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IN THE UNITED STATES DISTRICT COURT

FOR THE SOUTHERN DISTRICT OF CALIFORNIA

VIRGINIA DUNCAN, et al., Plaintiffs, v. XAVIER BECERRA, in his official capacity as Attorney General of the State of California, Defendant.	Case No: 17-cv-1017-BEN-JLB **DECLARATION OF DR. CARLISLE E. MOODY IN SUPPORT OF PLAINTIFFS' SUPPLEMENTAL BREIF; EXHIBITS 8–9**

DECLARATION OF DR. CARLISLE E. MOODY

1. I am Carlisle E. Moody, Professor of Economics at the College of William & Mary. Counsel for plaintiffs in this matter have asked me to confirm my prior expert witness report in this matter. I have personal knowledge of the facts set forth herein and, if called and sworn as a witness, could and would testify competently thereto.

2. Attached hereto as **Exhibit** 8 is a true and correct copy of my signed expert witness rebuttal dated November 3, 2017. Exhibit 1 contains my opinions and analysis relevant to this matter.

3. Attached hereto as **Exhibit** 9 is a true and correct copy of my most recent curriculum vitae, which describes my background, qualifications, and areas of expertise.

4. While I was unable to update my work in time to reflect post-2017 data, I confirm that I stand by my conclusion in Exhibit A, which was that I am unable to find any effect of ammunition magazines capable of holding more than 10 rounds or California's ban on such magazines on murders or gun homicides. More criminals using more guns with magazines capable of holding more than 10 rounds apparently do not cause more homicides. Such magazines appear to have nothing to do with homicide.

5. It is my expert opinion that California's ban on acquiring magazines capable of holding more than 10 rounds has not and will not, even when paired with a possession ban, result in any statistically significant reduction in the number or lethality of mass shooting incidents in California or violent crime rates in general.

I declare under penalty of perjury that the foregoing is true and correct. Executed within the United States on November 24, 2022.

Dr. Carlisle E. Moody
Declarant

EXHIBIT 8

Expert Witness Rebuttal of Dr. Carlisle E. Moody

Duncan, et al. v. Becerra, et al.
United States District Court (S.D. Cal.)
Case No: 3:17-cv-01017-BEN-JLB
November 30, 2022

I. INTRODUCTION

I am Dr. Carlisle E. Moody, Professor of Economics at the College of William & Mary. Counsel for plaintiffs in *Duncan v. Becerra* (S.D. Cal. Case No. 3:17-cv-01017-BEN-JLB) have asked me to offer a rebuttal opinion regarding this case. This report sets forth my qualifications, opinions, and scholarly foundation for those opinions.

II. BACKGROUND & QUALIFICATIONS

I am a Professor of Economics at the College of William and Mary in Virginia. I graduated from Colby College in 1965 with a major in Economics. I received my graduate training from the University of Connecticut, earning a Master of Economics degree in 1966 and a Ph.D. in Economics in 1970, with fields in mathematical economics and econometrics.

I began my academic career in 1968 as Lecturer in Econometrics at the University of Leeds, Leeds, England. In 1970 I joined the Economics Department at William and Mary as an Assistant Professor, I was promoted to Associate Professor in 1975 and to full Professor in 1989. I was Chair of the Economics Department from 1997-2003. I am still teaching full time at William and Mary. I teach undergraduate and graduate courses in Econometrics, Mathematical Economics, and Time Series Analysis.

I have published over 40 refereed journal articles and several articles in law journals and elsewhere. Nearly all these articles analyze government policies of various sorts. I have been doing research in guns, crime, and gun policy since 2000. I have published 11 articles directly related to guns and gun policy.

I have also consulted for a variety of private and public entities, including the United States Department of Energy, U.S. General Accountability Office, Washington Consulting Group, Decision Analysis Corporation of Virginia, SAIC Corporation, and the Independence Institute.

A full list of my qualifications, as well as a list of my publications, is attached hereto as **Exhibit 1.**

In the past four years, I have written export reports, been deposed, or testified at trial in the following matters:

- *Cooke v. Hickenlooper*, U.S. Dist. Ct., Dist. of Colo., Oct. 25, 2013 (submitted expert report, not deposed, did not testify);

- *Rocky Mountain Gun Owners v. Hickenlooper*, Dist. Ct., City and County of Denver, Case No. 2013-CV-33897, May 1, 2017 (testified).

- *William Wiese, et al v. Becerra*, U.S. Dist. Ct., E. Dist. of Cal., Case No. 2:17-cv-00903-WBS-KJN, April 28, 2017 (submitted expert report, not deposed, did not testify)

III. COMPENSATION

I am being compensated for my time in this case at an hourly rate of $250 per hour. My compensation is not contingent on the results of my analysis or the substance of my testimony.

IV. ASSIGNMENT

Plaintiffs' counsel has asked me to provide an opinion in response to the opinions presented in the expert reports submitted by Attorney General Xavier Becerra—specifically those of Dr. Louis Klarevas and Dr. Christopher S. Koper.

V. SUMMARY OF OPINIONS

The defense's experts posit that magazines over ten rounds increase the number of shots fired in mass shooting incidents and other violent crimes leading to more deaths and injuries. The conclusion they come to is that a ban on such magazines has the potential to reduce deaths and injuries sustained in such events. The defense's experts, however, provide no relevant evidence showing that California's ban would reduce deaths or injuries.

Koper presents evidence concerning the federal weapons ban in effect from 1994-2004, a nationwide ban on (among other things) magazines over ten rounds. His opinion regarding the effectiveness of that ban is largely irrelevant here because the challenged law is limited to California. Koper presents no evidence at all concerning the effectiveness of California's magazine ban, specifically, or statewide bans, more generally.

Klarevas presents some weak evidence that states with magazine bans have had fewer incidents of mass shootings and fewer people killed in mass shootings than states without such bans. He does not present any evidence that the California ban has had any effect, thereby rendering his report irrelevant.

It is my professional opinion, based on my training in economics, econometrics, and policy analysis, my expertise relevant to gun policy, including bans on "large capacity magazines,"[1] as well as my review and analysis of the relevant data that: (1) California's current ban on acquiring magazines over ten rounds[2] has not had any statistically significant impact on violent crime, including mass shootings, in California; (2) legally possessed magazines over ten rounds (i.e., those that were "grandfathered in" after the state banned acquisition) are not commonly used in mass shootings in California; and (3) bans on such magazines have no effect on violent crime, as illustrated by the results of the Washington Post study of firearms recovered by Virginia law enforcement.

In short, it is my expert opinion that California's acquisition ban has not and will not, even when paired with a possession ban, result in any statistically significant reduction in the number or lethality of mass shooting incidents in California or violent crime rates in general.

VI. OPINIONS & ANALYSIS

A. California's LCM Acquisition Ban Has Had No Statistically Significant Impact on Violent Crime in California

1. A Primer on Policy Analysis Using Regression Models[3]

A regression model estimates the possible linear relationship between the dependent (outcome) variable, say the California murder rate, and a set of explanatory variables such as the 1994 assault weapon ban and the California LCM ban. The law variables are so-called "dummy" variables which equal one in those years the law was in effect, zero otherwise. I also include a trend consisting of the numbers 1,2,3, etc. for the years in the sample. The coefficient on the trend shows by how much the murder rate changes each year due to all other factors that affect the murder rate aside from the variables included in the regression model. These

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[1] California law defines a "large capacity magazine" as, with limited exceptions, "any ammunition feeding device with the capacity to accept more than 10 rounds." Cal. Penal Code § 16740. I understand that this is not a universally accepted definition. But, for ease of reference, I refer to magazines over ten rounds as "large capacity magazines" or "LCMs" throughout this report.

[2] It is my understanding, and I have assumed for purposes of this study, that California has prohibited the manufacture, importation, sale, giving, lending, buying, and receiving of magazines over ten rounds since the enactment of Senate Bill 23 ("SB 23"), which is codified at California Penal Code section 32310(a) and took effect on January 1, 2000. I refer to this prohibition as California's "acquisition ban" throughout this report.

[3] Readers who are familiar with statistical methodology applied to policy analysis can skip this section.

factors include changes in trauma treatment that turn potential murders into assaults, the advent of 911 calls, cell phones, DNA, the national fingerprint directory, ubiquitous security cameras, smartphones with cameras, body cameras on police officers, etc. etc. If the trend is omitted, these influences on crime which are separate and distinct from the effect of any law, will be incorrectly attributed to the LCM ban. I also include a dummy variable for the years 1994-2004 to estimate the effect of the national LCM ban due to the Federal assault weapon ban. If that variable is omitted, the effect of the national ban is incorrectly attributed to the state ban. I also include some variables that are routinely included in almost any crime model: the proportion of the population between 15 and 29, the unemployment rate, income per capita, and a dummy variable for the years of the crack epidemic, 1984-1991.

The coefficient on the California LCM acquisition ban variable estimates the change in the dependent variable, e.g., the murder rate, due to the implementation of the acquisition ban, holding constant the effects of the national ban, the effects of the factors captured by the trend, and the effects of the crack epidemic, income, and unemployment. If the California acquisition ban has been effective in reducing murder, we would expect a negative and significant coefficient on the LCM ban dummy variable indicating a reduction in murder as a result of the ban.

Even if an estimated coefficient is negative, it does not mean the law necessarily had a beneficial effect. If the law had no effect, the coefficient on the law dummy variable could be negative just by chance. In fact, we would expect it to be negative 50 percent of the time. How do we know when an estimated coefficient is significantly different from zero? Answer: when it is so far from zero that we can conclude beyond a reasonable doubt that it is not zero.

A significance test is used for this. Tests for significance are made up of two hypotheses: the null hypothesis (that the law had no effect or equivalently the coefficient is actually zero) and the alternative hypothesis that the law did have an effect (that the coefficient is truly nonzero). We construct a t-statistic consisting of the estimated coefficient divided by its standard deviation (standard deviations are called “standard errors” in the context of a regression coefficient). The larger the value of the estimated coefficient, the more likely that it is not zero. However, given the standard deviation, we would expect some variation around zero even if the true value is zero (i.e., the null hypothesis is true). If the estimated coefficient is distributed according to the normal distribution (the famous bell curve), which is the usual assumption, then it would be quite unusual for an estimated coefficient to be twice as large as its standard error. How unusual? It would only happen 5% of the time if the true value of the coefficient was zero. Therefore, we reject the null hypothesis that the California acquisition ban had no effect if the t-statistic is greater than two.

The usual standard for significance is the 5 percent level, where there is only a five percent chance of a t-statistic that large if in fact the law had no effect on the murder rate. This is the statistical equivalent of a "reasonable doubt." Sometimes researchers use the 10 percent level, which is considered "marginally significant." I do not use this criterion. Whether the coefficient is significant can be seen by examining the "p-value", which indicates the probability of rejecting the null hypothesis, given the t-statistic. If the p-value is less than .05 there is a smaller than 5% probability that we could have estimated a coefficient this large if it is truly zero (implying significance). If the t-statistic has a p-value greater than .05, then we cannot reject the null hypothesis that there is no relationship between the explanatory variable and the dependent variable.

Since the data for California from 1977 to 2017 is a time series, we have to consider the possibility that the continuous variables (violent crime rate, murder rate, firearm homicide rate) are so-called "random walks." If they are random walks, then the regression must be done in first differences: Dx(t)=x(t)-x(t-1). There are tests for random walks, called "unit root" tests, the most powerful of which is the DFGLS test, which I used to test whether to use first differences.[4] It turns out that all three of the California crime series are random walks, so I report the results of the regressions in first differences. However, in the Appendix below, I report all the results, including the results of estimating the regressions in levels instead of first differences.[5] Note that the effect of the trend is captured by the constant (intercept) in the first difference regression.

In the following tables, the outcome variable is listed first, then names of the independent variables, the corresponding estimated coefficients, t-statistics, and p-values. For convenience, p-values less than .05 are indicated with an asterisk. For the California acquisition ban to have been successful in saving lives, the coefficient on the variable called "LCM ban" must be negative with a p-value less than .05 (or with an asterisk).[6]

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[4] Graham Elliot, Thomas J. Rothenberg & James H. Stock, *Efficient Tests for an Autoregressive Unit Root*, 64 Econometrica 813-836 (July 1996), *available at* https://ideas.repec.org/a/ecm/emetrp/v64y1996i4p813-36.html.

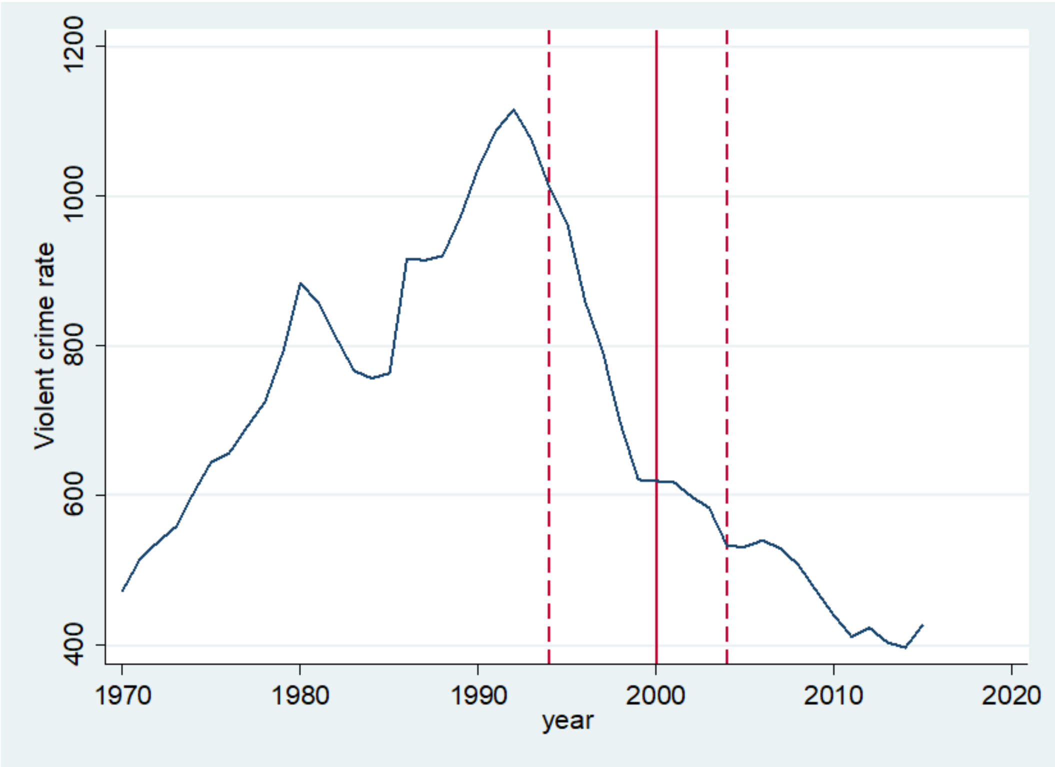
[5] I also test for serial correlation. There is no significant serial correlation in any of my regressions.

[6] For count data like the number of people killed in mass shootings, the number of incidents of mass shootings, and the number of police officers killed in the line of duty, the data is not distributed normally. For these data, I use the negative binomial model, a generalization of the Poisson model. The negative binomial is the standard model for count data.

2. California's Violent Crime Rate

The California violent crime rate is shown in Figure 1. The dotted vertical lines correspond to the years of the federal assault weapons ban and corresponding national LCM ban. The single solid vertical line corresponds to the California LCM acquisition ban. If the California acquisition ban successfully reduces violent crime, we should see a discontinuity (also called a "break") at or after the solid vertical line.

Figure 1: Violent crime rate, California, 1970-2015



Crime was generally rising until 1991, the last year of the crack epidemic, then generally declining. The downturn came before the federal LCM ban, so it is unlikely to have been caused by the national ban. There is no break at or after 2000, the downward trend just continues. We test these observations in Table 1 below. The violent crime rate includes murders and assaults, including gun assaults. If the California acquisition ban has been successful in reducing violent crime, it will have a negative and significant coefficient in Table 1 below.

Table 1: Violent crime rate, California, 1970-2015

Outcome	Variable	Coefficient	T-ratio	P-value
Violent crime rate	LCM ban	44.844	0.95	0.35

Federal assault weapons ban	-31.547	-1.00	0.32
Percent population 15-29	8.984	0.43	0.67
Crack epidemic 1984-1991	2.645	0.08	0.94
Income per capita	-1.000	-0.04	0.97
Unemployment rate	-2.653	-0.33	0.75
Violent crime rate, lagged	0.605	4.12*	0.00
Constant	-0.345	-0.04	0.97

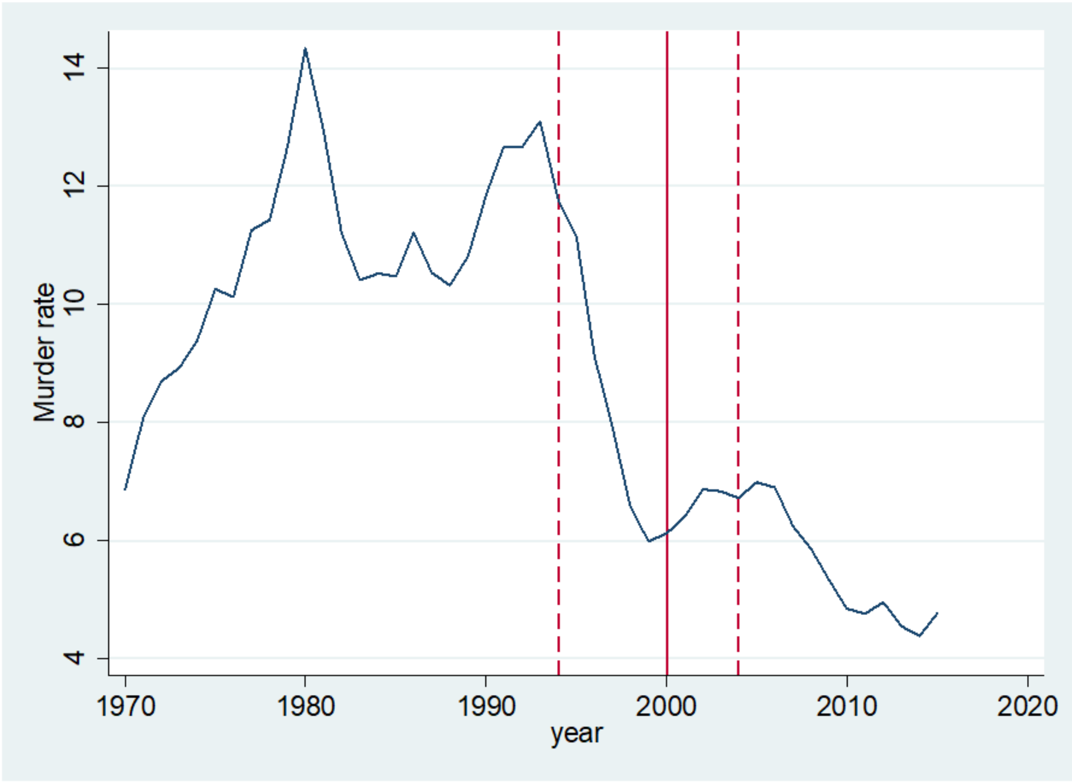
Notes: first differences, trend coefficient estimated by constant; * $p<0.05$

Unfortunately, the coefficient on the California LCM ban dummy is neither negative nor significant. The federal ban dummy is also not significant. Neither the state nor the federal LCM ban had any significant effect on the violent crime rate.

3. California's Murder Rate

The murder rate in California for 1970-2015 is shown in Figure 2.

Figure 2: Murder rate, California, 1970-2015



The murder rate also begins to decline in 1991, before the federal LCM ban, it increases from 1999-2005, then generally declines for the next 10 years. The regression model is shown in Table 2 below.

Table 2: Murder rate, California, 1970-2015

Outcome	Variable	Coefficient	T-ratio	P-value
Murder rate	LCM ban	0.586	0.73	0.47
	Federal assault weapons ban	-0.884	-1.61	0.12
	Percent population 15-29	0.225	0.60	0.55
	Crack epidemic 1984-1991	0.360	0.61	0.54
	Income per capita	-0.288	-0.64	0.52
	Unemployment rate	-0.056	-0.39	0.70
	Murder rate, lagged	0.452	2.97*	0.01
	Constant	0.047	0.31	0.76

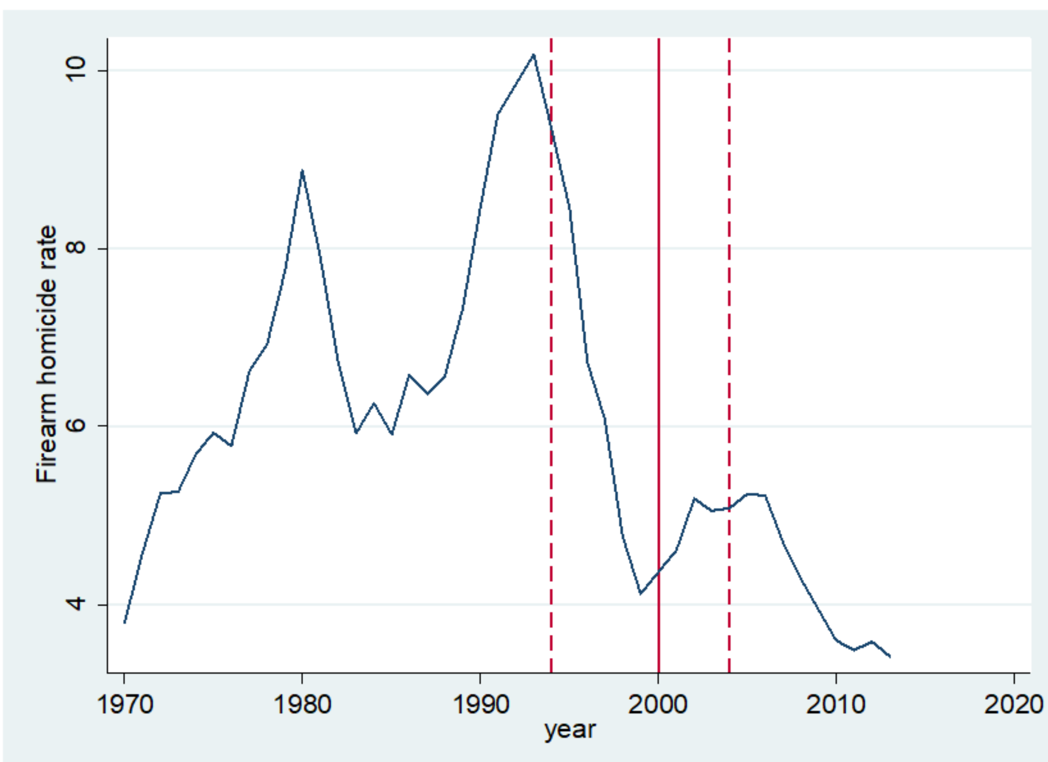
Notes: first differences, trend coefficient estimated by constant; * p<0.05.

Again, the coefficient on the LCM ban is neither negative nor significant. The federal ban also had no significant effect.

4. California Firearm Homicide Rate

The firearm homicide rate is more likely to be affected by a LCM ban than the violent crime rate or the overall murder rate. The firearm homicide rate in California for 1970-2015 is shown in Figure 3.

Figure 3: Firearm homicide rate, California, 1970-2015



The firearm homicide series follows the general murder rate very closely. As we see below, the results are the same.

Table 3: Firearm homicide rate, California, 1970-2015

Outcome	Variable	Coefficient	T-ratio	P-value
Firearm homicide rate	LCM ban	0.844	1.29	0.21
	Federal assault weapons ban	-0.606	-1.39	0.17
	Percent population 15-29	0.104	0.35	0.73
	Crack epidemic 1984-1991	0.472	0.99	0.33
	Income per capita	-0.355	-0.92	0.37
	Unemployment rate	-0.064	-0.56	0.58
	Firearm homicide rate, lagged	0.545	3.64*	0.00
	Constant	0.056	0.46	0.65

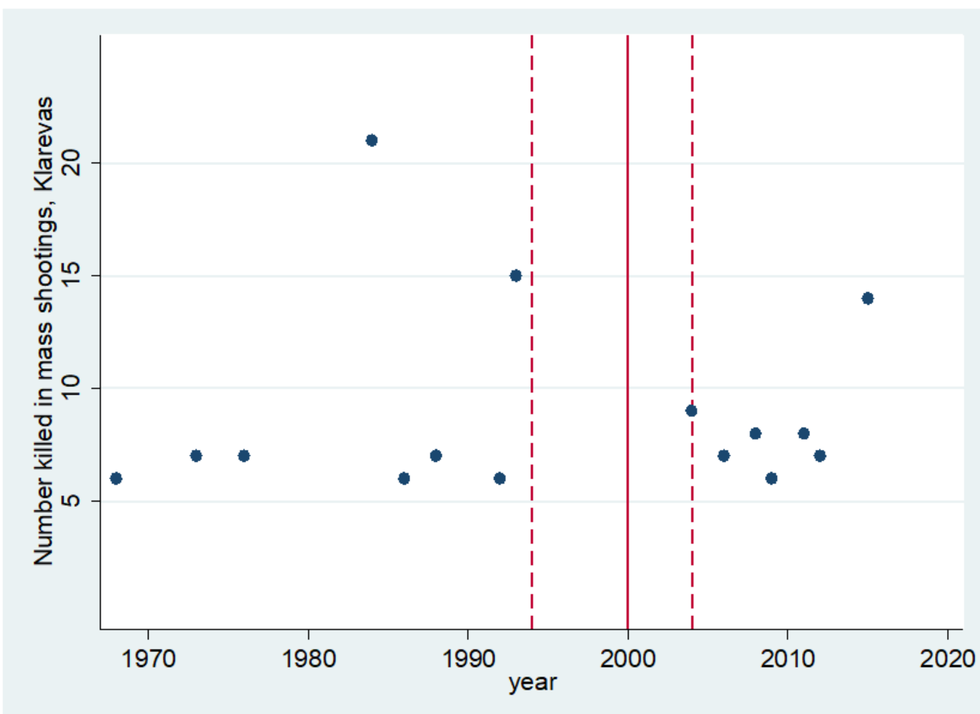
Notes: first differences, trend coefficient estimated by constant; * $p<0.05$.

There is no significant effect of either the state or the federal LCM ban on the gun homicide rate.

5. Number of People Killed in California Mass Shootings

The number of deaths due to mass shootings in California from1968-2015, as pulled from the data presented by Klarevas, is shown in Figure 4.

Figure 4: Deaths due to mass shootings, California, 1968-2015 (Klarevas data)



The regression analysis is reported in Table 4 below.

Table 4: Mass shooting deaths, California, 1970-2015

Outcome	Variable	Coefficient	T-ratio	P-value
Mass shooting deaths	LCM ban	-2.025	-0.53	0.59
	Federal LCM ban	-0.914	-0.62	0.53
	Trend	-0.701	-1.60	0.11
	Percent population 15-29	-1.046	-1.41	0.16
	Crack epidemic 1984-1991	3.037	1.62	0.10
	Income per capita	3.232	1.52	0.13
	Unemployment rate	1.219	1.60	0.11
	Constant	-19.890	-0.78	0.43

Notes: negative binomial model, income and unemployment data start in 1970, data from Klarevas, * $p<0.05$

There is no significant effect of either the federal or the state LCM ban on the number of mass shooting deaths in California.

6. Number of Mass Shootings in California

According to Klarevas, between 1968 and 1999 there were 9 incidents of mass shootings in California. Between 2000 and 2015, there were 7 incidents. The regression analysis is presented in Table 5 below.

Table 5: Incidents of mass shootings, California, 1970-2015

Outcome	Variable	Coefficient	T-ratio	P-value
Mass shooting incidents	LCM ban	-2.386	-1.16	0.25
	Federal LCM ban	-1.439	-1.07	0.29
	Trend	-0.235	-1.18	0.24
	Percent population 15-29	-0.380	-1.16	0.25
	Crack epidemic 1984-1991	0.491	0.50	0.61
	Income per capita	1.343	1.33	0.18
	Unemployment rate	0.409	1.42	0.15
	Constant	-11.043	-0.82	0.41

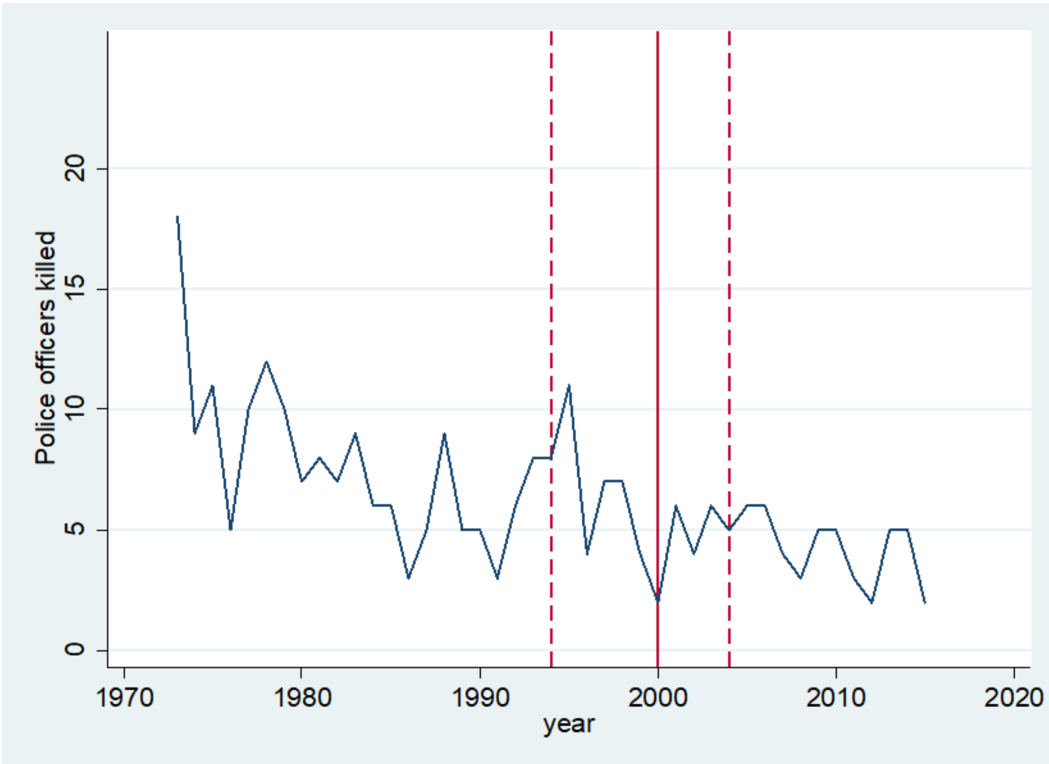
Notes: negative binomial model, income and unemployment data start in 1970, data from Klarevas, * $p<0.05$

There is no significant effect of either the federal or the state LCM ban on the number of incidents of mass shootings in California.

7. Number of Police Officers Killed in the Line of Duty in California

Koper notes that assault weapons and LCMs are overrepresented in killings of police officers. The implication is that a ban would reduce the number of police officers killed. The data are shown in Figure 5.

Figure 5: Police officers killed in line of duty, California, 1973-2015



The number of officers killed has been declining since 1973. However, the mean before the California LCM ban is 7.5 while the mean after the ban is 4.3. The question is whether this difference is significant. The test is presented in Table 6 below.

Table 6: Police officers killed in the line of duty, California, 1973-2015

Outcome	Variable	Coefficient	T-ratio	P-value
Police officers killed	LCM ban	0.056	0.14	0.89
	Federal LCM ban	-0.232	-0.89	0.37
	Trend	-0.029	-0.69	0.49
	Percent population 15-29	-0.089	-1.23	0.22
	Crack epidemic 1984-1991	-0.405	-1.93	0.05
	Income per capita	-0.078	-0.35	0.72
	Unemployment rate	-0.033	-0.48	0.63

Constant	6.453	1.83	0.07

Notes: negative binomial model, * $p<0.05$

Neither the state ban nor the national ban had any significant effect on the number of police officers killed in the line of duty in California.

8. Summary and Conclusions

From the statistical analysis of the effects of the state and federal LCM bans presented above, I conclude that the California LCM acquisition ban had no significant effect on violent crime, murder, firearm homicide, the number of people killed in mass shootings, the number of incidents of mass shootings, or the number of police officers killed in the line of duty.

Similarly, I find that the federal assault weapons law and its national LCM ban had no effect on the California violent crime rate, murder rate, gun murder rate, the number of people killed in mass shootings, the number of incidents of mass shootings, or the number of police officers killed in the line of duty.

B. Lawfully Possessed (or Grandfathered) Magazines Over Ten Rounds Are Not Commonly Used in Mass Shootings in California, So Banning Possession of Such Magazines Will Not Reduce the Number or Lethality of Such Incidents

Until the enactment of California Penal Code section 32310(c), the law did not prohibit the possession of LCMs lawfully acquired before January 1, 2000. Therefore, an indeterminate but substantial number of gun owners in California have owned, and continued to own, what I refer to herein as "pre-acquisition-ban" or "grandfathered" LCMs.

Adding a possession ban to California's current acquisition ban might be expected to save lives if it could be shown that grandfathered, pre-acquisition-ban LCMs are regularly used in mass shootings and can be shown to be responsible for death and injury of Californians. Since magazines over ten rounds in California cannot be legally manufactured, sold, transferred, or imported, the only harm they represent is their use by their lawful owner in criminal shootings.[7]

As an expert witness in another case (*Wiese v. Becerra*, E.D. Cal. No. 2:17-cv-00903-WBS-KJN), I conducted a comprehensive study of California mass

[7] This argument also requires the assumption that any possession ban would have an appreciable effect on the number of pre-acquisition-ban LCMs used in criminal shootings.

shooting incidents.[8] In doing so, I reviewed the www.massshootingtracker.com data set, which represents an exhaustive list of mass shooting incidents, as the site defines it.[9] From that data set, I found 185 incidents reported for California between January 1, 2013 and June 5, 2017.[10] Of these 185 cases, only three could be shown to involve the use of LCMs.[11] Between June 5 and October 30, 2017, there were 22 more mass shooting incidents in California as reported by www.massshootingtracker.com.[12]

I also reviewed the mass shooting cases reported in Klarevas's *Rampage Nation*, covering the years 1966-2016,[13] as well as his declaration in this case which includes, in his Appendix B, mass shooting cases for the years 1968-2017.[14] Klarevas conveniently lists the presence of LCMs in those cases. In addition, I have reviewed the cases listed in the *Mother Jones* data set, which spans the years 1982-2017, and the Violence Policy Center mass shooting list.[15]

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[8] Declaration of Carlisle E. Moody in Support of Plaintiffs' Motion for Issuance of a Temporary Restraining Order and Preliminary Injunction at 4, *Weise v. Becerra*, No. 2:17-cv-00903-WBS-KJN (June 10, 2017) ("Moody Declaration").

[9] Massshootingtracker.org defines mass shootings within its database as "a single outburst of violence in which four or more people are shot," including the perpetrator. Mass Shooting Tracker, www.massshootingtracker.org (last visited Oct. 25, 2017).

[10] Moody Declaration, *supra* note 8, at 5.

[11] *Id.*

[12] Mass Shooting Tracker, https://massshootingtracker.org/data (last visited Oct. 30, 2017) ("MST Data").

[13] Louis Klarevas, *Rampage Nation: Securing America from Mass Shootings* 71-86 (2016).

[14] Expert Report of Dr. Louis Klarevas, *Duncan v. Becerra*, No. 3:17-cv-01017-BEN-JLB (Oct. 6, 2017) ("Klarevas Report").

[15] Mother Jones, *US Mass Shootings, 1982-2017: Data from Mother Jones' Investigation*, http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data/ (last updated Oct. 18, 2017); Violence Policy Center, *High-Capacity Ammunition Magazines Are the Common Thread Running Through Most Mass Shootings in the United States* (July 1, 2017), *available at* http://gunviolence.issuelab.com/resource/high-capacity-ammunition-magazines-

From all these data, I have been presented with an accurate picture of the California mass shooting incidents since the acquisition ban took effect in 2000. I have determined that pre-acquisition-ban LCMs are simply not used in such incidents.

All the California mass shooting incidents involving LCMs since 2000 are discussed below.

1. Analysis of www.massshootingtracker.com Data, 1/1/2013-6/5/2017

6/7/13 Santa Monica, CA: 6 killed including shooter, 4 injured. The perpetrator used a .223 rifle which he assembled from parts. The parts were legally acquired, but the finished rifle was illegal. He was reported to have 40 LCMs with him during the incident. The recent construction of the gun and the age of the shooter (23) indicates that he did not use pre-acquisition-ban LCMs.[16] It is also unlikely that he stored 40 legal LCMs for over 13 years for a rifle that did not exist.

11/3/13 LAX: 1 killed, 4 injured including shooter. The perpetrator, armed with what police say was an assault rifle and carrying materials expressing anti-government sentiment, opened fire at Los Angeles International Airport. He killed one person before being chased down himself. He was reported to have used LCMs. However, at 23 he was too young to legally own pre-acquisition-ban LCMs. He was also living out of state before SB 23 was passed.[17]

12/2/15 San Bernardino, CA: 16 killed including both shooters, 22 injured. The perpetrators reportedly used LCMs. However, the shooters were children or living outside the country when SB 23 was passed. Also, an accomplice served as a

are-the-common-thread-running-through-most-mass-shootings-in-the-united-states.html.

[16] Samantha Tata, *Santa Monica shooter Built Illegal Weapon After Govt Denied Him Firearm*, NBC Los Angeles (June 14, 2013) http://www.nbclosangeles.com/news/local/Santa-Monica-Shooting-Police-News-Conference-Watch-Live-211492801.html

[17] Greg Botelho & Michael Martinez, *FBI: 23-Year-Old L.A. Man Is Suspect in Airport Shooting that Kills TSA Officer*, CNN.com (Nov. 1, 2013), http://www.cnn.com/2013/11/01/us/lax-gunfire/index.html?hpt=hp_t1.

straw purchaser. The weapons were acquired in 2011 and 2012, long after the passage of SB 23.[18]

Of these three incidents, it is a reasonable inference that these incidents did not involve pre-acquisition-ban magazines given media reports involving: (1) the age of the shooter; (2) the illegal assembly of weapons; and/or (3) the illegal acquisition of weapons generally from out of state. And in these three incidents, the shooter would have ignored or flouted existing California law that already prohibits the manufacture or import of LCMs. It is therefore reasonable to infer that an additional ban on the possession of such firearm parts would not have further deterred or prevented the perpetrator from carrying out the shootings.

2. Analysis of www.massshootingtracker.com Data, 6/6/2017-10/30/2017

As of October 30, 2017, there have been 22 mass shootings in California since June 5, 2017, according to www.masshootingtracker.com.[19] News reports mention LCMs in only one of these incidents:

6/14/17 San Francisco, CA: 4 killed including shooter, 2 injured. A United Parcel Service worker who killed three of his fellow delivery drivers and then himself in San Francisco used a MAC-10-style "assault pistol" with a 30-round magazine that had been stolen in Utah. He also carried a second handgun that had been stolen in Napa, but did not fire it. The shooter also had a black backpack with a box of bullets inside, which was recovered along with the guns.[20] The LCM used in this incident was illegally imported into California. It was not a pre-acquisition-ban LCM.

Of note is an incident from June 6, 2017, that left three dead and one injured in Fresno. There, the 30-year-old victim of a home invasion involving multiple attackers used an AR-15 rifle to defend himself.[21] Although such a weapon can

[18] Mike McIntire, *Weapons in San Bernardino Shootings Were Legally Obtained*, NY Times (Dec. 3, 2015), https://www.nytimes.com/2015/12/04/us/weapons-in-san-bernardino-shootings-were-legally-obtained.html

[19] MST Data, *supra* note 12.

[20] Vivian Ho, *UPS Shooter in San Francisco Used Stolen Gun with 30-round Magazine*, S.F. Gate (June 23, 2017), http://www.sfgate.com/crime/article/UPS-shooter-in-San-Francisco-used-stolen-gun-with-11243414.php.

[21] Jim Guy, *Gunfight at East-central Fresno Home Leaves Three Dead, One Wounded*, Fresno Bee (June 6, 2017), http://www.fresnobee.com/news/local/article154583549.html.

accept an LCM, there is no mention of an LCM in the news reports and the owner would have been too young (13) to have purchased a legal LCM before January 1, 2000.

3. Analysis of Remaining Mass Shooting Incidents in California Since 2000

1/30/2006 Goleta Postal Shooting, Goleta, CA: 6 killed. Jennifer San Marco purchased the firearm, a 9 mm Smith &Wesson model 915 handgun equipped with a 15-round magazine, from a pawn shop in Grants, NM in 2005.[22] The magazine was then illegally imported into California. It was not a pre-acquisition-ban magazine.

12/24/2008 Christmas Party Killings, Covina, CA: 9 killed. Bruce Jeffrey Pardo, dressed as Santa Clause invaded a Christmas party at his former in-laws' house. He used four, 13-round capacity handguns and a homemade flamethrower. Police found five empty boxes for semiautomatic handguns at his house.[23] The empty boxes indicate that the pistols were probably newly acquired and were therefore not likely to be fitted with pre-acquisition-ban LCMs.

1/27/2009 Los Angeles, CA: 6 killed. Ervin Lupoe killed his wife and five children in their home and then killed himself. No LCMs were used.[24]

3/21/2009 Oakland, CA: 4 killed. Lovelle Mixon, 26, killed two motorcycle police officers with a semiautomatic handgun after a traffic stop, then fled to his sister's apartment where he had stored a SKS carbine. He killed two police officers with the carbine. Mixon was on parole after serving prison time for armed robbery, thereby in possession of firearms illegally. Although the SKS carbine can accept box magazines of any size, the standard configuration is a 10-round magazine.[25] In any case, Mixon was 16 years old in 1999, making it unlikely that he owned pre-acquisition-ban LCMs.

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[22] Associated Press, *Postal Killer Believed She Was Target of a Plot*, NBCNews.com (Feb. 3, 2006), http://www.nbcnews.com/id/11167920/#.WfE1fGhSyUk.

[23] Wikipedia.com, *Covina Massacre* (last updated Oct. 29, 2017), https://en.wikipedia.org/wiki/Covina_massacre.

[24] Klarevas Report, *supra* note 14, App. B at 3.

[25] Wikipedia.com, *SKS* (last updated Oct. 28, 2017), https://en.wikipedia.org/wiki/SKS.

10/12/2011 Seal Beach Shootings, Seal Beach, CA: 8 killed. Scott Dekraai invaded the Salon Meritage hair salon carrying two semiautomatic pistols and a revolver. No LCMs were used.[26]

4/2/2012 Oikos University Killings, Oakland, CA: 7 killed. One L. Goh opened fire on the campus of Oikos University using a semiautomatic handgun and four 10-round magazines. No LCMs were used.[27]

2/20/2012 Alturas Tribal Shootings, Alturas, CA: 4 killed. Cherie Rhodes opened fire during an eviction hearing at the Cederville Rancheria tribal headquarters. She was armed with a 9-mm handgun and a knife. [28] No LCMs were used.

5/23/2014 Isla Vista Mass Murder, Isla Vista/Santa Barbara, CA: 6 killed. Elliot Rodger, 22, used three handguns, all legally purchased in California, all with 10-round magazines. Another 41 loaded 10-round magazines were found with his body in his car. No LCMs were used.[29]

4/18/2017 Fresno Downtown Shooting, Fresno, CA: 3 killed. Kori Ali Muhammad, 39, opened fire walking along a street in downtown Fresno, killing three people randomly in an alleged hate crime prior to being apprehended by police. Over the span of about a minute, Muhammad fired 16 bullets from a .357-caliber revolver over several blocks, killing three white men at random, police said. When he was finally stopped by officers, he acknowledged he was a wanted man.[30] No LCMs were used.

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[26] Klarevas Report, *supra* note 14, App. B at 3.

[27] *Id.*

[28] *Id.*

[29] Sossy Dombourian, Elisha Fieldstadt & Zoya Taylor, *California Gunman Still Had Hundreds of Rounds: Sheriff*, NBC News (May 24, 2014). https://www.nbcnews.com/storyline/isla-vista-rampage/california-gunman-still-had-hundreds-rounds-sheriff-n113961

[30] Matthew Haag, *Gunman, Thought to Be Targeting Whites, Kills 3 in Fresno, Police Say*, N.Y. Times (April 18, 2017), https://www.nytimes.com/2017/04/18/us/fresno-shooting-rampage-kori-ali-muhammad.html?_r=0.

4. Summary and Conclusions

Thus, after reviewing over 200 mass shooting incidents in California since January 1, 2000, I find that: (1) large capacity magazines were known to be used in only six cases and might have been used in two more; and (2) of the eight cases in which LCMs were, or could have been used, the characteristics of the shooter (age, residence, time of acquisition, etc.) make it extremely unlikely that pre-acquisition-ban LCMs were used in any of these incidents.

In summary, there is no evidence that legally possessed, pre-acquisition-ban LCMs were involved in any in mass shooting incident in California since 2000. It is thus my professional opinion that pre-acquisition-ban LCMs present no significant danger to the citizens of California and a possession ban would have no effect other than turning a large number of law-abiding citizens into criminals.

C. The Washington Post Report on LCMs Recovered by Law Enforcement in Virginia Does Not Show that the Federal Ban Had Any Effect on Murders or Gun Homicides

As Koper's expert report notes, in 2011 the Washington Post published the results of its study of a little-known database on weapons recovered by local law enforcement officers in Virginia.[31] The Criminal Firearms Clearinghouse, maintained by the Virginia State Police, contains detailed information regarding "all firearms seized, forfeited, found or otherwise coming into the possession of any state or local law-enforcement agency of the Commonwealth [of Virginia] which are believed to have been used in the commission of a crime."[32] It includes information on the circumstances of each firearm's recovery and each firearm's physical characteristics, including magazine capacity.

The Washington Post study found that, "[t]he number of guns with high-capacity magazines seized by Virginia police dropped during a decade-long federal prohibition on assault weapons, but the rate has rebounded sharply since the ban

[31] Expert Report of Dr. S. Christopher Koper at 18-19 & n.22, *Duncan v. Becerra*, No. 3:17-cv-01017-BEN-JLB (Oct. 6, 2017) ("Koper Report"); David S. Fallis & James V. Grimaldi, *Va. Date Show Drop in Criminal Firepower During Assault Gun Ban*, Wash. Post (Jan. 23, 2011), *available at* http://www.washingtonpost. com/wp-dyn/content/article/2011/01/22/AR2011012203452.html.

[32] Virginia State Police, *Firearms Transaction Center (FTC)*, Crim. Jus. Info. Servs. (CJIS) Div. Newsletter 1, July 2013, *available at* http://www.vsp.state.va.us/downloads/CJIS_Newsletters/CJIS-Newsletter-July-2013.pdf.

was lifted in late 2004 . . ..”[33] This, according to Koper, implies that the federal ban was effective in reducing the number of LCMs used by criminals. “Maybe the federal ban was finally starting to make a dent in the market by the time it ended,” the Washington Post reported Koper as claiming.[34]

Garen Wintemute, head of the Violence Prevention Research Program at the University of California at Davis, was also quoted as saying “[t]he pattern in Virginia ‘may be a pivotal piece of evidence’ that the assault weapons ban eventually had an impact on the proliferation of high-capacity magazines on the streets.” He continued:

> “Many people, me included, were skeptical about the chances that the magazine ban would make a difference back in 1994” . . . . “But what I am seeing here is that after a few years’ lag time the prevalence of high-capacity magazines was declining. The increase since the ban’s repeal is quite striking.”[35]

Wintemute’s comment about the “striking” increase of LCMs recovered in Virginia since the lapse of the federal ban is somewhat alarming. Did this “striking” increase in LCM use by criminals increase homicide in Virginia? The proportion of recovered firearms in the Criminal Firearms Clearinghouse with magazine capacity greater than 10 is shown in Figure 6 along with the corresponding murder and gun murder rate for Virginia from 1993 to 2013.[36]

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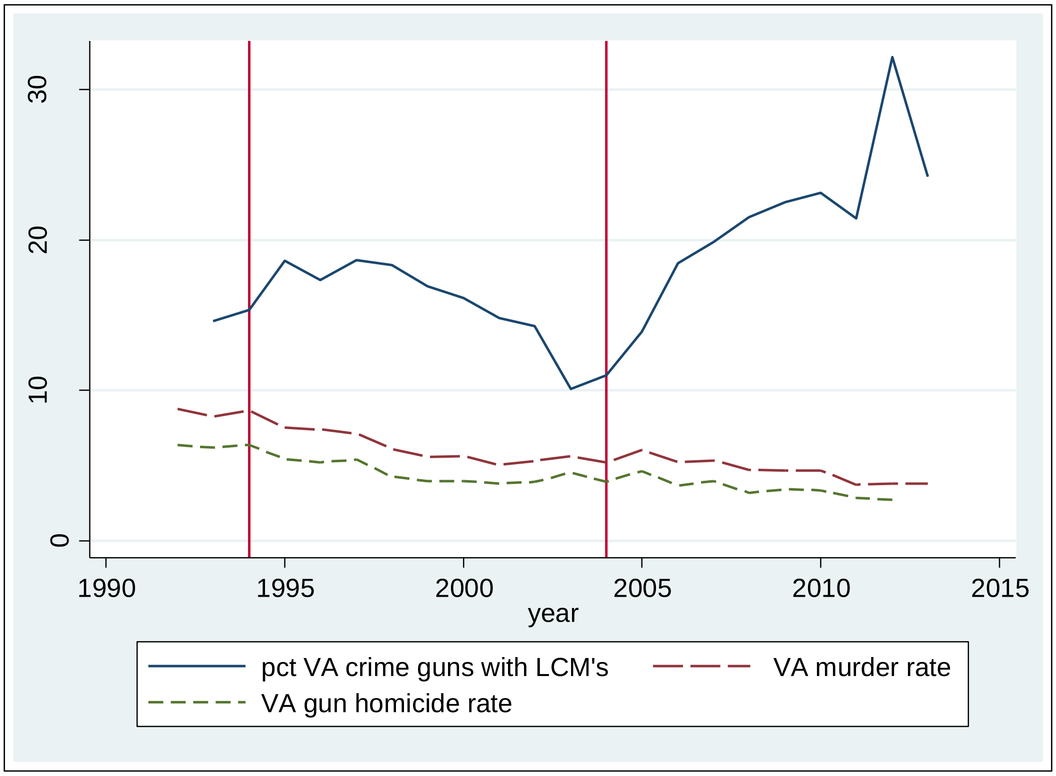
[33] Fallis, *supra* note 30, at 1.

[34] *Id.*

[35] *Id.*

[36] Murder data is taken from the Uniform Crime Reports. Gun homicide is taken from the CDC Wonder data base.

Figure 6: Proportion of crime guns with LCMs and homicide in Virginia



The proportion of crime guns with LCMs initially rose from 1994-1997, the first three years of the federal ban, then declined steadily to 2004, only to rise again after the ban was lifted. On the other hand, the murder rate and the gun homicide rate in Virginia have both declined steadily, revealing no apparent connection between gun homicides and the use of LCM's by criminals.

This observation can be tested by regressing the Virginia gun homicide rate and overall murder rate on the proportion of crime guns with LCMs and a trend term for 1993-2013. Because the time series could be a random walk, which could lead to a spurious regression, I also used first differences. The results are reported below.

Table 7: Proportion of crime guns with LCMs and homicide in Virginia

Variable	Percent LCM		Trend		Autocorrelation	
	Coeff	T-ratio	Coeff	T-ratio	Rho	T-ratio
Gun homicide rate	-0.109	-2.54**			0.713	5.15***
with trend	-0.008	-0.03	-0.151	-6.53***	0.417	1.78*

First differences	-0.027	-0.07	-0.158	-1.23	-0.552	-2.56**
Log gun homicide rate	-0.028	-3.03***			0.694	4.52***
with trend	-0.006	-1.03	-0.033	-6.86***	0.299	1.21
First differences	-0.006	-0.67	-0.037	-1.26	-0.593	-2.58**
Murder rate	-0.140	-2.48**			0.774	6.03***
with trend	-0.021	-0.67	-0.217	-8.49***	0.583	2.79**
First differences	-0.004	-0.12	-0.221	-1.83*	-0.411	-1.87*
Log murder rate	-0.027	-2.91***			0.744	4.96***
with trend	0.000	-0.06	-0.036	-8.86***	0.480	2.16**
First differences	0.006	0.10	-0.039	-1.84*	-0.459	-2.03*
Gun murders	-0.021	-3.03***				
with trend	-0.007	-1.20	-0.021	-4.73***		
Murders	-0.019	-2.78***				
with trend	-0.001	-0.16	-0.024	-6.33***		

Notes: *** significant at .01, ** significant at .05, * significant at .10, two-tailed. Percent LCM is the proportion of Virginia crime guns with LCMs. In the first difference model, the trend is estimated by the intercept. Gun murders and murders are estimated using a negative binomial model. See Appendix 2 for details.

If I omit the trend, the estimated coefficient on the proportion of LCMs is negative and highly significant, reflecting the fact that crime in Virginia continued its decline while the proportion of crime guns with LCMs increased substantially.[37]

[37] Table 7 also reports the Breusch-Godfrey test for autocorrelation. The regressions in levels show significant positive serial correlation, except for the log of the gun homicide rate, indicating that the t-ratios are likely to be overstated in those cases. In first differences, the serial correlation is negative, indicating that the t-ratios are underestimated. We estimated the regression in both levels and first differences because unit root tests were inconclusive.

However, when I include the trend, which is negative and highly significant, the proportion of LCMs is never significant.

Using a negative binomial model, appropriate for count data, I also regressed the number of gun homicides and murders in Virginia on the LCM proportion and a trend. The results are the same. There is no relationship between the proportion of crime guns with LCMs and either the number of murders or the number of gun homicides. (See Appendix 2 for complete results.)

There is no relationship between the number of public shooting victims and the proportion of LCMs because Virginia had only one such event, the Virginia Tech shooting in 2007, in which the shooter used both standard- and large-capacity magazines holding 10 and 15 rounds.

I conclude that, using data from the Virginia Firearms Clearinghouse, which counts the number of confiscated crime guns with LCMs, I am unable to find any effect of LCMs or the LCM ban on murders or gun homicides. More criminals using more guns with LCMs apparently do not cause more homicides. LCMs appear to have nothing to do with homicide.

VII. REFERENCES

Associated Press, *Postal Killer Believed She Was Target of a Plot*, NBCNews.com (Feb. 3, 2006), http://www.nbcnews.com/id/11167920/#.WfE1 GhSyUk.

David S. Fallis & James V. Grimaldi, *Va. Date Show Drop in Criminal Firepower During Assault Gun Ban*, Wash. Post (Jan. 23, 2011), *available at* http://www.washingtonpost.com/wp-dyn/content/article/2011/01/22/AR2011 012203452.html.

Declaration of Carlisle E. Moody in Support of Plaintiffs' Motion for Issuance of a Temporary Restraining Order and Preliminary Injunction at 4, *Weise v. Becerra*, No. 2:17-cv-00903-WBS-KJN (June 10, 2017).

Expert Report of Dr. Christopher S. Koper, *Duncan v. Becerra*, No. 3:17-cv-01017-BEN-JLB (Oct. 6, 2017).

Expert Report of Dr. Louis Klarevas, *Duncan v. Becerra*, No. 3:17-cv-01017-BEN-JLB (Oct. 6, 2017).

Graham Elliot, Thomas J. Rothenberg & James H. Stock, *Efficient Tests for an Autoregressive Unit Root*, 64 Econometrica 813-836 (July 1996), *available at* https://ideas.repec.org/a/ecm/emetrp/v64y1996i4p813-36.html.

Greg Botelho & Michael Martinez, *FBI: 23-Year-Old L.A. Man Is Suspect in Airport Shooting that Kills TSA Officer*, CNN.com (Nov. 1, 2013), http://www.cnn.com/2013/11/01/us/lax-gunfire/index.html?hpt=hp_t1.

Jim Guy, *Gunfight at East-central Fresno Home Leaves Three Dead, One Wounded*, Fresno Bee (June 6, 2017), http://www.fresnobee.com/news/local/article 154583549.html.

Louis Klarevas, *Rampage Nation: Securing America from Mass Shootings* (2016).

Mass Shooting Tracker, www.massshootingtracker.org (last visited Oct. 30, 2017).

Mass Shooting Tracker, https://massshootingtracker.org/data (last visited Oct. 30, 2017).

Matthew Haag, *Gunman, Thought to Be Targeting Whites, Kills 3 in Fresno, Police Say*, N.Y. Times (April 18, 2017), https://www.nytimes.com/2017/04/18/us/fresno-shooting-rampage-kori-ali-muhammad.html?_r=0.

Mother Jones, *US Mass Shootings, 1982-2017: Data from Mother Jones' Investigation*, http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data/ (last updated Oct. 18, 2017).

Violence Policy Center, *High-Capacity Ammunition Magazines Are the Common Thread Running Through Most Mass Shootings in the United States* (July 1, 2017), *available at* http://gunviolence.issuelab.com/resource/high-capacity-ammunition-magazines-are-the-common-thread-running-through-most-mass-shootings-in-the-united-states.html.

Virginia State Police, *Firearms Transaction Center (FTC)*, Crim. Jus. Info. Servs. (CJIS) Div. Newsletter 1, July 2013, *available at* http://www.vsp.state.va.us/downloads/CJIS_Newsletters/CJIS-Newsletter-July-2013.pdf.

Vivian Ho, *UPS Shooter in San Francisco Used Stolen Gun with 30-round Magazine*, S.F. Gate (June 23, 2017), http://www.sfgate.com/crime/article/UPS-shooter-in-San-Francisco-used-stolen-gun-with-11243414.php.

Wikipedia.com, *Covina Massacre* (last updated Oct. 29, 2017), https://en.wikipedia.org/wiki/Covina_massacre.

Wikipedia.com, *SKS* (last updated Oct. 28, 2017), https://en.wikipedia.org/wiki/SKS.

VIII. APPENDIX AND ATTACHMENT

Attached as **Appendix 1** is a true and correct copy of the complete output of the Stata program used to generate the results reported in Section VI.A. above.

Attached as **Appendix 2** is a true and correct copy of the complete output of the Stata program used to generate the results reported in Section VI.C above.

Attached at **Exhibit 1** and made a part of this report is a copy of my curriculum vitae, including a list of all my published works from the last ten years.

IX. CONCLUSION

Based on the findings listed above, it is my opinion that the California acquisition ban on LCMs has had no significant effect on the California murder rate, gun homicide rate, the number of people killed in mass shootings, the number of incidents of mass shootings, or the number of police officers killed in the line of duty.

Similarly, I find that the federal assault weapons law and its national LCM ban had no effect on the California violent crime rate, murder rate, gun murder rate, the number of people killed in mass shootings, the number of incidents of mass shootings, or the number of police officers killed in the line of duty.

The ineffectiveness of the acquisition ban is not due to the fact that possession of LCMs was not prohibited. A comprehensive examination of the incidents of mass shootings indicates that no grandfathered, pre-acquisition-ban LCMs have been used in any mass shootings in California.

It is thus my professional opinion that California’s acquisition ban has not and will not, even when paired with a possession ban, result in any statistically significant reduction in the number or lethality of mass shooting incidents in California or violent crime rates in general.

Dated: November 30, 2022

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APPENDIX 1

Complete output of the Stata program used to generate the results reported in Section 3.

```
----------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------
      name:  <unnamed>
       log:  C:\Users\cemood\Box Sync\California\report.log
  log type:  text
 opened on:  18 Oct 2017, 09:33:51

.
. *set more off
.
. tsset year
        time variable:  year, 1968 to 2017
                delta:  1 unit

. gen trend=year-1967

. gen fedban=(year>1993)*(year<2005)

. gen pp1529=pp1519+pp2024+pp2529
(4 missing values generated)

. gen crack=(year>=1984)*(year<=1991)

.
. gen dcrviopc=D.crviopc
(3 missing values generated)

. gen dcrmurpc=D.crmurpc
(3 missing values generated)

. gen dgunhomrate=D.gunhomrate
(5 missing values generated)

. gen dlcmban=D.lcmban
(1 missing value generated)

. gen dfedban=D.fedban
(1 missing value generated)

. gen dpp1529=D.pp1529
(5 missing values generated)

. gen drtpipc=D.rtpipc
(3 missing values generated)

. gen dunrate=D.unrate
(5 missing values generated)

. gen dcrviopc_1=LD.crviopc
(3 missing values generated)

. gen dcrmurpc_1=LD.crmurpc
(3 missing values generated)
```

```
. gen dgunhomrate_1=LD.gunhomrate
(5 missing values generated)

. gen dcrack=D.crack
(1 missing value generated)

.
.
. label var crviopc "Violent crime rate"

. label var crmurpc "Murder rate"

. label var gunhomrate "Firearm homicide rate"

. label var lcmban "LCM ban"

. label var fedban "Federal LCM ban"

.
. label var dcrviopc "Violent crime rate"

. label var dcrmurpc "Murder rate"

. label var dgunhomrate "Firearm homicide rate"

. label var dlcmban "LCM ban"

. label var dfedban "Federal LCM ban"

.
. label var dcrviopc_1 "Violent crime rate, lagged"

. label var dcrmurpc_1 "Murder rate, lagged"

. label var dgunhomrate_1 "Firearm homicide rate, lagged"

. label var crack "Crack epidemic 1984-1991"

. label var dcrack "Crack epidemic 1984-1991"

. label var dpp1529 "Percent population 15-29"

. label var dunrate "Unemployment rate"

. label var drtpipc "Income per capita"

. label var pp1529 "Percent population 15-29"

. label var unrate "Unemployment rate"

. label var rtpipc "Income per capita"

. label var trend "Trend"

. label var polkil "Police officers killed"

. label var killed "Mass shooting deaths, Klarevas"

. label var incidents "Mass shooting incidents, Klarevas"

.
```

```
.
. /* violent crime and the LCM ban */
.
. twoway (line crviopc year) if year>1969, xline(1994,lpattern(dash)) xline(2000)
xline(2004,lpattern(dash))

.
. dfgls crviopc

DF-GLS for crviopc                                        Number of obs =    38
Maxlag = 9 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    9           -1.402           -3.770            -2.723            -2.425
    8           -1.022           -3.770            -2.783            -2.490
    7           -1.045           -3.770            -2.850            -2.559
    6           -1.581           -3.770            -2.921            -2.630
    5           -1.375           -3.770            -2.994            -2.701
    4           -1.189           -3.770            -3.066            -2.769
    3           -1.239           -3.770            -3.133            -2.833
    2           -1.224           -3.770            -3.195            -2.889
    1           -1.171           -3.770            -3.247            -2.937

Opt Lag (Ng-Perron seq t) =  9 with RMSE  36.79024
Min SC   =  7.686171 at lag  1 with RMSE  42.40895
Min MAIC =  7.625905 at lag  1 with RMSE  42.40895

. regress dcrviopc  dlcmban dfedban dpp1529 dcrack drtpipc dunrate dcrviopc_1

      Source |       SS           df       MS      Number of obs   =        45
-------------+----------------------------------   F(7, 37)        =      2.89
       Model |  37953.3085         7  5421.90122   Prob > F        =    0.0163
    Residual |  69380.1786        37  1875.13996   R-squared       =    0.3536
-------------+----------------------------------   Adj R-squared   =    0.2313
       Total |  107333.487        44  2439.39744   Root MSE        =    43.303

------------------------------------------------------------------------------
    dcrviopc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dlcmban |   44.84434   46.96038     0.95   0.346    -50.30644    139.9951
     dfedban |  -31.54718   31.61965    -1.00   0.325    -95.61467    32.52031
     dpp1529 |   8.983775   21.06671     0.43   0.672    -33.70144    51.66899
      dcrack |   2.645099   33.32475     0.08   0.937    -64.87727    70.16747
     drtpipc |   -.999542   25.79697    -0.04   0.969    -53.26916    51.27008
     dunrate |   -2.65343   8.150656    -0.33   0.747    -19.16823    13.86137
  dcrviopc_1 |   .6052954    .146779     4.12   0.000     .3078928    .9026979
       _cons |  -.3448009   8.790083    -0.04   0.969     -18.1552     17.4656
------------------------------------------------------------------------------

. outreg using  table1 ,  starlevels(5) ctitles(Variable,Coefficient, T-ratio, P-value)
varlabels replace stats(b t p) nosubstat

                 -------------------------------------------------------------
                  Variable                     Coefficient  T-ratio  P-value
                 -------------------------------------------------------------
                   LCM ban                        44.844      0.95     0.35
                   Federal LCM ban               -31.547     -1.00     0.32
                   Percent population 15-29        8.984      0.43     0.67
                   Crack epidemic 1984-1991        2.645      0.08     0.94
```

```
                   Income per capita            -1.000      -0.04     0.97
                   Unemployment rate            -2.653      -0.33     0.75
                   Violent crime rate, lagged    0.605      4.12*     0.00
                   Constant                     -0.345      -0.04     0.97
                 -------------------------------------------------------------
                                         * p<0.05


. test dpp1529 dcrack drtpipc dunrate

 ( 1)  dpp1529 = 0
 ( 2)  dcrack = 0
 ( 3)  drtpipc = 0
 ( 4)  dunrate = 0

       F(  4,    37) =    0.11
            Prob > F =    0.9790

. regress dcrviopc  dlcmban dfedban dcrviopc_1

      Source |       SS           df       MS      Number of obs   =        46
-------------+----------------------------------   F(3, 42)        =      7.46
       Model |  37434.0285         3  12478.0095   Prob > F        =    0.0004
    Residual |  70204.9891        42  1671.54736   R-squared       =    0.3478
-------------+----------------------------------   Adj R-squared   =    0.3012
       Total |  107639.018        45  2391.97817   Root MSE        =    40.885

------------------------------------------------------------------------------
    dcrviopc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dlcmban |   45.16038   42.50885     1.06   0.294    -40.62595    130.9467
     dfedban |   -34.9102   28.91836    -1.21   0.234    -93.26981    23.44942
  dcrviopc_1 |   .5888778   .1279103     4.60   0.000     .3307443    .8470113
       _cons |  -1.334702    6.09661    -0.22   0.828    -13.63816    10.96875
------------------------------------------------------------------------------

. estat bgodfrey, lags(1) small

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                 df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        0.718          (  1,    41 )             0.4016
---------------------------------------------------------------------------
                        H0: no serial correlation

. *twoway (line dcrviopc year) if year>1969, xline(1994,lpattern(dash)) xline(2000)
xline(2004,lpattern(dash))
. more


.
. /* murder */
.
. twoway (line crmurpc year) if year>1969, xline(1994,lpattern(dash)) xline(2000)
xline(2004,lpattern(dash))

. dfgls crmurpc

DF-GLS for crmurpc                                       Number of obs =    38
Maxlag = 9 chosen by Schwert criterion
```

```
             DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic      Value             Value             Value
------------------------------------------------------------------------------
    9           -1.014           -3.770            -2.723            -2.425
    8           -0.786           -3.770            -2.783            -2.490
    7           -0.968           -3.770            -2.850            -2.559
    6           -1.172           -3.770            -2.921            -2.630
    5           -1.317           -3.770            -2.994            -2.701
    4           -1.334           -3.770            -3.066            -2.769
    3           -1.410           -3.770            -3.133            -2.833
    2           -1.671           -3.770            -3.195            -2.889
    1           -1.707           -3.770            -3.247            -2.937

Opt Lag (Ng-Perron seq t) =  1 with RMSE   .686063
Min SC   = -.5621197 at lag  1 with RMSE   .686063
Min MAIC = -.5328976 at lag  1 with RMSE   .686063

. regress dcrmurpc  dlcmban dfedban dpp1529 dcrack drtpipc dunrate dcrmurpc_1

      Source |       SS           df       MS      Number of obs   =        45
-------------+----------------------------------   F(7, 37)        =      2.07
       Model |  8.14377879         7  1.16339697   Prob > F        =    0.0723
    Residual |  20.8393118        37  .563224644   R-squared       =    0.2810
-------------+----------------------------------   Adj R-squared   =    0.1450
       Total |  28.9830906        44  .658706605   Root MSE        =    .75048

------------------------------------------------------------------------------
    dcrmurpc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
     dlcmban |   .5863887   .8065601     0.73   0.472    -1.047857    2.220635
     dfedban |  -.8840157   .5505488    -1.61   0.117    -1.999534    .2315022
     dpp1529 |   .2253544   .3744847     0.60   0.551    -.5334237    .9841324
      dcrack |   .3602601    .586199     0.61   0.543    -.8274918    1.548012
     drtpipc |  -.2878104   .4464038    -0.64   0.523     -1.19231    .6166895
     dunrate |  -.0560486   .1434289    -0.39   0.698    -.3466631     .234566
  dcrmurpc_1 |   .4516491    .152137     2.97   0.005     .1433902     .759908
       _cons |   .0467065   .1517945     0.31   0.760    -.2608583    .3542713
------------------------------------------------------------------------------

. outreg using  table2 ,  starlevels(5) ctitles(Variable,Coefficient, T-ratio, P-value)
varlabels replace stats(b t p) nosubstat

                  ----------------------------------------------------------
                   Variable                     Coefficient  T-ratio  P-value
                  ----------------------------------------------------------
                    LCM ban                         0.586      0.73     0.47
                    Federal LCM ban                -0.884     -1.61     0.12
                    Percent population 15-29        0.225      0.60     0.55
                    Crack epidemic 1984-1991        0.360      0.61     0.54
                    Income per capita              -0.288     -0.64     0.52
                    Unemployment rate              -0.056     -0.39     0.70
                    Murder rate, lagged             0.452      2.97*    0.01
                    Constant                        0.047      0.31     0.76
                  ----------------------------------------------------------
                                             * p<0.05


. predict e, resid
(5 missing values generated)

. estat bgodfrey, lags(1) small
```


Appendix 1

```
Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                      df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        0.004              (  1,    36 )              0.9515
---------------------------------------------------------------------------
                        H0: no serial correlation

. more

.
. /* gun homicide rate */
.
. twoway (line gunhomrate year) if year>1969, xline(1994,lpattern(dash)) xline(2000)
xline(2004,lpattern(dash))

. dfgls gunhomrate

DF-GLS for gunhomrate                                    Number of obs =    36
Maxlag = 9 chosen by Schwert criterion

               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    9            -0.875           -3.770            -2.716            -2.412
    8            -0.697           -3.770            -2.775            -2.477
    7            -0.957           -3.770            -2.843            -2.549
    6            -1.083           -3.770            -2.917            -2.623
    5            -1.254           -3.770            -2.994            -2.698
    4            -1.425           -3.770            -3.070            -2.771
    3            -1.600           -3.770            -3.142            -2.840
    2            -2.155           -3.770            -3.208            -2.901
    1            -1.931           -3.770            -3.264            -2.952

Opt Lag (Ng-Perron seq t) =  1 with RMSE  .5520979
Min SC   = -.9889755 at lag  1 with RMSE  .5520979
Min MAIC = -.9030688 at lag  1 with RMSE  .5520979

. regress dgunhomrate  dlcmban dfedban dpp1529 dcrack drtpipc dunrate dgunhomrate_1

      Source |       SS           df       MS      Number of obs   =        43
-------------+----------------------------------   F(7, 35)        =      2.70
       Model |  6.75439422         7  .96491346   Prob > F        =    0.0241
    Residual |  12.5292156        35  .357977588   R-squared       =    0.3503
-------------+----------------------------------   Adj R-squared   =    0.2203
       Total |  19.2836098        42  .459133567   Root MSE        =    .59831

-------------------------------------------------------------------------------
  dgunhomrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
--------------+----------------------------------------------------------------
      dlcmban |   .8436859   .6538369     1.29   0.205    -.4836736    2.171045
      dfedban |  -.6063146    .437159    -1.39   0.174    -1.493795    .2811653
      dpp1529 |   .1036157   .2944184     0.35   0.727    -.4940854    .7013167
       dcrack |   .4721783   .4757592     0.99   0.328    -.4936642    1.438021
      drtpipc |  -.3549564   .3873536    -0.92   0.366    -1.141326    .4314131
      dunrate |  -.0643103   .1157443    -0.56   0.582    -.2992837    .1706632
dgunhomrate_1 |   .5453604   .1500127     3.64   0.001     .2408184    .8499024
        _cons |   .0556823   .1222048     0.46   0.651    -.1924066    .3037712
-------------------------------------------------------------------------------
```

```
. outreg using  table3 ,  starlevels(5) ctitles(Variable,Coefficient, T-ratio, P-value)
varlabels replace stats(b t p) nosubstat

               ----------------------------------------------------------------
                Variable                         Coefficient  T-ratio  P-value
               ----------------------------------------------------------------
                 LCM ban                             0.844      1.29     0.21
                 Federal LCM ban                    -0.606     -1.39     0.17
                 Percent population 15-29            0.104      0.35     0.73
                 Crack epidemic 1984-1991            0.472      0.99     0.33
                 Income per capita                  -0.355     -0.92     0.37
                 Unemployment rate                  -0.064     -0.56     0.58
                 Firearm homicide rate, lagged       0.545      3.64*    0.00
                 Constant                            0.056      0.46     0.65
               ----------------------------------------------------------------
                                            * p<0.05


. estat bgodfrey, lags(2) small

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                 df                 Prob > F
-------------+-------------------------------------------------------------
       2     |        0.829           (  2,    33 )            0.4452
---------------------------------------------------------------------------
                        H0: no serial correlation

. *twoway (line gunhomrate year) if yhat ~=., xline(1994) xline(2000) xline(2004)
. more

.
. /* number killed in mass public shootings Klarevas data */
.
. gen kkilled=killed

. replace kkilled=. if killed==0
(35 real changes made, 35 to missing)

. label var kkilled "Number killed in mass shootings, Klarevas"

. twoway (scatter kkilled year) if year>1967, ysc(r(0 25))  xline(1994,lpattern(dash))
xline(2000) xline(2004,lpattern(dash))


.
. nbreg killed lcmban fedban trend pp1529 crack rtpipc unrate, nolog

Negative binomial regression                    Number of obs     =         46
                                                LR chi2(7)        =       7.35
Dispersion     = mean                           Prob > chi2       =     0.3932
Log likelihood = -74.530257                     Pseudo R2         =     0.0470

------------------------------------------------------------------------------
      killed |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |  -2.025035   3.791376    -0.53   0.593    -9.455996    5.405925
      fedban |  -.9139186   1.468685    -0.62   0.534    -3.792489    1.964652
       trend |  -.7012929   .4384203    -1.60   0.110    -1.560581     .157995
      pp1529 |  -1.045867   .7400789    -1.41   0.158    -2.496395     .404661
       crack |   3.036672   1.870139     1.62   0.104     -.628732    6.702076
      rtpipc |   3.231676     2.1214     1.52   0.128    -.9261921    7.389545
```

```
      unrate |   1.218783   .7615005     1.60   0.109     -.273731    2.711296
       _cons |  -19.88964   25.47565    -0.78   0.435    -69.82099    30.04172
-------------+----------------------------------------------------------------
    /lnalpha |   1.717326   .3556229                      1.020318    2.414334
-------------+----------------------------------------------------------------
       alpha |   5.569614   1.980682                      2.774076    11.18232
------------------------------------------------------------------------------
LR test of alpha=0: chibar2(01) = 159.74               Prob >= chibar2 = 0.000

. /***** note: Poisson rejected by likelihood ratio test on alpha *****/
.
. outreg using  table4 ,  starlevels(5) ctitles(Outcome,Variable,Coefficient, T-ratio, P-
value) varlabels replace stats(b t p) nosubstat

  ------------------------------------------------------------------------------------------
   Outcome                          Variable                      Coefficient  T-ratio  P-value
  ------------------------------------------------------------------------------------------
    Mass shooting deaths, Klarevas  LCM ban                          -2.025      -0.53    0.59
                    Federal LCM ban                 -0.914      -0.62     0.53
                    Trend                           -0.701      -1.60     0.11
                    Percent population 15-29        -1.046      -1.41     0.16
                    Crack epidemic 1984-1991         3.037      1.62      0.10
                    Income per capita                3.232      1.52      0.13
                    Unemployment rate                1.219      1.60      0.11
                    Constant                       -19.890      -0.78     0.43
    lnalpha                          Constant                         1.717      4.83*    0.00
  ------------------------------------------------------------------------------------------
                                            * p<0.05


.
. more

.
.
. /* number of incidents of mass murder, Klarevas data */
.
. gen x=incidents

. replace x=. if x==0
(35 real changes made, 35 to missing)

. label var x "Number of incidents of mass shootings, Klarevas"

. twoway (scatter x year),  xline(1994,lpattern(dash)) xline(2000) xline(2004,lpattern(dash))

.
. nbreg incidents lcmban fedban trend pp1529 crack rtpipc unrate, nolog

Negative binomial regression                    Number of obs     =         46
                                                LR chi2(7)        =       8.53
Dispersion     = mean                           Prob > chi2       =     0.2881
Log likelihood =   -28.2365                     Pseudo R2         =     0.1312

------------------------------------------------------------------------------
   incidents |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |  -2.385524   2.061694    -1.16   0.247     -6.42637    1.655323
      fedban |  -1.439191   1.348343    -1.07   0.286    -4.081894    1.203512
       trend |  -.2348308   .1984285    -1.18   0.237    -.6237436     .154082
      pp1529 |   -.379523   .3268173    -1.16   0.246    -1.020073    .2610272
```

```
       crack |   .4911215   .9752547     0.50   0.615    -1.420343    2.402586
      rtpipc |     1.3435   1.007087     1.33   0.182    -.6303553    3.317355
      unrate |   .4089753   .2875448     1.42   0.155     -.154602    .9725527
       _cons |  -11.04284   13.46766    -0.82   0.412    -37.43896    15.35328
-------------+----------------------------------------------------------------
    /lnalpha |  -35.09767          .                             .           .
-------------+----------------------------------------------------------------
       alpha |   5.72e-16          .                             .           .
------------------------------------------------------------------------------
LR test of alpha=0: chibar2(01) = 0.00                 Prob >= chibar2 = 1.000

. outreg using  table5 ,  starlevels(5) ctitles(Outcome,Variable,Coefficient, T-ratio, P-
value) varlabels replace stats(b t p) nosubstat

 ----------------------------------------------------------------------------------------------
  Outcome                                 Variable                   Coefficient  T-ratio  P-value
 ----------------------------------------------------------------------------------------------
   Mass shooting incidents, Klarevas  LCM ban                                -2.386      -1.16    0.25
                                  Federal LCM ban               -1.439      -1.07     0.29
                                  Trend                         -0.235      -1.18     0.24
                                  Percent population 15-29      -0.380      -1.16     0.25
                                  Crack epidemic 1984-1991       0.491      0.50      0.61
                                  Income per capita              1.343      1.33      0.18
                                  Unemployment rate              0.409      1.42      0.15
                                  Constant                     -11.043      -0.82     0.41
            lnalpha                                  Constant                         -35.098
 ----------------------------------------------------------------------------------------------
                                                          * p<0.05


. poisson incidents lcmban fedban trend pp1529 crack rtpipc unrate, nolog

Poisson regression                                Number of obs     =         46
                                                  LR chi2(7)        =       8.53
                                                  Prob > chi2       =     0.2881
Log likelihood =   -28.2365                       Pseudo R2         =     0.1312

------------------------------------------------------------------------------
   incidents |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |  -2.385524   2.061694    -1.16   0.247     -6.42637    1.655323
      fedban |  -1.439191   1.348343    -1.07   0.286    -4.081894    1.203512
       trend |  -.2348308   .1984286    -1.18   0.237    -.6237436     .154082
      pp1529 |   -.379523   .3268173    -1.16   0.246    -1.020073    .2610272
       crack |   .4911215   .9752547     0.50   0.615    -1.420343    2.402586
      rtpipc |     1.3435   1.007087     1.33   0.182    -.6303553    3.317355
      unrate |   .4089753   .2875448     1.42   0.155     -.154602    .9725527
       _cons |  -11.04284   13.46766    -0.82   0.412    -37.43896    15.35328
------------------------------------------------------------------------------

. more

.
. /* police officers killed in line of duty */
. drop x

. nbreg polkil lcmban fedban trend pp1529 crack rtpipc unrate,  nolog

Negative binomial regression                      Number of obs     =         43
                                                  LR chi2(6)        =      31.87
Dispersion     = mean                             Prob > chi2       =     0.0000
```

```
Log likelihood = -89.637301                     Pseudo R2         =     0.1510

------------------------------------------------------------------------------
      polkil |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |    .056078   .4088831     0.14   0.891    -.7453181    .8574741
      fedban |  -.2321364   .2598886    -0.89   0.372    -.7415086    .2772359
       trend |  -.0290026   .0421929    -0.69   0.492    -.1116993     .053694
      pp1529 |  -.0893957   .0726395    -1.23   0.218    -.2317665     .052975
       crack |  -.4051925   .2096658    -1.93   0.053      -.81613     .005745
      rtpipc |  -.0784565   .2221189    -0.35   0.724    -.5138015    .3568885
      unrate |  -.0327168   .0676716    -0.48   0.629    -.1653507    .0999171
       _cons |   6.453041   3.518096     1.83   0.067    -.4423013    13.34838
-------------+----------------------------------------------------------------
    /lnalpha |  -34.79069          .                             .           .
-------------+----------------------------------------------------------------
       alpha |   7.77e-16          .                             .           .
------------------------------------------------------------------------------
LR test of alpha=0: chibar2(01) = 0.00                 Prob >= chibar2 = 1.000

. outreg using  table6 ,  starlevels(5) ctitles(Outcome,Variable,Coefficient, T-ratio, P-
value) varlabels replace stats(b t p) nosubstat

      --------------------------------------------------------------------------------
       Outcome                 Variable                    Coefficient  T-ratio  P-value
      --------------------------------------------------------------------------------
        Police officers killed  LCM ban                        0.056      0.14     0.89
                    Federal LCM ban                -0.232       -0.89     0.37
                    Trend                          -0.029       -0.69     0.49
                    Percent population 15-29       -0.089       -1.23     0.22
                    Crack epidemic 1984-1991       -0.405       -1.93     0.05
                    Income per capita              -0.078       -0.35     0.72
                    Unemployment rate              -0.033       -0.48     0.63
                    Constant                        6.453       1.83      0.07
                 lnalpha                  Constant                     -34.791
      --------------------------------------------------------------------------------
                                                  * p<0.05


. test pp1529 rtpipc unrate

 ( 1)  [polkil]pp1529 = 0
 ( 2)  [polkil]rtpipc = 0
 ( 3)  [polkil]unrate = 0

           chi2(  3) =    2.08
         Prob > chi2 =    0.5569

. poisson polkil lcmban fedban trend pp1529 crack rtpipc unrate,  nolog

Poisson regression                              Number of obs     =         43
                                                LR chi2(7)        =      35.30
                                                Prob > chi2       =     0.0000
Log likelihood = -89.637301                     Pseudo R2         =     0.1645

------------------------------------------------------------------------------
      polkil |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |   .0560784   .4088831     0.14   0.891    -.7453177    .8574745
      fedban |  -.2321364   .2598886    -0.89   0.372    -.7415086    .2772359
       trend |  -.0290025   .0421929    -0.69   0.492    -.1116991    .0536941
```

```
      pp1529 |  -.0893956   .0726395    -1.23   0.218    -.2317664    .0529752
       crack |  -.4051925   .2096658    -1.93   0.053      -.81613     .005745
     rtpipc  |   -.078457   .2221189    -0.35   0.724    -.5138019     .356888
      unrate |  -.0327168   .0676716    -0.48   0.629    -.1653507     .099917
       _cons |   6.453043   3.518097     1.83   0.067    -.4423001    13.34839
------------------------------------------------------------------------------

. gen x=polkil if polkil~=0
(7 missing values generated)

. label var x "Police officers killed"

. twoway (line x year) if year>1972, ysc(r(0 25))  xline(1994,lpattern(dash)) xline(2000)
xline(2004,lpattern(dash))

. mean polkil if year<=1999

Mean estimation                   Number of obs    =         27

--------------------------------------------------------------
             |       Mean   Std. Err.     [95% Conf. Interval]
-------------+------------------------------------------------
      polkil |   7.518519   .6233134       6.23728    8.799758
--------------------------------------------------------------

. mean polkil if year>1999

Mean estimation                   Number of obs    =         16

--------------------------------------------------------------
             |       Mean   Std. Err.     [95% Conf. Interval]
-------------+------------------------------------------------
      polkil |     4.3125   .3732599      3.516915    5.108085
--------------------------------------------------------------
.
. /* regressions in levels instead of first differences */
.
. regress crviopc lcmban fedban pp1529 crack rtpipc unrate L.crviopc

      Source |       SS           df       MS      Number of obs   =        46
-------------+----------------------------------   F(7, 38)        =    216.16
       Model |  1911311.24         7  273044.462   Prob > F        =    0.0000
    Residual |  48000.0767        38  1263.15991   R-squared       =    0.9755
-------------+----------------------------------   Adj R-squared   =    0.9710
       Total |  1959311.31        45  43540.2514   Root MSE        =    35.541

------------------------------------------------------------------------------
     crviopc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |   52.97421   33.32976     1.59   0.120    -14.49837    120.4468
      fedban |  -52.17283   19.85951    -2.63   0.012    -92.37631   -11.96935
      pp1529 |    2.42715   4.805705     0.51   0.616    -7.301492    12.15579
       crack |   33.79697   18.29422     1.85   0.072    -3.237745    70.83169
      rtpipc |  -10.19981   6.295427    -1.62   0.113    -22.94424    2.544612
      unrate |  -8.285666   3.407783    -2.43   0.020    -15.18436    -1.38697
             |
     crviopc |
         L1. |   .9796338   .0422401    23.19   0.000     .8941232    1.065144
             |
       _cons |   178.0654   210.7171     0.85   0.403     -248.509    604.6398
------------------------------------------------------------------------------
```

```
. estat bgodfrey, lags(1) small

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                      df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        0.326               (  1,    37 )             0.5713
---------------------------------------------------------------------------
                        H0: no serial correlation

.
. regress crmurpc lcmban fedban pp1529 crack rtpipc unrate L.crmurpc

      Source |       SS           df       MS      Number of obs   =        46
-------------+----------------------------------   F(7, 38)        =     98.40
       Model |  340.195397         7  48.5993424   Prob > F        =    0.0000
    Residual |  18.7677972        38  .493889399   R-squared       =    0.9477
-------------+----------------------------------   Adj R-squared   =    0.9381
       Total |  358.963194        45  7.97695987   Root MSE        =    .70277

------------------------------------------------------------------------------
     crmurpc |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |   1.005674   .6305389     1.59   0.119    -.2707855    2.282133
      fedban |  -.6778448   .3865627    -1.75   0.088      -1.4604    .1047104
      pp1529 |   -.003023   .0970217    -0.03   0.975    -.1994331    .1933871
       crack |   .3856919   .3425114     1.13   0.267    -.3076861     1.07907
      rtpipc |  -.2482905   .1239648    -2.00   0.052    -.4992442    .0026632
      unrate |  -.1237299   .0670494    -1.85   0.073    -.2594643    .0120046
             |
     crmurpc |
         L1. |   .9153736   .0655541    13.96   0.000     .7826663    1.048081
             |
       _cons |   5.672326   4.142842     1.37   0.179     -2.71442    14.05907
------------------------------------------------------------------------------

. estat bgodfrey, lags(1) small

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                      df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        3.304               (  1,    37 )             0.0772
---------------------------------------------------------------------------
                        H0: no serial correlation

.
. regress gunhomrate lcmban fedban pp1529 crack rtpipc unrate L.gunhomrate

      Source |       SS           df       MS      Number of obs   =        44
-------------+----------------------------------   F(7, 36)        =     56.08
       Model |  130.524965         7  18.6464235   Prob > F        =    0.0000
    Residual |  11.9699041        36  .332497336   R-squared       =    0.9160
-------------+----------------------------------   Adj R-squared   =    0.8997
       Total |  142.494869        43  3.31383416   Root MSE        =    .57663

------------------------------------------------------------------------------
  gunhomrate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      lcmban |   1.219866   .5469665     2.23   0.032     .1105663    2.329165
```


Appendix 1

```
      fedban |  -.6035338    .319288    -1.89   0.067     -1.25108    .0440122
      pp1529 |  -.0490334   .0777201    -0.63   0.532     -.206657    .1085902
       crack |    .602306   .2905786     2.07   0.045     .0129852    1.191627
      rtpipc |   -.248543   .1099859    -2.26   0.030    -.4716047   -.0254813
      unrate |   -.102815    .055463    -1.85   0.072    -.2152991     .009669
             |
  gunhomrate |
         L1. |   .9880207   .0668339    14.78   0.000     .8524753    1.123566
             |
       _cons |   5.857603   3.459172     1.69   0.099    -1.157922    12.87313
------------------------------------------------------------------------------

. estat bgodfrey, lags(1) small

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                 df                  Prob > F
-------------+-------------------------------------------------------------
       1     |        4.477           (  1,    35 )             0.0415
---------------------------------------------------------------------------
                        H0: no serial correlation

.
. log close
      name:  <unnamed>
       log:  C:\Users\cemood\Box Sync\California\report.log
  log type:  text
 closed on:  18 Oct 2017, 09:34:02
-----------------------------------------------------------------------------------------------
-------------------------------------------------------------------------------------
```

APPENDIX 2

Complete output of the Stata program used to generate the results reported in Section VI.C.

```
-----------------------------------------------------------------------------------------------
--------------------------------------------

             name:  <unnamed>

              log:  C:\Users\cemood\Box Sync\California\Virginia\va.log

         log type:  text

        opened on:  26 Oct 2017, 08:52:43


. use va.dta, clear;


. tsset year;

        time variable:  year, 1990 to 2013

                delta:  1 unit


. rename lgunhomrate gun_hom_rate;


. rename lcrmurpc murder_rate;


. /* gun homicide */

> dfgls gun_hom_rate;


DF-GLS for gun_hom_rate                                  Number of obs =    14

Maxlag = 8 chosen by Schwert criterion


               DF-GLS tau      1% Critical       5% Critical      10% Critical
```

```
  [lags]     Test Statistic        Value              Value              Value
------------------------------------------------------------------------------
    8            -1.659           -3.770             -4.084             -3.139
    7            -1.735           -3.770             -3.465             -2.719
    6            -1.855           -3.770             -3.116             -2.510
    5            -1.993           -3.770             -2.981             -2.468
    4            -2.328           -3.770             -3.009             -2.548
    3            -2.103           -3.770             -3.143             -2.705
    2            -1.796           -3.770             -3.332             -2.896
    1            -1.405           -3.770             -3.521             -3.075

Opt Lag (Ng-Perron seq t) = 0 [use maxlag(0)]
Min SC   = -4.374397 at lag  1 with RMSE  .0929491
Min MAIC = -4.070523 at lag  1 with RMSE  .0929491

. regress gun_hom_rate pctlcm;

      Source |       SS           df       MS      Number of obs   =        20
-------------+----------------------------------   F(1, 18)        =      9.21
       Model |  .359084435         1  .359084435   Prob > F        =    0.0071
    Residual |  .701959689        18  .038997761   R-squared       =    0.3384
-------------+----------------------------------   Adj R-squared   =    0.3017
       Total |  1.06104412        19  .055844428   Root MSE        =    .19748

------------------------------------------------------------------------------
gun_hom_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
```

```
-------------+----------------------------------------------------------------
      pctlcm |  -.0282314   .0093037    -3.03   0.007    -.0477778   -.0086851
       _cons |   1.928703   .1727546    11.16   0.000     1.565759    2.291647
------------------------------------------------------------------------------

. regress gun_hom_rate pctlcm trend;

      Source |       SS           df       MS      Number of obs   =        20
-------------+----------------------------------   F(2, 17)        =     39.91
       Model |  .874730451         2  .437365225   Prob > F        =    0.0000
    Residual |  .186313673        17  .010959628   R-squared       =    0.8244
-------------+----------------------------------   Adj R-squared   =    0.8037
       Total |  1.06104412        19  .055844428   Root MSE        =    .10469

------------------------------------------------------------------------------
gun_hom_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      pctlcm |  -.0060742   .0058958    -1.03   0.317    -.0185132    .0063648
       trend |  -.0332869   .0048528    -6.86   0.000    -.0435255   -.0230483
       _cons |   1.947032   .0916205    21.25   0.000      1.75373    2.140335
------------------------------------------------------------------------------

. estat bgodfrey, lags(1) small;

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
```

```
    lags(p)  |          F                  df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        1.700           (  1,    16 )            0.2108
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of gun_hom_rate

         chi2(1)      =     0.49
         Prob > chi2  =   0.4822

. regress D.gun_hom_rate D.pctlcm;

      Source |       SS           df       MS      Number of obs   =        19
-------------+----------------------------------   F(1, 17)        =      0.45
       Model |  .006849736         1  .006849736   Prob > F        =    0.5130
    Residual |  .260889351        17  .015346432   R-squared       =    0.0256
-------------+----------------------------------   Adj R-squared   =   -0.0317
       Total |  .267739087        18  .014874394   Root MSE        =    .12388

------------------------------------------------------------------------------
D.           |
```

```
gun_hom_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      pctlcm |
         D1. |  -.0062635   .0093753    -0.67   0.513    -.0260436    .0135166
             |
       _cons |  -.0374536   .0297062    -1.26   0.224    -.1001283    .0252211
------------------------------------------------------------------------------


. predict e, resid;

(5 missing values generated)


. estat bgodfrey,lags(1) small;


Breusch-Godfrey LM test for autocorrelation

---------------------------------------------------------------------------
    lags(p)  |          F                 df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        6.520           (  1,    16 )            0.0213
---------------------------------------------------------------------------
                        H0: no serial correlation


. regress e L.e D.pctlcm;


      Source |       SS           df       MS      Number of obs   =        18
-------------+----------------------------------   F(2, 15)        =      4.05
       Model |  .089776188         2  .044888094   Prob > F        =    0.0392
```

```
    Residual |  .166197694        15  .011079846   R-squared       =    0.3507
-------------+----------------------------------   Adj R-squared   =    0.2642
       Total |  .255973881        17  .015057287   Root MSE        =    .10526

------------------------------------------------------------------------------
           e |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           e |
         L1. |  -.5928103    .208259    -2.85   0.012    -1.036704   -.1489167
             |
      pctlcm |
         D1. |  -.0014458   .0079844    -0.18   0.859    -.0184641    .0155725
             |
       _cons |  -.0045456   .0258962    -0.18   0.863    -.0597421    .0506509
------------------------------------------------------------------------------

. newey D.gun_hom_rate D.pctlcm, lag(1);

Regression with Newey-West standard errors      Number of obs     =         19
maximum lag: 1                                  F(  1,        17) =       0.55
                                                Prob > F          =     0.4683

------------------------------------------------------------------------------
D.           |             Newey-West
gun_hom_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
```

```
      pctlcm |
         D1. |  -.0062635   .0084435    -0.74   0.468    -.0240778    .0115508
             |
       _cons |  -.0374536   .0224824    -1.67   0.114    -.0848873    .0099801
------------------------------------------------------------------------------


. /* UCR murder rate */
> drop e;


. dfgls murder_rate;


DF-GLS for murder_rate                                   Number of obs =    15
Maxlag = 8 chosen by Schwert criterion


               DF-GLS tau      1% Critical       5% Critical      10% Critical
  [lags]     Test Statistic        Value             Value             Value
------------------------------------------------------------------------------
    8            -1.274           -3.770            -3.702            -2.892
    7            -1.468           -3.770            -3.257            -2.604
    6            -1.768           -3.770            -3.024            -2.482
    5            -2.542           -3.770            -2.960            -2.489
    4            -2.651           -3.770            -3.021            -2.590
    3            -2.528           -3.770            -3.163            -2.748
    2            -1.553           -3.770            -3.343            -2.927
    1            -1.483           -3.770            -3.517            -3.091
```

```
Opt Lag (Ng-Perron seq t) =  3 with RMSE  .0627365

Min SC   = -4.815476 at lag  3 with RMSE  .0627365

Min MAIC = -4.549201 at lag  1 with RMSE  .0764065


. regress murder_rate pctlcm;


      Source |       SS           df       MS      Number of obs   =        21

-------------+----------------------------------   F(1, 19)        =      8.48

       Model |  .354364145         1  .354364145   Prob > F        =    0.0089

    Residual |  .793680104        19  .041772637   R-squared       =    0.3087

-------------+----------------------------------   Adj R-squared   =    0.2723

       Total |  1.14804425        20  .057402212   Root MSE        =    .20438



------------------------------------------------------------------------------

 murder_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]

-------------+----------------------------------------------------------------

      pctlcm |  -.0269564   .0092551    -2.91   0.009    -.0463276   -.0075852

       _cons |   2.205412   .1746858    12.63   0.000     1.839791    2.571034

------------------------------------------------------------------------------


. regress murder_rate pctlcm trend;


      Source |       SS           df       MS      Number of obs   =        21

-------------+----------------------------------   F(2, 18)        =     60.74

       Model |  .999887087         2  .499943544   Prob > F        =    0.0000

    Residual |  .148157162        18  .008230953   R-squared       =    0.8709
```

```
-------------+----------------------------------   Adj R-squared    =    0.8566
       Total |  1.14804425        20  .057402212   Root MSE         =    .09072

------------------------------------------------------------------------------
 murder_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      pctlcm |  -.0002804   .0050943    -0.06   0.957    -.0109831    .0104223
       trend |  -.0359031   .0040542    -8.86   0.000    -.0444205   -.0273856
       _cons |   2.185345   .0775751    28.17   0.000     2.022365    2.348324
------------------------------------------------------------------------------

. estat bgodfrey, lags(1) small;

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                  df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        4.657            (  1,    17 )             0.0455
---------------------------------------------------------------------------
                        H0: no serial correlation

. estat hettest;

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of murder_rate
```

```
         chi2(1)      =     0.11

         Prob > chi2  =   0.7351


. regress D.murder_rate D.pctlcm;


      Source |       SS           df       MS      Number of obs   =        20

-------------+----------------------------------   F(1, 18)        =      0.01

       Model |  .000081479         1  .000081479   Prob > F        =    0.9241

    Residual |  .157061195        18  .008725622   R-squared       =    0.0005

-------------+----------------------------------   Adj R-squared   =   -0.0550

       Total |  .157142674        19  .008270667   Root MSE        =    .09341


------------------------------------------------------------------------------

D.           |

 murder_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]

-------------+----------------------------------------------------------------

      pctlcm |

         D1. |   .0005721   .0059201     0.10   0.924    -.0118656    .0130098

             |

       _cons |  -.0388827   .0210796    -1.84   0.082    -.0831694    .0054039

------------------------------------------------------------------------------


. predict e, resid;

(4 missing values generated)
```

```
. estat bgodfrey,lags(1) small;

Breusch-Godfrey LM test for autocorrelation
---------------------------------------------------------------------------
    lags(p)  |          F                   df                 Prob > F
-------------+-------------------------------------------------------------
       1     |        3.877            (  1,    17 )             0.0655
---------------------------------------------------------------------------
                        H0: no serial correlation

. regress e L.e D.pctlcm;

      Source |       SS           df       MS      Number of obs   =        19
-------------+----------------------------------   F(2, 16)        =      2.07
       Model |  .030759281         2  .01537964   Prob > F        =    0.1589
    Residual |  .118985178        16  .007436574   R-squared       =    0.2054
-------------+----------------------------------   Adj R-squared   =    0.1061
       Total |  .149744459        18  .008319137   Root MSE        =    .08624

------------------------------------------------------------------------------
           e |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
           e |
         L1. |  -.4590299   .2257132    -2.03   0.059    -.9375206    .0194608
             |
      pctlcm |
```

```
         D1. |  -.0029138   .0056386    -0.52   0.612    -.0148671    .0090396
             |
       _cons |  -.0040169   .0199469    -0.20   0.843    -.0463025    .0382688
------------------------------------------------------------------------------

. newey D.murder_rate D.pctlcm, lag(1);

Regression with Newey-West standard errors      Number of obs     =         20
maximum lag: 1                                  F(  1,        18) =       0.02
                                                Prob > F          =     0.9027

------------------------------------------------------------------------------
D.           |             Newey-West
 murder_rate |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      pctlcm |
         D1. |   .0005721   .0046124     0.12   0.903    -.0091182    .0102623
             |
       _cons |  -.0388827   .0167536    -2.32   0.032    -.0740808   -.0036846
------------------------------------------------------------------------------

. nbreg crmur pctlcm;

Fitting Poisson model:

Iteration 0:   log likelihood = -176.04004
```

```
Iteration 1:   log likelihood = -176.04004

Fitting constant-only model:

Iteration 0:   log likelihood =   -147.583
Iteration 1:   log likelihood = -118.99564
Iteration 2:   log likelihood = -118.69212
Iteration 3:   log likelihood = -118.68877
Iteration 4:   log likelihood = -118.68877

Fitting full model:

Iteration 0:   log likelihood = -115.89173
Iteration 1:   log likelihood = -115.44161
Iteration 2:   log likelihood = -115.43209
Iteration 3:   log likelihood = -115.43209

Negative binomial regression                    Number of obs     =         21
                                                LR chi2(1)        =       6.51
Dispersion     = mean                           Prob > chi2       =     0.0107
Log likelihood = -115.43209                     Pseudo R2         =     0.0274

------------------------------------------------------------------------------
       crmur |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      pctlcm |   -.018751   .0067401    -2.78   0.005    -.0319614   -.0055406
```

```
       _cons |   6.364963   .1266425    50.26   0.000     6.116748    6.613178
-------------+----------------------------------------------------------------
    /lnalpha |  -3.995576   .3466636                     -4.675024   -3.316128
-------------+----------------------------------------------------------------
       alpha |   .0183968   .0063775                      .0093253    .0362931
------------------------------------------------------------------------------
LR test of alpha=0: chibar2(01) = 121.22               Prob >= chibar2 = 0.000


. nbreg crmur pctlcm trend;


Fitting Poisson model:


Iteration 0:   log likelihood = -113.64944
Iteration 1:   log likelihood = -113.64944


Fitting constant-only model:


Iteration 0:   log likelihood =   -147.583
Iteration 1:   log likelihood = -118.99564
Iteration 2:   log likelihood = -118.69212
Iteration 3:   log likelihood = -118.68877
Iteration 4:   log likelihood = -118.68877


Fitting full model:


Iteration 0:   log likelihood = -110.86745
```

```
Iteration 1:   log likelihood = -107.26037

Iteration 2:   log likelihood = -106.58883

Iteration 3:   log likelihood = -104.99581

Iteration 4:   log likelihood =  -104.2693

Iteration 5:   log likelihood = -104.26131

Iteration 6:   log likelihood =  -104.2613


Negative binomial regression                    Number of obs     =         21

                                                LR chi2(2)        =      28.85

Dispersion     = mean                           Prob > chi2       =     0.0000

Log likelihood =  -104.2613                     Pseudo R2         =     0.1216


------------------------------------------------------------------------------

       crmur |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]

-------------+----------------------------------------------------------------

      pctlcm |   -.000778   .0048192    -0.16   0.872    -.0102235    .0086674

       trend |  -.0236072   .0037308    -6.33   0.000    -.0309194   -.0162949

       _cons |   6.337044   .0737494    85.93   0.000     6.192498     6.48159

-------------+----------------------------------------------------------------

    /lnalpha |  -5.347352   .4648032                      -6.25835   -4.436355

-------------+----------------------------------------------------------------

       alpha |   .0047607   .0022128                      .0019144     .011839

------------------------------------------------------------------------------

LR test of alpha=0: chibar2(01) = 18.78                Prob >= chibar2 = 0.000


. nbreg gunhomicides pctlcm;
```

```
Fitting Poisson model:

Iteration 0:   log likelihood = -139.64638
Iteration 1:   log likelihood = -139.64638

Fitting constant-only model:

Iteration 0:   log likelihood =  -134.6247
Iteration 1:   log likelihood = -107.73181
Iteration 2:   log likelihood = -107.37966
Iteration 3:   log likelihood = -107.37576
Iteration 4:   log likelihood = -107.37576

Fitting full model:

Iteration 0:   log likelihood = -104.25441
Iteration 1:   log likelihood = -103.65453
Iteration 2:   log likelihood = -103.64182
Iteration 3:   log likelihood = -103.64181

Negative binomial regression                    Number of obs     =         20
                                                LR chi2(1)        =       7.47
Dispersion     = mean                           Prob > chi2       =     0.0063
Log likelihood = -103.64181                     Pseudo R2         =     0.0348
```

```
------------------------------------------------------------------------------
gunhomicides |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      pctlcm |  -.0208157   .0068776    -3.03   0.002    -.0342956   -.0073358
       _cons |   6.098731   .1269795    48.03   0.000     5.849856    6.347606
-------------+----------------------------------------------------------------
    /lnalpha |  -4.079971   .3734793                     -4.811977   -3.347965
-------------+----------------------------------------------------------------
       alpha |    .016908   .0063148                      .0081318    .0351558
------------------------------------------------------------------------------
LR test of alpha=0: chibar2(01) = 72.01                Prob >= chibar2 = 0.000

. nbreg gunhomicides pctlcm trend;

Fitting Poisson model:

Iteration 0:   log likelihood = -105.02403
Iteration 1:   log likelihood = -105.02402

Fitting constant-only model:

Iteration 0:   log likelihood =  -134.6247
Iteration 1:   log likelihood = -107.73181
Iteration 2:   log likelihood = -107.37966
Iteration 3:   log likelihood = -107.37576
Iteration 4:   log likelihood = -107.37576
```

```
Fitting full model:

Iteration 0:   log likelihood =  -100.6319
Iteration 1:   log likelihood = -96.977163
Iteration 2:   log likelihood = -96.162899
Iteration 3:   log likelihood = -96.134374
Iteration 4:   log likelihood = -96.134321
Iteration 5:   log likelihood = -96.134321

Negative binomial regression                    Number of obs     =         20
                                                LR chi2(2)        =      22.48
Dispersion     = mean                           Prob > chi2       =     0.0000
Log likelihood = -96.134321                     Pseudo R2         =     0.1047

------------------------------------------------------------------------------
gunhomicides |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
      pctlcm |  -.0066636   .0055574    -1.20   0.231     -.017556    .0042288
       trend |  -.0210376   .0044435    -4.73   0.000    -.0297468   -.0123285
       _cons |    6.10229    .086847    70.26   0.000     5.932073    6.272507
-------------+----------------------------------------------------------------
    /lnalpha |  -5.069808   .4764139                     -6.003562   -4.136053
-------------+----------------------------------------------------------------
       alpha |   .0062836   .0029936                      .0024699    .0159858
------------------------------------------------------------------------------
```

```
LR test of alpha=0: chibar2(01) = 17.78                Prob >= chibar2 = 0.000


. log close;

      name:  <unnamed>

       log:  C:\Users\cemood\Box Sync\California\Virginia\va.log

  log type:  text

 closed on:  26 Oct 2017, 08:52:44

-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------
```

EXHIBIT 9

Carlisle E. Moody

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Education

B.A., Colby College, Waterville, Maine, 1965 (Economics)
M.A., University of Connecticut, Storrs, Connecticut, 1966 (Economics)
Ph.D., University of Connecticut, Storrs, Connecticut, 1970 (Economics)

Experience

Professor of Economics, College of William and Mary, 1989-
Chair of the Department of Economics, College of William and Mary 1997- 2003
Associate Professor of Economics, College of William and Mary, 1975-1989.
Assistant Professor of Economics, College of William and Mary, 1970-1975.
Lecturer in Econometrics, University of Leeds, Leeds, England, 1968-1970.

Consultant

Stanford Research Institute
Virginia Marine Resources Commission
U.S. General Accounting Office
U.S. Department of Transportation
U.S. Department of Energy
National Center for State Courts
Oak Ridge National Laboratory
Justec Research.
The Orkand Corporation
Washington Consulting Group
Decision Analysis Corporation of Virginia
SAIC Corporation
West Publishing Group
Independent Institute

Research and Teaching Fields

Law and Economics
Econometrics
Time Series Analysis

Honors

National Defense Education Act Fellow, University of Connecticut, 1965-1968.

Bredin Fellow, College of William and Mary, 1982.

Member, Methodology Review Panel, Prison Population Forecast, Virginia Department of Planning and Budget, 1987-1993.

Notable Individuals, Micro Computer Industry, 1983.

Speaker, Institute of Medicine and National Research Council Committe of Priorities for a Public Health Research Agenda to Reduce the Threat of Firearm-related Violence, National Academies of Science, Washington, DC, April 23, 2013.

Member, Methodology Review Panel, Prison Population Forecast, Virginia Department of Corrections, 2012-.

Principal Investigator, Rand Corporation Grant No. 790751, Estimating the Impact of Three Categories of Gun-Related Laws, 2019-2020, $57,042.

Refereed Publications

"Do White Police Officers Unfairly Target Black Suspects?" (with J.R. Lott) ***Economics, Law and Policy***, forthcoming.

"Clustering and Standard Error Bias in Fixed Effects Panel Data Regressions," (with T.B. Marvell) ***Journal of Quantitative Criminology***, 36, 347-369. 2020. https://link.springer.com/article/10.1007/s10940-018-9383-z

"Brought into the Open: How the U.S. Compares with Other Countries in the Rate of Public Mass Shooters," (with John Lott), ***Econ Journal Watch*** 71(1), 2020.

"Econometric Modeling and Model Falsification," (with George M. Lady), ***Advances in Pure Mathematics*** 9(9), 2019.
http://www.scirp.org/journal/paperinformation.aspx?paperid=95039

"Do Right to Carry Laws Increase Violent Crime? A Comment on Donohue, Aneja, and Weber," (with T.B. Marvell) ***Econ Journal Watch***, 16(1), 2019.

"Is the United States an Outlier in Mass Public Shootings? A Comment on Adam Lankford." (with John Lott) ***Econ Journal Watch***, 16(1), 2019.

"The Impact of Right-to-Carry Laws: Critique of the 2014 version of Aneja, Donohue, and Zhang," (with T.B. Marvell) ***Econ Journal Watch***, February 2018.

"Firearms and the Decline in Violence in Europe 1201-2010," ***Review of European Studies***, 9(2) 2017

"The Impact of Right-to-Carry Laws on Crime: An Exercise in Replication," (with T.B. Marvell, P.R. Zimmerman and Fisal Alemante) ***Review of Economics and Finance***, 4(1) 2014, 33-43.

"Did John Lott Provide Bad Data to the NRC? A Note on Aneja, Donohue, and Zhang," (with J.R. Lott and T.B. Marvell) ***Econ Journal Watch,*** January 2013.

"On the Choice of Control Variables in the Crime Equation," (with T.B. Marvell) ***Oxford Bulletin of Economics and Statistics***, 72(5) 2010, 696-715.

"The Debate on Shall-Issue Laws, Continued," (with T.B. Marvell) ***Econ Journal Watch***, 6(2) March 2009, 203-217.

"The Debate on Shall-Issue Laws," (with T.B. Marvell) ***Econ Journal Watch***, 5(3) September 2008, 269-293.

"Can and Should Criminology Research Influence Policy? Suggestions for Time-Series Cross-Section Studies" (with T.B. Marvell) ***Criminology and Public Policy*** 7(1) August, 2008, 359-364.

"Guns and Crime," (with T.B. Marvell), ***Southern Economic Journal,*** 71(4), April, 2005, 720-736.

"When Prisoners Get Out," (with Kovandzic, Marvell and Vieraitis), ***Criminal Justice Policy Review,*** 15, 2004, 212-228.

"The Impact of Right-to-Carry Concealed Firearms Laws on Mass Public Shootings," (with Tomislav Kovandzic and Grant Duwe), ***Homicide Studies***, 6, 2002, 271-296.

"Testing for the Effects of Concealed Weapons Laws: Specification Errors and Robustness," ***Journal of Law and Economics,*** 44 (PT.2), 2001, 799-813.

"The Lethal Effects of Three-Strikes Laws," (with T.B. Marvell), ***Journal of Legal Studies***, 30, 2001, 89-106.

"Female and Male Homicide Victimization Rates: Comparing Trends and Regressors," (with T. B. Marvell), ***Criminology***, 37, 1999, 879-902.

"The Impact of Out-of-State Prison Population on State Homicide Rates: Displacement and Free-Rider Effects," (with T.B. Marvell), ***Criminology***, 30, 1998, 513-535.

"The Impact of Prison Growth on Homicide," (with T.B. Marvell) ***Homicide Studies***, 1, 1997, 215-233.

"Age Structure, Trends, and Prison Populations," (with T.B. Marvell) ***Journal of Criminal Justice***, 25, 1997, 114-124.

"Police Levels, Crime Rates, and Specification Problems," (with T.B. Marvell) ***Criminology,*** 24, 1996, 606-646.

"A Regional Linear Logit Fuel Demand Model for Electric Utilities," ***Energy Economics,*** 18, 1996, 295-314.

"The Uncertain Timing of Innovations in Time Series: Minnesota Sentencing Guidelines and Jail Sentences," (with T.B. Marvell) ***Criminology***, 34, May, 1996.

"Determinant Sentencing and Abolishing Parole: the Long Term Impacts on Prisons and Crime," (with T.B. Marvell), ***Criminology,*** 34, 1996.

"The Impact of Enhanced Prison Terms for Felonies Committed with Guns" (with T.B. Marvell) ***Criminology***, Vol. 33, 1995.

"Prison Population Growth and Crime Reduction." (with T.B. Marvell) ***Journal of Quantitative Criminology***, 10, 1994, 109-140.

"Alternative Bidding Systems for Leasing Offshore Oil: Experimental Evidence." ***Economica***, 61, 1994, 345-353.

"Forecasting the Marginal Costs of a Multiple Output Production Technology." (with G. Lady), ***Journal of Forecasting***, 12, 1993, 421-436.

"Volunteer Attorneys as Appellate Judges." (with T.B. Marvell) ***The Justice System Journal***, 16, 1992, 49-64.

"Age Structure and Crime Rates: Conflicting Evidence." (with T.B. Marvell) ***Journal of Quantitative Criminology,*** 7, 1991, 237-273.

"OCS Leasing Policy and Lease Prices." (with W.J. Kruvant) ***Land Economics***, 66, February 1990, 30-39.

"The Effectiveness of Measures to Increase Appellate Court Efficiency and Decision Output." (with T.B. Marvell) ***Michigan Journal of Law Reform***, 21, 1988, 415- 442.

"Joint Bidding, Entry, and OCS Lease Prices" (with W.J. Kruvant) ***Rand Journal of Economics***, 19, Summer 1988, 276-284.

"Appellate and Trial Caseload Growth: A Pooled Time Series Cross Section Approach" (with T.B. Marvell) ***Journal of Quantitative Criminology,*** 3, 1987.

"The Impact of Economic and Judgeship Changes on Federal District Court Filings" (with T.B. Marvell) ***Judicature***, Vol. 69, No. 3, Oct./Nov. 1985, 156.

"The GAO Natural Gas Supply Model" (with P.A. Valentine and W.J. Kruvant) ***Energy Economics***, January 1985, 49-57.

"Strategy, Structure and Performance of Major Energy Producers: Evidence from Line of Business Data" (with A.T. Andersen and J.A. Rasmussen) ***Review of Industrial Organization***, Winter, 1984: 290-307.

"Quality, Price, Advertising and Published Quality Ratings" (with R.A. Archibald and C.A. Haulman) ***Journal of Consumer Research***, Vol. 4, No. 4, March 1983, 347-56.

"Sources of Productivity Decline in U.S. Coal Mining" (with W. Kruvant and P. Valentine) ***The Energy Journal***, Vol. 3, No. 3, 1982, 53-70.

"Seasonal Variation in Residential Electricity Demand: Evidence from Survey Data," (with R.A. Archibald and D.H. Finifter), ***Applied Economics***, Vol. 14, No. 2, April 1982, 167-181.

"The Subsidy Effects of the Crude Oil Entitlements Program," ***Atlantic Economic Journal***, Vol. 8, No. 2, July, 1980, 103.

"Industrial Generation of Electricity in 1985: A Regional Forecast," ***Review of Regional Studies***, Vol. 8, No. 2, 1980, 33-43.

"The Measurement of Capital Services by Electrical Energy," ***Oxford Bulletin of Economics and Statistics***, February 1974.

"Air Quality, Environment and Metropolitan Community Structure" (With Craig Humphrey), ***Review of Regional Studies,*** Winter 1973.

"Productivity Change in Zambian Mining" (With Norman Kessel), ***South African Journal of Economics***, March 1972.

Other Publications

Heller, McDonald and Murder: Testing the More Guns=More Murder Thesis," (with Don Kates), ***Fordham Urban Law Review***, Vol. 39, No. 5, 2012.

"Brief for the International Law Enforcement Educators and Trainers Association (ILEETA), International Association of Law Enforcement Firearms Instructors (IALEFI), Southern States Police Benevolent Association, Texas Police Chiefs Association, Law Enforcement Alliance of America, Congress of Racial Equality, the Claremont Institute, Professors Carlisle E. Moody, Roy T. Wortman, Raymond Kessler, Gary Mauser, Dr. Sterling Burnett, and the Independent Institute in Support of Petitioners," Supreme Court of the United States, No. 08-1521, Otis D. McDonald, et. al. vs City of Chicago, et.al., December 2009.

"Firearms and Homicide" in B. Benson and P. Zimmerman (eds.), ***Handbook on the Economics of Crime***, Edward Elgar, Northampton, MA 2010, 432-451.

"Is there a Relationship between Guns and Freedom? Comparative Results from 59 Nations." (with David B. Kopel and Howard Nemerov), ***Texas Review of Law and Politics*** 13(1), 1-42, Fall 2008.

"Brief of Academics as Amici Curiae in Support of Respondent." Supreme Court of the United States, No. 07-290, District of Columbia vs. Dick Anthony Heller, February 2008. Cited by Breyer, J. Dissenting, pp. 21-22.

"Econometric Research on Crime Rates: Prisons, Crime, and Simultaneous Equations" in Mark Cohen and Jacek Czabanske, ***Ekonomiczne, Podejscie Do Przestepczosci***, Ius et Lux, Warsaw, 2007, 235-258 (in Polish).

"Simulation Modeling and Policy Analysis," ***Criminology & Public Policy,*** 1, 2002, 393-398.

"Unintended Consequences: Three Strikes Laws and the Murders of Police Officers," (with T. Marvell and R. Kaminski), ***National Institute of Justice*** (NCJ Number 203649), 2002.

"Game Theory and Football" (with David Ribar), ***Access: The Journal of Microcomputer Applications***, Vol. 4, No. 3, Nov./Dec. 1985, 5-15.

"Reasons for State Appellate Caseload Growth" (with T. Marvell) Bureau of Justice Statistics, Department of Justice, 1985.

"State Appellate Caseload Growth: Documentary Appendix." (with Marvell, et. al.) National Center for State Courts, Williamsburg, VA, 1985.

"Model Documentation for the Mini-Macroeconomic Model: MINMAC" Washington, D.C., Energy Information Administration, 1984.

"Neighborhood Segregation." (with E.S. Dethlefsen.) ***Byte, The Small Systems Journal,*** Vol. 7, No. 7, July 1982, 178-206.

"Technological Progress and Energy Use," Proceedings of the Third Annual University of Missouri, Missouri Energy Council Conference on Energy, October, 1976.

"Technological Change in the Soviet Chemical Industry," Technical Note SSC-TN-2625-8 Stanford Research Institute, 1975 (With F.W. Rushing).

"Feasibility Study of Inter-City Transit Via Southern Railway R/W, Norfolk and Virginia Beach Corridor" (With R.H. Bigelow, S.H. Baker and M.A. Garrett), U.S. Department of Transportation, 1974.

"Productivity Growth in U.S. Manufacturing," in 1973 Proceedings of the Business and Economic Statistics Section, American Statistical Association.

CERTIFICATE OF SERVICE
UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF CALIFORNIA

Case Name: *Duncan, et al. v. Becerra*
Case No.: 17-cv-1017-BEN-JLB

IT IS HEREBY CERTIFIED THAT:

I, the undersigned, declare under penalty of perjury that I am a citizen of the United States over 18 years of age. My business address is 180 East Ocean Boulevard, Suite 200 Long Beach, CA 90802. I am not a party to the above-entitled action.

I have caused service of the following documents, described as:

DECLARATION OF DR. CARLISLE E. MOODY IN SUPPORT OF PLAINTIFFS' SUPPLEMENTAL BRIEF; EXHIBITS 8-9

on the following parties by electronically filing the foregoing on December 1, 2022, with the Clerk of the District Court using its ECF System, which electronically notifies them.

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I declare under penalty of perjury that the foregoing is true and correct. Executed on December 1, 2022, at Long Beach, CA.

Laura Palmerin