

Decision Memo

To: Senator Marco Rubio of Florida

From: Pipob Puthipiroj and Huey Ning Lok, External Consultants from Minerva Co.

Date: December 21, 2018.

Subject: Evaluating the Impact of Florida's "Stand Your Ground" Self-defense Law

Summary

Replication of Humphreys et al.'s (2017) evaluation on the effect of Florida's "Stand Your Ground" (SYG) laws on rates of homicide and homicide by firearm revealed an apparent increase in both rates. As an extension to their findings, the synthetic method was used to create a "synthetic Florida" control group consisting of a weighted combination of other American states. Matching variables were chosen based on existing research on homicide rate predictors (Alzheimer & Boswell, 2012). The homicide rate of synthetic Florida did not align close enough to the real Florida during the pre-treatment period (pre-2005) for results to be conclusive in either direction. We recommend that further study is conducted to investigate the homicide case verdicts to determine the extent of criminality associated with the increase in homicide rates, after which the net benefit of the SYG laws can be properly evaluated.

Background

"Stand Your Ground" laws have been the basis of much controversy in America. During the trial of George Zimmerman for his shooting of Trayvon Martin, police chief Bill Lee cited SYG laws, which provides immunity to people who kill someone in self-defense, to defend Zimmerman's actions (Robles, 2012). In the latest shooting of Markeis McGlockton in July 2018, shooter Michael Drejka was initially left uncharged for the killing due to SYG laws (Donovan, 2018).

Critics of SYG laws have two main concerns: the racial disparity in its application, and its effects on homicide rates and firearm homicide rates. The latter is the focus of this memo.

According to Cheng & Hoestra (2013), “homicide rates in states that passed (SYG) ... increased by an average of 8 percent over states without it - which translates to roughly 600 additional homicides per year”. In a widely reported study, Humphreys et al. found that the law was associated with a 24.4% increase in homicide, and a 31.6% increase in firearm-related homicide (2017).

In replicating Humphreys et al. study (2017), we identified some crucial methodological errors. The outcome metric used in the study was “homicide” and “firearm homicide”, but in media, this was interpreted as “murder” (Branca, 2016). By failing to distinguish between “murder” and “homicide”, the paper conflated unlawful and lawful killings.

Secondly, the paper did not choose an appropriate control group in comparing Florida’s SYG laws. The comparison states are seen to have a significantly different trend in homicide rates and homicide by firearm rates vs Florida before the SYG laws were passed (figure 1). Furthermore, one of the states (Virginia) in the comparison group actually had an SYG-equivalent law, though it was not called “Stand Your Ground”. Case law was completely overlooked in the paper in the choice of Virginia, which fundamentally undermined the methodological validity of the paper.

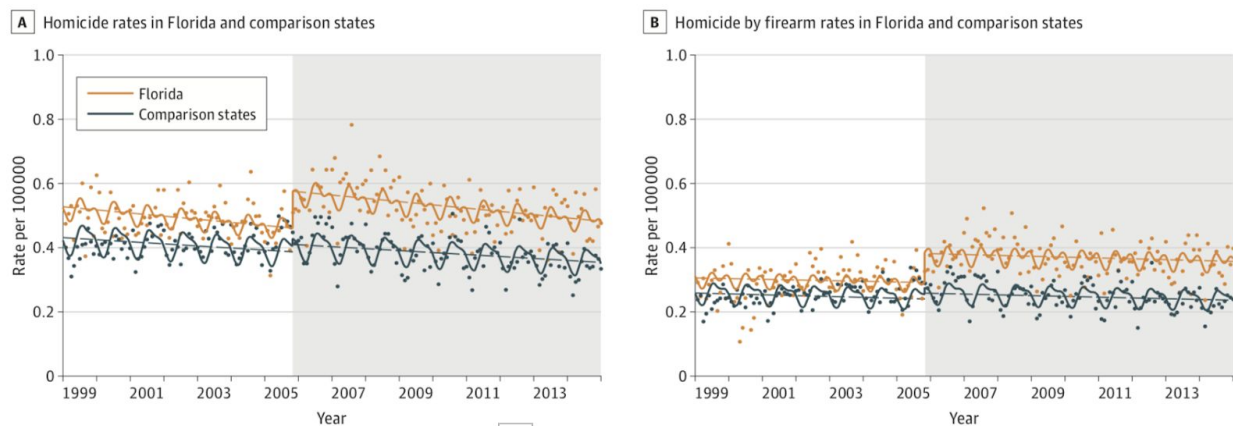


Figure 1: Homicide rates and homicide by firearm rates before and after SYG laws were enacted in 2005 in Florida, vs the rates in comparison states without SYG laws. Reprinted from Humphreys et al. (2017).

Replication

The replication figures are similar to the figures in Humphreys et al.'s report (2017). A discontinuity is seen in the trend line at the year 2005, which implies an effect of an increase in the homicide rate and homicide by firearm rate in Florida after the enactment of SYG laws.

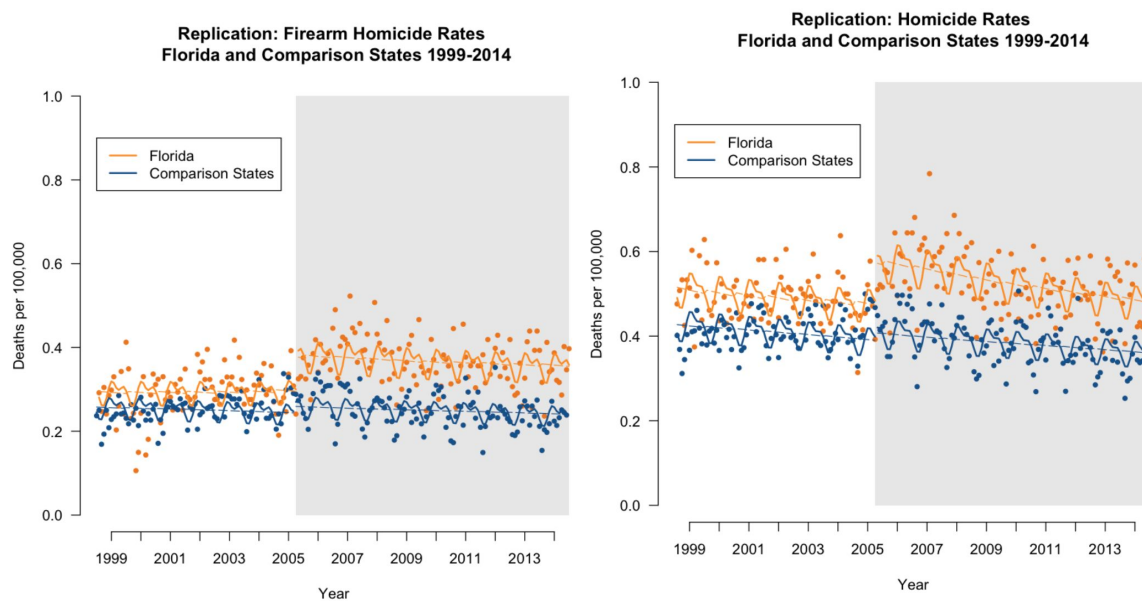


Figure 2: Replication figures of homicide rates and homicide by firearm rates between Florida and non-SYG comparison states.

Extension

According to John Lott, “there appears to have already been an increase occurring in 2005 before the Stand Your Ground law went into effect on October 1st, 2005. The drop after 2007 and 2008 also doesn’t fit the simple story of Stand Your Ground causing problems” (2016). The ideal study should be trying to understand the causal effect of Stand Your Ground laws, and in this sense, the Humphreys et al. (2017) paper falls short.

One distinctive feature of comparative political science is that the units of analysis are often aggregate entities, such as countries or regions, for which suitable single comparisons often do not exist (Collier 1993; George and Bennett 2005; Gerring 2007; Lijphart 1971). The synthetic control method is based on the premise that, when the units of analysis are a few aggregate entities, a combination of comparison units (which we term “synthetic control”) often does a better job of reproducing the characteristics of the unit or units representing the case of interest than any single comparison unit alone.

Motivated by this consideration, the comparison unit in the synthetic control method is selected as the weighted average of all potential comparison units that best resembles the characteristics of the case of interest (Abadie et al., 2015). Hence we obtain as a control for Florida a ‘synthetic Florida’; a linear combination of other states chosen so that it models Florida as closely as possible in the predictors of homicide rates: alcohol consumption, firearm ownership, Gross Domestic Product (GDP) per capita, and the proportion of young males from ages 15-34. These predictors were chosen based on existing research by Altheimer & Boswell (2012).

Alcohol consumption data was collected from the National Institute on Alcohol Abuse and Alcoholism (NIAAA), where alcoholic beverage sales data was used as a proxy for alcohol consumption (Haughwout et al., 2015). As federal law prohibits records of gun transactions from being stored in a central repository, total firearm background checks (checks conducted to verify that a buyer is eligible to purchase a gun) were used as a proxy for firearm ownership (FBI, 2016). It should be noted that these background checks are an imperfect proxy due to varying state laws and purchase scenarios. GDP data were collected from the Bureau of Economic Analysis (BEA), and the proportion of young males data were collected from the U.S. Census Bureau’s annual American Community Surveys (ACS).

The synthetic Florida was ultimately constructed with a mixture of weights across many states, with the largest being Colorado at 20%, Kentucky at 15%, Mississippi at 10%, and with the smallest being Massachusetts, at less than 1%. The trajectory of Florida and Synthetic Florida are given below:

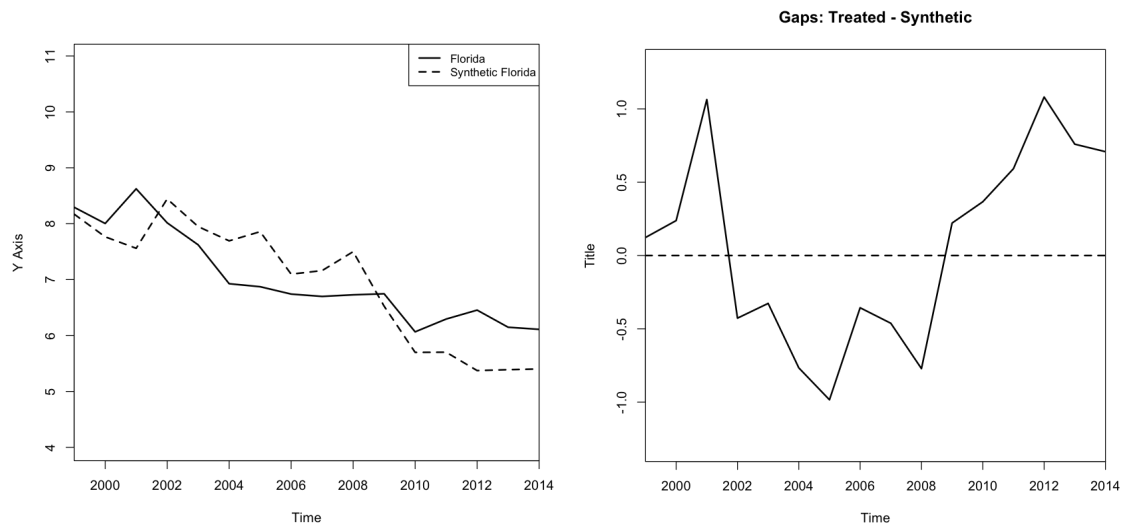


Figure 3: Plot of real Florida homicide rates vs synthetic Florida homicide rates from 1999 - 2014.

Discussion

With an MSPE of 0.3468506, our synthetic Florida could not get a very good match on the trajectory of actual Florida gun homicide rate on the pre-intervention (2005) periods. This was the likely the result of multiple factors: the small number of training periods, the small number of good predictors, and the extreme difficulty in collecting data for each of the periods. Specifically, we required estimates on the annual homicide death rate, alcohol consumption amount, gun ownership, GDP, and urbanization and demographics, and ideally at the granularity of the monthly level. In future attempts to replicate this method to the task at hand, we recommend that much more high-quality data be collected before attempting to match.

Conclusion

We began this project by recognizing fundamental methodological flaws in the Humphreys, Gasparini and Wiebe paper (2017), though in attempting to correct theirs, ended up with flaws of our own. With the data at hand, we could not constrain the donor pool in creating Synthetic Florida to states that did not implement stand your ground laws, much less states that did not have equivalent case laws. With the results themselves inconclusive as they are, a decrease in the of the quality of the model can only make the inferences worse.

Consequently, we would like to encourage further study of this question, since evidence as yet seems either scientifically flawed or impressively inconclusive. The Rand Corporation currently regards the evidence for the increase in firearm homicides as a result of stand-your-ground laws as 'limited', with the Humphreys paper being the only source (Xenakis, n.d.). Besides obtaining more and better quality historical data for Florida in the periods before 2005, as well as for the other states, future researchers studying this problem should also aim to distinguish between lawful and unlawful murders in their choice of effect measurement.

References

- Abadie, A., Diamond, A., & Hainmueller, J. (2015). Comparative politics and the synthetic control method. *American Journal of Political Science*, 59(2), 495-510.
- Altheimer, I., & Boswell, M. (2012). Reassessing the association between gun availability and homicide at the cross-national level. *American Journal of Criminal Justice*, 37(4), 682-704.
- Branca, Andrew. "What to Make of the New Study of Florida's 'Stand Your Ground' Law". National Review. Retrieved December 21, 2018, from <https://www.nationalreview.com/2016/11/guns-stand-your-ground-law-journal-american-medical-association-study-fatally-flawed/>.
- Cheng, C., & Hoekstra, M. (2013). Does strengthening self-defense law deter crime or escalate violence? Evidence from expansions to castle doctrine. *Journal of Human Resources*, 48(3), 821-854.
- Collier, David. 1993. "The Comparative Method." *In Political Science: The State of the Discipline II*, ed. Ada W. Finifter. Washington, DC: American Political Science Association, 105–19.
- Donovan, Evan (July 22, 2018). "WATCH: Sheriff explains why 'Stand Your Ground' shooter is not arrested". *CLEARWATER, Fla.: WFLA-TV*. Retrieved December 21, 2018, from <https://www.wfla.com/news/local-news/pinellas-county-sheriff-says-no-charges-for-stand-your-ground-shooter/1313540572>.
- FBI. (2016, June 04). NICS Firearm Checks: Month/Year. Retrieved December 21, 2018, from https://www.fbi.gov/file-repository/nics_firearm_checks_-_month_year.pdf/view
- Gerring, John. 2007. *Case Study Research: Principles and Practices*. Cambridge: Cambridge University Press.
- George, Alexander L., and Andrew Bennett. 2005. *Case Studies and Theory Development in the Social Sciences*. Cambridge MA: MIT Press.

Haughwout, S. P., LaVallee, R. A., & Castle, I. J. P. (2015). Surveillance Report# 102: Apparent per capita alcohol consumption: National, state, and regional trends, 1977–2013. National Institute on Alcohol Abuse and Alcoholism: Bethesda, MD.

Humphreys, D. K., Gasparrini, A., & Wiebe, D. J. (2017). Evaluating the impact of Florida's "stand your ground" self-defense law on homicide and suicide by firearm: an interrupted time series study. *JAMA internal medicine*, 177(1), 44-50.

Lijphart, Arend. 1971. "Comparative Politics and the Comparative Method." *American Political Science Review* 65(3): 682–93.

Lott, J. (2016, November 29). Misleading Journal of the American Medical Association research about Florida's Stand Your Ground Law. Retrieved December 21, 2018, from <https://crimeresearch.org/2016/11/misleading-journal-american-medical-association-research-floridas-stand-ground-law/>

Robles, Frances (March 27, 2012). "Sanford cops sought warrant to arrest George Zimmerman in Trayvon Martin shooting". *Tampa Bay Times*. Retrieved December 21, 2018, from <http://www.tampabay.com/news/publicsafety/crime/sanford-cops-sought-warrant-to-arrest-george-zimmerman-in-trayvon-martin/1222259>

Xenakis, L. (n.d.). Stand-Your-Ground Laws. Retrieved December 21, 2018, from <https://www.rand.org/research/gun-policy/analysis/stand-your-ground/violent-crime.html>

Appendix

Code for constructing synthetic Florida:

[https://github.com/thetruejacob/Final-Project/blob/master/Synthetic%20Control%20for%20Florida%20\(SYG\).ipynb](https://github.com/thetruejacob/Final-Project/blob/master/Synthetic%20Control%20for%20Florida%20(SYG).ipynb)

Data used for constructing synthetic Florida:

<https://github.com/thetruejacob/Final-Project/blob/master/data/matching-data.csv>