

Description of Methodology

Due to the public interest in our study, we thought some readers might like to see a simple explanation of the methodology we use to estimate the impact of stand-your-ground laws on homicide rates. Thus, the purpose of the following is to provide an intuitive illustration of the methodology that we use by showing simple examples. The actual implementation of the study is naturally somewhat more complicated than this and requires a little training in statistics and econometrics, but we hope this clarifies for the general reader what we did and why we did it that way.

We want to emphasize that while we will use arbitrarily chosen states below to illustrate various methodologies, the resulting “estimates” do not represent our findings as to the impact of the law in a given state. Estimating the impact of the law in any one state is difficult to do with any degree of certainty. It’s a bit like looking at the outcomes in some randomized drug trial, and trying to say something with certainty as to whether the drug worked for that particular person – there is just too much randomness going on. That said, there are more statistically complex ways of attempting to estimate the impact of a law in one particular state, but describing or performing those methods is not our purpose here.

In our study, we attempt to estimate the causal effect of stand-your-ground laws on homicide rates. Put differently, did these laws cause states’ homicide rates to be higher than they otherwise would have been?

One way to answer that question would be to compare adopting states’ homicide rates after they enacted the laws to other states over that time period. As an illustrating example, consider South Carolina, which enacted a stand-your-ground law in June of 2006, and North Carolina, which did not enact a stand-your-ground law as of 2010.¹

State	Years	Average # Homicides per 100,000 Population	% Difference
South Carolina	2007-2010	7.10	19.5
North Carolina	2007-2010	5.94	

If one were to take this approach, one would conclude that South Carolina’s stand-your-ground law induced a 19.5 percent increase in homicide rates. However, you might worry that there are many differences between North and South Carolina other than just the presence of this law. So how do we know that this 19.5 percent difference is due to South Carolina’s stand-your-ground law, and not something else? In fact, the pre-law homicide rates give us cause for concern:

State	Years	Average # Homicides per 100,000 Population	% Difference
South Carolina	2000-2005	7.61	14.3
North Carolina	2000-2005	6.66	

¹ In the following calculations we omit 2006 for simplicity, since the law was in effect for only part of 2006.

This shows that South Carolina's homicide rate was higher than North Carolina's *even before the law was passed*, which suggests we definitely shouldn't attribute the 19.5 percent difference to the law.

A second way to answer this question would be to compare how homicide rates in South Carolina changed after they enacted this law, relative to before. That is, one could assume that homicide rates would have stayed at the same level they were at prior to passing the law. Consider again the case of South Carolina:

State	Years	Average # Homicides per 100,000 Population	% Difference
South Carolina	2000-2005	7.61	-6.7
South Carolina	2007-2010	7.10	

What we see here is that the homicide rate in South Carolina fell by 6.7 percent. Thus, one might be tempted to interpret this as the causal effect of adopting the law. However, you might wonder if homicide rates really would have stayed the same over this time period, absent the law. On this question, we see cause for concern from North Carolina (and in most other non-adopting states!):

State	Years	Average # Homicides per 100,000 Population	% Difference
North Carolina	2000-2005	6.66	-10.8
North Carolina	2007-2010	5.94	

As shown above, homicide rates fell by 10.8 percent over this time period in North Carolina. Since North Carolina did not enact a stand-your-ground law over this time period, this decline could not have been caused by a stand-your-ground law. Instead, the decline makes us believe that the decline in South Carolina must be driven at least in part by other factors (such as economic conditions, or improved policing, etc.) And we certainly don't want to falsely attribute those effects to the law passed in South Carolina.

This leads us to the approach we use in the paper. Essentially, we assume that South Carolina's homicide rate would have changed in a way similar to North Carolina's over this time period, had South Carolina not passed the law. This is called a difference-in-differences research design. In our simplified example, this means that we subtract the change that occurred in the control state of North Carolina from the change that occurred in the treatment state of South Carolina:

State	Years	Average # Homicides per 100,000 Population	% Difference	Difference-in- Differences (%)
South Carolina	2000-2005	7.61	-6.7	4.1
South Carolina	2007-2010	7.10		
North Carolina	2000-2005	6.66	-10.8	
North Carolina	2007-2010	5.94		

The reason we want to subtract off the change in homicide rates that occurred in North Carolina is that there is good reason to think that other determinants of homicides changed over this time period. We don't want to attribute the effects of those factors to the law, and so we subtract them out in order to isolate the impact of South Carolina's law. Thus, using this illustrating example and a differences-in-differences approach, one would conclude that South Carolina's stand-your-ground law induced a 4.1 percent increase in the homicide rate.

For another example, consider Florida, which adopted the law in 2005:

State	Years	Average # Homicides per 100,000 Population	% Difference	Difference-in- Differences (%)
Florida	2000-2004	5.59	8.0	17.5
Florida	2006-2010	6.04		
North Carolina	2000-2004	6.60	-9.5	
North Carolina	2006-2010	5.97		

Here we see that Florida experienced an 8 percent increase in the homicide rate over the pre- and post-law time periods. By comparison, North Carolina experienced a 9.5 percent decline. Thus, applying our methodology to this one example would indicate that the impact of Florida's law was a 17.5 percent increase in the homicide rate.

As we noted earlier, these examples are constructed for purposes of illustration only. They do not represent our best estimates as to the impact of Florida's law, or South Carolina's law. To keep the examples simple, we chose arbitrary states in which the law was passed (Florida and South Carolina), and an arbitrary state as the control state (North Carolina). To obtain a credible estimate as to the impact of the law for any one state, one clearly would not want to focus on only one control state, much less pick that control state arbitrarily. In addition, as we mentioned before, it is difficult to determine whether the estimate for any given state is statistically different from zero.

As you know from the paper, what we find when we look across all of the adopting states and all of the other states is that on average, adopting states experienced an 8 percent increase in their homicide rate relative to other states over the same time period. Several factors lead us to conclude that this relative increase was caused by these laws, rather than by some other factor:

1. The magnitude of the estimate is sufficiently large that statistical tests indicate there is less than a 5 percent chance that it occurred by chance. Put differently, statistical tests indicate it is unlikely that this relative increase was due to bad luck on the part of adopting states.
2. The estimate remains the same when we only compare adopting states to other states in their region (this is the approach we primarily use in the study.) For example, this effect is not a consequence of comparing South Carolina to California.
3. The homicide rates of the two groups of states only diverge after the laws were enacted, rather than before. This can be seen in Figure 2 of the paper. If the homicide rates had started to diverge before the laws were passed, or if they diverged only slowly after the laws were passed, we would worry that something else was causing the relative increase.
4. Our estimate remains the same even after we account for changes in state economic conditions, welfare spending, and demographics that we might also expect to affect crime. Put differently, there is no evidence that states that adopted these laws experienced worse recessions, budgetary cuts to policing or welfare, or demographic shifts than other states.
5. While we observe an 8 percent relative increase in homicide rates after the laws, we do not observe increases of similar magnitude in other crime rates, such as larceny, motor vehicle theft, aggravated assault, or robbery. One would expect that if some other factor were causing the relative increase in homicide rates, we would see similar increases in other crime rates. The fact that we do not suggests that the cause of the relative increase in homicide rates was the enactment of these laws that reduced the expected penalties associated with the use of lethal force.