17-56081

IN THE UNITED STATES COURT OF APPEALS

FOR THE NINTH CIRCUIT

VIRGINIA DUNCAN, et al,

Plaintiff and Appellees,

v.

XAVIER BECERRA, in his Official Capacity as Attorney General of the State of California,

Defendant and Appellant.

On Appeal from the United States District Court
for the Southern District of California

No. 17-cv-1017-BEN-JLB
The Honorable Roger T. Benitez, Judge

APPELLANT'S EXCERPTS OF RECORD, VOLUME II, ER 0176-0459

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UNITED STATES DISTRICT COURT

SOUTHERN DISTRICT OF CALIFORNIA

VIRGINIA DUNCAN, RICHARD LEWIS, PATRICK LOVETTE, DAVID MARGUGLIO, CHRISTOPHER WADDELL, and CALIFORNIA RIFLE & PISTOL ASSOCIATION, INCORPORATED, a California corporation,

Plaintiffs,

vs.

XAVIER BECERRA, in his official capacity as Attorney General of the State of California; and DOES 1-10,

Defendants.

Case No.: 17-cv-1017-BEN-JLB

DECLARATION OF LUCY P. ALLEN IN SUPPORT OF DEFENDANTS' OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

Date: June 13, 2017
Time: 10:00 a.m.
Dept.: 5A
Judge: Hon. Roger T. Benitez

I, Lucy P. Allen, declare as follows:

1. I am a Managing Director of NERA Economic Consulting ("NERA"), a member of NERA's Securities and Finance Practice and Chair of NERA's Product Liability and Mass Torts Practice. NERA provides practical economic advice related to highly complex business and legal issues arising from competition, regulation, public policy, strategy, finance, and litigation. NERA was

established in 1961 and now employs approximately 500 people in more than 20 offices worldwide.

2. In my over 20 years at NERA, I have been engaged as an economic consultant or expert witness in numerous projects involving economic and statistical analysis. I have been qualified as an expert and testified in court on various economic and statistical issues relating to the flow of guns into the criminal market. I have testified at trials in Federal District Court, before the New York City Council Public Safety Committee, the American Arbitration Association and the Judicial Arbitration Mediation Service, as well as in depositions.

3. I have an A.B. from Stanford University, an M.B.A. from Yale University, and M.A. and M. Phil. degrees in Economics, also from Yale University. Prior to joining NERA, I was an Economist for both President George H. W. Bush's and President Bill Clinton's Council of Economic Advisers.

4. This declaration addresses the results of analyses that I and others under my direction at NERA conducted with respect to the following issues: (a) the number of rounds of ammunition fired by individuals using a gun in self-defense; and (b) the use of large-capacity magazines in mass shootings.

A. *Number of rounds fired by individuals in self-defense*

5. Plaintiffs claim the banned "large-capacity magazines" (which are magazines capable of holding more than ten rounds) are commonly used in the home for self-defense. In particular, the Complaint[1] claims, "There is little dispute that magazines having a capacity over 10 rounds are popular for self-defense purposes. […] Each available round is an additional opportunity to end a threat.

[1] Complaint for Declaratory and Injunctive Relief, dated May 17, 2017 ("Complaint").

That is precisely why millions of Americans choose magazines over ten rounds for self-defense, including in the home."[2]

6. Data from the NRA Institute for Legislative Action ("NRA-ILA") indicates that it is rare for a person, when using a firearm in self-defense, to fire more than ten rounds. The NRA-ILA maintains a database of "armed citizen" stories describing private citizens who have successfully defended themselves, or others, using a firearm. Although it is not compiled scientifically, this is the largest collection of accounts of citizen self-defense of which I am aware. Moreover, in light of the positions taken by the entity compiling the data, I would expect that any selection bias would be in favor of stories that put use of guns in self-defense in the best possible light.

7. A study of all incidents in this database over a 5-year period from 1997 through 2001 found that it is rare for individuals to defend themselves using more than ten rounds. Specifically, this study found that, on average, 2.2 shots were fired by defenders and that in 28% of incidents of armed citizens defending themselves the individuals fired no shots at all.[3]

8. We performed a similar analysis of NRA-ILA stories published between January 2011 and May 2017. For each incident, the number of offenders, defenders, and shots fired were tabulated, along with the location, nature and outcome of the crime. The information was gathered for each incident from both the NRA-ILA synopsis and, where available, one additional news story.[4]

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[2] Complaint, ¶47.

[3] Claude Werner, "The Armed Citizen – A Five Year Analysis."

[4] The following incidents were excluded from the analysis: (1) repeat stories, (2) wild animal attacks, and (3) one incident where the supposed victim later pleaded guilty to covering up a murder. When the exact number of shots fired was not specified, we used the average for the most relevant incidents with known number of shots. For example, if the stories indicated that "shots were fired" this would indicate that at least two shots were fired and thus we used the average

9. According to this analysis, defenders fired 2.2 shots on average. Out of 736 incidents, there were two incidents (0.3% of all incidents), in which the defender was reported to have fired more than 10 bullets. In 18.2% of incidents, the defender did not fire any shots, and simply threatened the offender with a gun. For incidents occurring in the home (56% of total), defenders fired an average of 2.1 shots, and fired no shots in 16.1% of incidents. The table below summarizes some of these findings.

Number of Shots Fired in Self-Defense
Based on NRA-ILA Armed Citizen Incidents in the United States
January 2011 - May 2017

	Shots Fired by Individual in Self-Defense	
	Overall	**Incidents in Home**
Average Shots Fired	2.2	2.1
Number of Incidents with No Shots Fired	134	66
Percent of Incidents with No Shots Fired	18.2%	16.1%
Number of Incidents with >10 Shots Fired	2	2
Percent of Incidents with >10 Shots Fired	0.3%	0.5%

Notes and Sources:
Events from NRA-ILA Armed Citizen database covering 736 incidents from January 2011 through May 2017. Excludes repeat stories, wild animal attacks and one incident where the supposed victim later pleaded guilty to covering up a murder.

10. We also performed this analysis for incidents that occurred in California. According to this analysis, defenders fired 2.0 shots on average. Out of 47 incidents, there were no incidents in which the defender was reported to have

number of shots fired in all incidents in which two or more shots were fired and the number of shots was specified.

fired more than 10 bullets. In 27.7% of incidents, the defender did not fire any shots, and simply threatened the offender with a gun. For incidents occurring in the home (60% of total), defenders fired an average of 1.9 shots, and fired no shots in 32.1% of incidents. The table below summarizes some of these findings for California.

Number of Shots Fired in Self-Defense
Based on NRA-ILA Armed Citizen Incidents in California
January 2011 - May 2017

	Shots Fired by Individual in Self-Defense	
	Overall	**Incidents in Home**
Average Shots Fired	2.0	1.9
Number of Incidents with No Shots Fired	13	9
Percent of Incidents with No Shots Fired	27.7%	32.1%
Number of Incidents with >10 Shots Fired	0	0
Percent of Incidents with >10 Shots Fired	0.0%	0.0%

Notes and Sources:
Events from NRA-ILA Armed Citizen database covering 47 incidents from January 2011 through May 2017. Excludes repeat stories, wild animal attacks and one incident where the supposed victim later pleaded guilty to covering up a murder.

B. *Mass shootings*

1. Use of large-capacity magazines in mass shootings

11. We found two comprehensive sources detailing historical mass shootings: 1) "US Mass Shootings, 1982-2017: Data From Mother Jones' Investigation," published by Mother Jones and 2) "Mass Shooting Incidents in

America (1984-2012)," published by the Citizens Crime Commission of New York City. See attached Table 1 for a summary of the combined data.

12. The definition of mass shooting and the period covered differed somewhat for each of the sources. Mother Jones covers 86 mass shootings from 1982 to 2017.[5] Mother Jones includes mass shootings in which a shooter killed four or more people in one incident in a public place and excludes crimes involving armed robbery or gang violence.[6] Starting in January 2013, Mother Jones changed its definition of a mass shooting to include instances when a shooter killed three or more people, consistent with a change in the federal definition of a mass shooting.[7] Citizens Crime Commission covers 33 mass shootings from 1984 to 2012. Citizens Crime Commission includes mass shootings in which a shooter killed four or more people and the gun used by the shooter had a magazine with capacity greater than ten.[8] We updated the data on shots fired for mass shootings where available.

13. Based on the combined data we found that large-capacity magazines (those with a capacity to hold more than 10 rounds of ammunition) are often used

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[5] "US Mass Shootings, 1982-2017: Data From Mother Jones' Investigation," *Mother Jones*, updated January 8, 2017. http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data, accessed June 1, 2017.

[6] "A Guide to Mass Shootings in America," *Mother Jones*, updated April 19, 2017. http://www.motherjones.com/politics/2012/07/mass-shootings-map. See, also, "What Exactly is a Mass Shooting," *Mother Jones*, August 14, 2012. http://www.motherjones.com/mojo/2012/08/what-is-a-mass-shooting

[7] "A Guide to Mass Shootings in America," *Mother Jones*, updated April 19, 2017. http://www.motherjones.com/politics/2012/07/mass-shootings-map. The Mother Jones data includes three incidents involving two shooters (Columbine High School, San Bernardino and Westside Middle School).

[8] "Mass Shooting Incidents in America (1984-2012)," *Citizens Crime Commission of New York City*. http://www.nycrimecommission.org/mass-shooting-incidents-america.php, accessed June 1, 2017.

in mass shootings. Such large-capacity magazines were used in the majority of the mass shootings with known magazine capacity since 1982 (44 out of 50 mass shootings).[9] In the past two years, guns with large-capacity magazines were used in eight of the nine mass shootings with known magazine capacity.[10]

14. The data indicates that it is common for offenders to fire more than ten rounds when using a gun with a large-capacity magazine in mass shootings. In particular, in mass shootings that involved use of large-capacity magazine guns, the average number of shots fired was 75.[11]

2. Casualties in mass shootings with large-capacity magazine guns compared with other mass shootings

15. Based on our analysis of the combined mass shootings data in the past 35 years, casualties were higher in the mass shootings that involved large-capacity magazine guns than in other mass shootings. In particular, we found an average number of fatalities or injuries of 22 per mass shooting with a large-capacity magazine versus 9 for those without.[12]

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[9] For many of the mass shootings, the data does not indicate whether a large-capacity magazine is used. Based only on Mother Jones data, large capacity magazines were used in 42 out of 48 mass shootings with known magazine capacity.

[10] During the past two years, there were six additional mass shootings in which the magazine capacity was unknown.

[11] There were 31 mass shootings in which the magazine capacity and the number of shots fired were known.

[12] A 2013 study by Mayors Against Illegal Guns similarly found that when mass shootings involved assault weapons or high capacity magazine, the number of deaths was higher. The study was based on data from the FBI and media reports covering the period January 2009 through January 2013. The study found that mass shootings where assault weapons or high-capacity magazines were used resulted in an average of 14.4 people shot and 7.8 deaths versus other mass shootings that resulted in 5.7 people shot and 4.8 deaths. See, "Analysis of

3. Mass shootings with only one gun and large capacity magazines

16. Based on our analysis of the combined mass shootings data in the past 35 years, there have been 44 incidents (88% of the 50 mass shootings with known magazine capacity) in which the shooter used a large capacity magazine. There have been 36 incidents (41% of the 88 mass shootings) in which the shooter had only one gun. There were 16 incidents (32% of the 50 mass shootings with known magazine capacity) where the shooter had only one gun and used a large capacity magazine. An average of 14 people were killed or injured in each of these 16 mass shootings.[13]

4. Percent of mass shooters' guns legally obtained

17. The combined data on mass shootings indicates that the majority of guns used in mass shootings were obtained legally. Shooters in 76% of mass shootings in the past 35 years obtained their guns legally (at least 67 of the 88 mass shootings) and almost 76% of the guns used in these 88 mass shootings were obtained legally (at least 147 of the 194 guns).

Recent Mass Shootings," *Mayors Against Illegal Guns*, September, 2013.

[13] An analysis of only the mass shootings identified by Mother Jones yielded similar results: 1) Large capacity magazines were used in 42 out of the 48 mass shootings with known magazine capacity; 2) The shooter had only one gun in 34 out of the 86 mass shootings; 3) The shooter had only one gun and used a large capacity magazine in 14 of the 48 shootings with known magazine capacity. An average of 14 people were killed or injured during these 14 mass shootings.

I declare under penalty of perjury that the forgoing is true and correct. Executed within the United States on June 5, 2017.

Lucy P. Allen

Table 1
Combined Mass Shootings Data
1982 – 2017

Location	Date	Source	Large Cap. Mag.?[1]	Fatalities[2]	Injuries[2]	Total Fatalities & Injuries[2]	Shots Fired	Gun(s) Obtained Legally?	Offenders' Number of Guns
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
), CA	4/18/2017	MJ	No	3	0	3	16 [a]	-	1
auderdale, FL	1/6/2017	MJ	-	5	6	11	-	Yes	1
gton, WA	9/23/2016	MJ	-	5	0	5	-	-	1
Rouge, LA	7/17/2016	MJ	Yes	3	3	6	-	-	3
, TX	7/7/2016	MJ	Yes	5	11	16	-	Yes	3
lo, FL	6/12/2016	MJ	Yes	49	53	102	-	Yes	2
n, KS	2/25/2016	MJ	Yes	3	14	17	-	Yes	2
azoo County, MI	2/20/2016	MJ	-	6	2	8	-	Yes	1
rnardino, CA	12/2/2015	MJ	Yes	14	21	35	150 [b]	Yes	4
do Springs, CO	11/27/2015	MJ	-	3	9	12	-	-	1
do Springs, CO	10/31/2015	MJ	Yes	3	0	3	-	Yes	3
urg, OR	10/1/2015	MJ	-	9	9	18	-	Yes	6
nooga, TN	7/16/2015	MJ	Yes	5	2	7	-	Yes	3
ston, SC	6/17/2015	MJ	Yes	9	1	10	-	Yes	1
ha, WI	6/11/2015	MJ	-	3	1	4	-	Yes	2
ville, WA	10/24/2014	MJ	-	5	1	6	-	Stolen	1
Barbara, CA	5/23/2014	MJ	Yes	6	13	19	-	Yes	3
ood, TX	4/3/2014	MJ	-	3	12	15	-	Yes	1
s, CA	2/20/2014	MJ	-	4	2	6	-	-	2
ngton, D.C.	9/16/2013	MJ	-	12	8	20	-	Yes	2
h, FL	7/26/2013	MJ	Yes	7	0	7	10 [c]	Yes	1
Monica, CA	6/7/2013	MJ	Yes	6	3	9	70 [d]	Yes	2
l Way, WA	4/21/2013	MJ	-	5	0	5	-	Yes	2
ner County, NY	3/13/2013	MJ	-	5	2	7	-	Yes	1
wn, CT	12/14/2012	MJ/CC	Yes	28	2	30/28	154	Stolen	4/3

Table 1
Combined Mass Shootings Data
1982 – 2017

Location	Date	Source	Large Cap. Mag.?[1]	Fatalities[2]	Injuries[2]	Total Fatalities & Injuries[2]	Shots Fired	Gun(s) Obtained Legally?	Offenders' Number of Guns
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
apolis, MN	9/27/2012	MJ/CC	Yes	7	1/2	8/9	46	Yes	1
reek, WI	8/5/2012	MJ/CC	Yes	7	3	10	-	Yes	1
ı, CO	7/20/2012	MJ/CC	Yes	12	70	82	80	Yes	4
, WA	5/30/2012	MJ	-	6	1	7	-	Yes	2
ıd, CA	4/2/2012	MJ	No	7	3	10	-	Yes	1
ɔss, GA	2/22/2012	MJ	-	5	0	5	-	Yes	1
each, CA	10/14/2011	MJ	-	8	1	9	-	Yes	3
ı City, NV	9/6/2011	MJ/CC	Yes	5	7	12	-	Yes	3
Rapids, MI	7/7/2011	CC	Yes	8	2	10	10	-	1
ı, AZ	1/8/2011	MJ/CC	Yes	6	13	19	33	Yes	1
ıester, CT	8/3/2010	MJ/CC	Yes	9	2	11	11	Yes	2
nd, WA	11/29/2009	MJ	-	4	1	5	-	Stolen	2
ood, TX	11/5/2009	MJ/CC	Yes	13	30/32	43/45	214	Yes	1
ımton, NY	4/3/2009	MJ/CC	Yes	14	4	18	99	Yes	2
ge, NC	3/29/2009	MJ	No	8	3	11	-	Yes	2
rson, KY	6/25/2008	MJ	-	6	1	7	-	Yes	1
b, IL	2/14/2008	MJ/CC	Yes	6	21	27	54	Yes	4
ood, MO	2/7/2008	MJ	-	6	2	8	-	Stolen	2
ı, NE	12/5/2007	MJ/CC	Yes	9	4/5	13/14	14	Stolen	1
ɔn, WI	10/7/2007	MJ	-	6	1	7	-	Yes	1
ıburg, VA	4/16/2007	MJ/CC	Yes	32/33	23/17	55/50	176	Yes	2
ıke City, UT	2/12/2007	MJ	No	6	4	10	-	No	2
ster County, PA	10/2/2006	MJ	-	6	5	11	-	Yes	3
, WA	3/25/2006	MJ	-	7	2	9	-	Yes	4
, CA	1/30/2006	MJ/CC	Yes	8	0	8	-	Yes	1

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Location	Date	Source	Large Cap. Mag.?[1]	Fatalities[2]	Injuries[2]	Total Fatalities & Injuries[2]	Shots Fired	Gun(s) Obtained Legally?	Offenders' Number of Guns
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
ake, MN	3/21/2005	MJ	-	10	5	15	-	Stolen	3
field, WI	3/12/2005	MJ	-	7	4	11	-	Yes	1
ibus, OH	12/8/2004	MJ	-	5	7	12	-	Yes	1
r, WI	11/21/2004	CC	Yes	6	3	9	20	-	1
ian, MS	7/8/2003	MJ	-	7	8	15	-	Yes	5
se Park, IL	2/5/2001	MJ	-	5	4	9	-	Yes	4
ield, MA	12/26/2000	MJ/CC	Yes	7	0	7	37	Yes	3
, FL	12/30/1999	MJ	-	5	3	8	-	Yes	2
ulu, HI	11/2/1999	MJ/CC	Yes	7	0	7	28	Yes	1
orth, TX	9/15/1999	MJ/CC	Yes	8	7	15	30	Yes	2
a, GA	7/29/1999	MJ	-	9	13	22	-	Yes	4
on, CO	4/20/1999	MJ/CC	Yes	13/15	24	37/39	188	No	4
field, OR	5/21/1998	MJ/CC	Yes	4	25	29	50	No	3
oro, AR	3/24/1998	MJ/CC	Yes	5	10	15	26	Stolen	9/10
gton, CT	3/6/1998	MJ/CC	Yes	5	1/0	6/5	5	Yes	1
e, CA	12/18/1997	MJ/CC	Yes	5	2	7	144	Yes	1
, SC	9/15/1997	MJ	-	4	3	7	-	No	1
auderdale, FL	2/9/1996	MJ	-	6	1	7	-	Yes	2
s Christi, TX	4/3/1995	MJ	-	6	0	6	-	Yes	2
ild Base, WA	6/20/1994	MJ/CC	Yes	5/6	23	28/29	-	Yes	1
, CO	12/14/1993	MJ	-	4	1	5	-	-	1
n City, NY	12/7/1993	MJ/CC	Yes	6	19	25	30	Yes	1
eville, NC	8/6/1993	MJ	-	4	8	12	-	Yes	3
ancisco, CA	7/1/1993	MJ/CC	Yes	9	6	15	75	No	3
ns Glen, NY	10/15/1992	MJ	-	5	0	5	-	Yes	1

Table 1
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Location	Date	Source	Large Cap. Mag.?[1]	Fatalities[2]	Injuries[2]	Total Fatalities & Injuries[2]	Shots Fired	Gun(s) Obtained Legally?	Offenders' Number of Guns
(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
urst, CA	5/1/1992	MJ	-	4	10	14	-	Yes	2
Oak, MI	11/14/1991	MJ	-	5	5	10	-	Yes	1
City, IA	11/1/1991	MJ	No	6	1	7	-	Yes	1
a, TX	10/16/1991	MJ/CC	Yes	24	20	44	100	Yes	2
nville, FL	6/18/1990	MJ/CC	Yes	10	4	14	14	Yes	2
ville, KY	9/14/1989	MJ/CC	Yes	9	12	21	21	Yes	5
on, CA	1/17/1989	MJ/CC	Yes	6	29/30	35/36	106	Yes	2
vale, CA	2/16/1988	MJ	-	7	4	11	-	Yes	7
Bay, FL	4/23/1987	MJ/CC	Yes	6	14/10	20/16	-	Yes	3
ad, OK	8/20/1986	MJ	-	15	6	21	-	Yes	3
sidro, CA	7/18/1984	MJ/CC	Yes	22	19	41	257	Yes	3
, TX	6/29/1984	MJ/CC	Yes	6	1	7	-	No	1
, FL	8/20/1982	MJ	No	8	3	11	-	Yes	1
			Average	**8.0**	**7.7**	**15.7**	**73**		
			Large Capacity Magazine Average	**10.0**	**11.8**	**21.8**	**75**		
			Non-Large Capacity Magazine Average	**6.3**	**2.3**	**8.7**	**-**		

tings, 1982-2017: Data from Mother Jones' Investigation," accessed June 1, 2017) and the Citizens Crime Commission of New York City ("Citizens ass Shooting Incidents in America (1984-2012)," accessed June 1, 2017). MJ indicates Mother Jones data. CC indicates Citizens Crime Commission n data, "/" is added between values. In these instances, values from MJ are listed first. Except where noted, all data on shots fired obtained from CC.
a capacity to hold more than 10 rounds of ammunition.
s and injuries.
ed After Gunman Kills 3 White Men in Downtown Fresno," *LA Times*, April 19, 2017.
cts Left Trail of Clues, but No Clear Motive," *New York Times*, December 3, 2015.
n Fire in Hialeah Shooting Rampage," *NBC News*, July 28, 2013.
ica Gunman 'Ready for Battle,'" *New York Times*, June 8, 2013.

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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; et al.,** Defendants.	17-cv-1017-BEN-JLB **DECLARATION OF PROFESSOR JOHN J. DONOHUE IN SUPPORT OF DEFENDANT XAVIER BECERRA'S OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION** Date: June 13, 2017 Time: 10:00 a.m. Dept: 5A Judge: Hon. Roger T. Benitez Action Filed: May 17, 2017

DECLARATION OF PROFESSOR JOHN J. DONOHUE

BACKGROUND AND QUALIFICATIONS

1. I, John J. Donohue, am the C. Wendell and Edith M. Carlsmith Professor of Law at Stanford Law School. After earning a law degree from Harvard and a Ph.D. in economics from Yale, I have been a member of the legal academy since 1986. I have previously held tenured positions as a chaired professor at both Yale Law School and Northwestern Law School. I have also been a visiting professor at a number of prominent law schools, including Harvard, Yale, the University of Chicago, Cornell, the University of Virginia, Oxford, Toin University (Tokyo), St. Gallens (Switzerland), and Renmin University (Beijing).

2. For a number of years, I have been teaching at Stanford a course on empirical law and economics issues involving crime and criminal justice, and I have previously taught similar courses at Yale Law School, Tel Aviv University Law School, the Gerzensee Study Center in Switzerland, and St. Gallen University School of Law in Switzerland. I have consistently taught courses on law and statistics for two decades.

3. I am a Research Associate of the National Bureau of Economic Research, and a member of the American Academy of Arts and Sciences. I was a Fellow at the Center for Advanced Studies in Behavioral Sciences in 2000-01, and served as the co-editor (handling empirical articles) of the *American Law and Economics Review* for six years. I have also served as the President of the American Law and Economics Association and as Co-President of the Society of Empirical Legal Studies.

4. I am also a member of the Committee on Law and Justice of the National Research Council ("NRC"), which "reviews, synthesizes, and proposes research related to crime, law enforcement, and the administration of justice, and provides an intellectual resource for federal agencies and private groups." (See

http://www7.national-academies.org/claj/ online for more information about the NRC.)

5. I filed an expert declaration in each of two cases involving a National Rifle Association ("NRA") challenge to city restrictions on the possession of large-capacity magazines: *Fyock v. City of Sunnyvale*, United States District Court (N.D. Cal.), January 2014; *Herrera v. San Francisco*, United States District Court (N.D. Cal.), January 2014.

6. I also filed an expert declaration in a case involving a challenge by NRA to Maryland's restrictions on assault weapons and large-capacity magazines: *Tardy v. O'Malley*, United States District Court (District of Maryland), February 2014.

7. In all these cases, the relevant gun regulations have (ultimately) been sustained in the relevant federal appellate courts.

8. I also just filed (June 1, 2017) an expert declaration in a case involving a challenge by NRA to California's restrictions on carrying of weapons in public: *Flanagan v. Becerra*, United States District Court (C.D. Cal.), Case No. 2:16-cv-06164-JAK-AS.

SUMMARY OF CONCLUSIONS

9. It is a sound, evidenced-based, and longstanding harm-reducing strategy for governments to place constraints on the harm that weapons can inflict. Restrictions on the size of large-capacity magazines (LCMs) sit comfortably in this appropriate regulatory approach, and can be expected to reduce deaths and injury from gun violence.

10. The LCM ban is well-tailored to limit the behavior of criminals engaging in the most dangerous forms of violent criminal behavior, and at the same time is likely to have little or no impact on the defensive capabilities of law-abiding citizens.

11. Over the last few decades, the number of households owning firearms has been declining, currently down to about 31 percent of Americans households. At

the same time, the growth in gun purchases reflects the highly concentrated rate of ownership with 20 percent of gunowners now owning 60 percent of the nation's firearms. While there is far less evidence on ownership of large-capacity magazines, one would expect the ownership of such products to be at least as concentrated as gun ownership.

DISCUSSION

12. A discussion of the social science literature concerning gun ownership rates must begin with the General Social Science Survey (GSS), which is an annual survey conducted by the National Opinion Research Center, headquartered at the University of Chicago. The GSS is widely regarded by social science researchers as the most reliable indicator of national social trends, in part because of its professional implementation of face-to-face interviews using a very large sample size (the latest GSS data comes from 2,867 respondents versus roughly 1000 in a typical telephone survey) with a high response rate (always in excess of 70 percent versus telephone survey responses which have fallen below 10 percent in recent surveys). See Pew Research Center, "Assessing the Representativeness of Public Opinion Surveys," (May 15, 2012); http://www.people-press.org/2012/05/15/assessing-the-representativeness-of-public-opinion-surveys/.

13. GSS data from 2016, the most recent year that data is available, states that 30.8% of American households have at least one gun, and that 20.5% of adults personally own a gun. See Donohue & Rabbani, "Recent Trends in American Gun Prevalence," (attached as Exhibit B). A carefully executed 2015 national survey showed that 34% of households owned guns, and that ownership of private firearms is highly concentrated among a small percentage of gun owners.[1]

[1] Azrael et al., "The Stock and Flow of US Firearms: Results from the 2015 National Firearms Survey," Russell Sage Foundation J. Soc. Sci., forthcoming (2017) (attached as Exhibit C).

14. This is a considerable drop from the approximately 50% of United States households with one or more guns in the late 1970s, as reflected in GSS surveys. See Donohue & Rabbani, supra. Other national surveys show similar results, such as research by the Pew Research Center and the National Behavioral Risk Factor Surveillance System. These studies consistently find a persistent decline in household gun ownership over the past several decades. A recent report from the Pew Research Center states:

> The Pew Research Center has tracked gun ownership since 1993, and our surveys largely confirm the General Social Survey trend. In our December 1993 survey, 45% reported having a gun in their household; in early 1994, the GSS found 44% saying they had a gun in their home. A January 2013 Pew Research Center survey found 33% saying they had a gun, rifle or pistol in their home, as did 34% in the 2012 wave of the General Social Survey.[2]

15. While the GSS in 2016 put the percentage of American households with guns at less than 31%, the most recent Gallup survey found that 39% of American adults live in a household that contains a gun, and 29% personally own one. There is no consensus about why Gallup's estimates are somewhat higher than those from the above sources, although it should be noted that the Gallup polls are far smaller surveys based on less reliable telephone interviews with dramatically lower response rates than the GSS. Nonetheless, every survey of gun ownership conducted over time—including Gallup—shows that the percentage of household with guns today is lower than it was two decades ago.

16. The evidence that gun ownership is concentrated is strong and uncontradicted. Researchers analyzing the results of a 2015 national survey found that 8% of individual gun owners reported owning ten or more firearms—collectively accounting for 39% of the American gun stock—and that the 20% of

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[2] [http://www.people-press.org/2013/03/12/section-3-gun-ownership-trends-and-demographics.]

gun owners who owned the most guns collectively possessed about 60% of the nation's guns.[3] A decade earlier, researchers found a similar pattern: a 2004 survey indicated that 48% of gun owners possessed four or more guns and that the top 20% of firearms owners possessed 65% of all firearms.[4]

17. The FBI publishes records of the number of background checks requested, and such background checks are often initiated pursuant to a desired purchase of firearms. With only a couple of exceptions, the trend has been for the number of background checks conducted each year to grow every year.[5] Gun industry trade groups cite increased background checks and an increase in collections of the federal excise taxes collected on the sale of firearms and ammunition as reflecting strong demand for firearms.[6]

18. Because reliable social science data shows that the number of households that own guns has likely dropped in recent decades, and certainly has not grown, it seems most likely that robust gun sales can be attributed not to increasingly broad gun ownership but instead largely to purchases of guns by members of households that previously owned guns.

19. I am not aware of any current social science research providing an estimate for the number of American households that own large-capacity magazines or LCMs (defined as an ammunition feeding device with the capacity to hold more than 10 rounds of ammunition) or for the number of LCMs in private hands in America.

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[3] See Azrael et al., supra.

[4] Hepburn et al., "The US Gun Stock: Results from the 2004 National Firearms Survey," Injury Prevention 2007;13:15–19.

[5] See National Instant Criminal Background Check System (NICS) Firearm Checks: Month/Year 2017, available at https://www.fbi.gov/file-repository/nics_firearm_checks_-_month_year.pdf/view.

[6] See, e.g., NRA-ILA, "The Myth Of "Declining" Gun Ownership," (Jul. 13, 2016), available at http://dailycaller.com/2016/07/13/the-myth-of-declining-gun-ownership/.

20. It is reasonable to assume that consumer demand for large-capacity magazines is broadly similar to demand for firearms generally. If anything, one would expect the specialized product of a large-capacity magazine to appeal to only a subset of gun owners. Accordingly, LCM ownership by household is likely to be at least as concentrated, with increased numbers of LCMs held by a declining share of households. This would be consistent with a January 2013 New York Times/CBS News poll of 1,110 adults nationwide showing that nearly two-thirds of Americans favored a ban on large-capacity magazines.[7]

21. A review of the resolution of mass shootings in the U.S. suggests that bans on large capacity magazines can help save lives by forcing mass shooters to pause and reload ammunition. Citizens have frequently taken advantage of a perpetrator stopping to reload his weapon to tackle him or otherwise subdue him in at least 20 separate shootings in the United States since 1991, notably including the December 7th, 1993 shooting of passengers on a Long Island Railroad car,[8] the October 29th, 1994 shooting near the grounds of the White House,[9] and the January 8th, 2011 shooting in Tucson, AZ that targeted U.S. Congresswoman Gabby Giffords.[10] In many other incidents, targeted victims were able to escape while a shooter reloaded. Perhaps the most vivid illustration of this benefit was seen when

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[7] http://www.nytimes.com/2013/02/19/us/politics/lawmakers-look-at-ban-on-high-capacity-gun-magazines.html?_r=1&.

[8] "DEATH ON THE L.I.R.R.: The Rampage; Gunman in a Train Aisle Passes Out Death," *The New York Times*, December 9, 1993 - http://www.nytimes.com/1993/12/09/nyregion/death-on-the-lirr-the-rampage-gunman-in-a-train-aisle-passes-out-death.html (9-millimeter pistol, 15 round magazine).

[9] "Public Report of the White House Security Review," Department of the Treasury, 1995 - http://www.fas.org/irp/agency/ustreas/usss/t1pubrpt.html (Chinese-made SKS semiautomatic rifle, 30 round magazine).

[10] "Crowd members took gunman down," *Los Angeles Times*, January 9, 2011 - http://articles.latimes.com/2011/jan/09/nation/la-na-arizona-shooting-heroes-20110110 (9mm Glock handgun, 30 round extended magazine).

11 children at Sandy Hook Elementary School were able to escape while Adam Lanza reloaded his 30 round LCM.[11]

22. The complaint in this case makes the following wholly untenable argument against the LCM ban:

> Banning magazines over ten rounds is no more likely to reduce criminal abuse of guns than banning high horsepower engines is likely to reduce criminal abuse of automobiles. To the contrary, the only thing the ban ensures is that a criminal unlawfully carrying a firearm with a magazine over ten rounds will have a (potentially devastating) advantage over his lawabiding victim.

23. This unsupported argument is incorrect for a host of reasons. First, as I just mentioned, Adam Lanza was able to kill more (a total of 20 children and six adults) because he was using lawfully purchased weapons equipped with a 30 round LCM. It may well be that Lanza would have criminally abused the guns that his mother had made available to him even if he had not had an LCM, but there is every reason to believe that he would have killed fewer individuals if he had to persistently reload during his murderous rampage. In other words, the LCM ban is designed precisely to save lives and by raising the costs for killers, the LCM ban would be expected to advance that goal.

24. Second, the quoted argument conjures a situation that a law-abiding citizen will be overwhelmed by a criminal who carries a firearm with an LCM. But the federal assault weapons ban – which did not contain a ban on possession of LCM, and thus would be less effective than the more complete California prohibition – led to increases in the price of LCM's. Therefore, California's LCM ban should elevate the cost that a criminal will need to pay to procure an LCM, which means that fewer criminals will be equipped with LCM's (under standard

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[11] "Legislative Leaders Say Bipartisan Agreement Could Yield Nation's Strongest Gun-Control Bill," *The Hartford Courant*, April 1, 2013. - http://www.courant.com/news/politics/hc-gun-deal-newtown-0413-20130401,0,7341094.story (Bushmaster .223 caliber rifle, high capacity 30 round magazine).

economic principles). In other words, fewer law-abiding individuals will be confronted by a criminal with an LCM because of the LCM ban.

25. Third, most mass killings by Americans involve the use of guns, and many of these killers – Adam Lanza (Newtown), James Holmes (the Batman movie killer in Aurora, Colorado killed 12 and injured 70), Jared Loughner (shooting Congresswoman Gabbie Giffords) to name just a few – were drawn to a vision of killing large number of individuals in a certain way that included the use of LCM's. On November 5, 2009, Nidal Hassan killed 13 and injured more than 30 others at Fort Hood, near Killeen, Texas. When Hasan purchased his killing arsenal, he asked for "the most technologically advanced weapon on the market and the one with the highest standard magazine capacity."[12] This is exactly what one would do if one wanted to simply kill as many people as possible in the shortest amount of time. If one is serious about stopping mass killings, a good first step is to deprive such killers of their preferred killing approaches.[13]

26. In this regard, consider what happened in Australia after a crazed gunman killed 35 people in Port Arthur, Tasmania in 1996. The Australian federal government persuaded all states and territories to implement tough new gun control laws. Under the National Firearms Agreement (NFA), firearms legislation was tightened throughout the country, national registration of guns was imposed, and it

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[12] Scott Huddleston, "Hasan Sought Gun with 'High Magazine Capacity,'" October 21, 2010, http://blog.mysanantonio.com/military/2010/10/hasan-sought-gun-with-high-magazine-capacity/.

[13] Anders Breivik who committed mass murder in Norway was aided in his efforts because of lax rules concerning LCM's in the United States. Breivik was very unhappy that he could not get the large-capacity magazines that he wanted to use since they were banned in Europe. In his manifesto, he wrote about his attempts to legally buy weapons, stating, "I envy our European American brothers as the gun laws in Europe sucks ass in comparison." Under the section titled, "December and January - Rifle/gun accessories purchased," Breivik wrote that he purchased ten 30-round ammunition magazines from a U.S. supplier who mailed the devices to him. Stephanie Condon, "**Norway Massacre Spurs Calls For New U.S. Gun Laws,**"CBS News, July 28, 2011, http://www.cbsnews.com/news/norway-massacre-spurs-calls-for-new-us-gun-laws/.

became illegal to hold certain long guns that might be used in mass shootings. The effect was that both while there were 13 mass shootings in Australia during the period 1979–96 (a per capita rate that was higher than in the U.S. at the time), there have been none in the 21 years since (while the problem of mass shootings in the United States is getting worse[14]).

27. The important point of the Australian experience for present purposes is that by depriving disturbed individuals of the vehicle by which they imagined they would unleash their murderous impulses, Australia showed that mass shootings can be dramatically reduced – even if guns are still widely available, as they remain in Australia.

28. In the face of the clear evidence from around the United States and the world, the NRA has provided expert statements that conjure a mythical old or disabled homeowner who is only able to thwart a violent home invasion by having enough bullets to blast enough shots without reloading. In this one-sided analysis, the only effect of the LCM ban is that it prevents a law-abiding citizen from protecting his or her family from criminal attack. The NRA experts opine that criminals rarely need to shoot more than a bullet or two, so there is no real benefit of the ban on LCM's, while the old lady or disabled person quaking with the blasting gun in her shaking hands will protect herself and her loved ones if she can only get off 30 plus shots without re-loading. These unsupported assertions are either irrelevant or have no empirical support.

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[14] Tristan Bridges and Tara Leigh Tober, "**Mass shootings in the US are on the rise. What makes American men so dangerous?**" ***The Society Pages***, December 31, 2015, https://thesocietypages.org/socimages/2015/12/31/mass-shootings-in-the-u-s-what-makes-so-many-american-men-dangerous/; Dan Diamond, "**Mass Shootings Are Rising. Here's How To Stop Them,**" ***Forbes***, June 18, 2015, https://www.forbes.com/sites/dandiamond/2015/06/18/charleston-deaths-are-an-american-tragedy-mass-shootings-are-rising/#12bd32ef787b.

29. First, the notion that safety will be enhanced if someone with quaking hands that prevent them from hitting their target in the first ten shots is able to spray additional bullets is ludicrous. Bullets from modern guns with large-capacity magazines can easily penetrate walls, which means that poorly directed shooting will pose a significant threat to other family members and neighbors.

30. Second, it is irrelevant if most times that criminals use guns, they don't fire their guns more than ten times. The LCM ban is designed to address one particularly societally damaging problem – that of mass shootings. By definition, these incidents will involve firing of many bullets, and therefore they are an appropriate target of government concern and regulation.

31. Third, it is worth noting that the vast majority of the time that an individual in the United States is confronted by violent crime, they do not use a gun for self-defense. Specifically, over the period from 2007-2011 when roughly 6 million violent crimes occurred each year, data from the National Crime Victimization Survey shows that the victim was not able to defend with a gun in 99.2 percent of these incidents – this in a country with 300 million guns in civilian hands.

32. Fourth, even if a gun were available for self-defense use, the need for a LCM is slight according to decades of statements by NRA affiliated and pro-gun experts. For example John Lott has repeatedly made the following claims:

- based on "about 15 national survey[s] … about 98 percent of [defensive gun uses] involve people brandishing a gun and not using them."[15]
- "When victims are attacked, 98 percent of the time merely brandishing a gun is enough to cause the criminal to stop his attack."[16]

[15] Statements by John R. Lott, Jr. on Defensive Gun Brandishing Posted by Tim Lambert on October 17, 2002 http://scienceblogs.com/deltoid/2002/10/17/lottbrandish/. Page 41, State of Nebraska, Committee on Judiciary LB465, February 6, 1997, statement of John Lott, Transcript prepared by the Clerk of the Legislature, Transcriber's Office.

[16] John R. Lott, Jr., Packing Protection, Letters, *Chicago Sun-Times*, April

(continued…)

- "Considerable evidence supports the notion that permitted handguns deter criminals. …. In 98% of the cases, people simply brandish weapons to stop attacks."[17]

33. As for Gary Kleck, the NRA expert in this case, we hear a similar albeit less precise claim: "More commonly, guns are merely pointed at another person, or perhaps only referred to ("I've got a gun") or displayed, and this is sufficient to accomplish the ends of the user, whether criminal or non- criminal."[18]

34. Gun Owners of America cite published survey results on gun brandishing by Gary Kleck for the following statement about gun brandishing: "Of the … times citizens use their guns to defend themselves every year, the overwhelming majority merely brandish their gun or fire a warning shot to scare off their attackers."[19]

35. In other words, a gun is used in defense less than 1 percent of the time when someone is attacked in the United States. In the "overwhelming majority" of cases (according to the NRA's expert) in the small percentage of the time that a gun *is* used, brandishing is all that is needed for defense. One would imagine that the vast majority of the times that the gun is fired in this increasingly small subset, it will be fired less than 10 times.

36. Should there be a future case of a law-abiding citizen who 1) has a gun and 2) the need and opportunity to use it in self-defense, and 3) the desire to fire more than 10 rounds, the individual can either re-load the defensive weapon by inserting a new clip or by using a second weapon, which an increasingly large

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(…continued)
30, 1997, Pg. 52.

[17] John R. Lott Jr., "Unraveling Some Brady Law Falsehoods," *Los Angeles Times*, July 2, 1997.

[18] Guns and Self-Defense by Gary Kleck, Ph.D., http://www.pulpless.com/gunclock/kleck2.html.

[19] Gary Kleck and Marc Gertz, "Armed Resistance to Crime: The Prevalence and Nature of Self-Defense with a Gun," 86(1) *Journal of Criminal Law and Criminology* 150-187 (Fall 1995). https://pdfs.semanticscholar.org/91da/afbf92d021f06426764e800a4e639a1c1116.pdf.

number of gun owners currently possess. This implies that the LCM ban is well-tailored to limit the behavior of criminals engaging in the most dangerous forms of violent criminal behavior, and at the same time is likely to have little or no impact on the defensive capabilities of law-abiding citizens.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on: June 5, 2017

John J. Donohue III

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IN THE UNITED STATES DISTRICT COURT

FOR THE SOUTHERN DISTRICT OF CALIFORNIA

VIRGINIA DUNCAN, RICHARD LEWIS, PATRICK LOVETTE, DAVID MARGUGLIO, CHRISTOPHER WADDELL, and CALIFORNIA RIFLE & PISTOL ASSOCIATION, INC., a California corporation,

Plaintiffs,

v.

XAVIER BECERRA, in his official capacity as Attorney General of the State of California; and DOES 1-10,

Defendants.

17-cv-1017-BEN-JLB

DECLARATION OF BLAKE GRAHAM IN SUPPORT OF DEFENDANT XAVIER BECERRA'S OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

Date: June 13, 2017
Time: 10:00 a.m.
Dept: 5A
Judge: Hon. Roger T. Benitez
Action Filed: May 17, 2017

DECLARATION OF BLAKE GRAHAM

I, BLAKE GRAHAM, declare:

1. I am a Special Agent Supervisor for the California Department of Justice, Bureau of Firearms. I make this declaration of my own personal knowledge and experience and, if called as a witness, I could and would testify competently to the truth of the matters set forth herein.

BACKGROUND AND QUALIFICATIONS

2. I received a Bachelor of Science degree in May 1992 in Criminal Justice at the California State University Sacramento. My coursework included forensics, corrections, and a number of classes in criminal justice-related topics.

3. Since 1994, I have worked as either an investigator for the California Department of Alcoholic and Beverage Control (ABC), or as a Special Agent for the California Department of Justice (DOJ). My job responsibilities in all of these positions have increasingly required the recovery, investigation, and identification of firearms, the ammunition used for those firearms, and the magazines used for feeding ammunition for such firearms.

4. My work as an investigator for ABC between 1994 and 1999 included the recovery of firearms, magazines and ammunition.

5. Between 1999 and 2002, I worked as a Special Agent for DOJ, and was assigned to the Violence Suppression Program in the Bureau of Narcotics Enforcement. In this job, I investigated violent crimes and various violations occurring at California gun shows. As a gun show enforcement agent, I attended gun shows in the San Francisco Bay Area to monitor, and if necessary, seize, firearms, ammunition, and magazines sold illegally to felons, parolees, and probationers.

6. From October 2002 to the present, I have been a Special Agent and Special Agent Supervisor, for the DOJ's Bureau of Firearms (BOF). In this capacity, I am assigned to recover firearms from prohibited individuals, monitor gun shows for illegal activities, conduct surveillance on gun dealers suspected of illegal activity, and investigate illegal trafficking of firearms, manufacturing of assault weapons, machine guns, and illegal possession of various magazines and ammunition.

7. Since 2008, I have been responsible for reviewing handguns that are submitted by manufacturers for inclusion in California's roster of handguns certified for sale. A copy of the roster can be found on the DOJ website: http://certguns.doj.ca.gov/.

8. In my career I have attended at least 40 gun shows and have become very knowledgeable on current laws pertaining to the sales of firearms, ammunition, and ammunition containers—including large-capacity magazines (LCMs)—in the State of California.

9. I have been trained and qualified to carry several different types of firearms, including: Glock Model 17 (9 mm semi-automatic pistol), multiple Glock .40 caliber semi automatic pistols, Heckler & Koch MPS (9 mm submachine gun), Smith & Wesson, Model 60 (.38 Special revolver), multiple .45 caliber semi-automatic pistols, and a Colt, Model M4 (5.56 mm machine gun). I have access to other Department-owned handguns, shotguns, submachine guns, machine guns, rifles, shotguns and 40 mm "less lethal" launchers.

10. Throughout my career, I have conducted training programs in the identification and handling of firearms. I have also trained other Special Agents of BOF on assault weapons and firearms identification. I also have given firearms identification classes to members of the Sacramento and San Joaquin County District Attorney's offices.

11. I have also completed at least 15 firearms training courses since 1994. These courses included the assembly and use of specific firearms, cartridge composition (bullet, the propellant, and the casing), common calibers used by law enforcement, and training on rifle and handgun ammunition. I have been certified as a California Peace Officer Standards and Training (POST) approved Firearms Instructor/Rangemaster since 2002.

12. During the course of my career and training I have become proficient in the use and disassembly of various revolvers, pistols, submachine guns, shotguns, and rifles. I have made or assisted in the arrest of at least thirty persons for violations involving illegal weapons possession. In the course of my employment I have participated in excess of thirty search warrants which involved the illegal possession of firearms.

13. I have been qualified as an expert witness regarding the use of firearms in 14 cases in both federal and state court since 2007.

FINDINGS

I. USE OF LARGE-CAPACITY MAGAZINES IN MASS SHOOTINGS.

14. Through the course of my work, I am familiar with the use of LCMs.

15. LCMs are ammunition feeding devices that can hold more than ten rounds, and sometimes up to 100 rounds, of ammunition.

16. LCMs allow semi-automatic weapons to fire 10 or more rounds without the need for a shooter to reload the weapon.

17. Because LCMs enable a shooter to fire repeatedly without needing to reload, they significantly increase a shooter's ability to kill and injure large numbers of people quickly.

18. Because magazines carrying more than 10 rounds at a time allow for uninterrupted shooting, such LCMs have been the preferred ammunition feeding devices in several mass shootings in California and elsewhere.

19. To the best of my knowledge, all of the shootings listed below involved persons who shot and wounded and/or killed one or more persons, including peace officers, while using LCMs.

a. On January 17, 1989, Patrick Purdy, shot and killed 5 and wounded 32 others at the Cleveland Elementary School in Stockton, California. He used an AK-47 style rifle and LCMs in the shooting.

b. On February 28, 1997, Larry Phillips and Emil Matasareanu, armed with multiple assault weapons and LCMs, wounded 20 people, including law enforcement officers, while robbing the Bank of America in North Hollywood, California.

c. On January 9, 2005, Andres Raya used a LCM and illegal assault weapon to shoot and kill Police Sgt. Howard Stevenson in Ceres, California.

d. On June 15, 2008, Marco Topete used an assault rifle and LCM to shoot and kill Yolo County Sheriff's Deputy Tony Diaz after a traffic stop near Dunnigan, California.

e. On November 5, 2009, Nidal Hasan used a semi-automatic pistol and LCMs to shoot and kill 13 and wounded over 30 others at the Fort Hood Army base in Fort Hood, Texas.

f. On February 25, 2010, Ricky Liles, used multiple weapons and LCMs to shoot and kill two law enforcement officers and wounded one other in Minkler, California.

g. January 8, 2011, Jared Loughner used a handgun with a LCM to shoot and kill 6 people and wounded 13 others in Tucson, Arizona. He was subdued while trying to reload his weapon.

h. On July 20, 2012, James Holmes used an assault weapon and LCMs to kill 12 people and wound 70 others in a movie theater in Aurora, Colorado.

i. On December 14, 2012, Adam Lanza used LCMs and multiple firearms to kill 20 children and six adults at Sandy Hook Elementary School in Newtown, Connecticut.

j. On June 7, 2013, John Zawarhi—who was previously denied purchase of a firearm by DOJ—used a home-built AR-15 rifle and LCMs to kill his father and brother at their family home, and then kill and wound others at the Santa Monica, California Community College.

k. On December 2, 2015, Syed Farook and his wife, Tashfeen Malik, used assault weapons and LCMs in killing 14 people and wounding 22 others at the Inland Regional Center in San Bernardino, California.

l. On June 12, 2016, Omar Mateen used an assault rifle and LCMs to shoot and kill 49 people and wound 53 others inside a nightclub in Orlando, Florida.

m. On July 7, 2016, Micah Johnson used an assault rifle and a LCM to shoot and kill five police officers and wound nine others in Dallas, Texas.

n. On July 17, 2016, Gavin Long used an assault rifle and LCMs to shoot and kill three police officers and wound three other officers in Baton Rouge, Louisiana.

II. LEGISLATION LIMITING LARGE CAPACITY MAGAZINES.

20. I am also aware of the state and federal laws banning the sale and possession of LCMs, and the effect of these laws on the availability of such magazines in California.

21. From 1994 to 2004, the federal assault weapons ban controlled the manufacture and sales of LCMs in the United States. During this 10-year window, LCMs were only able to be sold to law enforcement and the military. Over time, LCMs were removed from public access due to incidental seizure during everyday law enforcement investigations in all 50 states.

22. In 1999, the California Legislature passed Senate Bill No. 23, which restricted the sales, transfer and manufacture of LCMs on a state level. This bill, which, at the time did not prohibit possession of LCMs, eventually became codified as California Penal Code section 32310.

III. REASONS FOR CALIFORNIA'S PROHIBITION ON POSSESSION OF LARGE-CAPACITY MAGAZINES.

23. Once the Federal restrictions were lifted in late 2004, LCMs became available in states outside California. This has created in increase in the amount of illegal importation of LCMs into California.

24. Since at least 2002, Agents from the DOJ Bureau of Firearms have conducted investigations in which California residents would travel outside California and purchase or acquire LCMs and then return to California with these illegally imported LCMs.

25. In such cases, these same subjects would also acquire ammunition and firearms that would be smuggled back into California at the same time.

26. Many times these California residents were already prohibited from acquiring, owning and possessing firearms, ammunition and ammunition feeding devices. Sometimes the traffickers would not be firearms-prohibited but they would ultimately still break the law and smuggle back firearms and LCMs despite facing the potential of felony charges should they be caught.

27. The prohibition on sales, but not possession, of LCMs, has also created a market for LCM repair kits. At numerous California gun shows, prior to 2014, I saw subjects purchase disassembled LCMs being sold as large-capacity magazine repair kits. Often the repair kits were for weapons that were not even sold prior to the year 2000.

28. Because of the availability of the "repair kits," Special Agents with the Bureau of Firearms could see California residents were either illegally

importing LCM or purchasing these repair kits and assembling them into LCMs in violation of Penal Code Section 32310.

29. On October 11, 2013 Governor Brown signed Assembly Bill No. 48, which made it a misdemeanor to knowingly manufacture, import, keep for sale, offer or expose for sale, or give, lend, buy, or receive any LCM conversion kit that is capable of converting an ammunition feeding device into a large-capacity magazine. The bill also made it a misdemeanor or a felony to buy or receive a large-capacity magazine. This new law in essence outlawed "repair kits" and the issues associated with them. Much of AB 48 was codified as Section 32310, subdivisions (a) and (b).

30. Even with the passage of AB 48, BOF Agents do not have the ability to identify whether the LCMs at issue were legally purchased, or are the product of an illegal transfer. Also, the presence of large numbers of LCMs in the state—even if lawfully owned by law-abiding citizens—increases the potential for criminal theft or illegal trafficking of such magazines.

31. Because of these challenges in identifying legally possessed magazines, as well as use of LCMs in mass shootings that have occurred both in and outside of California for several years, the State of California has chosen to restrict access to large-capacity magazines. The State's laws prohibiting possession of large capacity magazines—through first Senate Bill No. 1446, and then through Proposition 63—ensures the restriction on the use of such magazines in the State.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on: June 5, 2017

Blake Graham

BLAKE GRAHAM

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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; et al.,** Defendants.	17-cv-1017-BEN-JLB **DECLARATION OF KEN JAMES IN SUPPORT OF DEFENDANT XAVIER BECERRA'S OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION** Date: June 13, 2017 Time: 10:00 a.m. Dept: 5A Judge: Hon. Roger T. Benitez Action Filed: May 17, 2017

I, KEN JAMES, declare:

1. I am a retired law enforcement officer retiring from the Emeryville, California Police Department on June 30, 2015 after forty years of service. I served the last seventeen years of my career as the Chief of Police of the department. During my career I held a wide variety of assignments, including patrol officer, K-9 officer, and general assignment investigator. I rose through the ranks in the Department and served as a patrol and investigations sergeant, Captain of both the Patrol and Professional Services Divisions prior to my appointment as Chief. During my career I investigated and supervised the investigations of various gun related crimes.

2. I served as the Chair of the California Police Chief's Association's Firearms Committee. The California Police Chiefs Association represents the municipal Chiefs, and their seconds in command, of 332 cities who provide public safety services for over twenty-six million Californians. The Association promotes and advances the science and art of police administration and crime prevention, to develop and disseminate professional administrative practices, and to encourage the adherence of all police officers to high professional standards of conduct in strict compliance with the Law Enforcement Officer's Code of Ethics.

3. The Association's Firearms Committee is responsible for the formulation and review of the Association's positions on gun violence prevention, including developing and advocating for legislation to reduce and/or prevent gun violence. The Association adopted its initial position paper in 1995 and has updated and revised its position three times since. The initial paper identified six areas, including limiting magazine capacity, that would significantly impact gun violence in California.

4. I also serve as a committee member of the International Association of Chiefs of Police's Firearm Committee. The IACP represents over 15,000

professional law enforcement administrators worldwide and promotes the best professionals policing practices. The Firearms Committee advises the IACP's Board of Directors and Executive Board on national firearms issues.

5. The information stated in this declaration is based on my knowledge, training, education, and experience.

6. In my opinion, the existence of high capacity magazines only serves to enhance the killing and injuring potential of a firearm. I have attended debriefings of several high profile mass shootings, including Columbine, Sandy Hook, Aurora Colorado, San Bernardino, Orlando Nightclub, and the Christopher Dorner shootings in Southern California. In each of these shootings high capacity magazines were utilized allowing the shooter or shooters to move quickly through an area dispensing a large number of bullets without slowing to reload, resulting in mass casualties. I have drawn from these reviews that casualties would have been significantly reduced if a shooter needed to slow or stop to reload after ten shots.

7. It is my opinion that possession and use of high capacity magazines by individuals committing criminal acts pose a significant threat to law enforcement personnel and the general public. I have been involved with and/or supervised the investigation of gun violence crimes in which high capacity magazines were used. For example, in a drive-by shooting in the City of Emeryville, the investigation revealed that in excess of forty casings from two different guns were found at the scene. The shooting resulted in the death of one individual, but fortunately, no other injuries to individuals at the scene. Witnesses told officers that the shooting lasted only a matter of seconds. The number of shots fired resulted in adjacent occupied buildings being struck by stray bullets posing a significant threat to the occupants of those buildings.

8. In my professional capacity as a police chief, Chair of the California Police Chiefs Association's Firearms Committee and member of the IACP's

Firearms Committee, I have read and viewed news accounts of incidents in which individuals have defended themselves from a criminal attacks and perceived criminal attacks by using a firearm. I have performed these reviews to discover evidence that the ability of a victim to fire a large number was necessary. I am not aware that in any of the accounts the victims fired in excess of ten shots in their defense.

9. The California Police Chiefs Association, in their initial position paper on gun violence written in 1995 and in subsequent updates, have identified limiting magazine capacities as an appropriate and necessary measure to reduce gun violence. The Association adopted its initial position paper in 1995 and has updated and revised its position three times since. The initial paper identified six areas, including limiting magazine capacity, that would significantly impact gun violence in California. Attached hereto as Exhibit A is a true and correct copy of the Association's position paper adopted in May of 2013. The Association supported legislation that resulted in the current laws regulating magazine capacity.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on: June 5, 2017

KEN JAMES

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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; et al.,** Defendants.	17-cv-1017-BEN-JLB **DECLARATION OF PROFESSOR DANIEL W. WEBSTER IN SUPPORT OF DEFENDANT XAVIER BECERRA'S OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION** Date: June 13, 2017 Time: 10:00 a.m. Dept: 5A Judge: Hon. Roger T. Benitez Action Filed: May 17, 2017:

I, Daniel W. Webster, under penalty of perjury, declare and state:

1. I am Professor of Health Policy and Management, Co-Director for Research at the Center for the Prevention of Youth Violence, and Director of the Johns Hopkins Center for Gun Policy and Research at the Johns Hopkins Bloomberg School of Public Health. Additionally, I head the Johns Hopkins-Baltimore Collaborative for Violence Reduction.

2. I began my career in public safety research in 1985 as a Research Associate at the University of Michigan's School of Public Health, and have devoted most of my research since then on gun-related injuries and violence. I have a Master of Public Health degree from the University of Michigan and a doctorate in Health Policy and Management from the Johns Hopkins School of Public Health. This graduate training included many advanced courses in epidemiology, research methods, and statistical analysis.

3. Immediately prior to joining the faculty at Johns Hopkins, I directed a program on violence research at the Washington (D.C.) Hospital Center. I joined the faculty of the Johns Hopkins School of Public Health in 1992, and since 2010 have been a tenured Professor of Health Policy and Management with a joint appointment in the School of Education's Division of Public Safety Leadership. I teach graduate courses on violence prevention. Previously, I taught courses in research and evaluation methods at Johns Hopkins, direct the PhD program in Health and Public Policy, and served on the steering committee of a pre- and post-doctoral training program in violence prevention research funded by the National Institutes of Health.

4. I have directed numerous studies related to gun violence and its prevention. I have published over 100 articles in scientific, peer-reviewed journals, the vast majority of these addressed some aspect of violence and/or firearm injuries and their prevention. I am the lead editor of a book entitled Reducing Gun Violence in America: Informing Policy with Evidence and Analysis by Johns Hopkins

University Press (2013), and am the lead author for two chapters and co-author on three other chapters in this book. In addition, I recently served as special editor or co-editor of three special issues on gun violence for top tier public health journals. My curriculum vita, detailing these publications, is attached as Exhibit 1 to this Declaration.

5. The Johns Hopkins Center for Gun Policy and Research was established to conduct rigorous research into gun policy questions, look objectively at all available data, and analyze and report the results. Where the data and research, considered objectively, support a particular policy, we say so. Where the data and research do not support a particular policy, we say that as well. Our goal is not to advance any particular policy or agenda, but to use data and research to inform public policy decisions.

6. I make this declaration on the basis of my training and expertise, the research discussed below, and the work I have done in this case to date. I am being compensated at $350/hour. In the past four years I have testified as an expert in the following cases:

a. *Rocky Mountain Gun Owners v. Hickenlooper*, Denver District Court case 13CV33879, Case matter 2013-EXAD-076563.

b. *Wrenn v. District of Columbia*, Civil Action No. 15-00162 (CKK)

c. *Heller v. District of Columbia*, Civil Action No. 08-01289 (D.D.C.)

d. *Norberg v. Badger Guns, Inc.*, No. 10 CV 020655 (Circuit Court of Wisconsin, Milwaukee County)

e. *Lopez v. Badger Guns, Inc.*, No. 10 CV 018530 (Circuit Court of Wisconsin, Milwaukee County, Civil Division)

f. *Cook v. Hickenlooper*, Civil Action No. 13-CV-1300-MSK-MJW (D. Colo.)

g. *Kolbe v O'Malley*, No.: 1:13-cv-02841-CCB (D. Md.)

7. There are data and good reasons to indicate that design and capabilities of firearms can potentially affect the likelihood that an intended target or by-stander at a shooting will be wounded as well as the severity of wounds resulting from criminal shootings. Particularly relevant is the capacity of a firearm's ammunition feeding device. In comparison to other magazines which feed ammunition to semi-automatic firearms, large capacity magazines (LCMs)—those that hold more than 10 rounds—increase the number of rounds that can be fired without the shooter having to take the time to reload.

8. A firearm's ability to accept LCMs and effectively and rapidly fire a large number of rounds from LCMs are what distinguish what is commonly referred to as assault weapons from other firearms. There is evidence that these design features of assault weapons make them especially appealing to criminals and those who commit mass shootings. A study of handgun purchasers in California prior to that state's ban of assault weapons found that assault pistols were more likely to be purchased by individuals with criminal histories; the more serious the prior offenses, the higher the likelihood that the handgun purchased was an assault pistol. The share of handguns purchased which were assault pistols was 2% if the purchaser had no criminal history, 4.6% if the purchaser had a history of minor criminal offenses, 6.6% for those with a previous criminal gun charge, and 10% for those who had previously been charged with two or more serious violent offenses.[1] I conclude from this research that features of assault pistols, some of which are common to assault rifles, particularly the ability accept detachable LCMs, are attractive to criminals.

9. Efforts to ban assault weapons and LCMs have followed their use in mass shootings in public places including some of the deadliest shootings in our

[1] Wintemute, Garen J., Mona A. Wright, Carrie A. Parham, Christiana M. Drake, and James J. Beaumont, Criminal activity and assault-style handguns: a study of young adults, Annals of Emergency Medicine 32:44-50 (1998).

nation's history. Prior to the Federal ban of LCMs, these include the following high-profile mass shootings:

a. The 1984 shooting at a McDonald's restaurant in California that led to 21 deaths and 19 with nonfatal wounds.

b. A schoolyard shooting in Stockton, California in 1989 which killed five children and left 29 others with nonfatal wounds.

c. A 1989 workplace shooting in Louisville, Kentucky which left seven dead and 15 with nonfatal wounds.

d. A 1991 shooting at a diner in Killeen, Texas that left 23 dead and 27 more wounded.

e. A 1993 shooting of 25 people on a Long Island Railroad train, six who died.

f. A shooting on April 20, 1999 at Columbine High School in Littleton, Colorado in which assailants used an Intratec TEC-DC9 assault pistol with a LCM and other guns to murder 13 students and wound an additional 23.

g. A shooting in which 76 rounds were fired to wound 70 people at a crowded movie theatre in Aurora, Colorado on July 20, 2012 in which the assailant used a Smith & Wesson M&P15 assault rifle with a 100-round LCM. Twelve people lost their lives in this shooting.

10. Among the mass shootings involving LCMS was the most deadly mass shooting in U.S. history at The Pulse nightclub in Orlando, Florida in 2016 in which the shooter used multiple 30-round magazines, some taped together to facilitate swift reloading. This shooting left 52 dead and another 50 people with gunshot wounds that they survived. It also includes a 2011 shooting in front of a supermarket in Tucson, Arizona that left six dead and 13 wounded including then U.S. Rep. Gabrielle Giffords who a suffered life-altering head wound. The Tucson

shooter used a handgun with a LCM and was able to fire 31 rounds before being restrained when attempting to reload. The shooter in the mass murder of 20 young children and six adults at Sandy Hook Elementary School in Newtown, Connecticut and the shooter of 49 people, 32 who died, at Virginia Tech University also used LCMs.

11. When mass shootings occur in public, especially shootings that take place in public places, the shooter often selects an assault weapon or another firearm with a LCM. Data on 15 public mass shootings in the U.S. from 1984 to 1993 collected by Gary Kleck revealed that six (40%) involved assault weapons or other firearms equipped with LCMs. [2,3] A collection of data by Mother Jones magazine on 62 mass shootings in public places by lone shooters from 1982 through 2012 found that 33 (53.2%) perpetrators used firearms or LCMs that were or would have been banned by the federal ban of assault weapons and LCMs.[4] A report by Everytown for Gun Safety examined data on mass shooting involving four or more gunshot victims from 2009 through August 31, 2016 using the FBI's Uniform Crime Reports/ Supplemental Homicide Reports data and media accounts.[5] This study did not limit the sample to shootings in public places involving lone shooters and thus included a large share of incidents of domestic violence or other scenarios in which a small number of people were targeted and, therefore, large ammunition capacity becomes less relevant than in the context of a mass shooting in a public place with a lot of people (e.g., school, workplace). Fifteen of 133 (11%) shootings involved a firearm with a LCM.

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[2] Kleck, Gary. Targeting Guns: Firearms and Their Control. New York: Aldine de Gruyter, pp. 124-126 (1997).

[3] Koper, 2004, p. 14.

[4] Mother Jones Magazine, US Mass Shootings, 1982-2012. Data from Mother Jones' Investigation, available at http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data (2014).

[5] Everytown for Gun Safety. *Analysis of Recent Mass Shootings* https://everytownresearch.org/reports/mass-shootings-analysis/ Accessed January 30, 2017.

12. Among all cases of mass shootings (4 or more victim fatalities) identified by Everytown, use of an assault weapon or other firearm with a LCM is associated with more people who are shot (on average, 13.3 vs. 5.2%) or killed (on average, 7.5 vs. 5.1) when compared with incidents in which LCMs are not used. In other words, the average number of persons shot when the shooter had a LCM or assault weapon that likely included a LCM was 2.5 times higher and the number killed 47% higher than when no LCM was used. Similarly, Professor Christopher Koper's re-analysis of his student's data from Mother Jones magazine's study of public mass murders with firearm revealed that mass shootings with assault weapons, compared with mass shooting with other firearms, involved more fatalities per incident (a mean of 10.4 vs. 7.4) and more victims with nonfatal gunshot wounds (mean of 13.5 vs. 6.4).[6] Dillon (2013) also reported that, compared with assaults carried out with firearms that did not have LCMs, mass shootings in which firearms with LCMs were used had 60% more fatalities on average (a mean of 10.19 vs. 6.35) and more than 3 times as many persons with nonfatal gunshot wounds (12.39 vs. 3.55). These findings are consistent with those from a study of criminal shootings in Jersey City, NJ which found that, compared to shootings with revolvers, shootings with semi-automatic pistols—which tend to hold significantly more bullets than revolvers—had more shots fired and more victims wounded.[7]

13. Unfortunately, data to more definitively determine the connections between ammunition capacity and gun violence outcomes—the number of shots

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[6] Dillon, Luke, Mass Shootings in the United States: An Exploratory Study of the Trends from 1982-2012, Thesis for Master of Arts in Criminology, Law and Society, George Mason University, September 2013; Koper, Christopher S., Supplemental affidavit submitted as an expert witness in June, Shew et al. v. Daniel P Malloy, et al. Civil Action No. 3:13-CV-00739-AVC. U.S. District Court, District of Connecticut, January 6, 2014.

[7] Reedy, Darin C., and Christopher S. Koper, Impact of handgun types on gun assault outcomes: a comparison of gun assaults involving semiautomatic pistols and revolvers, *Injury Prevention* 9:151-155 (2003).

fired, the rate of fire, the number of victims, the number of wounds per victims, lethality of woundings—have not been collected in any population. Gary Kleck, Professor Emeritus from Florida State University, has a working paper that pieces together various types of data in an attempt to discern whether there might be a logical connection between ammunition capacity or LCM use and outcomes in criminal violence.[8] Yet the data used by Kleck and the interpretations he makes of the data are flawed. To determine the set of cases where it would be plausible that involvement of LCM might be relevant to violence outcomes, Kleck searches for cases in which *more than six victims have been shot*. His logic is that an ordinary revolver can shoot six people without reloading and, thus, mass shootings with six or fewer victims might have involved guns without LCMs. But because the rate at which shooters hit their human targets is low[9], having more rounds available to shoot within a short and presumably stressful interval could increase the odds of a shooting leading to the wounding of one to five victims as well. Kleck then identifies various online databases of cases involving shootings with six or more victims where there is some information—from news media accounts—about whether or not a LCM was used in the incident. Through this process, Kleck identifies only 23 incidents in which more than six victims were shot at a single time and place in the U.S. for a period 1994-2013 and *"were known to involve the use of any magazines with capacities of ten rounds."* (page 14) He then takes a two-year period (2013-2014) of such cases—699 in all—and compares it against a list compiled by the Violence Policy Center for mass shootings in which a LCM was used and identifies two such cases. He uses this small ratio (2/699) to argue

[8] Kleck, Gary. Large-Capacity Magazines and the Casualty Counts in Mass Shootings: The Plausibility of Linkages. Working Paper, Social Science Research Network abstract 2741098. March 6, 2016. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2741098

[9] About 1 in 5 shootings reported by victims in the National Crime Victimization Survey result in a victim wounding. *Shotspotter* technology used to identify gunfire in urban areas identifies many time more shooting incidents than are reported to police or that result in woundings.

that LCMs are irrelevant to high-casualty shootings. Kleck acknowledges that news reports of mass shootings may not always report whether or not a LCM was used, but fails to acknowledge that the online databases he and others use to study mass shootings actually *rarely record the capacity of the firearm's magazine*. This careless method, that pretends as if there is a valid surveillance system for tracking use of LCM use when ammunition capacity is rarely recorded, produces very misleading estimates of the use of LCMs in mass shootings.

14. Kleck also makes an argument ammunition capacity is only logically relevant in incidents in which there is a high rate of fire over a short span of time. This is because longer intervals in an incident provide opportunities for a shooter to load another magazine or switch to another gun within a few seconds. The concept is partly defensible, but his measure—seconds elapsing per shot fired—is fraught with problems for large portion of the cases. For example, a shooter may fire 20 rounds in less than 10 seconds, wounding or killing many who do not have time to escape or fight back, and then spend many minutes or hours "hunting" additional victims. In such cases, a measure of seconds elapsed per shot fired is very misleading if the goal is to ascertain situations in which a shooter has the ability to and does fire a large number of rounds very quickly and uninterrupted. Also lost in Kleck's analysis and consideration is the fact that there is no way to measure the incidents where there was the potential for a large number of casualties in a shooting but fewer occurred *due to the absence of a LCM*. That is, the impact of a shooter having fewer bullets in an ammunition feeding device may have an important effect on reducing the likelihood that a case hits the victim threshold for a mass shooting that is captured in mass shooting tracking projects that Kleck uses in his analyses.

15. Studies of guns recovered by police and submitted for tracing to the U.S. Bureau of Alcohol, Tobacco and Firearms (ATF) prior to the 1994 federal assault weapon ban indicated that assault weapons accounted for between 1% to 8%

of such guns with the average of about 2%.[10] Yet a study of murders of police officers while on duty in 1994 found that assault weapons were used in 16% of the murders and a firearm with a LCM was used to shoot 31% to 41% of the police officers murdered.[11] The Violence Policy Center examined data on law enforcement officers murdered in the line of duty from the FBI for 1998-2001 and found 19.4 % (41 of 211) had been shot with an assault weapon.[12]

16. In contrast to the data indicating that assault weapons and LCMs increase casualties from mass shootings, I am aware of no study or systematic data that indicate that LCMs are necessary for personal defense more so than firearms that do not have a LCM. That is, I know of no data indicating that victims of violent crime tend to need more than 10 rounds of ammunition in the rare instances in which such persons use a firearm in self-defense or that persons equipped with assault weapons or LCMs were more effective in protecting themselves than were crime victims who used other types of firearms. For example, data from Colorado for the time period 2004-2013 indicate that citizens rarely, if ever, face situations in which they are defending their home against criminals and require more than 15 rounds. In *Cooke v. Hickenlooper*, 54 of 55 Colorado Plaintiff Sheriffs responded to Defendant's Interrogatories requiring that they supply information describing cases in their respective jurisdictions for every home invasion or robbery in a home to which their department responded during the ten-year period 2004-2013. This Interrogatory specifically asks for information on the circumstances, the number of criminal perpetrators, whether the perpetrators were armed and fired shots, whether victims were armed and used guns in self-defense, whether victims' guns had a

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[10] Kleck, Gary. *Targeting Guns: Firearms and Their Control.* New York: Aldine de Gruyter. (1997), pp. 112, 141-143.)

[11] W.C. Adler, F.M. Bielke, D.J. Doi, and J.F. Kennedy. Cops Under Fire: Law Enforcement Officers Killed with Assault Weapons and Guns with High-Capacity Magazines. Washington, DC: Handgun Control, Inc., 1995, p.4.

[12] Violence Policy Center, "Officer Down" Assault Weapons and the War on Law Enforcement, http://www.vpc.org/studies/officeone.htm (2003).

LCM, and the number of shots fired by the victims. A report of the data supplied by Sheriffs completed by Dr. Jeffrey S. Zax shows that perpetrators discharged firearms in home invasions or home robberies a total of 46 times during the 10-year study period, a rate of six per year or 1.25 per million population per year.[13] During this same time period, there were only two recorded instances in which a victim displayed a firearm with a LCM and there were no home invasion crimes in which a victim fired 16 or more rounds. Thus, Colorado residents who live in jurisdictions served by the 55 counties served by Sheriffs face an incredibly low risk of home invasion, an even smaller risk of a home invasion in which the criminal fires shots, and even more rarely, if ever, use a LCM in a manner in which extended ammunition capacity is relevant for their defense of themselves and their families.

17. Some claim that bans of assault weapons and LCMs do not work; however, this is not the conclusion of Christopher Koper, the respected researcher who has studied the role of assault weapons and LCMs in criminal violence and attempted to estimate the impact of the 1994 federal assault weapon ban. Koper correctly identified a number of weaknesses in the federal assault weapons ban which limited its impact, especially in the short-term. For example, the federal assault weapons ban allowed "copycat" versions of the banned firearms to be produced and sold following the ban as long as the new firearm model was not identical to the banned gun. Another was that the federal ban "grandfathered" currently owned assault weapons and LCMs, including allowing the ongoing sales of those grandfathered assault weapons and LCMs. It is estimated that this involved 1.5 million assault weapons and 25 million LCMs.[14] Similar to what I and my colleagues observed when Maryland banned so-called "Saturday night special"

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[13] Zax, Jeffrey S. Supplemental Report by Jeffrey S. Zax, Cooke, et al. V. Hickenlooper, September 13, 2013.

[14] Koper, Christopher S. *An Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence, 1994-2003.* Philadelphia: University of Pennsylvania. (2004). Page 10

handguns,[15] there was a sharp increase in sales of the to-be-banned assault weapons just prior to the ban going into effect. The same was likely true for LCMs that were to be banned for sale.

18. These factors would suggest that the positive effects of the federal ban on LCMs and assault weapons on violence would be somewhat muted as well as delayed. In other words, the full impact of the federal ban of LCMs and assault weapons have on violence would be expected to be delayed and somewhat gradual as pre-ban built-up stocks of LCMs and assault weapons would satisfy most of the demand for some time after the ban went into effect.

19. Koper's study of the effects of the federal ban of LCMs and assault weapons in its early years indicated that there was a substantial decline in the percentage of guns recovered by police that were assault weapons in six cities that were studied with declines ranging from 17% in Milwaukee (5.91% to 4.91%) to 72% in Boston (2.16% to 0.60%).[16] Koper also examined pre-ban vs. post-ban changes in the percentage of police-recovered firearms with LCMs in four selected cities with available data (for the early years of the ban period) and saw no evidence of a decline in LCM use in crime.[16] However, reporters from The Washington Post obtained data from the Criminal Firearms Clearinghouse collected by the Virginia State Police from 201 local law enforcement agencies across the state for the years 1993 through 2010, which included the ammunition capacity of the firearms recovered by police. These data revealed that the percentage of police-recovered

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[15] Webster, Daniel W., Jon S. Vernick, and Lisa M. Hepburn, Effects of Maryland's law banning Saturday night special handguns on homicides. American Journal of Epidemiology 155:406-412 (2002).

[16] Koper, Christopher S., America's Experience with the Federal Assault Weapons Ban, 1994-2004: Key Findings and Implications, pages 157-171 in Reducing Gun Violence in America: Informing Policy with Evidence and Analysis, Daniel W. Webster and Jon S. Vernick, eds. Baltimore: Johns Hopkins University Press, at 163 (2013). Other pre-ban to post-ban changes in the percentage of police-recovered firearms that were assault weapons: -34% in Baltimore (1.88% to 1.25%), 32% in Miami, FL (2.53% to 1.71%), 32% in St. Louis (1.33% to 0.91%), and -40% in Anchorage, AK (3.57% to 2.13%).

firearms that had LCMs rose steadily from about 13% in 1993 (the last full pre-ban year) until 1997 when firearms with LCMs accounted for nearly 18% of guns recovered by police. This increase was followed by a sharp decline following 1997 until LCM-equipped guns accounted for 10% of police-recovered firearms in 2004, the year the federal assault weapon ban expired. Particularly striking in these data was the sharp increase in the share of police-recovered firearms with LCMs after the federal ban expired in 2004. Firearms with LCMs rose from 10% in 2004 to more than 14% in 2005, continuing to rise in subsequent years until LCM-equipped guns accounted for 22% of all police-recovered firearms in Virginia.[17] This temporal pattern in the percentage of police-recovered firearms equipped with LCMs suggests that the pre-ban increased supply of LCMs likely brought about by a combination of increased domestic sales just prior to the ban and post-ban importation of LCMs (Koper 2004, pp. 65-67)[16] predictably increased their use in crime for a number of years before the blocked sales of new LCMs squeezed supply, making them less available for use in crime only several years into the post-ban period. Expiration of the ban in 2004 provided a large supply of LCMs to meet pent up demand.

20. Though Koper has been relatively thorough in his examination of the potential effects of the federal ban on assault weapons and LCMs on violent crime, his analyses did not examine data for the full 10-year period the federal ban of LCM and assault weapons was in effect because it was not available at the time he completed his study. Excluding data from the last years when the ban was in effect, based on temporal pattern of LCM use from data from Virginia police, likely underestimated the LCM ban's effects on gun violence. Koper's analyses of longitudinal data that ended between 2000 and 2003 depending on the analysis, largely tested differences between pre-ban and post-ban means. An underlying

[17] Fallis, David, VA data show drop in criminal firepower during assault gun ban, The Washington Post, January 23, 2011.

assumption behind such comparisons and statistical tests is that the potential effects of the assault weapons and LCM ban would be observed immediately and be constant over the post-ban time period. In his published reports, Koper did not formally test whether the federal assault weapons ban had a delayed or gradual effect on violent crime. Such a delayed or gradual effect is an outcome that would be more plausible than the immediate, constant change scenario that was tested, in light of the market data Koper analyzed, the effects of permitting ongoing sales of grandfathered assault weapons and LCMs, and trends in criminal use of LCMs in Virginia. For these reasons, it is my view that Koper's research is likely to understate potential long-term public safety benefits of the federal ban of assault weapons and LCMs.

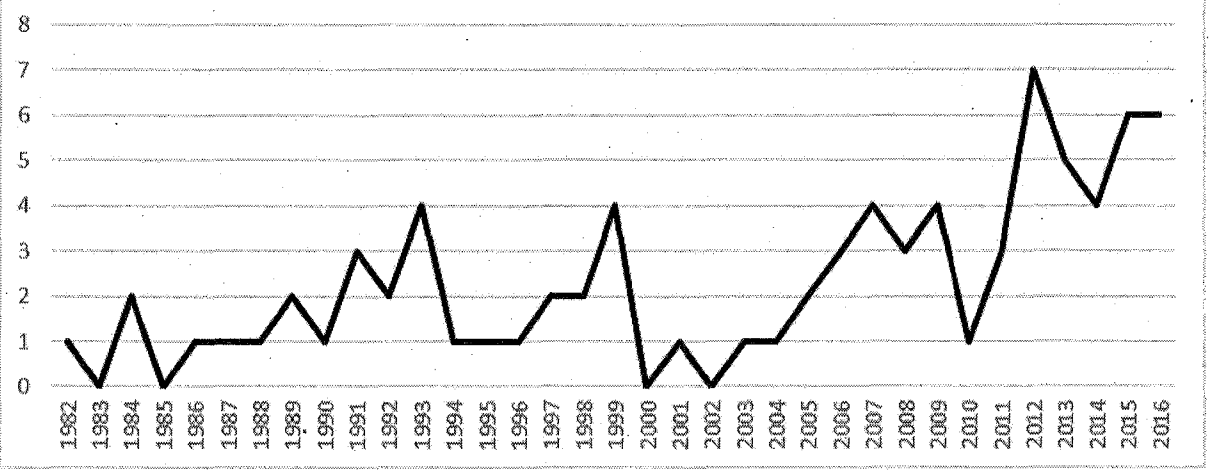
21. Furthermore, as Koper has pointed out, only about 5% of those shot in criminal shootings victimizations are shot in incidents in which more than 10 rounds were fired, suggesting an upper-bound for the potential impact of LCM bans on gun violence. Because trends in overall gun violence are influenced by myriad of factors, some of the potentially most important of which are very difficult to measure (e.g., drug market dynamics, gang disputes, social norms surrounding violence), it is possible that the federal ban of assault weapons and LCMs did contribute to a proportionately small yet meaningful reduction in gun violence, but available data and statistical models are unable to discern the effect. As Koper points out, a one percent reduction in shootings in a nation with such high rates of gun violence—undetectable in virtually any statistical analysis—translates to about 650 fewer shootings per year. (Koper 2013, p. 167.)[16]

22. Due to the relative rarity of such events, especially during his study period, Koper did not examine the potential impact of the federal assault weapon and LCM ban on mass shootings in public places or the effects of the policy change on the number of victims shot in such cases. Although no formal, sophisticated analyses of the data on mass shootings in public places by lone shooters for the

period 1982-2012 collected by Mother Jones magazine has been performed to my knowledge, a temporal pattern can be discerned that is consistent with a hypothesized protective effect of the federal assault weapon and LCM ban and a harmful effect of the expiration of that ban. Examining the data in Figure 1 (below), there is a noteworthy increase in the number of these incidents in the years leading up to the 1994 federal ban, a leveling off during the ban, and an increase following the expiration of the ban (from an annual average of 1.5 for 1995-2004 to 4.1 for 2005-2016).

Figure 1. Incidents of mass shootings in public places by year

Mother Jones Magazine, 2017

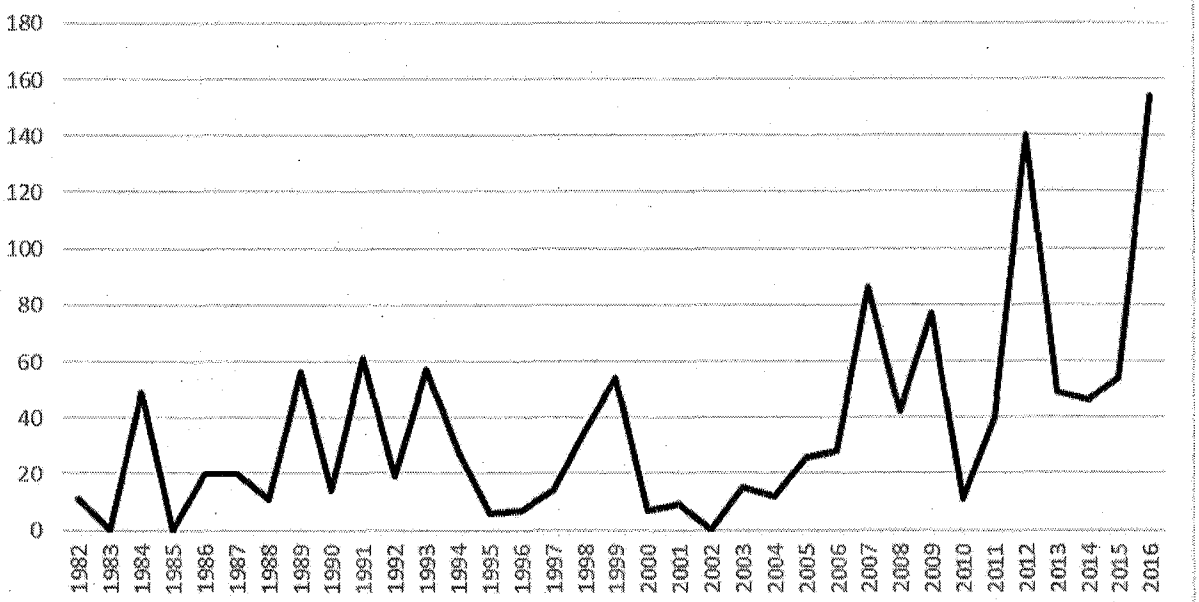


23. A more striking pattern is evident for the number of persons killed and wounded in public mass shootings by lone shooters (Figure 2). The mean number of persons shot per year in these incidents during the pre-ban years (1982- 1994) was 26.6, during the years the ban was in effect (1995-2004) it dipped to 21.1 (despite an upward pre-ban trajectory and the unusually large spike in 1999), and more than doubled during the years since the ban has expired (66.1 in 2005-2016). (Mother Jones Magazine 2017). These temporal changes could be due to a myriad

of factors, but the pattern of findings suggests that the federal assault weapons and LCM ban could have had a protective effect against the type of shootings in which the unique features of assault weapons and LCMs were most relevant and that motivated calls for the ban.

Figure 2. Number of victims in mass shootings in public places by year

Mother Jones Magazine, 2017



24. I performed a series of negative binomial regression analyses to test whether the pattern I observed in trends for mass shootings and victims shot in mass shootings were statistically significant and thus unlikely to be due to normal statistical fluctuation in the phenomena. These regression analyses use the annual US population as a so-called offset variable, thereby eliminating the effect of a growing population during the 1982-2016 study period. Simple regressions that tested for the effect of the 10-year federal ban of assault weapons and large capacity magazines indicated that the ban was associated with a statistically significant 62.6% reduction in the total number of victims shot in mass shootings during the ban (Incidence Rate Ratio, IRR = .374, p = 0.010) and a statistically significant

89.3% reduction in the number of victims shot in mass shootings in incidents involving an assault weapon or other firearm with a LCM (IRR = .107, p = <.001). When I included a linear trend term in the model to control for pre-ban trend in mass shooting victimizations, the statistically significant associations between the AW/LCM ban years and the other years were essentially unchanged (-59.9% for all victims, IRR = .401, p = .017; -87.4% for all victims shot in mass shootings with an AW or LCM, IRR = .126, p < .001). I also tested whether the effect of having the federal AW/LCM ban grew over the years the ban was in effect. This is arguably a better way to model the effect due to the fact that there were large increases in AW and LCM bans just prior to the ban and that more potential sales of AWs and LCMs were blocked with each year the ban was in effect. Again, I found that, even after controlling for population growth and pre-ban trend, the AW/LCM ban was associated with a 14.2% reduction in the rate of all mass shooting victimization for each year the ban was in effect (IRR = .858, p =.012) and a 28.5% reduction in the number of victims shot in public mass shootings where an AW or other firearm with a LCM was used (IRR = .725, p <.001). These associations were statistically significant.

25. To date, there are no studies that have examined separately the effects of an assault weapons ban, on the one hand, and a LCM ban, on the other hand, likely because the two have usually been enacted together. It is my opinion that the largest protective effect of these laws are due to restrictions on LCMs because LCMs are used much more frequently than assault weapons.

26. LCMs can increase the ability of criminals and those attempting to kill or wound large numbers of innocent people to maximize casualties from their attacks. When shootings result in mass casualties, those in which a firearm with a LCM is used result in 2.5 times as many people shot and 47% as many killed than is the case in mass shootings with other types of firearms. Based on the threat that they pose to public safety as well as the fear generated by mass shootings, the state

of California's law restricting the maximum size of ammunition feeding devices to 10 seems prudent. Indeed, a lower limit could be justified. There is good reason to believe that California's restriction in the capacity of ammunition feeding devices for firearms would lead to modest reductions in gun violence. The federal LCM ban appears to have led to a delayed decrease in the criminal use of LCMs and the expiration of that law contributed to an increase in the use of LCMs in crime. There is also data supporting the hypothesis that the federal ban and its expiration were associated with changes in the number of people shot in mass shootings in public places in a similar way.

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on: June 5, 2017

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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; et al.,** Defendants.	17-cv-1017-BEN-JLB **DECLARATION OF ALEXANDRA ROBERT GORDON IN SUPPORT OF DEFENDANT ATTORNEY GENERAL XAVIER BECERRA'S OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION** Date: June 13, 2017 Time: 10:00 a.m. Dept: 5A Judge: Hon. Roger T. Benitez Action Filed: May 17, 2017

I, Alexandra Robert Gordon, declare:

1. I am a Deputy Attorney General at the California Department of Justice and serve as counsel to Attorney General Xavier Becerra in the above-titled matter.

2. Except as otherwise stated, I have personal knowledge of the facts set forth in this declaration, and if called upon as a witness I could testify competently as to those facts. I make this declaration in support of the Attorney General's Opposition to Plaintiffs' Motion for Preliminary Injunction.

3. A true and correct copy of Phillip J. Cook, et al., *The Gun Debate's New Mythical Number How Many Defensive Uses Per Year?*, 16 Journal of Policy Analysis and Management, No. 3, (Summer, 1997), pp. 463-469, is attached hereto as **Exhibit 1**.

4. A true and correct copy of Eugene Volokh, *Implementing the Right to Keep and Bear Arms for Self-defense: An Analytical Framework and a Research Agenda*, 56 UCLA L. Rev. 1443 (June 2009) is attached hereto as **Exhibit 2**.

5. A true and correct copy of Michael Siegel, et al., *The Relationship Between Gun Ownership and Firearm Homicide Rates in the United States, 1981-2010*, American Journal of Public Health (Sept. 2013), is attached hereto as **Exhibit 3**.

6. A true and correct copy of selected pages of James Alan Fox and Jack Levin, *Extreme Killing: Understanding Serial and Mass Murder* (2d ed., 2005) pp. 147, 149, 152-53, 168, 187, 216, 227 is attached hereto as **Exhibit 4**.

7. A true and correct copy of selected pages of David Hemenway, *Private Guns Public Health* (2004) pp. 64-78, is attached hereto as **Exhibit 5**.

8. A true and correct copy of Firearms Tactical Institute, *Tactical Briefs (Volume 2, Number 4)* (April 1999), is attached hereto as **Exhibit 6**.

9. A true and correct copy of selected pages of Gary Kleck, *Point Blank: Guns and Violence in America* (1991), pp. 8-9, 20-21, 78-79, 111, is attached hereto as **Exhibit 7**.

10. A true and correct copy of Claude Werner, *The Armed Citizen – Analysis of Five Year of Armed Encounters*, Gunssavelives.net (Mar. 12, 2012), which can be located at http://gunssavelives.net/self-defense/analysis-of-five-years-of-armed-encounters-with-data-tables/, is attached hereto as **Exhibit 8**.

11. A true and correct copy of an excerpt of Massad Ayoob, *The Gun Digest Book of Concealed Carry* (2012) p. 64, is attached hereto as **Exhibit 9**.

12. A true and correct copy of the Brief for Professional Historians and Law Professors as Amici Curiae, *Heller v. District of Columbia*, D.C. Circuit Court of Appeals, Case No. 10-7036, Docket No.1266982, is attached hereto as **Exhibit 10**.

13. A true and correct copy of the Memorandum of Decision, *DeForst H. Benjamin, Jr., et al. v. John M. Bailey, et al.*, Case No. cv 93-0063723, June 30, 1994, is attached hereto as **Exhibit 11**.

14. A true and correct copy of the Order Denying Plaintiffs' Motion for Temporary Restraining Order, *Tardy v. O'Malley*, United States District Court, District of Maryland, Case No. 1:13-cv-02841-CCB, Docket No. 14, Oct. 2013, is attached hereto as **Exhibit 12**.

15. A true and correct copy of the Transcript of Temporary Restraining Order Proceedings held on October 1, 2013, in *Tardy v. O'Malley*, United States District Court, District of Maryland, Case No. 1:13-cv-02841-CCB, October 2013, is attached hereto as **Exhibit 13**.

16. A true and correct copy of the Declaration of Christopher S. Koper in Support of Sunnyvale's Opposition to Plaintiff's Motion for Preliminary Injunction, *Leonard Fyock, et al. v. The City of Sunnyvale, et al.*, Case Number 13-cv-05807, Docket No. 39, is attached hereto as **Exhibit 14**.

17. A true and correct copy of Exhibit A (Chart titled "Estimated 158 Million Pistol and Rifle Magazines in U.S. Consumer Possession 1990 – 2012") to the Declaration of James Curcuruto, *Leonard Fyock, et al. v. The City of Sunnyvale, et al.*, Case No. 5:13-cv-05807-RMW, Docket No. 13, is attached hereto as **Exhibit 15**.

18. A true and correct copy the California Department of Justice Division of Law Enforcement Information Bulletin 2016-BOF-02 titled "New and Amended Firearms/Weapons Law," is attached hereto as **Exhibit 16**.

19. A true and correct copy the California Department of Justice Division of Law Enforcement California Department of Justice Bureau of Firearms Large-Capacity Magazine Permit Application is attached hereto as **Exhibit 17**.

20. A true and correct copy of the California Department of Justice Firearms Regulations document titled "Finding of Emergency" (Dec 2016), is attached hereto as **Exhibit 18**.

21. A true and correct copy of the California Department of Justice Firearms Regulations document titled "Notice of Proposed Emergency Action" (Dec. 2016), is attached hereto as **Exhibit 19**.

22. A true and correct copy of the California Department of Justice Firearms Regulations document titled "Text of Emergency Regulations" (Dec. 2016), is attached hereto as **Exhibit 20.**

23. A true and correct copy of the California Department of Justice Firearms Regulations approved form STD 399, "Economic and Fiscal Impact" (Dec. 2016), is attached hereto as **Exhibit 21**.

24. A true and correct copy of the California Department of Justice Firearms Regulations document titled "Withdrawal of Emergency Regulations" (Dec. 2016), is attached hereto as **Exhibit 22**.

25. A true and correct copy of the California Department of Justice Firearms Regulations document titled, "Text of Draft Regulations" (May 2017), is attached hereto as **Exhibit 23.**

26. A true and correct copy of a letter from the National Rifle Association and the California Rifle & Pistol Association Incorporated to the California Office of Administrative Law and the California Department of Justice Bureau of Firearms, dated December 28, 2016, is attached hereto as **Exhibit 24**.

27. A true and correct copy of a letter from the Commissioner Charles H. Ramsey, Philadelphia Police Department, President of the Major Cities Chiefs Association to the Vice President of the United States, dated December 28, 2012, is attached hereto as **Exhibit 25.**

28. A true and correct copy of selected pages of United States Department of the Army, *Rifle Marksmanship M-16/M-4 Series Weapons* (Aug. 2008), pp. xv, 7-8-7-24, 7-47, is attached hereto **as Exhibit 26.**

29. A true and correct copy of a Sabrina Tavernise and Robert Gebeloff, *Share of Homes with Guns Shows 4-Decade Decline*, New York Times (Mar. 9, 2013), http://www.nytimes.com/2013/03/10/us/rate-of-gun-ownership-is-down-survey-shows.html, is attached hereto as **Exhibit 27.**

30. A true and correct copy of Mark Follman, *More Guns, More Mass Shootings—Coincidence?*, Mother Jones (Sep. 26, 2012), http://www.motherjones.com/politics/2012/09/mass-shootings-investigation, is attached hereto as **Exhibit 28.**

31. A true and correct copy of Mark Follman, et al., *A Guide to Mass Shootings in America*, Mother Jones (Jul. 20, 2012), http://www.motherjones.com/politics/2012/07/mass-shootings-map, is attached hereto as **Exhibit 29.**

32. A true and correct copy of Mark Follman and Gavin Aronsen, *"A Killing Machine": Half of All Mass Shooters Used High-Capacity Magazines*,

Mother Jones (Jan. 30, 2013), http://www.motherjones.com/politics/2013/01/high-capacity-magazines-mass-shootings, is attached hereto as **Exhibit 30.**

33. A true and correct copy of Wikipedia, *1986 FBI Shootout*, https://en.wikipedia.org/wiki/1986_FBI_Miami_shootout, is attached hereto as **Exhibit 31.**

34. A true and correct copy of CNN, *Stunned Police, Residents Cope with Aftermath of L.A. Shootout* (Mar. 1, 1997), https://web.archive.org/web/20050120124642/http://edition.cnn.com:80/US/9703/01/bank.shootout/, is attached hereto as **Exhibit 32.**

35. A true and correct copy of Wikipedia, *North Hollywood shootout*, https://en.wikipedia.org/wiki/North_Hollywood_shootout, is attached hereto as **Exhibit 33.**

36. A true and correct copy of Russell Goldman, *Gunman William Spengler Used Bushmaster, Left Chilling Note*, ABC News (Dec. 25, 2012), http://abcnews.go.com/US/webster-gunman-bushmaster-left-chilling-note/story?id=18062121, is attached hereto as **Exhibit 34.**

37. A true and correct copy of Wikipedia, *2012 Webster, New York shooting*, https://en.wikipedia.org/wiki/2012_Webster,_New_York_shooting, is attached hereto as **Exhibit 35**.

38. A true and correct copy of Jonathan Weisman, *Senate Blocks Drive for Gun Control*, New York Times (Apr. 17, 2013), http://www.nytimes.com/2013/04/18/us/politics/senate-obama-gun-control.html?pagewanted=all&pagewanted=print, is attached hereto as **Exhibit 36**.

39. True and correct copies of various media reports stating that the shooter was subdued or tackled while reloading are attached hereto as **Exhibit 37**.

40. A true and correct copy of Kevin Dolak and Justin Weaver, *Woman Wrestled Fresh Ammo Clip from Tucson Shooter as He Tried to Reload*, ABC

News (Jan. 9, 2011), http://abcnews.go.com/Politics/patricia-maisch-describes-stopping-gunman-reloading/story?id=12577933, is attached hereto as **Exhibit 38.**

41. A true and correct copy of Francis X. Clines, *DEATH ON THE L.I.R.R.: The Rampage; Gunman in Train Aisle Passes Out Death*, New York Times (Dec. 9, 1993), http://www.nytimes.com/1993/12/09/nyregion/death-on-the-lirr-the-rampage-gunman-in-a-train-aisle-passes-out-death.html?pagewanted=all&pagewanted=print, is attached hereto as **Exhibit 39.**

42. A true and correct copy of Edmund Mahony, et al., *Sandy Hook Shooter's Paul May Have Aided Students' Escape,* The Hartfort Courant (Dec. 23, 2012), http://www.courant.com/news/connecticut/newtown-sandy-hook-school-shooting/hc-lanza-gunjam-20121222-story.html, is attached hereto as **Exhibit 40.**

43. A true and correct copy of Paul Pinkham, *Have Gun, Will not Fear Anymore*, Florida Times Union (Jul. 18, 2000), http://jacksonville.com/tu-online/stories/071800/met_3568307.html#.WS8_VNy1vRY, is attached hereto as **Exhibit 41.**

44. A true and correct copy of Wave 3 News, *Pizza Hut Fires Driver for Carrying Gun; Driver Said He Killed Armed Robber* (May 18, 2004), http://www.wave3.com/story/1877208/pizza-hut-fires-driver-for-carrying-gun-driver-said-he-killed-armed-robber, is attached hereto as **Exhibit 42.**

45. A true and correct copy of Chris Eger, *San Francisco settles suit with 5 out-of-state suppliers over magazine 'repair kits'*, Guns.com (May 17, 2017), http://www.guns.com/2017/05/17/san-francisco-settles-suit-with-5-out-of-state-suppliers-over-magazine-repair-kits/, is attached hereto as **Exhibit 43.**

46. A true and correct copy of NBC Southern California, *LAPD Chief Backs Ban on Some Ammo Magazines* (Mar. 2, 2011), http://www.nbclosangeles.com/news/local/beck-lapd-ammunition-ban-nra-117261943.html, is attached hereto as **Exhibit 44.**

47. A true and correct copy of David S. Fallis and James V. Grinaldi, *Va. Data Show Drop in Criminal Firepower During Assault Gun Ban*, Washington Post (Jan. 23, 2011), http://www.washingtonpost.com/wp-dyn/content/article/2011/01/22/AR2011012203452_pf.html, is attached hereto as **Exhibit 45.**

48. A true and correct copy of David Fallis, *Data Indicate Drop in High-Capacity Magazines During Federal Gun Ban*, Washington Post (Jan. 10, 2013), https://www.washingtonpost.com/investigations/data-point-to-drop-in-high-capacity-magazines-during-federal-gun-ban/2013/01/10/d56d3bb6-4b91-11e2-a6a6-aabac85e8036_story.html?utm_term=.d3a51bc0befb, is attached hereto as **Exhibit 46.**

49. A true and correct copy of Greg Botelho and Steve Almasy, *San Bernardino shooting: Carnage was 'Unspeakable,' Police Say*, CNN (Dec. 4, 2015), http://www.cnn.com/2015/12/03/us/san-bernardino-shooting/index.html, is attached hereto as **Exhibit 47.**

50. A true and correct copy of Eric Levenson, *San Bernardino School Shooter Fired 10 shots, Reloaded Once*, CNN (Apr. 12, 2017), http://www.cnn.com/2017/04/11/us/san-bernardino-school-shooting/index.html, is attached hereto as **Exhibit 48.**

51. A true and correct copy of Ralph Ellis, et al., *Orlando Shooting: 49 Killed, Shooter Pledged ISIS Allegiance*, CNN (June 13, 2016), http://www.cnn.com/2016/06/12/us/orlando-nightclub-shooting/, is attached hereto as **Exhibit 49**.

52. A true and correct copy of Mark Follman, *This is the Assault Rifle Used by the Orlando Mass Shooter*, Mother Jones (Jun. 13, 2016), http://www.motherjones.com/politics/2016/06/assault-rifle-used-by-orlando-mass-shooter, is attached hereto as **Exhibit 50.**

53. A true and correct copy of an Excel spreadsheet of data from a *Mother Jones* investigation titled "U.S. Mass Shootings, 1982-2016," http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data (accessed and downloaded from site as of 5-30-2017), is attached hereto as **Exhibit 51.**

54. A true and correct copy of International Association of Chiefs of Police, *Position Paper of Firearm Violence,* www.theiacp.org/Portals/0/documents/pdfs/IACPFirearmsPositionPaper.pdf, is attached hereto as **Exhibit 52.**

55. A true and correct copy of National Law Enforcement Partnership to Prevent Gun Violence, *Protecting Communities from Assault Weapons and High-capacity Ammunition Magazines* (Jan. 2017), www.lepartnership.org/wp-content/uploads/2017/01/Partnership-Facts-Assault-Weapons-and-High-Cap-Ammo.pdf, is attached hereto as **Exhibit 53.**

56. A true and correct copy of Violence Policy Center, *A Shrinking Minority, the Continuing Decline of Gun Ownership in America* (May 1, 2005), http://www.vpc.org/studies/ownership.pdf, is attached hereto as **Exhibit 54.**

57. A true and correct copy of U.S. Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms (ATF), *Recommendation on the Importability of Certain Semiautomatic Rifles* (July 1989), is attached hereto as **Exhibit 55**.

58. A true and correct copy of U.S. Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms (ATF), *The Treasury Study on the Sporting Suitability of Modified Semiautomatic Assault Riles* (April 1989), https://www.atf.gov/file/57521/download, is attached hereto as **Exhibit 56**.

59. A true and correct copy of House of Representatives Report 103-489 (1994 WL 168883) is attached hereto as **Exhibit 57.**

60. A true and correct copy of the State of Connecticut, Division of Criminal Justice, *Report of the State's Attorney for the Judicial District of Danbury*

on the Shootings at Sandy Hook Elementary School (November 25, 2013), www.ct.gov/csao/lib/csao/Sandy_Hook_Final_Report.pdf, is attached hereto as **Exhibit 58.**

61. A true and correct copy of Mayors Against Illegal Guns, *Analysis of Recent Mass Shootings* (Sept. 16, 2013), libcloud.s3.amazonaws.com/9/56/4/1242/1/analysis-of-recent-mass-shootings.pdf., is attached hereto as **Exhibit 59.**

62. A true and correct copy of an excerpt of Virginia Tech Review Panel, *Mass Shootings a Virginia Tech, Report of the Review Panel* (April 16, 2007) is attached hereto as **Exhibit 60.**

63. A true and correct copy of the Brady Center to Prevent Gun Violence, *Assault Weapons: Mass Produced Mayhem* (Oct. 2008), www.bradycampaign.org/sites/default/files/mass-produced-mayhem.pdf, is attached hereto as **Exhibit 61.**

64. A true and correct copy of Violence Policy Center, *The Militarization of the U.S. Civilian Firearms Market* (June 2011), www.vpc.org/studies/militarization.pdf, is attached hereto as **Exhibit 62.**

65. A true and correct copy of United States Department of Justice, Bureau of Alcohol, Tobacco, Firearms, and Explosives, *ATF Study on the Immortality of Certain Shotguns* (Jan. 2011), is attached hereto as **Exhibit 63.**

66. A true and correct copy of a statement by the Professors of Constitutional Law titled "The Second Amendment and the Constitutionality of the Proposed Gun Violence Prevention Legislation" (Jan. 30, 2013), www.acslaw.org/Second%20Amendment%20Letter%20Final.pdf, is attached hereto as **Exhibit 64.**

67. A true and correct copy of the of United States Department of Justice, Bureau of Alcohol, Tobacco, Firearms, and Explosives, *Report on the Importality of Certain Shotguns* (July 2, 2012), is attached hereto as **Exhibit 65.**

68. A true and correct copy of Christopher S. Koper, *An Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence, 1994-2003* (2004), https://www.ncjrs.gov/pdffiles1/nij, is attached hereto as **Exhibit 66.**

69. A true and correct copy of Violence Policy Center, *Officer Down: Assault Weapons and the War on Law Enforcement* (May 2003), www.vpc.org/studies/officer%20down.pdf, is attached hereto as **Exhibit 67**.

70. A true and correct copy of United States Department of the Treasury, Bureau of Alcohol, Tobacco, and Firearms, *Assault Weapons Profile* (April 1994), is attached hereto as Exhibit 68.

71. A true and correct copy of the Final Report of the Sandy Hook Advisory Commission (Mar. 18, 2015) is attached hereto as **Exhibit 69.**

72. A true and correct copy of the Interim Report of the Sandy Hook Advisory Commission (Mar. 6, 2013) is attached hereto as **Exhibit 70.**

73. A true and correct copy of Violence Policy Center, *Firearm Justifiable Homicides and Non-Fatal Self-Defense Gun Use an Analysis of Federal Bureau of Investigation and National Crime Victimization Survey Data* (April 2013), www.vpc.org/studies/justifiable.pdf, is attached hereto as **Exhibit 71.**

74. A true and correct copy of Violence Policy Center, *Firearm Justifiable Homicides and Non-Fatal Self-Defense Gun Use an Analysis of Federal Bureau of Investigation and National Crime Victimization Survey Data* (June 2015), www.vpc.org/studies/justifiable15.pdf, is attached hereto as **Exhibit 72.**

75. A true and correct copy of Brady Center to Prevent Gun Violence Report titled "*On Target: The Impact of the 1994 Federal Assault Weapon Act*", www.bradycampaign.org/sites/default/files/on_target.pdf, is attached hereto as **Exhibit 73.**

76. A true and correct copy of 1997 Report by Christopher S. Koper and Jeffrey Roth (Urban Institute) titled "*Impact Evaluation of the Public Safety and*

Recreational Firearms Use Protection Act of 1994: Final Report", http://www.urban.org/sites/default/files/publication/67071/406797-Impact, is attached hereto as **Exhibit 74.**

77. A true and correct copy of 2013 Report by Christopher S. Koper titled "America's Experience with the Federal Assault Weapons Ban 1994-2004: Key Findings and Implications" (from *Reducing Gun Violence In America: Informing Policy with Evidence and Analysis*, ed. Daniel W. Webster and Jon S. Vernick, 2013), is attached hereto as **Exhibit 75.**

78. A true and correct copy of Report by Everytown for Gun Safety titled "*Mass Shootings in the United States: 2009-2016*", https://everytownresearch.org/wp-content/uploads/2017/03/Analysis_of_Mas, is attached hereto as **Exhibit 76.**

79. A true and correct copy of Report Appendix by Everytown for Gun Safety titled "Mass Shootings in the United States: 2009-2016," https://everytownresearch.org/documents/2017/03/appendix-mass-shootings-, is attached hereto as **Exhibit 77.**

80. A true and correct copy of Report by Citizens Crime Commission of New York City titled "*Mass Shooting Incidents in America (1984-2012)*," http://www.nycrimecommission.org/mass-shooting-incidents-america.php, is attached hereto as **Exhibit 78.**

81. A true and correct copy of Violence Policy Center Fact Sheet titled "High-Capacity Ammunition Magazines are the Common Thread Running Through Most Mass Shootings in the United States", www.vpc.org/fact_sht/VPCshootinglist.pdf, is attached hereto as **Exhibit 79.**

82. A true and correct copy of San Francisco Police Code section 619 is attached hereto as **Exhibit 80.**

83. A true and correct copy of Cal. Stats. 1999, ch. 129. is attached hereto as **Exhibit 81.**

84. A true and correct copy of N.Y.S. AB No. 11535 is attached hereto as **Exhibit 82.**

85. A true and correct copy of Excerpt of 2002 Md. Sess. Laws ch. 26, § 2. is attached hereto as **Exhibit 83.**

86. A true and correct copy of City of Rochester, N.Y., City Code No. 47-5., http://ecode360.com/print/RO0104?guid=8675393&children=true, is attached hereto as **Exhibit 84.**

87. A true and correct copy of Chicago, Ill., Municipal Code, §§ 8-20-010, 8-20-085 is attached hereto as **Exhibit 85.**

88. A true and correct copy of 2013 Colo. Stats. H.B. 13-1224 is attached hereto as **Exhibit 86.**

89. A true and correct copy of 2013 Conn. Legis. Serv. P.A. 13-3 (S.B. 1160) is attached hereto as **Exhibit 87.**

90. A true and correct copy of 2013 N.Y. Sess. Laws ch. 1, §§ 38, 41-b is attached hereto as **Exhibit 88.**

91. A true and correct copy of 2013 Md. Sess. Laws ch. 427 is attached hereto as **Exhibit 89.**

92. A true and correct copy of Sunnyvale, Cal., Muni. Code § 9.44.050 & ballot materials is attached hereto as **Exhibit 90.**

93. A true and correct copy of Senate Bill No. 1446, https://leginfo.legislature.ca.gov/faces/billPdf.xhtml?bill_id=201520160SB, is attached hereto as **Exhibit 91.**

94. A true and correct copy of Senate Bill No. 1446 Senate Third Reading Analysis, https://leginfo.legislature.ca.gov/faces/billAnalysisClient.xhtml?, is attached hereto as **Exhibit 92.**

95. A true and correct copy of California Code of Regulations sections 5480, 5482-84 (current LCM Regs),

https://govt.westlaw.com/calregs/Browse/Home/California/CaliforniaCodeofRegulations, is attached hereto as **Exhibit 93.**

96. A true and correct copy of Senate Bill No. 1446 Legislative History, https://leginfo.legislature.ca.gov/faces/billHistoryClient.xhtml?bill_id=201520160SB1446, is attached hereto as **Exhibit 94.**

97. A true and correct copy of the Text of Proposition 63 is attached hereto as **Exhibit 95.**

98. A true and correct copy of Proposition 63 Voter Guide, http://repository.uchastings.edu/cgi/viewcontent.cgi?article=2355&context=ca_ballot_props, is attached hereto as **Exhibit 96.**

99. A true and correct copy of Senate Bill No. 23, https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=199920000SB, is attached hereto as **Exhibit 97.**

100. A true and correct copy of Written Testimony of Laurence H. Tribe, Senate Judiciary Committee, Subcommittee on the Constitution, Civil Rights and Human Rights, "Proposals to Reduce Gun Violence: Protecting Our Communities While Respecting the Second Amendment", https://www.judiciary.senate.gov/download/testimony-of-tribe-pdf, is attached hereto as **Exhibit 98.**

101. A true and correct copy of Responses to Questions of Laurence H. Tribe, Senate Judiciary Committee, Subcommittee on the Constitution, Civil Rights and Human Rights, "Proposals to Reduce Gun Violence: Protecting Our Communities While Respecting the Second Amendment", https://www.judiciary.senate.gov/download/021213-qfrs-tribe, is attached hereto as **Exhibit 99.**

102. A true and correct copy of Testimony of Chief Jim Johnson, Baltimore County, Maryland, Chair, National Law Enforcement Partnership to Prevent Gun Violence (Senate Judiciary Committee Hearing),

https://www.judiciary.senate.gov/imo/media/doc/1-30-13JohnsonTestimony.pdf, is attached hereto as **Exhibit 100.**

103. A true and correct copy of Written Testimony for Chief Jim Bueermann (Ret.) President, Police Foundation, Washington, D.C. (Senate Judiciary Committee Hearing on Gun-related Violence), https://www.judiciary.senate.gov/imo/media/doc/013013RecordSubmission-Feins, is attached hereto as **Exhibit 101.**

104. A true and correct copy of Transcript of Senate Judiciary Committee Hearing on Gun Violence, https://www.washingtonpost.com/politics/senate-judiciary-committee-hearing-on-gun-violence-on-jan-30-2013-transcript/2013/01/30/1f172222-6af5-11e2-af53-7b2b2a7510a8_story.html?utm_term=.a51a88424a06, is attached hereto as **Exhibit 102.**

105. A true and correct copy of Written Testimony of Brian J. Siebel, Senior Attorney, Brady Center to Prevent Gun Violence, Before the Council of the District of Columbia is attached hereto as **Exhibit 103.**

106. A true and correct copy of the LA Times article titled "Unraveling Brady Law Falsehoods", http://articles.latimes.com/1997/jul/02/local/me-8910, is attached hereto as **Exhibit 104.**

107. A true and correct copy of the National Review article titled "Shutting Down", http://www.nationalreview.com/node/215734/print, is attached hereto as **Exhibit 105.**

108. A true and correct copy of the GunOwners.com article titled "Fact Sheet Guns Save Lives", http://www.gunowners.org/sk0802htm.htm, is attached hereto as **Exhibit 106.**

109. A true and correct copy of Affadavit of Christopher S. Koper in *June Shew, et al. v. Dannell P. Malloy, et al.*, Case No. 3:13-CV-0739, Court Docket No. 80-1 is attached hereto as **Exhibit 107.**

110. A true and correct copy of the San Francisco City Attorney Article, "Herrera Secures Court Order to Make California Communities Safer", https://www.sfcityattorney.org/2017/05/16/herrera-secures-court-order-make-california, is attached hereto as **Exhibit 108.**

Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Executed on June 5, 2017, at San Francisco, California.

/s/ Alexandra Robert Gordon

ALEXANDRA ROBERT GORDON

Exhibit 1

The Gun Debate's New Mythical Number: How Many Defensive Uses Per Year?

Philip J. Cook; Jens Ludwig; David Hemenway

Journal of Policy Analysis and Management, Vol. 16, No. 3, Special Issue: The New Public Management in New Zealand and beyond. (Summer, 1997), pp. 463-469.

Stable URL:
http://links.jstor.org/sici?sici=0276-8739%28199722%2916%3A3%3C463%3ATGDNMN%3E2.0.CO%3B2-3

Journal of Policy Analysis and Management is currently published by John Wiley & Sons.

Insights

Janet Weiss
Editor

Candidates for inclusion in the Insights section may be sent directly to the Insights Editor. Her address is: Janet A. Weiss, School of Public Policy, University of Michigan, Ann Arbor, MI 48109-1220.

THE GUN DEBATE'S NEW MYTHICAL NUMBER: *HOW* MANY DEFENSIVE USES PER YEAR?

Philip J. Cook, Jens Ludwig, and David Hemenway

In 1986, Peter Reuter suggested that the Association for Public Policy Analysis and Management (APPAM) consider offering an annual award for the "most outrageous number mentioned in a policy discussion by an elected official or agency head," with one of the criteria being that the number have "no reasonable basis" (pp. 811–812).

In this article, we discuss the candidacy of one of the more surprising numbers to surface in the course of America's gun debate: that 2.5 million Americans use a gun defensively against a criminal attacker each year [Kleck and Gertz, 1995]. News items,[1] editorial writers,[2] even the Congressional Research Service [Bea, 1994] have mentioned the 2.5 million defensive gun uses (DGUs) as established fact. This number is considerably higher than our best estimate of the number of crimes committed each year with a firearm (1.3 million) [U.S. Department of Justice, Bureau of Justice Statistics, 1996b], and has been used as an argument against regulations that would restrict widespread firearms ownership. The implicit notion seems to be that if there are more legitimate uses than criminal uses of guns against people, then widespread gun ownership is a net plus for public safety.

[1] One article begins, "That's right. Owning a gun, presuming you know how to use it, may be good for you" [Harper, 1996]. See also Witkin [1994].
[2] See Kumenta [1995].

Journal of Policy Analysis and Management, Vol. 16, No. 3, 463–469 (1997)

Published by John Wiley & Sons, Inc. CCC 0276-8739/97/030463-07

For reasons documented in this article, we believe that the 2.5 million figure is an example of what Max Singer has termed a "mythical number" [Singer, 1971]. Singer notes, "[E]ven responsible officials, responsible newspapers, and responsible research groups pick up and pass on as gospel numbers that have no real basis in fact. . . . [B]ecause an estimate has been used widely by a variety of people who should know what they are talking about, one cannot assume that the estimate is even approximately correct" (p. 9).

Estimates for the number of defensive gun uses are likely to be substantially overstated because of the problem of "false positives" [Hemenway, 1996]. This source of bias is a common problem in survey estimates of rare events, but largely unrecognized or ignored. We recount the evidence which indicates that the 2.5 million DGU estimate is far too high, and suggest that implications for both the policy debate over gun regulation, and for survey research.

Survey Results on Self-Defense

What distinguishes this remarkable statistic is the entirely respectable source and estimation method. We usually think of mythical numbers as coming from obviously flawed procedures, generated by advocates seeking attention for the problem of homelessness or heroin addiction or youthful predators or some other cause [Reuter, 1984, 1986].

In contrast, the DGU estimate was calculated by researchers affiliated with a major research university (Professors Gary Kleck and Marc Gertz of Florida State University), using widely accepted methods and published in a topflight, peer-reviewed criminology journal (Northwestern University Law School's *Journal of Criminal Law and Criminology*). Although many mythical numbers may be debunked by simply probing beneath the press reports to identify the source, such is not the case with the DGU figure.

In particular, Kleck and Gertz conducted a telephone survey of almost 5000 American adults in 1993, with the specific intent of examining the defensive-gun-use issue. On the basis of the survey responses, Kleck and Gertz were able to generate a range of estimates depending on the exact definition and judgments concerning the credibility of responses. Their now-famous estimate of 2.5 million is at the conservative end of this array of possibilities.

Their survey appears to have been conducted according to current standards, and the results have been reproduced in several subsequent surveys.[3] In 1994, for example, the National Institute of Justice sponsored a telephone survey of 2600 American adults examining gun ownership and uses, including defensive gun uses [Cook and Ludwig, 1996]. This National Survey of Private Ownership of Firearms (NSPOF) incorporated a sequence of DGU questions very similar to that used by Kleck and Gertz. Each respondent was asked, "Within the past 12 months, have you yourself *used* a gun, even if it was not fired, to protect yourself or someone else, or for the protection of property at home, work, or elsewhere?" Respondents who reported experiencing a defensive gun use were then asked 30 additional questions concerning their most recent DGU. Two of us (Cook and Ludwig) have analyzed these data, and report on them here.[4]

[3] Three nationally representative random-digit-dial telephone surveys of adults have focused on the issue of self-defensive gun use, asking questions similar to those of Kleck and Gertz. In addition to the survey reported next, there was a survey of 800 gun owners and 400 nonowners in 1994 sponsored by the Centers for Disease Control [Hemenway and Azrael, 1996a] and a survey of 1905 adults in 1996 sponsored by the National Institute of Justice [Hemenway and Azrael, 1996b].

[4] For details concerning survey design and results, see Cook and Ludwig [1997].

When we follow the example of Kleck and Gertz and exclude all respondents whose most recent DGU was part of military or law-enforcement work, who did not report a specific crime or use of the gun as part of the incident, or who did not actually see a perpetrator, we estimate 1.5 million defensive gun users. (Because many of the relevant respondents said that they experienced more than one, we estimate a total of 4.7 million defensive gun uses per annum.) Thus, our estimate, based on the NSPOF, is in the same ballpark as that propounded by Kleck and Gertz. The difference could plausibly be due to sampling error. Kleck and Gertz's DGU estimates do not appear to be artifacts of any particular computational or weighting decisions made in their analysis. If there is a problem here, it is intrinsic to the method.

Some Troubling Implications

One check on the credibility of these DGU estimates is made possible by the detailed follow-up questions included in both these surveys. In the NSPOF, respondents were asked whether they fired their guns, and if so, whether they managed to hit the mark. The responses to this item from our 19 "genuine" defensive gun users, multiplied by our sampling weights, imply that approximately 132,000 perpetrators were either wounded or killed at the hands of armed civilians in 1994. That number, it turns out, is just about the same as the total of all people who were shot and killed or received treatment for nonfatal gunshot wounds in an emergency room that year—yet we know that almost all of those are there as a result of criminal assault, suicide attempt, or accident.[5] There is no trace in these official statistics of the wounded assailants.

Respondents are also asked to report the circumstances under which they were provoked into using their gun. From the NSPOF, we estimate that 322,000 used a gun to defend against a would-be rapist. But that is more than the total number of rapes and attempted rapes estimated from the best available source, the National Crime Victimization Survey (NCVS)![6]

Similar puzzles are found in Kleck and Gertz's findings [Hemenway, 1996]. Our closer examination of the DGU reports in the NSPOF suggests that almost half of the incidents appear to contain some internal inconsistency, or otherwise do not make sense. We are persuaded that surveys of this sort generate estimates that grossly exaggerate the true number of DGUs. The most likely explanation provides an important insight about the limitations of the survey method.

Why Surveys Overestimate Defensive Gun Use

Surveys which include questions about DGUs are trying to estimate a rare event, in which even a small false-positive rate will lead to a relatively large overestimate. Medical epidemiologists have traditionally been much more alert to this problem than have survey researchers. As one of many possible examples, consider the Breast Cancer Screening Project conducted some years ago by the Health Insurance Plan of greater New York [Hennekens and Buring,

[5] About 100,000 people were nonfatally shot and treated in an emergency room or hospital in 1992 [Annest et al., 1995], and an additional 16,000 were shot and killed in criminal homicides [U.S. Department of Justice, Federal Bureau of Investigation, 1995].

[6] The NCVS is a large (48,000 households) survey that has been conducted by the U.S. Census Bureau since 1973. It is by far the most expensive and best-designed survey of its kind.

1987, p. 332]. In a total of almost 65,000 screening examinations (mammography plus physical exam), 1115 women were "positive" and followed up with biopsies. As it turned out, 983 (92 percent) of these positive tests were false, in the sense that they were not confirmed in the follow-up. Yet this result is not an indictment of mammography—indeed, the false-positive rate was only 1.5 percent. But that was sufficient, given the rarity of the true positives (less than 0.3 percent) to ensure that most positive results would be false, and that the estimated prevalence of breast cancer from this initial screen would far exceed the true prevalence.

Of course, in any survey there is a possibility of false negatives as well as false positives. Kleck and Gertz emphasize this possibility, arguing that because many respondents may worry that their defensive actions were somehow illegal, they will not admit to them during the survey interview. Kleck and Gertz argue that this effect should outweigh any other misreporting effects and lead to, if anything, an underestimate of the annual number of defensive uses.

Yet by any measure, including the Kleck–Gertz estimate, defensive gun use is a relatively rare event. If 0.5 percent of adults experience a DGU each year, in a survey of 1000 adults only about five would logically have the opportunity to provide a false negative. On the other hand, for 995 of the 1000 respondents, the only logically possible misclassification error is a false positive—and there are good reasons why some might falsely claim to have used a gun in self-defense. For one, using a gun defensively against a criminal may be a genuinely heroic act, and is often portrayed as such in movies and occasionally so in the nightly news.

Take, for example, the case of Dorothy Newton, who shot two robbers on the street in Richmond after having been wounded herself in a robbery one year earlier. The *Washington Post* reports that, although Newton had mixed feelings about the incident, the reaction of many in Richmond has been decidedly less ambiguous.[7] The *Richmond Times Dispatch* wrote in an editorial: "The thought of cocky young predators scurrying like scalded dogs is one decent people find immensely satisfying."[8]

The falsehood may stem from real events, given that survey respondents typically wish to present themselves favorably to interviewers [Sudman and Bradburn, 1974]. The falsehood may also stem from confusion on the part of the respondent: memories fade, and they also distort. "Telescoping," for example, is a common problem in survey research, where respondents who are asked to report about events occurring during the previous year will report an event that in fact happened 13 months or more earlier.[9] Actual experience may be revised in the telling, or may even elide with fiction. Given the prevalence of relevant mental disorders,[10] a nationally representative sample would include a number who were delusional, senile, or intoxicated—people unlikely to be reliable reporters in social science surveys.

[7] See Bowles [1996].
[8] See "Newton's Law," *Richmond Times-Dispatch*, June 7, 1996, p. A16.
[9] In the National Crime Victimization Survey, which questions the same households every six months concerning their epxerience with crime during the previous six months, rates of reported victimization in the first-time panel are typically over 50 percent higher than the bounded rates of subsequent surveys [Cantor, 1989].
[10] Recent estimates from the National Institute for Mental Health suggest that 51.3 million American adults aged 18 and over have "one or more mental or addictive disorders," which includes 2 million adults with schizophrenic disorders and 4.9 million with what are classified as severe cognitive impairments [Bourndon et al., 1994].

An additional possible source of false DGU reports is strategic responses by gun owners. With around 3 million National Rifle Association (NRA) members [Kleck, 1993, p. 370], it would not be surprising to have as much as 1 percent of respondents who are both aware of the ongoing empirical debate on this topic and feel a vested interest in the perpetuation of high DGU estimates.[11]

Is More Better?

About 40 percent of American households currently own a gun, and 14 million people routinely carry one when they go out [Cook and Ludwig, 1997]. Would we be better-off if these figures were, say, 80 percent and 28 million carriers? No doubt that would increase the number of DGUs, however defined or measured. But what would be the net benefit?

The difficulty in answering this question arises in part because of the ambiguous nature of many gun uses that are reported as "defensive" by respondents. Among the incidents in the NSPOF that meet the Kleck and Gertz-type criteria for "genuine" defensive gun uses, in almost one third the most serious crime reported by the respondent is a fight or attack. Assigning fault in a violent encounter can be a daunting problem even to a detective who has a chance to interview everyone involved, let alone a survey interviewer who is asking a few questions of just one of the combatants. In a recent telephone survey of 1905 adults [Hemenway and Azrael, 1996b], 13 respondents reported a defensive gun use against a criminal attacker. In contrast, 38 respondents indicated that a gun had been displayed against them in a hostile manner during an argument or some other circumstance. We suspect that many of the 38 gun users involved in these hostile brandishings would have claimed self-defense if they had been contacted by telephone.

Moreover, it is difficult in many cases to determine whether the gun use leads to an outcome that is better in some sense than what *would have* happened had a gun not been available. For the DGU reports in the NSPOF, a theft or trespass is the most serious crime reported in one out of every five cases. In such instances, is society necessarily made better-off when someone uses a gun rather than dials 911?

In our judgment, the most important effects of more guns would not show up in the DGU statistics at all. Some robbers or burglars, fearing the increased risk of confrontation with an armed victim, might retire (or switch to auto theft), and others might decide to arm themselves more heavily and act more aggressively in committing their crimes. Both of these effects, deterrence and escalation, are plausible, and the net effect is not obvious from armchair theorizing. One empirical study suggested that the murder rate in robbery tends to be higher in cities with many gun owners than in cities with relatively few [Cook, 1979]. In any event, these behavioral considerations, important as they may be, do not figure in the DGU calculus. Taking a broader view, we conclude that more guns may lead to more DGUs, but not necessarily to safer streets and homes.

Some Concluding Thoughts

The survey is a well-developed measurement tool which performs satisfactorily for a variety of purposes. But something goes wrong in the effort to use surveys

[11] Thanks to David Kennedy for this observation.

to estimate defensive gun uses. False positives are always a problem, and if the event is rare enough, then they may swamp the truth. What is to be done?

One possibility has long been incorporated in the National Crime Victimization Survey (NCVS), conducted for the U.S. Department of Justice by the Census Bureau [U.S. Department of Justice, Bureau of Justice Statistics, 1996a]. In this survey the false-positive problem is minimized by the design of the questionnaire. The only respondents who are asked whether they attempted to defend themselves in a crime are those who indicated that they had been the victim of a crime in which they had direct contact with the perpetrator. Limiting the DGU question to this small group changes the false-positive arithmetic dramatically. The resulting estimate for the annual number of DGUs (1992–1994) is about 108,000, a small fraction of the Kleck–Gertz estimate.

Another approach is suggested by ordinary practice in medical screening: When an initial test comes out positive, a follow-up test is usually applied to distinguish "true" from "false" positives. If knowing the true prevalence is sufficiently important, then it is worthwhile devising systems for distinguishing true from false positives after the initial screen.

Determining the social value of reported gun uses will be at least as difficult as overcoming the false-positive problem. More detailed information about the entire sequence of events, including the respondent's actions prior to using a gun, is necessary. Another interesting exercise would start with a sample of gun uses that are reported to the police, and interview each of the participants. Comparisons between these responses and the results of the police investigation may provide some sense of the ways in which survey reports are "shaded."

Meanwhile, the myth that there are millions of legitimate DGUs each year influences public opinion and helps fuel the bandwagon to liberalize regulations on gun possession and carrying. With respect to gun regulation, 2.5 million is the wrong answer to the wrong question.

This research was supported by a grant from the National Institute of Justice (NIJ) to the Police Foundation. The views expressed herein reflect those of the authors alone, and do not reflect the views of either NIJ or the Police Foundation. Thanks to David Kennedy, Kristin Goss, Kate Whetten-Goldstein, and Duncan Chaplin for helpful comments.

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Armed Resistance to Crime: The Prevalence and Nature of Self-Defense with a Gun

Gary Kleck; Marc Gertz

The Journal of Criminal Law and Criminology (1973-), Vol. 86, No. 1. (Autumn, 1995), pp. 150-187.

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The Social Costs of the Demand for Quantification

Peter Reuter

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http://links.jstor.org/sici?sici=0276-8739%28198622%295%3A4%3C807%3ATSCOTD%3E2.0.CO%3B2-B

Exhibit 4

JAMES ALAN FOX ■ JACK LEVIN

EXTREME KILLING

Understanding Serial and Mass Murder

Second Edition

EXTREME KILLING

Understanding Serial and Mass Murder

Second Edition

JAMES ALAN FOX ■ JACK LEVIN

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Rather than lose his beloved children, he decided to keep them together, at least spiritually. According to police, Elizalde had told friends that he would rather kill his children than let them go.

The devoted father purchased a gallon of gasoline from a filling station some three blocks from his apartment. After returning home, he doused his sleeping children with gasoline and set them afire, one at a time. When he was sure they were dead, he set himself on fire. By killing them all, he thought he had ensured that they would be reunited in a better life after death.

When love becomes a component in the mass killer's motivation, outsiders—neighbors, friends and extended kin—are typically incredulous when learning that a seemingly loving and normal husband/father has slaughtered his wife and children before committing suicide. In July 2000, residents of the seaside suburban community of Barry, outside of Cardiff in South Wales, were shocked to discover a gruesome family annihilation in their midst. Forty-nine-year-old Robert Mochrie, often described as a "devoted family man," had hanged himself after bludgeoning to death his wife and four childen as they slept in their middle-class single-family home.

Mochrie had a 10-year history of severe depression and had seen a psychiatrist on a number of occasions. He and his wife of 23 years were no longer intimate, and one of their children was autistic. On top of everything else that went wrong, he had recently experienced a number of failed business ventures which left him in deep debt, unable to pay his bills and faced with bankruptcy. Being a "loving father and good husband," Mochrie made sure that his family members died in their sleep with a blow to the head, minimizing their pain and suffering. He then covered each body with a blanket, as though trying to protect his wife and children from the elements.

Sweet Revenge

A twisted sense of love and responsibility clearly cannot explain many cases of mass murder. Why would a 31-year-old former postal worker, Thomas McIlvane, go on a rampage in Royal Oak, Michigan, killing four supervisors before shooting himself in the head? And what would provoke a 28-year-old graduate student, Gang Lu, to execute five others at the University of Iowa before taking his own life? And why would 35-year-old Colin Ferguson open fire on a crowded Long Island train, killing six commuters? The common denominator in these three cases is the killer's desire to execute his enemies, real or imagined, for the sake of sweet revenge.

Although each case has its unique aspects, by far the most frequent motivation for mass murder is revenge—the desire to get even for perceived mistreatment by family members, a company, or a whole category of people. In all forms of revenge-motivated mass murder, the perpetrator's objective is to punish all those whom he holds responsible, directly or indirectly, for his failures and disappointments.

On August 20, 1986, the morning after being reprimanded for poor job performance, 44-year-old Patrick Henry Sherrill "gave notice" in a most unconventional way. Arriving at the Edmond, Oklahoma, post office at 6:45 a.m., the part-time letter carrier was

The case against psychiatric medications would be stronger if it weren't for the fact that killers who were being treated at the time they committed murder typically had all of the warning signs associated with such crimes. In almost every case, there was a good reason why a psychiatrist had prescribed a psychotropic drug: The killer had been profoundly depressed, disappointed, and discouraged about the future. Moreover, the actions of killers who commit a rampage are typically neither episodic nor spontaneous. Wesbecker, for example, had planned his assault for months, including accumulating an arsenal of weaponry; yet he had taken Prozac for only a few weeks before the massacre. The drug may at most have reduced his inhibitions, but it hardly inspired him to kill.

Biological or chemical factors may be useful for explaining spontaneous or impulsive acts of extreme violence, but mass killings are typically planned and methodical rather than episodic. Massacres occurring at home, work, or school typically involve a complex set of contributors, including those located in the social environment of the perpetrator.

The social environment can be toxic when it involves the violent behavior and supporting attitudes of significant others. In fact, we learn to be violent not only from being directly rewarded and punished; we learn it through the role models we imitate. Clearly, other people may serve as models of learning in many other areas of life—for example, in acquiring language, using facial expressions, and dressing for various occasions. We should probably not be surprised, therefore, that imitation also occurs in learning violent behavior—even multiple homicide.

Early on, Bandura (1977) suggested that the mass media generally, but television in particular, provide a powerful source of models for aggressive conduct. Findings obtained in a large number of studies over several decades on the effects of televised influences on behavior support this argument: They show that our popular culture—television, motion pictures, iPods, video games, and the Internet—can serve as a tutor in teaching violent styles of behavior (Murray, 2008). We really shouldn't be surprised, considering the enormous amount of time that children tune in to popular culture. The typical youngster spends, on average, more than 38 hours weekly—almost 5½ hours on a daily basis—watching TV, playing video games, listening to music, and surfing the Internet. Nearly three-quarters of the children in the United States live in a home that possesses at least three TV sets.

The impact of popular culture frequently goes unchallenged. Many parents fail to impose any restrictions on their children's viewing behavior. In fact, some 53% of all parents permit a set in their youngster's bedroom; 58% leave a set on while the family has dinner; and only 5% watch TV with their older children.

Research by David Phillips (1983) suggests strongly that media images can teach even the most violent acts. He examined the homicide rate in America immediately following televised heavyweight prizefights and found a brief but sharp increase in homicides, an overall increase of 13%. This effect seemed to peak on the third day after the prizefights, especially following heavily publicized events. The biggest third-day peak occurred after the fights that received the greatest publicity.

Models for murder can also be located in the groups to which an individual belongs. Sutherland's differential association theory contends that criminal behavior is learned during adolescence from an individual's most intimate social relations—his peers, family, and friends. Criminal skills are acquired in such groups. In addition, the individual

between the successes of individuals and their peers, Agnew recognizes the influence of what sociologists have called "relative deprivation." Moreover, chronic strain may play a major role in encouraging mass killings at school, at work, or in the family. When life's disappointments become intolerable, an individual may seek vengeance, restoration of control, and/or infamy through the barrel of a gun.

The Great Equalizer

Men have unequal access to and training in the use of handguns and rifles. Three quarters of mass murderers kill with a firearm. It is difficult to kill a large number of people at one time using other weapons, such as a knife or a club. Typically, mass killers are fascinated with guns; own large collections of rifles, including military-style assault weapons; and have the shooting skills to match.

Twenty-five-year-old Charles Whitman, for example, had grown up around firearms. His father, himself a gun aficionado, had taught Charles to hunt when he was a young boy. Charles later fine-tuned his marksmanship skills while serving in the Marines.

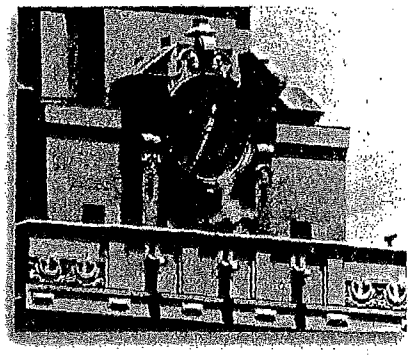

Photo 13.1 Random massacres, such as Charles Whitman's shooting spree from the University of Texas tower, attract the most attention yet are the rarest form of mass murder.

Charles Whitman's 1966 assault at the University of Texas was widely termed the "Crime of the Century," reflecting the rarity of such mass murder at the time. Of course, those who saw Whitman's crime as history-making could not have imagined what new and much deadlier slaughters lay ahead in the remaining quarter of the century. Whitman's crime may have helped to define the term *mass murder* in the American consciousness, but more recent tragedies have pushed the limits of public anxiety to the breaking point. We have witnessed massacres in schoolyards and shopping malls, trains and planes, post offices, and fast food establishments. People everywhere wonder, "Is nowhere safe?"

Several factors have coalesced recently to produce a deadly mix of resentment and despair. A growing number of middle-aged men are losing those aspects of their lives that give them meaning and support, particularly their families and their jobs. A shrinking and more competitive labor market has left thousands of men feeling hopeless and worthless. A high rate of divorce, greater residential mobility, and a general lack of neighborliness have left many men feeling very much alone. Though their crimes are reprehensible, a few of these desperate people feel that they have no place to turn and no means to resolve their problems other than use of their guns. The one problem they don't have is finding a high-powered weapon of mass destruction.

On November 1, 1991, Gang Lu, a 28-year-old Chinese-born graduate student at the University of Iowa, methodically shot and killed five people on campus whom he held responsible for denying him a coveted prize given for the top science dissertation. In advance of his massacre, Gang Lu had written to his sister in China outlining his funeral wishes, sending along the contents of the bank account he shortly wouldn't need. He also wrote a letter to the media outlining his grievance against the Physics Department and describing how his gun would help to right the terrible wrongs that had been done to him. "Private guns make every person equal, no matter what/who he/she is," he wrote. "They also make it possible for an individual to fight against a conspired/incorporated organization such as Mafia or Dirty University officials."

In the wake of virtually any large mass shooting, significant debate surfaces about the role of firearms in facilitating a bloodbath. Of course, guns didn't make Gang Lu lose out to his rival countryman, nor did they encourage his desire to kill those whom he blamed for ruining his life. However, for Gang Lu, the gun was a necessary instrument to achieve his desired outcome, and it was likely the only weapon that would do. Certainly, knives or other objects would not have made it possible to execute his entire hit list without being subdued. Explosives, on the other hand, might have provided a means of mass destruction—much like what occurred in Bath, Michigan, on May 18, 1927, when Andrew Kehoe detonated a cache of explosives hidden in the basement of a local school, killing 38 children, 5 adults, and himself. However, Gang Lu's plan was not to kill just anyone, only those intended targets for payback. A firearm was his only logical choice.

As indicated, firearms, especially high-powered ones, are the weapons used by most mass killers. Handguns and rifles are, of course, far more lethal than knives or clubs for the assailant who seeks to kill large numbers of victims in a short period of time. In countries where guns are relatively inaccessible, mass killings are far less likely to occur, even if the motivation for large-scale destruction exists. For example, China's strict gun laws prevent angry would-be mass murderers from securing a firearm and going on a deadly shooting spree. At the end of April 2010, a knife-wielding man in his forties burst into the Leicheng First Primary School in the city of Leizhou and stabbed 18 children and a teacher before being subdued by the police. All of the victims were wounded, but none suffered life-threatening injuries.

Mass murderers who seek out certain people for revenge are especially likely to use firearms because they are more predictable and controllable in their destructiveness than fire, explosives, or even poison. Thus, for their lethality and precision, the largest massacres in terms of body count almost always involve a firearm.

Because of their high-profile nature in terms of publicity (see Duwe, 2000), mass murders are often exploited for the sake of advancing some political agenda, and this is especially true when it comes to the role of firearms as a contributing factor to mass murder. Mass shootings have served as ammunition in the debate over gun control, but used, ironically enough, by advocates on both sides of the issue to further their cause.

In the wake of particularly deadly and widely publicized shootings, gun control proponents have argued that the carnage would not be so great were it not for the easy availability of high-powered firearms, especially assault weapons. By playing on public

As in high school, Harry was unpopular and was even ostracized. He had an inauspicious start at The Citadel. Harry's commanding officer (CO) was embarrassed when he mistakenly marked Harry present at formation when Harry actually had forgotten to appear. Of course, the CO took his embarrassment out on Harry, and the other cadets followed suit. As the weeks passed, Harry's peers forgot the particular incident but never reversed their opinion of him. As Harry continued to suffer from scorn, letters from his father urged him on, telling him, "No matter how tough they make it, you know you can take it" (quoted in Roesche, 1979, p. 85).

As Thanksgiving of 1976 approached, he could stand no more, and he left The Citadel for what he hoped was the last time, telling the school that his mother was sick with cancer. Military school was more than he could take: He was fed up with living the way his father wanted him to, and he was tired of being pushed, yet he couldn't bring himself to tell his father about not wanting to return to school. His father had always told him that "quitters were failures."

On November 28, Harry, Jr., returned home late, around 3 a.m., after visiting some of his former high school friends. He took a pistol, one of several in the house, and went to his parents' room, where they were asleep. He paced the room for some time, deciding what to do: Should he stand up to his father or simply release himself from the bondage? He held the gun to his father's head for 15 minutes. Finally, he fired. His mother stirred at the explosion, and he shot her. He then shot his father again. Next, he proceeded to his brothers' room. His 15-year-old brother, Ronald, lay there motionless, his eyes wide open. Harry shot and killed him. The other brother—Eric, age 12—made a rush for Harry. Harry shot him twice in the face and once in the chest, but he was still alive and struggling to get up. Harry bludgeoned him to death with the revolver and stuffed his body in a metal cabinet in the attic.

Harry, Jr.'s entire life had revolved around guns. They provided his uppermost achievement as well as his greatest tragedy. For Harry, the gun represented an instrument, a means not only to kill his persecutor but also to measure his own self-worth.

Harry's family annihilation ensured that he would never again bear the intolerable burden of his father's expectations or suffer the regimentation of military school. Instead, he would spend his adult years in a much more oppressive environment—a New Jersey state penitentiary.

Harry, Jr. received four life sentences to be served concurrently. Based on the New Jersey statute in force at the time of his murders, he became eligible for parole in 2002. However, having failed on several bids for release, he remains incarcerated.

stolen property. In October 1984, he did a 30-day stint in county jail in Woodland, California, for being an accomplice to a robbery.

Three years passed, and Purdy's behavior became increasingly outrageous. In 1987, he was arrested for indiscriminately firing a 9mm pistol in the El Dorado National Forest. On top of this, he was charged with resisting arrest for kicking a deputy sheriff and shattering a window of the patrol car with his feet. While being held in advance of trial, Purdy attempted to commit suicide by hanging himself in his jail cell and slicing open his wrist with his sharpest fingernail. But like everything else he tried, Purdy even failed at taking his own life.

By January 1989, life had become completely hopeless for Purdy. He despised almost everyone, but especially people in positions of authority and especially his "enemies," the newcomers to America's shores. Purdy had a special hatred for Southeast Asians. He often bragged about his father's conquests in the Vietnam War, slaughtering all those "gooks." Purdy fantasized about following in his dad's army bootsteps, but it would have to remain a fantasy because Patrick was only 7 years old when the U.S. forces pulled out of the Vietnam conflict.

No problem—Purdy would fight his own war against Southeast Asians. He would try one more time to achieve something big, and this time, his mission would not fail.

For weeks, Purdy had been living in Room 104 of the El Rancho Motel on the edge of Stockton, California, a riverfront agricultural city located some 80 miles east of San Francisco. He needed to concentrate, to plot his final assault on those who were to blame for his miserable existence. "General Purdy" spent hour after hour, day after day, in his "war room," manipulating the hundreds of toy soldiers, tanks, jeeps, and weapons that he had collected in order to simulate an attack and to develop an effective military strategy. There were toy soldiers everywhere: on the shelves, on the heating grates, even in the refrigerator.

Purdy prepared himself for battle as well. Perceiving a conspiracy involving people in charge, he displayed symbols of anti-Americanism boldly and loudly. He had carved the words "freedom" and "victory" into the butt of his AK-47 military assault rifle. On the camouflage shirt that he wore over his military jacket, he wrote "PLO," "Libya," and "Death to the great Satin." As reflected by the mistaken inscription for the name of the devil, spelling was never Purdy's strong suit . . . but then, he didn't seem to have any strong suit.

On Tuesday morning, January 17, Purdy donned his military flak jacket, picked up a handgun and his AK-47 semiautomatic assault rifle, and drove his 1977 Chevrolet station wagon a couple of miles to the Cleveland Elementary School in Stockton—the same elementary school he had attended from kindergarten to third grade. But things recently had begun to seem different to him, and it wasn't just having grown older. When he had lived there as a child, the neighborhood was white; now it was predominantly Asian.

Arriving at the Cleveland School just before noon, Purdy could see hundreds of young children—most of them refugees from Cambodia, Vietnam, China, and Mexico. Purdy preferred the term "boat people" when he spoke disparagingly of Asian refugees. Despite the chill in the air, the children played joyfully at recess on the blacktop in front of the brown stucco building, unaware of the war that would soon be declared.

Minority Against Majority

White males cannot, of course, claim sole ownership of resentful attitudes. Many minority Americans are angry as well: They see a racist behind every possibility for advancement. Some even envisage a large-scale conspiracy on the part of white supremacist groups, corporations, and government to deprive them of success, if not their lives. Thus, whereas Baumhammers, Williams, Lepine, Hennard, and Purdy were all members of the dominant group beating back the threat of a minority, mass murder can also serve as the weapon of a minority to retaliate for perceived oppression.

In a suburb not far from the city of Pittsburgh, a 39-year-old black resident of Wilkinsburg was at his wit's end. After a lifetime of racial insults and slights, Ronald Taylor felt that he could no longer tolerate what he believed to be the continuing racist neglect by his white maintenance man, John DeWitt. The front door of Taylor's apartment unit had remained broken for some period of time without being repaired, and Taylor fixated on his white maintenance man as the source of the problem.

On March 1, 2000, racial revenge was on Taylor's mind. Leaving his apartment, he remarked to a black neighbor living nearby that he wasn't going to hurt any black people—that he was just "out to kill white people." Taylor was true to his word. Not finding John DeWitt, he instead fatally shot a carpenter who had been working in the building. Then, he walked to a fast-food restaurant in the Wilkinsburg business district, where he shouted "White trash. Racist pig" and opened fire again, killing two and injuring two more (Levin & Rabrenovic, 2004, p. 55). All of Taylor's victims were white.

A horrific shooting that shocked New Yorkers and appeared to many as an indiscriminate shooting by a madman actually was more a carefully orchestrated hate crime. The gunman was indeed mad, but specifically because of feelings of personal slight and racial discrimination.

On any other day, it was the 5:33 local to Hicksville, but on December 7, 1993, it was the 5:33 express to hell. Hundreds of commuters, exhausted from a long workday in Manhattan, boarded the Long Island Rail Road commuter train at Penn Station, unprepared for the horror that would soon erupt in car #3. Just about 6:10 p.m., as the train raced toward Garden City in suburban Nassau County, a heavyset but gentle-looking black man rose quietly from his seat at the rear of the car and turned the weary scene into instant chaos.

Without warning, the gunman pulled from his canvas bag a Ruger P89 9mm semiautomatic pistol, a lightweight handgun known for its high velocity and accuracy, and started filling the air with gunfire. Stunned riders struggled to find cover in a death train that offered very little. The gunman slowly walked backward down the aisle, row by row, shooting alternately to his left and then his right.

Midway through the car, the assailant paused to reload with a second 15-round clip, then promptly resumed his attack. He moved to the front of the car, disappeared momentarily into the vestibule connecting to the forward car, but soon returned to finish his sweep of car #3. Fifteen rounds later, when again he stopped to reload, three heroic commuters rushed at the gunman and pinned him against a seat. Moments later, the train pulled into the Merillon Avenue Station. As terrified commuters bolted from

his job, the only activity that he found satisfying was working with his gun collection. Being without friends was not a problem—he could always count on his guns.

If only we had gun laws as strict as those in England, some Americans lament, James Huberty might never have become such a prolific mass killer. Of course, they likely have not heard of Michael Ryan, a resident of Hungerford, England, who killed 15 people and wounded just as many during a 4-hour siege through town before taking his own life. His victims included his own mother, his neighbor, and his two dogs, but most of those gunned down were perfect strangers who just happened to get in Ryan's way. Ryan was able to accomplish his tour of murder, which began at his home and ended at the school that he once attended, despite the country's rather restrictive gun laws.

Ryan, a 27-year-old good-for-nothing, had long had a bad reputation for belligerence. Despite his argumentative nature, however, he never had a brush with the law or involvement in the mental health system. Indeed, neither a criminal record nor a history of profound metal illness is a requirement for mass murder, even the indiscriminate type. Although he may have tended toward paranoia, he was far from psychotic in his thinking. Thus, each time Ryan applied to have his gun permit expanded, he was able to survive the screening process—a process that included an interview with local police to verify his sporting purpose.

By 1987, Ryan was licensed legally to own semiautomatic rifles for the sake of sportsmanship, but he viewed it as a license to murder. Ryan used his large cache of weapons that he had legally purchased under English law to take target practice on humanity. In the process, he committed the crime of the century, at least by English standards. In America, it would have been the crime of the week.

It took more than a large arsenal of weapons for Ryan to carry out his assault on his hometown. He developed the gun-handling skills through membership in a variety of gun clubs, the same memberships that earned him the legal right to own his weapons. But mass murderers don't have to join hunting clubs to become expert marksmen. Many of them are trained to handle high-powered firearms in preparation for military careers. The skills they acquire in the military for going to war prepare them in civilian life for going berserk.

When it comes to pseudo-commandos, Julian Knight of Melbourne, Australia, was as pseudo as they come. For as long as he could remember, and with his interest fostered by his adoption into a military family, the 19-year-old Aussie had focused nearly all his energies and thoughts toward a career in the military. In short, Knight was obsessed. He fashioned himself as a military man—better yet, a war hero. But the only war he would ever fight was a civil war. On August 7, 1987, along Hoddle Street in Melbourne, the "enemy" consisted of innocent strangers, 7 of whom were killed and 19 more of whom were wounded.

Unlike other pseudo-commandos, such as James Huberty and Patrick Purdy, Knight survived to become a hero in his own eyes. "I performed exactly as my Army superiors would have expected me to perform in a combat situation," reflected Knight from his jail cell. "In other circumstances I would have gotten a medal for what I did" (Time-Life Books editors, 1992, p. 70).

Knight was indeed well-trained to kill. He received his first gun, an air rifle, as a gift for his 12th birthday. Even with this relatively "harmless" initiation into weaponry, within 2 years, Knight was being trained in the use of an M16 rifle. Within 2 more years,

Exhibit 5

PRIVATE GUNS PUBLIC HEALTH

David Hemenway

with a New Afterword

THE UNIVERSITY OF MICHIGAN PRESS
Ann Arbor

First paperback edition 2006

Published in the United States of America by
The University of Michigan Press
Manufactured in the United States of America
⊗ Printed on acid-free paper

2010 2009 2008 2007 5 4 3 2

A CIP catalog record for this book is available from the British Library.

Library of Congress Cataloging-in-Publication Data

Hemenway, David, 1945–
Private guns, public health / David Hemenway.
p. ; cm.
Includes bibliographical references and index.
ISBN 0-472-11405-0 (cloth : alk. paper)
1. Gunshot wounds—United States—Prevention. 2. Firearms—Law and legislation—United States. 3. Gun control—United States. 4. Public policy—United States. 5. Medical policy—United States. 6. Firearms ownership—United States.
[DNLM: 1. Firearm ownership—United States. 2. Wounds, Gunshot—epidemiology—United States. 3. Public Health—United States. 4. Public Policy—United States. WO 807 H498p 2004] I. Title.

RD96.3.H45 2004
617.1'45'0973—dc22 2003024583

ISBN-13: 978-0-472-03162-7 (pbk. : alk. paper)
ISBN-13 978-0-472-02382-0 (electronic)

CHAPTER 4 SELF-DEFENSE USE OF GUNS

> There is little or no need for a gun for self-protection [for most Americans] because there's so little risk of crime. People don't believe it, but it's true. You just can't convince most Americans they're not at serious risk.
>
> —Gary Kleck

The previous chapters highlighted some of the costs guns impose on society. But guns also provide some safety benefits. Guns may be used to thwart criminal acts, and awareness of their presence may deter individuals from attempting to commit crimes. But how common is self-defense gun use, and how much benefit do guns really provide for our society? This chapter describes the scientific evidence available on the role of firearms in deterring crime and thwarting criminals, discusses the frequency of self-defense gun use and whether such incidents are usually socially beneficial, and considers the evidence concerning whether armed resistance against attackers makes good sense.

THE MYTH AND REALITY OF DETERRENCE

Given the claims of the gun lobby, it is perhaps surprising that there is in fact little credible evidence that guns deter crime. Criminologist Gary Kleck (1988) claims that publicized police programs to train citizens in gun use in Orlando (to prevent rape) and in Kansas City (to prevent robbery) led to reductions in crime by changing prospective criminals' awareness of gun ownership among potential victims. However, a careful analysis of the data found no evidence that crime rates changed in either location after the training (McDowall, Lizotte, and Wiersema 1991). The deterrent effects of civilian gun ownership

on burglary rates were also supposedly shown by the experiences of Morton Grove, Illinois (after it banned handguns), and Kennesaw, Georgia (after it required that firearms be kept in all homes) (Kleck 1988). Again, a careful analysis of the data did not show that guns reduced crime (McDowall, Wiersema, and Loftin 1989). Instead, in Morton Grove, the banning of handguns was followed by a large and statistically significant decrease in burglary reports (McDowall, Lizotte, and Wiersema 1991).

The fact that rural areas in the United States have more guns and less crime than urban areas has sometimes been claimed as evidence of the deterrent that firearms represent (e.g., Polsby and Kates 1998). The comparison, of course, is inappropriate. Cities in high-income countries generally experience more crime than rural areas, whatever the levels of gun ownership. A more valid comparison is between cities, between states, or between regions.

One study found a negative association between rates of gun ownership and crime rates (more guns, less crime) (Lott 1998a). However, in that study, gun ownership data came from election exit polls conducted in 1988 and 1996. These data on gun ownership levels are unreliable. According to the polling source, Voter News Service, the data cannot be used as the author uses them—to determine either state-level gun ownership levels or changes in gun ownership rates—for three reasons: (1) the survey sampled only actual voters, a minority of the adult population; (2) the gun ownership question changed between the two periods; and (3) the sample size was far too small for reliable estimates. In only fourteen states were there more than one hundred respondents to the 1996 poll, and for one such state, Illinois, the polls indicated, nonsensically, that personal gun ownership more than doubled between 1988 and 1996, from 17 to 36 percent of the adult population. Overall, the data from these exit polls indicate that gun ownership rates in the United States increased an incredible 50 percent during those eight years. Yet all other surveys of the general population show either no change or a decrease in the percentage of Americans who personally own firearms (Kleck 1997b). Analyses of guns and crime using the Voter News Service data are meaningless.

No other study finds that crime is lower in cities, states, or regions where there are more guns. Instead, the evidence indicates that where there are more guns, while there are no more robberies, there are more gun robberies and more robbery homicides (Cook 1987). Most studies find that where there are more guns, there are significantly more gun homicides and total homicides (Ohsfeldt and Morrisey 1992; Hepburn and Hemenway 2004).

A widely cited proponent of the supposed deterrent effect of guns has

claimed that when gun prevalence is high, burglars seek out unoccupied dwellings to avoid being shot (Kleck 1988, 1997b). Yet the evidence comes not from a scientific study but from a flawed comparison using different victimization surveys in different time periods for four areas—the United States, Britain, the Netherlands, and Toronto. In the United States, compared to the other three areas, a higher percentage of burglaries are committed when no one is at home. Kleck's analysis does not take into account relevant factors that might explain the association (e.g., the percentage of time in which dwellings are occupied). The areas are compared to the United States but not to each other, and only four nations/cities are examined. One could just as well argue that since cigarette consumption is higher in Japan and Stockholm than in the United States, and the Japanese and Swedish live longer than Americans, cigarettes are good for longevity.

A more reliable study used data from the Uniform Crime Reports for all fifty U.S. states for 1977–98 and data from the U.S. National Crime Victimization Survey (NCVS) for 330,000 households for 1994–98. The findings from both analyses were that U.S. counties and states with more guns have higher rates of burglary and higher per capita rates of "hot burglary" (burglary when someone is at home) (Cook and Ludwig 2003). Homes with firearm collections are considered prime targets for burglars.

Surveys of burglars in the United States do indicate that most would prefer that no one is at home—and presumably that no one is armed—when they enter the premises (Rengert and Wasilchick 1985; Wright and Rossi 1986). There is little question that professional burglars, who are among the least violent of serious criminals, want merchandise and do not want to get arrested, bludgeoned, or shot. But there is currently no credible evidence that a high prevalence of gun ownership reduces burglary or any other crime or in any way reduces potential violent confrontations.

HOW COMMON IS SELF-DEFENSE GUN USE?

Much discussion about the protective benefits of guns has focused on the incidence of self-defense gun use. Proponents of such putative benefits often claim that 2.5 million Americans use guns in self-defense against criminal attackers each year (Kleck and Gertz 1995). This estimate is not plausible and has been nominated as the "most outrageous number mentioned in a policy discussion by an elected official" (Cook, Ludwig, and Hemenway 1997, 463).

The estimate comes from a national telephone survey in which respon-

dents reported their own behavior. All attempts at external validation reveal it to be a huge overestimate (Hemenway 1997b). For example, in 34 percent of the cases in which respondents stated that they used guns for self-defense, they said they used guns to protect themselves during burglaries. If true, this would translate into guns being used in self-defense in approximately 845,000 burglaries each year. From sophisticated victimization surveys (the NCVS), however, we know that there were fewer than 6,000,000 burglaries in the year of the survey, and in only 1,300,000 of those cases was someone certainly at home. Since only 41 percent of U.S. households owned firearms, and since the victims in two-thirds of the occupied dwellings remained asleep, the 2.5 million figure requires us to believe that burglary victims used their guns in self-defense more than 100 percent of the time.

A more reasonable estimate of self-defense gun use during burglary comes from a retrospective analysis of Atlanta police department reports. Examining home invasion crimes during a four-month period, researchers identified 198 cases of unwanted entry into single-family dwellings when someone was at home (Kellermann et al. 1995). In only three cases (less than 2 percent) did a victim use a firearm in self-defense. If this figure were extrapolated nationally for the year the survey covers, it would suggest approximately twenty thousand gun uses against burglary.

If it were true, the estimate of 2.5 million self-defense gun uses per year would lead to many other absurd conclusions. There just aren't enough serious crimes for victims to use guns so many times. For example, the number of respondents who claim to have used a gun against rape and robbery attempts suggests that victims of these attempted crimes are more likely to use a gun against the offender than the attackers are to use a gun against the victim—even though the criminal chooses the time and place for the attack, most citizens do not own guns, and very few people carry guns. Similarly, the number of people who claim to use guns in self-defense and report the incident to police (64 percent in the Kleck survey) often exceeds the total number of such crimes reported to police, including all the crimes when the victim did not have a gun (Ludwig 2000).

Other results coming from this telephone survey are also grossly exaggerated. Respondents claim to have shot more than two hundred thousand criminals. Yet each year, only about one hundred thousand people total (typically victims of assaults, suicide attempts, or accidents) are treated in emergency departments for gunshot wounds (Annest et al. 1995). Kleck (1997b) makes the strange claim that most gunshot victims are criminals, and when

criminals are shot they do not seek professional medical care. But surveys of jail detainees find that even among criminals, almost all go to hospital emergency rooms for treatment of their wounds. Of more than 380 surveyed criminals in jails in California, Ohio, Nevada, Georgia, Maryland, and Washington, D.C., who had been wounded in incidents, few of which were related to their incarceration, more than 90 percent went to the hospital for treatment (May et al. 2000a; May, Hemenway, and Hall 2002).

While the survey respondents claimed to be shooting more than 200,000 criminals, FBI's Uniform Crime Reports (UCR) for that year reported only 350 justifiable homicides by private citizens, and not all of these were with firearms (U.S. Department of Justice 1993). Per week, that would mean about 3,850 shootings of bad guys—but fewer than 7 died? Even if the UCR figure may be somewhat of an underestimate (discussed later in this chapter) the wounding/death rates just don't make sense.

Respondents from this telephone survey also report being victims of more than four times the number of robberies as is estimated by the NCVS, whose purpose is to determine rates of victimization. But none of these additional robberies seem to show up in police records or in hospital admissions of injured patients.

Survey respondents in the self-defense telephone survey also claim to have used their guns to save more than four hundred thousand people a year from death. Yet only twenty-seven thousand homicides occurred in the year of the survey. In other words, for every person actually murdered, gun owners claimed to be saving fifteen (usually themselves and their families) from certain death. One might then expect that non–gun owners, of whom few are saved by guns, would have much higher rates of homicide victimization than gun owners. Yet the evidence shows that non–gun owners are less likely to be murdered than are gun owners.

It is clear that the claim of 2.5 million annual self-defense gun uses is a vast overestimate. But what can account for it? The main causes are telescoping and the false-positive problem—a matter of misclassification that is well known to medical epidemiologists. (See appendix A for a discussion of self-defense gun use and the false-positive problem.) Fortunately, the NCVS, which includes information on self-defense, drastically reduces these problems.

Housing units in the NCVS remain in the sample for three years, and residents are interviewed every six months. To eliminate telescoping—the reporting of events that occurred outside the time frame in question—inci-

dents reported in the first interview are excluded. Residents are asked in subsequent interviews only about events that occurred since the most recent interview. In surveys of criminal victimization, telescoping can increase estimates "by between 40% and 50% depending on the type of crime; the inflation rate is greatest for violent crimes" (Skogan 1990, 262; see also Cantor 1989).

More important, the NCVS properly restricts claims of self-defense gun use to those who report a threatened, attempted, or completed victimization; it cannot be a genuine self-defense gun use unless there is an actual threat. Limiting the defensive gun use issue to this group eliminates most of the false-positive problem. The resulting estimate for annual defensive gun uses is between 55,000 and 120,000 per year, less than one-twentieth of the 2.5 million figure (Cook 1991; McDowall and Wiersema 1994; National Archive 1998).

The NCVS estimate has some limitations. It does not ask about all crimes (e.g., trespassing or vandalism), but only about six serious ones—rape and sexual assault, robbery, assault, burglary, nonbusiness larceny, and motor vehicle theft. However, no one claims that instances of self-defense gun use for the minor crimes that are omitted would dramatically swell the total. We also might expect the NCVS to give an underestimate of self-defense gun use since it prompts respondents not by asking directly whether they used a gun in self-defense but only by asking, "What did you do?" and "Anything else?" However, there is little reason to expect that respondents might forget or might be unwilling to report using a gun to protect themselves against a crime that occurred within the past six months. (See appendix A on self-defense gun use.)

Whatever its limitations, it seems clear that the NCVS estimates of self-defense gun use are more valid than the private telephone survey estimates of millions of self-defense gun uses each year.

IS MORE BETTER?

A presumption exists that the higher the number of reported self-defense gun uses, the greater the benefit of guns, both to the user and to society generally. This assumption may be incorrect.

An increased likelihood of self-defense gun use may change the behavior of criminals in a perverse direction. Rather than being deterred from committing crimes, criminals may instead increasingly arm themselves in the belief

that the defender might be armed (Wright and Rossi 1986; Green 1987). Most delinquents and criminals claim that they are carrying and using guns primarily for self-protection (Wright and Rossi 1986; Hemenway et al. 1996). In a large survey of felons, half said a very important reason why they carried a gun was the chance that the victim might be armed (Wright and Rossi 1986). An arms race explains the sharp rise in homicide in many underclass neighborhoods in the late 1980s and early 1990s. Escalating murder rates increased the demand for guns for protection, which led to increases in murders, which led to further need for guns, turning these inner-city areas into "killing fields" (Wright, Sheley, and Smith 1992).

Having a gun for self-defense may also change the behavior of the gun owner in a perverse direction. For example, an individual who has a gun may become overconfident and put himself in dangerous situations he would have otherwise avoided. Even more important, he may use the gun inappropriately.

Police officers, who receive large amounts of training, are still often inadequately prepared to handle ambiguous but potentially dangerous situations. Intense stress, confusion, and fear are inherent in most possible shooting situations. Heart rates skyrocket, and it is difficult to think clearly and to act deliberately (Diaz 2001a). Not surprisingly, even police make serious mistakes. Individuals without training are likely to do much worse.

Attempts by civilians to use guns in self-defense sometimes end in catastrophe.

- A sixteen-year-old Japanese exchange student, Yoshihiro Hattori, in a suburb of Baton Rouge, Louisiana, was with an American friend on the way to a Halloween party. They missed the correct house by a few doors and rang the wrong doorbell. The frightened woman who answered the door called for her husband to get a gun. The boys left the property, but Hattori returned, probably because he mistook the homeowner's command of "Freeze" for "Please." The homeowner shot Hattori in the neck, killing him (Blakeman 2000).
- A fourteen-year-old girl jumped out of a closet and shouted "Boo" when her parents came home in the middle of the night. Taking her for an intruder, her father shot and killed her. Her last words were, "I love you, Daddy" (*Boston Globe* 1994).
- A twenty-year-old mother heard crunching noises on the gravel outside her home. Remembering reports of a recent burglary, she ran to

a bedroom and grabbed a small-caliber handgun. As she looked out the window for an intruder, the gun went off, striking her eight-month-old son in the head. The boy died seven hours later. The shooter's mother, stepfather, and thirteen-year-old sister returned home seconds after the shooting occurred (Moxley 2000).

- An eleven-year-old boy was trying to get three other boys, aged nine to eleven, to leave his trailer. He got his shotgun from his mother's room. He began arguing with his fifteen-year-old sister, and the gun went off, killing her. Neighbors said the boys had previously beaten up the eleven-year-old shooter (Vance 1999).
- A sixty-nine-year-old man critically wounded his seventy-two-year-old brother, thinking he was an intruder. The brothers lived together. The victim was shot by a .357-caliber revolver as he opened the front door (Craig 2000).
- A twenty-one-year-old woman wanted to surprise her new fiancé. With her eleven-year-old sister, she hid in his basement closet. When they jumped out, he killed her with a .40-caliber Glock handgun that he kept for protection (J. Anderson 2002).

un training in self-defense itself is not free of potential tragedy.

- A state trooper was shot and killed in a self-defense exercise by a fellow officer who forgot his gun was loaded (*Chicago Tribune* 1999).
- A co-owner of a music store was accidentally shot to death by his partner while the two men staged a mock robbery to rehearse how they would handle such an incident (*Boston Globe* 1999f).

Many reported self-defense incidents do not seem to be in society's inter-t. Our knowledge of these events comes primarily from surveys in which spondents report their side of a hostile interaction that usually occurred any months or years in the past. Still, many incidents appear to occur dur-g escalating arguments; an objective observer indeed might classify them as iminal gun uses.

Since the early 1990s, at least six private surveys have asked adults whether ey had ever used a gun in self-defense and followed up with detailed ques-ons for those who answered in the affirmative. The first survey, by Kleck and ertz (1995), produced the notorious 2.5 million estimate of self-defense gun e. Cook and Ludwig (1998) and McDowall, Loftin, and Presser (2000) ana-

lyzed two additional surveys. And the Harvard Injury Control Research Center sponsored three national telephone surveys (Hemenway and Azrael 1997, 2000; Hemenway, Miller, and Azrael 2000). The Harvard surveys seem to be the only ones to ask open-ended questions about the event. Some conclusions from the Harvard surveys follow.

First, many more people report a self-defense gun use against an animal than against a human (those surveys that find a lower rate often ask about animals only if the respondent first answered in the affirmative to "any self-defense gun use"). The main animals defended against were, in descending order, snakes, dogs, bears, raccoons, and skunks.

Second, police reported more total self-defense gun uses than did all civilians combined. This result is different from the NCVS, since, in those surveys, law enforcement officers can report using a gun in self-defense only if they personally were the victims of an attempted crime. Since police often use their weapons against criminals who have committed crimes against other people, the NCVS may miss some of the on-the-job police gun use that is reported on private surveys.

Third, excluding police, a handful of civilians report most of the self-defense incidents. For example, in a 1994 Harvard survey of eight hundred gun owners, five respondents reported 70 percent of the total self-defense gun incidents in the past five years; in a 1996 Harvard survey of nineteen hundred individuals, three respondents claimed 74 percent of the total incidents reported; and in the 1999 Harvard survey of more than twenty-five hundred adults, one respondent reported fifty self-defense gun uses (54 percent of the total incidents reported). One might ask, who are these people who continually use guns, and are all these events really self-defense?

Finally, and most importantly, many of the self-defense uses that were reported appear both illegal and undesirable. Five criminal court judges from across the United States read the thirty-five descriptions of the reported self-defense uses from the 1996 and 1999 surveys. Even assuming the gun ownership and carrying were legal and the description of the event was accurate, in more than half the cases, the majority of judges rated the self-defense gun use as probably illegal (Hemenway, Miller, and Azrael 2000). Three criminology students read a summary of the respondents' accounts from the 1996 survey and rated only 25 percent as socially desirable (Hemenway and Azrael 2000).

McDowall, Loftin, and Presser (2000) used a split-survey technique: for half of respondents, they used the NCVS approach, asking first about attempted crimes against the respondents and then about self-defense gun

use; for the other half they used the Kleck approach, asking first about self-defense. The researchers found that the second group reported many more gun uses. After analyzing the follow-up questions, they concluded that many of these incidents "relied heavily on respondent judgments about the motives of possible offenders, and motives may be murky if the respondents acted quickly. . . . The gun use may follow mistaken perceptions of innocuous actions by the supposed criminal. These cases of armed resistance would then legally amount to aggravated assaults" (14–15).

Cook and Ludwig also found in their survey that many of the incidents described by respondents as self-defense gun uses might well be illegal and were certainly of questionable social value. The authors concluded,

> Most commentators have assumed that the [defensive gun uses] reported by survey respondents are actions that would be endorsed by an impartial observer who knew all the facts. Yet the sketchy and unverified accounts available from surveys leave considerable uncertainty about what actually happened, whether the respondent was the victim or the perpetrator, and whether the respondent's actions were otherwise legal, reasonable, and in the public interest. (1996, 58)

Information is often available on self-defense gun uses that result in death. In 2001, the UCR reported 585 justifiable homicides, 63 percent by the police. Of the 215 civilian justifiable homicides, 176 were with firearms (U.S. Department of Justice, FBI 2003). The UCR's annual justifiable homicide figure may be an underestimate since some jurisdictions also have an "excusable" homicide category, and many homicides ultimately ruled noncriminal by prosecutors or judges are reported as criminal since that is how they were treated in the initial police investigation (Kleck 1991). However, in many instances when grand juries decline to indict, the shooting remains questionable. Examples from Texas include:

- Tommy Dean Morris, fifty-four, a twenty-one-year veteran of the repossession business, was shot dead when he tried to repossess a pickup truck. The owner, who was behind on his payments, shot Morris twice with a rifle and claimed to have thought that Morris was stealing the truck (Locy 1994).
- Andrew DeVries of Scotland was fatally shot by a Houston homeowner who thought DeVries, who was knocking on the door, was try-

ing to break into the house. DeVries was intoxicated, lost, and trying to find his way back to his hotel (Locy 1994).

- Jason Williams, seventeen, was shot when a man found Williams in bed with his fourteen-year-old daughter. The father claimed he thought Williams was an intruder in his home (Locy 1994).
- Delivery driver Kenny Tavai, thirty-three, was fatally shot by Gordon Hale, forty-two, during an argument after Tavai's side mirror grazed Hale's pickup. Witnesses said Hale fired after Tavai left his car and punched Hale. Hale was the first Texan to use his legally concealed handgun in a fatal shooting (*Boston Globe* 1996).

A 1994 ABC News report on guns and self-defense also described shootings in self-defense. In one case, in Colorado Springs, Colorado, fifty-five-year-old Vern Smalley told police that seventeen-year-old Carmine Tagliere was tailgating Smalley's car. Smalley admits that the two exchanged obscene gestures. When Tagliere tried to pass Smalley on a highway on-ramp, Smalley cut him off. Smalley abruptly motioned for Tagliere to pull over, claiming to have intended to scold the youngster for his driving. Tagliere got out and angrily approached the car. Smalley reached into his glove compartment and placed a gun in his lap. Smalley says that Tagliere came up to the car and punched him in the face. Tagliere turned and started to walk away from the vehicle. Witnesses say that Smalley said something and the young man returned to the window. Smalley shot Tagliere in the neck, killing him. The jury found Smalley not guilty of murder in the second degree. Diane Sawyer summed up the various cases on the show: "By and large, victims who claim they pulled a gun in self-defense seem to get the benefit of the doubt from juries" (ABC News 1994).

Few statistics are available on nonfatal self-defense shootings. However, some illuminating results come from surveys of criminals who have been shot. For example, in one study of detainees being held for crimes in Washington, D.C., 24 percent had previously been shot. Of the shootings, 4 percent were by police, and none were by civilian victims of crime. These criminals were not shot while they were committing crimes but instead were shot while they were being victimized—such as during robberies and assaults, during arguments, or when they were caught in cross fire (May et al. 2000b). If criminals are not being shot by decent, law-abiding citizens, who are these self-defense gun users shooting?

There is no question that citizens sometimes justifiably shoot criminals.

For example, in Jacksonville, Florida, in 1997, a seventeen-year-old with a shotgun tried to rob the cashier at a restaurant full of senior citizens. The teen ordered the thirty patrons to hit the floor and told the waitress to open the cash register. Two elderly, armed patrons (one eighty-one years old) opened fire on the robber. One of the bullets hit the teen in the stomach. He fled and was subsequently arrested (*Boston Globe* 1997a). Yet even in this type of case, when there is no ambiguity about the criminal or the self-defense gun use, one wonders whether, on average, having seniors shooting in restaurants increases or decreases the chance of injury to other patrons.

Some self-defense gun uses certainly are in the public interest. However, from society's point of view, a problem exists analogous to the false-positive problem that plagues estimates of rare events. The possibility of using a gun in a socially useful manner—against a criminal during the commission of a crime—will occur, for the average person, perhaps once in a lifetime (or less often). It is an extremely rare event. By contrast, at any other moment, the use of a gun against another human is socially undesirable. Regular citizens, who are sometimes tired, angry, drunk, or afraid and who are not trained in dispute resolution, have lots of opportunities for inappropriate gun use. People engage in innumerable annoying and somewhat hostile interactions with each other in the course of a lifetime. It is not surprising that, from an objective public health perspective, false-positive "self-defense" gun uses by people who believe they are "decent, law-abiding citizens" may outnumber their legitimate and socially beneficial uses of guns (Hemenway, Miller, and Azrael 2000).

HOW EFFECTIVE IS SELF-DEFENSE GUN USE?

With respect to self-defense gun use, *effectiveness* can have two meanings: preventing the crime and catching the criminal. Some of the proponents of self-defense gun use tend to focus on the latter meaning. Tom Diaz, a writer formerly immersed in the gun culture, says gun owners often fantasize about using their guns against intruders. They fantasize about the kill. "It was almost as if they wanted someone to break in because they wanted to shoot someone. I think that's very scary, and dangerous. But that's the way people think about guns. I know because I was around it, and I talked to those people all the time" (Frey 1999).

A study of Good Samaritans—specifically, private citizens coming to the aid of victims during crimes—found that the Good Samaritans were often gun owners and gun carriers. The prime motive for the intervention was

often anger against the criminal rather than concern for the victim. The authors concluded that the Samaritans have a low boiling point and seem to see their intervention as a contest between themselves and the criminal, while the victim is the occasion rather than the reason for action. As an example, the authors provided a story from the *Los Angeles Times.*

> A motorist saw a truck strike a pedestrian and then drive away. The motorist gave chase and forced the hit-and-run driver to the side of the road. He then took out a shotgun he had in his car and held the truck driver at gunpoint until the police arrived. Meanwhile, the woman who had been hit by the truck was left lying in the road, and died an hour later in the hospital. (Huston, Geis, and Wright 1976, 64)

The second issue is whether guns are useful in trying to stop crimes. The issue is controversial. Even given a completely unambiguous interaction—when the other party is definitely a robber or assailant—whether one should resist the criminal at all is much debated. More difficult is the question of whether it makes sense to try to use a firearm to resist. Kleck claims that NCVS data show that guns help prevent robberies from being completed and reduce the chance of injury to the victim. For example, in the NCVS, while 25 percent of robbery victims who did nothing were injured, only 17 percent of those who defended themselves with a gun received a physical injury (Kleck 1997b). More pertinent NCVS data provide information on whether victims were injured after (and not before) they tried to act in self-defense. Such data indicate that using a gun may not be much better at preventing injury than various other self-defense measures. For example, victims appear no more likely to be injured once they threaten the criminal with any weapon, or call the police (table 4.1). In addition, other data suggest that while resisting with a gun might reduce the chance of being injured, it increases the likelihood of being killed (Zimring and Zuehl 1986).

The most careful study of the relationship between victim resistance and injury and death in robberies finds that the existing data do not sufficiently take into account the differences in circumstances or type of robberies and thus do not support any conclusions about the victim's safest course of action when confronted by a robber. Author P. J. Cook concludes,

> I am convinced that victims should comply with an armed robber's demands in most cases and that it is a particularly dangerous and fool-

> hardy act to forcefully resist a robber with a gun. This judgment is based on what I like to think of as common sense. The data indicate that most victims act as if they agree with this judgment. I further believe that there are exceptions to the "no forceful resistance" rule, cases in which the robber intends to inflict serious injury on the victim. The upshot is that some victims save their lives by resisting and some lose their lives by resisting. Currently available data are not helpful in suggesting how to increase the former or to reduce the latter. (Cook 1986, 416)

Results from the NCVS and the Harvard Injury Control Research Center surveys indicate that self-defense with weapons other than guns is far more common than self-defense gun use. Indeed, in the Harvard surveys, there were more incidents of successful self-defense with a baseball bat than with a firearm. A principal conclusion from these surveys is that individuals without guns are not necessarily unarmed (Hemenway and Azrael 1997; Azrael and Hemenway 2000; Hemenway, Miller, and Azrael 2000). Self-defense is not solely or even primarily for those with guns readily at their disposal.

SUMMARY

Self-defense gun use is a somewhat nebulous concept. Criminals, for example, often claim that they carry guns for protection and use them during crimes in self-defense because they felt threatened by the victim. Most of the

TABLE 4.1. Victims Physically Injured After Self-Defense, 1992–98 (in percentages)

Selected Types of Victim Action	Robbery	Assault	Burglary
Threaten or Attack with Gun	8	4	2
Threaten with Other Weapon	0	3	0
Run/Drive Away/Tried to	5	5	29
Call Police, Guard	3	5	3
All Incidents with Self-Defense	7	8	4

Source: Data from National Crime Victimization Surveys, 1992–98; Kleck and Kates 2001 (289).

self-defense gun uses reported on private surveys appear to be both illegal and against the public's health and welfare. Of course, there are undoubtedly many instances of successful and socially beneficial self-defense gun uses. Each month, the *American Rifleman*, the magazine of the National Rifle Association, features about a dozen accounts of armed citizens defending themselves based on newspaper clippings submitted by NRA members. Yet even these stories may not always be what they purport to be (Magnuson 1989).

Surprisingly, although protection and self-defense are the main justifications for a heavily armed citizenry, there is little evidence of any net public health benefit from guns. No credible evidence exists for a general deterrent effect of firearms. Gun use in self-defense is rare, and it appears that using a gun in self-defense is no more likely to reduce the chance of being injured during a crime than various other forms of protective action. No evidence seems to exist that gun use in self-defense reduces the risk of death; case-control studies of firearms in the home fail to find any lifesaving benefit, even when exclusively considering cases involving forced entry (Kellermann et al. 1993).

Whatever one thinks about the benefits of self-defense gun use, reasonable gun policies—such as requiring manufacturers to meet minimum safety standards or requiring background checks on sales at gun shows—would have little effect on the ability of responsible adults in the United States to defend themselves with guns.

Exhibit 7

Gary Kleck

POINT BLANK

Guns and Violence in America

ALDINE TRANSACTION
A Division of Transaction Publishers
New Brunswick (U.S.A.) and London (U.K.)

Second paperback printing 2009
Paperback edition published 2005 by AldineTransaction, New Brunswick, New Jersey.

This book is printed on acid-free paper that meets the American National Standard for Permanence of Paper for Printed Library Materials.

Library of Congress Catalog Number: 91-16780
ISBN: 978-0-202-30762-6
Printed in the United States of America

Library of Congress Cataloging-in-Publication

Kleck, Gary, 1951-
Point blank : guns and violence in America / Gary Kleck.
p. cm. — (Social institutions and social change)
Includes bibliographical references and index.
ISBN 0-202-30419-1 (cloth); 0-202-30762-X (paper)
1. Violence—United States. 2. Firearms—Social aspects—United States. 3. Gun control—United States. I. Title. II. Series.

HN90.V5K56 1991
303.6'0973—dc20 91-16780

Anything Short of Total Success is Utter Failure

Opponents of gun laws, like opponents of any law, like to point to the failures of the laws—how many crimes are committed even in places with strict gun laws, how many criminals have guns despite the laws, and so on. This argument, however, is a non sequitur; it does not follow that gun laws are ineffective. All laws are violated and thus less than completely effective, and most important criminal laws are violated frequently, as a glance at criminal statistics indicates. Even some laws widely supported by the population have been violated by a majority of the population, as self-report surveys of the population have long shown (e.g., Wallerstein and Wyle 1947). Yet no one concludes that the thousands of homicides committed each year mean that laws prohibiting murder are ineffective and should be repealed. It is unreasonable to oppose a law merely because some people will violate it.

A more sensible standard to apply is to ask whether the benefits of the law exceed its costs, i.e., whether the world will, on balance, be a better place after the law is in effect. It is impossible to directly count the number of successes, i.e., the number of crimes deterred or otherwise prevented by the existence of laws prohibiting the acts, since one can never count the number of events that do not occur. And no matter how many failures there are, it is always possible that there are still more successes. The only way one can assess the relative balance of successes and failures is to compare jurisdictions having a law with those lacking the law, or to compare jurisdictions before and after they adopt a law, to see if there is, on balance, less crime with the law than without it. Just counting failures settles nothing.

Criminals Will Ignore the Law

A corollary to the previous fallacy is the assertion that many criminals will ignore gun laws and get guns anyway. This is indisputably true, but not especially decisive regarding the desirability of gun control, since it does not address the number of successes of gun control. There is no clearly established minimum level of compliance that must be achieved before a law is to be judged a success. And if there were such a standard, it certainly could not reasonably be 100%, and would not necessarily be even 50% or any other similarly high level. It is even conceivable that if just 1 or 2% of potentially violent persons could be denied a gun, the resulting benefits might exceed the costs of whatever measure produced this modest level of compliance.

As it happens, there appears to be some compliance with gun laws

even among the "hard-core" felons incarcerated in the nation's prisons. A survey of over 1800 felons in 11 state prisons found that 25% of felon gun owners reported having registered a firearm and 15% reported having applied for a permit to purchase or carry a gun, percentages that would have been higher had felons in states without such legal requirements been excluded from the computations (Wright and Rossi 1986, p. 84). Although the self-reported compliance levels were low, as one would expect in a sample of felons, they were also not zero. Among potentially violent persons not in prison, who are probably less persistently and seriously involved in law-breaking, compliance levels would presumably be even higher.

One Thing Leads to Another

Gun control supporters often wonder how the National Rifle Association (NRA) and other gun owner organizations can possibly oppose some of the more modest and apparently inoffensive regulations. Opponents reply that today's controls, no matter how limited and sensible, will just make it that much easier to take the next, more drastic step tomorrow, and then the next step, and the next, until finally total prohibition of private possession of firearms is achieved. They argue that gun control is a "slippery slope" on which it is hard to stop halfway, and that many proponents do not want to stop with just the more limited restrictions.

This fear is not completely unreasonable, as bills calling for a national ban on private possession of handguns have been introduced in Congress (Alviani and Drake 1975, pp. 55, 57) and much of the general public does favor prohibitions. In national opinion polls, about 40% of Americans say they support bans on the private possession of handguns, and one in six even support a ban on possession of *any* guns. Since about 75% of all Americans favor registering gun purchases and about 70% favor requiring police permits to buy a gun (Chapter 9), this means that *most* supporters of these moderate controls also favor a total ban on private handgun possession. If this is so among ordinary nonactivist supporters of gun control, it almost certainly is true of activists and leaders of gun control advocacy groups.

There have always been enough prominent prohibitionists willing to air their views in a highly visible way to lend credence to fears about a movement toward total prohibition. For example, criminologist Marvin Wolfgang, in a letter to the editor of *Time* magazine, advocated a total national ban on possession of all firearms (July 5, 1968, p. 6), a sentiment echoed by noted sociologist Morris Janowitz (*Time*, 6-21-68).

cators are necessarily "noisy," reflecting both gun availability and inclinations of violent people to choose guns for their aggressive or suicidal purposes. Although the two measures often show similar trends, they also moved in opposite directions during 1945–1951, 1976–1983, and, to a lesser degree, 1958–1963. If the gun share of homicides were used as an indicator of long-term trends in a general gun ownership, it would indicate that gun ownership had declined since the 1920s. In 1920–1926, 71% of U.S. homicides were committed with guns (Brearley 1932, p. 68). Since at that time six states in the South and West, where a high share of homicides were committed with guns, were not yet a part of the national vital statistics system, the figure almost certainly would have been higher had those states been included. By 1989, the national figure was down to 62% (U.S. FBI 1990).

Table 2.3 provides estimates of the size of the U.S. gun stock, based on national surveys that asked Rs how many guns they owned. They all support the view that there was a huge number of guns in private hands. All but one of the estimates, however, are substantially lower than production-based estimates for the same years (Table 2.1). Flaws in these estimates and reasons for the discrepancy are discussed in Appendix 2.

Table 2.4 displays information on the combinations and numbers of guns owned by gun-owning households and individuals. Part A shows that most households with guns have long guns (85%), and that most (56%) own *only* longguns, whereas only one-seventh of owning households have only handguns. However, it will be this handgun-only type of household that will be of special interest later because it may be the type most likely to have guns for crime-related reasons (Bordua et al. 1979). Conversely, two-thirds of households with handguns also have long guns. This fact is significant because it suggests that when handguns are used in crimes or for defense (at least when in the home), the use was often the result of a choice between different types of guns, rather than the fact that only handguns were available. This would support the view that there is something about handguns that gun users regard as especially suitable for defensive and criminal purposes. An even more important implication is that if handguns were restricted, most current handgun owners would not even have to acquire new guns in order to have substitute firearms to use. The implications of this substitution possibility will be discussed in detail in Chapter 3.

Part B of Table 2.4 attempts to provide more realistic estimates of the number of guns owned per owner than were reported in Table 2.3. It has been assumed that the true fraction of households and individuals own-

ing guns is 10% higher than survey figures indicate, to adjust for the underreporting previously discussed (see Appendix 2 for a justification). These survey figures were combined with the production cumulation figures in Table 2.1 to roughly estimate the numbers of guns owned per owner. Based on this procedure, among households owning guns, an average of over four guns are owned, considerably higher than most survey data suggest. The distribution, however, is undoubtedly skewed to the right, with a few households owning very large numbers of guns, and most households owning a few, based on the Table 2.3 survey results. Among households with a handgun, the average number of handguns owned is about 2.8. Among individuals age 18 or over who own guns, the average number owned is about 3.4, and among individuals with handguns, the average is about 2.0. Both these data and survey data support the conclusion that although gun ownership is widespread in the United States, a large share of the guns may also be in relatively few hands (see also Cook 1983, pp. 78–9).

Regardless of the major source on which one relies, it is clear that the number of guns currently in private hands in the United States is very large, whether the number is 100 or 200 million. One straightforward policy implication is that policies that seek to reduce gun violence by reducing the overall supply of guns, as distinct from reducing the number possessed by high-risk subsets of the population, face an enormous obstacle in this huge existing stock. Even if further additions to the stock could somehow be totally and immediately stopped, the size of the stock and durability of guns imply that, in the absence of mass confiscations or unlikely voluntary surrenders of guns, it might be decades before any perceptible impact became apparent.

Who Owns Guns?

In a nation where at least half of the households have a gun, it would be difficult to regard gun ownership as an unusual or deviant status. Nevertheless, gun owners do differ from nonowners in some respects, as the figures in Table 2.5 demonstrate. These figures were computed from the combined 1980, 1982, and 1984 General Social Surveys conducted by the National Opinion Research Center (for details of the surveys, see Davis 1984). These surveys were superior to previous national surveys in that they asked whether each *respondent* (R) owned a gun, rather than asking only whether someone in the household did. This made it possible to relate attributes of the R to whether the R owned

of "ARs," it is unlikely that criminals would adopt them. But even if at least some types of criminals did seek out rifles as an alternative to handguns, they would have an ample supply of more lethal substitute rifles available to them even in the absence of "ARs."

While "ARs" are not unusually lethal relative to other rifles, they do have other technical attributes potentially relevant to criminal violence: (1) they are capable of firing single shots as fast as the shooter can pull the trigger, and (2) they can accept magazines that hold a large number of cartridges. It is unclear whether either of these attributes is of substantial criminological significance. "ARs" are capable of firing at a rate somewhat faster than other gun types, but it is unknown how often violent incidents occur in which this higher rate of fire would have any impact on the outcome of the incident. For example, even in a rare mass shooting such as the 1989 Stockton schoolyard killing of five children, the killer fired 110 rounds in 3 to 4 (or more) minutes, or about 28–37 rounds per minute (*Los Angeles Times* 1-18-89, p. 3; 1-19-89, p. 9). The same rate of fire can be achieved with an ordinary double-action revolver using speed-loaders to reload. Further, there was nothing to stop Purdy from continuing his attack for another 3 or 4 minutes. The higher rate of fire was unnecessary for Purdy to carry out his murderous intentions—he did all the shooting he wanted to do in 4 minutes and then killed himself.

The effective rate of fire of any gun is limited by its recoil. When a shot is fired, the force of the bullet leaving the barrel causes the gun to move back toward the shooter and off of its original aiming alignment. It cannot be fired at the same target again until the shooter puts it back in line with the target. Thus the somewhat higher rate of fire of semiautomatic weapons cannot be fully exploited, reducing the effective difference between these weapons and revolvers.

Ordinary revolvers can easily fire six rounds in 3 seconds without any special skill on the part of the shooter or modification to the weapon. Even assuming a semiautomatic gun could fire at twice this rate, it would only mean that a shooter could fire six rounds in 1.5 instead of 3 seconds. The issue comes down to this: How many violent incidents occur each year in which a shooter has 1.5 seconds to shoot the victim(s), but not 3 seconds? Such incidents are probably fairly rare, although there are no hard data on the matter.

Critics of "ARs" have also pointed to the high total *volume* of fire of which the weapons are capable, due to their large magazines. It should be noted that magazines for these weapons are almost always detachable, and the weapons are usually capable of accepting many different

common magazine sizes, whether one containing only 3 rounds, or one containing 30 or more (Warner 1989). Thus, the high volume of rounds is not, strictly speaking, an attribute of the gun itself, but rather of the magazine. Likewise, most of the millions of ordinary semiautomatic pistols sold in the United States for decades are also capable of accepting box-type magazines that can have very large capacities. Consequently, one legal difficulty in distinguishing "ARs" from other semiautomatic rifles, or AWs from other semiautomatic handguns, is that most varieties of all of these weapon categories accept box-type magazines. Since such magazines can be either big or small, it means that the unrestricted civilian-style guns are just as capable of using a large-capacity magazine as are the restricted modern military-style AWs. Consequently, rational controls based on concern over large ammunition capacity would have to either ban large magazines or ban all guns capable of receiving types of magazines that sometimes have large capacities. The former alternative would be very difficult to enforce, whereas the latter alternative would mean banning large numbers of hunting rifles and most semiautomatic pistols, and thus would negate the chief political benefit of restricting only rare weapons.

It is doubtful whether a high volume magazine is currently relevant to the outcome of a large number of violent incidents. The rare mass killing notwithstanding, gun assaults usually involve only a few shots being fired. Even in a sample of gun attacks on armed police officers, where the incidents are more likely to be mutual combat gunfights with many shots fired, the suspects fired an average of only 2.55 times (New York City Police Department 1989, p. 6). On the other hand, if high-volume guns did become popular among criminals in the future, this could change for the worse. Further, although "ARs" are not unique in any one of their attributes, they are unusual, although not unique, in combining the lethality of rifles, a potentially large ammunition capacity, *and* a high rate of fire. It is possible that the combination of all three attributes could have a crime-enhancing effect greater than that generated by any one of the attributes.

Whereas semiautomatic firearms offer a rate of fire only somewhat higher than other common gun types, fully automatic weapons have much higher rates of fire. "ARs" sold on the civilian market are not capable of fully automatic fire, but it has been argued that this distinction is a minor one because "ARs" are so easily converted to fully automatic fire (*Newsweek* 10-14-85, pp. 48–9). The *New York Times*, in an editorial, even told its readers that "many semiautomatics can be made fully automatic with a screwdriver, even a paperclip" (8-2-88). Eight

share of defensive uses attributable to these sorts of users is relevant to assessing NCS information used later to evaluate the effectiveness of defensive gun uses, since that information is derived from questions that did not exclude any uses by persons with these violence-related occupations. Although the gun use surveys did not obtain sufficiently detailed occupational detail to assess this, the NCS did. In the 1979–1985 sample, members of these occupations accounted for 15.4% of self-protection gun uses. They do therefore account for a disproportionate share of the NCS-counted gun uses, but still a relatively small fraction. And again it should be stressed that on-duty uses by such persons were explicitly excluded from the surveys used to estimate the number of defensive gun uses.

Shooting in Self-Defense

Most uses of guns for either criminal or defensive purposes are probably much less dramatic or consequential than one might think. Only a tiny fraction of criminal gun assaults involves anyone actually being wounded, even nonfatally, and one would expect the same to be true of defensive gun uses. More commonly, guns are merely pointed at another person, or perhaps only referred to ("I've got a gun") or displayed, and this is sufficient to accomplish the ends of the user, whether criminal or noncriminal. Nevertheless, most gun owners questioned in surveys assert that they would be willing to shoot criminals under the right circumstances. The 1989 Time/CNN survey found that 80% of gun owners thought they would get their guns if they thought someone was breaking into their home, and 78% said they would shoot a burglar if they felt threatened by that person (Quinley 1990, p. 9).

Despite this stated willingness of gun owners to shoot under certain circumstances, most defensive uses of guns do not in fact involve shooting anyone. Although the surveys listed in Table 4.1 did not delve into much detail about the circumstances in which guns were used defensively, or the manner in which they were used, most did ask whether the gun was fired. Results generally indicate the gun was fired in less than half of the defensive uses; the rest of the times the gun was merely displayed or referred to, in order to threaten or frighten away a criminal.

Self-Defense Killings

The rarest, but most serious form of self-defense with a gun is a defensive killing. Although shootings of criminals represent a small frac-

Exhibit 8

Stories of Self Defense

Analysis of Five Years of Armed Encounters (With Data Tables)

March 12 2012

by GSL Staff

Incident at a Glance

Gun(s) Used:	Unknown	Location:	Unknown
# of Suspects:	Unknown	Shots Fired:	Unknown
Suspect Killed:	Unknown	State:	
Source:		Archive:	None

Foreword by GunsSaveLives.net

This article was originally written several years ago by Claude Werner. It is republished here, in its entirety (including data tables) with permission.

While the source material is somewhat dated there is still a lot of information we can learn from this. One thing to also note is that the stories used for this study were all situations in which a citizen *successfully* defended themselves. This means that the study focuses on and shows what works, not what doesn't work.

Author
Claude Werner
Firearms Safety Training LLC

The Armed Citizen – A Five Year Analysis

Overview

For the period 1997 – 2001, reports from "The Armed Citizen" column of the NRA Journals were collected. There were 482 incidents available for inclusion in the analysis. All involved the use of firearms by private citizens in self defense or defense of others. No law enforcement related incidents were included. The database is self-selecting in that no non-positive outcomes were reported in the column.

Analysis

As might be expected, the majority of incidents (52%) took place in the home. Next most common locale (32%) was in a business. Incidents took place in public places in 9% of reports and 7% occurred in or around vehicles.

The most common initial crimes were armed robbery (32%), home invasion (30%), and burglary (18%).

Overall, shots were fired by the defender in 72% of incidents. The average and median number of shots fired was 2. When more than 2 shots were fired, it generally appeared that the defender's initial response was to fire until empty. It appears that revolver shooters are more likely to empty their guns than autoloader shooters. At least one assailant was killed in 34% of all incidents. At least one assailant was wounded in an additional 29% of all incidents. Of the incidents where shots are fired by a defender, at least one assailant is killed in 53% of those incidents.

Handguns were used in 78% of incidents while long guns were used in 13%; in the balance the type of firearm was not reported. The most common size of handgun was the .35 caliber family (.38, .357, 9mm) at 61%, with most .38s apparently being of the 5 shot variety. Mouseguns (.380s and below) were at 23%, and .40 caliber and up at 15%.

The range of most incidents appears to be short but in excess of touching distance. It appears that most defenders will make the shoot decision shortly before the criminal comes within arm's length. Defenders frequently communicate with their attackers before shooting.

The firearm was carried on the body of the defender in only 20% of incidents. In 80% of cases, the firearm was obtained from a place of storage, frequently in another room.

Reloading was required in only 3 incidents. One of those involved killing an escaped lion with a .32 caliber revolver, which was eventually successful after 13 shots.

Multiple conspirators were involved in 36% of the incidents. However, there were no apparent cases of getaway drivers or lookouts acting as reinforcements for the criminal actor(s) once shooting starts. At the sound of gunfire, immediate flight was the most common response for drivers and lookouts.

When multiple conspirators were involved, the first tier was a two man action team. If another member was available, he was usually the driver of the getaway car and remained in the car. If a fourth conspirator was involved, he was stationed immediately outside the target location as a lookout for the police or other possible intervening parties. The outside conspirators do not generally appear to be armed. It does appear that the trend over the period has increased from one weapon in the action team to two weapons.

The largest group of violent criminal actors was 7, a group that committed serial home invasions in Rochester NY. An alert and prepared homeowner, who saw them invade an adjacent home, accessed his shotgun, and dispatched them (2 killed and 1 seriously wounded) when they broke in his door.

Incidents rarely occurred in reaction time (i.e., ¼ second increments). Most commonly, criminals acted in a shark-like fashion, slowly circling and alerting their intended victims. The defender(s) then had time to access even weapons that were stored in other rooms and bring them to bear.

The most common responses of criminals upon being shot were to flee immediately or expire. With few exceptions, criminals ceased their advances immediately upon being shot. Even small caliber handguns displayed a significant degree of instant lethality (30 per cent immediate one shot kills) when employed at close range. Many criminal actors vocally expressed their fear of being shot when the defender displayed a weapon. Upon the criminals' flight, the "victims" frequently chased and captured or shot the criminals and held them for the authorities.

Conclusions

1) Even small caliber weapons are adequate to solve the vast majority of incidents requiring armed self-defense.
2) Mindset of the potential victim was far more important than the type of weapon used. All the victims were willing to fight their opponents in order to survive. Although not common, in some cases bridge weapons, such as pens, were used to gain time to access the firearm.
3) Frequently, the defenders were aware that something was amiss before the action started and then placed themselves in position to access their weapons. Awareness of the surroundings appears to be a key element of successful defense.
4) The defenders had some measure of familiarity with their firearms. Although perhaps not trained in the formal sense, they appear to be able to access a firearm and immediately put it into action. At least one defender learned from a previous experience and made the firearm more accessible for subsequent use.

5) Training or practice with a firearm should include a substantial amount of accessing the firearm from off body locations, such as drawers, underneath counters, etc.
6) This analysis does not present a view of the totality of armed self-defense in that non-positive outcomes were not available for inclusion in the database. The analysis may, however, be useful in helping to describe a methodology for successful armed self-defense. This methodology might be described as:
1. be aware,
2. be willing to fight,
3. have a weapon accessible,
4. be familiar enough with the weapon to employ it without fumbling,
5. when ready, communicate, both verbally and non-verbally, to the attacker that resistance will be given, and
6. if the attacker does not withdraw, counterattack without hesitation.

Location of Incident

Location	%
Home	52%
Business	32%
Public	9%
In/around Vehicle	7%

Shots Fired

Type of Location	No	Yes
Business	33%	72%
Home	25%	75%
Public	29%	71%
In/around Vehicle	35%	65%
Total	28%	72%

Number of Shots Fired

Average	2.2
Median	2
Mode	1
Max	20

Gun Type

Handgun 78%
Long Gun 13%
Unknown 8%

Body Carry

Type of Location	No	Yes
Business	69%	31%
Home	94%	6%
Public	49%	51%
In/around Vehicle	65%	35%
Total	80%	20%

Multiple Assailants

Type of Location	No	Yes
Business	76%	24%
Home	72%	28%
Public	62%	38%
Retail Business	52%	48%
In/around Vehicle	49%	51%
Total	80%	20%

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Exhibit 9

GUN DIGEST® BOOK OF CONCEALED CARRY

2nd Edition

MASSAD AYOOB

Published by

Gun Digest® Books, an imprint of F+W Media, Inc.
Krause Publications • 700 East State Street • Iola, WI 54990-0001
715-445-2214 • 888-457-2873
www.krausebooks.com

To order books or other products call toll-free 1-800-258-0929
or visit us online at www.gundigeststore.com

Cover photography by Kris Kandler

ISBN-13: 978-1-4402-3267-1
ISBN-10: 1-4402-3267-9

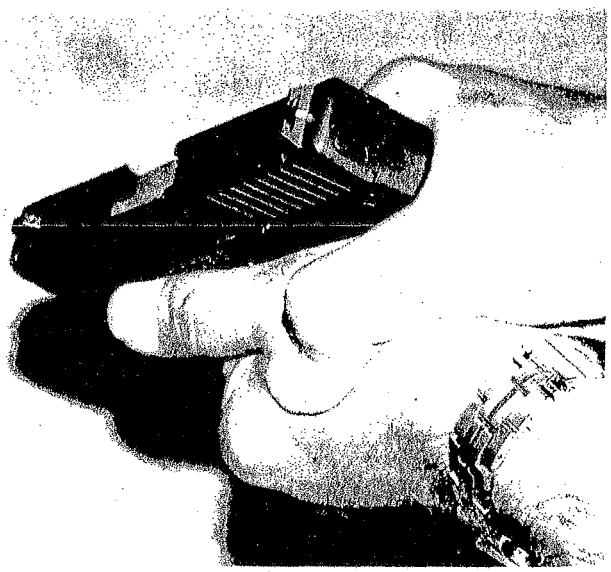
Cover Design by Dave Hauser
Designed by Dave Hauser
Edited Corrina Peterson

Printed in United States of America

G32 .357 SIG, G30 .45 ACP, and G38 .45 GAP) are all good choices. So are the many other compact (i.e., medium size) modern autos you'll find in the *Gun Digest,* where there's more space to pore over the various models and size/weight specifications than here. In the 1911, Commander and Officers size work well. For many, something more *sub*-compact fits the body better. These would include the "baby Glocks" in the same calibers, the Micro-series Kahrs, and the smallest of the 1911s by their many makers.

Finally, a full-size gun makes particular sense under cold-weather wardrobes, which can amply conceal them. In cold weather, with gloved or cold-numbed hands, a pistol with a longer grip-frame may be easier to handle. I like something with a large trigger guard, and whose trigger won't rebound so far forward that it can snag on or be blocked by thick glove material, which could make it fail to re-set. A TDA auto pistol will generally fill that bill, as will the Glock or XD. I get leery of single-action pistols when cold or gloves have further reduced a vasoconstricted hand's ability to feel the trigger, and the glove-blocking factor leaves most revolvers out entirely.

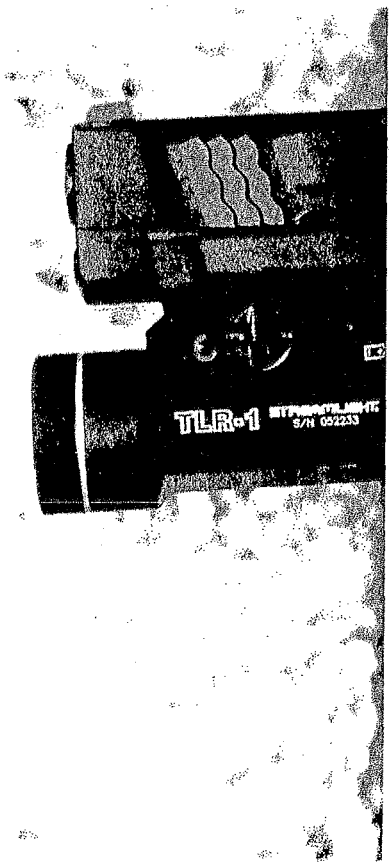
Subcompact carry guns can be "too small for your hand," necessitating technique changes. Trigger reach is so short on this Kahr that author's trigger finger is blocked by thumb in traditional grasp; thumb will need to come up. Little finger is tucked under short butt since there's no room for it on the frame...



...author's two-hand grasp on the Kahr puts firing thumb on support hand out of the way of trigger finger, and support hand thumb well forward to avoid the sharp edge on the Kahr's slide release lever.

The bottom line of "concealed handgun wardrobe selection" is this: the gun's size and shape must fit hand, body, and clothing selection alike. You probably don't dress the same every day. When you "dress to kill" (forgive me, I couldn't resist) you also need to vary that particular "wardrobe" to better suit your daily needs.

Final advice: In the immortal words of author and big game hunter Robert Ruark, "Use Enough Gun." Small-caliber weapons simply don't have the "oomph" to stop a violent human being. I coined the phrase "Friends don't let friends carry mouse-guns," and I'll stick by that. The cessation of homicidal human threat is the *raison d'etre* of CCW. If the Weapon you're Carrying Concealed isn't powerful enough to do that job, you've undercut the whole purpose of the mission. I personally draw the line above the marginal 380 ACP and consider the minimums to be 38 Special +P in a revolver and 9mm Luger in a semiautomatic pistol. On the top end, only master shooters can handle the violent recoil of 41 and 44 Magnums. For most people, the best bet is in a caliber range that encompasses 38 Special, 357 Magnum, 9mm Luger, 40 Smith & Wesson, 10mm Auto, 45 ACP, and 45 GAP. There are other rarely-carried rounds within that range, but any of those - with proper high-tech hollow-point defensive ammunition - can be reasonably counted on to get you through the night.



For more on gun and ammo selection, I'd refer you to my *Gun Digest Book of Combat Handgunnery, Sixth Edition,* available from Krause. The bottom line is, it's not about "what gun did you have" so much as it's about "did you have a gun?" Modern ultra-compact, ultra-light 38 Special and 9mm Luger handguns give you adequate power in extremely small and light packages. You just don't have to settle for anything less, when innocent lives - including your life and the lives of those you most love - will likely be at stake if and when the shooting starts.

Exhibit 14

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Attorneys for Defendants
THE CITY OF SUNNYVALE, THE MAYOR OF SUNNYVALE, ANTHONY SPITALERI in his official capacity, THE CHIEF OF THE SUNNYVALE DEPARTMENT OF PUBLIC SAFETY, FRANK GRGURINA, in his official capacity

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SAN JOSE DIVISION

LEONARD FYOCK, SCOTT HOCHSTETLER, WILLIAM DOUGLAS, DAVID PEARSON, BRAD SEIFERS, and ROD SWANSON,

Plaintiffs,

v.

THE CITY OF SUNNYVALE, THE MAYOR OF SUNNYVALE, ANTHONY SPITALERI in his official capacity, THE CHIEF OF THE SUNNYVALE DEPARTMENT OF PUBLIC SAFETY, FRANK GRGURINA, in his official capacity, and DOES 1-10

Defendants.

Case No. 13-cv-05807 RMW

DECLARATION OF CHRISTOPHER S. KOPER IN SUPPORT OF SUNNYVALE'S OPPOSITION TO PLAINTIFFS' MOTION FOR PRELIMINARY INJUNCTION

Date: February 21, 2014
Time: 9:00 a.m.
Location: San Jose Courthouse
Courtroom 6 – 4th Floor
280 South 1st Street
San Jose, CA 95113

I, Christopher S. Koper, declare as follows:

1. I am an Associate Professor for the Department of Criminology, Law and Society at George Mason University, in Fairfax, Virginia and a senior fellow at George Mason's Center

for Evidence-Based Crime Policy. My credentials, experience, and background are stated in my curriculum vitae, a true and correct copy of which is attached as Exhibit A.

2. In 1997, my colleague Jeffrey Roth and I conducted a study on the impact of Title XI, Subtitle A of the Violent Crime Control and Law Enforcement Act of 1994 (hereinafter the "federal assault weapons ban" or the "federal ban"), for the United States Department of Justice and the United States Congress.[1] I updated the original 1997 study in 2004[2] and briefly revisited the issue again by re-examining my 2004 report in 2013.[3] To my knowledge, these are the only published academic studies to have examined the efficacy of the federal ban on assault weapons and ammunition feeding devices holding more than ten rounds of ammunition (hereinafter referred to as "large-capacity magazines" or "LCMs").[4] My 1997 study was based on limited data, especially with regard to the criminal use of large-capacity magazines. As a result, my conclusions on the impact of the federal ban are most accurately and completely set forth in my 2004 and 2013 reports.

3. This declaration will summarize some of the key findings of those studies regarding the federal ban and its impact on crime prevention and public safety, and, based upon my findings, provide some opinions on the potential impact and efficacy of prohibitions and

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[1] Jeffrey A. Roth & Christopher S. Koper, *Impact Evaluation of the Public Safety and Recreational Firearms Use Protection Act of 1994: Final Report* (1997), attached hereto as Exhibit B (hereinafter, "*Impact Evaluation*").

[2] Christopher S. Koper, *An Updated Assessment of the Federal Assault Weapons Ban: Impacts on Gun Markets and Gun Violence*, 1994-2003 (2004), attached hereto as Exhibit C (hereinafter, "*Updated Assessment of the Federal Assault Weapons Ban*").

[3] Christopher S. Koper, *America's Experience with the Federal Assault Weapons Ban, 1994-2004: Key Findings and Implications*, ch. 12, pp. 157-171 in Reducing Gun Violence in America: Informing Policy with Evidence (Daniel S. Webster & Jon S. Vernick eds. 2013), attached hereto as Exhibit D (hereinafter "*America's Experience with the Federal Assault Weapons Ban*").

[4] As discussed below, there have been some additional studies as to the impact and efficacy of the federal assault weapons ban conducted by non-academic institutions. In 2011, for example, the Washington Post published the results of its own investigation into the federal ban's impact on the criminal use of LCMs in Virginia. *See infra* ¶ 50. I am also aware of gun tracing analyses conducted by ATF (2003 Congressional Q&A memo provided to the author) and the Brady Center to Prevent Gun Violence (2004), both of which are consistent with the findings of my studies regarding the decline in assault weapons as a percentage of crime gun traces between the pre-ban and post-ban periods. *See infra* note 20.

restrictions on large-capacity magazines, like those contained in Sunnyvale's recently enacted Sunnyvale Municipal Code, § 9.44.050, which was part of Measure C approved by some 67% of Sunnyvale voters on November 5, 2013.

4. As discussed below, it is my considered opinion that Sunnyvale's LCM ban has the potential to prevent and limit shootings, particularly those involving high numbers of shots and victims—and thus are likely to advance Sunnyvale's interests in protecting its populace from the dangers of such shootings.

I. CRIMINAL USES AND DANGERS OF LARGE-CAPACITY MAGAZINES

5. Large-capacity magazines allow semiautomatic weapons to fire more than 10 rounds without the need for a shooter to reload the weapon.[5] Large-capacity magazines come in a variety of sizes, including but not limited to 17-round magazines, 25- or 30-round magazines, and drums with the capacity to accept up to 100 rounds.

6. The ability to accept a detachable magazine, including a large-capacity magazine, is a common feature of guns typically defined as assault weapons.[6] In addition, LCMs are frequently used with guns that fall outside of the definition of assault weapon.

7. One of the core rationales for legislative attempts to ban, or otherwise limit, the availability of LCMs is that they are particularly dangerous because they facilitate the rapid firing of high numbers of rounds. This increased firing capacity thereby potentially increases injuries and deaths from gun violence. *See* Updated Assessment of the Federal Assault Weapons Ban, p. 97 (noting that "studies ... suggest that attacks with semiautomatics—including [assault weapons] and other semiautomatics with LCMs—result in more shots fired, persons wounded, and wounds

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[5] A semiautomatic weapon is a gun that fires one bullet for each pull of the trigger and, after each round of ammunition is fired, automatically loads the next round and cocks itself for the next shot, thereby permitting a faster rate of fire relative to non-automatic firearms. Semiautomatics are not to be confused with fully automatic weapons (*i.e.*, machine guns), which fire continuously so long as the trigger is depressed. Fully automatic weapons have been illegal to own in the United States without a federal permit since 1934. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 4 n.1 .

[6] Although the precise definition used by various federal, state, and local statutes has varied, the term "assault weapons" generally includes semiautomatic pistols, rifles, and shotguns with military features conducive to military and potential criminal applications but unnecessary in shooting sports or for self-defense.

per victim than do other gun attacks").

8. As such, semiautomatics equipped with LCMs have frequently been employed in highly publicized mass shootings, and are disproportionately used in the murders of law enforcement officers, crimes for which weapons with greater firepower would seem particularly useful. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 14-19, 87.

9. During the 1980s and early 1990s, semiautomatic firearms equipped with LCMs were involved in a number of highly publicized mass murder incidents that first raised public concerns and fears about the accessibility of high powered, military-style weaponry and other guns capable of discharging high numbers of rounds in a short period of time. For example:

- On July 18, 1984, James Huberty killed 21 persons and wounded 19 others in a San Ysidro, California McDonald's restaurant, using an Uzi carbine, a shotgun, and another semiautomatic handgun, and equipped with a 25-round LCM;
- On January 17, 1989, Patrick Purdy used a civilian version of the AK-47 military rifle and a 75-round LCM to open fire in a Stockton, California schoolyard, killing five children and wounding 29 other persons;
- On September 14, 1989, Joseph Wesbecker, armed with an AK-47 rifle, two MAC-11 handguns, a number of other firearms, and multiple 30-round magazines, killed seven and wounded 15 people at his former workplace in Louisville, Kentucky;
- On October 16, 1991, George Hennard, armed with two semiautomatic handguns with LCMs (and reportedly a supply of extra LCMs), killed 22 people and wounded another 23 in Killeen, Texas;
- On July 1, 1993, Gian Luigi Ferri, armed with two Intratec TEC-DC9 assault pistols and 40 to 50 round magazines killed nine and wounded six at the law offices of Pettit & Martin in San Francisco, California; and
- On December 7, 1993, Colin Ferguson, armed with a handgun and multiple LCMs, opened fire on commuters on a Long Island Rail Road train, killing 6 and wounding 19.

See Updated Assessment of the Federal Assault Weapons Ban, p. 14.[7]

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[7] Additional details regarding these incidents were obtained from: Violence Policy Center, *Mass Shootings in the United States Involving High-Capacity Ammunition Magazines*, available at http://www.vpc.org/fact_sht/VPCshootinglist.pdf (hereinafter, "Violence Policy Center Report"); Mark Follman, Gavin Aronsen & Deanna Pan, US Mass Shootings, 1982-2012: Data from Mother Jones' Investigation (updated Feb. 27, 2013), available at http://www.motherjones.com/politics/2012/12/mass-shootings-mother-jones-full-data (hereinafter, "Follman, Aronsen & Pan 2013"); and Mark Follman, Gavin Aronsen & Jaeah Lee,

10. More recently, in the years since the expiration of the federal ban in 2004, there have been another well-publicized series of mass shooting incidents involving previously banned assault weapons and/or LCMs. Since 2007, for example, there have been at least fifteen incidents in which offenders using assault-type weapons or other semiautomatics with LCMs have wounded and/or killed eight or more people.[8] Some of the more notorious of these incidents include:

- Blacksburg, Virginia, April 16, 2007: Student Seung-Hui Cho killed 33 (including himself) and wounded 17 on the campus of Virginia Tech, armed with a handgun and multiple LCMs;
- Tucson, Arizona, January 8, 2011: Jared Loughner, armed with a handgun and multiple LCMs, killed 6 and wounded 13, including Congresswoman Gabrielle Giffords;
- Aurora, Colorado, July 20, 2012: James Holmes killed 12 and wounded 58 in a movie theater, armed with a Smith & Wesson M&P1 5 assault rifle, 100-round LCMs, and other firearms; and
- Newtown, Connecticut, December 14, 2012: Adam Lanza killed 26 (twenty of whom were young children) and wounded two at Sandy Hook Elementary School, armed with a Bushmaster AR-15-style assault rifle, two handguns, and multiple LCMs.

See America's Experience with the Federal Assault Weapons Ban, pp. 157-58.[9]

11. There is evidence to suggest that the particularly large ammunition capacities of assault weapons, along with their military-style features, are more attractive to criminals than lawful users. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 17-18.

12. The available evidence also suggests that large-capacity magazines, along with assault weapons, pose particular dangers by their large and disproportionate involvement in two aspects of crime and violence: mass shootings and murders of police. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 14- 19, 87.

More Than Half of Mass Shooters Used Assault Weapons and High-Capacity Magazines (Feb. 27, 2013), available at http://www.motherjones.com/politics/2013/02/assault-weapons-high-capacity-magazines-mass-shootings-feinstein (hereinafter, "Pollman, Aronsen & Lee 2013").

[8] See Violence Policy Center Report; Follman, Aronsen & Pan 2013; Follman, Aronsen & Lee 2013.

[9] Additional details regarding these incidents were obtained from: Violence Policy Center Report; Follman, Aronsen & Pan 2013; and Follman, Aronsen & Lee 2013.

13. With respect to mass shootings, the available evidence before the federal assault weapons ban was enacted in 1994 and after its expiration in 2004 both support this conclusion. Prior to the federal ban, assault weapons or other semiautomatics with LCMs were involved in 6, or 40%, of 15 mass shooting incidents occurring between 1984 and 1993 in which six or more persons were killed or a total of 12 or more were wounded. See Updated Assessment of the Federal Assault Weapons Ban, p. 14.[10]

14. More recently, a media investigation and compilation of 62 public mass shooting incidents that involved the death of four or more people, over the period 1982-2012, showed that, of the cases where magazine capacity could be determined, 31 of 36 cases, or 86%, involved a large-capacity magazine. Including all cases, including those where magazine capacity could not be determined, exactly half of the cases (31 of 62) are known to have involved an LCM.[11]

15. LCMs, because they can be and are used both with assault weapons and guns that fall outside the definition of an assault weapon, appear to present even greater dangers to crime and violence than assault weapons alone.

16. Prior to the federal assault weapons ban, for example, guns with LCMs were used in roughly 13-26% of most gun crimes (as opposed to somewhere between about 1% and 8% for assault weapons alone). *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 15, 18-19; *America's Experience with the Federal Assault Weapons Ban*, pp. 161-62.

17. And, in New York City, the New York State Division of Criminal Justice Services reported that, in 1993, at least 16%, and as many as 25%, of guns recovered in murder investigations were equipped with LCMs. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 18.[12]

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[10] These figures are based on tabulations that I and my research team did using data reported in Gary Kleck, *Targeting Guns: Firearms and Their Control* (1997), pp. 124-26.

[11] This investigation and compilation of data on mass shootings was done by reporters at *Mother Jones* magazine. See Follman, Aronsen & Pan 2013; Follman Aronsen & Lee 2013; Mark Follman, Gavin Aronsen & Deanna Pan, *A Guide to Mass Shootings in America* (updated Feb. 27, 2013), available at http://www.motherjones.com/politics/2012/07/mass-shootings-map.

[12] The minimum estimate is based on cases in which discharged firearms were recovered, while the maximum estimate is based on cases in which recovered firearms were positively linked to the case with ballistic evidence. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 18

18. It also appears that guns with LCMs have been used disproportionately in murders of police. Specifically, the available data, from prior to the federal ban, indicates that LCMs are used in somewhere between 31% to 41% of gun murders of police. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 18; *America's Experience with the Federal Assault Weapons Ban*, p. 162.

19. Working under my direction, a graduate student at George Mason University recently analyzed the *Mother Jones* data for his Master's thesis, and compared the number of deaths and fatalities of the 62 mass shootings identified therein to determine how the presence of assault weapons and LCMs impacted the outcome.[13] With respect to LCMs, he compared cases where an LCM was known to have been used (or at least possessed by the shooter) against cases where either an LCM was not used or not known to have been used. He found that the LCM cases (which included assault weapons) had significantly higher numbers of fatalities and casualties: an average of 10.19 fatalities in LCM cases compared to 6.35 fatalities in non-LCM/unknown cases. He found an average of 12.39 people were shot but not killed in public mass shootings involving LCMs, compared to just 3.55 people shot in the non-LCM/unknown LCM shootings. These findings reflect a total victim differential of 22.58 killed or wounded in the LCM cases compared to 9.9 in the non-LCM/unknown LCM cases.[14] All of these differences were statistically significant and not a result of mere chance.

20. In addition, the available evidence suggests that gun attacks with semiautomatics—including both assault weapons and guns equipped with LCMs—tend to result in more shots fired, more persons wounded, and more wounds inflicted per victim than do attacks with other firearms. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 97; *America's Experience with the Federal Assault Weapons Ban*, pp. 166-67.

21. For example, in mass shooting incidents that resulted in at least 6 deaths or at least

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n.15.

[13] *See* Luke Dillon, *Mass Shootings in the United States: An Exploratory Study of the Trends from 1982 to 2012*. 2013. Master's thesis. Fairfax, VA: Department of Criminology, Law and Society, George Mason University.

[14] The patterns were also very similar when comparing the LCM cases against just those cases in which it was clear that an LCM was not used (though this was a very small number).

12 total gunshot victims from 1984 through 1993, offenders who clearly possessed assault weapons or other semiautomatics with LCMs wounded or killed an average of 29 victims in comparison to an average of 13 victims wounded or killed by other offenders. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 85-86; *America's Experience with the Federal Assault Weapons Ban*, p. 167.

22. Similarly, a study of handguns attacks in Jersey City, New Jersey during the 1990s found that the average number of victims wounded in gunfire incidents involving semiautomatic pistols was 15% higher than in those involving revolvers. The study further found that attackers using semiautomatics to fire more than ten shots were responsible for nearly 5% of all gunshot victims and that 100% of these incidents involved injury to at least one victim. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 84-86, 90-91; *America's Experience with the Federal Assault Weapons Ban*, p. 167.

23. Similar evidence comes from Milwaukee, Wisconsin. Between 1992 and 1995, gun homicide victims in Milwaukee who were killed by guns with LCMs had 55% more gunshot wounds than those victims killed by non-LCM firearms. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 86.

24. And, in an analysis I conducted of guns recovered by police in Baltimore, I also found LCMs to be associated with gun crimes that resulted in more lethal and injurious outcomes. For instance, I found, among other things, that guns used in shootings that resulted in gunshot victimizations were 17% to 26% more likely to have LCMs than guns used in gunfire cases with no wounded victims, and guns linked to murders were 8% to 17% more likely to have LCMs than guns linked to non-fatal gunshot victimizations. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 87.

25. In short, while tentative, the available evidence suggests more often than not that attacks with semiautomatics, particularly those equipped with LCMs, result in more shots fired, leading both to more injuries and injuries of greater severity. Such attacks also appear to result in more wounds per victim. This is significant because gunshot victims who are shot more than once are more than 60% more likely to die than victims who receive only one gunshot wound.

See Updated Assessment of the Federal Assault Weapons Ban, p. 87 (citing studies showing 63% increase and 61% increases, respectively, in fatality rates among gunshot victims suffering more than one wound).

26. In addition, diminishing the number of victims of shootings by even a small percentage can result in significant cost savings because of the significant social costs of shootings, as discussed *supra* in ¶¶ 52-53.

II. EFFECTS OF THE 1994 FEDERAL ASSAULT WEAPONS BAN

A. Provisions of the Federal Assault Weapons Ban

27. Enacted on September 13, 1994—in the wake of many of the mass shootings described above—the federal assault weapons ban imposed prohibitions and restrictions on the manufacture, transfer, and possession of both certain semiautomatic firearms designated as assault weapons and certain LCMs. Pub. L. No. 103-322, tit. XI, subtit. A, 108 Stat. 1796, 1996-2010 (1994).

28. The federal assault weapons ban was to expire after ten years, unless renewed by Congress. *Id.* § 110105(2). It was not renewed, and thus, by its own terms, the federal ban expired on September 13, 2004.[15]

1. Banned Assault Weapons and Features

29. As noted, the federal assault weapons ban imposed a ten-year ban on the manufacture, transfer, or possession of what the statute defined as "semiautomatic assault weapons." The federal ban was not a prohibition on all semiautomatic firearms; rather, it was directed against those semiautomatics having features that are useful in military and criminal applications but that are unnecessary in shooting sports or for self-defense.

30. Banned firearms were identified under the federal law in two ways: (i) by specific make and model; and (ii) by enumerating certain military-style features and generally prohibiting those semiautomatic firearms having two or more of those features.

[15] I understand that California prohibited assault weapons in 1989, before the federal ban, but grandfathered most existing assault weapons; and that California prohibited large-capacity magazines in 2000 but grandfathered existing LCMs. For further information, *see infra* ¶ 54. I am not aware of any studies of the effects of these California laws.

31. First, the federal ban specifically prohibited 18 models and variations of semiautomatic guns by name (*e.g.*, the Intratec TEC-9 pistol and the Colt AR-15 rifle), as well as revolving cylinder shotguns. This list also included a number of foreign rifles that the federal government had banned from importation into the country beginning in 1989 (*e.g.*, the Avtomat Kalashnikov models). And, indeed, several of the guns banned by name were civilian copies of military weapons and accepted ammunition magazines made for those military weapons. (A list of the weapons banned by name in the 1994 law is set forth in Table 2-1 of the *Updated Assessment of the Federal Assault Weapons Ban*, p. 5.)

32. Second, the federal assault weapons ban contained a "features test" provision that generally prohibited other semiautomatic guns having two or more military-style features. Examples of such features include pistol grips on rifles, flash suppressors, folding rifle stocks, threaded barrels for attaching silencers, and the ability to accept detachable magazines. (This "features test" of the federal ban is described more fully in Table 2-2 of the *Updated Assessment of the Federal Assault Weapons Ban*, p. 6, and in Table 12-1 of *America's Experience with the Federal Assault Weapons Ban*, p. 160.)

2. Banned Large-Capacity Magazines

33. The federal ban also prohibited most ammunition feeding devices holding more than ten rounds of ammunition (which I have referred to herein as "large-capacity magazines" or "LCMs").

34. The federal ban on LCMs extended to LCMs or similar devices that had the capacity to accept more than ten rounds of ammunition, or that could be "readily restored or converted or to accept" more than ten rounds of ammunition.[16]

3. Exemptions and Limitations to the Federal Ban

35. The 1994 federal assault weapons ban contained several important exemptions that limited its potential impact, especially in the short-term. *See Updated Assessment of the Federal*

[16] Technically, the ban prohibited any magazine, belt, drum, feed strip, or similar device that had the capacity to accept more than 10 rounds of ammunition, or which could be readily converted or restored to accept more than 10 rounds of ammunition. The ban exempted attached tubular devices capable of operating only with 22 caliber rimfire (*i.e.*, low velocity) ammunition.

Assault Weapons Ban, pp. 10-11.

36. First, assault weapons and LCMs manufactured before the effective date of the ban were "grandfathered" in and thus legal to own and transfer. Estimates suggest that there may have been upward of 1.5 million assault weapons and 25-50 million LCMs thus exempted from the federal ban. Moreover, an additional 4.8 million pre-ban LCMs were imported into the country from 1994 through 2000 under the grandfathering exemption. Importers were also authorized to import another 42 million pre-ban LCMs, which may have arrived after 2000. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 10; *America's Experience with the Federal Assault Weapons Ban*, pp. 160-61.

37. Furthermore, although the 1994 law banned "copies or duplicates" of the named firearms banned by make and model, federal authorities emphasized exact copies in enforcing this provision. Similarly, the federal ban did not apply to a semiautomatic weapon possessing only one military-style feature listed in the ban's features test provision.[17] Thus, many civilian rifles patterned after military weapons were legal under the ban with only slight modifications. See Updated Assessment of the Federal Assault Weapons Ban, pp. 10-11.[18]

B. Impact of the Federal Assault Weapons Ban

38. This section of my declaration discusses the empirical evidence of the impact of the federal assault weapons ban. I understand that the Plaintiffs in this litigation contend that Sunnyvale's prohibition on the possession of LCMs will not have an effect on crime or gunshot victimization because criminal users of firearms will not comply with Sunnyvale's ban. In my

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[17] It should be noted, however, that any firearms imported into the country must still meet the "sporting purposes test" established under the federal Gun Control Act of 1968. In 1989, ATF determined that foreign semiautomatic rifles having any one of a number of named military features (including those listed in the features test of the 1994 federal assault weapons ban) fail the sporting purposes test and cannot be imported into the country. In 1998, the ability to accept an LCM made for a military rifle was added to the list of disqualifying features. Consequently, it was possible for foreign rifles to pass the features test of the federal assault weapons ban but not meet the sporting purposes test for imports. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 10 n.7.

[18] Examples of some of these modified, legal versions of banned guns that manufacturers produced in an effort to evade the ban are listed in Table 2-1 of the *Updated Assessment of the Federal Assault Weapons Ban*, p. 5.

opinion, that contention misunderstands the effect of possession bans. The issue is not only whether criminals will be unwilling to comply with such laws, though this could be an important consideration if the penalties for possession or use are particularly severe. The issue is also how possession bans affect the availability of weapons for offenders. Examining the effects of the federal ban on LCMs could cast some light on how a local prohibition on possession of LCMs may diminish their availability for offenders. It is difficult, however, to assess trends in LCM use because of limited information. *See infra* ¶¶ 47 *et seq.* For that reason, this section discusses both the impacts of the federal ban both on LCM use, for which information is limited, and on ownership and use of assault weapons, for which there is more information.

1. Assault Weapons

39. Prior to the federal ban, the best estimates are that there were approximately 1.5 million privately owned assault weapons in the United States (less than 1% of the total civilian gun stock). *See America's Experience with the Federal Assault Weapons Ban*, pp. 160-61; *Updated Assessment of the Federal Assault Weapons Ban*, p. 10.

40. Although there was a surge in production of assault weapon-type firearms as Congress debated the ban in 1994, the federal ban's restriction of new assault weapon supply helped drive up the prices for many assault weapons (notably assault pistols) and appeared to make them less accessible and affordable to criminal users. *See America's Experience with the Federal Assault Weapons Ban*, pp. 162-63; *Updated Assessment of the Federal Assault Weapons Ban*, pp. 25-38.

41. Analyses that my research team and I conducted of several national and local databases on guns recovered by law enforcement indicated that crimes with assault weapons declined after the federal assault weapons ban was enacted in 1994.

42. In particular, across six major cities (Baltimore, Miami, Milwaukee, Boston, St. Louis, and Anchorage), the share of gun crimes involving assault weapons declined by 17% to 72%, based on data covering all or portions of the 1995-2003 post-ban period. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 2, 46-60; *America's Experience with the Federal Assault Weapons Ban*, p. 163.

43. This analysis of local data is consistent with patterns found in the national data on guns recovered by law enforcement agencies around the country and reported to the federal Bureau of Alcohol, Tobacco, Firearms and Explosives ("ATF") for investigative gun tracing.[19] Specifically, although the interpretation is complicated by changes in tracing practices that occurred during this time, the national gun tracing data suggests that use of assault weapons in crime declined with the onset of the 1994 federal assault weapons ban, as the percentage of gun traces for assault weapons fell 70% between 1992-93 and 2001-02 (from 5.4% to 1.6%). And, notably, this downward trend did not begin until 1994, the year the federal ban was enacted. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 2, 39-46, 51-52; *America's Experience with the Federal Assault Weapons Ban*, p. 163.[20]

44. In short, the analysis that my research team and I conducted indicates that the criminal use of assault weapons declined after the federal assault weapons ban was enacted in 1994, independently of trends in gun crime. *See Updated Assessment of the Federal Assault Weapons Ban*, pp. 51-52; *America's Experience with the Federal Assault Weapons Ban*, p. 163.

45. This decline in crimes with assault weapons was due primarily to a reduction in the use of assault pistols. Assessment of trends in the use of assault rifles was complicated by the rarity of crimes with such rifles and by the substitution in some cases of post-ban rifles that were very similar to the banned models. In general, however, the decline in assault weapon use was only partially offset by substitution of post-ban assault weapon-type models. Even counting the post-ban models as assault weapons, the share of crime guns that were assault weapons fell 24% to 60% across most of the local jurisdictions studied. Patterns in the local data sources also suggested that crimes with assault weapons were becoming increasingly rare as the years passed.

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[19] A gun trace is an investigation that typically tracks a gun from its manufacture to its first point of sale by a licensed dealer. It is undertaken by the ATF, upon request by a law enforcement agency. The trace is generally initiated when the requesting law enforcement agency provides ATF with a trace request including identifying information about the firearm, such as make, model and serial number. For the full discussion of the use of ATF gun tracing data, see section 6.2 of *Updated Assessment of the Federal Assault Weapons Ban*, pp. 40-46.

[20] These findings are consistent with other tracing analyses conducted by ATF and the Brady Center to Prevent Gun Violence. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 44 n.43.

See Updated Assessment of the Federal Assault Weapons Ban, pp. 46-52; *America's Experience with the Federal Assault Weapons Ban*, pp. 163-64.

46. Thus, while developing a national estimate of the number of assault weapons crimes prevented by the federal ban is complicated by the range of estimates of assault weapon use and changes therein derived from different data sources, tentatively, it appears that the federal ban prevented a few thousand crimes with assault weapons annually. For example, using 2% as the best estimate of the share of gun crimes involving assault weapons prior to the ban, and 40% as a reasonable estimate of the post- ban drop in this figure, implies that almost 2,900 murders, robberies, and assaults with assault weapons were prevented in 2002. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 52 n.61.[21] If this tentative conclusion is correct, then contrary to Plaintiffs' contention, prohibitions like the federal ban do have an impact on criminal users of guns.

2. Large-Capacity Magazines

47. Assessing trends in LCM use is much more difficult because there was, and is, no national data source on crimes with LCMs, and few local jurisdictions maintain this sort of information.

48. It was possible, nonetheless, to examine trends in the use of guns with LCMs in four jurisdictions: Baltimore, Milwaukee, Anchorage, and Louisville. In all four jurisdictions, the overall share of crime guns equipped with LCMs rose or remained steady through at least the late 1990s. This failure to reduce overall LCM use for at least several years after the federal ban was likely due to the immense stock of exempted pre-ban magazines, which, as noted, was enhanced by post-ban imports. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 68-79; *America's Experience with the Federal Assault Weapons Ban*, p. 164.

49. My studies did show that crimes with LCMs may have been decreasing by the early 2000s, but the available data in the four cities I investigated were too limited and

[21] While it seems likely that some or all of these crimes happened regardless, as perpetrators merely substituted some other gun for the assault weapon, it also seems likely that the number of victims per shooting incident, and the number of wounds inflicted per victim, was diminished in some of those instances.

inconsistent to draw any clear overall conclusions in this regard. *See America's Experience with the Federal Assault Weapons Ban*, p. 164; *Updated Assessment of the Federal Assault Weapons Ban*, pp. 68-79.

50. However, a later investigation by the Washington Post of LCM use in Virginia, analyzing data maintained by the Virginia State Police as to guns recovered in crimes by local law enforcement officers across the state, suggests that the ban may have had a more substantial impact on the supply of LCMs to criminal users by the time it expired in 2004. In Virginia, the share of recovered guns with LCMs generally varied between 13% and 16% from 1994 through 2000 but fell to 9% by 2004. Following expiration of the federal ban in 2004, the share of Virginia crime guns with an LCM rose to 20% by 2010. *See America's Experience with the Federal Assault Weapons Ban*, p. 165.[22] These data suggest that the federal ban may have been reducing the use of LCMs in gun crime by the time it expired in 2004, and that it could have had a stronger impact had it remained in effect.

3. Summary of Results of the Federal Assault Weapons Ban

51. The federal ban's exemption of millions of pre-ban assault weapons and LCMs meant that the effects of the law would occur only gradually—and that those effects were still unfolding when the ban expired in 2004. Nevertheless, while the ban did not appear to have a measurable effect on overall gun crime during the limited time it was in effect, as just discussed, my studies and others do appear to show a significant impact on the number of gun crimes

[22] The results of the *Washington Post's* original investigation (which are what are conveyed in *America's Experience with the Federal Assault Weapons Ban*, p. 165) are reported in David S. Fallis & James V. Grimaldi, *Va. Data 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, and attached as Exhibit E to this declaration. In early 2013, the Post updated this analysis, and slightly revised the figures it reported by identifying and excluding from its counts more than 1,000 .22-caliber rifles with large-capacity tubular magazines, which were not subject to the federal ban (and which are similarly not subject to New York's ban on large-capacity magazines). *See* David S. Fallis, *Data Indicate Drop in High-Capacity Magazines During Federal Gun Ban*, Wash. Post, Jan. 10, 2013, available at http://failover.washingtonpost.com/investigations/data-point-to-drop-in-high-capacity-magazines-during-federal-gun-ban/2013/01/10/d56d3bb6-4b91-11e2-a6a6-aabac85e8036_story.html, and attached as Exhibit F to this declaration. This updated data is reported above.

involving assault weapons and a possibly significant impact (based on the *Washington Post's* analysis of Virginia data) on those crimes involving LCMs.[23]

52. Moreover, as set forth in my 2013 book chapter, there is evidence that, had the federal ban remained in effect longer (or were it renewed), it could conceivably have yielded significant additional societal benefits as well, potentially preventing hundreds of gunshot victimizations annually and producing millions of dollars of cost savings per year in medical care alone. Indeed, reducing shootings by even a very small margin could produce substantial long-term savings for society, especially as the shootings prevented accrue over many years. *See America's Experience with the Federal Assault Weapons Ban*, pp. 166-67; *see also Updated Assessment of the Federal Assault Weapons Ban*, p. 100 n.118. Some studies have shown that the lifetime medical costs for gunshot injuries are about $28,894 (adjusted for inflation). Thus, even a 1% reduction in gunshot victimizations at the national level would result in roughly $18,781,100 in lifetime medical costs savings from the shootings prevented each year. (*See America's Experience with the Federal Assault Weapons Ban*, pp. 166-67; *see also Updated Assessment of the Federal Assault Weapons Ban*, p. 100 n.18).

53. The cost savings potentially could be substantially higher if one looks beyond just medical costs. For example, some estimates suggest that the full societal costs of gun violence -- including medical, criminal justice, and other government and private costs (both tangible and intangible) -- could be as high as $1 million per shooting. Based on those estimates, even a 1% decrease in shootings nationally could result in roughly $650 million in cost savings to society from shootings prevented each year. (*See America's Experience with the Federal Assault Weapons Ban*, pp. 166-67).

[23] In our initial 1997 study on the impact of the federal assault weapons ban, Jeffrey Roth and I also estimated that gun murders were about 7% lower than expected in 1995 (the first year after the ban), adjusting for pre-existing trends. *See Impact Evaluation*, pp. 6, 79-85. However, the very limited post-ban data available for that study precluded a definitive judgment as to whether this drop was statistically meaningful. Our later findings on LCM use made it difficult to credit the ban with this effect, however, and we did not update it for our 2004 report. *See Updated Assessment of the Federal Assault Weapons Ban*, p. 92 n.109.

III. SUNNYVALE'S LARGE-CAPACITY MAGAZINE PROHIBITION

54. On November 5, 2013, the citizens of the City of Sunnyvale voted to approve Measure C by some 67% of the vote. Measure C contained provisions requiring reporting of lost or stolen firearms, safe storage of firearms, logging of ammunition sales, and a prohibition on possession of LCMs. The LCM possession ban was codified in Sunnyvale Municipal Code § 9.44.050, which prohibits the possession of LCMs within Sunnyvale's borders subject to enumerates exceptions, principally for law enforcement. California law already prohibits the manufacture, import, sale, or transfer of large-capacity magazines but does not directly regulate the possession of magazines. *See* California Penal Code § 32310. The practical effect of California's law is to permit people who lawfully owned large-capacity magazines prior to January 1, 2000, the effective date of California's ban, to retain these grandfathered magazines. Sunnyvale tightens existing restrictions on LCMs by prohibiting the possession of LCMs grandfathered under California law. I examine Sunnyvale's prohibition on large-capacity magazines, and opine as to its potential impact and likely efficacy in this section of my declaration.

55. Sunnyvale's ordinance was recently enacted and I have not undertaken any study or analysis of its effects. But any law or regulation prohibiting the possession of large-capacity magazines, with no exception for grandfathered LCMs, addresses some weaknesses that were present in the federal ban.

56. While the LCM ban was arguably the most important feature of the 1994 federal ban (given that LCMs are the key feature contributing to an assault weapon's firepower, and that the reach of the LCM was much greater than the assault weapons ban as many semiautomatic guns that were not banned could still accept LCMs), my studies as to the effects of the federal ban indicated that the LCM ban was likely not as efficacious in reducing the use of these magazines in crime as it otherwise might have been because of the large number of pre-ban LCMs which were exempted from the ban. The Washington Post's investigation of recovered guns with LCMs in Virginia, which showed an increasing decline in the number of recovered guns with LCMs the longer the ban was in effect, similarly suggests that the grandfathering of pre-ban LCMs delayed

the full impact of the federal ban. In my opinion, eliminating the grandfathering of pre-ban LCMs would have improved the efficacy of the federal ban.

57. In my opinion, based on the data and information contained in this declaration and the sources referred to herein, a complete ban on the possession of LCMs has the potential to (1) reduce the number of crimes committed with LCMs; (2) reduce the number of shots fired in gun crimes; (3) reduce the number of gunshot victims in such crimes; (4) reduce the number of wounds per gunshot victim; (5) reduce the lethality of gunshot injuries when they do occur; and (6) reduce the substantial societal costs that flow from shootings.

58. Through Sunnyvale Municipal Code, § 9.44.050, Sunnyvale has enacted a ban on the possession of LCMs. I believe this measure has the potential to help prevent the use and spread of particularly dangerous magazines, and is a reasonable and well-constructed measure that is likely to advance Sunnyvale's interest in protecting its citizens and its police force. I believe that the effects of such a measure will be amplified if similar measures are adopted in other jurisdictions as well.

59. I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed this 28th day of January, 2014, in Ashburn, Virginia.

Christopher S. Koper

Christopher S. Koper

EXHIBIT A

To

Declaration of Christopher S. Koper in Support of Sunnyvale's Opposition to Plaintiffs' Motion for Preliminary Injunction

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Education

1995	Ph.D., Criminology and Criminal Justice, University of Maryland
1992	M.A., Criminology and Criminal Justice, University of Maryland
1988	B.A. (Summa cum Laude), Criminal Justice, University of Maryland

Career Brief

Dr. Christopher S. Koper is an Associate Professor in the Department of Criminology, Law and Society at George Mason University and a senior fellow in George Mason's Center for Evidence-Based Crime Policy. Dr. Koper holds a Ph.D. in criminology and criminal justice from the University of Maryland and has over 20 years of experiencing conducting criminological research at George Mason, the Police Executive Research Forum, the University of Pennsylvania, the Urban Institute, the RAND Corporation, the Police Foundation, and other organizations. He has written and published extensively on issues related to firearms, policing, federal crime prevention efforts, research methods, and other topics. Dr. Koper has served as a lead or senior-level investigator for numerous projects funded by the U.S. Department of Justice, including Congressionally-mandated assessments of the 1994 federal assault weapons ban and the federal Community Oriented Policing Services (COPS) program. He is the co-creator of the Evidence-Based Policing Matrix, a tool used by local and national organizations including the federal Bureau of Justice Assistance and the National Policing Improvement Agency of the United Kingdom to visualize research results on police effectiveness and translate those results for practitioners and policymakers. Dr. Koper's work on the methods of patrolling crime hot spots (often referred to as the "Koper curve" principal) is also used by numerous police agencies in the United States and abroad.

Professional Background

Associate Professor:	Department of Criminology, Law and Society, George Mason University (Aug. 2011-present)
Director of Research:	Police Executive Research Forum (May 2010-Aug. 2011)
Deputy Director of Research:	Police Executive Research Forum (Dec. 2007 – May 2010)
Behavioral / Social Scientist:	RAND Corporation (2007)

Senior Research Associate:	Jerry Lee Center of Criminology, University of Pennsylvania (2001 – 2006)
Research Associate:	The Urban Institute (1997 – 2001)
Faculty Research Scientist:	Department of Criminology and Criminal Justice, University of Maryland (1997)
Research Scientist:	Crime Control Institute (1994-1997)
Graduate Assistant:	Department of Criminology and Criminal Justice, University of Maryland: (1989-1994)
Social Science Program Specialist (Graduate Intern):	National Institute of Justice, U.S. Department of Justice (1990)
Consultant:	Police Foundation (1988-1989)

Peer-Reviewed Publications

Koper, Christopher S. 2013 (In press). "Assessing the Practice of Hot Spots Policing: Survey Results from a National Convenience Sample of Local Police Agencies." Accepted for publication in the *Journal of Contemporary Criminal Justice*.

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Translational Publications and Tools

(Additional publications and works for practitioner, policymaker, and general audiences)

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Tate, Renee, Thomas Neale, Cynthia Lum, and Christopher Koper. 2013. "Case of Places." *Translational Criminology: The Magazine of the Center for Evidence-Based Crime Policy (George Mason University)* Fall 2013: 18-21. http://cebcp.org/wp-content/TCmagazine/TC5-Fall2013

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Forum and the Lockheed Martin Corporation), Suffolk (Virginia), November.

Police Executive Research Forum. 2008. *Violent Crime in America: What We Know About Hot Spots Enforcement*. Washington, DC. (Contributor). http://policeforum.org/library/critical-issues-in-policing-series/HotSpots_v4.pdf.

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Koper, Christopher S. 2004. "Disassembling the Assault-Gun Ban." Editorial. *The Baltimore Sun*: September 13.

Other Publications, Reports, and Working Papers

Koper, Christopher S., Daniel J. Woods, and Bruce E. Kubu. 2012. *Gun Enforcement and Gun Violence Prevention Practices among Local Law Enforcement Agencies: A Research and Policy Brief*. Washington, DC: Police Executive Research Forum.

Koper, Christopher S. 2008. *Policing Gun Violence: A Brief Overview*. Discussion paper prepared for the Police Executive Research Forum and the St. Louis Metropolitan Police Department.

Appears in Koper, Christopher, et al. 2010. *Developing a St. Louis Model for Reducing Gun Violence: A Report from the Police Executive Research Forum to the St. Louis Metropolitan Police Department*. Washington, D.C.: Police Executive Research Forum.

Koper, Christopher S. 2007. *Assessments of Corporate Culture and Prosecutorial Decisions by U.S. Attorneys: A Draft Research Proposal*. Concept paper prepared for the LRN-RAND Corporation Center for Corporate Ethics, Law, and Governance.

Koper, Christopher S. 2003. *Police Strategies for Reducing Illegal Possession and Carrying of Firearms: A Systematic Review Protocol Prepared for the Campbell Collaboration*. Published by the Campbell Collaboration Crime and Justice Group. http://campbellcollaboration.org/lib.

Koper, Christopher S. 2002. *Testing the Generalizability of the Concealed Carry Hypothesis: Did Liberalized Gun Carrying Laws Reduce Urban Violence, 1986-1998?* Working Paper. Philadelphia: Jerry Lee Center of Criminology, University of Pennsylvania.

Koper, Christopher S. 2002. *Gun Types Used in Crime and Trends in the Lethality of Gun Violence: Evidence from Two Cities*. Working Paper. Philadelphia: Jerry Lee Center of Criminology, University of Pennsylvania.

Koper, Christopher S. 1995. *Gun Lethality and Homicide: Gun Types Used By Criminals and the Lethality of Gun Violence in Kansas City, Missouri, 1985-1993*. Ph.D. Dissertation. College Park, MD: Department of Criminal Justice and Criminology, University of Maryland. (Published by University Microfilms, Inc.: Ann Arbor, Michigan.)

Koper, Christopher S. 1995. Review essay on *The Politics of Gun Control* by Robert J. Spitzer. *The Criminologist* 20:32-33.

Koper, Christopher S. 1992. *The Deterrent Effects of Police Patrol Presence Upon Criminal and Disorderly Behavior at Hot Spots of Crime*. M.A. Thesis. College Park, MD: Department of Criminology and Criminal Justice, University of Maryland.

Koper, Christopher S. 1989. *Quality Leadership and Community-Oriented Policing in Madison: A Progress Report on the EPD (Experimental Police District)*. Report prepared for the Police Foundation (Washington, D.C.).

Portions reprinted in *Community Policing in Madison: Quality from the Inside Out* (1993). Report to the National Institute of Justice, U.S. Department of Justice by Mary Ann Wycoff and Wesley G. Skogan. Washington, D.C.: Police Foundation.

Koper, Christopher S. 1989. *The Creation of Neighborhood-Oriented Policing in Houston: A Progress Report.* Report prepared for the Police Foundation (Washington, D.C.).

Koper, Christopher S. 1989. *External Resources for Police*. Report prepared for the Police Foundation (Washington, D.C.).

Funded Research

Selected projects as a principal or senior-level investigator

Principal investigator (with Cynthia Lum, PI): "Evaluating the Crime Control and Cost-Benefit Effectiveness of License Plate Recognition (LPR) Technology in Patrol and Investigations." $553,713 grant from the National Institute of Justice (U.S. Department of Justice) to George Mason University. Awarded 2013.

Principal investigator (with Cynthia Lum, PI). "Violent Gun and Gang Crime Reduction Program (Project Safe Neighborhoods), Fiscal Year 2013." $29,997 research partner subcontract from the U.S. Attorney's Office (District of Columbia) funded through the Bureau of Justice Assistance (U.S. Department of Justice). Awarded 2013.

Co-Principal Investigator: "The Evidence-Based Policing Matrix Demonstration Project." $749,237 grant from the Bureau of Justice Assistance (U.S. Department of Justice) to George Mason University. Awarded 2011.

Principal Investigator: "Realizing the Potential of Technology for Policing: A Multi-Site Study of the Social, Organizational, and Behavioral Aspects of Implementing Policing Technologies." $592,151 grant from the National Institute of Justice (U.S. Department of Justice) to the Police Executive Research Forum and George Mason University (subcontractor). Awarded 2010.

Principal Investigator (Jan. 2011-Aug. 2011): "Community Policing Self-Assessment Tool Short Form, COPS Hiring Recovery Program Administration." $85,444 subcontract from ICF International and the Office of Community Oriented Policing Services (U.S. Department of Justice) to the Police Executive Research Forum. Awarded 2011.

Principal Investigator: "National Study of Gun Enforcement and Gun Violence Prevention Practices Among Local Law Enforcement Agencies." $70,400 grant from the Joyce Foundation to the Police Executive Research Forum. Awarded 2010.

Principal Investigator: "Development of the Community Policing Self-Assessment Tool Short Form." $53,907 subcontract from ICF International and the Office of Community Oriented Policing Services (U.S. Department of Justice) to the Police Executive Research Forum. Awarded 2010.

Principal Investigator: "A Systematic Review of Research on Police Strategies to Reduce Illegal Gun Carrying." $15,600 subcontract from George Mason University and the National Policing Improvement Agency of the United Kingdom to the Police Executive Research Forum. Awarded 2010.

Principal Investigator (2009-Aug. 2011) and consultant (Aug. 2011-present): "Hiring of Civilian Staff in Policing: An Assessment of the 2009 Byrne Program." $549,878 grant from the National Institute of Justice (U.S. Department of Justice) to the Police Executive Research Forum. Awarded 2009.

Co-Principal Investigator (2005-2010): "Understanding and Monitoring the 'Whys' Behind Juvenile Crime Trends." $2,249,290 grant from the Office of Juvenile Justice and Delinquency Prevention (U.S. Department of Justice) to the University of Pennsylvania (with subcontracts to the Police Executive Research Forum, 2009-2010). Initial and continuation awards, 2001-2005.

Principal Investigator: "Police Interventions to Reduce Gun Violence: A National Examination." Supported through $200,000 in funding from the Motorola Foundation to the Police Executive Research Forum. Awarded 2009.

Principal Investigator: "The Varieties and Effectiveness of Hot Spots Policing: Results from a National Survey of Police Agencies and a Re-Assessment of Prior Research." Supported through $80,000 in funding from the Motorola Foundation to the Police Executive Research Forum. Awarded 2008.

Co-Principal Investigator: "Assessment of Technology Needs in Law Enforcement." $185,866 contract from the Lockheed Martin Corporation to the Police Executive Research Forum. Awarded 2008.

Co-Principal Investigator (for research partner subcontract): "An Evaluation of the Jacksonville Data Driven Reduction of Street Violence Project." $650,008 grant from the Bureau of Justice Assistance (U.S. Department of Justice) to the Jacksonville, FL Sheriff's Office and the Police Executive Research Forum (subcontractor). Awarded 2007.

Co-Principal Investigator: "A Randomized Experiment Assessing License Plate Recognition Technology in Mesa, Arizona." $474,765 grant from the National Institute of Justice (U.S. Department of Justice) to the Police Executive Research Forum. Awarded 2007.

Evaluation Director (for research partner subcontract): "Developing a St. Louis Model for Reducing Gun Violence." $500,000 grant from the Bureau of Justice Assistance (U.S. Department of Justice) to the St.

Louis Metropolitan Police Department and the Police Executive Research Forum (subcontractor). Awarded 2007.

Co-Principal Investigator: "Evaluation Study of the Prince William County Police Immigration Enforcement Policy." $282,129 contract from the Prince William County Police Department to the University of Virginia and the Police Executive Research Forum (subcontractor). Awarded 2008.

Principal Investigator: "Crime Gun Risk Factors: The Impact of Dealer, Firearm, Transaction, and Buyer Characteristics on the Likelihood of Gun Use in Crime." $103,514 grant from the U.S. Department of Justice to the University of Pennsylvania. Awarded 2004.

Principal Investigator: "A Reassessment of the Federal Assault Weapons Ban." $38,915 grant from the U.S. Department of Justice to the University of Pennsylvania. Awarded 2003.

Co-Principal Investigator: "Pennsylvania Fair Share Tax Project." $100,000 grant from the Jerry Lee Foundation to the University of Pennsylvania. Awarded 2003.

Principal Investigator: "The Impact of Dealer and Firearm Characteristics on the Likelihood of Gun Use in Crime." $60,000 grant from the Smith Richardson Foundation to the University of Pennsylvania. Awarded 2001.

Principal Investigator: "Police Hiring and Retention Study." $250,000 grant from the U.S. Department of Justice to the Urban Institute. Awarded 1999.

Co-Principal Investigator: "Analysis of Title XI Effects." $301,826 grant from the U.S. Department of Justice to the Urban Institute. Awarded 1998.

Co-Principal Investigator: "Illegal Firearms Markets." $499,990 grant from the U.S. Department of Justice to Northeastern University and the Urban Institute (subcontractor). Awarded 1997.

Co-Principal Investigator (director of national survey and evaluation task leader), 1997-2001: "Evaluation of Title I of the 1994 Crime Act." $3,356,156 grant from the U.S. Department of Justice to the Urban Institute.

Co-Principal Investigator: "Impact Evaluation of the Public Safety and Recreational Firearms Use Protection Act of 1994." $150,000 grant from the U.S. Department of Justice to the Urban Institute (subcontract later awarded to the Crime Control Institute). Awarded 1995.

Principal Investigator: "Gun Density versus Gun Type: Did More, or More Lethal, Guns Drive Up the Dallas Homicide Rate, 1978-1992?" $49,714 grant from the U.S. Department of Justice to the Crime Control Institute. Awarded 1994.

Other successful proposals written or co-authored

Co-author and proposed research director: "Research and Policy Initiatives to Help Police Leaders Speak Out on Gun Violence in America." $375,000 grant from the Joyce Foundation to the Police Executive Research Forum. Awarded 2011.

Co-author and proposed evaluation director: "Demonstrating Innovation in Policing: Using Evidence-Based Strategies to Build Police Legitimacy and Reduce Violent Crime." $599,896 grant from the Bureau of Justice Assistance to the Police Executive Research Forum. Awarded 2011.

Co-author and proposed co-principal investigator: "Recruitment and Hiring Clearinghouse." $499,763 grant from the Office of Community Oriented Policing Services, U.S. Department of Justice to the RAND Corporation. Awarded 2007.

Selected Presentations

Invited presentations, lectures, and policy briefings

"Evidence Based Policing Strategies." Missouri Attorney General's Urban Crime Summit. University of Missouri, Kansas City, 2013.

"Putting Hot Spots Research into Practice." 6th International Conference on Evidence-Based Policing. Cambridge University, United Kingdom, 2013. Video: http://www.crim.cam.ac.uk/events/conferences/ebp/2013/.

"America's Experience with the Federal Assault Weapons Ban, 1994-2004: Key Findings and Implications." Summit on Reducing Gun Violence in America: Informing Policy with Evidence and Analysis. Johns Hopkins University, January 2013. Video: C-SPAN (http://www.c-spanvideo.org/clip/4304369) and the Johns Hopkins University Bloomberg School of Public Health (http://www.jhsph.edu/events/gun-policy-summit/video-archive).

"Assessing Police Efforts to Reduce Gun Crime: Results from a National Survey."
- Federal Government Accountability Office's Homeland Security and Justice speaker series. Washington, D.C., 2013.
- Firearms Committee of the International Association of Chiefs of Police, 2012

"Police Strategies for Reducing Gun Violence." 2013 Summit to Combat Gun Violence hosted by the City of Minneapolis and the City of Milwaukee. Minneapolis, 2013.

"A Randomized Trial Comparing Directed Patrol and Problem-Solving at Violent Crime Hot Spots"
- 4th International Conference on Evidence-Based Policing. Cambridge University, United Kingdom, 2011
- 12th Annual Jerry Lee Symposium on Criminology and Public Policy. Washington, D.C. (held in the U.S. Senate Russell Office Building), 2011
- Annual Symposium of the Center for Evidence-Based Crime Policy, George Mason University. Fairfax, VA, 2010

"Evaluation Study of Prince William County's Illegal Immigration Enforcement Policy"
- Prince William County, Virginia Board of County Supervisors, November 16, 2010 (co-presented with Thomas Guterbock)
- Briefings for senior staff of the Prince William County Police Department and Prince William County Government, October-November 2010 (co-presented with Thomas Guterbock)

"Police Strategies for Reducing Gun Violence." Congressional briefing on "Evidence-Based Policy: What We Know, What We Need to Know," organized by the Center for Evidence-Based Crime Policy, George Mason University. Washington, D.C. (U.S. Capitol Visitors' Center), 2009. Video: http://cebcp.org/outreach-symposia-and-briefings/evidence-based-crime-policy/

"Hot Spots Policing: A Review of the Evidence." 2nd International Conference on Evidence-Based Policing (sponsored by the National Policing Improvement Agency of the United Kingdom and Cambridge University). Cambridge University, United Kingdom, 2009.

"Assessments of Corporate Culture and Prosecutorial Decisions by U.S. Attorneys." Presentation to the advisory board of the LRN-RAND Center for Corporate Ethics, Law, and Governance. New York, 2007.

"Risk Factors for Crime Involvement of Guns Sold in Maryland." Center for Injury Research and Policy, Johns Hopkins School of Public Health. Baltimore, 2007

"Police Strategies for Reducing Illegal Possession and Carrying of Firearms"

- Annual Jerry Lee Crime Prevention Symposium. Washington, D.C. (U.S. Senate Dirksen Office Building), 2005
- Firearm and Injury Center at Penn (FICAP) Forum Series. University of Pennsylvania, Philadelphia, 2005

"The Impacts of the 1994 Federal Assault Weapons Ban on Gun Markets and Gun Violence"

- Briefings for the Associate Attorney General of the United States and other staff of the U.S. Department of Justice and the U.S. Department of the Treasury. Washington, D.C., 1997
- National Research Council, Committee to Improve Research Information and Data on Firearms. Washington, D.C., 2002
- Firearm and Injury Center at Penn (FICAP) Forum Series. Philadelphia, 2003
- Jerry Lee Center of Criminology (University of Pennsylvania) Colloquium. Philadelphia, 2001

"Federal Legislation and Gun Markets: An Assessment of Recent Initiatives Affecting Licensed Firearms Dealers." Jerry Lee Center of Criminology (University of Pennsylvania) Colloquium. Philadelphia, 2003.

"Juvenile Gun Acquisition." Philadelphia Interdisciplinary Youth Fatality Review Team (A Project of the Philadelphia Departments of Public Health and Human Services). Philadelphia, 2002.

"A National Study of Hiring and Retention Issues in Police Agencies." Briefing for staff of the Office of Community Oriented Policing Services (U.S. Department of Justice) and the National Institute of Justice (U.S Department of Justice). Washington, D.C., 2001.

"COPS and the Level, Style, and Organization of American Policing: Findings of the National Evaluation"

- Press briefing sponsored by the Urban Institute. Washington, D.C., September 2000
- Briefings for staff of the Office of Community Oriented Policing Services (U.S. Department of Justice) and the National Institute of Justice (U.S. Department of Justice). Washington, D.C., 1998 and 1999

Other conference presentations
(Summary list)

- Annual meeting of the American Society of Criminology (1991-2001, 2003-2006, 2008-2013)
- Annual Stockholm Criminology Symposium (2006, 2010)
- Annual meeting of the Police Executive Research Forum (2008-2009)
- 14th World Congress of Criminology (2005)
- Annual meeting of the Academy of Criminal Justice Sciences (1995, 1997, 1999-2001, 2012)
- U.S. Department of Justice Annual Conference on Criminal Justice Research and Evaluation (1995-1997, 1999, 2002)
- U.S. Department of Justice National Conference on Community Policing (1998)
- National Institute of Justice (U.S. Department of Justice) Firearms Cluster Conference (1996)

Workshops and other events

Co-organizer, speaker, and session leader: Center for Evidence-Based Crime Policy's Evidence-Based Policing Workshop. George Mason University, Fairfax, VA, 2012. Presentation materials: http://cebcp.org/cebcp-symposium-2012/. Video: http://www.youtube.com/playlist?list=PL4E509820FD3010E9&feature=plcp

Organizer and speaker: Congressional briefing on "Reducing Gun Violence: Lessons from Research and Practice." Sponsored by the Center for Evidence-Based Crime Policy, George Mason University. Washington, D.C. (Rayburn Building of the U.S. House of Representatives), 2012. Video: http://cebcp.org/outreach-symposia-and-briefings/reducing-gun-violence/

Speaker and session leader: Center for Evidence-Based Crime Policy's Evidence-Based Policing Workshop. George Mason University, Fairfax, VA, 2011. Presentation slides and video: http://cebcp.org/evidence-based-policing/evidence-based-policing-workshop/

Speaker: Police Executive Research Forum symposium, "How are Innovations in Technology Transforming Policing?" (Critical Issues in Policing Series). Washington, D.C., 2011

Co-organizer, speaker, and session leader: Police Executive Research Forum and Lockheed Martin Law Enforcement Future Technologies Workshop. Suffolk, Virginia, 2008.

Speaker: Police Executive Research Forum symposium on "Hot Spots" (2008 Critical Issues in Policing Series). Washington, D.C., 2008.

Speaker and participant: Firearm Injury Center at Penn (FICAP, University of Pennsylvania) Workshop on Existing and Innovative Methods in the Study of Gun Violence. Bryn Mawr, Pennsylvania, 2003

Professional Service

Editorships

- Area editor for police strategies and practices, *Encyclopedia of Criminology and Criminal Justice* (in press for Springer Verlag, Gerben Bruinsma and David Weisburd, editors in chief)
- Co-editor of *Translational Criminology* briefs series (in progress for Springer-Verlag)

Reviews of manuscripts, reports, and proposals

- *Journal of Quantitative Criminology* (2001-2005, 2009, 2011, 2013)
- *Criminology and Public Policy* (2005, 2013)
- *Australian and New Zealand Journal of Criminology* (2013)
- *Policing: A Journal of Policy and Practice (2013)*
- *Policing: An International Journal of Police Strategies and Management* (2013)
- *Police Practice and Research* (2013)
- *Journal of Experimental Criminology* (2004, 2009, 2011, 2012)
- National Institute of Justice (U.S. Department of Justice) (2001, 2013)
- *Justice Research and Policy* (2012)
- *Sociological Quarterly* (2012)
- Oxford University Publishing (2011, 2013)
- *Police Quarterly* (2002-2004, 2011)
- *Criminology* (2006, 2010)
- *Justice Quarterly* (2008)
- *Homicide Studies* (2008)
- *Injury Prevention* (2004-2005)
- Population Reference Bureau (1994)

Other professional affiliations, service, and consulting

- Member, American Society of Criminology (ASC)
- Member and Executive Counselor, ASC Division of Experimental Criminology
- Delphi process participant to develop international reporting guidelines for randomized trials for the CONSORT Statement for Social and Psychological Interventions
- Member of the Research Advisory Board of the Police Foundation
- Consultant to the New York State Office of the Attorney General
- Consultant to the Connecticut Office of the Attorney General
- Consultant to the Office of the City Attorney of the City of San Francisco (California)
- Contributor to the Crime and Justice Group of the Campbell Collaboration
- Former Associate of the Jerry Lee Center of Criminology, University of Pennsylvania
- Former Associate of the Firearm and Injury Center at Penn, University of Pennsylvania Health System
- Participant in the National Research Collaborative on Firearm Violence convened by the Firearm and Injury Center at Penn (2005)
- Participant in National Institute of Justice (U.S. Department of Justice) focus group on identity theft research (2005)
- Participant in annual fellowship fundraiser for the American Society of Criminology (1993-2006, 2012-2013)

- Member of award selection committee for the American Society of Criminology (2002)
- Member of the Advisory Committee for the National Criminal History Improvement Program State Firearms Research Project of the Justice Research and Statistics Association (1996)

Selected Honors and Awards

Fellow of the Academy of Experimental Criminology (2013)

Excellence in Law Enforcement Research Bronze Award from the International Association of Chiefs of Police, 2012 (for co-authorship of *Evaluation Study of Prince William County's Illegal Immigration Enforcement Policy*)

Scholar-in-Residence of the Firearm and Injury Center at Penn (University of Pennsylvania Health System), 2004 – 2006

Smith Richardson Foundation Public Policy Research Fellowship, 2001

Graduate Assistant Award, Department of Criminology and Criminal Justice, University of Maryland, 1989-1994

Honors, Ph.D. Theory Comprehensive Examination, Department of Criminology and Criminal Justice, University of Maryland, 1993

Summa cum Laude, University of Maryland, 1988

Peter P. Lejins Award for Top Graduate in Criminal Justice, Department of Criminology and Criminal Justice, University of Maryland, 1988

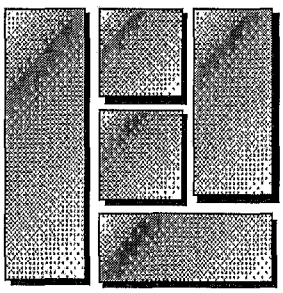
EXHIBIT B

To

Declaration of Christopher S. Koper in Support of Sunnyvale's Opposition to Plaintiffs' Motion for Preliminary Injunction

IMPACT EVALUATION OF THE PUBLIC SAFETY AND RECREATIONAL FIREARMS USE PROTECTION ACT OF 1994

Final Report



THE URBAN INSTITUTE
2100 M STREET, N.W.
WASHINGTON, DC 20037

March 13, 1997

Jeffrey A. Roth and
Christopher S. Koper

with William Adams, Sonja Johnson, John Marcotte, John McGready, Andrew Scott, Maria Valera, and Douglas Wissoker

Supported under award #95-IJ-CX-0111 from the National Institute of Justice, Office of Justice Programs, U.S. Department of Justice. Points of view in this document are those of the author(s) and do not necessarily represent the official position of the U.S. Department of Justice.

Acknowledgments

Researchers traditionally acknowledge assistance from others in completing a study. However, we received far more than traditional amounts of help. A host of people who cared about the questions we were asking generously donated their expertise, data, and time.

Our greatest debts are owed to our advisors, Bill Bridgewater and Judy Bonderman. Bill, as executive director of the National Alliance of Stocking Gun Dealers, and his wife Carole, editor of the *Alliance Voice*, shared with us a vast knowledge of guns and gun markets. As adjunct law professor at Catholic University and an occasional legal advisor to Handgun Control, Inc., Judy taught us much about the relevant laws. Both helped us frame the questions we asked. While Bill and Judy made successful careers as advocates of quite different perspectives on gun policy, they both respected the integrity of our work as disinterested researchers. Sadly, Bill passed away before our work was completed. We hope he would agree that we learned what he tried to teach us.

We also received substantial help from staff at the Bureau of Alcohol, Tobacco and Firearms. Ed Owen continued our education about firearms in the late stages of the project. He, Joe Vince, and Jerry Nunziato provided technical information and critically reviewed an early draft of this report. Willie Brownlee, Gerry Crispino, Jeff Heckel, David Krieghbaum, Tristan Moreland, Valerie Parks, and Lia Vannett all shared data and insights.

We are grateful to the following researchers and organizations who generously shared their data with us: Tom Marvell, of Justec Research; Scott Decker, Richard Rosenthal, and Richard Rabe of Washington University; David Kennedy and Anthony Braga of Harvard University; Glenn Pierce of Northeastern University; Stephen Hargarten, M.D., and Mallory O'Brien of the Medical College of Wisconsin; Weldon Kennedy, Loretta Behm, and Monte McKee of the Federal Bureau of Investigation; Denise Griffin of the National Conference of State Legislatures; Kristen Rand of the Violence Policy Center; Donald T. Reay, M.D., Chief Medical Examiner, King County, Washington; Michael Buerger of the Jersey City Police Department; Beth Hume and Maxine Shuster of the Massachusetts Department of Public Health; Yvonne Williams, Office of the Medical Examiner, County of San Diego; and Rebecca Knox of Handgun Control, Inc.

We appreciate the fine work of our Urban Institute colleagues who contributed to this report: Bill Adams, John Marcotte, John McGready, Maria Valera, and Doug Wissoker. We also appreciate research assistance by Sonja Johnson, Andrew Scott, Jason Greenberg, Kristen Mantei, Robert Moore, Rick Poulson, Veronica Puryear, and Claudia Vitale. We are grateful for O. Jay Arwood's expert work in producing this complex document. Finally, we appreciate the advice and encouragement of Lois Felson Mock, our National Institute of Justice grant monitor, and the thorough and helpful comments by anonymous reviewers inside and outside NIJ.

Any remaining errors or omissions are the responsibility of the authors. **Opinions expressed herein are those of the authors and not necessarily those of The Urban Institute, its trustees, or its sponsors.**

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1. OVERVIEW

Title XI of the Violent Crime Control and Law Enforcement Act of 1994 (the Crime Control Act) took effect on September 13, 1994. Subtitle A banned the manufacture, transfer, and possession of designated semiautomatic assault weapons. It also banned "large-capacity" magazines, which were defined as ammunition feeding devices designed to hold more than 10 rounds. Finally, it required a study of the effects of these bans, with particular emphasis on violent and drug trafficking crime, to be conducted within 30 months following the effective date of the bans. To satisfy the study requirement, the National Institute of Justice (NIJ) awarded a grant to The Urban Institute for an impact evaluation of Subtitle A. This report contains the study findings.

In defining assault weapons, Subtitle A banned 8 named categories of rifles and handguns. It also banned *exact copies* of the named guns, revolving cylinder shotguns, and guns with detachable magazines that were manufactured with certain features such as flash suppressors and folding rifle stocks. The ban specifically exempted *grandfathered* assault weapons and magazines that had been manufactured before the ban took effect. Implicitly, the ban exempts all other guns; several of these, which we treated as *legal substitutes,* closely resemble the banned guns but are not classified as exact copies.

Among other characteristics, ban proponents cited the capacity of these weapons, most of which had been originally designed for military use, to fire many bullets rapidly. While this capacity had been demonstrated in several highly publicized mass murders in the decade before 1994, ban supporters argued that it was largely irrelevant for hunting, competitive shooting, and self-defense. Therefore, it was argued, the ban could prevent violent crimes with only a small burden on law-abiding gun owners. Some of our own analyses added evidence that assault weapons are disproportionately involved in murders with multiple victims, multiple wounds per victim, and police officers as victims.

To reduce levels of these crimes, the law must increase the scarcity of the banned weapons. Scarcity would be reflected in higher prices not only in the *primary markets* where licensed dealers create records of sales to legally eligible purchasers, but also in *secondary markets* that lack such records. Although most secondary-market transfers are legal, minors, convicted felons, and other ineligible purchasers may purchase guns in them (usually at highly inflated prices) without creating records. In theory, higher prices in secondary markets would discourage criminal use of assault weapons, thereby reducing levels of the violent crimes in which assault weapons are disproportionately used.

For these reasons, our analysis considered potential ban effects on gun markets, on assault weapon use in crime, and on lethal consequences of assault weapon use. However, the statutory schedule for this study constrained our findings to short-run effects, which are not necessarily a reliable guide to long-term effects. The timing also limited the power of our statistical analyses to detect worthwhile ban effects that may have occurred. Most fundamentally, because the banned guns and magazines were never used in more than a fraction of all gun murders, even the maximum theoretically achievable preventive effect of the ban on gun murders is almost certainly too small to detect statistically with only one year of post-ban crime data.

With these cautions in mind, our analysis suggests that the primary-market prices of the banned guns and magazines rose by upwards of 50 percent during 1993 and 1994, while the ban was being debated, as gun distributors, dealers, and collectors speculated that the banned weapons would become expensive collectors' items. However, production of the banned guns also surged, so that more than an extra year's normal supply of assault weapons and legal substitutes was manufactured during 1994. After the ban took effect, primary-market prices of the banned guns and most large-capacity magazines fell to nearly pre-ban levels and remained there at

least through mid-1996, reflecting both the oversupply of grandfathered guns and the variety of legal substitutes that emerged around the time of the ban.

Even though the expected quick profits failed to materialize, we found no strong evidence to date that licensed dealers have increased "off the books" sales of assault weapons in secondary markets and concealed them with false stolen gun reports. Stolen gun reports for assault weapons did increase slightly after the ban took effect, but by less than reported thefts of unbanned large-capacity semiautomatic handguns, which began rising well before the ban.

The lack of an increase in stolen gun reports suggests that so far, the large stock of grandfathered assault weapons has remained largely in dealers' and collectors' inventories instead of leaking into the secondary markets through which criminals tend to obtain guns. In turn, this speculative stockpiling of assault weapons by law-abiding dealers and owners apparently reduced the flow of assault weapons to criminals, at least temporarily. Between 1994 and 1995, the criminal use of assault weapons, as measured by law enforcement agency requests for BATF traces of guns associated with crimes, fell by 20 percent, compared to an 11 percent decrease for all guns. BATF trace requests are an imperfect measure because they reflect only a small percentage of guns used in crime. However, we found similar trends in data on all guns recovered in crime in two cities. We also found similar decreases in trace requests concerning guns associated with violent and drug crimes.

At best, the assault weapons ban can have only a limited effect on total gun murders, because the banned weapons and magazines were never involved in more than a modest fraction of all gun murders. Our best estimate is that the ban contributed to a 6.7 percent decrease in total gun murders between 1994 and 1995, beyond what would have been expected in view of ongoing crime, demographic, and economic trends. However, with only one year of post-ban data, we cannot rule out the possibility that this decrease reflects chance year-to-year variation rather than a true effect of the ban. Nor can we rule out effects of other features of the 1994 Crime Act or a host of state and local initiatives that took place simultaneously. Further, any short-run preventive effect observable at this time may ebb in the near future as the stock of grandfathered assault weapons and legal substitute guns leaks to secondary markets, then increase as the stock of large-capacity magazines gradually dwindles.

We were unable to detect any reduction to date in two types of gun murders that are thought to be closely associated with assault weapons, those with multiple victims in a single incident and those producing multiple bullet wounds per victim. We did find a reduction in killings of police officers since mid-1995. However, the available data are partial and preliminary, and the trends may have been influenced by law enforcement agency policies regarding bullet-proof vests.

The following pages explain these findings in more detail, and recommend future research to update and refine our results at this early post-ban stage.

1.1. Primary-Market Effects

1.1.1. Prices and Production

1.1.1.1. Findings

We found clear peaks in legal-market prices of the banned weapons and magazines around the effective date of the ban, based on display ads in the nationally distributed periodical Shotgun News between 1992 and mid-1996. For example, a price index of banned SWD semiautomatic pistols rose by about 47 percent during the year preceding the ban, then fell by about 20 percent the following year, to a level where it remains. Meanwhile, the

prices of non-banned Davis and Lorcin semiautomatic pistols remained virtually constant over the entire period. Similarly, a price index for banned AR-15 rifles, exact copies, and legal substitutes at least doubled in the year preceding the ban, then fell after the ban nearly to 1992 levels, where they have remained. Prices of unbanned semiautomatic rifles (e.g., the Ruger Mini-14, Maadi, and SKS) behaved similarly to AR-15 prices, presumably due to pre-ban speculation that these guns would be included in the final version of the Crime Act.

Like assault weapon prices, large-capacity magazine prices generally doubled within the year preceding the ban. However, trends diverged after the ban depending on what gun the magazine was made for. For example, magazines for non-banned Glock handguns held their new high levels, while magazines for banned Uzi and unbanned Mini-14 weapons fell substantially from their peaks. AR-15 large-capacity magazine prices also fell to 1993 levels shortly after the ban took effect, but returned to their 1994 peak in mid-1996. We believe that demand for grandfathered Glock and AR-15 magazines was sustained or revived by continuing sales of legal guns that accept them.

Production of the banned assault weapons surged in the months leading up to the ban. Data limitations preclude precise and comprehensive counts. However, we estimate that the annual production of five categories of assault weapons (AR-15s and models by Intratec, SWD, AA Arms, and Calico) and legal substitutes rose by more than 120 percent, from an estimated 1989–93 annual average of 91,000 guns to about 204,000 in 1994 — more than an extra year's supply. In contrast, production of non-banned Lorcin and Davis pistols, which are among the guns most frequently seized by police, fell by about 35 percent, from a 1989–93 annual average of 283,000 to 184,000 in 1994.

Our interpretation of these trends is that the pre-ban price and production increases reflected speculation that grandfathered weapons and magazines in the banned categories would become profitable collectors' items after the ban took effect. Instead, however, assault weapon prices fell sharply within months after the ban took effect, apparently under the combined weight of the extra year's supply of grandfathered guns, along with legal substitute guns that entered the distribution chain around the time of the ban. While large-capacity magazine prices for several banned assault weapons followed similar trends, those for unbanned Glock pistols sustained their peaks, and those for the widely-copied AR-15 rifle rebounded at least temporarily to peak levels in 1996, after an immediate post-ban fall.

1.1.1.2. Recommendations

To establish our findings about legal-market effects more definitively, we have short-term (i.e., 12-month) and long-term research recommendations for consideration by NIJ. In the short term, we recommend entering and analyzing large-capacity magazine price data that we have already coded but not entered, in order to study how the prices and legal status of guns affect the prices of large-capacity magazines as economic complements. We also recommend updating our price and production analyses for both the banned firearms and large-capacity magazines, to learn about retention of the apparent ban effects we identified. For the long term, we recommend that NIJ and BATF cooperate in establishing and maintaining time-series data on prices and production of assault weapons, legal substitutes, other guns commonly used in crime, and the respective large and small capacity magazines; like similar statistical series currently maintained for illegal drugs, we believe such a price and production series would be a valuable instrument for monitoring effects of policy changes and other influences on markets for weapons that are commonly used in violent and drug trafficking crime.

1.2. Secondary-Market Effects

1.2.1. Findings

In addition to the retail markets discussed above, there are secondary gun markets in which gun transfers are made without formal record keeping requirements. Secondary market transfers are by and large legal transactions. However, prohibited gun purchasers such as minors, felons, and fugitives tend to acquire most of their guns through secondary markets and pay premiums of 3 to 5 times the legal-market prices in order to avoid eligibility checks, sales records, and the 5-day waiting period required by the Brady Act. We were unable to observe secondary-market prices and quantities directly. Anecdotally, however, the channels through which guns "leak" from legal to secondary markets include gun thieves, unscrupulous licensed dealers who sell guns on the streets and in gun shows more or less exclusively to prohibited purchasers (who may resell the guns), as well as "storefront" dealers who sell occasionally in secondary markets, reporting the missing inventories to BATF inspectors as "stolen or lost." Since two of these channels may lead to theft reports to the FBI's National Crime Information Center (NCIC), we tested for an increase in reported assault weapon thefts after the ban.

To this point, there has been only a slight increase in assault weapon thefts as a share of all stolen semiautomatic weapons. Thus, there does not appear to have been much leakage of assault weapons from legal to secondary markets.

In order to assess the effects of the large-capacity magazine ban on secondary markets, we examined thefts of Glock and Ruger handgun models that accept these magazines. Thefts of these guns continued to increase after the ban, despite the magazine ban, which presumably made the guns less attractive. Yet we also did not find strong evidence of an increase in thefts of these guns relative to what would have been predicted based on pre-ban trends. This implies that dealers have not been leaking the guns to illegitimate users on a large scale.

1.2.2. Recommendations

To monitor possible future leakage of the large existing stock of assault weapons into secondary markets, we recommend updating our analyses of trends in stolen gun reports. We also recommend that BATF and NCIC encourage reporting agencies to ascertain and record the magazines with which guns were stolen. Also, because stolen gun reports are deleted from NCIC files when the guns are recovered, we recommend that analyses be conducted on periodic downloads of the database in order to analyze time from theft to recovery. For strategic purposes, it would also be useful to compare dealer patterns of assault weapon theft reports with patterns of occurrence in BATF traces of guns recovered in crime.

1.3. Effects on Assault Weapon Use in Crime

1.3.1. Findings

Requests for BATF traces of assault weapons recovered in crime by law enforcement agencies throughout the country declined 20 percent in 1995, the first calendar year after the ban took effect. Some of this decrease may reflect an overall decrease in gun crimes; total trace requests dropped 11 percent in 1995 and gun murders dropped 12 percent. Nevertheless, these trends suggest an 8–9 percent additional decrease due to substitution of other guns for the banned assault weapons in 1995 gun crimes. We were unable to find similar assault pistol reductions in states with pre-existing assault pistol bans. Nationwide decreases related to violent and drug crimes were at least as great as that in total trace requests in percentage terms, although these categories were quite small

in number. The decrease we observed was evidently not a spurious result of a spurt of assault-weapon tracing around the effective date of the ban, because there were fewer assault weapon traces in 1995 than in 1993.

Trace requests for assault weapons rose by 7 percent in the first half of 1996, suggesting that the 1995 effect we observed may be temporary. However, data limitations have prevented us from attributing this rebound to changes in overall crime patterns, leakage of grandfathered assault weapons to secondary markets, changes in trace request practices, or other causes. Data from two cities not subject to a pre-existing state bans suggested that assault weapon use, while rare in those cities both before and after the ban, also tapered off during late 1995 and into 1996.

With our local data sources, we also examined confiscations of selected unbanned handguns capable of accepting large-capacity magazines. Criminal use of these guns relative to other guns remained stable or was higher during the post-ban period, though data from one of these cities were indicative of a recent plateau. However, we were unable to acquire data on the magazines with which these guns were equipped. Further, trends in confiscations of our selected models may not be indicative of trends for other unbanned large-capacity handguns. It is therefore difficult to make any definitive statements about the use of large-capacity magazines in crime since the ban. Nevertheless, the contrasting trends for these guns and assault weapons provide some tentative hints of short-term substitution of non-banned large-capacity semiautomatic handguns for the banned assault weapons.

1.3.2. Recommendations

Although BATF trace request data provide the only national trends related to assault weapon use, our findings based on them are subject to limitations. Law enforcement agencies request traces on only a fraction of confiscated guns that probably does not represent the entire population. Therefore, we recommend further study of available data on all guns recovered in crime in selected cities that either were or were not under state assault weapon bans when the Federal ban took effect. Beyond that, we recommend analyzing BATF trace data already in-house to compare trends for specific banned assault weapon models with trends for non-banned models that are close substitutes. Most strongly, we also recommend updating our trend analysis, to see if the early 1996 rebound in BATF trace requests for assault weapons continued throughout the year and to relate any change to 1996 trends in gun crime and overall trace requests.

From a broader and longer-term perspective, we share others' concerns about the adequacy of BATF trace data, the only available national data, as a basis for assessing the effects of firearms policies and other influences on the use of assault weapons and other guns in violent and drug trafficking crime. Therefore, we commend recent BATF efforts to encourage local law enforcement agencies to request traces on more of the guns they seize from criminals. As a complement, however, we recommend short-term research on departmental policies and officers' decisions that affect the probability that a specific gun recovered in crime will be submitted for tracing.

Unfortunately, we have been unable to this point to assemble much information regarding trends in the criminal use of large-capacity magazines or guns capable of accepting these magazines. This gap is especially salient for the following reasons: the large-capacity magazine is perhaps the most functionally important distinguishing feature of assault weapons; the magazine ban affected more gun models than did the more visible bans on designated assault weapons; and based on 1993 BATF trace requests, non-banned semiautomatic weapons accepting large-capacity magazines were used in more crimes than were the banned assault weapons. For these reasons, we recommend that BATF and state/local law enforcement agencies encourage concerted efforts to record the magazines with which confiscated firearms are equipped — information that frequently goes unrecorded under present practice — and we recommend further research on trends, at both the national and local levels, on the

criminal use of guns equipped with large-capacity magazines. Finally, to support this research and a variety of strategic objectives for reducing the consequences of violent and drug trafficking crime, consideration should be given to studying the costs and benefits of legislative and administrative measures that would encourage recording, tracing, and analyzing magazines recovered in crimes, with or without guns.

1.4. Consequences of Assault Weapon Use

1.4.1. Findings

A central argument for special regulation of assault weapons and large-capacity magazines is that the rapid-fire/multi-shot capabilities they make available to gun offenders increase the expected number of deaths per criminal use, because an intended victim may receive more wounds, and more people can be wounded, in a short period of time. Therefore, we examined trends in three consequences of gun use: gun murders, victims per gun homicide incident, and wounds per gunshot victim.

Our ability to discern ban effects on these consequences is constrained by a number of facts. The potential size of ban effects is limited because the banned weapons and magazines were used in only a minority of gun crimes — based on limited evidence, we estimate that 25% of gun homicides are committed with guns equipped with large-capacity magazines, of which assault weapons are a subset. Further, the power to discern small effects statistically is limited because post-ban data are available for only one full calendar year. Also, a large stock still exists of grandfathered magazines as well as grandfathered and legal-substitute guns with assault weapon characteristics.

Our best estimate of the impact of the ban on state level gun homicide rates is that it caused a reduction of 6.7% in gun murders in 1995 relative to a projection of recent trends. However, the evidence is not strong enough for us to conclude that there was any meaningful effect (i.e., that the effect was different from zero). Note also that a true decrease of 6.7% in the gun murder rate attributable to the ban would imply a reduction of 27% in the use of assault weapons and large-capacity guns and no effective substitution of other guns. While we do not yet have an estimate of large-capacity magazine use in 1995, our nationwide assessment of assault weapon utilization suggested only an 8 to 20 percent drop in assault weapon use in 1995.

Using a variety of national and local data sources, we found no statistical evidence of post-ban decreases in either the number of victims per gun homicide incident, the number of gunshot wounds per victim, or the proportion of gunshot victims with multiple wounds. Nor did we find assault weapons to be overrepresented in a sample of mass murders involving guns (see Appendix A).

The absence of stronger ban effects may be attributable to the relative rarity with which the banned weapons are used in violent crimes. At the same time, our chosen measures reflect only a few of the possible manifestations of the rapid-fire/multi-shot characteristics thought to make assault weapons and large-capacity magazines particularly dangerous. For example, we might have found the use of assault weapons and large-capacity magazines to be more consequential in an analysis of the number of victims receiving any wound (fatal or non-fatal), in broader samples of firearm discharge incidents. Moreover, our comparisons did not control for characteristics of incidents and offenders that may affect the choice of weapon, the consequences of weapon use, or both.

Recommendations: First, we recommend further study of the impact measures examined in this investigation. Relatively little time has passed since the implementation of the ban. This weakens the ability of statistical tests — particularly those in our time-series analyses — to discern meaningful impacts. Moreover, the

ban's effects on the gun market are still unfolding. Hence, the long term consequences of the ban may differ substantially from the short term consequences which have been the subject of this investigation.

Therefore, we recommend updating the state-level analysis of gun murder rates as more data become available. Similarly, investigations of trends in wounds per gunshot victim could be expanded to include longer post ban periods, larger numbers of jurisdictions, and, wherever possible, data on both fatal and non-fatal victims. Examination of numbers of total wounded victims in both fatal and non-fatal gunshot incidents may also be useful. In some jurisdictions, it may also be possible to link trends in the types of guns seized by police to trends in specific weapon-related consequence measures.

Second, we recommend further research on the role of assault weapons and large-capacity magazines in murders of police officers. Our analysis of police murders has shown that the fraction of police murders involving assault weapons is higher than that for civilian murders. This suggests that gun murders of police should be more sensitive to the ban than gun murders in general. Yet, further research, considering such factors as numbers of shots fired, wounds inflicted, and offender characteristics, is necessary for a greater understanding of the role of the banned weaponry in these murders.

Along similar lines, we strongly recommend in-depth, incident-based research on the situational dynamics of both fatal and non-fatal gun assaults to gain greater understanding of the roles of banned and other weapons in intentional deaths and injuries. A goal of this research should be to determine the extent to which assault weapons and guns equipped with large-capacity magazines are used in homicides and assaults and to compare the fatality rates of attacks with these weapons to those with other firearms. A second goal should be to determine the extent to which the properties of the banned weapons influence the outcomes of criminal gun attacks after controlling for important characteristics of the situations and the actors. In other words, how many homicides and non-fatal gunshot wound cases involving assault weapons or large-capacity magazines would not occur if the offenders were forced to substitute other firearms and/or small capacity magazines? In what percentage of gun attacks, for instance, does the ability to fire more than 10 rounds without reloading influence the number of gunshot wound victims or determine the difference between a fatal and non-fatal attack? In this study, we found some weak evidence that victims killed with guns having large-capacity magazines tend to have more bullet wounds than victims killed with other firearms, and that mass murders with assault weapons tend to involve more victims than those with other firearms. However, our results were based on simple comparisons; much more comprehensive research should be pursued in this area.

Future research on the dynamics of criminal shootings, including various measures of the number of shots fired and wounds inflicted, would provide information on possible effects of the assault weapon and magazine ban that we were unable to estimate, as well as useful information on violent gun crime generally. Such research requires linking medical and law enforcement data sets on victim wounds, forensic examinations of recovered firearms and magazines, and police incident reports.

2. BACKGROUND FOR THE IMPACT ASSESSMENT

Title XI of the Violent Crime Control and Law Enforcement Act of 1994 (the Crime Control Act), took effect on its enactment date, September 13, 1994. Subtitle A, which is itself known as the Public Safety and Recreational Firearms Use Protection Act, contains three provisions related to "semiautomatic assault weapons." Section 110102 (the assault weapons ban) made unlawful the manufacture, transfer, or possession of such weapons under 18:922 of the United States Code. Section 110103 (the magazine ban) made unlawful the transfer or possession of "large-capacity ammunition feeding devices": detachable magazines that accept more than 10 rounds[1] and can be attached to semi- or automatic firearms. Section 110104 (the evaluation requirement) required the Attorney General to study the effect of these prohibitions and "in particular...their impact, if any, on violent and drug trafficking crime." The evaluation requirement specified a time period for the study: an 18-month period beginning 12 months after the enactment date of the Act. It also required the Attorney General to report the study results to Congress 30 months after enactment of the Crime Control Act — March 13, 1997. The National Institute of Justice awarded a grant to the Urban Institute to conduct the mandated study, and this report contains the findings.

This chapter first explains the legislation in additional detail, then discusses what is already known about the role of the banned weapons in crime, and finally explains certain relevant features of firearms markets.

2.1. THE LEGISLATION

Effective on its enactment date, September 13, 1994, Section 110102 of Title XI banned the manufacture, transfer, and possession of "semiautomatic assault weapons." It defined the banned items defined in four ways:

1) Named guns: specific rifles and handguns, available from ten importers and manufacturers: Norinco, Mitchell, and Poly Technologies (all models, popularly known as AKs); Israeli Military Industries UZI and Galil models, imported by Action Arms; Beretta Ar 70 (also known as SC-70); Colt AR-15; Fabrique National FN/FAL, FN/LAR, FN/FNC), SWD M-10, M-11, M-11/9, and M-12; Steyr AUG; and INTRATEC TEC-9, TEC-DC9, and TEC-22;

2) Exact copies: "Copies or duplicates of the [named guns] in any caliber";

3) Revolving cylinder shotguns: Large-capacity shotguns, with the Street Sweeper and Striker 12 named as examples; and

4) Features-test guns: semiautomatic weapons capable of accepting detachable magazines and having at least two named features.[2]

Several provisions of the ban require further explanation because they affected our approach to this study. First, the ban exempted several categories of guns: a long list of specific models specified in Appendix A to Sec.

[1] Or "that can be readily restored or converted to accept."

[2] For rifles, the named features were: a folding or telescoping stock; a pistol grip that protrudes below the firing action; a bayonet mount; a flash suppresser or threaded barrel designed to accommodate one; a grenade launcher. For pistols, the features were a magazine outside the pistol grip; a threaded barrel (capable of accepting a barrel extender, flash suppresser, forward handgrip, or silencer); a heat shroud that encircles the barrel; a weight of more than 50 ounces unloaded; and a semiautomatic version of an automatic firearm. For shotguns, named features included the folding or telescoping stock, protruding pistol grip, fixed magazine capacity over 5 rounds, and ability to accept a detachable magazine.

110102; bolt- or pump-action, inoperable, and antique guns; semiautomatic rifles and shotguns that cannot hold more than 5 rounds; and firearms belonging to a unit of government, a nuclear materials security organization, a retired law enforcement officer, or an authorized weapons tester.

Second, the prohibitions exempted weapons and magazines that met the definitional criteria but were legally owned (by manufacturers, distributors, retailers, or consumers) on the effective date of the Act. Such "grandfathered" guns may legally be sold, resold, and transferred indefinitely. Estimates of their numbers are imprecise. However, a 1992 report by the American Medical Association reported an estimate of 1 million semiautomatic assault weapons manufactured for civilian use, plus 1.5 million semiautomatic M-1 rifles sold as military surplus (AMA Council, 1992). To distinguish grandfathered guns from exempt guns that might be stolen or diverted to illegal markets, the ban required the serial numbers of guns in the banned categories to clearly indicate their dates of manufacture.

Third, the ban on exact copies of the named guns did not prohibit the manufacture, sale, or transfer of legal substitutes, most of which first appeared around or after the effective date of the ban. Legal substitutes differ from banned exact copies by lacking certain named features or by incorporating minimal design modifications such as slight reductions of pistol barrel length, thumbholes drilled in a rifle stock, or the like. Manufacturers named some legal substitutes by adding a designation such as "Sporter," "AB," (After Ban), or "PCR" (Politically Correct Rifle) to the name of the corresponding banned weapon.

Section 110103 of Title XI banned large-capacity magazines, i.e., magazines that accept ten or more rounds of ammunition. Its effective date, exemptions, and grandfathering provisions correspond to those governing firearms under Section 110102. This provision exempts attached tubular devices capable of operating only with .22 caliber rimfire ammunition.

Section 110104 required the study that is the subject of this report: a study of the effect of the ban, citing impacts on violent crime and drug trafficking in particular. It also specified the time period of the study: to begin 12 months after enactment, to be conducted over an 18-month period, and to be reported to Congress after 30 months. Finally, Title XI included a "sunset provision" for the ban, repealing it 10 years after its effective date.

Subtitles B and C of Title XI are relevant to this study because they took effect at the same time, and so special efforts are needed to distinguish their effects from those effects of the assault weapon and magazine bans in Subtitle A. With certain exemptions, Subtitle B bans the sale, delivery, or transfer of handguns to juveniles less than 18 years old. This juvenile handgun possession ban applies, of course, to assault pistols and to other semiautomatic handguns that are frequently recovered in crimes. Subtitle C requires applicants for new and renewal Federal Firearms Licenses — the Federal dealers' licenses — to submit a photograph and fingerprints with their applications and to certify that their businesses will comply with all state and local laws pertinent to their business operations. These subtitles gave force of law to practices that BATF had begun early in 1994, to require the fingerprints and photographs, and to cooperate with local law enforcement agencies in investigations of Federal Firearms Licensees' (FFLs) compliance with local sales tax, zoning, and other administrative requirements. These BATF practices are believed to have contributed to an 11 percent reduction in licensees (from 281,447 to 250,833) between January and the effective date of the Crime Act, and a subsequent 50 percent reduction to about 124,286 by December 1996 (U.S. Department of Treasury, 1997). These practices and subtitles were intended to discourage license applications and renewals by the subset of licensees least likely to comply with laws governing sales to felons, juveniles, and other prohibited purchasers.

2.2. CONTEXT FOR THE ASSAULT WEAPONS BAN

At least three considerations appear to have motivated the Subtitle A bans on assault weapons and large-capacity magazines: arguments over particularly dangerous consequences of their use, highly publicized incidents that drew public attention to the widespread availability of military-style weapons, and the disproportionate use of the banned weapons in crime.

The argument over dangerous consequences is that the ban targets a large array of semiautomatic weapons capable of accepting large-capacity magazines (i.e., magazines holding more than 10 rounds). Semiautomatic firearms permit a somewhat more rapid rate of fire than do non-semiautomatics. When combined with large-capacity magazines, semiautomatic firearms enable gun offenders to fire more times and at a faster rate, thereby increasing the probability that offenders hit one or more victims at least once.

There is very little empirical evidence, however, on the direct role of ammunition capacity in determining the outcomes of criminal gun attacks (see Koper 1995). The limited data which do exist suggest that criminal gun attacks involve three or fewer shots on average (Kleck 1991, pp.78-79; McGonigal et al. 1993, p.534). Further, there is no evidence comparing the fatality rate of attacks perpetrated with guns having large-capacity magazines to those involving guns without large-capacity magazines (indeed, there is no evidence comparing the fatality rate of attacks with semiautomatics to those with other firearms). But in the absence of substantial data on the dynamics of criminal shootings (including the number of shots fired and wounds inflicted per incident), it seems plausible that offenders using semiautomatics, especially assault weapons and other guns capable of accepting large-capacity magazines, have the ability to wound more persons, whether they be intended targets or innocent bystanders (see Sherman et al. 1989). This possibility encouraged us to attempt to estimate the effect of the ban on both the number of murder victims per incident and the number of wounds per murder victim.

The potential of assault weapons to kill multiple victims quickly was realized in several dramatic public murder incidents that occurred in the decade preceding the ban and involved assault weapons or other semiautomatic firearms with large-capacity magazines (e.g., see Cox Newspapers 1989; Lenett 1995). In one of the worst mass murders ever committed in the United States, for example, James Huberty killed 21 persons and wounded 19 others in a San Ysidro, California, McDonald's on July 18, 1984, using an Uzi handgun and a shotgun. On September 14, 1989, Joseph T. Wesbecker killed seven persons and wounded thirteen others at his former workplace in Louisville, Kentucky before taking his own life. Wesbecker was armed with an AK-47 rifle, two MAC-11 handguns, and a number of other firearms. One of the most infamous assault weapon cases occurred on January 17, 1989, when Patrick Edward Purdy used an AK-47 to open fire on a schoolyard in Stockton, California, killing 5 children.

There were additional high profile incidents in which offenders using semiautomatic handguns with large-capacity magazines killed large numbers of persons. In October of 1991, a gunman armed with a Glock 17, a Ruger P89 (both the Glock and Ruger models are semiautomatic handguns capable of accepting magazines with more than 10 rounds), and several large-capacity magazines killed 23 people and wounded another 19 in Killeen, Texas. In a December 1993 incident, six people were killed and another 20 were wounded on a Long Island commuter train by a gunman equipped with a semiautomatic pistol and large-capacity magazines.

These events have been cited as jarring the public consciousness, highlighting the public accessibility of weapons generally associated with military use, and demonstrating the apparent danger to public health posed by semiautomatic weapons with large-capacity magazines. These considerations, along with the claim that large-capacity magazines were unnecessary for hunting or sporting purposes, reportedly galvanized public support for the initiative to ban these magazines (Lenett, 1995).

Debate over assault weapons raged for several years prior to the passage of the 1994 Crime Act. Throughout that time, different studies, news reports, policy debates, and legal regulations employed varying definitions of assault weapons. Yet, in general terms, the firearms targeted in these debates and those ultimately prohibited by the federal government's ban consist of various semiautomatic pistols, rifles, and shotguns, most of which accept detachable ammunition magazines and have military-style features. Mechanically, the most important features of these guns are their semiautomatic firing mechanisms and the ability to accept detachable magazines, particularly large-capacity magazines. However, these traits do not distinguish them from many other semiautomatic weapons used for hunting and target shooting. Therefore, some have argued that assault weapons differ only cosmetically from other semiautomatic firearms (Kleck 1991; Cox Newspapers 1989).

Nonetheless, proponents of assault weapons legislation argued that these weapons are too inaccurate to have much hunting or sporting value. Furthermore, they argued that various features of these weapons, such as folding stocks and shrouds surrounding their barrels, have no hunting or sporting value and serve to make these weapons more concealable and practical for criminal use (Cox Newspapers 1989). To the extent that these features facilitated criminal use of long guns or handguns with large-capacity magazines, one could hypothesize that there would be an increase in the deadliness of gun violence. Proponents also claimed that some of these weapons, such as Uzi carbines and pistols, could be converted rather easily to fully automatic firing.[3]

To buttress these arguments, proponents of assault weapons legislation pointed out that assault weapons are used disproportionately in crime. According to estimates generated prior to the federal ban, assault weapons represented less than one percent of the over 200 million privately-owned guns in the United States; yet they were reported to account for 8% of all firearms trace requests submitted to BATF from 1986 to 1993 (Lenett 1995; also see Zawitz 1995). Moreover, these guns were perceived to be especially attractive to offenders involved in drug dealing and organized crime, as evidenced by the relatively high representation of these weapons among BATF gun trace requests for these crimes. To illustrate, a late 1980s study of BATF trace requests reported that nearly 30% of the guns tied to organized crime cases were assault weapons, and 12.4% of gun traces tied to narcotics crimes involved these guns (Cox Newspapers 1989, p.4).

Further, most assault weapons combine semiautomatic firing capability with the ability to accept large-capacity magazines and higher stopping power (i.e., the ability to inflict more serious wounds).[4] Thus, assault weapons would appear to be a particularly lethal group of firearms. However, this is also true of many non-banned semiautomatic firearms. Moreover, there have been no studies comparing the fatality rate of attacks with assault weapons to those committed with other firearms.

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[3] Fully automatic firearms, which shoot continuously as long as the trigger is held down, have been illegal to own in the U.S. without a federal permit since 1934. BATF has the responsibility of determining whether particular firearm models are too easily convertible to fully automatic firing. Earlier versions of the SWD M series assault pistols made by RPB Industries were met with BATF disapproval for this reason during the early 1980s.

[4] Determinants of firearm stopping power include the velocity, size, shape, and jacketing of projectiles fired from a gun. Notwithstanding various complexities, the works of various forensic, medical, and criminological researchers suggest we can roughly categorize different types of guns as inflicting more or less lethal wounds (see review in Koper 1995). At perhaps the most general level, we can classify shotguns, centerfire (high-veolocity) rifles, magnum handguns, and other large caliber handguns (generally, those larger than .32 caliber) as more lethal firearms and small caliber handguns and .22 caliber rimfire (low velocity) rifles as less lethal firearms. Most assault weapons are either high velocity rifles, large caliber handguns, or shotguns.

Nonetheless, the involvement of assault weapons in a number of mass murder incidents such as those discussed above provided an important impetus to the movement to ban assault weapons. Commenting on Patrick Purdy's murder of five children with an AK-47 rifle in Stockton, California in 1989, one observer noted, "The crime was to raise renewed outcries against the availability of exotic military-style weapons in our society. This time police forces joined forces with those who have traditionally opposed the widespread ownership of guns" (Cox Newspapers 1989, p.i). Later that year, California became the first state in the nation to enact an assault weapons ban, and the federal government enacted a ban on the importation of several foreign military-style rifles.

2.3. Assault Weapons and Crime

Table 2-1 describes the named guns banned by Subtitle A in terms of their design, price, pre-ban legal status, and examples of legal substitutes for the banned guns. The table also reports counts of BATF trace requests — law enforcement agency requests for BATF to trace the recorded purchase history of a gun. Trace counts are commonly used to compare the relative frequencies of gun model uses in crime, although they are subject to biases discussed in the next chapter. Together, the named guns and legal substitutes accounted for 3,493 trace requests in 1993, the last full pre-ban year. This represented about 6.3 percent of all 55,089 traces requested that year.

Of the nine types of banned weapons shown in Table 2-1, five are foreign-made: AKs, UZI/ Galil, Beretta Ar-70, FN models, and the Steyr AUG. Together they accounted for only 394 BATF trace requests in 1993, and 281 of those concerned Uzis. There are at least three reasons for these low frequencies. First, imports of all of them had been banned under the 1989 assault weapon importation ban. Second, the Blue Book prices of the UZI, FN models, and Steyr AUG were all high relative to the prices of guns typically used in crime. Third, the FN and Steyr models lack the concealability that is often desired in criminal uses.

Among the four domestically produced banned categories, two handgun types were the most frequently submitted for tracing, with 1,377 requests for TEC models and exact copies, and 878 traces of SWD's M-series. Table 2-1 also reports 581 trace requests for Colt AR-15 rifles, 99 for other manufacturers' exact copies of the AR-15, and a handful of trace requests for Street Sweepers and Berettas.

Table 2-1. Description of firearms banned in Title XI

Name of firearm	*Description*	*1993 Blue Book price*	*Pre-ban Federal legal status*	*1993 trace request count*	*Examples of legal substitutes*
Avtomat Kalashnikov (AK)	Chinese, Russian, other foreign and domestic: .223 or 7.62x39mm cal., semi-auto Kalashnikov rifle, 5, 10*, or 30* shot mag., may be supplied with bayonet.	$550 (plus 10-15% for folding stock models)	Imports banned in 1989	87	Norinco NHM 90/91
UZI, Galil	Israeli: 9mm, .41, or .45 cal. semi-auto carbine, mini-carbine, or pistol. Magazine capacity of 16, 20, or 25, depending on model and type (10 or 20 on pistols).	$550-$1050 (UZI) $875-$1150 (Galil)	Imports banned in 1989	281 UZI 12 Galil	
Beretta Ar-70	Italian: .222 or .223 cal., semi-auto paramilitary design rifle, 5, 8, or 30 shot mag.	$1050	Imports banned in 1989	1	
Colt AR-15	Domestic: .Primarily 223 cal. paramilitary rifle or carbine, 5-shot magazine, often comes with two 5-shot detachable mags. Exact copies by DPMS, Eagle, Olympic, and others.	$825-$1325	Legal (civilian version of military M-16)	581 Colt 99 Other manufacturers	Colt Sporter, Match H-Bar, Target. Olympic PCR Models.
FN/FAL, FN/LAR, FNC	Belgian design: .308 Winchester cal., semi-auto rifle or .223 Remington combat carbine with 30-shot mag. Rifle comes with flash hider, 4-position fire selector on automatic models. Manufacturing discontinued in 1988.	$1100-$2500	Imports banned in 1989	9	L1A1 Sporter (FN, Century)
SWD M-10, M-11, M-11/9, M-12	Domestic: 9mm paramilitary semi-auto pistol, fires from closed bolt, 32-shot mag. Also available in fully automatic variation.	$215	Legal	878	Cobray PM-11, PM12 Kimel AP-9, Mini AP-9
Steyr AUG	Austrian: .223 Remington/5.56mm cal., semi-auto paramilitary design rifle.	$2500	Imports banned in 1989	4	
TEC-9, TEC*DC-9, TEC-22	Domestic: 9mm semi-auto paramilitary design pistol, 10** or 32** shot mag.; .22 LR semi-auto paramilitary design pistol, 30-shot mag.	$145-$295	Legal	1202 Intratec 175 Exact copies	TEC-AB
Revolving Cylinder Shotguns	Domestic: 12 gauge, 12-shot rotary mag., paramilitary configuration, double action.	$525***	Legal	64 SWD Street Sweepers	

* The 30-shot magazine was banned by the 1994 Crime Act, and the 10-shot magazine was introduced as a result.
** The 32-shot magazine was banned by the 1994 Crime Act, and the 10-shot magazine was introduced as a result.
*** Street Sweeper
Source: *Blue Book of Gun Values*, 17th Edition, by S.P. Fjestad, 1996.

Although the banned weapons are more likely than most guns to be used in crime, they are so rare that only 5 models appeared among the BATF National Tracing Center list of the 50 most frequently traced guns in 1993: the SWD M-11/9 (659 trace requests, ranked 8), the TEC-9 (602 requests, ranked 9), the Colt AR-15 (581 requests, ranked 11), the TEC-DC9 (397 requests, ranked 21), and the TEC-22 (203, ranked 48). In addition, the list named eight unbanned guns that accept banned large-capacity magazines: the Glock 17 pistol (509 requests, ranked 13), the Ruger P85 pistol (403 requests, ranked 20), the Ruger P89 pistol (361 requests, ranked 24), the

Glock 19 pistol (339 requests, ranked 28), the Taurus PT92 (282 requests, ranked 31), the Beretta/FI Industries Model 92 pistol (270 requests, ranked 33), the Beretta Model 92 (264 requests, ranked 34), and the Ruger Mini-14 rifle (255 requests, ranked 36).

In contrast, the list of ten most frequently traced guns is dominated by inexpensive small-caliber semiautomatic handguns not subject to the ban. These included the Raven P-25 (1,674 requests, ranked 1), the Davis P380 (1,539 requests, ranked 2), the Lorcin L-380 (1,163 requests, ranked 3), the Jennings J-22 (714 requests, ranked 6), and the Lorcin L-25 (691 requests, ranked 7). Other guns among the 1993 top ten list were: the Norinco SKS, a Chinese-made semi-automatic rifle (786 requests, ranked 4); the Mossberg 500 .12-gauge shotgun (742 requests, ranked 5), and the Smith & Wesson .38 caliber revolver (596 requests, ranked 10). None of these are subject to the assault weapon ban.

The relative infrequency of BATF trace requests for assault weapons is consistent with other findings summarized in Koper (1995). During the two years preceding the 1989 import ban, the percentage of traces involving assault weapons reportedly increased from 5.5 to 10.5 percent for all crimes (Cox Newspapers, n.d., p.4), and was 12.4 percent for drug crimes. Because law enforcement agencies are thought to request BATF traces more frequently in organized crime and drug crime cases, many criminal researchers (including ourselves) believe that raw trace request statistics overstate the criminal use of assault weapons in crime. Based on more representative samples, Kleck (1991) reports that assault weapons comprised 3.6 percent or less of guns confiscated from most of the Florida agencies he surveyed, with only one agency reporting as high as 8 percent. Similarly, Hutson et al. (1994) report that assault weapons were involved in less than one percent of 1991 Los Angeles drive-by shootings with juvenile victims. Based on his reanalysis of 1993 New York City data, Koper (1995) concluded that assault weapons were involved in only 4 percent of the 271 homicides in which discharged guns were recovered and 6.5 percent of the 169 homicides in which ballistics evidence positively linked a recovered gun to the crime.

Koper (1995) also summarizes findings which suggest that criminal self-reporting of assault weapon ownership or use may have become "trendy" in recent years, especially among young offenders. The percentages of offenders who reported ever using weapons in categories that may have included assault weapons was generally around 4 percent in studies conducted during the 1980s, but rose to the 20- to 30-percent range in surveys of youth reported since 1993, when publicity about such weapons was high (see, e.g., Knox et al., 1994; Sheley and Wright, 1993).

2.4. Markets for Assault Weapons and Other Firearms

Predicting effects of the bans on assault weapons and large-capacity magazines requires some basic knowledge of firearms markets. The Federal Bureau of Alcohol, Tobacco and Firearms (BATF) licenses persons to sell or repair firearms, or accept them as a pawnbroker under the Gun Control Act of 1968. Cook et al. (1995, p.73) summarized the relevant characteristics of a Federal firearms licensee (FFL) as follows. Licenses are issued for three years renewable, and they allow Federal Firearm licensees to buy guns mail-order across state lines without a background check or a waiting period. Starting well before the 1994 Crime Act, applicants had to state that they were at least 21 years old and provide a Social Security number, proposed business name and location, and hours of operation. Since the 1968 Omnibus Crime Control and Safe Streets Act, FFL applicants have had to state that they were not felons, fugitives, illegal immigrants, or substance abusers, and that they had never renounced their American citizenship, been committed to a mental institution, or dishonorably discharged from the military.

The Gun Control Act of 1968 made these same categories of persons ineligible to purchase a gun from a licensee and required would-be purchasers to sign statements that they were not ineligible purchasers. The 1968

Act also requires FFLs to retain the records of each sale and a running log of acquisitions and dispositions of all guns that come into their possession. In 1993, the Brady Handgun Violence Prevention Act added several more requirements on handgun sales by FFLs; the focus on handguns reflected their disproportionate involvement in crime. Under the Brady Act, licensed dealers[5] became required to obtain a photo ID from each would-be handgun purchaser, to verify that the ID described the purchaser, to notify the chief law enforcement officer (CLEO) of the purchaser's home of the attempt to purchase, and to wait five business days before completing the sale, allowing the CLEO to verify eligibility and notify the seller if the purchaser is ineligible. The Brady Act also raised the fee for the most common license, Type 1 (retail), from $10.00 per year to $200.00 for the first three years and $90.00 for each three-year renewal.

Subtitle C of Title XI which took effect simultaneously with the 1994 assault weapons ban strengthened the requirements on FFLs and their customers in several ways, including the following. To facilitate fingerprint-based criminal history checks and to deter applicants who feared such checks, Subtitle C required FFL applicants to submit fingerprints and photographs; this ratified BATF practice that had begun in early 1994. To make FFLs more visible to local authorities, Subtitle C required applicants to certify that within 30 days they would comply with applicable local laws and required the Secretary of the Treasury to notify state and local authorities of the names and addresses of all new licensees. To help local law enforcement agencies recover stolen guns and to discourage licensees from retroactively classifying firearms they had sold without following Federally required procedures as "stolen," Subtitle C introduced requirements for FFLs to report the theft or loss of a firearm to BATF and to local authorities within 48 hours.

Assault weapons and other firearms are sold in primary and secondary markets whose structure was described by Cook et al. (1995). Primary markets include transactions by FFLs. At the wholesale level, licensed importers and distributors purchase firearms directly from manufacturers and advertise them through catalogs and display ads in nationally distributed publications such as *Shotgun News*. Under the law, purchasers may include walk-ins who reside in the distributor's state and FFLs from anywhere who can order guns by telephone, fax, or mail. Primary-market retailers include both large discount stores and smaller-volume independent firearms specialists who offer advice, gun service, sometimes shooting ranges, and other professional services of interest to gun enthusiasts. Some 25,000 independent dealers are organized as the National Alliance of Stocking Gun Dealers. At both the wholesale and retail level, primary-market sellers are legally required to verify that the purchaser is eligible under Federal laws, to maintain records of sales for possible future use in BATF traces of guns used in crime, and, since the effective date of the Crime Act, to report thefts of guns to BATF.

Cook et al. (1995, p.68) also designated "secondary markets," in which non-licensed persons sell or give firearms to others. Sellers other than FFLs include collectors or hobbyists who typically resell used guns through classified ads in newspapers or "consumer classified sheets," through newsletters oriented toward gun enthusiasts, or through word of mouth to family and friends. The secondary market also includes gun shows, "street sales", and gifts or sales to family, friends, or acquaintances. Secondary transfers are not subject to the record-keeping requirements placed on FFLs.

Gun prices in the primary markets are widely publicized, and barriers to entry are few, so that the market for legal purchasers is fairly competitive. For new guns, distributors' catalogs and publications such as *Shotgun News* disseminate wholesale prices. Prices of used guns are reported annually in a *Blue Book* catalog (Fjestad, 1996). Based on interviews with gun market experts, Cook et al. (1995, p.71) report that retail prices track

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[5] The Brady Act exempted sellers in states that already had similar requirements to verify the eligibility of would-be gun purchasers.

wholesale prices quite closely. They estimate that retail prices to eligible purchasers generally exceed wholesale (or original-purchase) prices by 3–5 percent in the large chain stores, by about 15 percent in independent dealerships, and by about 10 percent at gun shows because overhead costs are lower.

In contrast, purchasers who wish to avoid creating a record of the transaction and ineligible purchasers, including convicted felons who lack convincing false identification and wish to avoid the Brady Act eligibility check or waiting period, must buy assault weapons and other guns in the secondary markets, which are much less perfect. Prices for banned guns with accurate and complete descriptions are rarely advertised, for obvious reasons. Sellers do not supply catalogues and reference books that would help an untrained buyer sort out the bewildering array of model designations, serial numbers, and detachable features that distinguish legal from illegal guns. And competition is limited because sellers who are wary of possible undercover purchases by law enforcement agencies prefer to limit "off-the-books" sales either to persons known or personally referred to them, or to settings such as gun shows and streets away from home, where they themselves can remain anonymous.

In general, ineligible purchasers face premium prices some 3 to 5 times legal retail prices.[6] Moreover, geographic differentials persist that make interstate arbitrage, or trafficking, profitable from "loose regulation" states to "tight regulation" states. Among the banned assault weapons, for example, Cook et al. (1995, p.72, note 56) report TEC-9s with an advertised 1991 price of $200 in the Ohio legal retail market selling for $500 on the streets of Philadelphia. By 1995, they report a legal North Carolina price of $300 compared to a street price of $1,000 in New York City. In 1992 interviews with Roth (1992), local and state police officers reported even higher premiums in secondary submarkets in which ineligible purchasers bartered drugs for guns: prices in terms of the street value of drugs reportedly exceeded street cash prices by a factor of about 5.

The attraction that the higher premiums hold for FFLs as sellers has been noted by both researchers and market participants. Cook et al. (1995, p.72) note that licensed dealers willing to sell to ineligible purchasers or without Federal paperwork offer buyers the combined advantages of the primary and secondary markets: "they have the ability to choose any new gun in the catalog, but without the paperwork, delays, fees, and restrictions on who can buy." Their data raise the possibility that up to 78 percent of FFLs in the Raleigh/Durham/Chapel Hill area of North Carolina may operate primarily or exclusively in secondary markets, since 40 percent had not given BATF a business name on their application, and an additional 38 percent provided "business" numbers that turned out to be home numbers (Cook et al., 1995:75). They note the consistency of their findings with a national estimate by the Violence Policy Center (1992 — More Gun Dealers than Gas Stations) that 80 percent of dealers nationwide do not have storefront retail firearms businesses. Jacobs and Potter (1995, p.106) note that because resource constraints have restricted BATF inspections to storefronts, dealers without storefronts may operate without regard to the Brady Act requirements, or presumably to other requirements as well.

The opportunities for FFLs, whether operating from storefronts or not, to sell firearms in both the primary and secondary markets, were colorfully described in the 1993 statement of the National Alliance of Stocking Gun Dealers (NASGD) to the House and Senate Judiciary Committees regarding Subtitle C. After noting the substantial price premium for selling guns directly felons to and others on the street, the statement continues:

> Should you feel a little queasy about the late night hours and the face-to-face negotiations with the street folk, then you can become a "gun-show cowboy." Simply drive by your friendly "distributor"..., load up 250 handguns, and hit the weekend circuit of gun shows...If you choose

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[6] There are exceptions. Guns fired in crimes may sell at substantial discounts on the street because ballistic "fingerprints" may incriminate the subsequent owner. Drug addicts who find and steal guns during burglaries may sell or trade them for drugs at prices far below market.

> to do the "cash and carry" routine then you will command higher prices than those who insist on selling lawfully with all the attendant ID and paperwork. However, since you will most probably be selling at gun shows in states other than where you are licensed, it is unlawful for you to sell and deliver on the spot, so you will not want to identify yourself either. Attendees (purchasers) at gun shows include the entire spectrum of the criminal element — felons, gangs who don't have their own armorer, underage youth, buyers for underage youth, multistate gun runners and such...Though the gun show cowboy won't achieve quite as high a profit as the street seller, he can sell in very high volume and easily earn the same dollar amount and feel a lot safer. (NASGD, 1993:2-3).

Pierce et al. (1995) made an initial effort to investigate the extent and distribution of FFLs' transactions in secondary submarkets through which firearms flow to criminal uses. Using the automated Firearms Tracing System (FTS) recently developed by BATF's National Tracing Center, they explored several covariates of the distribution of traces in which a given FFL holder is named. They reported the highest mean number of traces for dealers in Maryland, Vermont, and Virginia. Other cross-tabulations indicated that currently active dealers operating at the addresses previously used by out-of-business dealers were more likely than average to be named in traces, which suggests that dealers who are active in secondary markets tend to reapply for licenses under new names. Finally, they reported a very high concentration of dealers in trace requests. While 91.6 percent of the dealers in the FTS database had never been named in a trace, 2,133 dealers, 0.8 percent of the total, had been named in 10 or more traces. Together, they were named in 65.7 percent of all traces conducted. An even smaller handful of 145 dealers' names surfaced in 30,850 traces — 25.5 percent of the entire trace database. These findings indicated that the channels through which guns flow from FFLs to criminal users are more heavily concentrated than previously recognized.

The channels described above through which firearms flow from licensed dealers (FFLs) and eligible purchasers to ineligible purchasers vary in terms of visibility.[7] In primary markets, ineligible purchasers may buy guns from FFLs using fake identification themselves or using "straw purchasers" (eligible buyers acting as agents for ineligible buyers, unbeknownst to the FFL). In Cook and Leitzel's (1996) terminology, these are "formal" transactions that create official records, but the records do not identify the actual consumer.

We use the term "leakage" to designate channels through which guns flow from legal primary and secondary markets to ineligible purchasers. No leakage channel creates valid sales records; however, at least since 1994, all are likely to generate stolen gun reports to BATF. Ineligible purchasers may buy guns informally (i.e., without paperwork) from unethical FFLs at gun shows or through "street" or "back door" sales. To prevent informal sales from creating discrepancies between actual inventories and the acquisition/disposition records, the FFL may report them as stolen. Such transactions are indistinguishable from actual thefts, the other leakage channel.

Guns may also leak from eligible non-FFL gun owners to ineligible owners through direct sales on the street or at gun shows, or through thefts. While non-FFL owners are not required to record sales or transfers of their guns, they may also wish to report a gun that they sell to an ineligible purchaser as stolen if they suspect it may be recovered in a future crime. Therefore, leakage in secondary markets may also be reflected in theft reports.

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[7] While the law presumes ineligible purchasers to be more likely than eligible purchasers to use guns during crimes, eligible purchasers have, in fact, committed viable crimes with large-capacity firearms.

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3. ANALYSIS PLAN

Subtitle A of Title XI banned the manufacture, transfer, and possession of assault weapons and large-capacity magazines. We hypothesized that the ban would produce direct effects in the primary markets for these weapons, that related indirect effects in secondary markets would reduce the frequency of their criminal use, and that the decrease in use would reduce such consequences as gun homicides, especially incidents involving multiple victims, multiple wounds, and killings of law enforcement officers. In this chapter, we explain our general strategy testing these hypotheses.

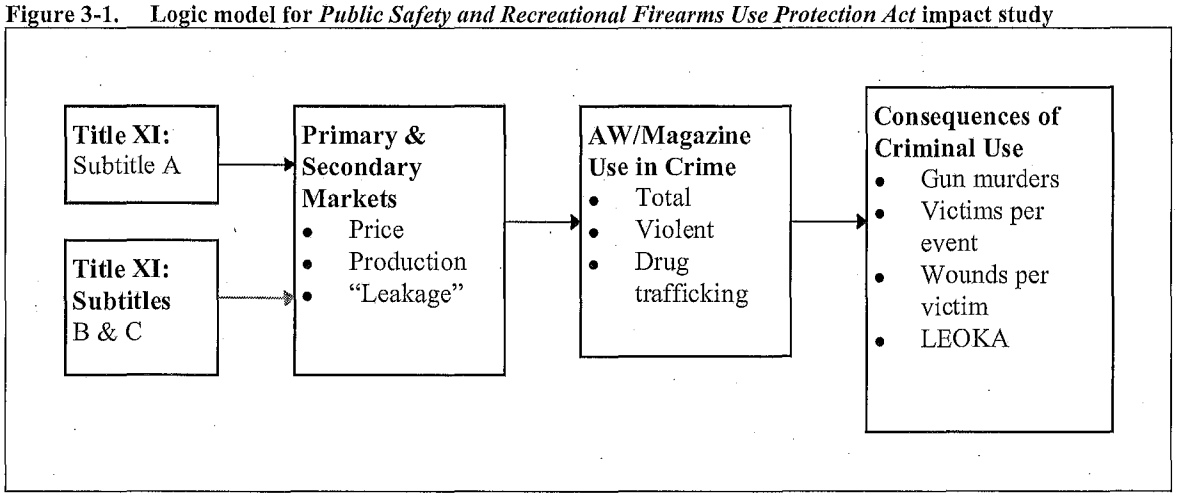
3.1. POTENTIAL BAN EFFECTS

Figure 3-1 displays the ban effects that we hypothesized and the measures that we used to test those effects. As shown there, we anticipated potential effects on primary and secondary markets for the banned guns and magazines, potential reductions in their use in crime, and subsequent reductions in the consequences of criminal use. Although the available measures of any single effect are problematic, the problems differ by measure. Therefore, our approach was to conduct several small studies, each subject to different error sources, and then to integrate the findings of the separate studies.

As shown in Figure 3-1, the **market effects** of interest included indicators of price, production, and "leakage" between primary and secondary markets. If the Subtitle A bans are to be effective in reducing criminal uses of the banned weapons and magazines, they must increase the prices of those items. Our **price** indicators were collected for banned guns, selected legal substitutes, large-capacity magazines, and, as comparison groups, comparable guns that should not have been directly affected by the ban. The data were the nationally advertised prices of distributors who ran display ads in *Shotgun News* continuously from January 1992 through mid-1996. Because these distributors sell guns simultaneously at the wholesale and retail levels, and because primary-market retail margins are small, we believe these prices offer a useful index of primary-market prices. We used hedonic price analysis to study trends. Annual **production** data were obtained from the Violence Policy Research Project, an organization that compiles BATF manufacturing data. We lacked post-ban data because release of the production statistics is delayed two years by law. Also, we had to make certain approximations because production statistics are not reported for specific models. Therefore, findings from our tabular analyses of production are less complete and more tentative than those about price. Finally, as discussed in Section 3.2, we defined **"leakage"** as the transfer of firearms to ineligible purchasers from licensed dealers and eligible purchasers. Because we argued there that leakage is likely to generate theft reports (either because the guns were transferred by theft or because a false theft report was used to conceal a sale to an ineligible purchaser), we measured leakage using counts of stolen gun reports to the FBI's National Crime Information Center (NCIC).

Our primary indicator of assault weapon **use in crime** is the volume of requests for BATF traces of guns recovered in crime. **Trace request** data have the advantage of providing a national picture, and they allow us to focus on two of the Congressional priorities for this study, violent crime and drug trafficking crime. They require special caution in interpretation, however, since trace requests are a small and unrepresentative sample of guns recovered in crime. We believe that our tabular analyses provide a defensible estimate of the short-term effects of Title XI on criminal use of the banned weapons. We attempted to supplement the national analysis with analyses of **local trends in recovered assault weapons** in representative samples of recovered guns from a number of law enforcement agencies, but could obtain the necessary data for only a few cities.

Figure 3-1. Logic model for *Public Safety and Recreational Firearms Use Protection Act* impact study



Finally, as shown in Figure 3-1, we used four indicators of the **consequences** of criminal use of assault weapons and semiautomatic weapons with large-capacity magazines: total gun murders by state, victims per criminal event involving gun murder, entry wounds per gunshot wound victim, and law enforcement officers killed in action. While these indicators all have logical relationships to use of the banned items, all have difficulties. Total gun murders is an insensitive indicator because attacks with assault weapons and other semiautomatics with large-capacity magazines account for only a fraction of all murders. Other consequences such as victims per event and wounds per victim are more specific to the banned weapons and magazines, as supporters argued during the ban debates, and assault weapons are more disproportionately used in killings of law enforcement officers than in other murders. However, available databases for measuring those impacts are difficult to analyze because they contain such small numbers of cases. And, for all the indicators, the existence of only one full post-ban year in available data may make the estimates too imprecise to discern short-run impacts even if they are large enough to be of policy interest. As a result, our findings about ban effects on consequences are especially tentative.

We anticipated that market effects during the short-term period allowed for this study would be heavily influenced by expectations. Enactment of the ban was preceded by extensive publicity and debate, which afforded time for manufacturers, distributors, retailers, and collectors to speculate that the firearms being considered for ban coverage would eventually become expensive collectors' items. Analogous experience from 1989 seemed instructive, because that year saw both a Federal ban on importation of assault rifles and a California ban analogous to Title XI. During the three months leading up to the importation ban, import license requests for assault rifles, which had numbered 40,000 in 1987 and 44,000 in 1988, swelled 10-fold to an annual rate of 456,000 (AMA Council, 1992). It is not clear how rapidly the import surge flowed through the distribution chain from importers to consumers in the primary and secondary markets. Yet six months later, during the period leading up to a California ban and sentence enhancement, several police agencies reported sharp decreases in criminal use of assault rifles. At the time, observers attributed this seeming paradox to advance publicity that may have left the misimpression that the ban took effect when enacted, judicial anticipation of the enhancements in setting bond and imposing sentence, tips to police from law-abiding gun dealers sensitive to the criminal gun use that motivated the ban, and owners' reluctance to risk confiscation for misuse of their assault weapons, which had become more valuable in anticipation of the ban (Mathews, 1989). However, it is equally plausible that the speculative price increases for the banned weapons in formal markets at least temporarily bid assault weapons

away from ineligible purchasers who would more probably have used them in crimes (Cook and Leitzel, 1996).[8] Whether these short-run conditions would hold for the long run would depend on the extent to which grandfathered guns in the banned categories leaked into secondary markets over time through gun shows, "back door" sales, and thefts.

Therefore, our objectives became to estimate ban-related effects on price, supply responses, and leakage from formal to informal markets; to estimate how these market effects influenced criminal assault weapon use; and to estimate trends in the consequences of that use. In accordance with the statutory study requirement, we placed special emphasis on the use of assault weapons in violent crime and drug trafficking crime wherever available data permitted.

3.2. General Design Strategy

Our general design strategies are to test whether the assault weapon and magazine bans interrupted trends over time in the outcome measures listed above. A variety of techniques exist for this general problem. They differ in terms of desirable qualities such as statistical power, robustness against various threats to the validity of findings, and precision; unfortunately, the techniques with more desirable properties are generally more demanding in terms of data requirements. Because of different data constraints, we employed a variety of methods, including various forms of time series and multiple regression analysis (i.e., pooled, cross-sectional time series analysis, hedonic price analysis, and Box-Jenkins interrupted time series models), simple before and after comparisons, and graphical displays. As a result, our conclusions about some measures are stronger than about others.

Because we anticipated these circumstances, our approach to the Congressional mandate was to conduct a number of small-scale analyses of more-or-less readily available data, then to synthesize the results into our best judgment concerning the impacts of Title XI.[9] We carried out three kinds of analyses of market effects:

- Hedonic price analyses of 1992–96 primary-market price trends for banned semiautomatic firearms, comparable unbanned firearms, and large-capacity magazines, using national distributors' prices;
- Tabular analyses of gun production data through 1994, the latest available year;
- Pre-ban/post-ban comparisons and time series analyses of 1992–96 trends in "leakage" to illegal markets, as measured by guns reported stolen to FBI/NCIC.

We carried out two kinds of analyses of assault weapon use:

- Graphical and tabular analyses of 1992–96 trends in requests for BATF traces of assault weapons recovered in crime, in both absolute terms and as a percentage of all requests;

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[8] While unbanned, widely available, inexpensive semiautomatic pistols made by Lorcin, Davis, and other manufacturers are good (and perhaps superior) substitutes for the banned assault weapons in most criminal uses, they are not substitutes for speculative purposes.

[9] During the project, we abandoned early plans for several additional impact studies that we had contemplated. It proved impossible to analyze trends in enforcement of the ban because of the small numbers of matters referred to U.S. Attorneys and cases filed in U.S. District Court. We were forced to abandon plans to measure secondary-market prices of banned weapons from classified advertisements for two reasons: back issues of consumer classifieds proved unavailable, and the ads describe the weapons too imprecisely for consistent classification. Finally, we dropped plans to analyze multi-city assault weapon use data from the gun module of the Drug Use Forecasting (DUF) program for two reasons. Data exist only for the post-ban period, and we had concerns about the validity of respondents' reports of assault weapon ownership and use.

- Pre-ban/post-ban comparisons and time series analyses of 1992–96 trends in counts of guns recovered in crime by selected local law enforcement agencies.

We carried out the following analyses of the consequences of using assault weapons and semiautomatics with large-capacity magazines in crime:

- An analysis of state-level time-series data on gun murders which controls for potential influences of legal, demographic, and criminological importance;
- Pre-ban/post-ban comparisons and time series analyses of 1980–95 trends in victims per gun-homicide incident as measured nationally from Supplementary Homicide Reports;
- Descriptive analysis of the use of assault weapons in mass murders in the U.S. from 1992-present (see Appendix A);
- Graphical analyses and pre-ban/post-ban comparisons of 1992–96 trends in the number of wounds per gunshot victim using medical data from medical examiners and one hospital emergency department in selected cities, following Webster et al. (1992) and McGonigal et al. (1993);
- A tabular analysis of 1992–96 trends in law enforcement officers killed in action (LEOKA) with assault weapons.

3.2.1. Threats to Validity and Use of Comparison Groups

The validity of the techniques we applied depends on comparisons of trends between meaningful treatment and comparison groups, and we used two approaches to defining comparison groups. In general, to estimate ban effects on markets and uses, we compared trends between types of guns and magazines that were differentially affected by the ban. To estimate effects on the consequences of assault weapon use, we used pre-existing state-level bans on assault weapons and juvenile handgun possession to define comparison groups, because we assumed that such laws would attenuate the effects of the Federal ban.[10]

Table 3-1 describes our general classification scheme for types of guns affected by the ban and the corresponding comparison groups.[11] The comparisons are not always precise, and, as later chapters will make clear, they differ from measure to measure depending on the gun descriptors used in available databases.

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[10] Although in theory, comparisons of markets and uses could be made simultaneously by weapon and jurisdiction, the disaggregation often leaves too little data for meaningful analysis.

[11] To be considered a potential comparison gun, we had to have at least anecdotal evidence that it had appeal beyond the community of sportsmen and collectors and/or evidence that it was among the 50 guns most commonly submitted for BATF traces. Without that constraint, it would have been unreasonable to consider it as being functionally similar to any banned gun, and data on prices and uses would have involved numbers too small to analyze. The trade-off is that the comparison guns may well have been subject to indirect substitution effects from the ban.

Table 3-1. Banned weapons and examples of unbanned comparison weapons

Banned weapon	*Examples of Comparison weapon*
Named Domestic Assault Pistols	
-SWD M-10, M-11, M-11/9, M-12, exact copies under other names, legal substitutes -TEC-9, TEC-DC9,TEC-22, exact copies by AA Arms, legal substitutes	-Lorcin, Davis semiautomatic pistols (less expensive) -Glock, Ruger semiautomatic pistols (more expensive)
Named Domestic Assault Rifles	
-Colt AR-15, exact copies and legal substitutes	-Ruger Mini-14 (unbanned domestic) -Maadi (legal import)
Named Foreign Assault Weapons	
-UZI carbines and pistols -AK models	-SKS (recently restricted, widely available import)
"Features Test" Guns	
Calico Light Weapons pistols and rifles Feather rifles	See pistols and rifles above.
Rare Banned Weapons	
Beretta Ar-70, FN models, Steyr AUG, revolving cylinder shotguns	No comparisons defined.

Of the banned weapons named in Table 3-1, the named domestic assault pistols are of greatest interest because they are more widely used in crime than rifles. We used two categories of pistols as comparison groups: the cheap small-caliber pistols by Lorcin and Davis that are among the most widely used guns in crime, and the more expensive Glock and Ruger pistols. The Glock and Ruger models took on additional significance by serving as indicators of non-banned handguns capable of accepting large-capacity magazines. For the AR-15 family of assault rifles, we used the Ruger Mini-14, SKS, and/or Maadi rifles in various comparisons. All are legally and widely available.

We performed relatively few comparative analyses of named foreign assault weapons, the UZI, Galil, and AK weapons, because the 1989 import ban limited their availability during our observation period, and their legal status was unchanged by the Title XI ban. Nevertheless, because these guns remain in criminal use, we performed price analyses for their large-capacity magazines, which are also widely available from foreign military surplus. The SKS semiautomatic rifle, which was imported from China and Russia in fairly large numbers[12] until recently, served as an unbanned comparison weapon for the banned foreign rifles. We carried out no analyses concerning the rarest assault weapons shown in Table 3-1.

Because few available databases relate the consequences of assault weapon use to the make and model of weapon, most of our analyses of consequences are based on treatment and comparison jurisdictions defined in terms of their legal environments. Four states — California, Connecticut, Hawaii, and New Jersey — already

[12] Although a 1994 ban on Chinese imports of many goods including firearms nominally covered SKS rifles, large numbers continued to enter the country under Craig Amendment exemptions for goods already "on the water" at the time of the import ban.

banned assault weapons before the Federal ban was enacted. Although state bans can be circumvented by interstate traffickers, we hypothesized that their existence would reduce the effects of the Federal ban in their respective states.

The following chapters report findings of the analyses described here. Each chapter also explains in detail the tailoring of this general analysis plan to data constraints associated with each comparison.

4. GUN AND MAGAZINE MARKET EFFECTS

The discussion of gun markets in Chapter 2 led us to several hypotheses. First, assuming that the primary and secondary markets were in equilibrium before Congress took up serious discussion of a ban on assault weapons and large-capacity magazines, we hypothesized that the opening of debate would stimulate speculative demand for the banned guns and magazines, leading to price increases in primary markets well in advance of the effective date of the ban. Second, we hypothesized that for the makes and models of assault weapons whose prices increased, quantities produced would also increase before the ban took effect. These "grandfathered guns" were exempted from the ban.

Having been advised by a gun market expert[13] that legal substitutes for many of the banned weapons appeared in primary markets around the effective date of the ban, it seemed doubtful that the speculative pre-ban price increases could hold under the combined weight of stockpiled grandfathered guns and the flows of new legal substitute models. Therefore, our third hypothesis was that the post-ban prices of banned guns and their legal substitutes would return to their pre-debate equilibrium levels.

We presumed that assault weapons and large-capacity magazines are economic complements, so that, like bread and butter, an increase in the supply of either one should decrease its price and increase the price of the other. Therefore, our fourth hypothesis was that, for the oversupplied assault weapons and legal substitutes whose prices fell from their speculative peaks, their magazine prices[14] should rise over time, as the stock of grandfathered magazines dwindled.

Finally, we believed that for banned makes and models whose prices experienced a speculative price bubble around the time of the ban and then returned to pre-ban levels, speculative demand would fall eventually in both primary and secondary markets as expectations receded for a price "rebound" in primary markets. In contrast, demand by ineligible purchasers intending to use the banned weapons in crime should be relatively unaffected. Therefore, at least in the short run, relative prices should rise in secondary markets, where such "crime demand" is concentrated. We could not directly observe secondary-market prices. However, a price rise in secondary relative to primary markets should cause increased "leakage" to secondary markets, reflected in rising theft reports of assault weapons during post-ban periods of low prices in primary markets.

The following sections report the methods we used to test these hypotheses about market effects of the ban, and our findings.

4.1. FINDINGS OF PRICE ANALYSIS

4.1.1. Collection of Price Data

To test our hypotheses about price trends, we sought to approximate the prices at which the banned items could be legally purchased throughout the country. After considering available data sources, we decided that monthly data would be sufficient and that the distributors' prices advertised in national publications would offer a

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[13] William R. Bridgewater, personal communication, September 1995.

[14] Magazines are make and model-specific, so that in general a magazine made for a specific rifle will not fit other rifles. However, a magazine made for a banned assault rifle like the Colt AR-15 will fit an exact copy like the Olympic Arms AR-15 and a legal substitute like the Colt AR-15 Sporter, which has the same receiver.

suitable index. Those prices are available to any FFL, and, as discussed in Chapter 2, primary-market FFLs generally re-sell within 15 percent of the distributors' price.

To collect the necessary data, we developed two forms. The first was designed to collect data on base price and accessorized price on 47 makes and models of guns. These included all guns named in Subtitle A along with selected legal substitutes and functional substitutes (e.g., low-capacity semiautomatic pistols that are commonly used in crimes). The second form recorded make, model, capacity, and price of any advertised large-capacity magazines. Both forms also recorded the distributors' names and, for verification purposes, a citation to the location of the advertisements.

We selected twelve gun and magazine distributors that had display ads on a monthly basis in *Shotgun News* throughout the entire period from April 1992 through June 1996. This period was selected to permit observation of rumored "Clinton election" price effects (i.e., increased speculative demand based on concern over possible new gun controls under a Democratic administration) as well as the entire period of debate over Subtitle XI and as long a post-ban period as possible. Display ad prices were coded on a monthly basis throughout the period except immediately around the ban, from August 1994 to October 1994, when prices were coded on a weekly basis to maximize statistical power during the period when we expected the largest price variances. The Shotgun News issue to be coded for each month was selected randomly, to avoid any biases that might have occurred if a particular part of the month was coded throughout the period. The number of advertised-price observations for any given gun varied from month to month over the period, as distributors chose to feature different makes and models. The number of price observations for a given make and model bears an unknown relationship to the number of transactions occurring at that price. The advertised prices should be considered approximations for at least three reasons. Advertised prices simultaneously represent wholesale prices to retail dealers and retail prices to "convenience dealers" who hold licenses primarily to receive guns for personal use by mail from out-of-state sources. There is anecdotal evidence of discounts from advertised prices for purchases in large quantities or by long-time friends of the distributors. Finally, the ads did not permit us to accurately record such price-relevant features as finish, included gun cases, and included magazines.

4.1.2. Analysis

Price trends for a number of firearms and large-capacity magazines were analyzed using hedonic price analysis (Berndt 1990, pp.102-149; also see Chow 1967). This form of analysis examines changes over time in the price of a product while controlling for changes over time in the characteristics (i.e., quality) of the product. Hedonic analysis employs a model of the form:

$$Y = a + b * X + c_1 * T_1 + \ldots c_n * T_n + e$$

where Y is the logarithmic price of the product, X represents one or more quality characteristics affecting the price of the product, T_1 through T_n are dummy variables for the time periods of interest, a is an intercept term, and e is an error term with standard properties. The coefficients c_1 through c_n provide quality-adjusted estimates of changes over time in the price of the product.

In the analysis that follows, all price data were first divided by quarterly values of the gross domestic product price deflator as provided in *Economic Indicators* (August 1996). This quantity was then logged. In all models, we have omitted the time dummy for the period when the ban went into effect. Thus, the time coefficients are interpreted relative to the prices at the time of ban implementation. Because the outcome variable is logged, the coefficients on the time period indicators can be interpreted as multiplier effects (we illustrate this in more

detail below). Whenever possible, we examined quarterly price trends. In a number of instances, however, sample size considerations required us to use semi-annual or annual periods.

Our quality variables correspond to factors such as manufacturer, model, distributor, and, in some cases, weapon caliber. In addition, some of the models include an indicator variable denoting whether the firearm had special features or enhancements or was a special edition of any sort.[15] We have used these variables as proxy variables for quality characteristics in the absence of more detailed measures of weapon characteristics. Further, we cannot fully account for the meaning of significant distributor effects. Distributor effects may represent unmeasured quality differentials in the merchandise of different distributors, or they may represent other differences in stock volume or selling or service practices between the distributors.[16] Nevertheless, we included distributor because it was often a significant predictor of price. Thus, our models provide price trends after controlling for the mix of products and distributors advertised during each time period. Finally, the models presented below are parsimonious models in which we have retained only those quality indicators which proved meaningful in preliminary analyses.[17]

4.1.2.1. Gun Prices

For the analysis of firearm prices, we chose groups of weapons based on both theoretical importance and data availability (a number of the guns included on our coding form appeared infrequently in the ads examined by project staff). We examined price trends in banned assault pistols and compared them to price trends for unbanned semiautomatic handguns commonly used in crime. In addition, we analyzed the price trend for the banned AR-15 assault rifle and its variations and compared it to trends for a number of similar semiautomatic rifles not subject to the ban.

Our findings for handguns were consistent with our hypotheses. For the banned SWD group of assault pistols, the average advertised price peaked at the time the ban took effect, having risen from 68 percent of the peak a year earlier; within a year, the mean price fell to about 79 percent of peak. In contrast, advertised prices of unbanned Davis and Lorcin semiautomatic pistols commonly used in crime were essentially constant over the entire period.

Rifle price trends were only partially consistent with our hypotheses. For semiautomatic rifles, prices of both the banned AR-15 family of assault rifles and a comparison group of unbanned semiautomatic rifles showed evidence of speculative peaks around the time the ban took effect, followed by a decrease to approximately pre-speculation levels.

We interpret these findings as evidence of substantial speculative pre-ban demand for guns that were expected to be banned as assault weapons, while the underlying primary market for guns more commonly used in crime remained stable. While no plausible definition of assault weapon was ever likely to include the Davis and

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[15] We note, however, that recording special features of the weapons was a secondary priority in the data collection effort; for this reason, and because the ads do not follow a consistent format, this information may not have been recorded as consistently as other data elements.

[16] We have heard speculations but have no evidence that distributors' prices for a given quantity of a specific gun may be inversely related to the rigor of their verification of purchasers' eligibility.

[17] We eliminated control variables that had t values less than one in absolute value. This generally improved the standard errors for the coefficients of interest (i.e., the coefficients for the time period indicators).

Lorcin pistols, Lenett (1995) describes considerable uncertainty during the Crime Act debate over precisely which rifles were to be covered.

Assault pistols: The analysis of assault pistol prices focused on the family of SWD M10/M11/M11-9/M12 weapons.[18] [19] Our coders did not find enough ads for these weapons to conduct a quarterly price trend analysis; therefore, we examined semi-annual prices. Results are shown in Table 4-1. In general, the M10, M11, and M11/9 models were significantly more expensive than the M12 model and the new PM11 and PM12 models. Models with the Cobray trademark name had lower prices, while weapons made in .380 caliber commanded higher prices. Finally, two distributors selling these weapons had significantly lower prices than did the other distributors.

[18] Over the years, this class of weapons has been manufactured under a number of different names (i.e., Military Armaments Corp., RPB Industries, Cobray, SWD, and FMJ).

[19] Initially, we had also wished to analyze the prices of banned Intratec weapons and their copies. However, project staff found few ads for these guns among the chosen distributors, particularly in the years prior to the ban's implementation.

Table 4-1. Regression of SWD handgun prices on time indicators, controlling for product characteristics and distributors

Analysis of Variance

Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	16	16.26086	1.01630	13.376	0.0001
Error	132	10.02900	0.07598		
C Total	148	26.28986			

Root MSE	0.27564	R–square	0.6185
Dep Mean	0.87282	Adj R–square	0.5723

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	1.00876	0.073205	13.78	0.0001
T1	1	-0.17097	0.130798	-1.307	0.1935
T2	1	-0.29236	0.109943	-2.659	0.0088
T3	1	-0.26949	0.078477	-3.434	0.0008
T4	1	-0.38309	0.086909	-4.408	0.0001
T5	1	-0.1881	0.12957	-1.452	0.1489
T7	1	-0.04368	0.076185	-0.573	0.5674
T8	1	-0.23376	0.108602	-2.152	0.0332
T9	1	0.108787	0.205848	0.528	0.5981
CAL380	1	0.200609	0.06946	2.888	0.0045
DIST 3	1	-0.26216	0.128954	-2.033	0.0441
DIST 5	1	0.331378	0.224065	1.479	0.1415
DIST 6	1	-0.18987	0.059367	-3.198	0.0017
COBRAY	1	-0.18832	0.053756	-3.503	0.0006
M10	1	0.771313	0.131932	5.846	0.0001
M11	1	0.308675	0.057351	5.382	0.0001
M119	1	0.110174	0.077347	1.424	0.1567

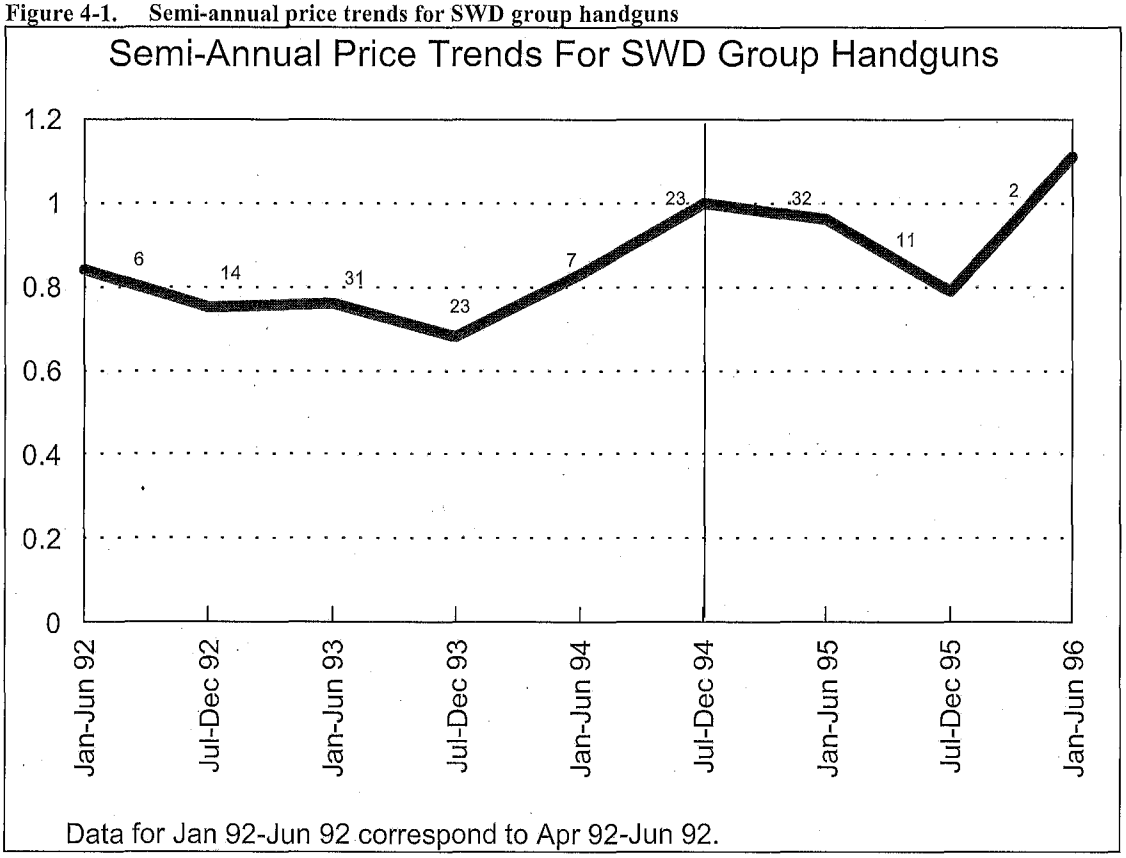
The coefficients for the time indicator variables provide quality-adjusted price trends. The time indicator t6 has been omitted from the equation.[20] This indicator corresponds to the period of July 1994 through December 1994 which encompasses the ban implementation date of September 13, 1994. The coefficients on the time dummy variables are all negative and most are significant, indicating that prices for these weapons were at their highest during the six month period when the ban took effect. To interpret the time variables, we exponentiate the coefficients (i.e., take their antilogs). To illustrate, the coefficient for the first time period (January 1992 through June 1992) is -0.170966.[21] Exponentiating this coefficient yields approximately 0.84, indicating that the average price of these weapons at time 1 (January 1992 through June 1992) was 84 percent of the average price at time 6

[20] In this and all other price analyses, time dummies are defined to omit the time period that includes the effective date of the ban. This restricts the coefficient to 0 and exp(0) = 1. Therefore, the effective date is the reference period for prices in all other periods.

[21] Data collection began with April 1992 issues of Shotgun News. Consequently, the first data point is based on data for April through June of 1992 rather than a full six-month period.

(July 1994 through December 1994). Conversely, the average quality-adjusted price of these firearms was 17 percent less during the January 1992-June 1992 period than during the July 1994-December 1994 period.

Figure 4-1. Semi-annual price trends for SWD group handguns



The time effects are displayed graphically in Figure 4-1 (sample sizes are shown for each time period).[22] During the semi-annual periods prior to the ban's implementation, prices of these weapons ranged from 68 to 83 percent of their price during the period of the ban's implementation. Prices peaked when the ban became effective in the latter part of 1994 and remained high through the first half of 1995. In the second half of 1995, however, the prices dropped off dramatically, falling to levels comparable to the pre-ban period. Prices may have rebounded again during the first half of 1996, but the apparent "rebound" was based on only two advertisements and should be treated very cautiously. If one assumes that wholesale markets were in equilibrium before debates about the ban started, then these data reflect a ban-related, speculative peak of up to 47 percent in price, followed by a decline of about 20 percent. Parenthetically, we note that contrary to some anecdotes, we found no evidence of speculation related to the 1992 election.

Comparison handguns: For comparison, we also examined price trends for a number of unbanned semiautomatic handgun models: the Davis P32 and P380 and the Lorcin L25 and L380. By a number of accounts, these models are among the guns most frequently used in crime (BATF 1995; Kennedy et al. 1996; Wintemute 1994, Chapter 2 supra). Because of small sample size, this model was estimated using semi-annual data spanning from 1992 through 1995. Referring to Table 4-2, two of the handgun models were significantly less expensive than the others, and one distributor offered statistically significant discounts for these guns.

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[22] Sample sizes are defined in terms of number of price observations available during the period. The number of transactions that took place at each recorded price is, of course, unavailable to us.

Table 4-2. Regression of Lorcin and Davis handgun prices on time indicators, controlling for product characteristics and distributors

Analysis of Variance

Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	11	3.60246	0.32750	30.678	0.0001
Error	81	0.86469	0.01068		
C Total	92	4.46716			

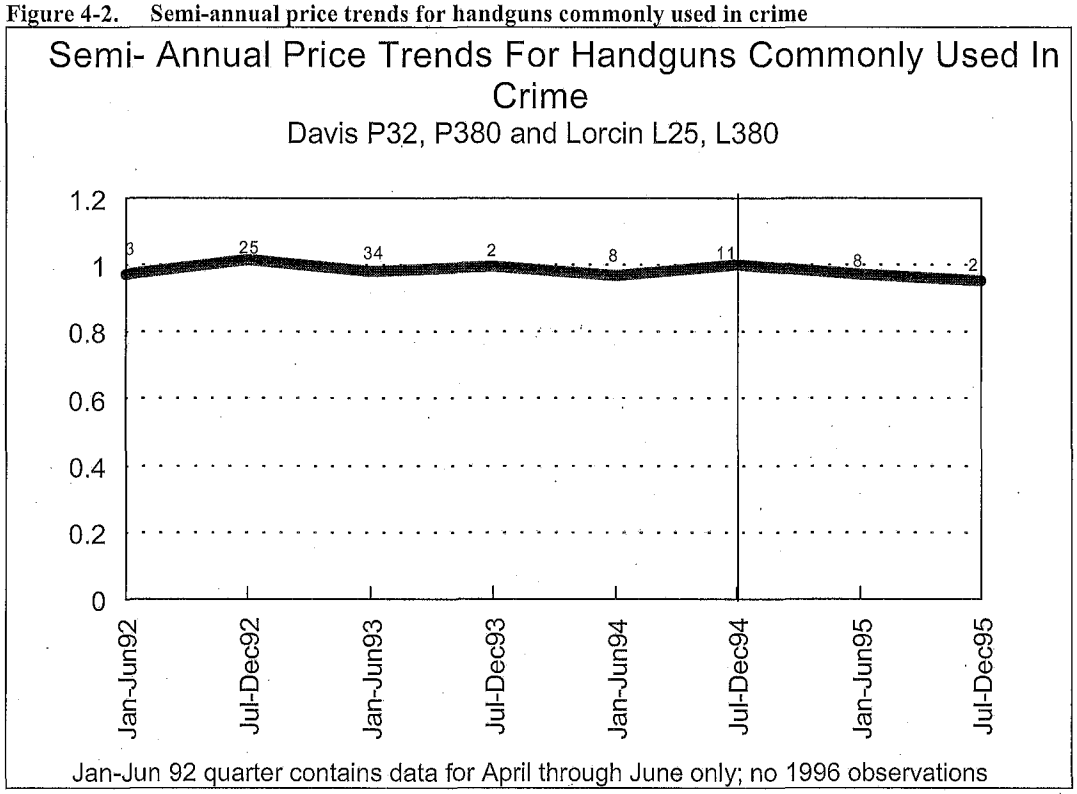
Root MSE	0.10332	R–square	0.8064
Dep Mean	-0.60396	Adj R–square	0.7801
C.V.	-17.10713		

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	-0.44243	0.034043	-12.996	0.0001
T1	1	-0.03004	0.069877	-0.43	0.6684
T2	1	0.014817	0.040258	0.368	0.7138
T3	1	-0.0198	0.037239	-0.532	0.5964
T4	1	-0.00259	0.082314	-0.031	0.975
T5	1	-0.03162	0.048582	-0.651	0.517
T7	1	-0.02753	0.048576	-0.567	0.5724
T8	1	-0.05041	0.082314	-0.612	0.542
P32	1	-0.22559	0.033404	-6.753	0.0001
L25	1	-0.55562	0.034119	-16.285	0.0001
DIST 2	1	-0.06434	0.030256	-2.127	0.0365
DIST 6	1	-0.05723	0.042414	-1.349	0.181

The time period coefficients indicate that prices for these weapons were unaffected by the assault weapons ban. Most of the time dummies have negative signs, but their t score values are very small, indicating that prices during these periods did not differ meaningfully from those at the time when the ban was implemented. This is underscored graphically in Figure 4-2.

Figure 4-2. Semi-annual price trends for handguns commonly used in crime



Assault rifles: To investigate the ban's effect on assault rifle prices, we examined quarterly price trends for the Colt AR15 family, which includes the AR15 as well as Colt's Sporter, H-Bar, and Target models.[23] Referring to Table 4-3, the AR15 model was more expensive than other models. Further, guns which had special features/enhancements or a special designation of some sort had somewhat higher prices. Models in 7.62mm caliber were lower in price than other models, though this effect was not quite statistically significant. Finally, one distributor stood out as having lower prices than other distributors.

[23] A number of other manufacturers also made exact copies of the Colt AR15 (e.g., Essential Arms, Olympic Arms, and SGW Enterprises). We included a number of these copies on our price coding form before the ban and legal substitutes thereafter, but we did not find advertisements for these non-Colt versions in *Shotgun News*.

Table 4-3. Regression of Colt AR15 group prices on time indicators, controlling for product characteristics and distributors

Analysis of Variance

Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	23	21.67729	0.94249	18.161	0.0001
Error	235	12.19537	0.05190		
C Total	258	33.87266			

Root MSE	0.22781	R–square	0.6400
Dep Mean	2.13335	Adj R–square	0.6047
C.V.	10.67826		

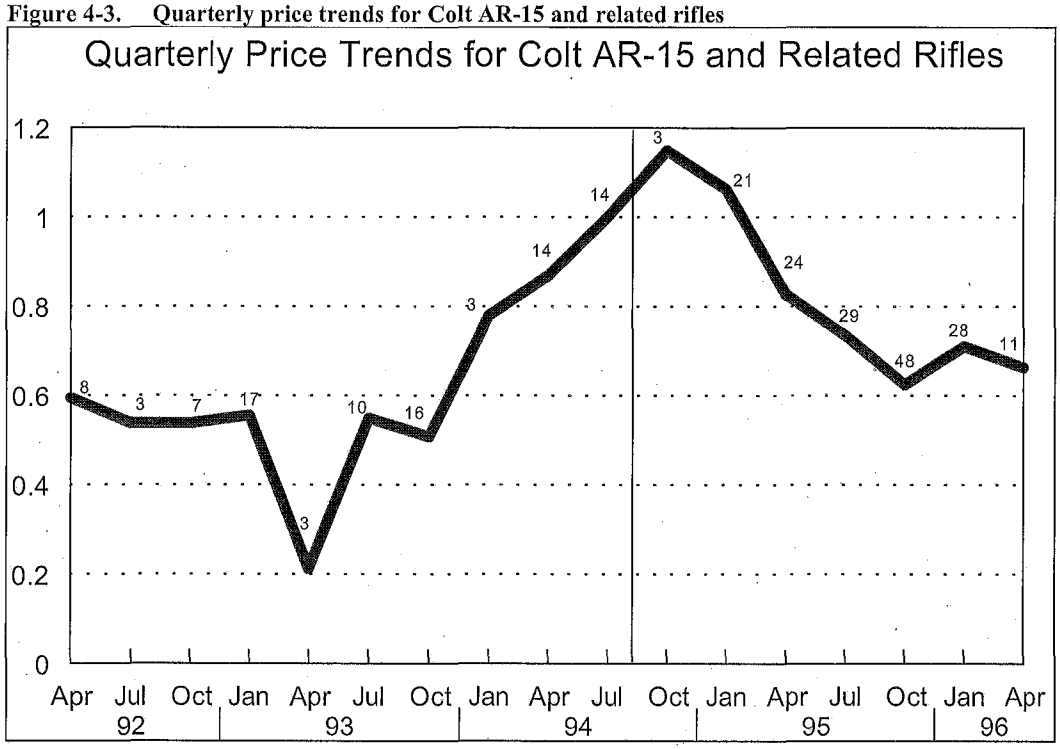
Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	2.714668	0.066599	40.762	0.0001
Q1	1	-0.52079	0.107749	-4.833	0.0001
Q2	1	-0.62023	0.149137	-4.159	0.0001
Q3	1	-0.62368	0.116786	-5.34	0.0001
Q4	1	-0.58506	0.083154	-7.036	0.0001
Q5	1	-1.54569	0.150793	-10.25	0.0001
Q6	1	-0.60339	0.095035	-6.349	0.0001
Q7	1	-0.68488	0.084707	-8.085	0.0001
Q8	1	-0.25158	0.14673	-1.715	0.0877
Q9	1	-0.14066	0.087217	-1.613	0.1081
Q11	1	0.143282	0.148951	0.962	0.3371
Q12	1	0.059189	0.082263	0.72	0.4725
Q13	1	-0.18904	0.07715	-2.45	0.015
Q14	1	-0.3144	0.075984	-4.138	0.0001
Q15	1	-0.46528	0.069595	-6.686	0.0001
Q16	1	-0.33741	0.079461	-4.246	0.0001
Q17	1	-0.40788	0.093078	-4.382	0.0001
DIST 5	1	-0.16586	0.044717	-3.709	0.0003
SPORTERL	1	-0.26691	0.042783	-6.239	0.0001
SPORTERC	1	-0.27709	0.057987	-4.778	0.0001
MATCH H-BAR	1	-0.28594	0.041454	-6.898	0.0001
TARGET	1	-0.30664	0.05565	-5.51	0.0001
FEATURE	1	0.1039	0.040315	2.577	0.0106
CAL762	1	-0.14924	0.092373	-1.616	0.1075

Turning to the quarterly indicator variables, the omitted period is quarter ten (July 1994 through September 1994). Most of the quarterly dummy variables have coefficients which are negative and significant, indicating that prices rose significantly at the time of the ban's implementation. Indeed, prices during the 1992–93 period were 41 to 79 percent lower than those at the time of the ban. The prices then began rising during 1994 and peaked during the quarter after the ban's implementation (however, prices during the latter period were not significantly different from those when the ban went into effect). These data reflect price increase of 69 to 100 percent over typical quarters during the 1992–93 period, and a 376 percent increase over the lowest price quarter during that period.

Quality-adjusted prices began to fall significantly during the second quarter of 1995. During the first two quarters of 1996, prices were 29 to 33 percent less than at the time of the ban.[24] These trends are illustrated in Figure 4-3.[25]

Figure 4-3. Quarterly price trends for Colt AR-15 and related rifles



Other Semiautomatic Rifles: A comparison price series was constructed for a small number of semiautomatic rifles not prohibited by the ban. The rifles selected for this analysis, the Ruger Mini-14 and Maadi rifles are arguably useful substitutes for the banned rifles for many purposes. The Mini-14 is a semiautomatic rifle which is relatively common among guns submitted to ATF for tracing.[26] The Maadi is an Egyptian semiautomatic rifle which is loosely patterned after the AK-47, but it is a legal gun, according to BATF experts.

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[24] Colt has discontinued its AR15 models, but the company has continued to make post-ban, modified versions of other weapons in the AR15 family (e.g., the Sporter). We considered the possibility that the AR15 model would follow a different pre/post ban trend from the other Colt models. Based on the number of available observations, we estimated a yearly model for the AR15. Yearly prices for the AR15 followed the same basic pattern as did the entire AR15 group. Relative to 1994, prices for the AR15 were 57 percent lower in 1993 ($p<.01$), 39 percent lower in 1995 ($p=.02$), and 37 percent lower in 1996 ($p=.06$). In addition, we estimated a model containing dummy variables for the AR15 and the post-ban period and an interaction term between these dummy variables (no other time period dummies were included in the model). The interaction term was very small and insignificant, leading us to include that the price differential between the AR15 model and the other Colt models remained constant throughout the period under study.

[25] Because some quarterly estimates were based on very small numbers of advertisements, the exact values of the quarterly coefficients should be treated cautiously. Nevertheless, a semi-annual model produced the same pattern of results.

[26] Based upon figures provided by ATF, the Mini-14 ranked as the 23rd most common firearm submitted to ATF for tracing in 1992 and the 36th most common firearm submitted in 1993. The Ruger Mini-14 was also featured as a common assault weapon in an early study of assault weapons published by *Cox Newspapers* (1989). However, the Crime Act specifically exempts Mini-14's without folding stocks from assault weapons status.

Further, the Maadi rifle has not been affected by import restrictions as have a number of other potential substitute rifles.

Table 4-4 and Figure 4-4 present trends for prices of these rifles (N=156) measured on a quarterly basis. The Ruger Mini-14 was significantly more expensive than was the Maadi, and a number of distributors had substantially lower or higher prices for these weapons. Guns having some sort of special feature or classification were somewhat less expensive than were other weapons.

Table 4-4. Regression of Ruger Mini-14 and Maadi rifle prices on time indicators, controlling for product characteristics and distributors

Analysis of Variance

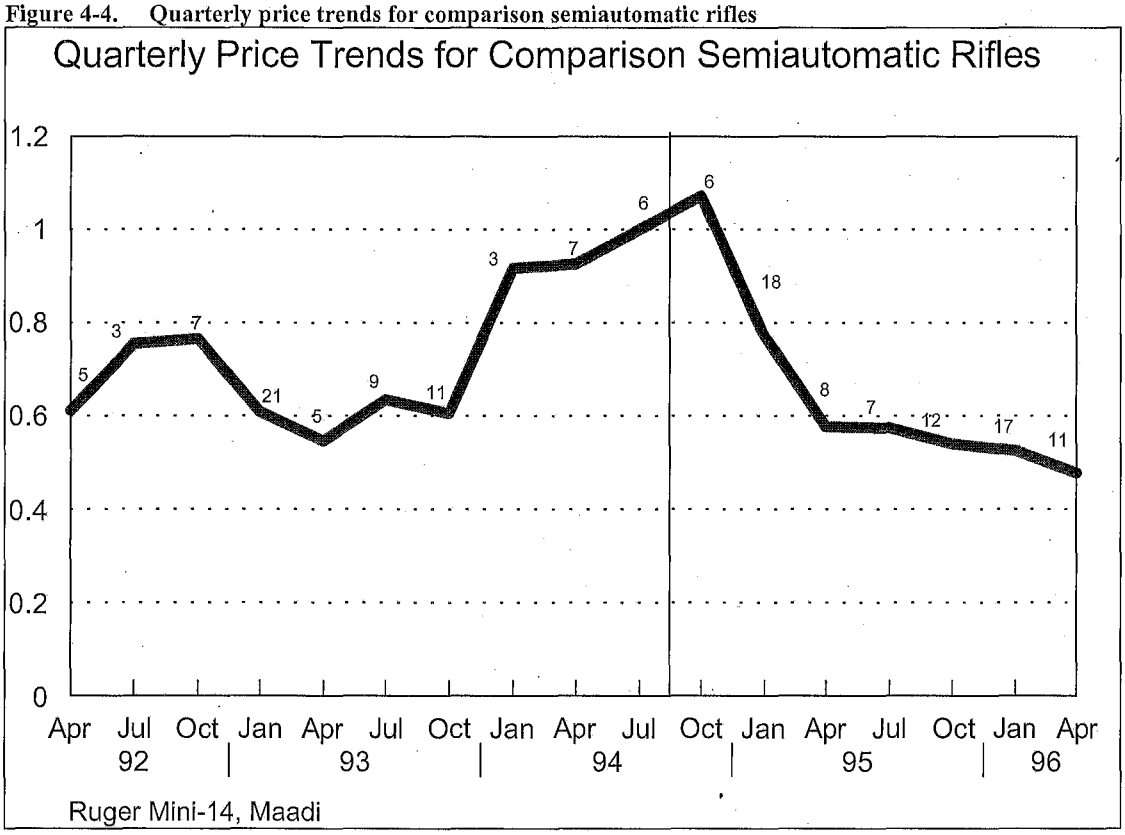
Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	23	15.72251	0.68359	12.468	0.0001
Error	132	7.23741	0.05483		
C Total	155	22.95993			

Root MSE	0.23416	R–square	0.6848
Dep Mean	1.11132	Adj R–square	0.6299
C.V.	21.06999		

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	1.348039	0.096025	14.038	0.0001
Q1	1	-0.49339	0.150985	-3.268	0.0014
Q2	1	-0.28143	0.170394	-1.652	0.101
Q3	1	-0.26618	0.145198	-1.833	0.069
Q4	1	-0.49586	0.1189	-4.17	0.0001
Q5	1	-0.60429	0.149813	-4.034	0.0001
Q6	1	-0.45337	0.12651	-3.584	0.0005
Q7	1	-0.50108	0.123093	-4.071	0.0001
Q8	1	-0.08801	0.166538	-0.528	0.598
Q9	1	-0.07736	0.131103	-0.59	0.5561
Q11	1	0.06801	0.139693	0.487	0.6272
Q12	1	-0.26056	0.114103	-2.284	0.024
Q13	1	-0.55108	0.128193	-4.299	0.0001
Q14	1	-0.5565	0.137519	-4.047	0.0001
Q15	1	-0.61763	0.120067	-5.144	0.0001
Q16	1	-0.64124	0.119303	-5.375	0.0001
Q17	1	-0.73806	0.123765	-5.963	0.0001
RUGER	1	0.672197	0.055061	12.208	0.0001
DIST 2	1	-0.17779	0.079666	-2.232	0.0273
DIST 3	1	-0.08717	0.054575	-1.597	0.1126
DIST 4	1	-1.66399	0.242712	-6.856	0.0001
DIST 5	1	-0.19243	0.0727	-2.647	0.0091
DIST 7	1	0.235402	0.131826	1.786	0.0764
FEATURES	1	-0.08813	0.047131	-1.87	0.0637

Figure 4-4. Quarterly price trends for comparison semiautomatic rifles



The temporal price trends for these weapons mirror those found for the AR15 family rifles. Relative to the period of the ban's implementation, prices were significantly lower during periods before and after the ban's implementation. During 1992 and 1993, prices ranged from 23 to 45 percent lower than during the reference period. Prices were at their highest during 1994, with the peak occurring during the quarter following the ban's effective date, reflecting an increase of 82 percent from the 1992–93 low point to the immediate post-ban period. However, prices for the first, second, and fourth quarters of 1994 were not discernibly different from those during the third quarter. Prices began to fall significantly in 1995, and by the second quarter of 1996, prices were approximately 52 percent lower than during the quarter when the ban took effect.[27]

Alternative Comparison for Semiautomatic Rifles: As a final test of price trends for potential substitute semiautomatic rifles, we added the SKS rifle to the semiautomatic rifles model. The SKS rifle is imported (there are Russian and Chinese versions) and is occasionally mistaken for an AK-47. The SKS was not covered by either the 1989 import ban or the Crime Act. We initially excluded it as a comparison semiautomatic rifle because importation was nominally restricted in 1994 as part of U.S. trade sanctions directed against China. However, SKS rifles have continued to enter the U.S. under the Craig Amendment exemption for goods already "on the water" when the trade sanctions were imposed. We added it to subsequent analysis because it has been relatively

[27] Because some of the quarterly periods yielded few observations, we also estimated a semi-annual model for these gun prices. The results of this model paralleled those of the quarterly model; prices were at their highest during the latter half of 1994 and were significantly lower throughout 1992, 1993, 1995, and early 1996.

common among gun traces submitted to BATF[28] and because our coders found over 550 ads for SKS rifles, making that gun the most frequently advertised weapon in *Shotgun News* from among those guns chosen for the analysis.

Results from a quarterly price trend model for 698 SKS, Ruger Mini-14, and Maadi AK-type advertisements are presented in Table 4-5 and Figure 4-5. Again, the results indicate that prices were highest during 1994 and peaked during the quarter of the ban's implementation (quarter ten). Prices during the 1992–93 period were generally 32 to 25 percent less than they were during the quarter of the ban's implementation. Following the ban, however, prices fell rather quickly, and by 1996 they were approximately 35 percent less than they had been at the time of the ban.

[28] Figures provided to us by BATF show that the SKS was the 10th most common firearm traced in 1992 and the 4th most common in 1993.

Table 4-5. Regression of Ruger Mini-14, Maadi, and SKS rifle prices on time indicators, controlling for product characteristics and distributors

Analysis of Variance

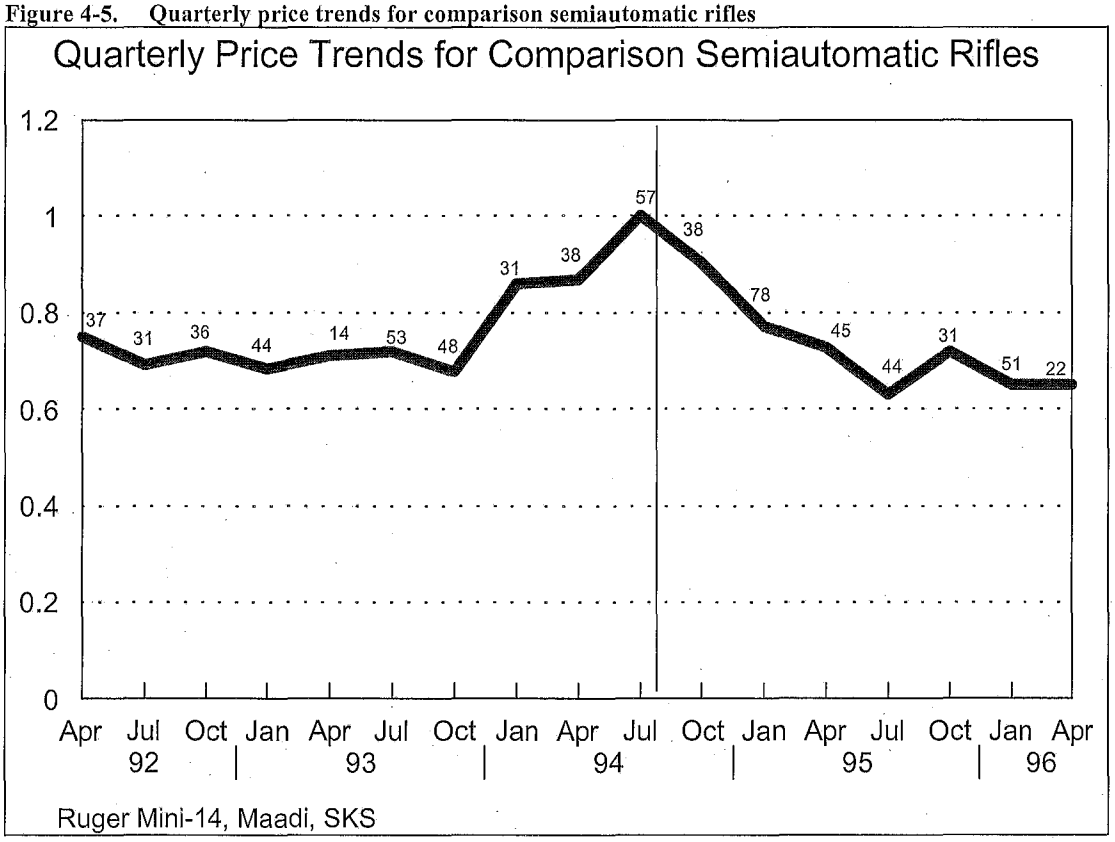
Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	19	145.53206	7.65958	105.960	0.0001
Error	678	49.01094	0.07229		
C Total	697	194.54300			

Root MSE	0.26886	R–square	0.7481
Dep Mean	0.32139	Adj R–square	0.7410
C.V.	83.65546		

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	0.320571	0.037047	8.653	0.0001
Q1	1	-0.29288	0.056985	-5.14	0.0001
Q2	1	-0.36758	0.060234	-6.103	0.0001
Q3	1	-0.32732	0.057937	-5.65	0.0001
Q4	1	-0.37657	0.056037	-6.72	0.0001
Q5	1	-0.33581	0.08099	-4.146	0.0001
Q6	1	-0.32629	0.051373	-6.351	0.0001
Q7	1	-0.39266	0.052767	-7.441	0.0001
Q8	1	-0.15306	0.060298	-2.538	0.0114
Q9	1	-0.13647	0.056349	-2.422	0.0157
Q11	1	-0.09587	0.056591	-1.694	0.0907
Q12	1	-0.25553	0.047168	-5.417	0.0001
Q13	1	-0.32473	0.053753	-6.041	0.0001
Q14	1	-0.457	0.054492	-8.387	0.0001
Q15	1	-0.32702	0.06053	-5.403	0.0001
Q16	1	-0.43303	0.052708	-8.216	0.0001
Q17	1	-0.42588	0.068581	-6.21	0.0001
MAADI	1	0.855348	0.032324	26.462	0.0001
RUGER	1	1.363013	0.036904	36.934	0.0001
FEATURES	1	0.093431	0.02203	4.241	0.0001

Figure 4-5. Quarterly price trends for comparison semiautomatic rifles



4.1.3. Magazine Prices

Since the Crime Act permanently capped the stock of large-capacity magazines at the number produced before September 13, 1994, our long-run expectations about price trends for the banned magazines depend on whether or not the ban prevented increases in the supply of "compatible" guns that accept the magazine. For compatible guns whose supply continued to increase — such as the unbanned Ruger Mini-14 rifle and Glock pistols and the AR-15 family of rifles, for which legal substitutes emerged — we expect a gradual long-run increase in the price of the large-capacity magazines. Only for compatible guns such as Uzi models, whose supply was capped because legal substitutes did not emerge, do we expect stable or declining long-run magazine prices as the operational stock of banned guns gradually declines.

In the short run, which is all we can observe at this time, we expect at least three confounding factors to divert large-capacity magazine prices from these trends. First, as with the banned guns, speculative demand for the banned magazines may have caused prices to rise and then fall around the time of the ban. Second, because guns and magazines are economic complements, their prices may be likely to move in opposite directions. Third, for banned guns such as the AR-15 and Uzi models, which are mechanically identical to military weapons, there are military surplus supplies that we believe are huge relative to civilian demand. For these reasons, short-run price trends are a poor guide to long-run price trends for large-capacity magazines.

With these reservations in mind, we examined price trends for large-capacity magazines (i.e., magazines holding more than 10 rounds) manufactured for use with banned firearms and compared them to trends for large-capacity magazines made for unbanned semiautomatic weapons. Selection of firearm models was based on both theoretical relevance and available sample sizes. To improve the generalizeability of the results, we attempted to

analyze magazine prices for both handguns and long guns and for both banned and non-banned weapons. The methodology for the magazine price analysis was essentially the same as that used in the firearm price analysis.[29] As in the firearm price analysis, our quality control variables consisted primarily of indicator variables corresponding to manufacturers and distributors. An additional key variable for the magazine analysis was the number of rounds held by the magazine (logged).[30]

Assault weapon handgun magazines–Uzi: Our analysis of large-capacity magazines prices for assault weapons focused upon the 9mm Uzi handgun.[31] Though importation of the Uzi handgun had been discontinued in 1993 (Fjestad 1996, p.1049), our coders found ads for Uzi magazines (N=117) more frequently than for other assault weapon handguns.[32] Even so, the number of observations was as low as 1-2 for some quarterly periods, and we therefore grouped the data into semi-annual time periods. There is no legal substitute for the banned Uzis that accepts the same magazine.

Regression results for Uzi magazine prices are presented in Table 4-6 and price trends are displayed in Figure 4-6. Controlling for the number of rounds held by the magazine, semi-annual prices during the January 1992 through June 1994 period ranged from approximately 52 to 62 percent of their value during the latter half of 1994. Prices peaked in the first half of 1995, rising another 56 percent, to a tripling of their 1992–94 lowest prices. Prices began to fall in the latter half of 1995 and the first half of 1996, but they did not differ significantly from prices during the latter half of 1994.

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[29] Project staff recorded information on all advertisements for magazines holding more than 10 rounds which appeared in the selected issues of *Shotgun News*. However, the volume of collected data required us to pursue a data reduction strategy. Based on informal inspection of the hardcopy data, therefore, we chose a group of magazines which appeared relatively more frequently and which had relevance as a banned weapon or legal substitute.

[30] Other potentially important characteristics are whether the magazine was new or used and the type of metal from which the magazine was made. Ads often did not state whether magazines were new or used, and our research staff did not record this information. Our working assumption is that the magazines were new or in good working condition. If an ad featured the same magazine manufactured with different types of metals, we used the base price magazine. If the coding form indicated that the advertisement featured only magazines made from special materials (e.g., stainless steel), we made note of this characteristic. There were very few such cases, and preliminary analyses using an indicator variable for the presence of a special metal showed the variable to have no impact in any of the models discussed in the main text.

[31] The Uzi was previously manufactured and imported to the U.S. in both carbine and handgun versions, but the carbine versions were banned from importation in 1989.

[32] The relative frequency of Uzi magazine advertisements is probably due to the fact that the Uzi is a military weapon. Firearms experts have informed us that good quality, military surplus magazines are commonly available and are often sold cheaply.

Table 4-6. Regression of Uzi large-capacity magazine prices on time indicators, controlling for product characteristics and distributors

Analysis of Variance

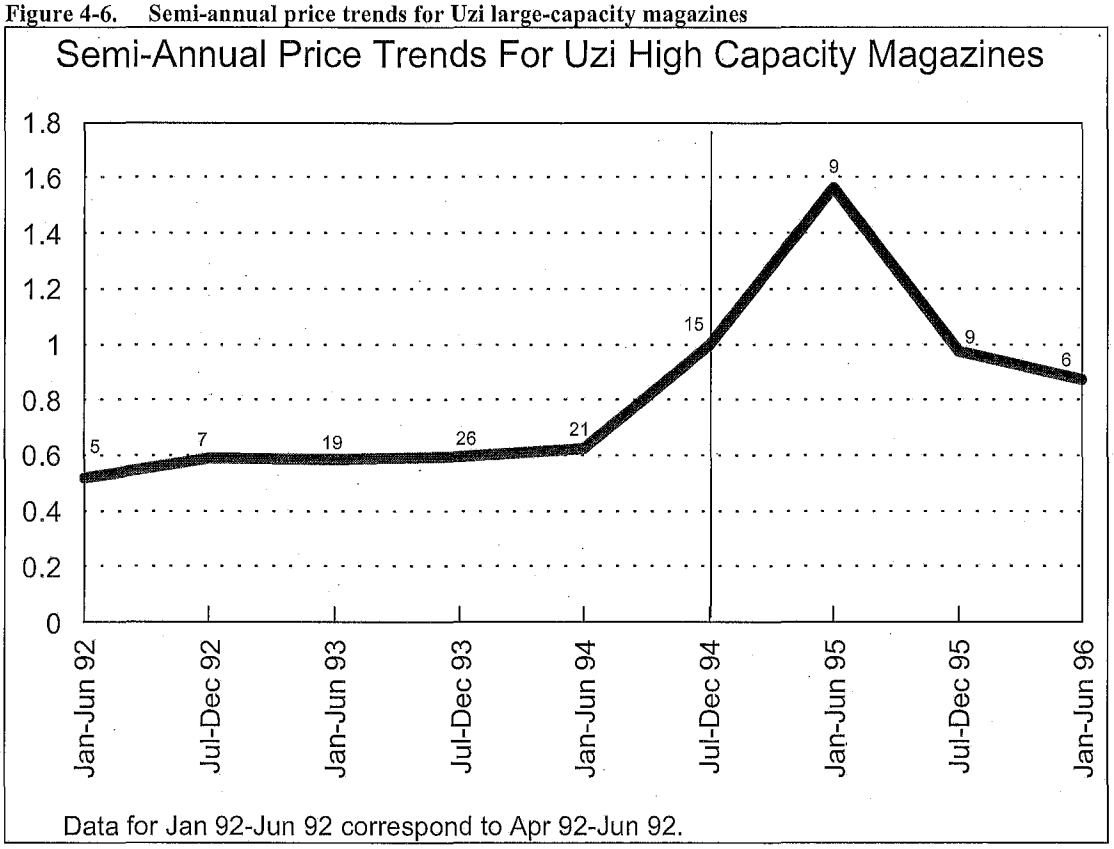
Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	9	12.80484	1.42276	9.670	0.0001
Error	107	15.74298	0.14713		
C Total	116	28.54782			

Root MSE	0.38358	R–square	0.4485
Dep Mean	-1.65739	Adj R–square	0.4022
C.V.	-23.14337		

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	-3.835055	0.54716949	-7.009	0.0001
ROUNDS	1	0.729783	0.15350538	4.754	0.0001
T1	1	-0.661263	0.19914123	-3.321	0.0012
T2	1	-0.525479	0.17560540	-2.992	0.0034
T3	1	-0.536934	0.13325422	-4.029	0.0001
T4	1	-0.515880	0.12659037	-4.075	0.0001
T5	1	-0.474834	0.12970256	-3.661	0.0004
T7	1	0.447430	0.16646042	2.688	0.0083
T8	1	-0.027967	0.16286070	-0.172	0.8640
T9	1	-0.137577	0.18908164	-0.728	0.4684

Figure 4-6. Semi-annual price trends for Uzi large-capacity magazines



Other Handgun Magazines: To provide price trends for large-capacity magazines manufactured for non-banned handguns, we examined large-capacity magazines for Glock 9mm handguns. Prior to the Crime Act, Glock sold several handgun models with large-capacity magazines. The most common, the Glock 17, was among the ten firearm models submitted most frequently to ATF for tracing in 1994 (BATF 1995a). Guns currently manufactured by Glock are capable of accepting Glock's pre-ban large-capacity magazines, but the supply is limited to magazines made before the ban.

Project staff found 74 advertisements for Glock magazines, but the large majority of these ads were placed after the ban (only nine ads were pre-ban) and there were no ads for 1992. It was therefore necessary to group the advertisements into yearly periods rather than quarterly or semi-annual periods. Regression results and price trends for 1993 through 1996 are shown in Table 4-7 and Figure 4-7 respectively. In general, magazines with greater numbers of rounds were more expensive. In addition, a number of distributors had higher prices for these magazines, and magazines for one particular model were more expensive at a moderate level of statistical significance.[33]

[33] For the model dummy variables, the excluded category included magazines for which no model was indicated.

Table 4-7. Regression of Glock large-capacity handgun magazine prices on time indicators, controlling for product characteristics and distributors

Analysis of Variance

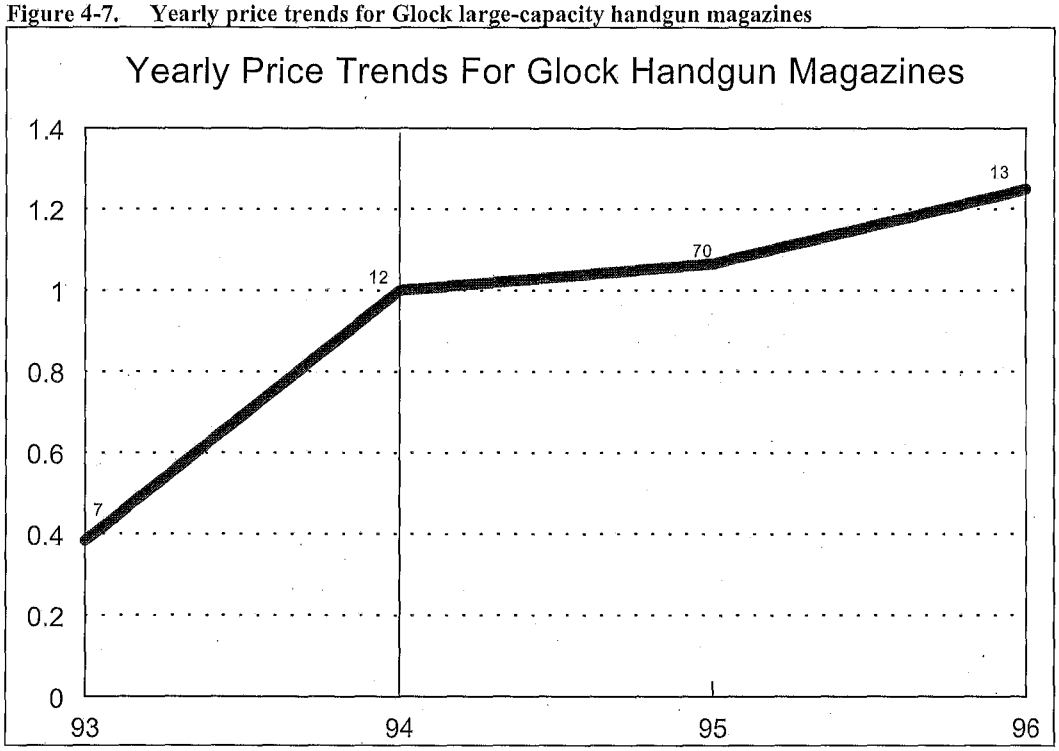
Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	10	29.85755	2.98575	28.020	0.0001
Error	91	9.69680	0.10656		
C Total	101	39.55434			

Root MSE	0.32643	R–square	0.7548
Dep Mean	-0.86656	Adj R–square	0.7279
C.V.	-37.66991		

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	-3.37422	0.56384	-5.984	0.0001
ROUNDS	1	0.618327	0.197724	3.127	0.0024
Y93	1	-0.95884	0.17246	-5.56	0.0001
Y95	1	0.064606	0.108817	0.594	0.5542
Y96	1	0.2227	0.143595	1.551	0.1244
DIST 10	1	0.529244	0.279526	1.893	0.0615
DIST 12	1	0.601322	0.162505	3.7	0.0004
DIST 3	1	0.37606	0.17071	2.203	0.0301
DIST 5	1	0.980483	0.101626	9.648	0.0001
M17	1	0.198804	0.108878	1.826	0.0711
M19	1	0.169323	0.112614	1.504	0.1362

Figure 4-7. Yearly price trends for Glock large-capacity handgun magazines



Most importantly, prices for large-capacity Glock magazines were 62 percent lower in 1993 than they were in 1994. Prices remained high through 1995, and they increased another 25 percent in 1996 (relative to 1994), though this increase was not statistically significant by conventional standards.

Assault rifle magazines — AR15 Family: Pre-ban large-capacity magazines manufactured by Colt for their AR15's and related rifles can be utilized with the post-ban, modified versions of these rifles. Consequently, we expected that there would be a continuing demand for these magazines.

Project staff recorded 364 ads for large-capacity magazines (.223 caliber) made to fit the AR15 and related rifles. Results from our analysis of quarterly price trends for these magazines are shown in Table 4-8 and Figure 4-8. Magazines having larger ammunition capacities were more expensive as were those magazines for which Colt was listed explicitly as the manufacturer.[34] In addition, prices tended to differ significantly between distributors.

During the quarters of 1992 and 1993, prices were anywhere from 33 to 56 percent lower than during the third quarter of 1994. Prices rose further during the last quarter of 1994 and remained high through the first three quarters of 1995. In the last quarter of 1995 and the first quarter of 1996, prices fell though they remained higher than their pre-ban levels. Prices then rebounded in the second quarter of 1996, reaching a peak value comparable to the last quarter of 1995 (prices were approximately 29 percent higher than during the quarter when the ban took effect). Gun market experts have suggested to us that these short-run fluctuations reflect intermittent availability of military surplus M-16 magazines, which are compatible with the AR-15 family of rifles.

[34] Though firearms usually require magazines made by the same manufacturer, a number of manufacturers other than Colt make magazines which can fit Colt rifles.

Table 4-8. **Regression of Colt AR15 group large-capacity magazine prices on time indicators, controlling for product characteristics and distributors**

Analysis of Variance

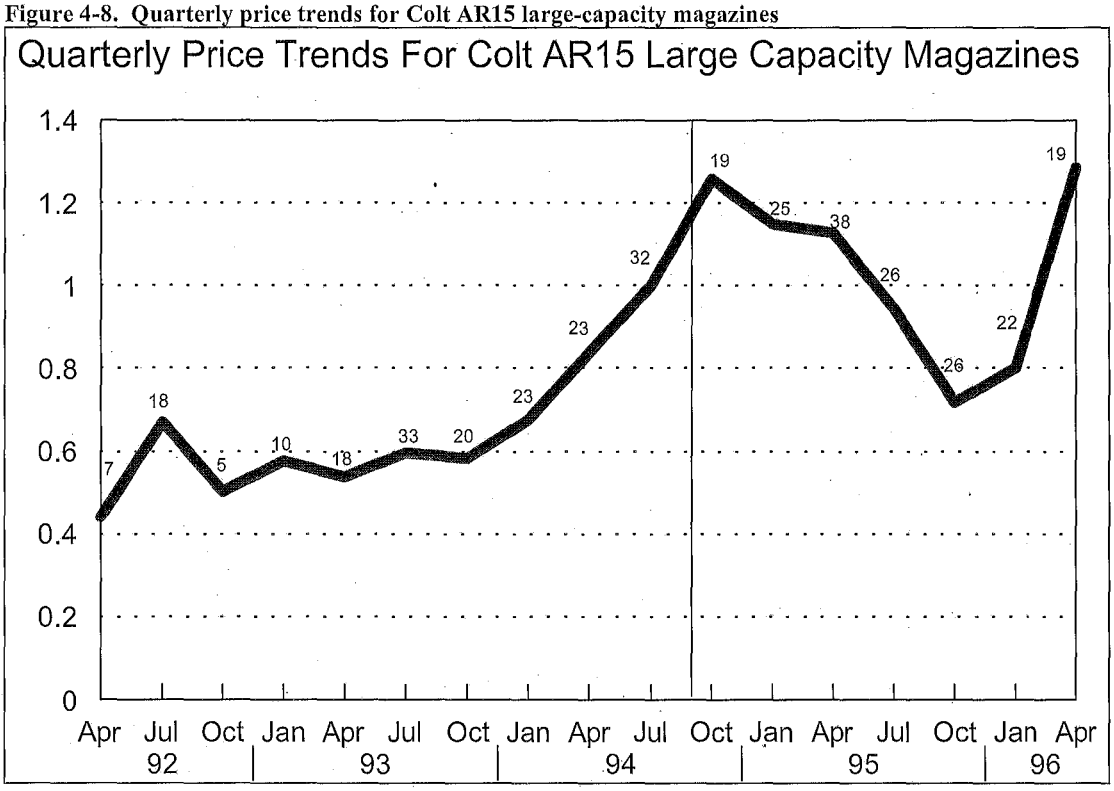
Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	26	122.28012	4.70308	33.836	0.0001
Error	337	46.84153	0.13900		
C Total	363	169.12165			

Root MSE	0.37282	R–square	0.7230
Dep Mean	-1.65183	Adj R–square	0.7017
C.V.	-22.57021		

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	-5.34744	0.194896	-27.437	0.0001
ROUNDS	1	1.025757	0.046243	22.182	0.0001
CLT	1	0.184123	0.063507	2.899	0.004
DIST 2	1	0.385288	0.283893	1.357	0.1756
DIST 3	1	0.10778	0.078807	1.368	0.1723
DIST 4	1	-0.40188	0.129797	-3.096	0.0021
DIST 5	1	0.134623	0.068759	1.958	0.0511
DIST 7	1	-0.41214	0.13435	-3.068	0.0023
DIST 10	1	0.137861	0.080196	1.719	0.0865
DIST 11	1	-0.36298	0.168942	-2.149	0.0324
DIST 12	1	0.215247	0.085722	2.511	0.0125
Q1	1	-0.82099	0.158248	-5.188	0.0001
Q2	1	-0.39767	0.115668	-3.438	0.0007
Q3	1	-0.68998	0.181038	-3.811	0.0002
Q4	1	-0.55199	0.137727	-4.008	0.0001
Q5	1	-0.61893	0.115858	-5.342	0.0001
Q6	1	-0.52304	0.093025	-5.623	0.0001
Q7	1	-0.54396	0.107619	-5.055	0.0001
Q8	1	-0.38921	0.102709	-3.789	0.0002
Q9	1	-0.17713	0.104247	-1.699	0.0902
Q11	1	0.229259	0.11575	1.981	0.0484
Q12	1	0.13716	0.107928	1.271	0.2047
Q13	1	0.115077	0.099774	1.153	0.2496
Q14	1	-0.05869	0.106556	-0.551	0.5821
Q15	1	-0.32639	0.107409	-3.039	0.0026
Q16	1	-0.21758	0.109759	-1.982	0.0482
Q17	1	0.252132	0.117683	2.142	0.0329

Figure 4-8. Quarterly price trends for Colt AR15 large-capacity magazines



Comparison Semiautomatic Rifle Magazines — Ruger Mini-14: Quarterly price regression results for large-capacity magazines made for the Ruger Mini-14 rifle are shown in Table 4-9. Magazines with the Ruger name and larger magazines were more expensive than other magazines.[35] Further, prices differed significantly among distributors.

[35] A number of manufacturers besides Ruger made large-capacity magazines to fit the Mini-14.

Table 4-9. **Regression of Ruger Mini-14 large-capacity magazine prices on time indicators, controlling for product characteristics and distributors**

Analysis of Variance

Source	*DF*	*Sum of squares*	*Mean square*	*F value*	*Prob>F*
Model	26	64.39474	2.4672	34.029	0.0001
Error	303	22.05342	0.07278		
C Total	329	86.44816			

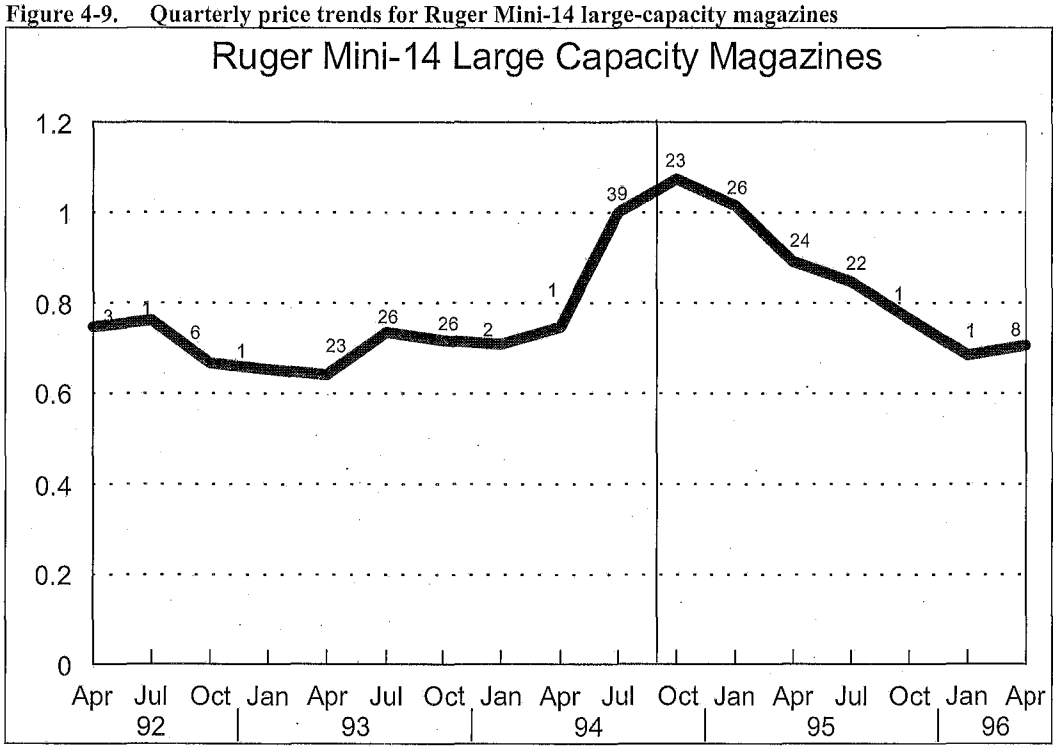
Root MSE	0.26978	R–square	0.7449
Dep Mean	-1.72827	Adj R–square	0.7230
C.V.	-15.61009		

Parameter Estimates

Variable	*DF*	*Parameter estimate*	*Standard error*	*T for H0 parameter = 0*	*Prob>|T|*
INTERCEP	1	-4.41607	0.145547	-30.341	0.0001
ROUNDS	1	0.836435	0.036639	22.829	0.0001
RUG	1	0.264903	0.061061	4.338	0.0001
DIST 2	1	-0.3889	0.17264	-2.253	0.025
DIST 3	1	-0.13012	0.072105	-1.805	0.0721
DIST 4	1	-0.57328	0.126483	-4.532	0.0001
DIST 5	1	-0.40885	0.066235	-6.173	0.0001
DIST 7	1	-0.5319	0.278193	-1.912	0.0568
DIST 10	1	-0.26988	0.074589	-3.618	0.0003
DIST 11	1	-0.1793	0.164002	-1.093	0.2751
DIST 12	1	0.324892	0.094116	3.452	0.0006
Q1	1	-0.29169	0.178205	-1.637	0.1027
Q2	1	-0.27167	0.08733	-3.111	0.002
Q3	1	-0.40486	0.122507	-3.305	0.0011
Q4	1	-0.425	0.082811	-5.132	0.0001
Q5	1	-0.44577	0.073027	-6.104	0.0001
Q6	1	-0.30726	0.070368	-4.366	0.0001
Q7	1	-0.33086	0.069189	-4.782	0.0001
Q8	1	-0.34428	0.074365	-4.63	0.0001
Q9	1	-0.29213	0.078927	-3.701	0.0003
Q11	1	0.071176	0.074263	0.958	0.3386
Q12	1	0.013922	0.07447	0.187	0.8518
Q13	1	-0.11436	0.073432	-1.557	0.1204
Q14	1	-0.1658	0.075341	-2.201	0.0285
Q15	1	-0.26924	0.081055	-3.322	0.001
Q16	1	-0.37783	0.084169	-4.489	0.0001
Q17	1	-0.34628	0.111216	-3.114	0.002

The quarterly indicators in Table 4-9 and the graphic illustration in Figure 4-9 show that quarterly prices prior to the ban were 64 to 76 percent of their level at the time of the ban. By late 1995, prices of these magazines were falling significantly, and by 1996 they had fallen to levels comparable to pre-ban prices.

Figure 4-9. Quarterly price trends for Ruger Mini-14 large-capacity magazines



4.1.4. Summary of Large-Capacity Magazine Price Trends

In summary, short-run price trends for four examples of banned large-capacity magazines appeared to depend on the legal status of the guns they fit, speculative demand for the guns and magazines, and the availability of military surplus magazines. All four magazine prices rose substantially during the period of debate over the ban, reflecting anticipatory demand. However, their price trends diverged substantially after that point. For a banned assault pistol (the 9mm Uzi) for which no legal substitute emerged, the post-ban magazine price fell to a level between its peak and its pre-speculation level and remained there. For a banned rifle (Colt AR-15) for which legal substitutes emerged and the gun price fell sharply after the ban, post-ban magazine prices fluctuated dramatically, apparently because of variations in the availability of military surplus M-16 magazines. For unbanned Glock pistols, whose supply continued to grow, the post-ban magazine price continued to rise throughout the post-ban period, though at a slower rate than during the pre-ban speculation; this is consistent with the expected long-term price trend. Finally, prices for large-capacity Ruger Mini-14 magazines appear to have followed speculative trends similar to those for the rifles themselves.

4.2. PRODUCTION TRENDS

Analyses reported in Section 4.1 found substantial pre-ban price increases for two major categories of assault weapons that were examined: SWD and related handguns (+47 percent), the AR-15 assault rifle family (+69 percent to +100 percent, at minimum). A comparison group of unbanned semiautomatic rifles including the domestically produced Ruger Mini-14 showed a pre-ban price increase of 82 percent. But strikingly, a comparison group of inexpensive Davis and Lorcin semiautomatic handguns showed no discernible price change during the 4-year period that included the effective date of the ban.

In the introduction to this chapter, we hypothesized that weapons whose prices increased during the pre-ban period would also show increases in production. To test that hypothesis, we were able to obtain annual

production data from the Violence Policy Center for three of the four weapon categories above: the SWD, AR-15, and Davis/Lorcin groups.[36] The data extend through 1994, the year of the ban and the last year for which production data are available.

The production data for these three groups are shown in Figure 4-10, Figure 4-11, and Figure 4-12, and they strongly support the hypothesis that pre-ban price speculation was associated with increases in production. As shown there, the SWD and AR-15 groups show substantial increases in production in 1993 and 1994, the years when prices were increasing in advance of the ban. Production increases of similar magnitude appear for two other categories of banned assault weapons that could not be included in the price analysis: the Intratec/AA Arms group, and Calico and Feather Industries rifles, which are banned by the features test.[37] In contrast, the Davis/Lorcin handgun group showed decreased production relative to both 1993 and their 1989–93 average.

Table 4-10 summarizes production data for five typical groups of banned assault weapons and the Lorcin/Davis comparison group of small-caliber semiautomatic pistols. For each weapon type, the table reports 1994 production, average 1989–93 production, and the ratio of 1994 production to the average over the period. On average, 1994 assault weapon production exceeded the 1989–93 average by a ratio of 2.233 during the nine months before the ban took effect. In contrast, 1994 production for the Lorcin/Davis comparison group was only 65.2 percent of the 1989–93 average.

Table 4-10. Production trends for banned assault weapons and comparison guns

Firearm type	*(1) 1994 production*	*(2) 1989–93 average production*	*(3) Ratio [(1)/(2)]*	*(4) "Excess" production [(1)-(2)]*
AR-15 group	66,042	38,511	1.714	27,531
Intratec 9mm, 22	102,682	33,578	3.058	69,104
SWD family (all) & MAC (all)	14,380	10,508	1.368	3,872
AA Arms	17,280	6,561	2.633	10,719
Calico 9mm, 22	3,194	1,979	1.613	1,215
Lorcin, Davis	184,139	282,603	0.652	
Assault Weapon Total*	203,578	91,137	2.233	112,441

*Assault weapon total excludes Lorcin/Davis group

Table 4-10 also displays "excess" production, the difference between 1994 production and 1989–93 average production. Excess 1994 production for the five assault weapon types shown in the table was approximately 112,000, which were added to the stock of grandfathered assault weapons eligible for resale after the ban took effect.

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[36] BATF production data for rifles are not disaggregated by model or caliber. While we could be confident that nearly all Colt's rifles belong to the AR-15 family and could therefore use Colt's rifle production data as an index of AR-15 production, Sturm, Ruger produces too many rifles besides the Mini-14 for us to have a reliable index of Mini-14 production.

[37] It may be of interest that the Intratec, SWD, and Calico/Feather groups, but not the AR-15 group, also had production peaks in 1989, the year of the assault weapon import ban.

Figure 4-10. Annual production data, Colt and Olympic Arms AR-15 type (years with complete data only)

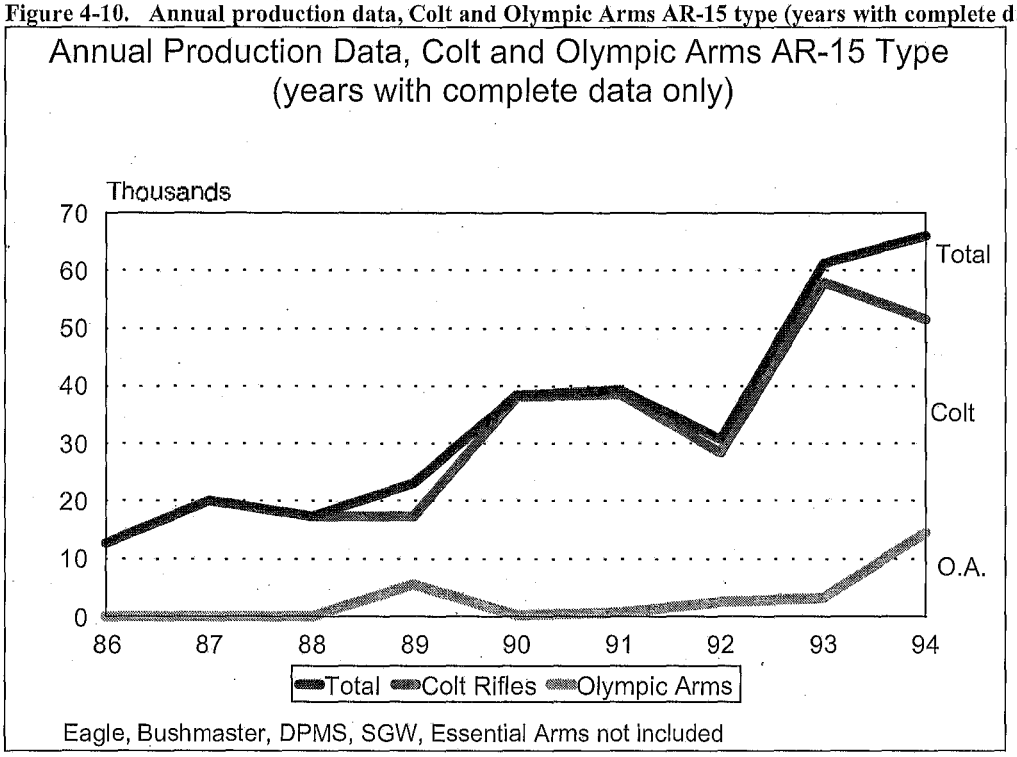

Figure 4-11. Annual production data, SWD group (missing data in some early years)

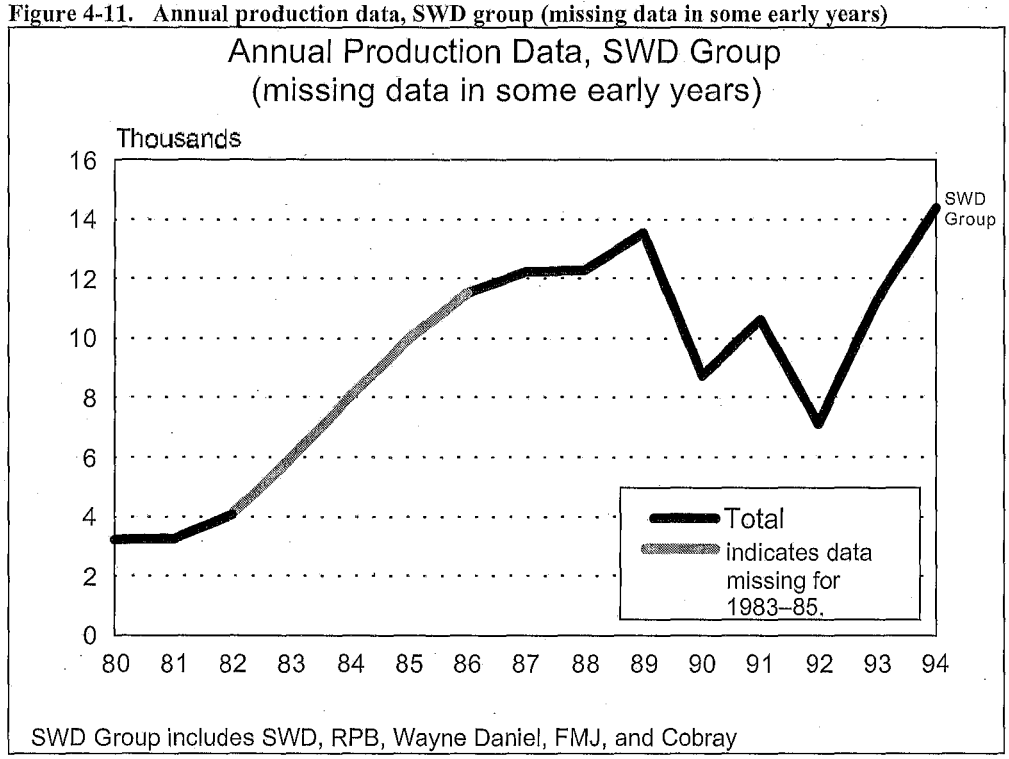

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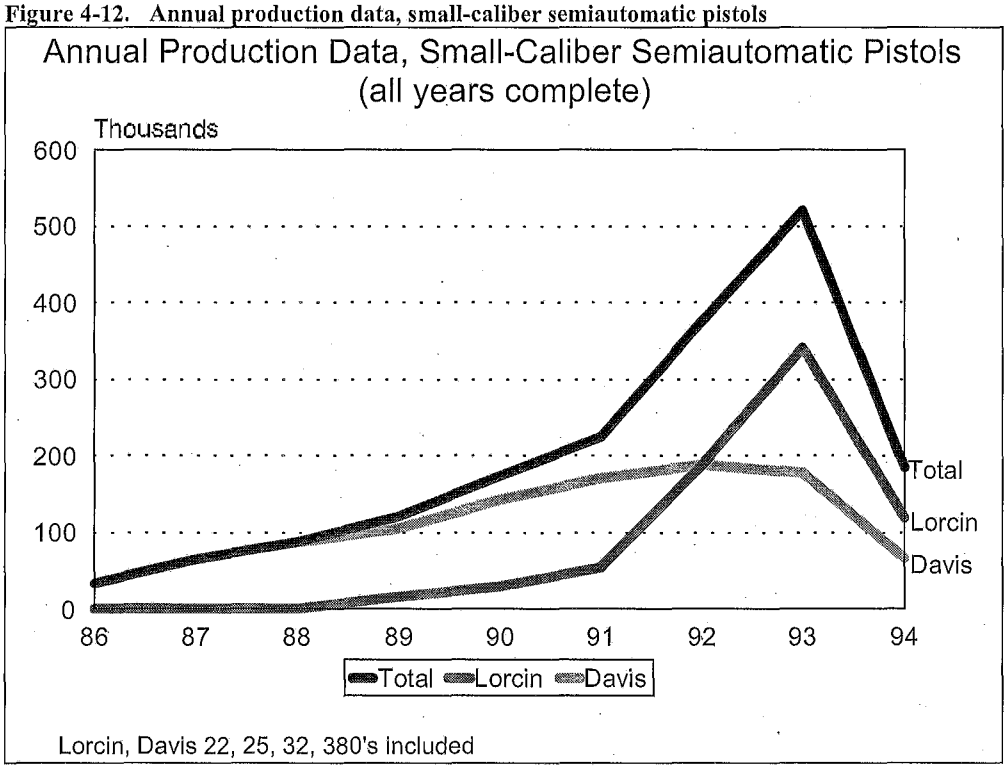
Figure 4-12. Annual production data, small-caliber semiautomatic pistols



4.3. UNINTENDED CONSEQUENCES: GUN THEFTS AND "LEAKAGE"

4.3.1. Introduction

As a final consideration of the ban's impact on gun markets, we investigated trends in stolen firearms. Given the boom in production of the banned weapons prior to the assault weapon ban, there would appear to be a substantial stockpile of banned weapons, some of which may "leak" from gun dealers and carriers into the hands of criminals and other violence-prone individuals after the ban through a combination of recorded transfers, unrecorded transfers, and thefts.

Indeed, we hypothesized that the Crime Act might have the unintended consequence of increasing reported thefts of the banned weapons for two reasons. Short-term price increases in primary markets might temporarily keep assault weapons from entering the sales distribution channels to criminals, who might be tempted to steal them instead. In addition, dealers who had paid high speculative prices for grandfathered assault weapons around the time of the of the ban but then suffered the post-ban price decline prices might be encouraged to sell their to ineligible purchases and then report the weapons as stolen to BATF, who in turn would enter them into the Federal Bureau of Investigation's national database on stolen firearms. Our tests of these hypotheses had to recognize that any observed rise in assault weapon thefts could be due, at least in part, to new theft reporting requirements established for firearm dealers by Subtitle C of Title XI. In the sections below, we describe the tests and findings.

4.3.2. Data and Analysis Strategy

Since 1967, the Federal Bureau of Investigation has stored law enforcement agency reports of stolen and recovered guns in a database maintained by the National Crime Information Center (NCIC). This database contains records on guns which have been reported stolen to participating agencies. It also includes a relatively small number of guns which have been recovered by law enforcement agencies but which have not been reported stolen to the FBI. The latter category of guns accounts for about 6 percent of the guns in the database, and we removed them from our analysis. Weapons which are stolen and later recovered are removed from the database by the NCIC. Thus, the file contains only guns which have been stolen and not recovered. Among other items, the database contains entries for the following: the date the gun was reported stolen ; the weapon type, make, model, caliber, and serial number of the gun; and the agency to which the weapon owner reported the theft.

For our analysis, we utilized data on guns stolen between January 1992 and May 1996. Our analysis of assault weapon thefts focused upon our select group of domestic assault weapons. Unfortunately, weapon model is missing for the majority of the records in the file. Therefore we used the following operational definitions to approximate thefts of assault weapons and other guns:[38]

1) Colt AR15 group: all .223 caliber firearms made by Colt, Eagle, Olympic/SGW, Essential Arms, Bushmaster, and Sendra.

2) Intratec group: all 9mm and .22 caliber semiautomatic weapons made by Intratec and all 9mm semiautomatic handguns made by AA Arms.

3) SWD group: all 9mm, .380, and .45 caliber semiautomatic weapons made by SWD, Ingram, Military Armaments Corp., and RPB Industries.

4) Features test group: all semiautomatic handguns and rifles made by Calico and all 9mm and .22 caliber semiautomatic rifles made by Feather.

5) Non-banned large-capacity handguns: Based on the relative frequency of the Glock 17 and Ruger P89 among guns traced by BATF (see Chapter 2), we used Glock and Ruger 9mm semiautomatic handguns to operationalize this count.

4.3.3. Trends in Stolen Assault Weapons

Statistics in Table 4-11 show that the number of assault weapons reported stolen per month was higher during the post-ban period than during the pre-ban period. These figures combine all of the assault weapons in our select group. As is shown in

[38] We arrived at these operational definitions by examining the varieties of gun types, makes, models, and calibers contained in the *Blue Book of Gun Values* (Fjestad 1996). The largest approximation error is probably that Group 2 includes the Protect .22, which is not banned and does not accept large-capacity magazines.

Figure 4-13, this post-ban increase continued an upward trend which began before the assault weapon ban. Interpreting the raw numbers of assault weapons thefts is problematic even with time series methods, however, because the Subtitle C theft reporting requirement for FFL's may have caused an artificial increase in reported thefts. The monthly average of total reported gun thefts did increase from approximately 11,602 for the January 1992 through August 1994 period to 12,806 during the September 1994 through May 1996 period, although we did not make systematic attempts to explain the increase.

Table 4-11. Pre-ban (Jan. 1992-Aug. 1994) to post-ban (Sept. 1994-May 1996) changes in counts of stolen assault weapons and unbanned semiautomatic handguns capable of accepting large-capacity magazines

Stolen gun type	***Pre-ban monthly mean***	***Post-ban monthly mean***
Assault weapons	2,334	2,642
Unbanned large-capacity semiautomatic handguns	235	343

Table 4-12. Pre-ban (Jan. 1992-Aug. 1994) to post-ban (Sept. 1994-May 1996) changes in ratios of stolen assault weapons and unbanned semiautomatic handguns capable of accepting large-capacity magazines

		Pre-ban	***Post-ban***	***Change***
Ratio:	Assault weapons ÷ automatic and semiautomatic guns	.449	.463	+3%
Ratio:	Unbanned large-capacity semiautomatic handguns ÷ All semiautomatic handguns	.054	.073	+35%

To control for possible confounding effects of the Subtitle C reporting requirement, we examined assault weapon thefts as a proportion of all reported thefts of semiautomatic and automatic weapons. A post-ban increase in this proportion would suggest a rise in assault weapon thefts which occurred independently of any Subtitle C effect. We used semiautomatic and automatic weapons as our baseline rather than all reported thefts in order to control for changes in the composition of the gun stock; semiautomatic firearms, of which assault weapons are a subset, have grown dramatically since the late 1980s as a share of the firearms market. Relatedly, some law enforcement personnel have suggested to us that gun theft victims are more likely to report thefts of recently purchased firearms because it is easier for victims to assemble information necessary for a theft report (such as serial numbers) when dealing with a newer firearm. Finally, expressing assault weapons as a proportion of semiautomatic/automatic weaponry may correct potential bias stemming from the NCIC's removal of recovered weapons from their data system. Some evidence suggests that semiautomatic handguns tend to move more quickly from retail sale to crime than do other firearms (Kennedy et al. 1996). If this process works the same way for the time from theft to use in crime and recovery by police, then assault weapons and other semiautomatic firearms may tend to drop out of the system at a faster rate than other firearms.

Figures in Table 4-12 reveal that between 1992 and 1996 automatic and semiautomatic assault weapon thefts increased only very slightly (about 3%) as a proportion of thefts of rapid fire weapons. A contingency table chi-square test indicated that this was a statistically significant increase ($p<.01$).[39] However, an interrupted time series analysis of monthly trends (see Figure 4-14) failed to provide any strong evidence that the ban caused a change in the proportion of semiautomatic/automatic firearm thefts involving assault weapons.[40] Either way, the relative Increase in assault weapon thefts appears to have been very modest.

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[39] The proportion of semiautomatic/automatic gun thefts accounted for by assault weapons is strikingly large in light of the generally low prevalence of these guns among confiscated and traced weapons. Due to the manner in which we approximated assault weapon thefts, our figures probably overstate assault weapon thefts to some degree. In addition, BATF agents have suggested to us that assault weapon thefts may be more likely to be reported to NCIC than thefts of other firearms due to owners' insurance claims on assault weapons and owners' concerns about how stolen assault weapons may be used.

Errors in the data submitted by law enforcement agencies may also be relevant. The NCIC uses character and numeric codes to identify manufacturers, weapon types, and calibers. To assess coding error in the data, we ran a number of crude reliability tests with guns made by selected manufacturers. To illustrate, if a particular handgun manufacturer makes only semiautomatic handguns, one can examine all guns made by that company which appear in the database and determine what percentage were coded as weapon types other than semiautomatic handguns. If 5% of the guns produced by this manufacturer have other weapon type codes, then the manufacturer and/or weapon type must be incorrect for that 5% of cases.

We chose guns made by Davis Industries and Intratec for our tests. Davis Industries makes only derringers and semiautomatic pistols (Fjestad 1996, pp.412-413). Davis derringers are made in .22, .25, .32, .38, and 9mm calibers. The company's semiautomatic pistols are produced in calibers .32 and .380. Of the several thousand guns in the data coded as Davis Industries firearms, about 10% were coded as weapon types other than derringers or semiautomatic handguns (most of these were coded as revolvers). Virtually 100% of the Davis Industries derringers had calibers in the proper range, as did 95% of the semiautomatic handguns.

Intratec, a prominent maker of assault weapons, makes derringers in .38 caliber and produces semiautomatic handguns in .22, .25, .380, .40, .45, and 9mm calibers (Fjestad 1996, pp.577-579). Approximately 89% of the several thousand guns coded as Intratecs were coded as semiautomatic handguns or derringers. Nearly 100% of the Intratec semiautomatic handguns had caliber codes in the proper range, while 97% of the derringers had the proper caliber.

In light of the various coding errors which are present in the NCIC data, we constructed our counts of assault weapons and semiautomatic/automatic guns using a broad array of weapon type codes corresponding to various semiautomatic and fully automatic weapon types. The analyses described above seem to indicate that errors in the numerator and denominator of our assault weapon measure are roughly proportional. Finally, our analysis assumes that any biases in the data resulting from the various issues discussed above have remained relatively constant from the pre-ban to post-ban periods.

[40] Due to ambiguity regarding the form of the ban's hypothesized impact on assault weapon thefts, we tested a number of impact models (see McCleary and Hay 1980). The temporary increase in assault weapon prices which occurred around the time of the ban may have raised the incentive for criminals to steal assault weapons, thereby creating an abrupt, temporary impact on thefts of assault weapons. However, an abrupt temporary impact was inconsistent with the data.

The eventual fall in assault weapon prices, on the other hand, could have increased the incentive for dealers to "leak" the guns to illegitimate buyers. The gradual decline of assault weapon prices documented in the price analysis would suggest a gradual, permanent impact on assault weapon thefts. However, an abrupt, permanent impact also seems plausible. Further, abrupt, permanent impact models are less demanding on the data and sometimes provide a better fit and more accurate results even when the true form of the impact is not of this type (see McDowall et al. 1996). In this case, a gradual, permanent impact model yielded insignificant results and provided a worse fit to the data than did an abrupt, permanent impact model.

Assessment of the abrupt, permanent impact model was complicated by the presence of an outlier observation corresponding to March 1993, during which time there was an unusually low proportion of thefts involving assault weapons (see Figure 4-14). We therefore estimated models with and without this observation. In the first model, we retained the outlier observation and logged the data series. This model suggested that the ban produced a moderately significant ($p<.10$) positive impact on the proportion of semiautomatic/automatic gun thefts that involved assault weapons. (After adding the intervention component, this model did not require any autoregressive or moving average parameters for the noise component). When the outlier observation was removed, however, the model failed to yield evidence of an impact from the ban. (The noise

component for this model included a fourth order autoregressive subset model [see SAS Institute 1993] in which all parameters except the fourth were set to zero).

Figure 4-13. Stolen assault weapons count, January 1992–May 1996

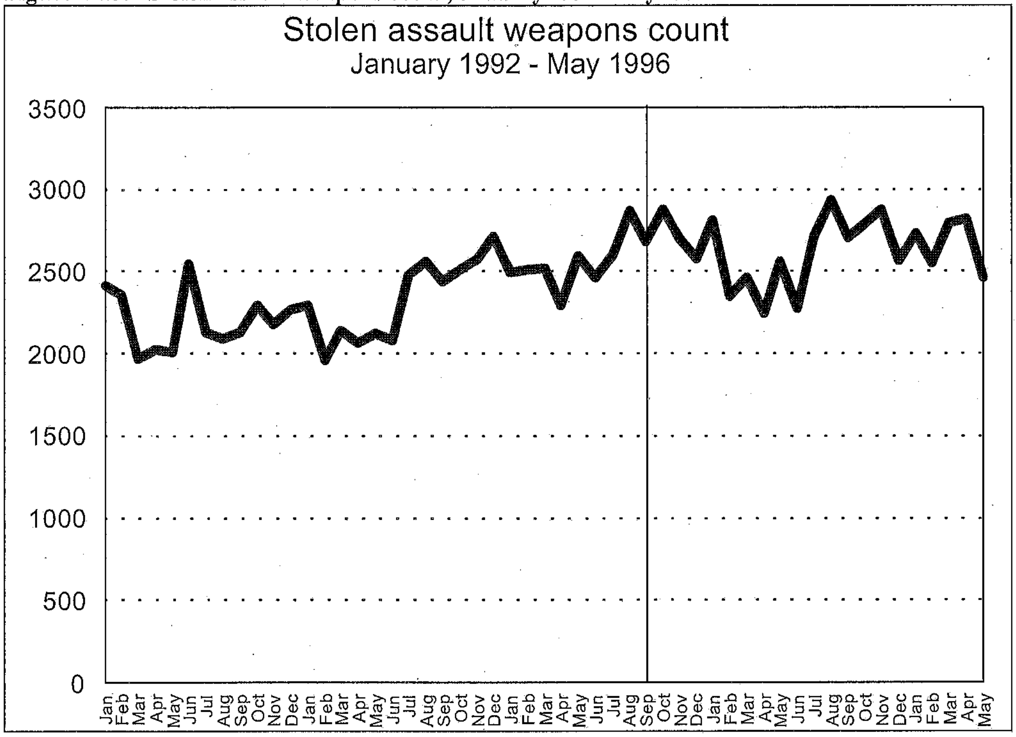
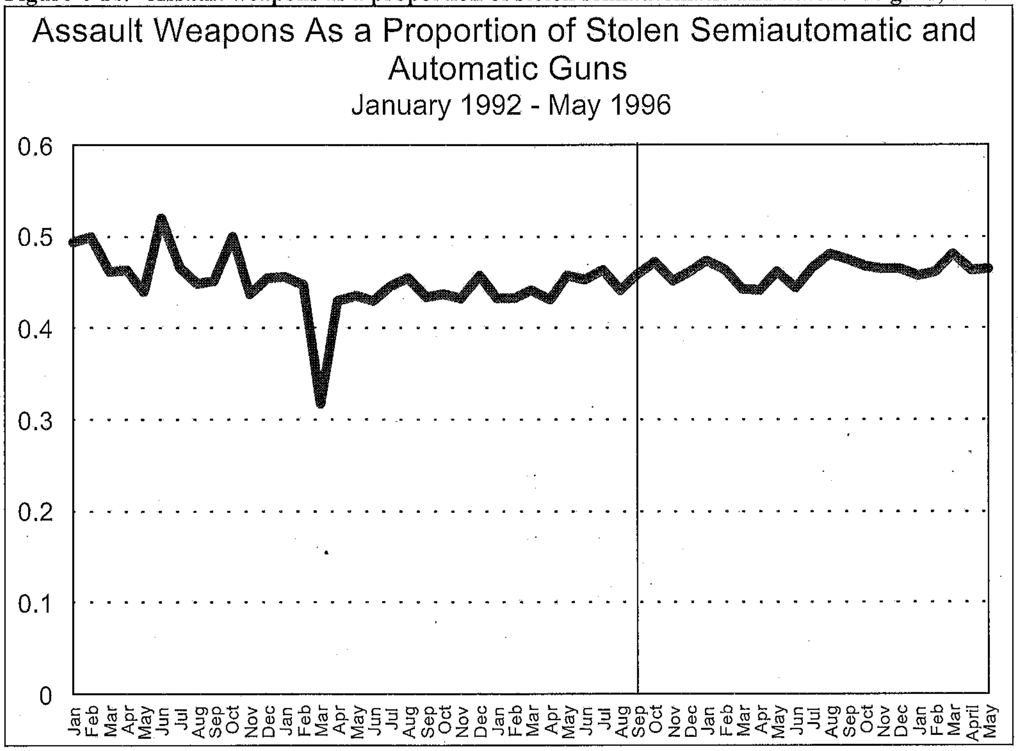


Figure 4-14. Assault weapons as a proportion of stolen semiautomatic and automatic guns, January 1992–June 1996



Additional analyses (not shown) revealed that the assault weapon trends were driven entirely by assault pistols. Thefts of the AR15 group weapons, for example, were rather few in number both before and after the ban, and they decreased both in numbers and as a proportion of stolen weapons during the post-ban months.

4.3.4. Trends in Thefts of Non-Banned Semiautomatic Handguns Capable of Accepting Large-capacity Magazines

In another set of analyses, we investigated whether the ban affected thefts of non-banned semiautomatic handguns capable of handling banned, large-capacity magazines. A number of effects seem plausible. If the magazine ban has been effective in decreasing the availability of large-capacity magazines, one might hypothesize a decrease in offenders' demand for handguns capable of accepting these magazines and a decrease in thefts of these weapons from primary-market dealers and eligible owners. Alternatively, if a similar decrease in the demand for these guns drove down their prices in the primary market, it might increase the incentive for dealers to leak the guns to the illegal market and report the guns as stolen or missing. However, recent years' Blue Book values for Glock pistols suggest that their primary-market prices have been quite stable, when adjusted for inflation. Therefore, if these magazines are still widely available in secondary markets, some offenders might desire to substitute unbanned large-capacity handguns for banned assault weapons. In that case, we might also expect to see a rise in thefts of these guns.

Average monthly thefts of these weapons were higher in the months following the ban (Table 4-11). Moreover, thefts of these guns increased by about a third during the post ban period as a fraction of all semiautomatic handgun thefts (Table 4-12).. However, Figure 4-15 and Figure 4-16 show that thefts of these guns were trending upwards in both numbers and as a proportion of semiautomatic handgun thefts both before and after the ban. A time series analysis did not provide conclusive evidence that handguns accepting large-capacity magazines increased significantly after the ban as a fraction of semiautomatic handgun thefts.[41] (We did not employ contingency table chi-square tests due to the clear upward trend in this variable.) At any rate, the Crime Act does not appear to have decreased criminal demand for these guns, as approximated by theft reports.

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[41] We tested a variety of potential impact forms for this time series, though we considered an abrupt, permanent impact or a gradual, permanent impact to be most plausible in light of the steadily increasing prices for Glock magazines documented in the price analysis. A model with an abrupt, permanent intervention component and a first order autoregressive process for the noise component provided an adequate fit to the data. However, this model yielded an impact estimate virtually identical to the change in the proportion measure shown in Table 4-12 (an increase of approximately one third). In light of the clear pre-ban upward trend in this measure shown in Figure 4-16, we find this effect to be implausible and suspect that the data series is too short to provide a rigorous test of the ban's impact using this methodology.

We ran a crude alternative test in which we regressed the proportion measure on a time trend and a pre-ban/post-ban indicator variable. The time trend variable was significant, while the post ban variable suggested a positive, but statistically insignificant, increase of about 7% in the proportion measure.

Figure 4-15. Stolen unbanned large-capacity semiautomatic handgun counts, January 1992–May 1996

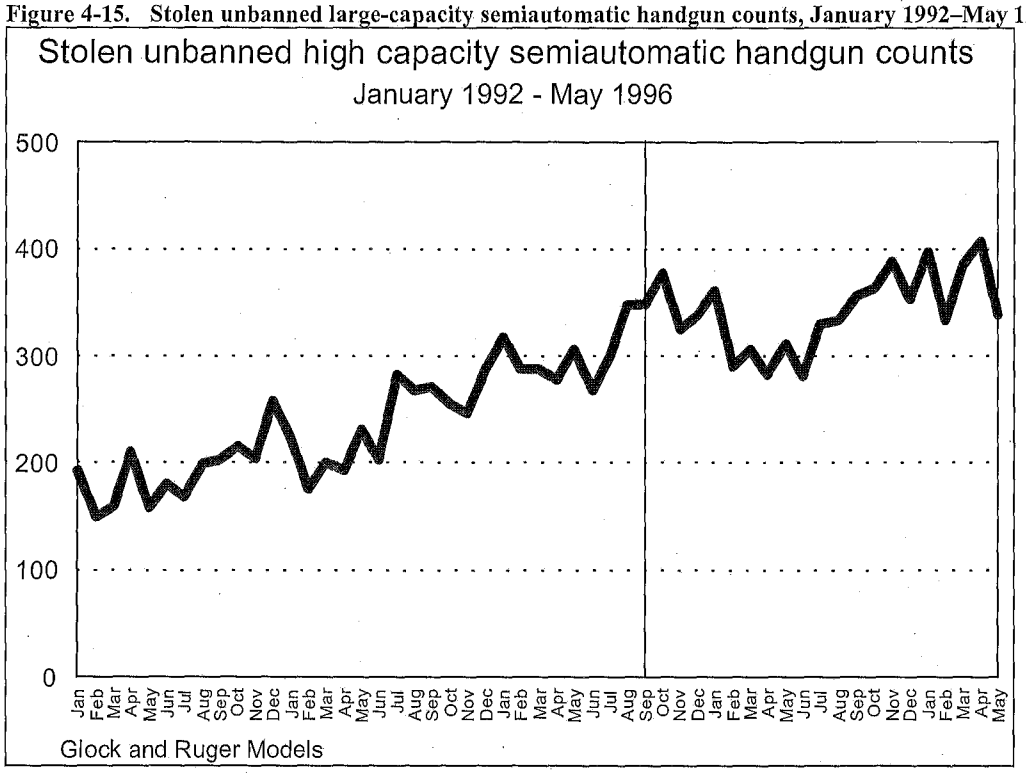
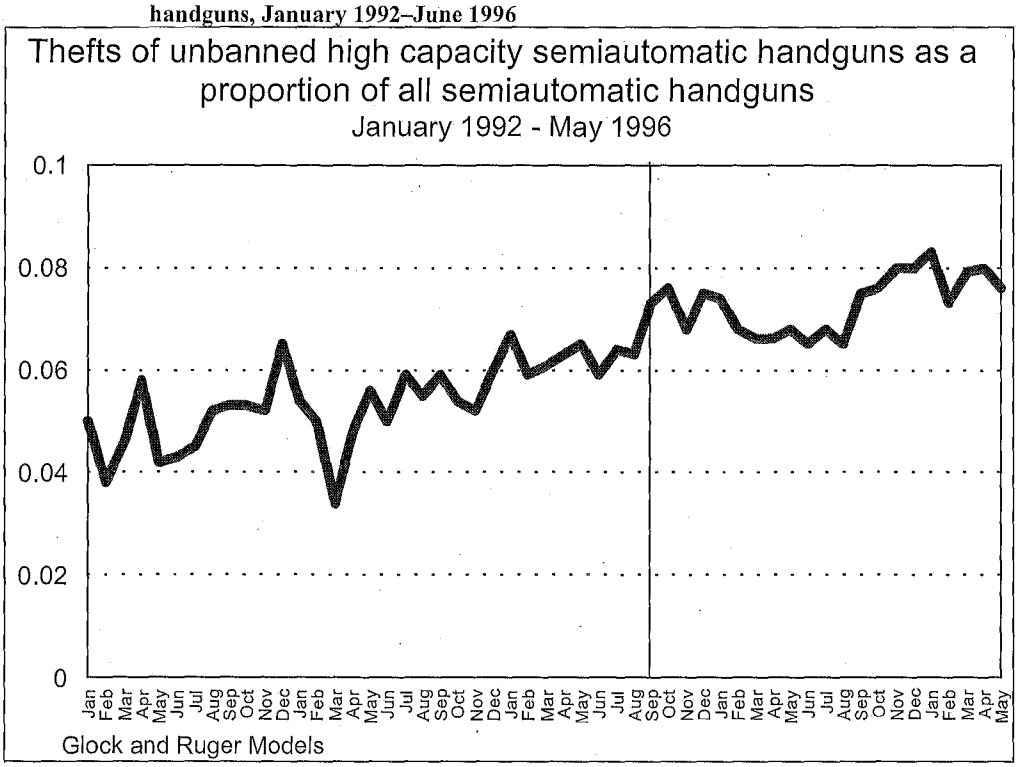


Figure 4-16. Thefts of unbanned large-capacity semiautomatic handguns as a proportion of all semiautomatic handguns, January 1992–June 1996



5. UTILIZATION EFFECTS

5.1. BATF NATIONAL FIREARM TRACE DATA

5.1.1. Introduction: Data and Limitations

To provide national level estimates of the use of assault weapons, we obtained data on firearm trace requests submitted to the U.S. Bureau of Alcohol, Tobacco and Firearms (BATF) by Federal, State, and local law enforcement personnel throughout the nation from January 1993 through May 1996. BATF maintains a firearm tracing center in West Virginia. Upon request, personnel at this center can trace firearms to their last point of recorded sale in a primary market. BATF makes this service available to police departments throughout the country to assist in criminal investigations.

The assault weapon trace file provided by BATF contains the make, model, and caliber of all models subject to the assault weapons ban (the designations are discussed in more detail below). Further, the file includes the month and year when BATF received the request, the state from which the request originated, and type of crime with which the firearm was associated. Our data for total traces consist of aggregate counts of traces broken down by month, year, state, weapon type,[42] and offense.

BATF trace data are the only available national-level sample of guns used in crime. Nevertheless, BATF trace data have significant limitations for research purposes. As Zawitz (1995, p.4) has noted, trace requests represent an unknown fraction of all guns used in crime. In terms of general limitations, BATF cannot trace military surplus weapons, imported guns without the importer name, stolen guns, or guns without a legible serial number (Zawitz 1995, p.4). Tracing guns manufactured before 1968 is also difficult because FFL's were not required to keep records of their transactions prior to that time. BATF does not generally trace guns having a manufacturing date more than six years old (such guns are likely to be many transfers removed from the original retail purchaser), though BATF can and does trace these guns in response to special requests.

Moreover, trace data are based on requests from law enforcement agencies; yet not all guns used in crime are seized by authorities, and agencies, particularly local ones, do not submit all guns they seize for tracing. Consequently, firearms submitted to BATF for tracing may not be a representative sample of firearms used in crime. Previous studies of trace data have suggested that only about 10 percent of gun crimes and 2 percent of violent crimes result in trace requests to BATF (Cox Newspapers 1989, p.3; Kleck 1991, p.75).[43]

The vast majority of weapons submitted to BATF for tracing are associated with weapons offenses, drug offenses, or violent crimes. In 1994, 72% of traces were for weapons offenses, 12% were for drug-related offenses, 12% were for the combined violent crimes of homicide, assault, and robbery, and 2% were for burglary

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[42] The weapon categories consist of revolver, pistol, derringer, rifle, shotgun, combination rifle/shotgun, and a few other miscellaneous categories.

[43] A prior study of BATF trace data by *Cox Newspapers* (1989) suggested that police are more likely to request gun traces for organized crime and drug trafficking. Further, the study indicated that these were the types of crimes with which assault weapons were most likely to be associated. Nearly 30 percent of the gun traces tied to organized crime were for assault weapons as defined by the Cox study (their definition did not match that in the 1994 Crime Act), and 12.4 percent of gun traces for drug crimes involved these guns. In contrast, assault weapons accounted for only 8 percent of gun trace requests for assaults and homicides.

(BATF 1995a, p.43). The high representation of weapons offenses was probably due to the fact that 57% of the trace requests were made by BATF field offices (BATF 1995a, p.45).

Because of the predominance of weapons offenses, BATF trace data might not appear to be a good indicator of guns used in violent and/or drug-related crime. However, the fact that a gun was not seized in association with a specific violent crime does not rule out the possibility that it had been used or would have been used in violent crime. Substantial percentages of adult and juvenile offenders carry firearms on a regular basis for protection and to be prepared for criminal opportunities (Sheley and Wright 1993; Wright and Rossi 1986). In Kansas City, Missouri, for example, about 60% of the guns seized as a result of regular police enforcement activity in high crime beats in 1992 were seized in conjunction with pedestrian checks, car checks, and other traffic violations (Shaw 1994, p.263).[44] Moreover, drug offenders tend to be disproportionately involved in violence and illegal gun traffic (National Institute of Justice 1995; Sheley and Wright 1993). Thus, guns seized in association with weapons offenses and violent offenses — in addition to those seized for drug-related crimes — may serve as a good indicator of guns possessed by drug offenders.

Despite their limitations, guns confiscated by law enforcement agencies are a reasonable index of guns used in violent and drug-related crime, and they are the best available indicator of changes over time in the types of guns used in crime and possessed and/or carried by criminal and otherwise deviant or high risk persons. BATF trace data are the only such national sample.

Yet, another important limitation to national trace data is that the process by which state and local law enforcement agencies decide to submit guns for tracing is largely unknown, and there are undoubtedly important sources of variation between agencies in different states and localities (and perhaps regions). For instance, a state or local agency may be less likely to need the tracing services of BATF if its state or city maintains its own firearms registration system. Knowledge of BATF's tracing capabilities and participation in federal/state/local law enforcement task forces are some additional factors that can affect an agency's tracing practices. Further, these conditions will vary over time; for example, BATF has been actively trying to spread this knowledge and encourage trace requests since 1994. For all of these reasons, BATF trace data should be interpreted cautiously.

Finally, prior studies have suggested that assault weapons are more likely than other guns to be submitted for tracing.[45] However, this generalization may no longer be valid, for, as is discussed below, police appear to be requesting traces for increasing proportions of confiscated firearms.

5.1.2. Trends in Total Trace Requests

Table 5-1 presents yearly changes in trace requests for all firearms for 1993 through early 1996. Total traces grew 57 percent from 1993 to 1994, decreased 11 percent from 1994 to 1995, and then increased 56 percent from 1995 to 1996. In contrast, Table 5-2 indicates that gun crimes declined throughout the 1993–95 period (national gun crime figures are not yet available for 1996). The increase in gun trace requests that occurred in 1994 was not attributable to an increase in gun crime and thus appears to have reflected a change in police trace request behavior and/or BATF initiatives. The large growth in traces in early 1996 also seems to be unrelated to gun crime (national gun crime figures for 1996 are not yet available, but we are not aware of any data suggesting

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[44] This calculation excludes guns seized by special crime hot spots patrols which were proactively targeting guns. Thus, the figure reflects normal police activity.

[45] Prior estimates have indicated that approximately 5 to 11 percent of trace requests are for assault weapons (*Cox Newspapers* 1989; Lenett 1995; Zawitz 1995), though these estimates have not all been based on the 1994 Crime Act definition of assault weapons.

that gun crime has increased over 50 percent since 1995). On the other hand, the decline in trace requests in 1994 mirrored the decline in gun crime, particularly gun homicides (the most accurately measured gun crime category), suggesting that tracing practices were fairly stable from 1994 to 1995.

Table 5-1. Total traces, January 1993–May 1996

Year	*Total*	*Monthly average*	*Percent change from previous year*
1993	55,089	4,591	N/A
1994	86,216	7,185	+ 57
1995	76,924	6,410	- 11
1996 (Jan.-May)	54,254	10,851	+56*

* Change is expressed relative to January through May of 1995.

Table 5-2. National trends in gun crime, 1993–95

Year	*Offense*	*Number*	*Percent change from previous year*
1993	Gun murders	16,136	N/A
1994	Gun murders	15,463	- 4
1995	Gun murders	13,673	- 12
1993	Gun robberies	279,737	N/A
1994	Gun robberies	257,428	- 8
1995	Gun robberies	238,023	- 8
1993	Gun aggrav. assaults	284,910	N/A
1994	Gun aggrav. assaults	268,788	- 6
1995	Gun aggrav. assaults	251,712	- 6

Sources: FBI Uniform Crime Reports, *Crime in the United States* (1996, pp.18, 26-29, 31-32; 1995, pp.18, 26-29, 31; 1994, pp.27-29, 31-32).

As a comparison to national trends, Table 5-3 presents gun confiscation figures for the cities of Boston and St. Louis, two cities for which we have data on all confiscated firearms.[46] The Boston data are consistent with national trends in gun violence in that they show decreases in gun seizures for each year.[47] In St. Louis, gun confiscations increased slightly in 1994, but in 1995, they decreased by an amount comparable to the nationwide

[46] These Boston data were provided to us by the Boston Police Department via researchers at Harvard University. The St. Louis data are from the St. Louis Police Department and were provided by researchers at the University of Missouri, St. Louis.

[47] The sharp decrease in gun confiscations from 1995 to 1996 may be due in part to recent youth gun violence initiatives being undertaken by the Boston Police Department in collaboration with a number of other agencies and researchers from Harvard University (Kennedy et al. 1996; Kennedy 1996).

decreases in gun murders and gun robberies. Of course, trends in Boston and St. Louis may not be indicative of those in the rest of the nation. Nevertheless, the contrast between the Boston and St. Louis figures and the national tracing figures provide further evidence that changes in national gun traces in 1994 and early 1996 were driven largely by police practices and BATF initiatives rather than changes in gun crime.

Table 5-3. Gun confiscations/traces, January 1993–May 1996

Year	*Total*	*Monthly average*	*Percent change from previous year*
Gun confiscations/traces for Boston, MA, January 1993–May 1996			
1993	866	72	N/A
1994	762	64	- 12%
1995	712	59	- 7%
1996 (Jan.-May)	241	48	- 28%*
Gun confiscations in St. Louis, MO, 1993–95			
1993	3,544	295	N/A
1994	3.729	311	5%
1995	3,349	279	-10%

*Change is expressed relative to January-May of 1995.

In sum, the changes in national trace requests which occurred in 1994 and early 1996 appear to have stemmed from BATF initiatives. Although we have little documentation of these changes, our consultations with BATF agents have suggested that the surge in trace requests from 1993 to 1994 was due largely to internal BATF initiatives that now require agents to submit all confiscated firearms for tracing. In addition, BATF has made efforts to encourage more police departments to submit trace requests and to encourage police departments to request traces for greater fractions of their confiscated weapons. One example is BATF's national juvenile firearms tracing initiative launched in late 1993 (BATF 1995b, p.21). Greater cooperation between BATF and local agencies (through, for example, special task forces) has also resulted in more trace requests according to BATF officials, and a few states and localities have recently reached 100 percent tracing. Beginning in the fall of 1995, moreover, agents from the tracing center began visiting BATF's field divisions to inform federal, state, and local law enforcement personnel about the tracing center's services and capabilities, including the implementation of computerized on-line tracing services. This would appear to be a major factor behind the growth in trace requests from 1995 to 1996.

For the 1994–95 period, however, tracing practices seem to have remained steady. The decline in traces in 1995 matched a real decrease in gun crimes. These developments have important ramifications for the analysis of assault weapon traces.[48]

[48] We made limited efforts to further disentangle federal and state/local trends by obtaining annual data on traces from a number of states broken down by requesting agency. We examined trace requests from a number of cities where, according to informal judgments by BATF agents, cooperative efforts between local law enforcement agencies and BATF had resulted in the submission of trace requests for a relatively high percentage of confiscated firearms over an extended period. We anticipated that trace requests from BATF field offices in these locations would show substantial increases from 1993 to

5.1.3. Total Assault Weapon Traces

During the period from January 1993 through May 1996, BATF received 12,701 trace requests for assault weapons. This count covers specific makes and models listed in the 1994 Crime Act, exact copies of those makes and models, and other firearms failing the Crime Act's features test for assault weapons.[49] The requests include all states, Washington, D.C., Puerto Rico, and Guam.[50]

Table 5-4 shows the number, monthly averages, and percentage changes of assault weapon traces for each year. Assault weapon traces increased 9 percent from 1993 to 1994, declined 20 percent from 1994 to 1995, and then increased 7 percent from 1995 to 1996. While one cannot entirely dismiss the possibility that the use of assault weapons rose in 1994 and 1996, it seems likely that these increases were due partially or entirely to the general increase in police trace requests which occurred during those years. Yet assault weapon traces increased by amounts much smaller than did total traces in 1994 and 1996, a finding which supports the conjecture that police have been more consistently diligent over time in requesting traces for confiscated assault weapons.[51]

1994, and that requests from the local law enforcement agencies would rise from 1995 to 1996. However, the figures from these locations did not reveal any clearly interpretable patterns. Any patterns which might have existed may be obscured by the fact that local agencies may submit traces directly to the tracing center or submit them indirectly through local ATF field offices. In 1994, for example, 17% of trace requests were from outside (i.e., non-BATF) agencies directly, while 26% were from outside agencies through BATF offices (BATF 1995, p.45). Our judgment is that analyzing trace requests according to submitting agency will not necessarily illuminate the ambiguities in interpreting trace request trends without extensive research into both the processes by which guns are selected for tracing and submitted by local agencies and BATF field offices and the impact of special BATF/local initiatives on these processes.

[49] The guns designated as "features test" guns consist of makes and models that fail the features test based on manufacturer specifications. The file does not generally include guns which were legal as manufactured but were later modified in ways which made them illegal. (Firearms which are traced by BATF are not actually sent to BATF for inspection). Further, firearms are often manufactured and sold with various options, and the legal/illegal status of some models is contingent upon the particular features with which the gun was manufactured. For example, a Franchi Spas 12 shotgun may or may not be an assault weapon depending upon the size of its ammunition magazine (prior to the ban, the gun was sold with 5 shot and 8 shot tube magazines - see Fjestad [1996, p.471]). Unfortunately, this level of detail is not available in the BATF data. Potential assault weapon models like the Franchi Spas 12 were included in the assault weapon file, but, as is discussed later in the text, we did not utilize them in all analyses.

[50] It should be noted that the firearm make and model designations in BATF trace data are made by the law enforcement officers who submit the requests. Undoubtedly, there exists some level of error in these designations, though we do not have any data with which to estimate the error rate.

[51] The 1996 assault weapon traces include 89 observations identified as "duplicate traces." Although these trace requests can sometimes represent instances in which the same gun was used in multiple crimes, they usually represent instances in which, for various administrative reasons, a particular trace request was entered into the computer system more than once. Unfortunately, it is not possible to identify duplicate trace requests for years prior to 1996. In order to treat data from all years in a consistent manner, we therefore retained all of the 1996 trace requests for the analysis. Consequently, the total and assault weapon trace numbers presented in this report overstate the true numbers of trace requests. Our analysis of the trace data rests on the assumption that the rate of duplicate tracing has remained relatively constant over the 1993–96 period.

Table 5-4. Assault weapons traces, January 1993–May 1996

Year	*Total*	*Monthly average*	*Percent change from previous Year*
1993	3,748	312	N/A
1994	4,077	340	+ 9%
1995	3,268	272	- 20%
1996 (Jan.-May)	1,608	322	+ 7%*

*Change is expressed relative to January through May of 1995.

Traces for assault weapons dropped more markedly from 1994 to 1995 (20 percent) than did overall traces (11 percent). In a t-test of 1994 and 1995 monthly means, the drop in assault weapon traces was statistically significant (p=.01, two-tailed test), while the drop in total traces was not (p=.22, two-tailed test). Moreover, the drop in assault weapon traces was substantially greater than the declines in gun murder (12 percent), gun robbery (8 percent), and gun assault (6 percent) for the same period. This suggests that criminal use of assault weapons decreased from 1994 to 1995, both in absolute terms and relative to crime trends generally. In addition, utilization of assault weapons in crime was less in 1995 than in 1993.

5.1.4. Analysis of Select Assault Weapons

As noted in Chapter 2, many of the foreign makes and models banned by Title XI were banned from importation prior to the passage of that legislation. Thus, any recent decrease in the use of those weapons cannot be attributed unambiguously to the effects of the Crime Act. For this reason, we concentrated our analyses below on a select group of domestic assault weapons whose availability was not affected by legislation or regulations predating the 1994 Crime Act. These guns include the AR15 family (including the various non-Colt copies), the Intratec family (including the AA Arms AP-9), and the SWD handgun family.

In addition, we selected a small number of firearm models which, as manufactured, fail the features test of the assault weapons legislation. These weapons had to meet three selection criteria: 1) the weapon had to be in production at the time of the Crime Act (if the weapon was a foreign weapon, its importation could not have been discontinued prior to the Crime Act);[52] 2) there had to be 30 or more trace requests for assault weapons made by that manufacturer during the period January 1993 through April 1994; and 3) the weapon had to have an unambiguous assault weapon designation as it was manufactured prior to the ban (i.e., its status could not be conditional on optional features).[53] These criteria ensured that we would capture the most prevalent assault weapons that were still being sold in primary markets just prior to the effective date of Title XI. We used January 1993 through April 1994 as the selection period in order to minimize effects on the gun market which may have resulted from the passage of the assault weapons legislation by the U.S. House of Representatives in May of 1994.

[52] Heckler and Koch, for example, manufactured a number of rifle and handgun models which were relatively common among assault weapon traces (i.e., the IIK91, HK93, HK94, and SP89). However, these models were all discontinued between 1991 and 1993 (Fjestad 1996, p.531).

[53] BATF officials assisted us in these designations. The only weapon which passed the first two criteria but not the third was the Franchi Spas 12 shotgun. The assault weapon trace file contained 53 trace requests for this model prior to May 1994.

The features test weapons selected for the analysis were: Calico M950 and M110 model handguns; Calico M100, M900, and M951 model rifles; and Feather AT9 and AT22 model rifles.

This select group of assault weapons accounted for 82 percent of assault weapon traces submitted to BATF during the study period. Yearly trends in trace requests for these weapons (see Table 5-5) were virtually identical to those for all assault weapons. Most importantly, average monthly traces were 20 percent lower in 1995 than in 1994 (p=.01, two-tailed test). Figure 5-1 displays the trend in monthly traces for these firearms.

Figure 5-1. National ATF trace data: Traces for select assault weapons, January 1993–May 1996

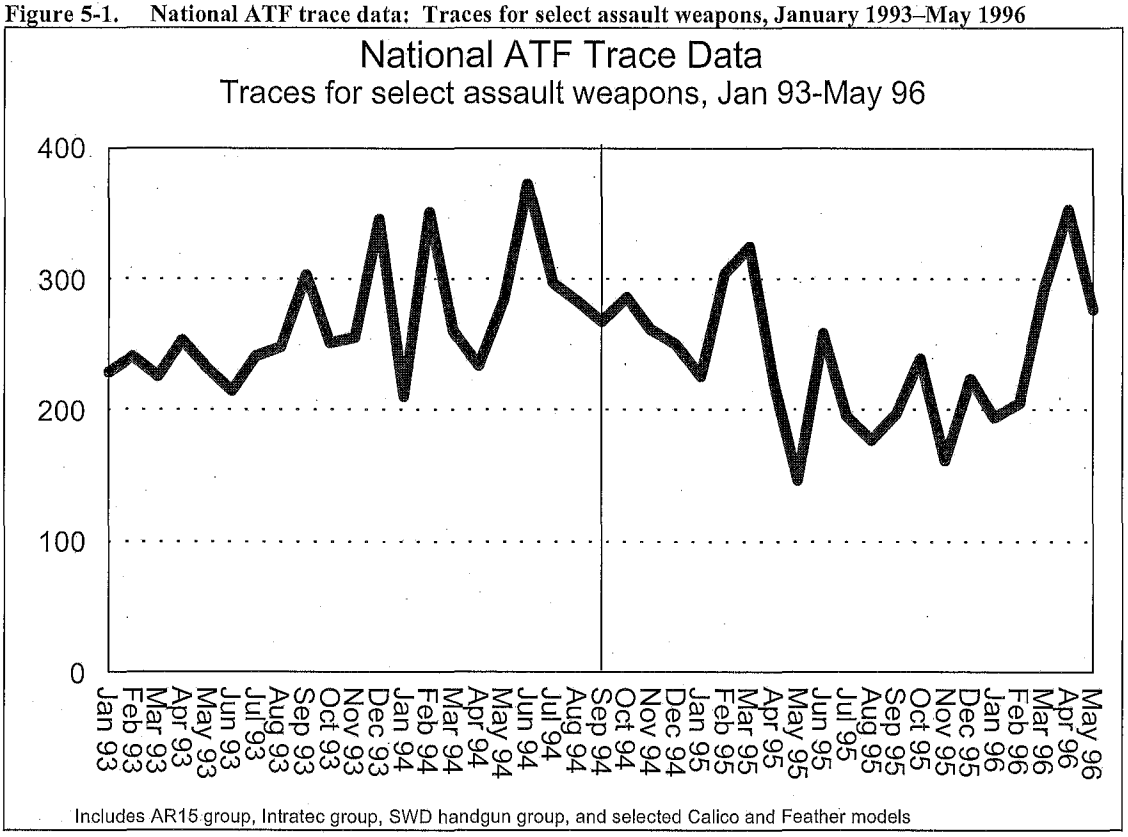


Table 5-5. Traces for select assault weapons,† January 1993–May 1996

Year	*Total*	*Monthly average*	*Percent change from previous year*
1993	3,040	253	N/A
1994	3,358	280	+ 10%
1995	2,673	223	- 20%
1996 (Jan.-May)	1,323	265	+ 8%*

*Change is expressed relative to January through May of 1995.

†Includes traces for AR15 group, Intratec group, SWD handgun group, and selected Calico and Feather models.

5.1.5. Assault Weapon Traces for Violent Crimes and Drug-Related Crimes

To fulfill Title XI's mandate to assess the effects of the ban on violent and drug-related crime, we also analyzed assault weapon traces associated with violent crimes (murder, assault, and robbery) and drug-related crimes. We used our select group of assault weapons for this analysis. Yearly trends for these traces are presented in Table 5-6. Monthly trends are graphed in Figure 5-2 and Figure 5-3. A striking feature of these numbers is their small magnitude. On average, the monthly number of assault weapon traces associated with violent crimes across the entire nation ranged from approximately 30 in 1995 to 44 in 1996. For drug crimes, the monthly averages ranged from 34 in 1995 to 50 in 1994.

Figure 5-2. National ATF trace data: Traces for select assault weapons (violent crimes)

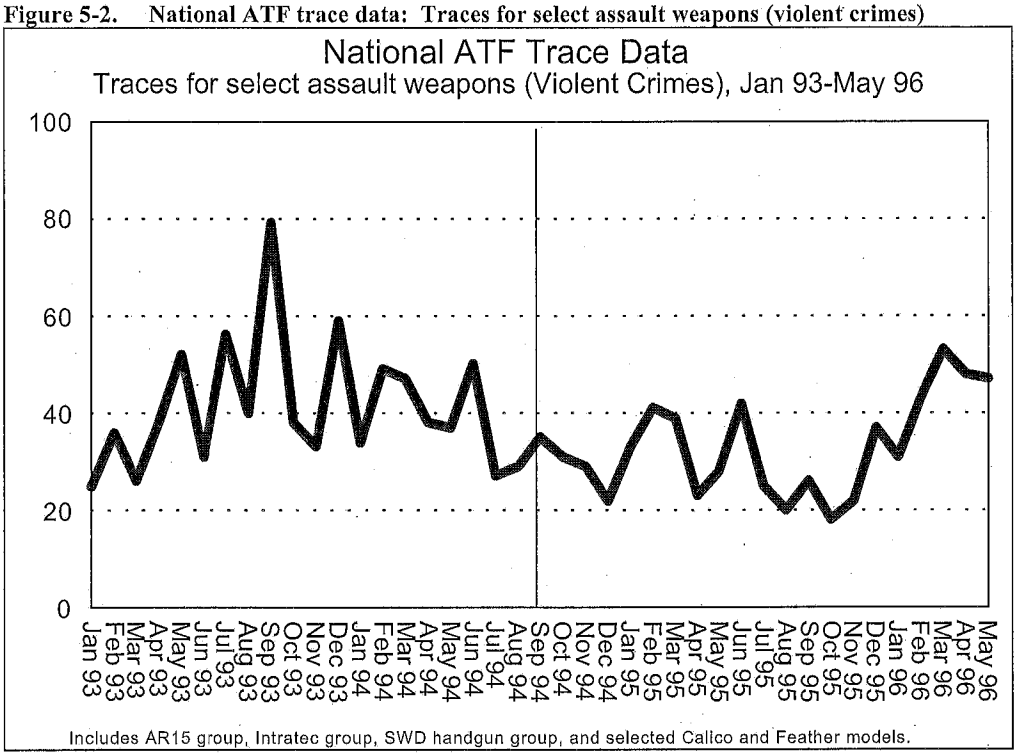


Figure 5-3. National ATF trace data: traces for select assault weapons (drug crimes)

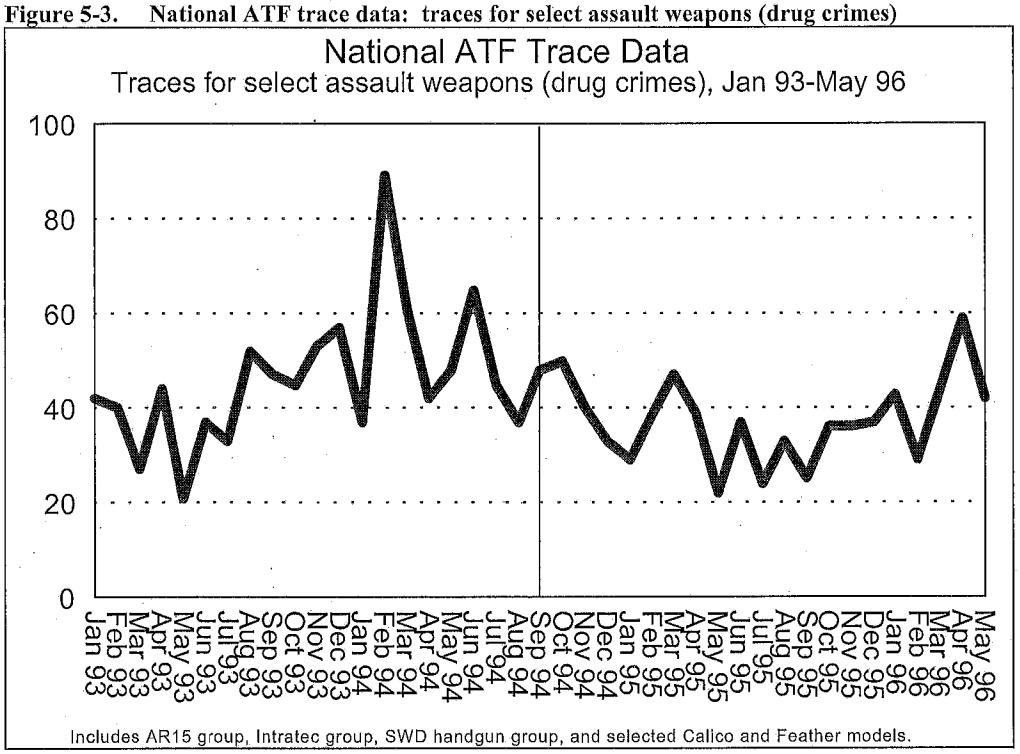


Table 5-6. Traces for select assault weapons,† January 1993–May 1996 (violent and drug-related crimes)

Violent Crimes:

Year	*Total*	*Monthly average*	*Percent change from previous year*
1993	513	43	N/A
1994	428	36	- 17%
1995	354	30	- 17%
1996 (Jan.-May)	222	44	+ 35%*

Drug-Related Crimes:

Year	*Total*	*Monthly average*	*Percent change from previous year*
1993	498	42	N/A
1994	595	50	+ 19%
1995	403	34	- 32%
1996 (Jan.-May)	217	43	+ 24%*

*Change is expressed relative to January through May of 1995.

†Includes AR15 group, Intratec group, SWD handgun group, and selected Calico and Feather models.

Traces for assault weapons associated with violent crimes dropped 17 percent in both 1994 and 1995. Both decreases were greater than the decreases which occurred for violent gun crimes in each of those years. However, assault weapon traces for violent crime rebounded 35 percent in 1996 to a level comparable with that in 1993.

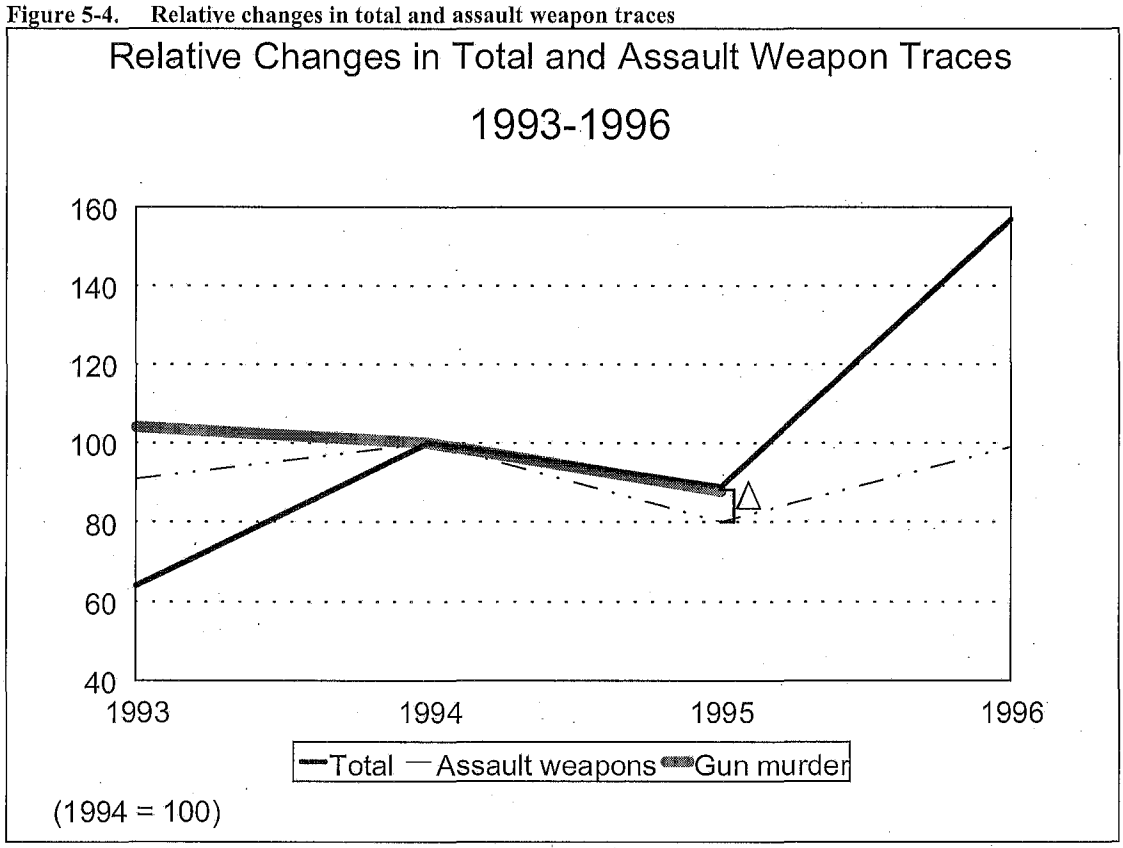
Assault weapon traces for drug crimes followed patterns similar to those for all assault weapons. Assault weapon traces increased 19 percent from 1993 to 1994, decreased 32 percent from 1994 to 1995, and then increased 24 percent from 1995 to 1996. The yearly fluctuations of these traces were greater than those for all assault weapons, but the drug trace numbers may be relatively more unstable due to the small number of weapons under consideration.

5.1.6. Conclusions on National Trends in the Use of Assault Weapons

National-level data suggest that the use of assault weapons, as measured by trace requests to BATF, declined in 1995 in the wake of the Crime Act. The 20 percent decrease in assault weapon trace requests from 1994 to 1995 was greater than occurred overall, and it was greater than the 6 to 12 percent national drop in violent gun crime. This is demonstrated graphically in Figure 5-4. Assault weapon traces for violent crimes and drug-related crimes also decreased in 1995 by amounts comparable to or greater than the overall drop in assault weapon

traces. Further, there were approximately 13 percent fewer assault weapon trace requests in 1995 than during the pre-ban year of 1993.[54]

Figure 5-4. Relative changes in total and assault weapon traces



Another indication that this was an effect from the ban is that assault weapon traces declined less in 1995 in states which had their own bans prior to the Federal legislation. Table 5-7 presents combined yearly traces for our select assault pistol group in the four states with assault weapon bans: California, New Jersey, Connecticut, and Hawaii. In general, assault weapon traces in these states followed the same pattern as did the national figures. The increases in 1994 and 1996 were larger than the national increases which occurred during those years, but the 1995 decrease was smaller than the national assault weapon decrease. Further, the decline in these ban states was consistent in magnitude with the national drop in gun crime.[55]

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[54] The data also do not show any obvious substitution of non-banned long guns for assault weapons. Trace requests for shotguns decreased 10 percent in 1995. Total rifle traces increased 3.5 percent in 1995, but our select group of assault weapon rifles (AR15 group and selected Calico and Feather models) also increased 3 percent. Thus, banned and non-banned rifles did not follow divergent trends. With currently available data, we have not been able to assess whether the assault weapon ban led to displacement to other categories of weapons, such as non-banned semiautomatic handguns capable of carrying pre-ban large-capacity magazines.

[55] We chose to examine only assault weapon pistols because assault rifles are rarely used in crime and Hawaii's assault weapons legislation covers only handguns. Maryland passed an assault pistol ban in 1994, but the legislation was passed only a few months prior to the Federal ban, so we did not include Maryland as a ban state.

All of the assault pistol ban states outlawed one or more of the handguns in our select group of assault pistols. However, the coverage of these state laws varied, and our select assault pistols were not banned in all of these states. We therefore conducted a supplemental analysis focusing on the Intratec TEC-9 series and the M10/M11 series made by SWD and others. As far as we can determine, these guns were covered by all of the state assault pistol bans. Trace requests for TEC-9's,

Table 5-7. Assault pistol traces, ban states (CA, NJ, CT, and HI), January 1993–May 1996

Year	*Total*	*Monthly mean*	*Percent change from previous year*
1993	204	17	N/A
1994	228	19	+12%
1995	210	18	- 8%
1996 (Jan.-May)	106	21	+15%

*Change is expressed relative to January through May of 1995.

Nationally, traces for assault weapons rebounded in 1996 to a level higher than that of 1993 but lower than that of 1994. This could represent leakage into illegal channels from the stockpile of legal, grandfathered assault weapons manufactured prior to the implementation of Title XI. Production of assault weapons increased considerably in 1994, and prices of these weapons fell to pre-ban levels in late 1995 and early 1996 (see Chapter 3). Over the next few years, it is possible that more, rather than fewer, of the grandfathered weapons will make their way into the hands of criminals through secondary markets.

On the other hand, the increase for 1996 may be an artifact of recent BATF initiatives to increase trace requests from local police. The rebound in assault weapon traces might also reflect an as yet undocumented rebound in gun crime in 1996. Unfortunately, we cannot disentangle these possibilities with data available at this time, and it is not yet clear whether the 1995 decrease in our indicator of assault weapon use was temporary or permanent.[56]

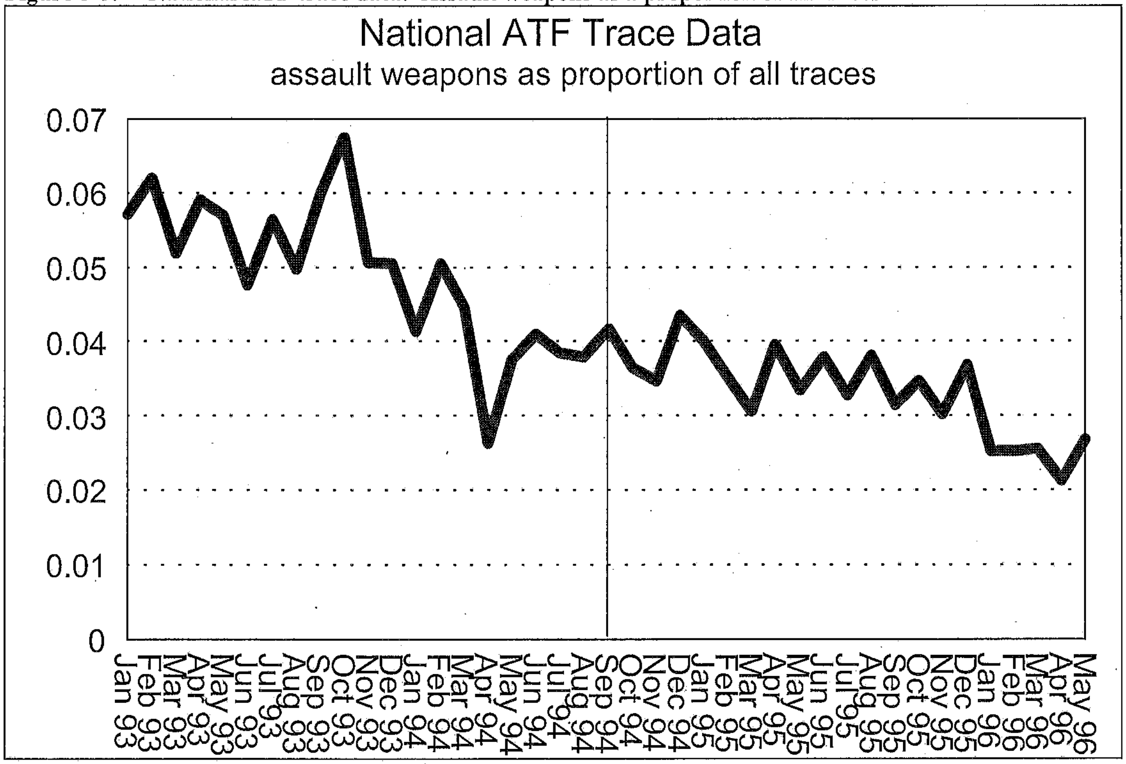
5.1.7. The Prevalence of Assault Weapons Among Crime Guns

As is shown in Figure 5-5, assault weapon traces decreased as a proportion of all traces throughout the entire study period. While Title XI may have contributed to this trend, it is apparent that the trend began before implementation of Title XI, and, to a large degree, must reflect the disproportionate growth in trace requests for non-assault weapons rather than a continual decline in the prevalence of assault weapons.

M10's, and M11's from the ban states rose 1% from 1993 to 1994, decreased 6% from 1994 to 1995, and remained steady from 1995 to early 1996. The 6% drop in 1995 seems to confirm that assault weapon trace requests dropped in the ban states after implementation of the federal law but by smaller percentages than assault weapon trace requests nationwide.

[56] In light of the substantial instrumentation problems with these data and the threat which such problems pose to quasi-experimental time series designs (Campbell and Stanley 1963, pp.40-41), we elected not to pursue more sophisticated methods, such as an interrupted time series analysis, with these data.

Figure 5-5. National ATF trace data: Assault weapons as a proportion of all traces



Despite this problem with interpreting trends in the prevalence of assault weapon traces, the 1996 trace figures arguably provide the best available estimate of the prevalence of assault weapons among crime guns. Firearm tracing should now be more complete and less biased than at any time previously. For January through May of 1996, assault weapons accounted for 3 percent of all trace requests. Our group of select domestic assault weapons represented 2.5 percent of all traces. Traces for the select assault weapon group accounted for 2.6 percent of traces for guns associated with violent crimes and 3.5 percent of traces for guns associated with drug crimes. This is consistent with previous research indicating that assault weapons are more likely to be associated with drug crimes than with violent crime (Cox Newspapers 1989; Kleck 1991). At the same time, these numbers reinforce the conclusion that assault weapons are rare among crime guns.

5.1.8. Crime Types Associated with Assault Weapons

Table 5-8 displays the types of offenses with which assault weapons were associated. For each year, approximately two-thirds of assault weapons were tied to weapons offenses. Drug offenses were the next most common, accounting for 16 to 18 percent of assault weapon traces for each year. Violent offenses ranged from 13 to 17 percent of assault weapon traces. For comparison, the percentage of total traces associated with drug offenses varied between 12 and 13 percent during this period. Violent offenses accounted for 12 to 16 percent of total traces. Hence, assault weapons were more likely to be associated with drug offenses than were other traces.

Table 5-8. Assault weapon trace requests to BATF by crime type

Offense type*	*1993* (N=3,725)	*1994* (N=4,048)	*1995* (N=3,226)	*1996 (Jan–May)* (N=1,500)
Murder/Homicide	.097	.069	.063	.072
Aggravated assaults	.048	.040	.051	.076
Robbery	.027	.018	.020	.022
Drug abuse violations	.167	.182	.161	.174
Weapons; carrying, possessing, etc.	.647	.665	.661	.581
Other offenses	.015	.025	.046	.075

*Offense type could not be determined for 1 percent of assault weapon traces in 1993, 1994, and 1995. Offense type could not be determined for 7 percent of assault weapon traces in 1996.

5.2. Assault Weapon Utilization: Local Police Data Sources

5.2.1. Introduction and Data Collection Effort.

Because of our concerns over the validity of national BATF trace data for measuring the distribution of guns used in crime, we attempted to collect and analyze data from a number of police departments around the country. We sought to acquire data on all firearms confiscated in these jurisdictions, rather than just firearms for which BATF trace requests were made. Analyzing all guns confiscated in a jurisdiction provides a more complete and less biased picture of weapons used in crime than does analysis of guns selected for BATF traces. The disadvantage of using local agency gun seizure data is that trends in any given jurisdiction may not be indicative of those elsewhere in the nation. Of course, local agency data are still subject to general limitations regarding police gun confiscation data which were raised in the last section (i.e., not all guns confiscated by police are used in violent or drug-related crime and not all guns used in crime are seized by police).

Unfortunately, the attempt to collect local gun data fell short of our expectations. Our intention was to collect data from cities in states both with and without their own assault weapon bans. Further, we concentrated our data collection effort on cities in states which had relatively high rates of gun violence. To this end, we contacted several police departments around the country. However, most of the departments that we contacted either did not have their property records computerized or had only computerized their records a few months prior to the implementation of the Crime Act, thus precluding the collection of meaningful pre-ban baseline data.[57]

Ultimately, we obtained data from two cities, St. Louis and Boston, neither of which is subject to a State assault weapon ban. From St. Louis, we acquired a database on all firearms confiscated by police from 1992 through 1995 (N=13,863). Our Boston data consist of monthly counts of various categories of firearms confiscated by Boston police from 1992 through August of 1996 (total confiscations numbered 3,840 for this period). For both locations, we examined trends in confiscations of our select domestic assault weapon group (i.e., the AR15, Intratec, and SWD families and selected Calico and Feather models). In addition, we approximated trends in confiscations of semiautomatic handguns capable of accepting large-capacity magazines by analyzing confiscations of selected Glock and Ruger pistols.

[57] Time, cost, and personnel considerations limited our ability to implement on-site data collection efforts.

The patterns we discovered were relatively consistent in both cities. Assault weapon confiscations were rare both before and after the ban. In both cities, the data were suggestive of a decrease in assault weapon confiscations after the ban. As a fraction of all confiscated guns, assault weapons decreased roughly 25% in these cities. Thus, these data sources provide some confirmation of our inferences regarding assault weapon trends from the national trace data. Further, we were able to examine the crimes with which assault weapons were associated in St. Louis and found that, as in the national data, assault weapons are overrepresented in drug offenses but not in violent offenses. Finally, confiscations of non-banned semiautomatic handguns capable of accepting large-capacity magazines increased or remained stable after the ban as a fraction of all confiscated handguns in both St. Louis and Boston.[58]

5.2.2. Assault Weapons in St. Louis and Boston

St. Louis police confiscated 180 weapons in the select assault weapon group between 1992 and 1995.[59] The vast majority of these weapons were from the Intratec and SWD assault pistol groups. Average monthly confiscations of assault weapons dropped from 4 to 3 after the ban's implementation (see Table 5-9). Total gun seizures also dropped during the post-ban months. In order to control for the general downward trend in gun confiscations, we examined assault weapons as a fraction of all confiscated guns. Prior to the ban, assault weapons accounted for about 1.4% of all guns. After the ban they decreased to 1% of confiscated guns, a relative decrease of approximately 29%. A contingency table chi-square test indicated that this was a statistically meaningful drop (p=.05). In addition, assault weapons represented a lower fraction of all guns confiscated during 1995 (.009) than

Table 5-9. Summary data on guns confiscated in St. Louis, January 1992 – December 1995

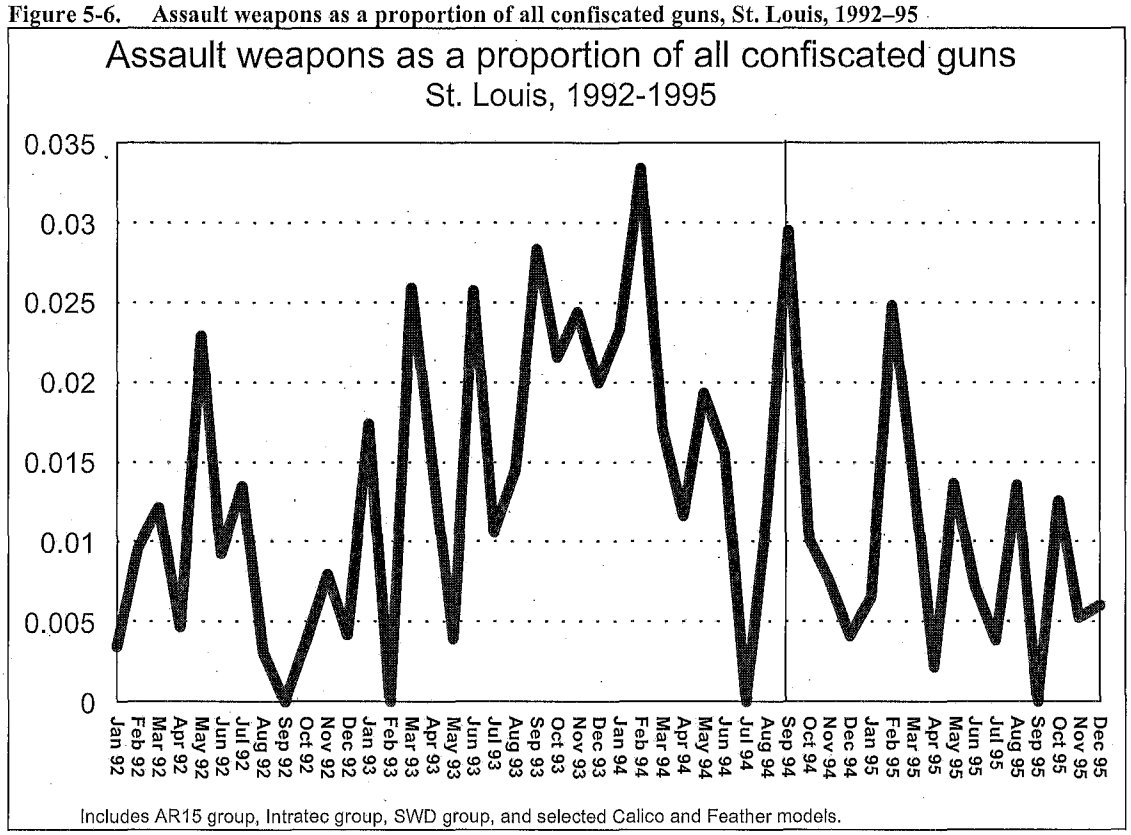
	Pre-ban (Jan. '92–Aug. '94)	*Post-ban (Sept. '94–Dec. '95)*	*Change*
Total guns confiscated			
Total	9,372	4,491	
Monthly mean	293	281	-4%
Assault guns			
Total	134	46	
Monthly mean	4	3	-25%
Proportion of confiscated guns	.014	.010	-29%
Large-capacity handguns (Ruger and Glock)			
Total	118	93	
Monthly mean	4	6	+50%
Proportion of all handguns	.018	.031	+72%

[58] As stated above, analyses of local data sources have the limitation that they are not necessarily indicative of those elsewhere in the nation. We cannot address the various local conditions which may have impacted recent gun trends in the selected cities. However, we should note that youth gun violence initiatives sponsored by the National Institute of Justice have been ongoing in each city during recent years. It is not clear at this time what impact, if any, these initiatives have had upon the gun trends that are the subjects of our investigation.

[59] The St. Louis data contain a few SWD streetsweeper shotguns in addition to SWD assault pistols.

during 1993 (.018), the last full calendar year prior to the passage and implementation of the ban. A monthly trend line for assault weapons as a fraction of all guns is shown in Figure 5-6.[60] [61]

Figure 5-6. Assault weapons as a proportion of all confiscated guns, St. Louis, 1992–95



A similar picture emerged from Boston. From 1992 through August of 1996, Boston police seized only 74 of these weapons. As in St. Louis, the vast majority were Intratec and SWD assault pistols. Table 5-10 shows

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[60] We also estimated interrupted time series models to test the post intervention change in the monthly trend for the assault weapons proportion measure. As in the NCIC analysis reported in Section 4.3 (p.50) we considered various models of impact. An abrupt, temporary impact model might seem appropriate, for example, based on the price trends presented in Section 4.1 (p.24). Both abrupt, permanent and gradual, permanent impacts are also plausible and seem to better match the pattern displayed in the St. Louis data. At any rate, these analyses failed to confirm that there was a significant change in assault weapons as a fraction of all guns. (The best fitting model was an abrupt, permanent impact model with an autoregressive parameter at the third lag).

However, we have emphasized the chi-square proportions test because the monthly series is rather short (N=48) for interrupted time series analysis (McCleary and Hay 1980) and because the monthly trend line provides no strong indication that the post ban drop was due to a preexisting trend.

[61] Average monthly confiscations of long guns (rifles and shotguns) increased somewhat from 88 in the pre-ban months to 92 after the ban. As a proportion of all confiscated guns, long guns rose from .299 before the ban to .326 after the ban. Thus, the decrease in assault weapons may have been offset by an increase in the use of long guns. However, we did not have the opportunity to investigate the circumstances under which long guns were seized. The post-ban increase could have been due, for example, to an increase in the proportion of confiscated guns turned in voluntarily by citizens. In addition, the ramifications of a long gun substitution effect are somewhat unclear. If, for instance, the substituted long guns were .22 caliber, rimfire (i.e., low velocity) rifles (and in addition did not accept large-capacity magazines), then a substitution effect would be less likely to have demonstrably negative consequences. If, on the other hand, offenders substituted shotguns for assault weapons, there could be negative consequences for gun violence mortality.

the respective numbers of total firearms and assault weapons seized before and after the Crime Act. The average number of assault weapons seized per month dropped from approximately 2 before the ban to about 1 after the ban, but total gun seizures were also falling. As a fraction of all guns, assault weapons decreased from .021 before the ban to .016 after the ban, a relative decrease of about 24%. A contingency table chi-square test indicated that this change was not statistically meaningful (p=.38), but the numbers provide some weak indication that assault weapons were dropping at a faster rate than were other guns. Quarterly trends for the proportions variable shown in Figure 5-7 suggest that assault weapons were relatively high as a proportion of confiscated guns during the quarters immediately following the ban, but then dropped off notably starting in the latter part of 1995.[62] [63]

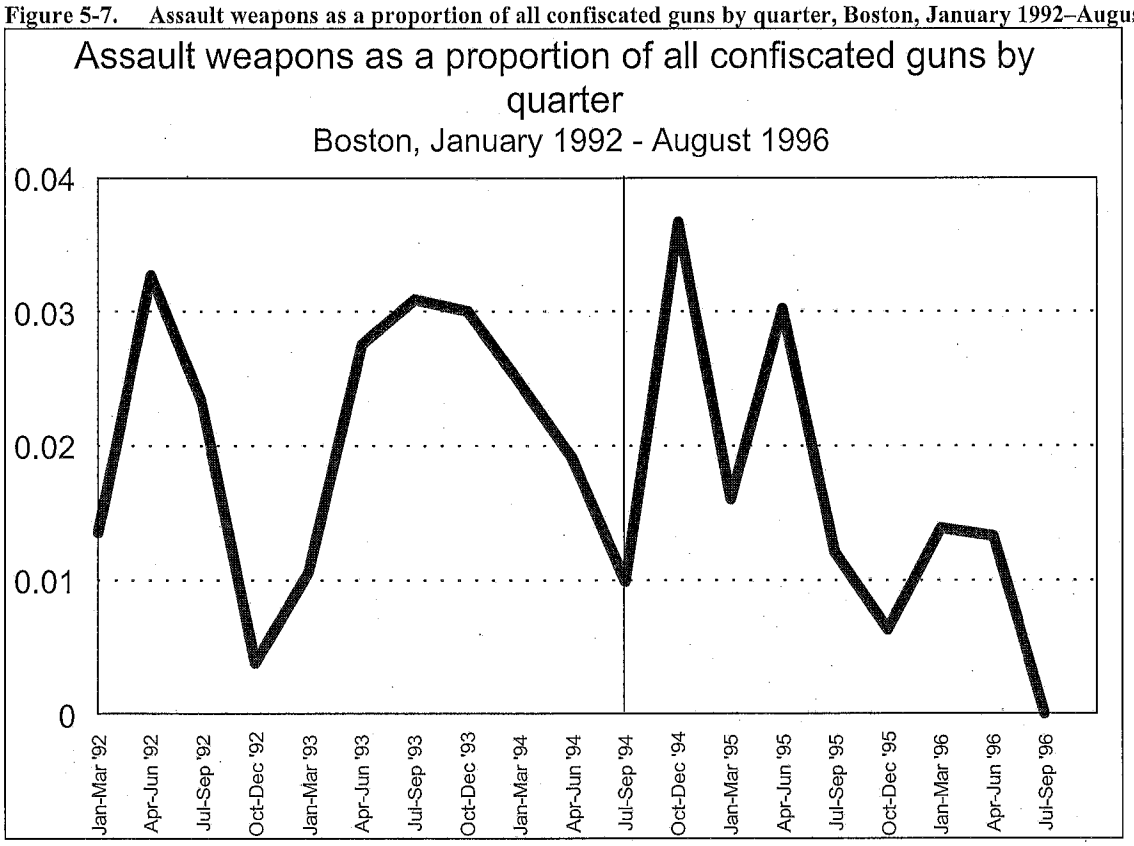
Table 5-10. Summary data on guns confiscated in Boston, January 1992 – August 1996

	Pre-ban Jan. '92–Aug. '94)	*Post-ban (Sept. '94–Aug. '96)*	*Change*
Total guns confiscated			
Total	2,567	1,273	
Monthly mean	80	53	-34%
Assault guns			
Total	53	21	
Monthly mean	2	1	-50%
Proportion of confiscated guns	.021	.016	-24%
Large-capacity handguns (Ruger and Glock)			
Total	28	17	
Monthly mean	1	1	0%
Proportion of all handguns	.015	.016	+7%

[62] We did not estimate time series models with the Boston data due to the rarity with which assault weapons were confiscated during the study period.

[63] In other analyses, we found that long guns decreased as a proportion of gun confiscations throughout the period, suggesting that there was not substitution of long guns for assault weapons in Boston.

Figure 5-7. Assault weapons as a proportion of all confiscated guns by quarter, Boston, January 1992–August 1996



5.2.3. Assault Weapons and Crime

Using the data from St. Louis, we were able to investigate the types of crimes with which assault weapons were associated. Approximately 12% of the assault weapons seized in St. Louis during the study period were associated with the violent crimes of homicide, aggravated assault, and robbery. Overall, about 12% of all confiscated guns were associated with these crimes. Hence, assault weapons do not appear to be used disproportionately in violent crime relative to other guns in these data, a finding consistent with our conclusions about national BATF trace data (see previous section). Overall, assault weapons accounted for about 1% of guns associated with homicides, aggravated assaults, and robberies.

However, 27% of the assault weapons seized in St. Louis were associated with drug offenses. This figure is notably higher than the 17% of all confiscated guns associated with drug charges.[64] This finding is also consistent with our national trace data analysis showing assault weapons to be more heavily represented among drug offenders relative to other firearms. Nevertheless, only 2% of guns associated with drug crimes were assault weapons.

5.2.4. Unbanned Handguns Capable of Accepting Large-capacity Magazines

We could not directly measure criminal use of pre-ban large-capacity magazines. Therefore, in order to approximate pre-ban and post-ban trends, we examined confiscations of a number of Glock and Ruger handgun models which can accept large-capacity magazines. These guns are not banned by the Crime Act, but they can

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[64] Some of the guns associated with drug charges were also tied to weapons charges.

accept banned large-capacity magazines. We selected Glock and Ruger models because they are relatively common in BATF trace data (BATF 1995a, p.35). A caveat to the analysis is that we were not able to obtain data on the magazines recovered with these guns. Consequently, we cannot say whether Glock and Ruger pistols confiscated after the ban were equipped with pre-ban large-capacity magazines. It is also possible that trends corresponding to Glocks and Rugers are not indicative of trends for other unbanned, large-capacity handguns.

As was discussed in Chapter 4 (see the NCIC stolen gun analysis), the hypothesized effects of the ban on this group of weapons is ambiguous. If large-capacity handgun magazines have become less available since the ban as intended (indeed, recall that the magazine price analysis in Chapter 4 indicated that prices of large-capacity magazines for Glock handguns remained at high levels through our last measurement period in the spring of 1996), one might hypothesize that offenders would find large-capacity handguns like Glocks and Rugers to be less desirable, particularly in light of their high prices relative to other handguns. If, on the other hand, large-capacity magazines for these unbanned handguns are still widely available, offenders seeking high-quality rapid-fire capability might substitute them for the banned assault weapons.

With the St. Louis data, we investigated trends in confiscations of all Glock handguns and Ruger P85 and P89 models. Police confiscated 118 of these handguns during the pre-ban months and 93 during the post-ban months (see Table 5-9). The monthly average increased from approximately 4 in the pre-ban months to 6 in the post-ban period. As a fraction of all confiscated handguns, moreover, the Glock and Ruger models rose from .018 before the ban to .031 after the ban, a relative increase of 72%. (These handguns also increased from .037 to .065 — a 76% change — as a fraction of all semiautomatic handguns; thus, the upward trend for these guns was not simply a result of a general increase in the use of semiautomatic handguns). However, Figure 5-8 shows that these handguns were trending upward as a fraction of all handguns well before the ban was implemented. (For this reason, we did not conduct contingency table chi-square tests for the pre-ban and post-ban proportions). Visually, it appears that the ban may have caused this trend to level off. Nevertheless, an interrupted time series analysis failed to provide evidence of a ban effect on the proportion of handguns which were unbanned large-capacity semiautomatics.[65]

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[65] In preliminary analysis, we found that the noise component of this time series was substantially affected by a modest outlier value at the last data point. We were able to estimate a better fitting model with more stable parameters with the outlier removed. After removing this data point (N=47), the final noise component consisted of a moving average parameter at the third lag, autoregressive parameters at lags two and four, and a seasonal autoregressive parameter at the twelfth lag. As in the time series analyses reported elsewhere, we examined a variety of impact models. The most appropriate impact model for the data was an abrupt, permanent impact. The impact parameter was positive (.006) but statistically insignificant (t value=1.13).

Figure 5-8. Unbanned large-capacity handguns as a proportion of all confiscated handguns, St. Louis, 1992–95

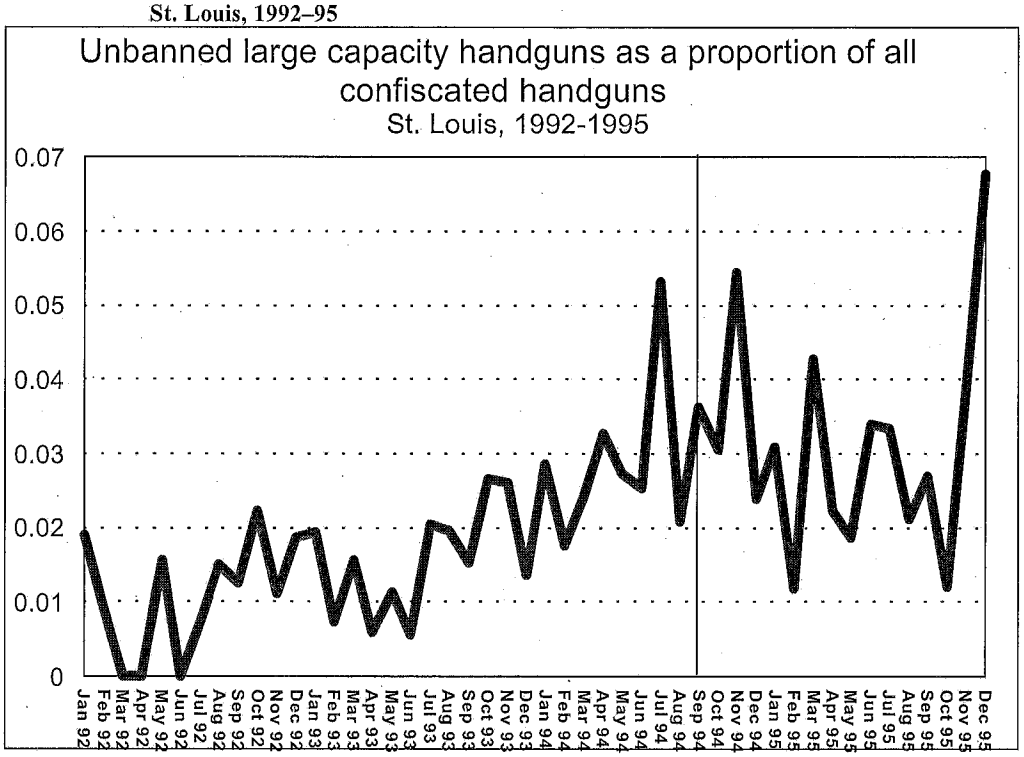
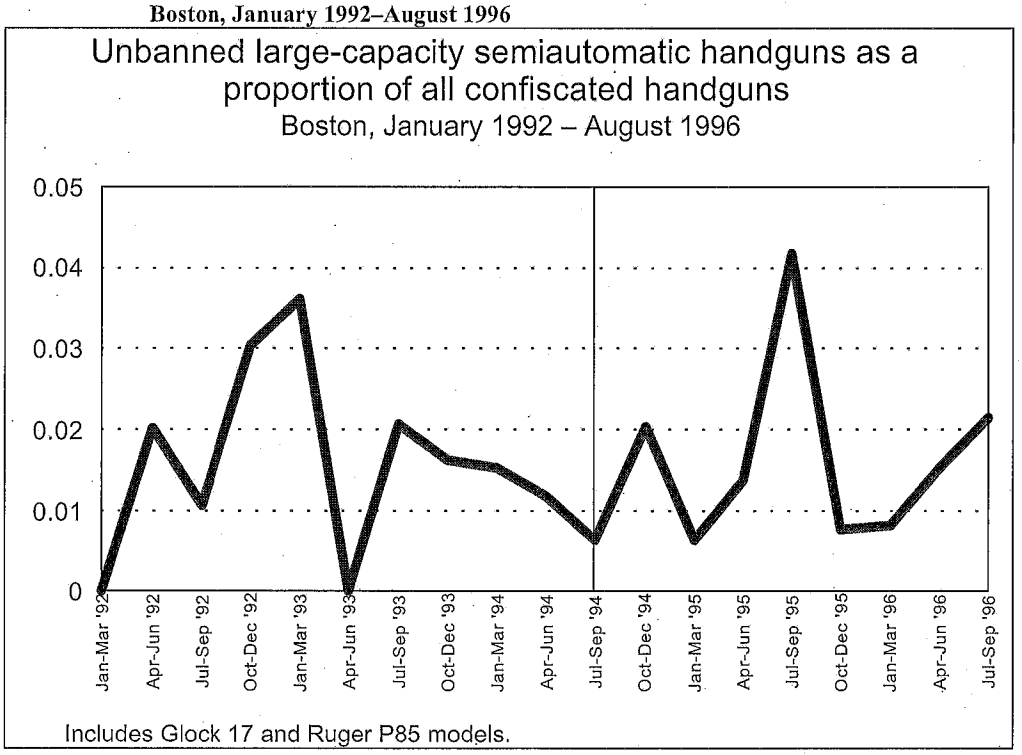


Figure 5-9. Unbanned large-capacity semiautomatic handguns as a proportion of all confiscated handguns, Boston, January 1992–August 1996



The data we acquired from Boston included counts for two specific unbanned, large-capacity handgun models, the Glock 17 and Ruger P85. Police in Boston confiscated 28 of these guns from January 1992 through August of 1994 and 17 from September 1994 through August 1996 (see Table 5-10). As a proportion of all

confiscated handguns, these models increased slightly from .015 before the ban to .016 after the ban. However, a contingency table chi-square test indicated that this difference was not statistically meaningful (p=.83).[66] The quarterly trend for the proportion measure is displayed in Figure 5-8. The pattern does not suggest any meaningful trends over time.[67]

In sum, the data from St. Louis and Boston do not warrant any strong conclusions one way or the other with respect to the use of large-capacity magazines, as crudely approximated by confiscations of a few relatively popular unbanned handgun models which accept such magazines. The ban on large-capacity magazines does not seem to have discouraged the use of these guns. At the same time, the assault weapon ban has not caused a clear substitution of these weapons for the banned large-capacity firearms.

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[66] We did not attempt any time series analyses with these data due to the rarity with which these guns were confiscated in Boston.

[67] A caveat to this analysis is that the Ruger P85 was discontinued in 1992 and replaced with a new version called the P89 (Fjestad 1996, p.996). The P89 was one of the ten most frequently traced guns nationally in 1994 (BATF 1995a, p.35). Unfortunately, we did not acquire data on confiscations of P89's in Boston (the P89 was included in our St. Louis figures). Had we been able to examine P89's in Boston, we may have found a greater increase in the use of unbanned, large-capacity handguns after the ban. Accordingly, the most prudent conclusion from the Boston data may be that there are no signs of a decrease in the use of unbanned, large-capacity handguns.

6. POTENTIAL CONSEQUENCES OF ASSAULT WEAPON USE

The Congressional mandate for this study required us to study how the Subtitle A bans on assault weapons and large-capacity magazines affected two consequences of using those weapons: specifically, violent and drug-related crime. Among violent crimes, we devoted most attention to gun murders, because it is the best measured. However, the total gun murder rate is an insensitive indicator of ban effects, because only a fraction of gun murders involve large-capacity magazines, and only about 25 percent of those murders involve the banned assault weapons. Therefore, we carried out supplementary analyses of certain categories of gun murders that more commonly involve the banned guns and magazines: events that involve multiple gun murder victims, gun murders involving multiple wounds, and killings of law enforcement officers. Unlike the BATF trace data analyzed in Chapter 5, available data sources did not permit us to categorize these events on the basis of relationship to drugs.

6.1. TRENDS IN STATE-LEVEL GUN HOMICIDE RATES

To estimate the impact of the Subtitle A bans on gun homicide rates, we estimated multivariate regression models using data from all states with reasonably consistent Supplementary Homicide Reporting over the sixteen-year period 1980 through 1995. We closely followed the approach used by Marvell and Moody (1995) to analyze the impact of enhanced prison sentences for felony gun use. Marvell and Moody generously provided their database, which we updated to cover the post-ban period.

Any effort to estimate how the ban affected the gun murder rate must confront a fundamental problem, that the maximum achievable preventive effect of the ban is almost certainly too small to detect statistically. Although our statistical model succeeded in explaining 92 percent of the variation in State murder rates over the observation period, a post hoc power analysis revealed that it lacks the statistical power to detect a preventive effect smaller than about 17 percent of all gun murders under conventional standards of statistical reliability.[68] A reduction that large would amount to preventing at least 2.4 murders for every one committed with an assault weapon before the ban, or, alternatively, preventing two-thirds of all gun murders committed with large-capacity magazines — obviously impossible feats given the availability of substitutes for the banned weapons.[69] While there are substantially smaller reductions that would benefit society by more than the cost of the ban, they would be impossible to detect in a statistical sense, at least until the U.S. accumulates more years of post-ban data.

Within this overall constraint, our strategy was to begin with a "first-approximation" estimate of the ban effect on murders, then to produce a series of re-estimates intended to rule out alternative explanations of the estimated effect. Based on these efforts, our best estimate of the short-run effect is that the ban produced a 6.7 percent reduction in gun murders in 1995. However, we caution that for the reasons just explained, we cannot statistically rule out the possibility that no effect occurred. Also, we expect any short-run 1995 preventive effect on gun murders to ebb, then flow, in future years, as the stock of grandfathered assault weapons makes its way to offenders patronizing secondary markets, while the stock of large-capacity magazines dwindles over time.

The following sections first describe our data set, then explain our analyses.

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[68] By conventional standards, we mean statistical power of 0.8 to detect a change, with .05 probability of a Type 1 error.

[69] Moreover, no evidence exists on the lethality effect of limiting magazine capacity.

6.1.1. Data

Data for gun homicides are available for the entire 1980–95 period of the study. We obtained data from "Crime in the United States" Uniform Crime Reports for the years 1994 and 1995, and from Marvell and Moody for the years 1980 through 1993. (Marvell and Moody used "Crime in the United States" Uniform Crime Reports for years 1991 to 1993, and unpublished data from the FBI for the earlier years.)

Since the fraction of homicides for which weapon use was reported by states varied from state to state and even year to year over the period, it was necessary to adjust and filter the data. To address this reporting problem, we adopted Marvell and Moody's (1995) approach to compile what they call a "usable" data series, consisting of observations (each year for each state) for which homicide weapon-use reporting is at least 75 percent complete (See Marvell and Moody, 1995).[70] On this basis we had to eliminate a certain portion of the gun homicide data (see Table 6-2) For each observation that met this requirement, the number of gun homicides was multiplied by a correction factor defined as the ratio of the FBI estimate for the total number of reported homicides in the state to the number of homicides for which the state reported weapon data.

We used Marvell and Moody's rule of retaining states in the analysis only if they had data for seven or more consecutive years[71] and added the additional requirement that states must have had gun homicide data for the post-intervention year, 1995. (This additional requirement caused us to eliminate four states entirely from the analysis: Delaware, Kansas, Nebraska, and New Mexico.) In addition, Marvell and Moody made allowances for otherwise adequate seven-year series that contained a single year of data that did not meet the above requirements. Provided the reporting rate was at least 50 percent and the corrected figure did not "depart greatly"[72] from surrounding years, the state was not dropped from the analysis. (These are: Louisiana 1987, South Carolina 1991, Tennessee 1991, and Wyoming 1982.) A further allowance was, that if the reporting rate was below 50 percent, or if the adjusted number did depart from surrounding years, the percentage of gun homicides was revised as the average of that for the four surrounding years. (These are: Alaska 1984, Arizona 1989, Idaho 1991, Iowa,1987, Kentucky 1983, Maryland 1987, Minnesota 1990, North Dakota 1991, Texas 1982, and Vermont, 1993.) In the end, "usable data" remained for 42 states for the analysis (see Table 6-2).

To allow us to account for intervening influences on gun homicide rates, we gathered data for several time-varying control variables that proved statistically significant in Marvell and Moody's analysis. Two economic variables (state per capita personal income and state employment rate) and two age structure variables were included. State per capita personal income was available from the Bureau of Economic Analysis for all years; we obtained data for 1991–95 directly from the Department of Commerce, while Marvell and Moody provided us the data for earlier years. State employment rates were available from the Bureau of Labor Statistics, Department of Labor for 1994 and 1995 and from the Bureau of Economic Analysis (via Marvell and Moody) for year 1980–93. Data on the age structures of state populations were available from the Bureau of the Census.

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[70] An alternative approach would have been to use mortality data available from the National Center for Health Statistics through 1992, then to append NCR data for the subsequent years. We were concerned about possible artifactual effects of combining medical examiners' and police data into a single time series, but recommend this approach for future replication.

[71] However, we departed from Marvell and Moody by including observations for years that followed a gap in a series of "usable" data and were therefore not part of a seven-year string. The state was treated as a missing observation during the gap.

[72] According to Marvell and Moody, a single year of data does not "depart greatly" from surrounding years if either the percentage of gun murders falls within the percentages for the prior and following years, or if it is within three percentage points of the average of the four closest years.

unadjusted estimates of total resident population of each state as of July 1 of each year. (We obtained these data directly for years 1994–95, while Marvell and Moody generously provided us with the data for earlier years).

6.1.2. Research Design

As a first approximation for estimating effects of the assault weapon ban, we specified Model 1 as loglinear in state gun homicide rate (adjusted as described above) and a series of regressors.[73] The regressors were:

- A third-degree polynomial trend in the logarithm of time;
- A dummy variable for each state;
- State per-capita income and employment rates for each year (logged);
- Proportions of the population aged 15-17 and 18-24 (logged);
- D95, a 1995 dummy variable, which represented ban effects in this first-approximation model; and
- PREBAN, a dummy variable set to represent states with assault weapon bans during their pre-ban years.

We represented time with the polynomial trend instead of a series of year dummies for two reasons. First, by reducing the number of time parameters to estimate from 15 to 3, we improved statistical efficiency. Second, during sensitivity analyses after Model 1 was fit, we discovered that it produced more conservative estimates of ban effects than a model using time dummies (that model implicitly compares 1995 levels to 1994 levels instead of to the projected trend for 1995), because the estimated trend began decreasing at an increasing rate in the most recent years. We included the economic and demographic explanatory variables because Marvell and Moody (1995) had found them to be significant influences on state-level homicide rates using the same data set. PREBAN was included so that for states with their own assault weapon bans, the D95 coefficient would reflect differences between 1995 and only those earlier years in which the state's gun ban was in place.

As shown in Table 6-1, Model 1 estimated a 9.0 percent reduction in gun murder rates in the year following the Crime Act, based on a statistically significant estimated coefficient for the 1995 dummy variable.[74] This estimated coefficient, of course, reflects the combined effect of a package of interventions that occurred nearly simultaneously with the Subtitle A bans on assault weapons and large-capacity magazines. These include: the Subtitle B ban on juvenile handgun possession and the new Subtitle C FFL application and reporting requirements, other Crime Act provisions, the Brady Act, and a variety of State and local initiatives.

We reasoned that if the Model 1 estimate truly reflected assault weapon ban effects, then by disaggregating the states we would find a larger reduction in gun murders in the states without pre-existing assault weapon bans than in the four states with such bans prior to 1994 (California, Connecticut, Hawaii, and New Jersey). To test this hypothesis, we estimated Model 2, in which D95 was replaced by two interaction terms that indicated whether or not a State ban was in place in 1995. As shown in Table 6-1, disaggregating the states using

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[73] We weighted the regression by state population to adjust for heteroskedasticity and to avoid giving undue weight to small states.

[74] In our sensitivity analyses of models in which the polynomial time trend was replaced with year dummies, the corresponding Model 1 estimated reduction was 11.2 percent, and the estimated coefficient was statistically significant at the .05 level. Similarly, for alternatives to Models 2-4, the estimated ban effects were 2 to 3 percent larger than those shown in Table 6-1 and were statistically significant at the .05 level.

Model 2 did produce a larger estimated ban effect, a statistically significant reduction of 10.3 percent in the states without their own bans.

Table 6-1. Estimated Coefficients and Changes in Gun Murder Rates from Title XI Interventions

Model	*Subgroup for 1995 impact*	*Coefficient*	*Percent change*	*test statistic*
1	All Usable (N = 42)	-0.094 +	-9.0%	-1.67
2	States without AW ban (N = 38)	-0.108 +	-10.3	-1.88
	States with AW ban (N = 4)	-0.001	-0.1	-0.01
3	States without AW or JW ban (N = 22)	-0.102	-9.7	-1.56
	States without AW, with JW ban (N = 16)	-0.115	-10.9	-1.64
	States with AW, without JW ban (N = 2)	-0.076	-7.3	-0.41
	States with AW and JW ban (N = 2)	0.044	4.5	0.39
4	California and New York excluded: States without AW or JW ban (N = 22)	-0.103	-9.8	-1.58
	States without AW, with JW ban (N = 15)	-0.069	-6.7	-0.95
	States with AW, without JW ban (N = 2)	-0.079	-7.6	-0.43
	States with AW and JW ban (N = 1)	0.056	5.8	0.30

+ Statistically significant at 10-percent level

To isolate the hypothesized Subtitle A bans from the Subtitle B ban on juvenile handgun possession, we estimated Model 3, in which D95 was used in four interaction terms with dummy variables indicating whether a state had its own assault weapon ban, juvenile handgun possession ban, both, or neither at the time of the Crime Act.[75] We also added a term, PREJBAN, which represented states with juvenile bans during their pre-ban years, for reasons analogous to the inclusion of PREBAN. The estimates of most interest are those for the 38 states without their own assault weapon bans. Among those, the estimated ban effect was slightly larger in states that

[75] A more restrictive alternative to Model 3 is based on the assumption that the impacts for states without assault weapon bans and the impacts for states without juvenile handgun possession bans are additive. A model estimate under this assumption yielded very similar point estimates and slightly smaller standard errors than Model 3. We preferred the more flexible Model 3 for two reasons. First, the less restrictive model helps us interpret the estimates clearly in light of some of the legislative changes that occurred in late 1994. Model 3 allows the reader to assess the consequences of the assault weapon ban under each set of conditions that existed at the time the ban was implemented. Second, because a juvenile handgun possession ban a fortiori prohibits the most crime-prone segment of the population from possessing the assault weapons most widely used in crime, we hesitated to impose an additivity assumption.

already had a juvenile handgun possession ban than in those that did not. We interpret the former estimate as a better estimate of the assault weapon ban effect because the State juvenile ban attenuates any confounding effects of the Federal juvenile ban. In any event, however, the estimates are not widely different, and they imply a reduction in the 10 to 11 percent range.

We were also concerned that our estimates might be distorted by the effects of relevant State and local initiatives. Therefore, we reestimated Model 3 excluding 1995 data for California and New York. We filtered out these two because combined they account for nearly one-fourth of all U.S. murders and because they were experiencing potentially relevant local interventions at the time of the ban: California's "three strikes" law and New York City's "Bratton era" in policing, coming on the heels of several years of aggressive order maintenance in that city's subway system.

The estimation results with California and New York omitted appear as Model 4 in Table 6-1. While dropping these states leaves three of the estimated coefficients largely unaffected, it has a substantial effect on New York's category, states with a juvenile handgun possession ban but no assault weapon ban. The estimated ban effect in this category drops from a nearly significant 10.9 percent reduction to a clearly insignificant 6.7 percent reduction, which we take as our best estimate.

To conclude our study of state-level gun homicide rates, we performed an auxiliary analysis. We were concerned that our Model 4 estimate of 1995 ban effects could be biased by failure to control for the additional requirements on FFL applicants that were imposed administratively by BATF in early 1994 and included statutorily in Subtitle C of Title XI, which took effect simultaneously with the assault weapon ban. These requirements were intended to discourage new and renewal applications by scofflaw dealers who planned to sell guns primarily to ineligible purchasers presumed to be disproportionately criminal. Indeed, they succeeded in decreasing the number of FFLs by some 37 percent during 1994 and 1995, from about 280,000 to about 180,000 (U.S. Department of Treasury, 1997). We were concerned that if the FFLs who left the formal market during that period were disproportionately large suppliers of guns to criminals, then failure to control for their disappearance could cause us to impute any resulting decrease in gun murder rates mistakenly to the Subtitle A ban.

Unfortunately, we could use only the 1989–95 subset of our database to test this possibility, because we could not obtain state-level FFL counts for years before 1989. Therefore, we modified Model 4 by replacing the time trend polynomial with year dummies. We then estimated the modified Model 4 both with and without a logged FFL count and an interaction term between the logged count and a 1994–95 dummy variable. Although the estimated coefficient on the interaction term was significantly negative, the estimated 1995 ban effect was essentially unchanged.

Table 6-2. Years for which gun-related homicide data are not available

	Gun homicide data 1980–95
Alabama	✓
Alaska	✓
Arizona	✓
Arkansas	✓
California	✓
Colorado	✓
Connecticut	✓

	Gun homicide data 1980–95
Delaware	No usable data
District of Columbia	No usable data
Florida	1988–91
Georgia	1980–81
Hawaii	✓
Idaho	✓
Illinois	No usable data
Indiana	1989–1991
Iowa	1991–1993
Kansas	No usable data
Kentucky	1987-89; 1994
Louisiana	1990–91
Maine	1990–92
Maryland	✓
Massachusetts	1988–90
Michigan	✓
Minnesota	✓
Mississippi	No usable data
Missouri	✓
Montana	No usable data
Nebraska	No usable data
Nevada	✓
New Hampshire	✓
New Jersey	✓
New Mexico	No usable data
New York	✓
North Carolina	✓
North Dakota	1994
Ohio	✓
Oklahoma	✓
Oregon	✓

	Gun homicide data 1980–95
Pennsylvania	✓
Rhode Island	✓
South Carolina	✓
South Dakota	No usable data
Tennessee	✓
Texas	✓
Utah	✓
Vermont	1980-83
Virginia	✓
Washington	✓
West Virginia	✓
Wisconsin	✓
Wyoming	✓

✓ indicates usable data are available for all years (1980–95) in the period

6.2. Assault Weapons, Large-Capacity Magazines, and Multiple Victim/Mass Murders

6.2.1. Trends in Multiple-Victim Gun Homicides

The use of assault weapons and other firearms with large-capacity magazines is hypothesized to facilitate a greater number of shots fired per incident, thus increasing the probability that one or more victims are hit in any given gun attack. Accordingly, one might expect there to be on average a higher number of victims per gun homicide incident for cases involving assault weapons or other firearms with large-capacity magazines. To the extent that the Crime Act brought about a permanent or temporary decrease in the use of these weapons (a result tentatively but not conclusively demonstrated for assault weapons in Chapter 5), we can hypothesize that the number of victims per gun homicide incident may have also declined.

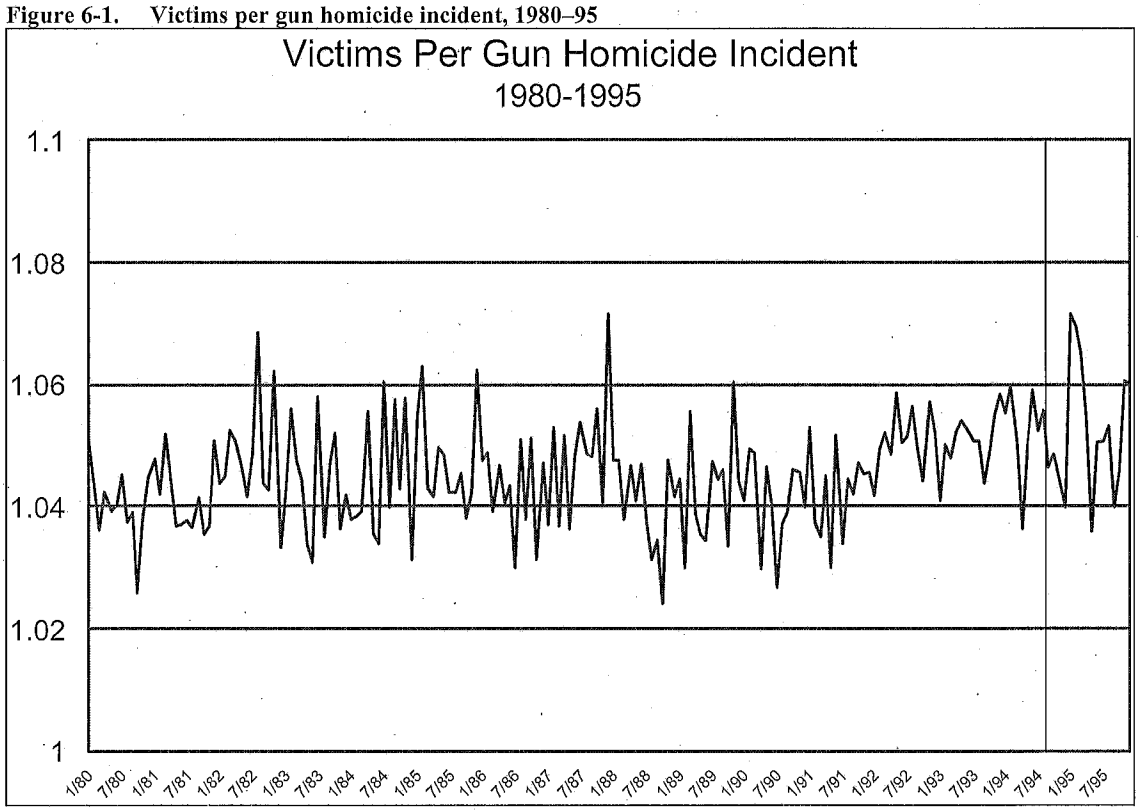
We investigated this hypothesis using data from the Federal Bureau of Investigation's Supplemental Homicide Reports (SHR) for the years 1980 through 1995. We constructed a monthly database containing the number of gun homicide incidents and victims throughout the nation.[76] The SHR does not contain information

[76] The SHR is compiled annually by the FBI based on homicide incident reports submitted voluntarily by law enforcement agencies throughout the country (see the FBI's *Uniform Crime Reports* for more information about reporting to the Uniform Crime Reports and the Supplemental Homicide Reports). Though the SHR contains data on the vast majority of homicides in the nation, not all agencies report homicide incident data to the SHR, and those agencies which do report may fail to report data for some of the homicides in their jurisdiction. In this application, it is not clear how any potential bias from

about the makes, models, and magazine capacities of firearms used in homicides. Consequently, these results rely on indirect, inferred links between expected changes in the use of banned weapons and trends in the victim per incident measure.

From 1980 through August of 1994 (the pre-ban period), there were 184,528 gun homicide incidents reported to the SHR. These cases involved 192,848 victims, for an average of 1.045 victims per gun homicide incident. For the post-ban months of September 1994 through December 1995, there were 18,720 victims killed in 17,797 incidents, for an average of 1.052 victims per incident. Thus, victims per incident increased very slightly (less than 1 percent) after the Crime Act. A graph of monthly means presented in Figure 6-1 suggests that this increase predated the assault weapon ban. Nevertheless, an interrupted time series analysis also failed to produce any evidence that the ban reduced the number of victims per gun homicide incident.[77]

Figure 6-1. Victims per gun homicide incident, 1980–95



Considering the rarity with which assault weapons are used in violent crime (for example, assault weapons are estimated to be involved in 1 to 7 percent of gun homicides),[78] this result is not unexpected. At the same time, an important qualifier is that the data available for this study have not produced much evidence regarding pre-ban/post-ban trends in the use of large-capacity magazines in gun crime. In the next section, we offer a tentative estimate, based on one city, that approximately 20 to 25 percent of gun homicides are committed

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missing cases would operate. That is, we are unaware of any data indicating whether reported and non-reported cases might differ with respect to the number of victims killed.

[77] We tested the data under different theories of impact suggested by the findings on assault weapon utilization reported in Chapter 5, but failed to find evidence of a beneficial ban effect. If anything, our time series analysis suggested that the post-ban increase in victims per gun murder incident was a meaningful change.

[78] See discussion in Chapters 2 (p.8) and 5 (p.58) and in Section 6.3 (p.87) of this chapter.

with gun equipped with large-capacity magazines banned by the Crime Act.[79] Hence, trends in the use of large-capacity magazines would seem to have more potential to produce measurable effects on gun homicides. It is not yet clear as to whether the use of large-capacity magazines has been substantially affected by the Crime Act.

Despite these ambiguities, we can at least say that this examination of SHR data produced no evidence of short term decreases in the lethality of gun violence as measured by the mean number of victims killed in gun homicide incidents.[80]

6.3. Consequences of Title XI: Multiple Wound Gun Homicides

To provide another measure of the consequences of the assault weapon/large-capacity magazine ban on the lethality of gun violence, we analyzed trends in the mean number of gunshot wounds per victim of gun homicides in a number of sites. In one jurisdiction, we were able to examine trends in multiple wound non-fatal gunshot cases. The logic of these analyses stems from the hypothesis that offenders with assault weapons or other large-capacity firearms can fire more times and at a more rapid rate, thereby increasing both the probability that they hit one or more victims and the likelihood that they inflict multiple wounds on their victims. One manifestation of this phenomenon could be a higher number of gunshot wounds for victims of gun homicides committed with assault weapons and other large-capacity firearms. To the extent that Title XI decreased the use of assault weapons and large-capacity magazines, we hypothesize a decrease in the average number of wounds per gun murder victim.

To test this hypothesis, we collected data from police and medical sources on gunshot murders (justifiable homicides were excluded) in Milwaukee County, Seattle and King County, Jersey City (New Jersey), Boston, and San Diego County. Selection of the cities was based on both data availability and theoretical relevance. Jersey City and San Diego were chosen as comparison series for the other cities because New Jersey and California had their own assault weapons bans prior to the Federal ban. The New Jersey and California laws did not ban all large-capacity magazines, but they did ban several weapons capable of accepting large-capacity magazines. Thus, we hypothesized that any reduction in gunshot wounds per gun homicide victim due to the Federal ban might be smaller in magnitude in Jersey City and San Diego.

The data from Seattle and San Diego were collected from the respective medical examiners' offices of those counties.[81] The Milwaukee data were collected from both medical and police sources by researchers at the Medical College of Wisconsin. The Jersey City data were collected from the Jersey City Police Department. Finally, the Boston data were provided by the Massachusetts Department of Public Health. From each of these sources, we were able to collect data spanning from January 1992 through at least the end of 1995. In some cities we were able to obtain data on the actual number of gunshot wounds inflicted upon victims, while in other cities we were able to classify cases only as single wound or multiple wound cases. Depending on data available, we analyzed pre-ban and post-ban data in each city for either the mean number of wounds per victim or the proportion

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[79] A New York study estimated this figure to be between 16 percent and 25 percent (New York State Division of Criminal Justice Services 1994, p.7).

[80] See Appendix A for an investigation of assault weapon use in mass murders.

[81] The Seattle data were collected for this project by researchers at the Harborview Injury Prevention and Research Center in Seattle. The San Diego County Medical Examiner's Office provided data from San Diego.

of victims with multiple wounds. We concluded this investigation with an examination of the mean number of gunshot wounds for victims killed with assault weapons and other firearms with large-capacity magazines, based on data from one city.

6.3.1. Wounds per Incident: Milwaukee, Seattle, and Jersey City

From the Milwaukee, Seattle, and Jersey City data, we were able to ascertain the number of gunshot wounds suffered by gun murder victims. Relevant data comparing pre-ban and post-ban cases are displayed in Table 6-3. The average number of gunshot wounds per victim did not decrease in any of these three cities. Gunshot wounds per victim actually increased in all these cities, but these increases were not statistically significant.[82] [83]

Table 6-3. Gunshot wounds per gun homicide victim, Milwaukee, Seattle, and Jersey City

	Cases	*Average*	*Standard deviation*	*T value*	*P level*
Milwaukee County (N = 418)					
Pre-ban: January '92 - August '94	282	2.28	2.34		
Post-ban: September '94 - December '95	136	2.52	2.90		
Difference		+ 0.24		0.85*	.40
Seattle and King County (N = 275)					
Pre-ban: January '92 - August '94	184	2.08	1.78		
Post-ban: September '94 - June '96	91	2.46	2.22		
Difference		+ 0.38		1.44*	.15
Jersey City (N =44)					
Pre-ban: January '92 - August '94	24	1.58	1.56		
Post-ban: September '94 - May '96	20	1.60	1.79		
Difference		+ 0.02		0.03	.97

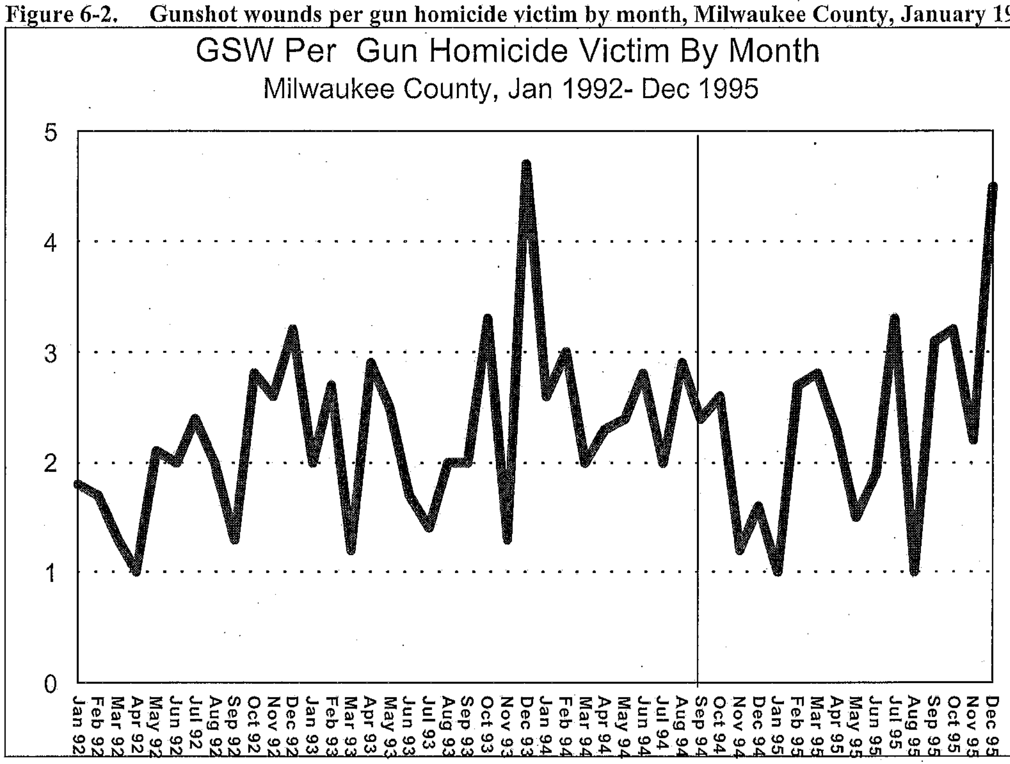
* T values were computed using formula for populations having unequal variances

[82] Our comparisons of pre-ban and post-ban cases throughout this section are based on the assumption that the cases in each sample are independent. Technically, this assumption may be violated by incidents involving multiple victims and/or common offenders. Violation of this assumption has the practical consequence of making test statistics larger, thus making it more likely that differences will appear significant. Since the observed effects in these analyses are insignificant and usually in the wrong direction, it does not appear that violation of the independence assumption is a meaningful threat to our inferences.

[83] We also ran tests comparing only cases from 1993 (the last full year prior to passage and implementation of Title XI) and 1995 (the first full year following implementation of Title XI). These tests also failed to yield evidence of a post-ban reduction in the number of wounds per case.

Time trends in the monthly average of wounds per victim for Milwaukee and Seattle are displayed in Figure 6-2 and Figure 6-3. Figure 6-4 presents quarterly time trends for Jersey City. None of the graphs provide strong visual evidence of trends or changes in trends associated with the implementation of Title XI, but the Milwaukee and Seattle graphs are somewhat suggestive of upward pre-ban trends that may have been affected by the ban. We made limited efforts to estimate interrupted time series models (McCleary and Hay 1980) for these two series. The Milwaukee model provided no evidence of a ban effect,[84] and the efforts to model the Seattle data were inconclusive.[85] Because the ban produced no effects in Milwaukee or Seattle, it was not necessary to draw inferences about Jersey City as a comparison site.

Figure 6-2. Gunshot wounds per gun homicide victim by month, Milwaukee County, January 1992–December 1995



84 We tested the Milwaukee data under various theories of impact but failed to find evidence of an effect from the ban.

85 The Seattle data produced an autocorrelation function (see McCleary and Hay 1980) that was uninterpretable, perhaps as a result of the small number of gun murders per month in Seattle. Aggregating the data into larger time periods (such as quarters) would have made the series substantially shorter than the 40-50 observations commonly accepted as a minimum number of observations necessary for Box-Jenkins (i.e., ARIMA) modeling techniques (e.g., see McCleary and Hay 1980, p.20).

Figure 6-3. Gunshot wounds per gun homicide victim by month, King County (Seattle), January 1992–June 1996

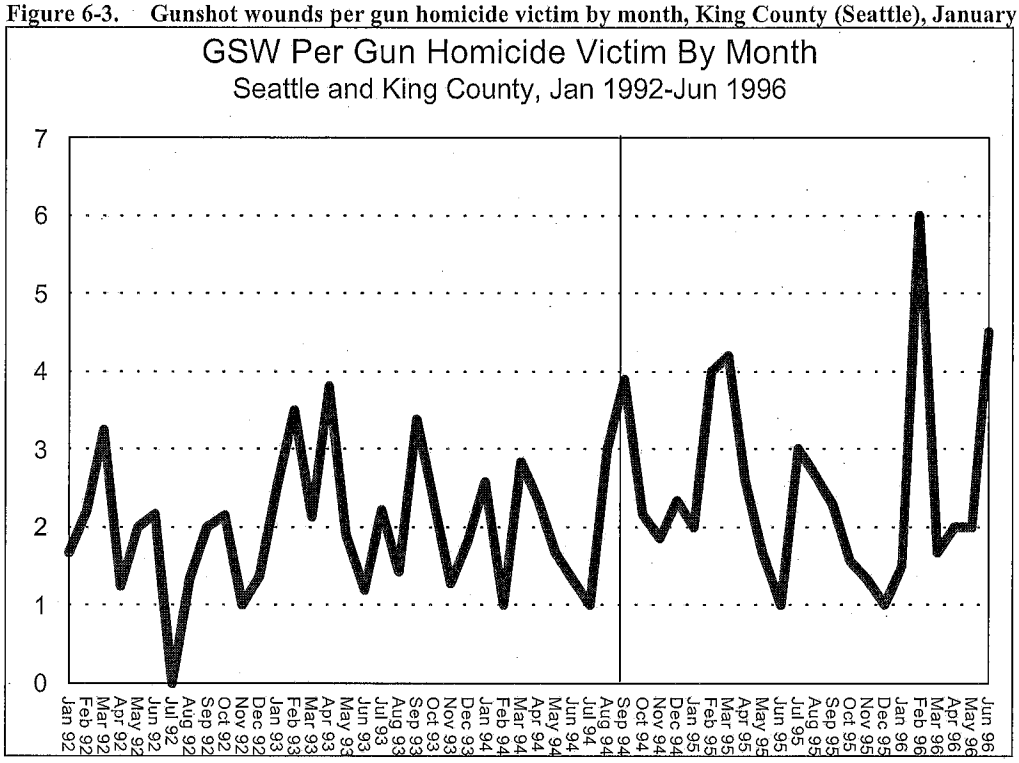
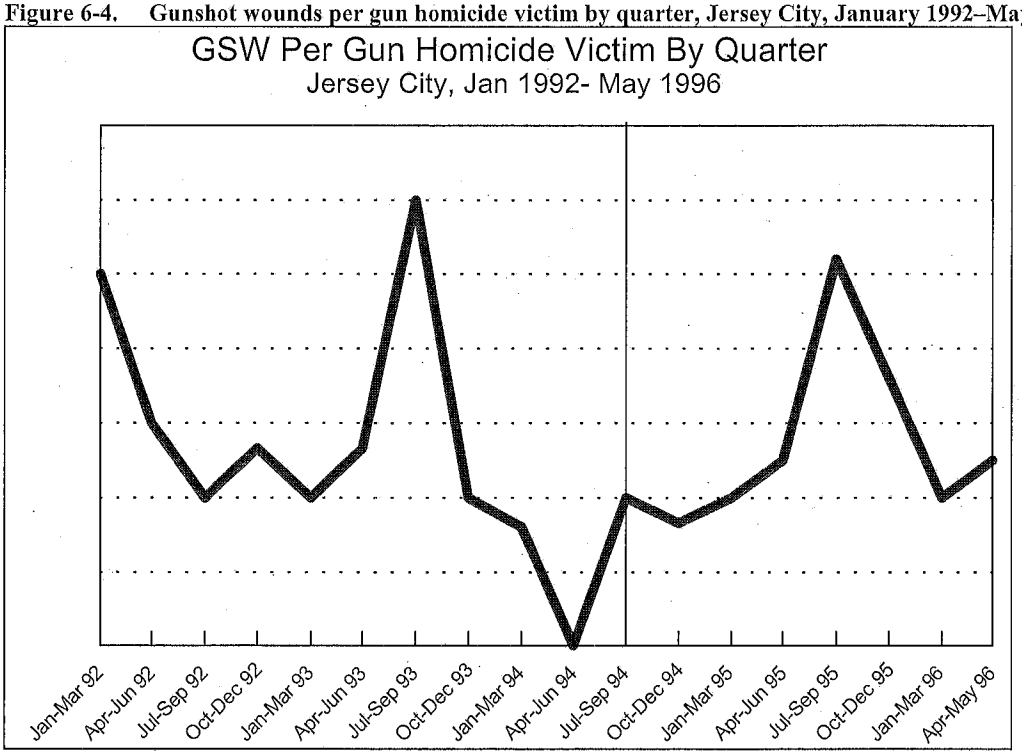


Figure 6-4. Gunshot wounds per gun homicide victim by quarter, Jersey City, January 1992–May 1996

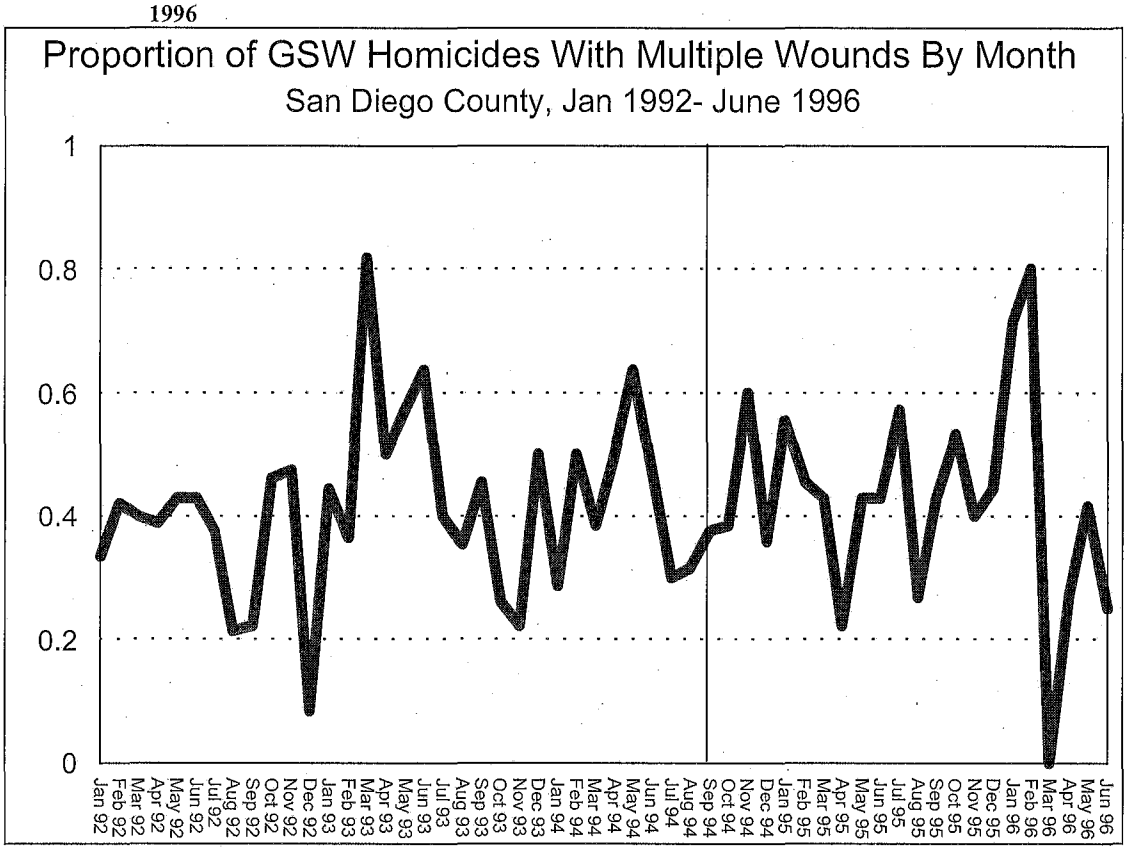


6.3.2. Proportion of Cases With Multiple Wounds: San Diego and Boston

The data from San Diego and Boston identified cases only as being single or multiple wound cases. We examined the proportions of pre-ban and post-ban cases involving multiple wounds and utilized contingency tables with chi-square tests to determine whether pre-ban and post-ban cases differed significantly.[86]

The proportion of San Diego County's gun homicide victims sustaining multiple wounds increased very slightly after the ban (see Table 6-4), thus providing no evidence of a ban impact. Nor do there appear to have been any significant temporal trends before or after the ban (see Figure 6-5).

Figure 6-5. Proportion of gunshot homicides with multiple wounds by month, San Diego County, January 1992–June 1996



The Boston data require further explanation and qualification. The data were taken from the Weapon-Related Injury Surveillance System (WRISS) of the Massachusetts Department of Public Health (MDPH). WRISS tracks gunshot and stabbing cases treated in acute care hospital emergency departments throughout the state.[87] These data have the unique advantage of providing trends for non-fatal victimizations, but they represent a biased sample of gunshot homicide cases because gun homicide victims found dead at the scene are not tracked by WRISS.[88] Since multiple wound victims can be expected to have a greater chance of dying at the scene, WRISS

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[86] Monthly and quarterly averages in the fraction of cases involving multiple wounds did not appear to follow discernible time trends for any of these series (see Figure 6-5 through Figure 6-8). Therefore, we did not analyze the data using time series methods.

[87] For a discussion of error rates in the determination of wound counts by hospital staff, see Randall (1993).

[88] The MDPH also maintains a database on all homicide victims, but this database does not contain single/multiple wound designations and data for 1995 are not complete as of this writing.

data are likely to underestimate the fraction of gun homicide victims with multiple wounds. While it is possible that this bias has remained constant over time, the gun homicide trends should be treated cautiously.

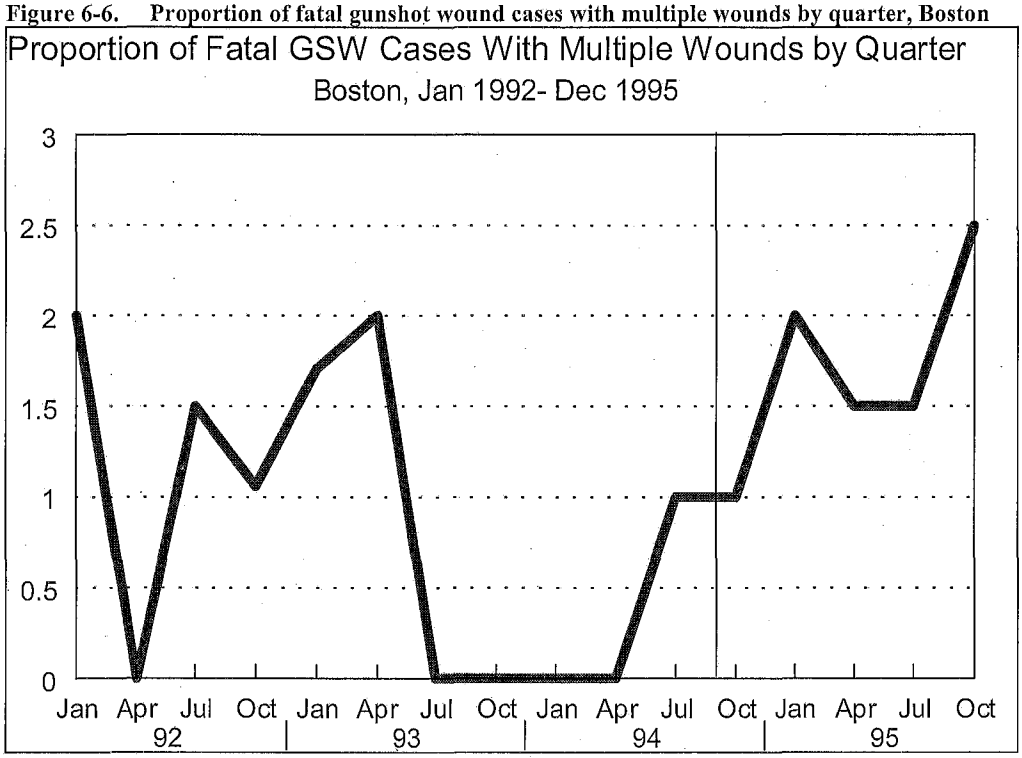
Table 6-4. Proportion of gunshot victims receiving multiple wounds, San Diego and Boston

	Cases	*Proportion with multiple wounds*	*Standard deviation*
San Diego homicides (N = 668)			
Pre-ban: January '92 - August '94	445	.41	.49
Post-ban: September '94 - June '96	223	.43	.50
Difference		.02	
$\xi^2 = 0.177$			
P level = .674			
Boston Gun homicides (N = 53)			
Pre-ban: January '92 - August '94	32	.50	.50
Post-ban: September '94 - December '95	21	.38	.50
Difference		-.12	
$\xi^2 = 0.725$			
P level = .39			
Boston non-fatal gunshot victims (N = 762)			
Pre-ban: January '92 - August '94	518	.18	.39
Post-ban: September '94 - December '95	244	.24	.43
Difference		.06	
$\xi^2 = 3.048$			
P level = .08			
Boston total gunshot victims (N = 815)			
Pre-ban: January '92 - August '94	550	.20	.40
Post-ban: September '94 - December '95	265	.27	.44
Difference		.07	
$\xi^2 = 4.506$			
P level = .03			

An additional concern with WRISS data is that system compliance is not 100 percent. Based on figures provided by MDPH, yearly hospital reporting rates in Boston during the study period were as follows: 63 percent for 1992; 69 percent for 1993; 75 percent for 1994; and 79 percent for 1995. It is thus possible that gunshot cases treated in non-reporting hospitals differ significantly from those treated in reporting hospitals with respect to single/multiple wound status. For all of these reasons, the Boston data should be interpreted cautiously. Overall, the WRISS captured 18 to 33 percent of Boston's gun homicides for the years 1992–94.

Pre-ban/post-ban comparisons for fatal, non-fatal, and total gunshot cases from WRISS are presented in Table 6-4. The proportion of multiple wound cases decreased only for gun homicides. This decrease was not statistically significant, but the sample sizes were very small and thus the statistical power of the test is rather low. Nonetheless, the non-fatal wound data, which are arguably less biased than the fatal wound data, show statistically meaningful increases in the proportion of cases with multiple wounds.[89] Figure 6-6 through Figure 6-8 present monthly or quarterly trends for each series. These trends fail to provide any visual evidence of a post-ban reduction in the proportion of multiple wound gunshot cases.[90] Thus, overall, the Boston data appear inconclusive.

Figure 6-6. Proportion of fatal gunshot wound cases with multiple wounds by quarter, Boston



[89] Further, the decrease for homicide cases could have been due to an increase in the proportion of multiple wound victims who died at the scene and were not recorded in the WRISS.

[90] As with the Milwaukee and Seattle data, we also ran supplemental tests with the San Diego and Boston data using only cases from 1993 and 1995. These comparisons also failed to produce evidence of post-ban reductions in the proportion of gunshot cases with multiple wounds.

Figure 6-7. Proportion of non-fatal gunshot wound cases with multiple wounds by month, Boston, January 1992–December 1995

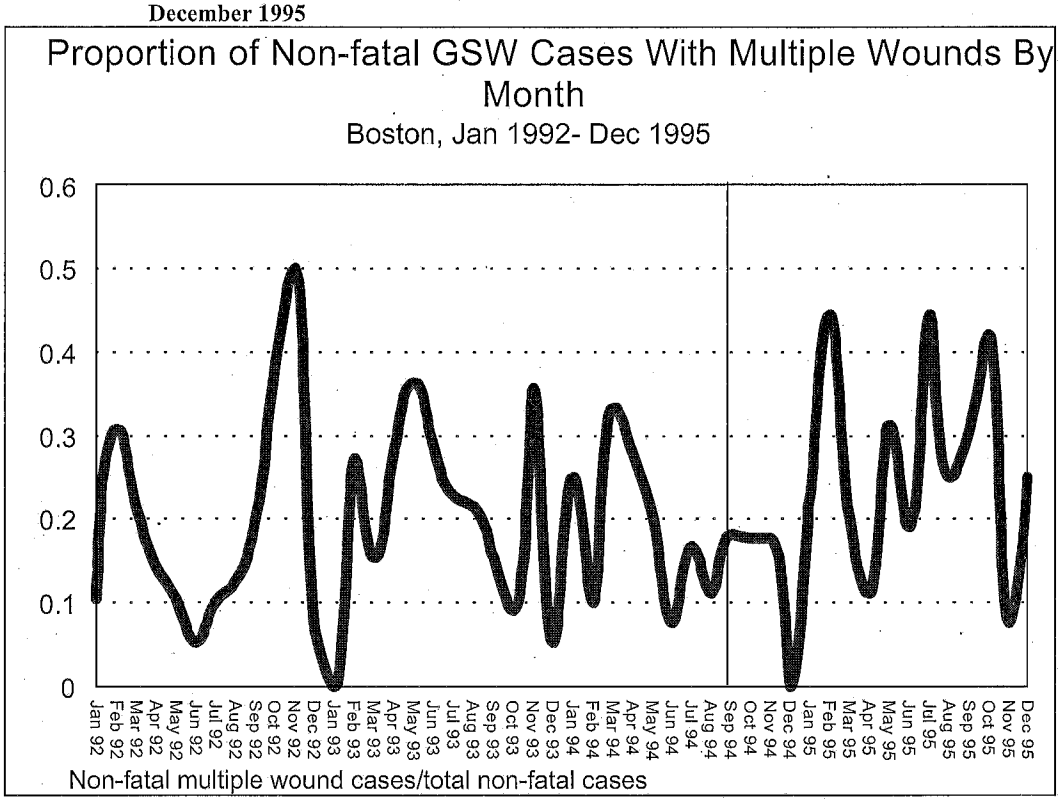
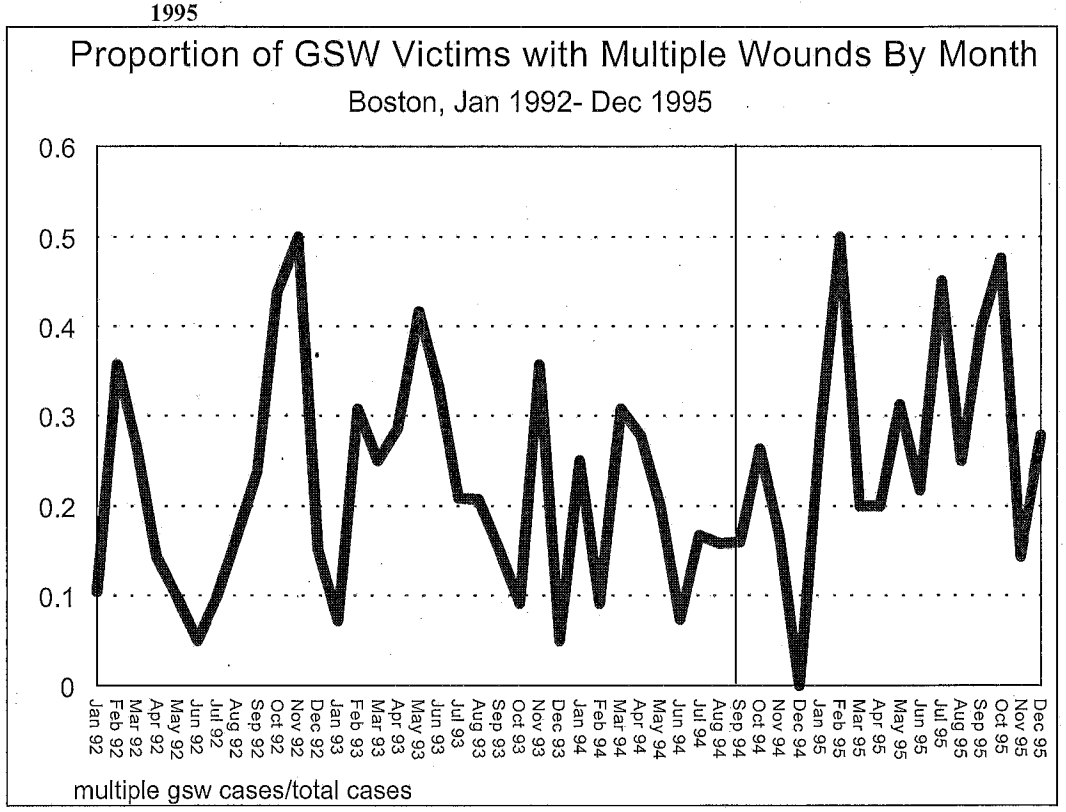


Figure 6-8. Proportion of gunshot wound victims with multiple wounds by month, Boston, January 1992–December 1995



6.3.3. Assault Weapons, Large-Capacity Magazines, and Multiple Wound Cases: Milwaukee

Most of the data sources used in this investigation contain little or no detailed information regarding weapon makes and models. Consequently, the validity of the previous analyses rest on indirect, inferred links between multiple wound gun homicides and expected changes in the use of assault weapons and large-capacity magazines.

However, we were able to make more explicit links between the banned weapons and gunshot wound counts by performing a cross-sectional analysis with the data from Milwaukee. Complete weapon make and model data were obtained for 149 guns associated with the 418 gun murders which occurred in Milwaukee County from 1992 through 1995. Eight of these firearms, or 5.4 percent, were assault weapons named in Title XI or copies of firearms named in Title XI (all of the assault weapons were handguns).[91] Table 6-5 shows the mean number of wounds for gun homicide victims killed with assault weapons and other guns. Note that in Table 6-5 we screened out two cases in which the victim appeared to have been shot with multiple firearms. One of these cases involved an assault weapon. The results in Table 6-5 indicate that victims killed with assault weapons were shot a little over three times on average, while victims killed with other firearms were shot slightly over two times on average. This difference was not statistically significant, but the small number of cases involving assault weapons makes the test rather weak.

Table 6-5. Gunshot wounds per gun homicide victim: Assault weapon and large-capacity magazine cases, Milwaukee

	Cases	*Average*	*Standard deviation*	*T value*	*P level*
Assault weapons v. other firearms (N = 147)					
Assault weapons	7	3.14	3.08		
Other firearms	140	2.21	2.87		
Difference		0.93		0.83	.41
Firearms with banned large-capacity magazines v. other firearms (N = 132)					
Large-capacity firearms	30	3.23	4.29		
Other firearms	102	2.08	2.48		
Difference		1.15		1.41*	.17

*T values were computed using formula for populations having unequal variances.

We also conducted a more general examination of cases involving any firearm with a large-capacity magazine. There were 132 cases in which a victim was killed with a firearm for which make, model, and magazine capacity could be determined (the magazine capacity variable corresponds to the magazine actually recovered with the firearm). This analysis also excluded cases in which the victim was shot with more than one firearm. In 30 of these cases (23 percent), the victim was killed with a firearm carrying a large-capacity magazine

[91] It is possible that other firearms in the database were assault weapons according to the features test of Title XI, but we did not have the opportunity to fully assess this issue.

banned by Title XI. As is shown in the bottom of Table 6-5, offenders killed with guns having banned large-capacity magazines received over three wounds on average. In contrast, persons killed with firearms having non-banned magazines received an average of two wounds. Despite the relatively small number of large magazine cases, the t statistic is moderately large and could be considered statistically meaningful with a one-tailed test.[92] In addition, we constructed a regression model in which wound counts were regressed upon magazine capacity and the number of perpetrators involved in the incident.[93] The large-capacity magazine coefficient was 1.24 with a two-tailed p level equal to 0.05 (however, the equation explained only 3 percent of the variance in wound counts). These admittedly crude comparisons support the hypothesis that large-capacity magazines are linked to higher numbers of shots fired and wounds inflicted.

6.3.4. Conclusions

Our multi-site analysis of gunshot wounds inflicted in fatal and non-fatal gunshot cases failed to produce evidence of a post-ban reduction in the average number of gunshot wounds per case or in the proportion of cases involving multiple wounds. These results are perhaps to be expected. Available data from national gun trace requests to BATF (see Chapter 5), Milwaukee (this chapter), and other cities (see Chapters 2 and 5) indicate that assault weapons account for only 1 to 7 percent of all guns used in violent crime. Likewise, our analysis of guns used in homicides in Milwaukee suggests that a substantial majority of gun homicides (approximately three-quarters) are not committed with guns having large-capacity magazines. Further, victims killed with large-capacity magazines in Milwaukee were shot three times on average, a number well below the ten-round capacity permitted for post-ban magazines. This does not tell us the actual number of shots fired in these cases, but other limited evidence also suggests that most gun attacks involve three or fewer shots (Kleck 1991; McGonigal et al. 1993). Finally, a faster rate of fire is arguably an important lethality characteristic of semiautomatics which may influence the number of wounds inflicted in gun attacks; yet one would not expect the Crime Act to have had an impact on overall use of semiautomatics, of which assault weapons were a minority even before the ban.

On the other hand, the analysis of Milwaukee gun homicides did produce some weak evidence that homicide victims killed with guns having large-capacity magazines tended to have more bullet wounds than did victims killed with other firearms. This may suggest that large-capacity magazines facilitate higher numbers of shots fired per incident, perhaps by encouraging gun offenders to fire more shots (a phenomenon we have heard some police officers refer to as a "spray and pray" mentality). If so, the gradual attrition of the stock of pre-ban large-capacity magazines could have important preventive effects on the lethality of gun violence. However, our analysis of wounds inflicted in banned and non-banned magazine cases was crude and did not control for potentially important characteristics of the incidents, victims, and offenders. We believe that such incident-based analyses would yield important information about the role of specific firearm characteristics in lethal and non-lethal gun violence and provide further guidance by which to assess this aspect of the Crime Act legislation.

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[92] Note that two cases involving attached tubular .22 caliber large-capacity magazines were included in the non-banned magazine group because these magazines are exempted by Title XI. In one of these cases, the victim sustained 13 wounds. In a second comparison, these cases were removed from the analysis entirely. The results were essentially the same; the two-tailed p level for the comparison decreased to .13.

[93] The regression model (N=138) included cases in which the victim was shot with more than one gun. Separate variables were included for the number of victims and the use of more than one firearm. Both variables proved insignificant, but the perpetrator variable had a somewhat larger t statistic and was retained for the model discussed in the main text.

6.4. Law Enforcement Officers Killed in Action

6.4.1. Introduction and Data

As a final measure of consequences stemming from the assault weapons ban, we examined firearm homicides of police officers. Assault weapons and other high capacity firearms offer substantial firepower to offenders and may be especially attractive to very dangerous offenders. Further, the firepower offered by these weapons may facilitate successful gun battles with police. We hypothesized that these weapons might turn up more frequently in police homicides than in other gun homicides, and that the Crime Act might eventually decrease their use in these crimes.

To investigate this issue, we obtained data from the Federal Bureau of Investigation (FBI) on all gun murders of police officers from January 1992 through May 1996.[94] The data include the date of the incident, the state in which the incident occurred, the agency to which the officer belonged, and the make, model, and caliber of the firearm reportedly used in the murder. During this period, 276 police officers were killed by offenders using firearms. Gun murders of police peaked in 1994 (see Table 6-6). Data for 1995 and early 1996 suggest a decline in gun murders of police. However, any drop in gun murders of police could be due to more officers using bullet-proof vests, changes in policing tactics for drug markets, or other factors unrelated to the assault weapons ban. Moreover, the 1995 and 1996 data we received are preliminary and thus perhaps incomplete. For these reasons, we concentrated on the use of assault weapons in police homicides and did not attempt to judge whether the assault weapon ban has caused a decline in gun murders of police.

Table 6-6. Murders of police officers with assault weapons

Year	*Total gun murders of police officers*	*Officers killed with assault weapons*	*Proportion of victims killed with assault weapons (minimum estimate)*	*Proportion of victims killed with assault weapons for cases in which gun make is known*
1992	54	0	0%	0%
1993	67	4	6%	8%
1994	76	9	12%	16%
1995*	61	7	11%	16%
1996* (Jan–May)	18	0	0%	0%

*Data for 1995 and 1996 are preliminary

Even this more limited task was complicated by the fact that complete data on the make, model, and caliber of the murder weapon were not reported for a substantial proportion of these cases. The number of cases by year for which at least the gun make is known are 43 (80%) for 1992, 49 (73%) for 1993, 58 (76%) for 1994, 44 (72%) for 1995, and 10 (56%) for 1996.

6.4.2. Assault Weapons and Homicides of Police Officers

We focused our investigation on all makes and models named in Title XI and their exact copies. We also included our selected features test guns (Calico and Feather models), although we did not make a systematic

[94] These data are compiled annually by the FBI based on reports submitted by law enforcement agencies throughout the country.

assessment of all guns which may have failed the features test of the Crime Act as produced by their manufacturers.[95] Using these criteria, our estimate is that 20 officers were murdered by offenders using assault weapons during this period. (In some of these cases, it appears that the same weapon was used to murder more than one officer). Of these cases, 3 involved Intratec models, 6 were committed with weapons in the SWD family, 3 involved AR15's or exact AR15 copies, 2 cases involved Uzi's, and 6 cases identified AK-47's as the murder weapons.[96] [97] These cases accounted for about 7% of all gun murders of police during this period. This 7% figure serves as a minimum estimate of assault weapon use in police gun murders. A more accurate estimate was obtained by focusing on those cases for which, at a minimum, the gun make was reported. Overall, 10% of these cases involved assault weapons, a figure higher than that for gun murders of civilians.[98]

All of the assault weapon cases took place from 1993 through 1995 (see Table 6-6). For those three years, murders with assault weapons ranged from 6% of the cases in 1993 to 12% in 1994. Among those cases for which firearm make was reported, assault weapons accounted for 8% in 1993 and 16% in both 1994 and 1995. All of these cases occurred prior to June 1995. From that point through May of 1996, there were no additional deaths of police officers attributed to assault weapons. This is perhaps another indication of the temporary or permanent decrease in the availability of these weapons which was suggested in Chapter 5.

In sum, police officers are rarely murdered with assault weapons. Yet the fraction of police gun murders perpetrated with assault weapons is higher than that for civilian gun murders. Assault weapons accounted for about 10% of police gun murders from 1992 through May of 1996 when considering only those cases for which the gun make could be ascertained. Whether the higher representation of assault weapons among police murders is due to characteristics of the weapons, characteristics of the offenders who are drawn to assault weapons, or some

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[95] With the available data, it is not possible for us to determine whether otherwise legal guns were modified so as to make them assault weapons.

[96] There is a discrepancy between our data and those provided elsewhere with respect to a November 1994 incident in which two FBI agents and a Washington, D.C. police officer were killed. In a study of police murders from January 1994 through September 1995, Adler et al. (1995) reported that the offender in this case used a TEC9 assault pistol. The FBI data identify the weapon as an M11. (The data actually identify the gun as a Smith and Wesson M11. However, Smith and Wesson does not make a model M11. We counted the weapon as an SWD M11.)

In addition, Adler et al. identified one additional pre-ban incident in which an officer was killed with a weapon which may have failed the features test (a Springfield M1A). We are not aware of any other cases in our data which would qualify as assault weapon cases based on the features test, but we did not undertake an in-depth examination of this issue. There were no cases involving our select features test guns (Calico and Feather models).

[97] The weapon identifications in these data were made by the police departments reporting the incidents, and there is likely to be some degree of error in the firearm model designations. In particular, officers may not always accurately distinguish banned assault weapons from legal substitutes or look-alike variations. We note the issue here due to the prominence of AK-47's among guns used in police homicides. There are numerous AK-47 copies and look-alikes, and firearm experts have informed us that legal guns such as the SKS rifle and the Norinco NHM-90/91 (a modified, legal version of the AK-47) are sometimes, and perhaps commonly, mistakenly identified as AK-47's.

[98] In consultation with BATF officials, we developed a list of manufacturers who produced models listed in the Crime Act and exact copies of those firearms. We were thus able to determine whether all of the identified makes in the FBI file were assault weapons.

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Appendix A
Assault Weapons and Mass Murder

INTRODUCTION: MASS MURDERS AS AN IMPACT MEASURE

As another indicator of ban effects on the consequences of assault weapon use, we attempted to analyze pre- and post-ban trends in mass murders, which we defined as the killing of four or more victims at one time and place by a lone offender. Although we lacked advance information on the proportion of mass murders involving assault weapons, we had two reasons for believing that assault weapons were more prevalent in mass murders than in events involving smaller numbers of victims:

1) A weapon lethality/facilitation hypothesis, that assault weapon characteristics, especially high magazine capacities, would enable a rational but intent killer to shoot more people more rapidly with an assault weapon than with many other firearms.

2) A selection hypothesis, that certain deranged killers might tend to select assault weapons to act out "commando" fantasies (e.g., see Holmes and Holmes 1994, pp.86-87).

In addition, we believed that newspaper reports of mass murders might carry more detail than reports of other murders, and that these reports might provide insights into the situational dynamics of mass murders involving assault weapons.

Our attempt to construct and analyze a 1992–96 trend line in mass murders using Nexis searches of U.S. news sources foundered, for two primary reasons. First, apparent variations in reporting or indexing practices forced us to alter our search parameters over the period, and so all three kinds of variation introduce validity problems into the trends. Second, newspaper accounts were surprisingly imprecise about the type of weapon involved. In some cases, the offender had not yet been apprehended and thus the make and model of the weapon was probably unknown. In other instances, there was apparent inattention or confusion regarding the make, model, and features. Finally, some offenders were armed with multiple weapons when they committed their crimes or when they were captured, and it was unclear to the reporter which weapon accounted for which death(s).[1]

Nevertheless, our mass murder analysis produced several interesting, though tentative, findings. First, SHR and news media sources both appear to undercount mass murders under our definition, and our capture-recapture analysis suggests that their true number may exceed the count based on either source by something like 50 percent. Second, contrary to our expectations, only 2 — 3.8 percent — of the 52 mass murders we gleaned from the Nexis search unambiguously involved assault weapons. This is about the same percentage as for other murders. Third, media accounts lend some tenuous support to the notion that assault weapons are more deadly than other weapons in mass murder events, as measured by victims per incident.

Our search methodology and the findings above are explained more fully in the following sections, which conclude with recommendations for further related research.

[1] It is also not unusual for news accounts to use imprecise terms like "assault rifle" when describing a military-style firearm. However, we did not encounter any such cases in our particular sample.

Defining Mass Murders and Sample Selection

In general terms, a mass murder is the killing of a number of people at one time and place. The time requirement in particular sets mass murders apart from serial murders, which take place over a very long timeframe. We focused our analysis upon mass murders committed with firearms, and we chose four victims for our operational definition of mass murder.[2] In addition, we focused upon cases in which the murders were committed by one offender. We selected the victim and offender criteria based on practicality and because they arguably fit better with the weapon lethality/weapon facilitation argument. If assault weapons do contribute to mass murder, we hypothesized that they will enable a single offender to murder greater numbers of people at one time. Thus, we selected a subset of mass murders for which we felt assault weapons might plausibly play a greater role.

Project staff conducted Nexis searches for multiple-victim firearm murder stories appearing in U.S. news sources from 1992 through the early summer of 1996. Fifty-two stories meeting our firearm mass murder criteria were found. A breakdown of these cases by year is shown in the bottom row of table A-1.[3] Cases ranged from a low of 3 in 1994 and 1996 to a high of 20 in 1995. We urge caution in the interpretation of these numbers. Although project staff did examine well over a thousand firearm murder stories, we do not claim to have found all firearm mass murders occurring during this time. Rather, these cases should be treated as a possibly unrepresentative sample of firearm mass murders. Further, we do not recommend using these numbers as trend indicators. We refined our search parameters several times during the course of the research, and we cannot speak to issues regarding changes in journalistic practices (or Nexis coverage) which may have occurred during this period and affected our results. This portion of the evaluation was more exploratory in nature, and the primary goal was to assess the prevalence of assault weapons among a sample of recent mass murder incidents.

Table A-1. Mass murder newspaper reports, by weapon type and year of event

	1992	*1993*	*1994*	*1995*	*1996*	*Total*
Semiautomatics						
Handgun	4	3	1	7	1	16
Rifle	0	0	0	2	0	2
Generic weapon types						
Revolver	0	0	0	1	0	1
Other non-semiautomatic handgun	0	0	0	0	0	0
Handgun, type unknown	2	2	0	1	0	5
Non-semiautomatic rifle	0	0	0	1	0	1
Rifle, type unknown	1	1	0	0	0	2
Non-semiautomatic shotgun	0	0	0	1	0	1
Shotgun, type unknown	2	3	0	1	0	6
Unknown firearm	5	2	2	6	2	17

[2] As Holmes and Holmes (1994, pp.71-73) have noted, most scholars set the victim criterion for mass murder at three or four victims.

[3] Table A-1 excludes 1 of the 52 for which we were unable to ascertain the date of the mass murder.

CERTIFICATE OF SERVICE

Case Name: **Duncan, Virginia et al v. Xavier Becerra** No. **17-56081**

I hereby certify that on October 12, 2017, I electronically filed the following documents with the Clerk of the Court by using the CM/ECF system:

APPELLANT'S EXCERPTS OF RECORD, VOLUME II, ER 0176-0459

I certify that **all** participants in the case are registered CM/ECF users and that service will be accomplished by the CM/ECF system.

I declare under penalty of perjury under the laws of the State of California the foregoing is true and correct and that this declaration was executed on October 12, 2017, at San Francisco, California.

N. Newlin	s/ N. Newlin
Declarant	Signature

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