/2020	3/24/2020	5/1/2020	"Domestic Violence" "Family Trouble"
Columbus, OH	1/1/2019	9/13/2020	3/24/2020	5/1/2020	-
Davenport, IA	1/1/2019	9/13/2020	-	-	-
Dayton, OH	1/1/2019	9/13/2020	3/24/2020	5/1/2020	-
Detroit, MI	9/20/2016	9/13/2020	3/24/2020	5/7/2020	"DV"
El Paso, TX	1/1/2019	9/13/2020	4/2/2020	5/1/2020	-
Gaithersburg, MD	5/1/2017	9/13/2020	3/31/2020	5/15/2020	"Domestic"
Greensboro, NC	1/1/2019	9/13/2020	3/31/2020	5/8/2020	-
Greenville, SC	1/1/2019	9/13/2020	4/8/2020	4/20/2020	-
Indianapolis, IN	1/1/2019	9/13/2020	3/25/2020	5/4/2020	-
Jonesboro, AR	1/1/2019	9/13/2020	-	-	-
Lafayette, LA	1/1/2019	9/13/2020	3/24/2020	5/15/2020	-
Lima, OH	1/1/2019	9/13/2020	3/24/2020	5/1/2020	-
Mesa, AZ	1/1/2017	9/13/2020	4/1/2020	5/8/2020	"Family Fight"
Miami, FL	1/1/2019	9/13/2020	4/3/2020	5/4/2020	-
New Orleans, LA	1/1/2019	9/13/2020	3/24/2020	5/15/2020	"DOMESTIC"
Peoria, IL	1/1/2019	9/13/2020	3/22/2020	5/1/2020	-
Sacramento, CA	1/1/2019	9/13/2020	3/19/2020	5/8/2020	"Domestic" "Disturbance-Family"
Salt Lake City, UT	1/13/2019	9/13/2020	3/30/2020	5/1/2020	"Family" "Domestic"
St. Louis, MO	1/1/2019	9/13/2020	4/6/2020	5/4/2020	-
Terre Haute, IN	1/1/2019	9/13/2020	3/25/2020	5/4/2020	-
Topeka, KS	1/1/2019	9/13/2020	3/30/2020	5/4/2020	-
Tucson, AZ	1/1/2019	9/13/2020	4/1/2020	5/8/2020	"DV" "Family"
Waco, TX	1/1/2019	9/13/2020	4/2/2020	5/1/2020	-
West Palm Beach, FL	1/1/2019	9/13/2020	4/3/2020	5/4/2020	-
Zanesville, OH	1/1/2019	9/13/2020	3/24/2020	5/1/2020	-

<sup>a</sup>Chandler, Arizona; Cincinnati, Ohio; Detroit, Michigan; Mesa, Arizona; New Orleans, Louisiana; Sacramento, California; Salt Lake City, Utah; Tucson, Arizona are 8 cities which were part of the Police Data Initiative. Remaining police departments in the initiative either did not provide up-to-date information on incidents at the time this paper was written, report identifiers for domestic violence related calls, or allow us to access address information for matching calls to census-tract information.

<sup>b</sup>The sign "-" in SAH Order Date indicates that the state never introduced SAH orders. The timing of SAH orders at the state level comes from the New York Times Mervosh, Lu and Swales (2020).

<sup>c</sup>The reopening dates at the state level were obtained from the GitHub repository made available by Nguyen et al. (2020). (<https://github.com/nguyendieuthuy/ReOpeningPlans>)

<sup>d</sup>The sign "-" in Domestic Violence Parsing Terms indicates that the data set obtained from the police department contained only domestic violence related calls.

TABLE A2: PRE-PANDEMIC CENSUS TRACT CHARACTERISTICS OF THE CITIES IN THE PD DATA VERSUS THE REST OF THE COUNTRY IN 2019

	Cities in the PD Data		Rest of the Country		Normalized Difference
	Mean	S.D.	Mean	S.D.	
Total Population	4097	2309.6	4493	2316	-0.121
Percent of High School Graduate	26.21	11.169	27.87	11.163	-0.106
Percent of Bachelor Degree or Higher	31.12	21.289	30.61	19.173	0.018
Mean Income	74813	45476	85693	44149	-0.172
Labor Force Participation Rate	63.37	10.756	62.42	10.588	0.063
Female Labor Force Participation Rate	72.67	10.541	71.97	10.299	0.048
Employment/Population Ratio	58.61	11.865	58.49	11.067	0.008
Female Employment/Population Ratio	67.89	11.984	68.12	11.254	-0.014
Number of COVID-19 Cases	30304	39602	28890	57906	0.020
Number of Observations	3,303		70,659		

*Notes:* Observations are at the census tract-by-day level. Given the unequal sample sizes, we follow Imbens and Wooldridge (2009) in our comparison and focus on normalized differences:

$$\Delta_X = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{S_1^2 + S_2^2}},$$

rather than on the t-statistics here, since they are independent of the sample size. Imbens and Wooldridge (2009) suggest using 0.25 as the rule of thumb in these comparisons.

TABLE A3: EFFECTS OF SOCIAL DISTANCING ON DOMESTIC VIOLENCE CALLS DURING COVID-19 USING A FULLY INTERACTED MODEL

Full Sample	Above 75%		Below 25%		Above 75%		Below 25%		Above 75%		Below 25%	
	Share White	Share Black	Share White	Share Black	Share Hispanic	Share Noncitizen	Share Hispanic	Share Noncitizen	Share Hispanic	Share Noncitizen	Share Hispanic	Share Noncitizen
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
March 9 to SAH	0.015*** (0.004)	0.004 (0.004)	0.022*** (0.008)	0.019** (0.008)	0.007 (0.005)	0.032*** (0.007)	0.031*** (0.007)	0.005 (0.006)	0.005 (0.006)	0.031*** (0.007)	0.005 (0.006)	0.005 (0.006)
SAH to April 15	0.015*** (0.005)	0.009* (0.005)	0.014* (0.007)	0.010 (0.007)	0.014** (0.006)	0.029*** (0.008)	0.030*** (0.008)	0.001 (0.006)	0.001 (0.006)	0.030*** (0.008)	0.016** (0.006)	0.016** (0.006)
April 15 to reopening	-0.000 (0.966)	-0.001 (0.004)	-0.012 (0.008)	-0.018** (0.007)	0.008 (0.005)	0.018** (0.008)	0.021*** (0.007)	-0.015*** (0.006)	-0.015*** (0.006)	0.021*** (0.007)	-0.008 (0.006)	-0.008 (0.006)
Reopening	-0.002 (0.005)	-0.005** (0.002)	-0.002 (0.005)	-0.004 (0.005)	0.002 (0.003)	0.007 (0.005)	0.001 (0.004)	0.006* (0.003)	0.006* (0.003)	0.001 (0.004)	0.012*** (0.003)	0.012*** (0.003)
Observations	2,064,427	482,260	549,720	583,763	446,188	517,452	500,100	594,540	594,540	500,100	569,073	569,073
Outcome mean	0.23	0.11	0.33	0.33	0.14	0.30	0.28	0.21	0.21	0.28	0.21	0.21

Notes: This table presents the difference-in-difference estimates from Eq. 1 for census tracts above 75<sup>th</sup> percentile and below 25<sup>th</sup> percentile for shares of different demographic groups. The city-interacted controls include city-by-year, city-by-week, and city-by-day-of-week fixed effects. Column (1) reports estimates by shares of Whites, columns (2)-(3) report estimates by shares of Whites, columns (4)-(5) report them for shares of Blacks, columns (6)-(7) report them for shares of Hispanics, and columns (8)-(9) report them for shares of noncitizens. The outcome is the daily number of domestic violence service calls. Observations are at the census tract-by-day level for 31 cities. The variables and controls are defined in Section 2. Standard errors are clustered at the city level. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE A4: EFFECTS OF SOCIAL DISTANCING ON DOMESTIC VIOLENCE CALLS DURING COVID-19 USING WILD BOOTSTRAPPED STANDARD ERRORS

Full Sample	(1)	Above 75% Share White	(2)	Below 25% Share White	(3)	Above 75% Share Black	(4)	Below 25% Share Black	(5)	Above 75% Share Hispanic	(6)	Below 25% Share Hispanic	(7)	Above 75% Share Noncitizen	(8)	Below 25% Share Noncitizen	(9)
March 9 to SAH	0.020*** (0.001)	0.008 (0.135)	0.027** (0.027)	0.023** (0.040)	0.004 (0.450)	0.032** (0.012)	0.005 (0.519)	0.034*** (0.004)	0.009 (0.209)								
SAH to April 15	[0.011, 0.029]	[-0.001, 0.018]	[0.006, 0.048]	[0.003, 0.041]	[-0.005, 0.014]	[0.017, 0.045]	[-0.008, 0.020]	[0.021, 0.045]	[-0.003, 0.021]								
	0.016**	0.011*	0.010	0.007	0.011*	0.027***	-0.002	0.029**	0.011**								
	(0.017)	(0.071)	(0.417)	(0.584)	(0.066)	(0.002)	(0.526)	(0.017)	(0.035)								
April 15 to reopening	[0.005, 0.026]	[0.001, 0.021]	[-0.006, 0.037]	[-0.010, 0.036]	[0.001, 0.019]	[0.012, 0.045]	[-0.009, 0.005]	[0.008, 0.049]	[0.002, 0.024]								
	-0.000	0.001	-0.016	-0.021***	0.004	0.017**	-0.019*	0.020**	-0.011								
	(0.966)	(0.877)	(0.110)	(0.004)	(0.510)	(0.012)	(0.073)	(0.013)	(0.144)								
Reopening	[-0.008, 0.008]	[-0.010, 0.015]	[-0.033, 0.001]	[-0.040, -0.011]	[-0.009, 0.018]	[0.006, 0.028]	[-0.029, -0.003]	[0.010, 0.031]	[-0.0224, 0.00193]								
	-0.003	-0.004	-0.002	-0.004	0.001	0.007	0.006	0.002	0.012								
	(0.712)	(0.275)	(0.935)	(0.854)	(0.873)	(0.316)	(0.424)	(0.777)	(0.219)								
Observations	2,064,427	482,260	549,720	583,763	446,188	517,452	594,540	500,100	569,073								
Outcome mean	0.23	0.11	0.33	0.33	0.14	0.30	0.21	0.28	0.21								

Notes: This table presents the difference-in-difference estimates from Eq. 1 for census tracts above 75<sup>th</sup> percentile and below 25<sup>th</sup> percentile for shares of different demographic groups. Columns (1) reports estimates for the full sample, columns (2)-(3) report estimates by shares of Whites, columns (4)-(5) report them for shares of Blacks, columns (6)-(7) report them for shares of Hispanics, and columns (8)-(9) report them for shares of noncitizens. The outcome is the daily number of domestic violence service calls. Observations are at the census tract-by-day level for 31 cities. The variables and controls are defined in Section 2. 90% confidence intervals from wild bootstrapped standard errors corrected for clustering at the city-level are reported in brackets, with the associated p-value in parentheses. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10 percent levels, respectively.

TABLE A5: EFFECTS OF SOCIAL DISTANCING ON DOMESTIC VIOLENCE CALLS DURING COVID-19 BY INCOME, EDUCATION AND HISTORY OF DOMESTIC VIOLENCE

	Above 75% Share Income Level (1)	Below 25% Share Income Level (2)	Above 75% Share Bachelor's Degree (3)	Below 25% Bachelor's Degree (4)	Above 75% Share DV Calls in 2019 (5)	Below 25% Share DV Calls in 2019 (6)
March 9 to SAH	0.008 (0.007)	0.020 (0.012)	0.004 (0.008)	0.028** (0.012)	0.048*** (0.014)	0.028*** (0.007)
SAH to April 15	0.007 (0.005)	0.013 (0.012)	0.006 (0.008)	0.016 (0.012)	0.040** (0.014)	0.021** (0.008)
April 15 to reopening	0.000 (0.005)	-0.016 (0.009)	-0.001 (0.006)	-0.005 (0.012)	-0.012 (0.011)	0.001 (0.006)
Reopening	-0.002 (0.004)	0.001 (0.015)	-0.011* (0.006)	0.006 (0.012)	-0.014 (0.019)	-0.003 (0.009)
Observations	428,623	618,211	466,949	575,018	521,249	1,548,640
Outcome mean	0.09	0.37	0.11	0.33	0.61	0.31

Notes: This table presents the difference-in-difference estimates from Eq. 1 for census tracts above 75<sup>th</sup> percentile and below 25<sup>th</sup> percentile for the distribution of income level, completion of bachelor's degree and domestic violence related police calls in 2019 at the census tract level. Columns (1)-(2) report these estimates by income level, columns (3)-(4) report them for completion of bachelor's degree, and columns (5)-(6) report them by domestic violence related police calls in 2019. The outcome is the daily number of domestic violence service calls. Observations are at the census tract-by-day level for 31 cities. The variables and controls are defined in Section 2. Standard errors are clustered at the city level. \*\*\*, \*\*, and \* denote significance at the 1, 5, and 10 percent levels, respectively.

## Appendix B A review of the literature on the effects of COVID-19 on domestic violence

Study	Sample	Main Finding
Agüero (2021)	Monthly call volumes to a national DV hotline in Peru through July 2020	48% increase in calls during lockdowns, which was uniform across demographic characteristics and states.
Arenas Arroyo, Fernandez-Kranz and Nollenberger (2020)	Online survey of 13,000 women in Spain conducted in late May and early June 2020	23% increase in DV during the lockdown, with economic harms being the primary driver of the increase.
Asik and Ozen (2021)	National and local press data on female homicides and assault to women in Turkey between 2014 and July 2020.	57% decline in female homicides by intimate partners during the period of strict social distancing.
Béland et al. (2020)	Online survey of 4,600 Canadians conducted in late March and early April 2020	Financial stress increased concerns of experiencing DV, but receiving financial relief did not reduce concern levels.
Berniell and Facchini (2021)	Weekly Google search volume of DV related keywords in the United States, Europe, and Latin America	31% increase in searches about DV after stay-at-home orders were implemented.
Bhalotra et al. (2021)	High-frequency administrative data on alternative measures of DV	An increase in calls to DV helplines and increased occupancy of DV shelters and a decrease in crime reports to police during lockdowns.
Bullinger, Carr and Packham (2021)	911 calls and crime data from Chicago, Illinois from January to April 2020	7.5% increase in DV calls for service due to stay at home order, but an 8.2% decrease in police reports and 27.1% decrease in arrests for DV.
Dai, Xia and Han (2021)	Police calls for service in Hubei province, China	278% increase in DV calls for service during the lockdown, which was the strictest lockdown implemented anywhere in China.
Hoehn-Velasco, Silverio-Murillo and Balmori de la Miyar (2021)	Police crime reports in Mexico	Up to 35% reduction in DV crime reports during the stay-at-home order, returning to baseline levels after the stay at-home order was lifted.
Hsu and Henke (2020)	Police data from 36 US cities from January to May 2020	5% increase in DV from March 13th to May 24th 2020.
Hsu and Henke (2021)	Police data from 28 US cities from January to April 2020	6% increase in DV from March 16th to April 30th 2020
Ivandic, Kirchmaier and Linton (2021)	Crime records and calls for service for greater London through May 2020	8.1% and 17.1% increase in DV by current partners and family members, respectively, but 11.4% decline by ex-partners over the lockdown period.
Leslie and Wilson (2020)	Police calls for service from 14 US cities through May 2020	7.5% increase in DV calls during March through May 2020.

Miller, Segal and Spencer (2020)	911 calls, DV hotline calls, and crime data in Los Angeles, California through August 2020	During lockdown, 911 and DV hotline calls increased but DV crime incident reports and arrests decreased. During re-opening all 4 fell.
Miller, Segal and Spencer (2021)	Police calls for service and assault crime data from 18 police departments through May 2020	10% reduction in DV assaults but 7.9% increase in DV calls for service during the shutdown.
Payne and Morgan (2020)	Violent crime rates in Queensland, Australia through March 2020	Rates of DV in March 2020 were statistically identical to expected values based on ARIMA model estimates.
Piquero et al. (2020)	DV incident reports in Dallas, Texas from January to April 2020	DV incidents increased for 2 weeks after the stay-at-home order, but that trend started before the stay-at-home order.
Ravindran and Shah (2020)	DV complaints received by the Indian National Commission for Women through May 2020	0.47 SD (131%) increase in DV complaints in districts with the strictest lockdowns.
Sanga and McCrary (2020)	Police calls for service from 14 cities through April 2020	12% increase in DV calls that subsided by late April. The largest increases occurred in houses with no history of DV.
Silverio-Murillo, Balmori de la Miyar and Hoehn-Velasco (2020)	DV hotline calls and police reports from Mexico City, Mexico through August 2020	30% increase in DV hotline calls but 27% decrease in official police reports of DV.

## References

- Agüero, Jorge M.** 2021. "COVID-19 and the rise of intimate partner violence." *World Development*, 137: 105217.
- Arenas Arroyo, Esther, Daniel Fernandez-Kranz, and Natalia Nollenberger.** 2020. "Intimate Partner Violence under Forced Cohabitation and Economic Stress: Evidence from the COVID-19 Pandemic." *Journal of Public Economics*, 104350.
- Asik, Gunes A, and Efsan Nas Ozen.** 2021. "It takes a curfew: The effect of COVID-19 on female homicides." *Economics Letters*, 200: 109761.
- Berniell, Inés, and Gabriel Facchini.** 2021. "COVID-19 Lockdown and Domestic Violence: Evidence from Internet Search Behavior in 11 Countries." *European Economic Review*, 136(4).
- Bhalotra, Sonia, Damian Clark, Emilia Brito, Pilar Larroulet, and Francisco Pino.** 2021. "Dynamic Impacts of Lockdown on Domestic Violence: Evidence from Multiple Policy Shifts in Chile." *Working Paper*.
- Bullinger, Lindsey, Jillian Carr, and Analisa Packham.** 2021. "Covid-19 and Crime: Effects of Stay-at-Home Orders on Domestic Violence." *American Journal of Health Economics*, 7(w27667).
- Béland, Louis-Philippe, Abel Brodeur, Joanne Haddad, and Derek Mikola.** 2020. "Covid-19, Family Stress and Domestic Violence: Remote Work, Isolation and Bargaining Power." *IZA Discussion Paper*, , (13332).
- Dai, Mengliang, Yiwei Xia, and Rongxu Han.** 2021. "The Impact of Lockdown on Police Service Calls During the COVID-19 Pandemic in China." *Policing*, 15(3): 1867–1881.
- Hoehn-Velasco, Lauren, Adan Silverio-Murillo, and Jose Roberto Balmori de la Miyar.** 2021. "The great crime recovery: Crimes against women during, and after, the COVID-19 lockdown in Mexico." *Economics and Human Biology*, 41.
- Hsu, Lin-Chi, and Alexander Henke.** 2020. "COVID-19, staying at home, and domestic violence." *Review of Economics of the Household*, 19: 145–155.
- Hsu, Lin-Chi, and Alexander Henke.** 2021. "The Effect of Sheltering in Place on Police Reports of Domestic Violence in the US." *Feminist Economics*, 27(1-2): 362–379.
- Imbens, Guido W, and Jeffrey M Wooldridge.** 2009. "Recent Developments in the Econometrics of Program Evaluation." *Journal of Economic Literature*, 47(1): 5–86.
- Ivandic, Ria, Tom Kirchmaier, and Ben Linton.** 2021. "Changing patterns of domestic abuse during Covid-19 lockdown." *Available at SSRN 3686873*.
- Leslie, Emily, and Riley Wilson.** 2020. "Sheltering in place and domestic violence: Evidence from calls for service during COVID-19." *Journal of Public Economics*, 189: 104241.
- Mervosh, Sarah, Denise Lu, and Vanessa Swales.** 2020. "See Which States and Cities Have Told Residents to Stay at Home." *The New York Times*.
- Miller, Amalia R, Carmit Segal, and Melissa K Spencer.** 2020. "Effects of the COVID-19 Pandemic on Domestic Violence in Los Angeles." National Bureau of Economic Research Working Paper 28068.
- Miller, Amalia R, Carmit Segal, and Melissa K Spencer.** 2021. "Effects of COVID-19 Shutdowns on Domestic Violence in US Cities." National Bureau of Economic Research Working Paper 29429.
- Nguyen, Thuy D, Sumedha Gupta, Martin Andersen, Ana Bento, Kosali I Simon, and Coady Wing.** 2020. "Impacts of State Reopening Policy on Human Mobility." National Bureau of Economic Research Working Paper 27235.
- Payne, Jason Leslie, and Anthony Morgan.** 2020. "COVID-19 and Violent Crime: A comparison of recorded offence rates and dynamic forecasts (ARIMA) for March 2020 in Queensland, Australia." Center for Open Science SocArXiv g4kh7.

- Piquero, Alex R, Jordan R Riddell, Stephen A Bishopp, Chelsey Narvey, Joan A Reid, and Nicole Leeper 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.
- Ravindran, Saravana, and Manisha Shah.** 2020. "Unintended Consequences of Lockdowns: COVID-19 and the Shadow Pandemic." National Bureau of Economic Research Working Paper 27562.
- Sanga, Sarath, and Justin McCrary.** 2020. "The impact of the coronavirus lockdown on domestic violence." *Available at SSRN 3612491*.
- Silverio-Murillo, Adan, Jose Roberto Balmori de la Miyar, and Lauren Hoehn-Velasco.** 2020. "Families under Confinement: COVID-19, Domestic Violence, and Alcohol Consumption." *Andrew Young School of Policy Studies Research Paper Series*.