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IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF CALIFORNIA

WILLIAM WIESE, et al.,

Plaintiff,

v.

XAVIER BECERRA, et al.,

Defendant.

2:17-cv-00903-WBS-KJN

**DECLARATION OF PROFESSOR JOHN
J. DONOHUE**

Date: June 16, 2017
Time: 10:00 a.m.
Courtroom: 5, 14th Floor
Judge: Hon. William B. Shubb
Trial Date: None Set
Action Filed: April 28, 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. (A copy of my complete cv is attached as Exhibit A.) 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, Tohoku 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 an NRA challenge 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 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. Finally, I filed an expert declaration on June 4, 2017 in a case challenging California’s ban on the possession of large-capacity magazines in *Duncan v. Becerra*, United States District Court (S.D. Cal.), Case No. 17-cv-1017-BEN-JLB.

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

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, which both find a persistent decline in household gun ownership over the past several decades. A recent report from the Pew Research Center states:

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).

1 The Pew Research Center has tracked gun ownership since 1993, and our surveys largely
2 confirm the General Social Survey trend. In our December 1993 survey, 45% reported
3 having a gun in their household; in early 1994, the GSS found 44% saying they had a gun
4 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

5
6 15. While the GSS in 2016 put the percentage of American households with guns at less
7 than 31%, the most recent Gallup survey found that 39% of American adults live in a household
8 that contains a gun, and 29% personally own one. There is no consensus about why Gallup's
9 estimates are somewhat higher than those from the above sources, although it should be noted
10 that the Gallup polls are far smaller surveys based on less reliable telephone interviews with
11 dramatically lower response rates than the GSS. The weight of the survey evidence on gun
12 ownership conducted over time shows that the percentage of household with guns today is lower
than it was two decades ago.

13 16. The evidence that gun ownership is concentrated is strong and uncontradicted.
14 Researchers analyzing the results of a 2015 national survey found that 8% of individual gun
15 owners reported owning ten or more firearms—collectively accounting for 39% of the American
16 gun stock—and that the 20% of gun owners who owned the most guns collectively possessed
17 about 60% of the nation's guns.³ A decade earlier, researchers found a similar pattern: a 2004
18 survey indicated that 48% of gun owners possessed four or more guns and that the top 20% of
19 firearms owners possessed 65% of all firearms.⁴

20 17. The FBI publishes records of the number of background checks requested, and such
21 background checks are often initiated pursuant to a desired purchase of firearms. With only a
22 couple of exceptions, the trend has been for the number of background checks conducted each
23

24
25 ² [<http://www.people-press.org/2013/03/12/section-3-gun-ownership-trends-and-demographics>.]

26 ³ See Azrael et al., *supra*.

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

1 year to grow every year.⁵ Gun industry trade groups cite increased background checks and an
2 increase in collections of the federal excise taxes collected on the sale of firearms and
3 ammunition as reflecting strong demand for firearms.⁶

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

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

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

19 21. A review of the resolution of mass shootings and other public shootings unleashed
20 with large-capacity magazines in the U.S. suggests that bans on large-capacity magazines can
21 help save lives by forcing mass shooters to pause and reload ammunition. Citizens have
22 frequently taken advantage of a perpetrator stopping to reload his weapon to tackle him or
23

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

26 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/>.

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

1 otherwise subdue him in at least 20 separate shootings in the United States since 1991, notably
 2 including the December 7th, 1993 shooting of passengers on a Long Island Railroad car,⁸ the
 3 October 29th, 1994 shooting near the grounds of the White House,⁹ and the January 8th, 2011
 4 shooting in Tucson, AZ that targeted U.S. Congresswoman Gabby Giffords.¹⁰ In many other
 5 incidents, targeted victims were able to escape while a shooter reloaded. Perhaps the most vivid
 6 illustration of this benefit was seen when at least nine children at Sandy Hook Elementary School
 7 were able to escape while Adam Lanza reloaded his 30 round LCM.¹¹

8 22. The complaint in this case notes that “In 1999, through passage of Senate Bill 23,
 9 California enacted legislation generally banning methods of acquiring ... ammunition feeding
 10 devices that can hold more than ten rounds (so-called “large-capacity magazines”, as defined in
 11 Penal Code § 16740).”

12 23. In other words, for 18 years, California residents have been banned from acquiring
 13 such large-capacity magazines, and the plaintiffs are now seeking to complain as the state levels
 14 the playing field by banning any further possession of these devices.

15 24. There is not the slightest evidence that 18 years of California’s restrictions on large-
 16 capacity magazines or the federal restrictions on large-capacity magazines that were enacted five
 17 years earlier in 1994 (and lapsed ten years later) compromised the security of any law-abiding
 18 citizen. But since large-capacity magazines are useful for those bent on mass killing, further

19 ⁸ “DEATH ON THE L.I.R.R.: The Rampage; Gunman in a Train Aisle Passes Out
 20 Death,” *The New York Times*, December 9, 1993 -
 21 <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).

22 ⁹ “Public Report of the White House Security Review,” Department of the Treasury, 1995
 23 - <http://www.fas.org/irp/agency/ustreas/ussst/t1pubrpt.html> (Chinese-made SKS semiautomatic
 24 rifle, 30 round magazine).

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

28 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). While some contend that 11 children were saved in this fashion at Sandy
 Hook, Louis Klarevas puts the number at 9 in his book, *Rampage Nation: Securing America from
 Mass Shootings* (Amherst, NY: Prometheus 2016). p. 22.

1 limiting their availability will have a beneficial effect on a problem that is serious and growing in
2 the United States. Presumably, this fact explains why the citizens of California voting via
3 referendum (adopting Proposition 63) and through their elective representatives (in passing SB
4 1446) have clearly expressed a strong preference for banning large-capacity magazines.

5 25. While the plaintiffs seek special treatment to be allowed to possess what other
6 citizens of California have been barred from acquiring for the better part of two decades, they
7 offer no rationale using a careful evaluation of the costs and benefits of maintaining large-
8 capacity magazines within the state for why such special treatment would be warranted.
9 Moreover, the task of law enforcement is greatly complicated by a regime that provides special
10 treatment to one category of holders of large-capacity magazines, since identifying when and
11 under what circumstances a large-capacity magazine was acquired will not be easy for a police
12 officer.

13 26. It should be noted that even if a ban on large-capacity magazines does not reduce the
14 criminal use of guns, it can be expected to reduce the overall death toll from the criminal use of
15 guns for a host of reasons.

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

23 28. Second, while the plaintiffs conjure a situation that a law-abiding citizen will be
24 overwhelmed by a criminal who carries a firearm with an LCM, the fact is that fewer law-abiding
25 citizens will confront such a situation if LCM's are banned. The federal assault weapons ban –
26 which did not contain a ban on possession of LCM's, and thus would be considerably less
27 effective than the more complete California prohibition – led to increases in the price of LCM's.
28 Therefore, California's LCM ban should elevate the cost that a criminal will need to pay to

1 procure an LCM, which means that fewer criminals will be equipped with LCM's (under standard
 2 economic principles). In other words, fewer law-abiding individuals will be confronted by a
 3 criminal with an LCM because of the LCM ban.

4 29. Third, most mass killings by Americans involve the use of guns, and many of these
 5 killers – Adam Lanza (Newtown), James Holmes (the Batman movie killer in Aurora, Colorado
 6 killed 12 and injured 70), Jared Loughner (shooting Congresswoman Gabby Giffords) to name
 7 just a few – were drawn to a vision of killing large number of individuals in a certain way that
 8 included the use of LCM's. On November 5, 2009, Nidal Hassan killed 13 and injured more than
 9 30 others at Fort Hood, near Killeen, Texas. When Hasan purchased his killing arsenal, he asked
 10 for "the most technologically advanced weapon on the market and the one with the highest
 11 standard magazine capacity."¹² This is exactly what one would do if one wanted to simply kill as
 12 many people as possible in the shortest amount of time. If one is serious about stopping mass
 13 killings, a good first step is to deprive such killers of their preferred killing approaches.¹³

14 30. Indeed, the events of earlier today involving the mass shooting in Virginia that
 15 wounded Congressman Steve Scalise, while too early to provide definitive assessments, may well
 16 underscore the increased danger to the public associated with weapons equipped with large-
 17 capacity magazines.¹⁴

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

22 ¹³ Anders Breivik who committed mass murder in Norway was aided in his efforts
 23 because of lax rules concerning LCM's in the United States. Breivik was very unhappy that he
 24 could not get the large-capacity magazines that he wanted to use since they were banned in
 25 Europe. In his manifesto, he wrote about his attempts to legally buy weapons, stating, "I envy our
 26 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/>.

27 ¹⁴ Michael Shear et al, "Steve Scalise Among 4 Shot at Baseball Field; Suspect is Dead,"
 28 The New York Times, June 14, 2017, https://www.nytimes.com/2017/06/14/us/steve-scalise-congress-shot-alexandria-virginia.html?_r=1.

31. 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 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 worse¹⁵).

32. 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.

33. In the face of the clear evidence from around the United States and the world, some of the comments in the declarations seem to suggest that large-capacity magazines might protect against crime rather than simply increase the death toll. First, 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.

¹⁵ 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>.

34. Second, 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.”¹⁶
- “When victims are attacked, 98 percent of the time merely brandishing a gun is enough to cause the criminal to stop his attack.”¹⁷
- “Considerable evidence supports the notion that permitted handguns deter criminals. In 98% of the cases, people simply brandish weapons to stop attacks.”¹⁸

35. Gary Kleck offers 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.”¹⁹

36. 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.”²⁰

37. 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.

¹⁶ 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.

¹⁷ John R. Lott, Jr., Packing Protection, Letters, *Chicago Sun-Times*, April 30, 1997, Pg. 52.

¹⁸ John R. Lott Jr., “Unraveling Some Brady Law Falsehoods,” *Los Angeles Times*, July 2, 1997.

¹⁹ Guns and Self-Defense by Gary Kleck, Ph.D., <http://www.pulplless.com/gunclock/kleck2.html>.

²⁰ 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>.

1 38. Should there be a future case of a law-abiding citizen who 1) has a gun and 2) the
2 need and opportunity to use it in self-defense, and 3) the desire to fire more than 10 rounds, the
3 individual can either re-load the defensive weapon by inserting a new clip or by using a second
4 weapon, which an increasingly large number of gun owners currently possess. This implies that
5 the LCM ban, which is designed to limit the mayhem caused by criminals engaging in the most
6 dangerous forms of violent criminal behavior, is likely to have little or no impact on the defensive
7 capabilities of law-abiding citizens.

8 39. I reviewed a declaration by James Curcuruto who works for a “trade association for
9 the firearms industry.” I could not understand how his comments about the number of LCM’s in
10 other states was relevant to whether banning large-capacity magazines would save the lives of
11 Californians. Obviously, if Congress had banned LCM’s sufficiently earlier than 1994 and
12 retained the ban there would be few in the hands of law-abiding citizens today. Governments
13 certainly don’t lose their rights to protect their citizens simply because they do not perceive the
14 need for action quickly enough.

15 40. I also reviewed the declaration of plaintiff’s expert firearm instructor Massad Ayoob,
16 who stated:

17 “The average citizen is not trained like law enforcement personnel and is thus
18 generally not readily prepared, mentally or physically, for combat with an armed
19 criminal. As noted, they are likely to have a single firearm loaded with a
20 single magazine available, and they are more susceptible to the psychological
21 effects of fear, anxiety, and stress that naturally occur when faced with the threat of
22 deadly violence and tend to deprive one of the focus and clarity of mind necessary
23 to make accurate shots at the attacker.”

24 41. Of course, this is true, which also explains why citizen defense with guns occurs in
25 such a tiny fraction of violent crimes. Ayoob offers no reason to believe that equipping a fearful,
26 stressed individual who is unprepared both physically and mentally for combat with an armed
27 criminal with more potent killing power will enhance citizen safety. As every gun expert knows,
28 bullets from modern guns with large-capacity magazines can easily penetrate walls, which means

1 that poorly directed shooting will pose a significant threat to other family members and
2 neighbors.

3 42. I also reviewed the declaration of plaintiff's expert D. Allen Youngman of an arms
4 advisory council, who stated:

5
6 "From my experience in this industry, I am aware that there is no market, or would be no
7 market, for the purchase and sale of used ammunition magazines that are 17 years old or
8 older. ... used magazines, from unknown sources, may suffer from defects such as worn
9 springs, followers and feed lips, which may greatly impair their reliability. Furthermore,
10 with literally tens of millions of new standard-capacity magazines on the market nation-
11 wide, many of them reflective of advances in materials and design over the past several
12 years, there is no reason for someone, law enforcement or civilian, to buy older ones from
13 unknown sources. For these reasons, there is or would be very little demand for magazines
14 sold by retailers, re-selling 17+ year old magazines, especially much older ones, within the
15 United States generally."

16 Given the robust markets in second-hand goods that exist in the United States, Youngman's
17 comments would only be true if the old magazines that are being banned are worthless. Indeed,
18 one would think from Youngman's comments that no one could rely on such old and unreliable
19 technology for self-defense. This would seem to completely undermine the major claims of the
20 plaintiffs' case.

21 43. Finally, I have also reviewed the declaration of plaintiff's expert Carlisle Moody, who
22 states:

23 "in my prior studies of mass shootings using data from many different sources, including a
24 2016 book from Louis Klarevas, a *Mother Jones* database involving 89 mass-shooting
25 incidents from 1982-2016, and a study by the FBI on what they call "active shooter"
26 incidents, I have concluded that bans concerning large-capacity magazines have no effect
27 on the prevalence or lethality of these incidents."

28 44. It must be noted, however, that the researcher who Moody references -- Louis
Klarevas, an Associate Lecturer of Global Affairs at the University of Massachusetts-Boston and
the author of *Rampage Nation: Securing America from Mass Shootings* (Amherst, NY:
Prometheus 2016) -- reaches the exact opposite conclusion to Moody.

45. Unlike Moody, Klarevas, who has become the primary authority on research
concerning mass shootings in the United States, concludes that bans on large-capacity magazines
will be effective in reducing the death toll from mass shootings. Klarevas finds that the use of

1 large-capacity magazines leads to more bullet wounds for victims (thereby substantially
2 increasing the death toll of those who are shot), results in more shots fired (thus increasing the
3 number of individuals who are shot), and reduces the capacity of potential victims to flee to safety
4 or take effective defensive action.

5 46. While the limited time that I had available to prepare this declaration prevents me
6 from going through all the details of the Moody declaration, it is immediately obvious that the list
7 of mass shootings in California that Moody offers is oddly flawed. For example, Moody makes
8 no reference to the horrible Covina massacre in which 8 individuals were killed by a crazed
9 gunmen on December 24, 2008. Since this gun massacre is discussed in the Klarevas book that
10 Moody said that he consulted, I have no idea why it is not included in his discussion of California
11 mass shootings.

12
13
14
15 Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true
16 and correct.

17
18 Executed on: June 14, 2017

19
20 

21 John J. Donohue
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CERTIFICATE OF SERVICE

Case Name: **Wiese, William, et al. v.
Xavier Becerra, et al.**

No. **2:17-cv-00903-WBS-KJN**

I hereby certify that on June 15, 2017, I electronically filed the following documents with the Clerk of the Court by using the CM/ECF system:

DECLARATION OF PROFESSOR JOHN J. DONOHUE

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 June 15, 2017, at San Francisco, California.

N. Newlin
Declarant

/s/ N. Newlin
Signature

Exhibit A

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EMPLOYMENT

Full-time Positions

- Stanford Law School, C. Wendell and Edith M. Carlsmith Professor of Law, September 2010 to the present.
- Yale Law School, Leighton Homer Surbeck Professor of Law, July 2004 to August 2010.
- Stanford Law School, Professor of Law, September 1995 to June 2004.
 - William H. Neukom Professor of Law, February 2002 – June 2004.
 - John A. Wilson Distinguished Faculty Scholar, March 1997 – January 2002.
 - Academic Associate Dean for Research, since July 2001 – July 2003.
 - Stanford University Fellow, September 2001 – May 2003.
- Northwestern University School of Law:
 - Class of 1967 James B. Haddad Professor of Law, September 1994-August 1995
 - Harry B. Reese Teaching Professor, 1994-1995
 - Professor of Law, May 1991-September 1994
 - Associate Professor, May 1989-May 1991
 - Assistant Professor, September 1986-May 1989.
- Research Fellow, American Bar Foundation, September 1986-August 1995.
- Associate Attorney, Covington & Burling, Washington, D.C., October 1978-July 1981 (including last six months as Attorney, Neighborhood Legal Services)
- Law Clerk to Chief Justice T. Emmet Clarie, U.S. District Court, Hartford, Connecticut, September 1977-August 1978.

Temporary Appointments

- Fellow of the Society for Empirical Legal Studies, 2015-2016
- Visiting Professor, Bocconi University, Milan, Italy, October- November 2012, April 2014, and June 2015.
- 2011 Faculty Scholar in Residence, University of Denver Sturm College of Law, April 21-22, 2011.
- Visiting Fellow, The Milton Friedman Institute for Research in Economics, University of Chicago, October 2009
- Schmidheiny Visiting Professor of Law and Economics, St. Gallen University, November – December, 2007.
- Visiting Lecturer in Law and Economics, Gerzensee Study Center, Switzerland, June 2007.
- Visiting Professor, Tel Aviv University School of Law, May 2007.
- Herbert Smith Visitor to the Law Faculty, University of Cambridge, England, February 2006.

- Visiting Professor, Harvard Law School, January 2003.
- Fellow, Center for Advanced Studies in the Behavioral Sciences, Stanford, California, Academic year 2000-01.
- Visiting Professor, Yale Law School, Fall, 1999.
- Professor, Center for the Study of American Law in China, Renmin University Law School, Beijing, July 1998.
- Visiting Professor of Law and Economics, University of Virginia, January 1997.
- Lecturer, Toin University School of Law, Yokohama, Japan, May-June 1996.
- Cornell Law School, Distinguished Visiting Fellow in Law and Economics, April 8-12, 1996 and September 25-29, 2000
- Visiting Professor, University of Chicago Law School, January 1992-June 1992.
- Visiting Professor of Law and Economics, University of Virginia Law School, January 1990-May 1990.
- Fellow, Yale Law School Program in Civil Liability, July 1985-August 1986.
- Private Practice (part-time), New Haven, Connecticut, September 1981-August 1986.
- Instructor in Economics, Yale College, September 1983-August 1985.
- Summer Associate, Donovan Leisure Newton & Irvine, New York, Summer 1982.
- Summer Associate, Perkins, Coie, Stone, Olsen & Williams, Seattle, Washington, Summer 1976.
- Research Assistant, Prof. Laurence Lynn, Kennedy School of Government, Harvard University, Summer 1975.
- LSAT Tutor, Stanley Kaplan Education Center, Boston, Massachusetts; Research Assistant, Prof. Philip Heymann, Harvard Law School; Research Assistant, Prof. Gordon Chase, Harvard School of Public Health. (During Law School).

EDUCATION

Yale University, 1981-1986

- University Fellow in Economics; M.A. 1982, M. Phil. 1984, Ph.D. 1986.
 - Dissertation: "A Continuous-Time Stochastic Model of Job Mobility: A Comparison of Male-Female Hazard Rates of Young Workers." Awarded with Distinction by Yale.
 - Winner of the Michael E. Borus Award for best social science dissertation in the last three years making substantial use of the National Longitudinal Surveys--awarded by the Center for Human Research at Ohio State University on October 24, 1988.
- National Research Service Award, National Institute of Health.
- Member, Graduate Executive Committee; Graduate Affiliate, Jonathan Edwards College.

Harvard Law School, 1974-1977 (J.D.)

- Graduated Cum Laude.
- Activities: Law Clerk (Volunteer) for Judge John Forte, Appellate Division of the District Court of Central Middlesex; Civil Rights, Civil Liberties Law Review; Intra-mural Athletics; Clinical Placement (Third Year): (a) First Semester: Massachusetts Advocacy Center; (b) Second Semester: Massachusetts Attorney General's Office--Civil Rights and Consumer Protection Divisions. Drafted comments for the Massachusetts Attorney

General on the proposed U.S. Department of Justice settlement of its case against Bechtel Corporation's adherence to the Arab Boycott of Israeli companies.

Hamilton College, 1970-1974 (B.A.)

- Departmental Honors in both Economics and Mathematics
 - Phi Beta Kappa (Junior Year)
- Graduated fourth in class with the following academic awards:
 - Brockway Prize
 - Edwin Huntington Memorial Mathematical Scholarship
 - Fayerweather Prize Scholarship
 - Oren Root Prize Scholarship in Mathematics
- President, Root-Jessup Public Affairs Council.

PUBLICATIONS

Books and Edited Volumes:

- Law and Economics of Discrimination, Edward Elgar Publishing, 2013.
- Employment Discrimination: Law and Theory, Foundation Press, 2005, 2009 (2d edition) (with George Rutherglen).
- Economics of Labor and Employment Law: Volumes I and II, Edward Elgar Publishing, 2007. http://www.e-elgar.co.uk/bookentry_main.lasso?id=4070
- Foundations of Employment Discrimination Law, Foundation Press, 2003 (2d edition).
- Foundations of Employment Discrimination Law, Oxford University Press, 1997 (Initial edition).

Book Chapters:

- "Drug Prohibitions and Its Alternatives." Chapter 2 in Cook, Philip J., Stephen Machin, Olivier Marie, and Giovanni Mastrobuoni, eds, *Lessons from the Economics of Crime: What Reduces Offending?* MIT Press. 45-66 (2013).
- "The Death Penalty," Chapter in Encyclopedia of Law and Economics, Spring (2013).
- "Rethinking America's Illegal Drug Policy," in Philip J. Cook, Jens Ludwig, and Justin McCrary, eds, Controlling Crime: Strategies and Tradeoffs (2011), pp.215-289 (with Benjamin Ewing and David Peloquin).
- "Assessing the Relative Benefits of Incarceration: The Overall Change Over the Previous Decades and the Benefits on the Margin," in Steven Raphael and Michael Stoll, eds., "Do Prisons Make Us Safer? The Benefits and Costs of the Prison Boom," pp. 269-341 (2009).
- "Does Greater Managerial Freedom to Sacrifice Profits Lead to Higher Social Welfare?" In Bruce Hay, Robert Stavins, and Richard Vietor, eds., Environmental Protection and the Social Responsibility of Firms: Perspectives from Law, Economics, and Business (2005).

- “The Evolution of Employment Discrimination Law in the 1990s: A Preliminary Empirical Evaluation” (with Peter Siegelman), in Laura Beth Nielsen and Robert L. Nelson, eds., Handbook of Employment Discrimination Research (2005).
- “Divining the Impact of Concealed Carry Laws,” in Jens Ludwig and Philip Cook, Evaluating Gun Policy: Effects on Crime and Violence (Washington D.C.: Brookings, 2003).

Articles:

- “Right-to-Carry Laws and Violent Crime: A Comprehensive Assessment Using Panel Data and a State-Level Synthetic Controls Analysis” NBER Working Paper. May 2017 (with Abhay Aneja, and Kyle Weber).
- “Comey, Trump, and the Puzzling Pattern of Crime in 2015 and Beyond,” *Columbia Law Review* (2017, forthcoming).
- “Did Jeff Sessions forget wanting to execute pot dealers?” The Conversation, January 23, 2017 (with Max Schoening), <https://theconversation.com/did-jeff-sessions-forget-wanting-to-execute-pot-dealers-71694>
 - Reprinted in Huffington Post, http://www.huffingtonpost.com/the-conversation-us/did-jeff-sessions-forget_b_14344218.html
 - Reprinted in Salon, <http://www.salon.com/2017/01/30/jeff-sessions-forgetting-he-once-wanted-to-execute-pot-dealers/#comments>
- “Jeff Sessions, The Grim Reaper of Alabama,” The New York Times, January 9, 2017 (with Max Schoening), <http://www.nytimes.com/2017/01/08/opinion/jeff-sessions-the-grim-reaper-of-alabama.html>
- “Testing the Immunity of the Firearm Industry to Tort Litigation,” *JAMA Intern Med*. Published online November 14, 2016. <http://jamanetwork.com/journals/jamainternalmedicine/fullarticle/2582991> (with David Studdert and Michelle Mello).
- “Empirical Analysis and the Fate of Capital Punishment,” 11 *Duke Journal of Constitutional Law and Public Policy* 51-106 (2016). Available at: <http://scholarship.law.duke.edu/djclpp/vol11/iss1/3>
- “Firearms on College Campuses: Research Evidence and Policy Implications,” Johns Hopkins Bloomberg School of Public Health, (October 15, 2016)(with Daniel Webster et al). <http://www.jhsph.edu/research/centers-and-institutes/johns-hopkins-center-for-gun-policy-and-research/pdfs/GunsOnCampus.pdf>
- “Be skeptical about claims of benefits of concealed carry permits.” *Sacramento Bee*, (October 6, 2016), <http://www.sacbee.com/opinion/op-ed/soapbox/article106329677.html>

- "The Death Penalty Does Not Add Up to Smart Justice," California State Treasurer Intersections (September 2016), <http://treasurer.ca.gov/newsletter/2016/201609/conversation.asp>
- "Reducing civilian firepower would boost police and community safety, Stanford expert says," Stanford News (July 2016), <http://news.stanford.edu/2016/07/15/reducing-civilian-firepower-boost-police-community-safety/review/>
- "Domestic Violence and Effectively Terminating the Gun Rights of the Dangerous," Legal Aggregate – Stanford Law School (June 2016), <https://law.stanford.edu/2016/06/28/domestic-violence-and-effectively-terminating-the-gun-rights-of-the-dangerous/>
- "4 Gun Control Steps U.S. Needs Now," CNN.com (June 2016), <http://www.cnn.com/2016/06/23/opinions/gun-control-donohue/index.html>
- "The Demise of the Death Penalty in Connecticut," Legal Aggregate - Stanford Law School (June 2016), <https://law.stanford.edu/2016/06/07/the-demise-of-the-death-penalty-in-connecticut/>
- "Empirical Evaluation of Law: The Dream and the Nightmare," 17 American Law and Economics Review 313 (2015).
- "Capital Punishment Does not Deter Homicides," Casetext, August 30, 2015, <https://casetext.com/posts/capital-punishment-does-not-deter-homicides>
- "There's no evidence that death penalty is a deterrent against crime," The Conversation, August 8, 2015. <http://theconversation.com/theres-no-evidence-that-death-penalty-is-a-deterrent-against-crime-43227>
- "Glossip v. Gross: Examining Death Penalty Data for Clarity," Stanford Lawyer, June 29, 2015. <http://stanfordlawyer.law.stanford.edu/2015/06/glossip-v-gross-examining-death-penalty-data-for-clarity/>
- "How US Gun Control Compares to the Rest of the World," The Conversation, June 24, 2015. <http://theconversation.com/how-us-gun-control-compares-to-the-rest-of-the-world-43590>
 - Reprinted in slightly modified form under the title "Ban guns, end shootings? How evidence stacks up around the world," in CNN.com on August 27, 2015 <http://www.cnn.com/2015/08/27/opinions/us-guns-evidence/>
- "The 10 day period is reasonable," San Francisco Daily Journal, September 3, 2014.
- "An Empirical Evaluation of the Connecticut Death Penalty System Since 1973: Are There Unlawful Racial, Gender, and Geographic Disparities?" 11 Journal of Empirical Legal Studies 637 (2014).
- "The Impact of Right to Carry Laws and the NRC Report: The Latest Lessons for the Empirical Evaluation of Law and Policy," NBER Working Paper 18294. Revised November 2014 (with Abhay Aneja and Alexandria Zhang), <http://www.nber.org/papers/w18294>
- "Do Police Reduce Crime? A Reexamination of a Natural Experiment," in Yun-Chien Chang, ed., Empirical Legal Analysis: Assessing the Performance of Legal Institutions, London: Routledge, Chapt. 5, pp. 125-143, 2014 (with Daniel E. Ho & Patrick Leahy)

- “Reflections on the Newtown Shooting One Year Later,” Stanford Lawyer, December 5, 2013.
<http://stanfordlawyer.law.stanford.edu/2013/12/reflections-on-the-newtown-shooting-one-year-later/>
- Outlier Nation: Homicides, Incarceration, Guns and Gun Culture, TAR 9 (Verona, Italy: 2013).
- “Gun lunacy rides high in America,” Special to CNN, September 13, 2013.
<http://www.cnn.com/2013/09/13/opinion/donohue-gun-control/index.html?iref=allsearch>
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<http://www.cnn.com/2013/04/10/opinion/donohue-background-checks/index.html>
- “Substance vs. Sideshows in the More Guns, Less Crime Debate: A Comment on Moody, Lott, and Marvell” (with Abhay Aneja, and Alexandria Zhang) ECON JOURNAL WATCH 10(1) January 2013: 32-39
- “More Guns, Less Crime Thesis,” Guns in American Society: An Encyclopedia of History, Politics, Culture, and the Law (volume 2:G-Q, at page 585) (2012).
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- “When Will America Wake Up to Gun Violence?” CNN opinion, July 21, 2012. Posted to:
<http://www.cnn.com/2012/07/20/opinion/donohue-gun-control/>.
- “Time To Kill The Death Penalty?” The California Progress Report, June 28, 2012.
- “Assessing Post-ADA Employment: Some Econometric Evidence and Policy Considerations.” Journal of Empirical Legal Studies Vol. 8: No. 3, September 2011, pp. 477-503 (with Michael Ashley Stein, Christopher L. Griffin, Jr. and Sascha Becker).
- “The Impact of Right-to-Carry Laws and the NRC Report: Lessons for the Empirical Evaluation of Law and Policy,” Am Law Econ Rev (Fall 2011) 13 (2): 565-631 (with Abhay Aneja and Alex Zhang). See January 2014 Revision released as an NBER working paper above.
- “Punishment is a Cost, Not a Benefit,” Review of Mark A. R. Kleiman’s “When Brute Force Fails: How to Have Less Crime and Less Punishment,” XLVII Journal of Economic Literature (March 2010), 168-172.
- “The Politics of Judicial Opposition: Comment,” Journal of Institutional and Theoretical Economics, 166(1), 108—114 (2010).
- “Introduction to the Death Penalty Symposium,” 11 American Law and Economics Review, v (Fall 2009) (with Steve Shavell).
- “Estimating the Impact of the Death Penalty on Murder,” 11 American Law and Economics Review 249 (Fall 2009) (with Justin Wolfers).

- “The Impact of the Death Penalty on Murder,” Criminology & Public Policy (November 2009, Volume 8, Issue 4) at pp. 795-801.
- “The Impact of Legalized Abortion on Teen Childbearing,” 11 American Law and Economics Review 24 (2009) (with Jeff Grogger and Steven Levitt).
- “More Guns, Less Crime Fails Again: The Latest Evidence from 1977-2006,” 6 Econ Journal Watch 218-233 (May 2009)(with Ian Ayres).
- “Yet Another Refutation of the More Guns, Less Crime Hypothesis – With Some Help From Moody and Marvell,” 6 Econ Journal Watch 35-59 (January 2009)(with Ian Ayres).
- “Measurement Error, Legalized Abortion, and the Decline in Crime: A Response to Foote and Goetz,” The Quarterly Journal of Economics (2008) 123 (1): 425-440 (with Steven Levitt).
<http://qje.oxfordjournals.org/content/123/1/425.abstract>
- “AntiDiscrimination Law,” in Steven Durlauf and Lawrence Bloom, eds., The New Palgrave Dictionary of Economics, 2d Edition, 2008.
- “Murder in Decline in the 1990s: Why the U.S. and N.Y.C. Were Not That Special,” Punishment and Society 10: 333 (2008) at <http://pun.sagepub.com>
- “Understanding the 1990s Crime Drops in the U.S. and Canada,” Canadian Journal of Criminology and Criminal Justice, Vol 49, No. 4, p. 552 (October 2007).
- “The Law and Economics of Antidiscrimination Law,” A. M. Polinsky and Steven Shavell, eds., Handbook of Law and Economics, Volume 2 (2007), Pages 1387-1472.
- “Economic Models of Crime and Punishment,” Social Research, Vol. 74: No. 2, Summer 2007, pp. 379-412.
- “Rethink the War on Drugs,” Yale Law Reports, Summer 2007, pp. 46-47.
- “More Cops,” Brookings Policy Brief #158, March 2007 (with Jens Ludwig),
http://www.brookings.edu/papers/2007/03crime_john-j--donohue-iii.aspx.
- “Studying Labor Market Institutions in the Lab: Minimum Wages, Employment Protection, and Workfare: Comment,” Journal of Theoretical and Institutional Economics, 163(1), 46—51 (March 2007).
- “The Impact of Damage Caps on Malpractice Claims: Randomization Inference with Difference-in-Differences,” (with Daniel Ho), 4 Journal of Empirical Legal Studies 69 (2007).
- “The Discretion of Judges and Corporate Executives: An Insider’s View of the Disney Case,” The Economists’ Voice: Vol. 3: No. 8, Article 4. Available at: <http://www.bepress.com/ev/vol3/iss8/art4>
- “The Knicks Boldly Go Where Companies Have Not,” The New York Times, July 2, 2006 Sunday (with Ian Ayres).
- “The Death Penalty: No Evidence of Deterrence,” The Economists’ Voice, (with Justin Wolfers) (April 2006),
[http://bpp.wharton.upenn.edu/jwolfers/Press/DeathPenalty\(BEPress\).pdf](http://bpp.wharton.upenn.edu/jwolfers/Press/DeathPenalty(BEPress).pdf).
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- “The Costs of Wrongful-Discharge Laws,” 88 Review of Economics and Statistics (with David Autor and Stewart Schwab)(2006), pp. 211-31.

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- “Uses and Abuses of Empirical Evidence in the Death Penalty Debate,” 58 Stanford Law Review 791 (2005) (with Justin Wolfers).
 - Reprinted in Steven Levitt and Thomas Miles, eds., The Economics of Criminal Law, Edward Elgar Publishing (2008).
 - Reprinted in Robert Cooter and Francesco Parisi, eds., Foundations of Law and Economics, Edward Elgar Publishing (2010)
- “Does Terrorism Increase Crime? A Cautionary Tale,” (with Daniel Ho), 2005.
- “Fighting Crime: An Economist’s View,” 7 The Milken Institute Review 46 (2005).
 - Reprinted in Kurt Finsterbusch, ed., Social Problems (McGraw-Hill, 2006).
- “Guns, Crime, and the Impact of State Right-to-Carry Laws,” 73 Fordham Law Review 623 (2004).
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- “The Employment Consequences of Wrongful-Discharge Laws: Large, Small, or None at All?” American Economic Review: Papers and Proceedings May, 2004 (with David Autor and Stewart Schwab).
- “Further Evidence that Legalized Abortion Lowered Crime: A Reply To Joyce,” 39 Journal of Human Resources 29 (Winter 2004)(with Steven Levitt).
- “The Final Bullet in the Body of the More Guns, Less Crime Hypothesis,” Criminology & Public Policy (July 2003, Volume 2, Issue 3) at pp. 397-410.
- “Shooting Down the ‘More Guns, Less Crime’ Hypothesis,” 55 Stanford Law Review 1193 (2003)(with Ian Ayres).
- “The Latest Misfires in Support of the ‘More Guns, Less Crime’ Hypothesis,” 55 Stanford Law Review 1371 (2003)(with Ian Ayres).
- “Can Guns, Or Gun Violence, Be Controlled?” (Reviewing James Jacobs, Can Gun Control Work?), The American Prospect (December 16, 2002), p. 35.
- “The Search for Truth: In Appreciation of James J. Heckman,” 27 Law and Social Inquiry 23 (2002).
- “The Schooling of Southern Blacks: The Roles of Social Activism and Private Philanthropy, 1910-1960,” Quarterly Journal of Economics (Feb. 2002), (with James Heckman and Petra Todd), pp. 225 – 268.
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- “The Impact of Race on Policing and Arrests,” Journal of Law and Economics, vol. XLIV October 2001)(with Steven Levitt), pp. 367 – 394.
- “The Impact of Legalized Abortion on Crime,” Quarterly Journal of Economics (Vol. CXVI, Issue 2, May 2001)(with Steven Levitt) pp. 379-420.

- Reprinted in Steven Levitt and Thomas Myles, eds., The Economics of Criminal Law, Edward Elgar Publishing (2008).
- Reprinted in Robert Cooter and Francesco Parisi, eds., Recent Developments In Law And Economics, Edward Elgar Publishing (2010).
- “Understanding the Reasons for and Impact of Legislatively Mandated Benefits for Selected Workers,” 53 Stanford Law Review 897 (2001).
 - Reprinted in Michael Zimmer, Charles Sullivan et al, Cases and Materials on Employment Discrimination (6th edition)(2003).
- “Nondiscretionary Concealed Weapons Law: A Case Study of Statistics, Standards of Proof, and Public Policy,” American Law and Economics Review 436 (1999)(with Ian Ayres).
 - Reprinted in Steven Levitt and Thomas Myles, eds., The Economics of Criminal Law, Edward Elgar Publishing (2008).
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 - Excerpted in Sanford Kadish & Stephen Schulhofer, Criminal Law and Its Processes (8th ed. 2007),
- “Guns, Violence, and the Efficiency of Illegal Markets,” 88 American Economic Review 463 (May 1998)(with Steve Levitt).
- “Did *Miranda* Diminish Police Effectiveness?” 50 Stanford Law Review 1147 (1998).
- “Some Thoughts on Affirmative Action,” 75 Washington University Law Quarterly 1590 (1997).
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- “Some Perspective on Crime and Criminal Justice Policy,” Lawrence Friedman and George Fisher, eds., The Crime Conundrum: Essays on Criminal Justice 45 (1997).
- “The Selection of Employment Discrimination Disputes for Litigation: Using Business Cycle Effects to Test the Priest/Klein Hypothesis,” 24 Journal of Legal Studies 427 (1995) (with Peter Siegelman).
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- Review of Richard Epstein's Forbidden Grounds: The Case Against Employment Discrimination Laws, 31 Journal of Economic Literature 1477 (1994).
- "Law and Macroeconomics: Employment Discrimination Over the Business Cycle," 66 University of S. Calif. L. Rev. 709 (1993) (with Peter Siegelman).
- "Advocacy Versus Analysis In Assessing Employment Discrimination Law," 44 Stanford Law Review 1583 (1992).
- Reprinted in Christopher McCrudden, Anti-Discrimination Law (2003).
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- "The Changing Nature of Employment Discrimination Litigation," 43 Stanford Law Review 983 (1991) (with Peter Siegelman).
- "The Effects of Fee Shifting on the Settlement Rate: Theoretical Observations on Costs, Conflicts, and Contingency Fees," 54 Law and Contemporary Problems 195 (1991).
- "Re-Evaluating Federal Civil Rights Policy," 79 Georgetown Law Journal 1713 (1991) (with James Heckman).
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- Reprinted in Paul Burstein, ed., Equal Employment Opportunity, Aldine De Gruyter, New York (1994).
- "The Impact of Federal Civil Rights Policy on the Economic Status of Blacks," 14 Harvard Journal of Law and Public Policy 41 (1991).
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- "The Law & Economics of Tort Law: The Profound Revolution," 102 Harvard Law Review 1047 (1989).
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- “Why I’d Stick With Yale Clerks-- Some Econometric Ruminations,” <http://balkin.blogspot.com/2008/04/why-id-stick-with-yale-clerks-some.html> (April 2008).

WORKSHOPS AND ADDRESSES

- “Comey, Trump, and the Puzzling Pattern of Crime in 2015 and Beyond,” **University of Texas School of Law and Economics Seminar**, April 24, 2017, Faculty Workshop, **UC Davis School of Law**, April 10, 2017; Law and Social Science Seminar, **Texas A&M University School of Law**, March 6, 2017; Quantlaw, **University of Arizona Law School**, February 17, 2017.
- Debate with Kent Scheidegger on Capital Punishment, Philosophy of Punishment Seminar, **JFK University School of Law**, March 18, 2017.
- “The Evidence on Guns and Gun Laws,” **Federal Bar Council Program on Guns and Gun Laws** -- Rancho Mirage, California, February 23, 2017.
- “Guns, Crime and Race in America,” Stanford’s Center for Population Health Sciences, **Stanford Medical School**, October 17, 2016.
- “Evaluating the Death Penalty,” Forum on California Propositions 62 and 66, **Stanford Law School**, September 14, 2016.
- “Empirical Analysis and the Fate of Capital Punishment,” Colloquium, Presley Center for Crime and Justice Studies; **University of California, Riverside**, October 24, 2016.
- “Gun Violence and Mental Illness,” Department of Psychiatry, **Stanford University**, August 25, 2016.
- “The Battle Over Gun Policy In America,” Physicians and Social Responsibility” seminar; **Stanford Medical School**, October 3, 2016; **Bioethics Committee of the San Mateo County Medical Association**, April 27, 2016; **The League of Women Voters of Palo Alto**, April 19, 2016; Human Rights and Health Seminar, **Stanford University**, April 12, 2016; Bechtel International Center, **Stanford University**, February 23, 2016; Stanford in Government Seminar, Haas Center, **Stanford University**, February 2, 2016.
- American Economic Association Continuing Education Course “The Economics of Crime” (with Jens Ludwig), **AEA Annual Meeting**, San Francisco, January 5-7, 2016.
- “Race and Arbitrariness in the Connecticut Death Penalty,” **University of Connecticut School of Law**, Nov. 20, 2015.
- “*Connecticut v. Santiago* and the Demise of the Connecticut Death Penalty,” Faculty Workshop, **Stanford Law School**, August 19, 2015.

- “Do Handguns Make Us Safer? A State-Level Synthetic Controls Analysis of Right-to-Carry Laws,” Second Amendment Conference, **Covington and Burling, New York**, May 14, 2015; **NBER Summer Institute**, Cambridge, MA, July 23, 2015; Faculty Workshop, **Stanford Law School**, November 11, 2015.
- “U.S. Criminal Justice Under Siege : Will Becker or Beccaria Prevail?” Faculty Seminar, **Bocconi University School of Law, Milan, Italy**, June 18, 2015.
- “Can You Believe Econometric Evaluations of Law, Policy, and Medicine?” **Stanford Law School**, Legal Theory Workshop, March 1, 2007; Faculty Workshop, **Tel Aviv University School of Law**, May 14, 2007; Faculty Workshop, **University of Haifa Law School**, May 16, 2007; Law and Economics Workshop, **Georgetown Law School**, September 19, 2007; Law and Economics Workshop, **St. Gallen Law School**, Switzerland, November 29, 2007; and Yale Law School, February 25, 2008; Law and Economics Workshop, **Swiss Institute of Technology**, Zurich, Switzerland, May 21, 2008; Faculty Workshop, **University of Virginia Law School**, October 24, 2008; Plenary Session, Latin American and Caribbean Law and Economics Association, **Universitat Pompeu Fabra (Barcelona)**, June 15, 2009; **Google, Milan**, Italy, June 8, 2015.
- Commentator: ““Throw Away the Jail or Throw Away The Key? The Effect of Punishment on Recidivism and Social Cost,”” by Miguel F. P. de Figueiredo, American Law and Economics Association Meetings, **Columbia Law School**, May 15, 2015.
- “Broken Windows, Stop and Frisk, and Ferguson,” 2015 Justice Collaboratory Conference: Policing Post-Ferguson, **Yale Law School**, April 17, 2015.
- “Assessing the Development and Future of Empirical Legal Studies,” **Stanford Law School** course on Modern American Legal Thought, February 25, 2015.
- Commentator: “Payday Lending Restrictions and Crimes in the Neighborhood,” by Yilan Xu, 9th Annual Conference on Empirical Legal Studies, **Boalt Hall**, Berkeley, CA, November 7, 2014.
- “An Empirical Evaluation of the Connecticut Death Penalty Since 1973: Are There Unconstitutional Race, Gender and Geographic Disparities?” Faculty Workshop, **Economics Department, Rice University**, Houston, TX, Feb. 18, 2014; Law and Economics Workshop, **University of Virginia Law School**, September 11, 2014; Faculty Colloquium, **University of San Diego School of Law**, October 3, 2014.
- “What's Happening to the Death Penalty? A Look at the Battle in Connecticut,” **Hamilton College**, Clinton, New York, June 6, 2014.
- Panel Member, Research Methods Workshop, Conference for Junior Researchers on Law and Society, **Stanford Law School**, May 15, 2014.
- “Logit v. OLS: A Matter of Life and Death,” Annual Meeting of the American Law and Economics Association, **University of Chicago**, May 9, 2014.
- “Guns: Law, Policy, Econometrics,” Second Amendment Litigation and Jurisprudence Conference, **Jenner & Block**, Chicago, May 8, 2014.
- “The Impact of Antidiscrimination Law: The View 50 Years after the Civil Rights Act of 1964,” **Renaissance Weekend**, Liguna Niguel, CA, Feb. 15, 2014.

- "Concealed Carry and Stand Your Ground Law," **Renaissance Weekend**, Liguna Niguel, CA, Feb. 15, 2014.
- "Reducing Gun Violence," Forum on Gun Violence Reduction, Mountainview City Hall, Mountainview, CA, Feb. 8, 2014.
- "Gun Policy Debate," **C-SPAN**. National Cable Satellite Corporation, Jan. 16, 2014. <<http://www.c-span.org/video/?317256-1/GunPoli>>.
- "Trial and Decision in the Connecticut Death Penalty Litigation," Faculty Workshop, **Stanford Law School**, November 20, 2013.
- "Rethinking America's Illegal Drug Policy," Law and Economics Workshop, **Harvard Law School**, April 20, 2010; NBER Conference, "Economical Crime Control," **Boalt Hall**, Berkeley, CA, January 16, 2010; **NBER Summer Institute** Pre-Conference "Economical Crime Control," July 23, 2009; **Whitney Center** Lecture Series, Hamden, CT, October 5, 2009; Law and Economics Workshop, **University of Chicago Law School**, October 13, 2009; Seminar for Spanish Law Professors, **Harvard Law School**, October 23, 2009; The Criminal Law Society, **Stanford Law School**, March 31, 2011, **University of Denver Sturm College of Law**, April 21, 2011; Law and Economics Workshop, **Boalt Hall**, Berkeley, CA, October 17, 2011; Shaking the Foundations Conference, **Stanford Law School**, November 2, 2013.
- "The Challenge to the Connecticut Death Penalty," **Yale Law School**, Death Penalty Clinic, November 5, 2007; Graduate Student Seminar, November 11, 2009; Stanford Program in International Legal Studies Seminar, **Stanford Law School**, Nov. 11, 2010; Faculty Workshop, **Stanford Law School**, June 8, 2011; Faculty workshop, **Duke Law School**, April 13, 2012; Program on Public Policy, **Stanford University**, May 2, 2012; Annual Meeting of the American Law and Economics Association, **Vanderbilt Law School**, Nashville, TN, May 18, 2013; Faculty Workshop, **University of Arizona Law School**, October 17, 2013; 8th Annual Conference on Empirical Legal Studies, **University of Pennsylvania Law School**, October 26, 2013.
- Commentator: "How to Lie with Rape Statistics" by Corey Rayburn Yung, 8th Annual Conference on Empirical Legal Studies, **University of Pennsylvania Law School**, October 2013.
- "An Empirical Look at Gun Violence in the U.S." **University of Arizona Law School**, October 17, 2013
- Discussant, "Sex Offender Registration and Plea Bargaining," **NBER Labor Summer Institute**, Cambridge, MA, July 25, 2013.
- "What Works in the War Against Crime?" **Renaissance Weekend**, Jackson Hole, Wyoming, July 5, 2013.
- Seminar Presentation, "Statistics and the Streets – Curbing Crime, Realities of the Death Penalty, and Successes in Public Safety," **Renaissance Weekend**, Jackson Hole, Wyoming, July 5, 2013.
- Flashes of Genius (Glimpses of Extra-ordinarily Novel Thinking) -- "Stemming Gun Violence," **Renaissance Weekend**, Jackson Hole, Wyoming, July 5, 2013.
- "Can Laws Reduce Crime?" Safe Oakland Speakers Series, Holy Names University, Oakland, CA, May 1, 2013, <http://www.ustream.tv/channel/safe-oakland-speaker-series>
- Presentation on "The Death Penalty in America" on a panel on "human rights and criminal justice systems in the world," Science for Peace conference at Bocconi University in Milan, Italy, November 15, 2012. <http://>

www.fondazioneveronesi.it/scienceforpeace2012/

- Seminar Presentation, "America's Criminal Justice System," **Renaissance Weekend**, Santa Monica, CA., Feb. 19, 2012.
- "Statistical Inference, Regression Analysis and Common Mistakes in Empirical Research," SPILLS Fellow's Workshop, **Stanford Law School**, February 2, 2012.
- "New Evidence in the 'More Guns, Less Crime' Debate: A Synthetic Controls Approach," Conference on Empirical Legal Studies, **Northwestern Law School**, November 4, 2011.
- "Drug Legalization and its Alternatives," *Lessons from the Economics of Crime: What Works in Reducing Offending?* **CESifo Venice Summer Institute Workshop**, July 22, 2011.
- "Incapacitating Addictions: Drug Policy and American Criminal Justice," in Rethinking the War on Drugs through the US-Mexico Prism, **Yale Center for the Study of Globalization**, May 12, 2011.
- Plenary Session: Flashes of Genius (Glimpses of Extra-ordinarily Novel Thinking) -- "Has Legalized Abortion Reduced Crime?" **Renaissance Weekend**, Liguna Niguel, CA., Feb. 18, 2011.
- "An Evidence-Based Look at the More Guns, Less Crime Theory (after Tucson)" The American Constitution Society for Law and Policy (ACS), **Stanford Law School**, January 25, 2011; **Renaissance Weekend**, Liguna Niguel, CA., Feb. 19, 2011; "Faculty Forum" at the External Relations Office, **Stanford Law School**, April 5, 2011.
- "Empirical Evaluation of Law: The Dream and the Nightmare," SPILS Fellows Lecture, **Stanford Law School**, January 15, 2015; Legal Studies Workshop, **Stanford Law School**, Feb. 7, 2011; **Renaissance Weekend**, Liguna Niguel, CA., Feb. 20, 2011; **University of Denver Sturm College of Law**, April 22, 2011; Presidential Address, Annual Meeting of the American Law and Economics Association, **Columbia University**, May 20, 2011.
- Death Sentencing in Connecticut, **American Society of Criminology Annual Meeting**, San Francisco, Nov. 17, 2010.
- "The Impact of Right to Carry Laws and the NRC Report: Lessons for the Empirical Evaluation of Law and Policy," Conference on Empirical Legal Studies, **Yale Law School**, Nov. 6, 2010.
- Comment on Bushway and Gelbach, "Testing for Racial Discrimination in Bail Setting Using Nonparametric Estimation of a Parametric Model," Conference on Empirical Legal Studies, **Yale Law School**, Nov. 6, 2010.
- Commentator, "A Test of Racial Bias in Capital Sentencing," **NBER Political Economy Program Meeting**, April 23, 2010.
- "The (Lack of a) Deterrent Effect of Capital Punishment," Faculty Workshop, **University of Chicago Economics Department**, October 21, 2009.
- Keynote Address, "The Evolution of Econometric Evaluation of Crime and Deterrence," 1st Paris& Bonn Workshop on Law and Economics: The Empirics of Crime and Deterrence, **University of Paris Ouest Nanterre**, September 24, 2009.
- Comment on Cook, Ludwig, and Samaha, "Gun Control after *Heller*: Litigating Against Regulation," NBER Regulation and Litigation Conference, **The Boulders**, Carefree, Arizona, September 11, 2009.

- "Impact of the Death Penalty on Murder in the US," Faculty Workshop, Law School, **Universitat Pompeu Fabra (Barcelona)**, June 18, 2009.
- Comment on Joanna Shepherd's "The Politics of Judicial Opposition," Journal of Institutional and Theoretical Economics Conference, **Kloster Eberbach, Germany**, June 12, 2009.
- "The Great American Crime Drop of the '90s: Some Thoughts on Abortion Legalization, Guns, Prisons, and the Death Penalty," **Hamilton College**, Clinton, NY, June 5, 2009.
- "The Impact of the ADA on the Employment and Earnings of the Disabled," **American Law and Economics Association Meetings**, University of San Diego, May 15, 2009.
- "Crime and Punishment in the United States," **Eastern State Penitentiary, Yale Alumni Event**, Philadelphia, PA, April 26, 2009.
- "Measuring Culpability in Death Penalty Cases," Conference on Applications of Economic Analysis in Law, **Fuqua School of Business, Duke University**, April 18, 2009.
- "Autopsy of a Financial Crisis," Workshop on New International Rules and Bodies for Regulating Financial Markets, **State University of Milan**, March 23, 2009.
- "Yet Another Refutation of the More Guns, Less Crime Hypothesis – With Some Help From Moody and Marvell, Law and Economics Workshop, **NYU Law School**, March 10, 2009.
- Intelligence-Squared Debate: "Guns Reduce Crime," **Rockefeller University**, New York, October 28, 2008.
- "The D.C. Handgun Controls: Did the Supreme Court's Decision Make the City Safer?" Debate, **The Contemporary Club of Albemarle**, Charlottesville, VA, October 23, 2008.
- "Evaluating the Empirical Claims of the Woman-Protective Anti-Abortion Movement," Panel on The Facts of the Matter: Science, Public Health, and Counseling, Yale Conference on the Future of Sexual and Reproductive Rights, **Yale Law School**, October 11, 2008.
- "Empirical Evaluation of Gun Policy," **Harvard Law School**, October 9, 2008.
- "Assessing the Relative Benefits of Incarceration: The Overall Change Over the Previous Decades and the Benefits on the Margin," **Russell Sage Foundation**, New York, May 3, 2007; Law and Economics Workshop, **Tel Aviv University School of Law**, May 28, 2008.
- Death Penalty Debate with Orin Kerr, Bloggingheads, April 11, 2008.
- "Evaluating Connecticut's Death Penalty Regime," Faculty Public Interest Conversation, **Yale Law School**, April 9, 2008.
- "The Death Penalty in Connecticut and the United States," **The Whitney Center**, Hamden, CT, November 5, 2007; Seminar on Advanced Criminal Law: Criminal Sentencing and the Death Penalty, **Fordham Law School**, April 8, 2008; Law and Economics Workshop, **Swiss Institute of Technology**, Zurich, Switzerland, May 20, 2008.
- Radio Interview, "The Death of Capital Punishment?" Morning Edition: Where We Live. WNPR. Connecticut, March 10, 2008.
- Comment on Thomas Dee's "Born to Be Mild: Motorcycle Helmets and Traffic Safety," **American Economics Association Meetings**, New Orleans, Louisiana, January 4, 2008.

- “The Empirical Revolution in Law and Policy: Jubilation and Tribulation,” **Keynote Address, Conference on Empirical Legal Studies, NYU Law School**, November 9, 2007.
- “The Optimal Rate of Incarceration,” **Harvard Law School**, October 26, 2007.
- “Empirical Evaluation of Law: The Impact on U.S. Crime Rates of Incarceration, the Death Penalty, Guns, and Abortion,” Law and Economics Workshop, **St. Gallen Law School, Switzerland**, June 25, 2007.
- Comment on Eric Baumer’s “A Comprehensive Assessment of the Contemporary Crime Trends Puzzle,” Committee on Law and Justice Workshop on Understanding Crime Trends, **National Academy of Sciences**, Washington, D.C., April 25, 2007.
- Comment on Bernard Harcourt, Third Annual Criminal Justice Roundtable Conference, **Yale Law School**, “Rethinking the Incarceration Revolution Part II: State Level Analysis,” April 14, 2006.
- “Corporate Governance in America: The Disney Case,” **Catholic University Law School**, Milan, Italy, March 19, 2007.
- “The U.S. Tort System,” (Latin American) Linkages Program, **Yale Law School**, February 13, 2007.
- Panel Member, “Guns and Violence in the U.S.,” **Yale University, International Center**, January 24, 2007.
- “Economic Models of Crime and Punishment,” Punishment: The U.S. Record: A Social Research Conference at **The New School**, New York City, Nov. 30, 2006
- Comment on Baldus et al, “Equal Justice and the Death Penalty: The Experience fo the United States Armed Forces, Conference on Empirical Legal Studies, **University of Texas Law School**, Austin, Texas, October 27, 2006.
- “Empirical Evaluation of Law: The Promise and the Peril,” **Harvard Law School**, October 26, 2006.
- “Estimating the Impact of the Death Penalty on Murder,” Law and Economics Workshop, **Harvard Law School**, September 12, 2006; Conference on Empirical Legal Studies, **University of Texas Law School**, October 28, 2006; Joint Workshop, Maryland Population Research Center and School of Public Policy, **University of Maryland**, March 9, 2007.
- “Why Are Auto Fatalities Dropping so Sharply?” **Faculty Workshop, Wharton**, Philadelphia, PA, April 19, 2006.
- “The Law of Racial Profiling,” Law and Economic Perspectives on Profiling Workshop, **Northwestern University Department of Economics**, April 7, 2006.
- “Landmines and Goldmines: Why It’s Hard to Find Truth and Easy To Peddle Falsehood in Empirical Evaluation of Law and Policy,” **Rosenthal Lectures, Northwestern University School of Law**, April 4-6, 2006.
- “The Impact of Legalized Abortion on Crime,” **American Enterprise Institute**, March 28, 2006.
- “The Impact of Damage Caps on Malpractice Claims: Randomization Inference with Difference-in-Differences,” **Conference on Medical Malpractice, The Rand Corporation**, March 11, 2006.
- “Powerful Evidence the Death Penalty Deters?” **Leighton Homer Surbeck Chair Lecture, Yale Law School**, March 7, 2006.
- “Uses and Abuses of Empirical Evidence in the Death Penalty Debate,” Faculty Workshop, **University of Connecticut Law School**, October 18, 2005; Faculty Workshop, **UCLA Law School**, February 3, 2006; Law and

Economics Workshop, **Stanford Law School**, February 16, 2006; ; Law Faculty, **University of Cambridge, Cambridge, England**, February 28, 2006; **University of Illinois College of Law**, Law and Economics Workshop, March 2, 2006; Faculty Workshop, **Florida State University Law School**, March 30, 2006; **ALEA**, Berkeley, CA May 6, 2006; **University of Chicago Law School**, Law and Economics Workshop, May 9, 2006.

- “Is Gun Control Illiberal?” Federalist Society Debate with Dan Kahan at Yale Law School, January 31, 2006.
- “Witness to Deception: An Insider’s Look at the Disney Trial,” **2005-2006 Distinguished Lecture, Boston University School of Law**, November 10, 2005; Center for the Study of Corporate Law, **Yale Law School**, November 3, 2005; **Law Offices of Herbert Smith, London, England**, February 23, 2006; Law Faculty, **University of Cambridge, Cambridge, England**, February 27, 2006.
- “Understanding the Surprising Fall in Crime in the 1990s,” **Rotary Club**, Orange, CT, August 5, 2005; Faculty Workshop, **Yale School of Management**, September 21, 2005.
- Panel Member, “The Board's Role in Corporate Strategy,” The Yale Global Governance Forum, **Yale School of Management**, September 8, 2005.
- “Crime and Abortion,” **Museo de la Ciudad de Mexico**, Mexico City, October 20, 2003.
- “Allocating Resources towards Social Problems and Away From Incarceration as a Means of Reducing Crime,” **MacArthur Foundation Research Network on Adolescent Development and Juvenile Justice**, San Francisco, CA, February 28, 2003.
- “Shooting Down the More Guns, Less Crime Hypothesis,” **Stanford Law School**, Law and Economics Seminar, January 28, 2003; Faculty Workshop, Center for the Study of Law and Society, **Boalt Hall**, University of California, Berkeley, Feb. 24, 2003; Development Workshop, **Stanford Law School**, April 25, 2003; Faculty Workshop, **Stanford Law School**, July 2, 2003; Law and Public Affairs Program Workshop, **Princeton University**, September 29, 2003; Stanford Alumni Weekend, **Stanford University**, October 17, 2003; Faculty Workshop, **CIDE**, Mexico City, October 20, 2003.
- “The Impact of Legalized Abortion on Teen Childbearing,” **NBER Labor Summer Institute**, Cambridge, MA, July 30, 2002.
- “Do Concealed Handgun Laws Reduce Crime?” Faculty Workshop, **Stanford Law School**, October 4, 2000; First-Year Orientation, **Stanford Law School**, September 5, 2001; Faculty Workshop, **Harvard Law School**, April 26, 2002; Faculty Workshop, **Columbia Law School**, April 29, 2002.
- “The Evolution of Employment Discrimination Law in the 1990s: An Empirical Investigation,” Fellows Workshop, American Bar Foundation, February 11, 2002.
- “The Role of Discounting in Evaluating Social Programs Impacting on Future Generations: Comment on Arrow and Revesz,” Colloquium on Distributive Justice, **Stanford Law School**, Oct. 18, 2001.
- “The Impact of Wrongful Discharge Laws,” **NBER Labor Summer Institute**, Cambridge, MA, July 30, 2001; Labor and Employment Seminar, **NYU Law School**, October 16, 2001; Faculty Workshop, **Stanford Law School**, September 18, 2002; **Yale Law School**, January, 2004.
- “Racial Profiling: Defining the Problem, Understanding the Cause, Finding the Solution,” **American Society of Criminology Conference**, San Francisco, CA, November 15, 2000.
- “Institutional Architecture for Building Private Markets,” Conference on “Latin America and The New Economy” at **Diego Portales University** in Santiago, Chile, October 26, 2000.

- “The History and Current Status of Employment Discrimination Law in the United States,” Unicapital School of Law, (Centro Universitario Capital), Sao Paulo, Brazil, March 10, 2000.
- “Corporate Governance in Developing Countries: Opportunities and Dangers,” Conference on Neoliberal Policies for Development: Analysis and Criticism,” University of Sao Paulo Law School, March 13, 2000
- “Legalized Abortion and Crime,” Law and Economics Workshop, **University of Pennsylvania Law School**, September 21, 1999; Faculty Workshop, **Yale Law School**, September 27, 1999; **John Jay College of Criminal Justice**, October 7, 1999; Faculty Workshop, **Quinnipiac Law School**, October 13, 1999; Faculty Workshop, **University of Connecticut Law School**, October 19, 1999; **University of Virginia Law School**, October 25, 1999; Faculty Workshop, **Baruch College**, November 9, 1999; MacArthur Foundation Social Interactions and Economic Inequality Network Meeting, **Brookings Institution**, December 4, 1999; Faculty Workshop, **NYU Law School**, January 21, 2000; Faculty Workshop, **University of San Diego Law School**, February 18, 2000; Public Economics Workshop, Department of Economics, **Stanford University**, April 28, 2000; Law and Economics Workshop, **University of California at Berkeley Law School**, September 18, 2000; Faculty Workshop, **Cornell Law School**, September 26, 2000; OB-GYN Grand Rounds, **Stanford Medical School**, October 2, 2000; **Center for Advanced Studies in the Behavioral Sciences**, October 11, 2000; Faculty Workshop, **Graduate School of Business**, February 5, 2002.
- Panel member, Session on Executive Compensation, Director's College, **Stanford Law School**, March 23, 1999.
- “Exploring the Link Between Legalization of Abortion in the 1970s and Falling Crime in the 1990s,” Law and Economics Workshop, **Harvard Law School**, March 16, 1999; Law and Economics Workshop, **University of Chicago Law School**, April 27, 1999; Faculty Workshop, **Stanford Law School**, June 30, 1999.
- “Is the Increasing Reliance on Incarceration a Cost-Effective Strategy of Fighting Crime?” Faculty Workshop, **University of Wisconsin School of Social Science**, February 19, 1999.
- “What Do We Know About Options Compensation?” Institutional Investors Forum, **Stanford Law School**, May 29, 1998.
- Commentator on Orlando Patterson’s presentation on “The Ordeal of Integration,” **Stanford Economics Department**, May 20, 1998.
- “Understanding The Time Path of Crime,” Presentation at Conference on Why is Crime Decreasing? **Northwestern University School of Law**, March 28, 1998; Faculty Workshop, **Stanford Law School**, September 16, 1998; Faculty Workshop, **University of Michigan Law School**, February 18, 1999.
- Commentator, Conference on Public and Private Penalties, the **University of Chicago Law School**, Dec. 13-14, 1997.
- “Some Thoughts on Affirmative Action,” Presentation at a conference on Rethinking Equality in the Global Society, **Washington University School of Law**, November 10, 1997.
- Commentator on Chris Jencks’ Presentation on Welfare Policy, **Stanford Economics Department**, October 8, 1997.
- “The Impact of Race on Policing, Arrest Patterns, and Crime,” Faculty Workshop, **Stanford Law School**, September 10, 1997; Law and Economics Workshop, **University of Southern California Law School**, October 23, 1997; Law and Economics Workshop, **Columbia University Law School**, November 24, 1997; Law and Economics Workshop, Haas School of Business, **University of California at Berkeley**, February 19, 1998; Annual Meeting of the American Law and Economics Association, **University of California at Berkeley**, May 8, 1998; Conference on the Economics of Law Enforcement, **Harvard Law School**, October 17, 1998.

- "Crime in America: Understanding Trends, Evaluating Policy," **Stanford Sierra Camp**, August 1997.
- "Executive Compensation: What Do We Know?" TIAA-CREF Committees on Corporate Governance and Social Responsibility, Center for Economic Policy Research, **Stanford University**, June 27, 1997; NASDAQ Director's Day, **Stanford University**, June 30, 1997.
- Panel Chair, Criminal Law (Theory), Criminal Law (Empirical), and Labor/Discrimination/Family Law, American Law and Economics Association, **University of Toronto Law School**, May 9-10, 1997.
- Commentator, "Diversity in Law School Hiring," **Stanford Law School**, February 25, 1997.
- Keynote Speaker, "The Optimal Rate of Crime," 11th Annual Conference, **The Oklahoma Academy for State Goals**, Tulsa, Oklahoma, May 7, 1996.
- Panel member, Session on Executive Compensation, Director's College, **Stanford Law School**, March 28-29, 1996.
- "The Power of Law: Can Law Make a Difference in Improving the Position of Women and Minorities in the Labor Market?" The Fellows of the **American Bar Foundation**, Baltimore, Maryland, February 3, 1996.
- "Public Action, Private Choice and Philanthropy: Understanding the Sources of Improvement in Black Schooling Quality in Georgia, 1911-1960," **Stanford Faculty Workshop**, January 24, 1996; Faculty Workshop, **University of Virginia Law School**, January 22, 1997; **National Bureau of Economic Research**, Cambridge, Massachusetts, Labor Studies Conference, April 3, 1998.
- Commentator, "The Effect of Increased Incarceration on Crime," Meetings of the **American Economics Association**, San Francisco, January 6, 1996.
- Commentator, Symposium on Labor Law, **University of Texas Law School**, November 10-11, 1995.
- Panel Member, Symposium on Criminal Justice, **Stanford Law School**, October 6-7, 1995.
- Commentator, "The Litigious Plaintiff Hypothesis," Industrial and Labor Relations Conference, **Cornell University**, May 19, 1995.
- Commentator on Keith Hylton's, "Fee Shifting and Predictability of Law," Faculty Workshop, **Northwestern University School of Law**, February 27, 1995.
- "The Selection of Employment Discrimination Disputes for Litigation: Using Business Cycle Effects to Test the Priest/Klein Hypothesis," **Stanford University**, Law and Economics Seminars, October 31, 1994.
- "Is the United States at the Optimal Rate of Crime?" Faculty Workshop, **Indiana University School of Law**, Indianapolis, November 18, 1993; Faculty Workshop, **Northwestern University School of Law**, April 18, 1994; Law and Economics Workshop, **Stanford Law School**, April 28, 1994; Meetings of the American Law and Economics Association, **Stanford Law School**, May 13, 1994; **American Bar Foundation**, September 7, 1994; Faculty Workshop, **DePaul Law School**, September 21, 1994; Law and Economics Workshop, **University of Chicago Law School**, October 11, 1994; Faculty Seminar, **Stanford Law School**, October 31, 1994; Law and Economics Luncheon, **Stanford Law School**, November 1, 1994; Faculty Seminar Workshop, **University of Illinois College of Law**, Champaign, November 22, 1994; Law and Economics Workshop, **Harvard Law School**, November 29, 1994; School Alumni Luncheon, Chicago Club, December 13, 1994; **Northwestern Law School**; Law and Economics Workshop, **Yale Law School**, February 1, 1996; Faculty Workshop, **Cornell Law School**, April 10, 1996; Faculty Workshop, **Tokyo University Law School**, June 4, 1996; Panel on "The Economics of Crime," **Western Economics Association** Meeting, San Francisco, July 1, 1996.

- "The Broad Path of Law and Economics," Chair Ceremony, **Northwestern University School of Law**, September 30, 1994.
- Commentator on Paul Robinson's "A Failure of Moral Conviction," **Northwestern University School of Law**, September 20, 1994.
- "The Do's of Diversity, The Don'ts of Discrimination," Kellogg School of Business, **Northwestern University**, May 17, 1994.
- "Does Law Matter in the Realm of Discrimination?" **Law and Society Summer Institute**, Pala Mesa Lodge, Fallbrook, California, June 25, 1993.
- Commentator, "The Double Minority: Race and Sex Interactions in the Job Market," Society for the Advancement of Socio-Economics, **New School for Social Research**, March 28, 1993.
- "The Effects of Joint and Several Liability on Settlement Rates: Mathematical Symmetries and Meta-Issues in the Analysis of Rational Litigant Behavior," Economic Analysis of Civil Procedure, **University of Virginia School of Law**, March 26, 1993.
- Debate with Richard Epstein on Employment Discrimination Law, **Chicago Federalist Society**, February 23, 1993.
- Panel Chair, "Optimal Sanctions and Legal Rules in Tort and Criminal Law," Meetings of Annual Association of Law and Economics, **Yale Law School**, May 15, 1992.
- Panel Member, "The Law and Economics of Employment at Will," **The Institute For Humane Studies**, Fairfax, Virginia, March 27, 1992.
- "The Efficacy of Title VII," Debate with Professor Richard Epstein, **University of Chicago Law School**, February 26, 1992.
- Moderator, "Using Testers to Demonstrate Racial Discrimination," **University of Chicago Law School**, February 13, 1992.
- "Law & Macroeconomics: The Effect of the Business Cycle on Employment Discrimination Litigation," Law and Society Workshop, **Indiana University**, November 6, 1991; Faculty Workshop, **University of North Carolina Law School**, Chapel Hill, November 8, 1991; Faculty Workshop, **Northwestern University School of Law**, December 11, 1991; Law and
- Economics Conference, **Duquesne Law School**, March 14, 1992; **University of Chicago Law School**, April 2, 1992.
- Panel Chair and Commentator, "New Perspectives on Law and Economics," **Society for the Advancement of Socioeconomics**, Stockholm, June 17, 1991; **Law and Society Meetings**, Amsterdam, June 29, 1991.
- Panel Chair, "Regulation of International Capital Markets," **Law and Society Meetings**, Amsterdam, June 27, 1991.
- Panel Chair, "The Law and Economics of Discrimination," American Association of Law and Economics, **University of Illinois Law School**, May 24, 1991.
- "The Economics of Employment Discrimination Law," **Industrial Relations Research Association**, Chicago, Illinois, March 4, 1991.

- "Does Current Employment Discrimination Law Help or Hinder Minority Economic Empowerment?" Debate with Professor Richard Epstein, The Federalist Society, **Northwestern Law School**, February 26, 1991.
- Panel Member, "The Law and Economics of Employment Discrimination," **AALS Annual Meeting**, Washington, D.C., January 6, 1991.
- "Re-Evaluating Federal Civil Rights Policy," Conference on the Law and Economics of Racial Discrimination in Employment, **Georgetown University Law Center**, November 30, 1990.
- "Opting for the British Rule," Faculty Seminar, **Northwestern Law School**, September 11, 1990; Faculty Seminar, **University of Virginia Law School**, September 14, 1990; Law and Economics Seminar, **University of Michigan Law School**, October 18, 1990; Faculty Workshop, **NYU Law School**, November 14, 1990; Faculty Workshop, **University of Florida Law School**, March 18, 1991.
- "The Effects of Fee Shifting on the Settlement Rate: Theoretical Observations on Costs, Conflicts, and Contingency Fees," at the **Yale Law School Conference "Modern Civil Procedure: Issues in Controversy,"** June 16, 1990.
- "Studying the Iceberg From Its Tip?: An Analysis of the Differences Between Published and Unpublished Employment Discrimination Cases," **Law and Society Meetings**, Berkeley, California, May 31, 1990.
- Panel Discussion on Tort Reform, **University of Pennsylvania Law School**, April 27, 1990.
- Panel Discussion of "The Role of Government in Closing the Socio-Economic Gap for Minorities," at the Federalist Society National Symposium on "The Future of Civil Rights Law," **Stanford Law School**, March 16, 1990.
- "Continuous versus Episodic Change: The Impact of Affirmative Action and Civil Rights Policy on the Economic Status of Blacks," **University of Virginia Economics Department**, February 15, 1990; **Princeton University Department of Economics**, February 21, 1990 (with James Heckman); Law & Economics Workshop, **University of Toronto Law School**, October 8, 1991.
- "Sex Discrimination in the Workplace: An Economic Perspective," Fellows Seminar, **American Bar Foundation**, October 16, 1989.
- "The Changing Nature of Employment Discrimination Litigation," Law and Economics Workshop, **Columbia Law School**, March 23, 1989; Faculty Seminar, **University of Virginia Law School**, March 24, 1989; Law and Economics Workshop, **University of Chicago**, April 25, 1989; **Law & Society Meeting**; Madison, Wisconsin, June 8, 1989; Labor Economics Workshop, **University of Illinois**, Chicago, November 1, 1989; Law & Economics Workshop, **University of Pennsylvania Law School**, November 9, 1989; Law and Economics Seminar, **University of California at Berkeley**, October 4, 1990; Law and Social Science Workshop, **Northwestern University**, February 3, 1991; Law and Economics Seminar, **Stanford Law School**, March 21, 1991; Faculty Workshop, **Cornell Law School**, April 3, 1991; Visiting Committee, **Northwestern Law School**, April 5, 1991.
- "Law & Economics: The Third Phase," The Association of General Counsel, **Northwestern University School of Law**, October 14, 1988.
- "Employment Discrimination Litigation," **Northwestern Law School** Alumni Monthly Loop Luncheon. **Chicago Bar Association**, May 31, 1988.
- "The Morality of the Death Penalty." A debate with Ernest Van Den Haag. **Northwestern University School of Law**, April 19, 1988.

- "Models of Deregulation of International Capital Markets." A presentation with David Van Zandt, Faculty Seminar, **Northwestern University School of Law**, April 1, 1988; Visiting Committee, May 5, 1988.
- "Is Title VII Efficient?" A debate with Judge Richard Posner, Faculty Seminar, **Northwestern University School of Law**, November 20, 1987.
- "The Senate's Role in Confirming Supreme Court Nominees: The Historical Record," **Northwestern University School of Law**, September 22, 1987.
- "Diverting the Coasean River: Incentive Schemes to Reduce Unemployment Spells," **Yale Law School** Civil Liability Workshop, March 30, 1987; Faculty Seminar, **Northwestern University School of Law**, March 18, 1987; **University of Southern California Law Center**, May 1, 1987; and Seminar in Law and Politics, Department of Political Science, **Northwestern University**, May 8, 1987; Labor Workshop, Department of Economics, **Northwestern University**, October 27, 1987; **AALS Annual Meeting**, New Orleans, January 7, 1989.
- "Women in the Labor Market--Are Things Getting Better or Worse?" **Hamilton College**, February 23, 1987.
- "The Changing Relative Quit Rates of Young Male and Female Workers," **Hamilton-Colgate Joint Faculty Economics Seminar**, February 23, 1987.
- "Living on Borrowed Money and Time--U.S. Fiscal Policy and the Prospect of Explosive Public Debt," **Orange Rotary Club**, February 22, 1985.
- "Capital Punishment in the Eighties," **Hamilton College**, April 6, 1981.
- "Terms and Conditions of Sale Under the Uniform Commercial Code," Executive Sales Conference, **National Machine Tool Builders' Association**, May 12, 1980.

PROFESSIONAL ACTIVITIES

- Member, Committee on Law and Justice, National Research Council, October 2011 – present.
- Co-Editor (with Steven Shavell), [American Law and Economics Review](#), May 2006 – August 2012.
- President, American Law and Economics Association, May 2011 – May 2012.
- Co-President, Society for Empirical Legal Studies, November 2011 - August 2012. Member, Board of Directors from November 2011 - November 2014.
- Testified before the Connecticut Legislature in Support of Senate Bill 1035 and House Bill 6425 (A Bill to Eliminate the Death Penalty), March 7, 2011; Testified again before the Connecticut Judiciary Committee on March 14, 2012.
- Member of the Special Committee on ALI Young Scholars Medal, October 2009 – February 2011.
- Vice-President/President Elect, American Law and Economics Association, June 2010 – May 2011.
- Secretary-Treasurer, American Law and Economics Association, June 2009 – May 2010.
- Board of Advisors, Yale Law School Center for the Study of Corporate Law, July 2004 – August 2010.
- Evaluated the Connecticut death penalty system: "Capital Punishment in Connecticut, 1973-2007: A Comprehensive Evaluation from 4600 murders to One Execution," http://works.bepress.com/john_donohue/137/

- Member, Panel on Methods for Assessing Discrimination, National Academy of Sciences, September 2001 – June 2004. Resulting Publication: National Research Council, Measuring Racial Discrimination (2004), <http://www.nap.edu/catalog/10887.html>
- Member, National Science Foundation Review Panel, Law and Social Sciences, September, 1999 – April 2001.
- Editorial Board, Journal of Empirical Legal Studies, July 2003 – present.
- Editorial Board, International Review of Law and Economics, October 1999 – present.
- Editorial Board, Law and Social Inquiry, February 2000 – present.
- Board of Editors, American Law and Economics Review, August 1998 – April 2013.
- Consultant, Planning Meeting on Measuring the Crime Control Effectiveness of Criminal Justice Sanctions, National Academy of Sciences, Washington, D.C., June 11, 1998
- Member, Board of Directors, American Law and Economics Association, June 1994-May 1997. Member, ALEA Nominating Committee, July 1995-May 1996. Member, Program Committee, July 1996-May 1998 and July 2000 – May 2002.
- Statistical Consultant, 7th Circuit Court of Appeals Settlement Conference Project (December, 1994).
- Testified before U.S. Senate Labor Committee on evaluating the Job Corps, October 4, 1994.
- Assisted the American Bar Association Standing Committee on the Federal Judiciary in evaluating the qualifications of Ruth Bader Ginsburg (June 1993) and David Souter (June, 1990).
- Chair, AALS Section on Law and Economics, January 1990-January 1991.
- Economic Consultant to Federal Courts Study Committee. Analyzing the role of the federal courts and projected caseload for Judge Richard Posner's subcommittee. February 1989-March 1990.
- Member, 1990 AALS Scholarly Papers Committee.
- Member, Advisory Board, Corporate Counsel Center, Northwestern University School of Law. Since December 1987.
- Associate Editor, Law and Social Inquiry. Summer 1987-December 1989.
- Interviewed Administrative Law Judge candidates for U.S. Office of Personnel Management. Chicago, Illinois. May 23, 1988.
- Member, Congressman Bruce Morrison's Military Academy Selection Committee. Fall 1983.
- 1982 Candidate for Democratic Nomination, Connecticut State Senate, 14th District (Milford, Orange, West Haven).

PRO BONO LEGAL WORK

- Death Penalty case: Heath v. Alabama. Fall 1986-Fall 1989.
- Wrote brief opposing death sentence in Navy spy case. Court ruled in favor of defendant on September 13, 1985.
- Staff Attorney, Neighborhood Legal Services, January-July 1981.

- Appealed sentence of death for Georgia defendant to the United States Supreme Court. Sentence vacated on May 27, 1980. Baker v. Georgia.
- Court-appointed representation of indigent criminal defendant in District of Columbia Superior Court, February-July 1980.

RESEARCH GRANTS

- Stanford University Research Fund, January 1997 and January 1998.
- The National Science Foundation (project with James Heckman), December 1992; (project with Steve Levitt), July 1997.
- Fund for Labor Relations Studies, University of Michigan Law School, March 1988.

BAR ADMISSIONS

- Connecticut - October 1977; District of Columbia - March 1978 (Currently Inactive Status); United States Supreme Court - November 1980; U.S. District Court for the District of Connecticut – February 14, 1978.

PROFESSIONAL and HONORARY ASSOCIATIONS

- American Academy of Arts and Sciences (since April 2009).
- Research Associate, National Bureau of Economic Research (since October 1996) – in Law and Economics and Labor Studies.
- American Law Institute (since September 29, 2010).
- American Bar Association
- American Economic Association
- American Law and Economics Association

PERSONAL

- Born: January 30, 1953.

Exhibit B

Recent Trends in American Gun Prevalence*

John J. Donohue III[†] and Isaac J. Rabbani[‡]

June 5, 2017

Abstract

We explore trends in a variety of measures of gun prevalence, including direct surveys, proxies, and economic indicators. We find that firearm ownership, measured at both the individual and household levels, has declined significantly since the 1970s, though concentration of ownership has increased. The decrease seems attributable largely to reduced interest in hunting, as it has been driven by a drop in ownership of rifles and shotguns. Ownership of handguns, which are typically bought for self-defense, has remained stable, despite decreases in crime and in fear of danger.

Introduction

Recent high-visibility incidents involving firearms—especially mass shootings, such as that at Sandy Hook Elementary School—have renewed public interest in firearms legislation. In order to effectively tailor gun policy, it is important to understand the extent of gun prevalence in American society, whether this prevalence has changed over time, and if so, how—all of which have been the subjects of considerable media discussion (Bialik, 2013a; Brennan, 2012; NRA-ILA, 2016). One spokesperson for the National Rifle Association ascribed the drop in violent crime rates over recent decades to the passage of shall-issue laws, claiming that “[i]t would be disingenuous for anyone to not credit increased self-defense laws to account for this decline” (Miller, 2012). Opponents of this position claim that the reduction in crime was due to other factors; that despite the initiation of concealed-carry programs, gun ownership has actually declined; and further, that this decline, reflecting a shift in popular preferences, justifies calls for stricter regulation of firearm sales (Waldman, 2012).

In this paper, we review annual survey data at the national, state, and Census-Division levels, that track the prevalence of firearms in American households. Drawing on the larger gun policy literature, we then examine several commonly used proxy measures for gun prevalence. Both approaches lead to the same conclusions: Gun ownership in the U.S. has undergone a sustained and significant decrease over the past 35 years, and has simultaneously become more concentrated. Finally, we offer potential explanations for this decline, finding that the most salient is an abatement in interest in hunting, and that it is more difficult to judge the effects of other factors.

A Note on Terminology

For the remainder of the paper, we use the terms gun ownership and gun prevalence (or firearm ownership and firearm prevalence) interchangeably. One could argue that the two are actually subtly different: If one were studying the phenomenon of suicide committed by firearm, then perhaps a relevant factor to consider would be how accessible guns are to the everyday person—that is to say, prevalence. On the other hand, if one were studying changes in societal attitudes towards keeping a gun in the home, one might be more interested in the rate of household ownership. In practice, however—in part due to the paucity of data on

*We are extremely grateful to Deborah Azrael, Matthew Miller, Peter Siegelman, and Abhay Aneja for constructive comments, to Stephen Fischer Jr. of the FBI and Jaesok Son of the GSS for guidance on interpreting their data, and to Bhargav Gopal, Maggie Yellen, and Alex Albright for excellent research assistance.

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guns—the literature on this subject tends to use the ownership rate, especially the household ownership rate, as a yardstick for prevalence.

Survey Measures

Perhaps the most widely cited measure of national gun ownership is that of the General Social Survey (GSS), which has collected data on household gun ownership since 1973, and personal gun ownership since 1980, switching between annual and biennial collection in various years (Smith & Son, 2015). The GSS is considered to be one of the most reliable instruments for tracking broad social trends, especially relative to telephone surveys, because of its in-person interview format, large sample size (2,867 respondents in the 2016 survey), high response rates (consistently over 70%), and careful efforts to generate a representative sample of the U.S. population. Figure 1 shows that the GSS data reflect a substantial drop in household gun ownership levels since the late 1970s. In 2016, the GSS-reported percentage of households that contained a gun was 30.8%, a significant drop from a high¹ of 50.4% in 1977. Personal gun ownership, meanwhile, dropped from a peak of 30.5% in 1985 to 20.5% in 2016.

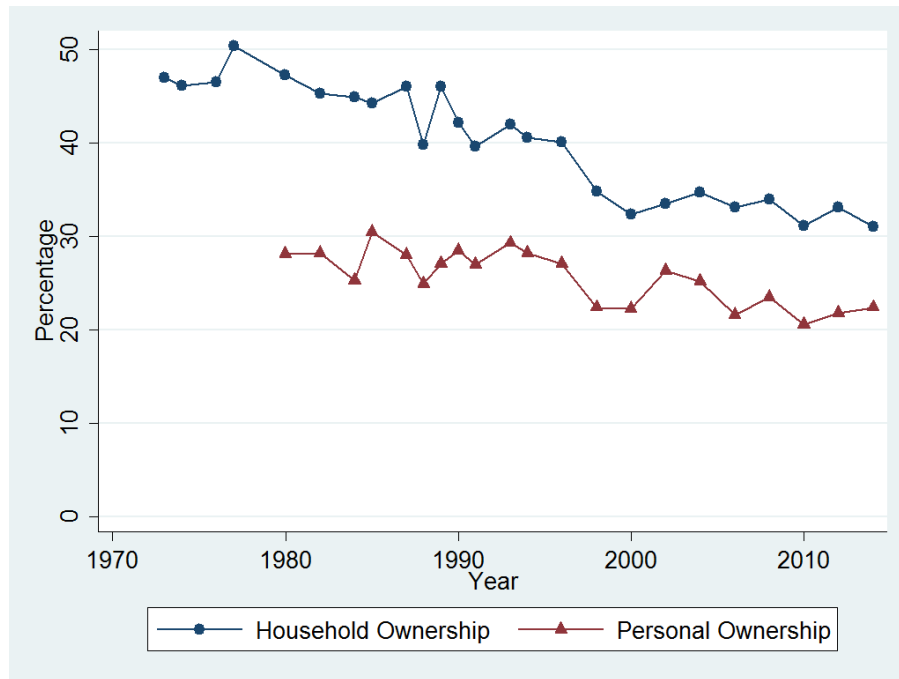


Figure 1: GSS-Measured Trends in Gun Ownership, 1973 - 2016.

The Pew Research Center has tracked gun ownership since 1993, and also reports a significant decrease. In Pew's 1993 survey, 45% responded yes to having a gun in their household (the corresponding GSS rate was 43.8%), and by 2013 this number had fallen to 33% (when the GSS recorded 34.4%) (Pew Research Center, 2013). In a report for the National Opinion Research Center—the organization that conducts the GSS, at the University of Chicago—Smith *et al.* (2014), using the iPoll archive, compile the results of 415 polls conducted between 1959 and 2013 that have surveyed national gun ownership. Going by the 364 of these that estimated a household rate, the authors estimate a decline in household gun ownership of 9 percentage points from the late 1970s to 2013,² and find that the annual trend of abatement is statistically significant and robust to controlling for various survey methodologies.³

¹All maximum and minimum survey values are taken over the entire period for which a survey question is asked.

²The authors use year ranges instead of individual years, and estimate a drop from 48.4% before 1980 to 39.4% in 2006-2013.

³Such methodological variations include in-person interviewing versus telephone interviewing; use of all adults as the polling base, versus restriction to registered voters; and different wordings of gun possession questions.

One major survey that deviates from the GSS, Pew, and the iPoll study is Gallup, which has tracked gun ownership since 1960, but finds a different pattern, as shown in Figure 2 (Gallup, 2015). Essentially, the Gallup surveys suggest that after 1960, gun ownership declined for twenty years, and since then has roughly stayed constant, albeit with some substantial temporary swings. Part of the reason for this volatility could be that the response rates for Pew's and Gallup's surveys—as they are conducted via telephone as opposed to in person—are typically much lower than that of the GSS (Pew Research Center, 2012).

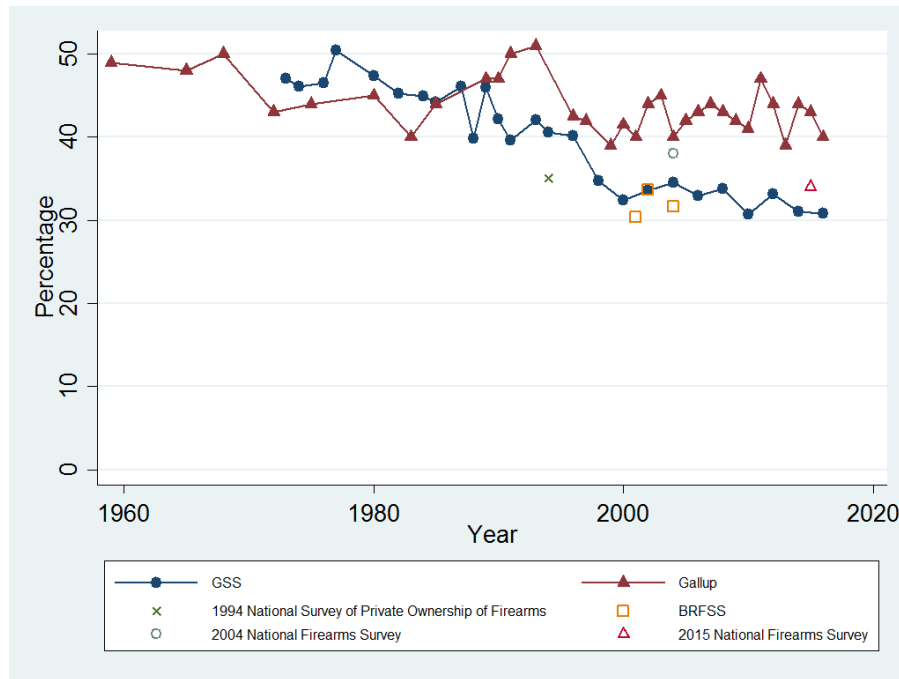


Figure 2: Survey Rates of National Household Gun Ownership, 1959 - 2015.

Criticism of Survey Evidence

The accuracy of survey results for controversial subjects such as gun ownership is often subject to debate. Skeptics of an ownership decline contend that many firearm owners are loath to reveal their true ownership status (Bialik, 2013b). Downward response error could result from fear that one owns or uses a gun illegally (whether or not that is the case), fear that the government will acquire the survey information and secretly maintain a database of gun owners, or from simply not knowing there is a gun in the household at all (National Research Council, 2004). But at least in the past, survey respondents seemed to answer gun questions willingly and accurately. In one survey of concealed-carry permit holders, Smith (2003) found that 94% accurately reported their status. Another experiment found that only 1 of 35 people living at addresses where handguns had recently been registered denied that any kind of gun had been kept in their home (Kellermann *et al.*, 1990).⁴ According to Tom Smith, director of the GSS, less than 1% of respondents have refused to answer the GSS gun ownership question since it started being asked (in 1973); the question is “asked well into [the] survey...They’ve already told us all kinds of things about themselves” (Bialik, 2013a).⁵ Low response rates are also cited as cause for concern, though once again this is principally a problem for telephone surveys, and in any case there is little reason to believe that non-responders are more likely than

⁴31 respondents acknowledged possession of a gun, and the other 3 claimed that a gun was recently kept in their home, but is no longer. False positives were not assessed since only those who had recently registered guns were surveyed. See Rafferty *et al.* (1995) for another example of such evidence.

⁵For further discussion of survey validity and methodologies, see Smith *et al.* (2014) and Chapter 2 of National Research Council (2004)

responders to be gun owners.⁶ Overall, the gun prevalence decline in the GSS data seems most likely to be accurate.

Proxy Measures

Background

Most surveys that include questions on gun ownership are conducted at the national level or within particular states, and are not conducted every year. The GSS, for example, is only constructed to be representative at the levels of the nine Census Divisions and the country. The CDC's Behavioral Risk Factor Surveillance System (BRFSS), another commonly used state-level survey, only included questions on gun ownership in all states in 2001, 2002, and 2004. Because these limitations often make survey data difficult to employ, especially when analyzing more granular geographic units, firearms researchers have developed several proxy metrics that are highly correlated with survey measures of gun ownership, but cover broader time periods and finer units. In order to build a more complete picture of recent trends in gun ownership, we compile several of these proxies,⁷ namely: the proportion of suicides committed by gun, the circulation rate of the firearm magazine *Guns & Ammo*, the per capita numbers of hunting licensees and federal firearms background checks, and the rate of accidental firearm death among children. Table 1 presents fixed-effects regressions, at the Census-Division and state levels, of the log of the GSS ownership rate on the log of each proxy.⁸ In the appendix, we also present simple pairwise correlation coefficients between national, Census-Division level, and state gun ownership rates and the corresponding proxies.

Criticism of Proxies

It should be noted that Kleck (2004) rejects the use of any gun ownership proxy to analyze inter-temporal trends, claiming that of the twelve proxies he examines, some capture inter-spatial variation in gun ownership, but none captures inter-temporal variation. His methodology, however, is to compare the annual percent change in each proxy to that of the GSS national gun ownership rate. As Hemenway (2012) rightly points out, in doing so he fails to take into account that “year-to-year changes in the GSS national measure of gun ownership...are probably almost entirely ‘noise.’ That changes in no other firearm proxy are highly correlated with this ‘noise’ does not mean other measures are bad (or good) proxies.” As Table 1 and Appendix Table 2 indicate, *levels* of certain proxies are strongly predictive of survey rates at the national and sub-national levels, even after controlling for region- and year-fixed effects.

Proxies

First validated by Miller *et al.* (2001), the fraction of suicides that are committed by gun—abbreviated FS/S, for firearm suicides divided by total suicides—is constructed from the CDC's National Vital Statistics System's Fatal Injury Reports, and is available from 1981 to 2015. FS/S has been shown to have strong and significant correlations with survey measures of gun ownership, both cross-sectionally and inter-temporally,

⁶Finally, Smith has said, and we have confirmed, that the rate of respondents refusing to answer the gun ownership questions has increased in recent years. As a check, we created an upper bound rate for which all refusers were assumed to have a gun in their home. For the Census Division-level data, for 180 of 225 observations (80%), this upper bound was at most 5% larger than the regular estimate. For the national-level data, the equivalent statistic is 22 of 25 (88%) observations with a difference below 5%.

⁷While there are specific criticisms against the use of each of the following proxies in statistical analysis, and we will enumerate some of those below, our goal is simply to get a more complete (if blurry) picture of gun prevalence trends. To that end, we defer to the literature, examining some of the proxies that are more commonly used by firearms researchers.

⁸The GSS is not constructed to be representative at the state level. However, note that for three of the five proxies—FS/S, licenses per capita, and circulation per capita—the coefficients at the Census-Division level are similar to those at the state level. This suggests that the state-level results are not too misleading, and that the other two proxies may simply be less reliable (for the reasons described below).

	(1)	(2)	(3)	(4)	(5)
	FS/S	Acc. Gun Death Rate	Licenses per Capita	Circ. per Capita	Checks per Capita
Coefficient	0.626*	0.0573**	0.207**	0.331**	0.609**
	(0.308)	(0.024)	(0.084)	(0.140)	(0.194)
Year Range	1982-2014	1982-1998	1973-2014	1980-2014	2000-2014
Number of Years	20	12	25	9	8
Adjusted R ²	0.438	0.219	0.461	0.395	0.127
N	180	107	225	81	72

All regressions are log-log, and include Division- and year-fixed effects. Standard errors (in parentheses) are clustered by Division.
Number of years used does not correspond exactly to year range due to gap years in administration of GSS gun ownership question.
All nine Census Divisions' data were included in this regression.

* p < 0.10, ** p < 0.05, *** p < 0.01

(a) Census-Division Level

	(1)	(2)	(3)	(4)	(5)
	FS/S	Acc. Gun Death Rate	Licenses per Capita	Circ. per Capita	Checks per Capita
Coefficient	0.593	0.0138	0.221**	0.393**	-0.0327
	(0.522)	(0.042)	(0.089)	(0.188)	(0.020)
Year Range	1982-2014	1982-1998	1973-2014	1980-2014	2000-2014
Number of Years	20	12	25	9	8
Adjusted R ²	0.641	0.642	0.663	0.637	0.577
N	515	286	644	230	203

All regressions are log-log, and include state- and year-fixed effects. Standard errors (in parentheses) are clustered by state.
Number of years used does not correspond exactly to year range due to gap years in administration of GSS gun ownership question.
Regressions are weighted by the number of respondents coming from the state in each year.
Because many states had small numbers of respondents in many years, these regressions include only the 26 states for which at least 10 years exist when the number of respondents from the state was greater than or equal to 20.
Regressions do not include the District of Columbia.

* p < 0.10, ** p < 0.05, *** p < 0.01

(b) State Level

Table 1: Regressions of Gun Ownership Rate on Proxies.

and as a result, has become the most widely-used proxy for the level of gun ownership (Cook & Ludwig, 2006; Briggs & Tabarrok, 2014; Kalesan *et al.*, 2015). Various criticisms have been levelled against its validity (Duggan, 2003; National Research Council, 2004; Shenassa *et al.*, 2006). Perhaps the most serious of these is that if use of a gun to commit suicide, given that it is a more effective method than drug overdose and hanging, is the result of a higher level of suicidal intent, then FS/S could simply be capturing “the average level of suicidal intent in the population” (Kleck, 2004). Furthermore, if suicidal intent is at least partly driven by some latent social unrest or dysfunction, and that unrest also pushes people to acquire guns (perhaps for self-defense), then a spurious positive correlation exists between FS/S and gun ownership. Nonetheless, our results, combined with those of the previously cited studies validating it, give us confidence in using the percentage of suicides by gun to proxy for gun ownership.

The Fatal Injury Reports also contain the rate of unintentional death by firearm, which exists from 1981 to 1998 at the state level, and 1981 to 2015 at the national level.⁹ We use this death rate among children aged 0 to 14 as another intuitive proxy for the level of gun prevalence: The number of unintentional firearm deaths in a given population and unit of time is feasibly a Poisson random variable whose rate parameter is proportional to, or at least increasing in, the availability of guns. One problem with this proxy is that it exhibits significant truncation, as roughly 20% of state-year rates are 0.¹⁰

Duggan (2001) first proposed utilizing per capita circulation of the firearm magazine *Guns & Ammo* as a proxy for gun ownership, and since then the practice has spread (Briggs & Tabarrok, 2014; Siegel *et al.*,

⁹This variable stops at 1998 at the state level because from 1999 on the CDC stopped reporting rates based on fewer than 10 deaths.

¹⁰The measurement of unintentional firearm deaths has also been found to suffer from some degree of error (Barber & Hemenway, 2011).

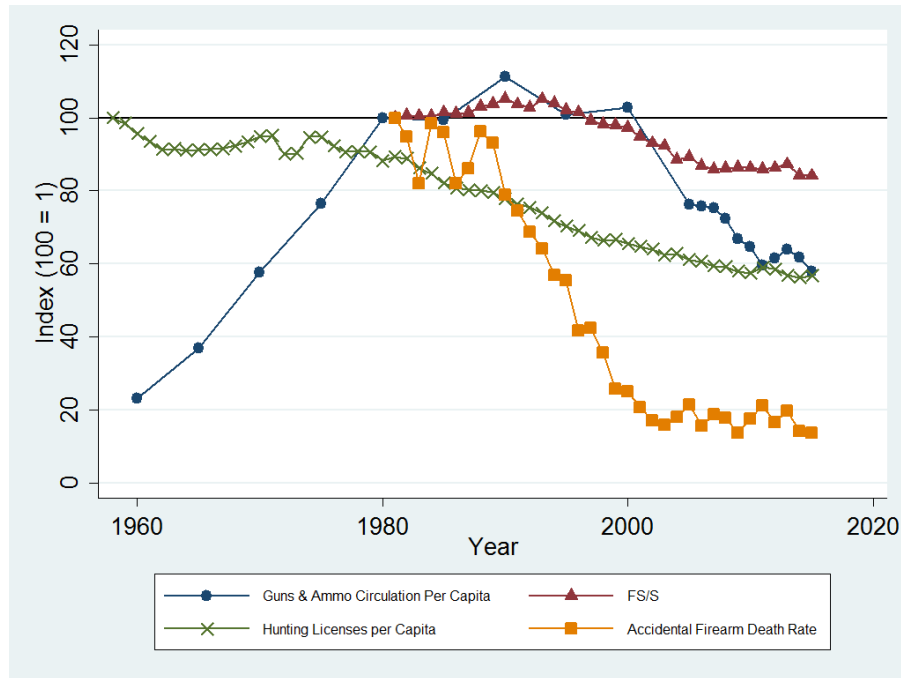


Figure 3: Trends in Gun Ownership Proxies, 1977 - 2015.

2014).¹¹ The magazine is one of the most popular amongst gun enthusiasts, with a total circulation of over 4.5 million in 2015, roughly 90% of which comes from subscriptions. Circulation data, which we have annually from 2005 to 2015, and in five-year increments from 1960 to 2000, is taken from the Alliance for Audited Media.

Siegel *et al.* (2014) introduce a novel proxy for gun ownership, a composite of FS/S with the (per capita) number of hunting license holders, the latter of which is available from the U.S. Fish and Wildlife Service starting in 1958. We look at FS/S and the hunting license measure separately, instead of as a composite. One caveat about this proxy is that it includes license holders who reside in *other* states as well, which means it is inflated for states where many people travel to hunt.¹²

Finally, the per capita number of background checks conducted through the National Instant Criminal Background Check System (NICS) is available from 1999, and has been offered as a proxy for firearm ownership. This measure is only valid if purchase rates for new firearms are proportional to current ownership rates.¹³ Even assuming this proportionality requirement holds, there is reason to be skeptical of the measure's usefulness: For one, NICS checks are only necessarily conducted by federally licensed firearms dealers, whereas a significant portion of gun sales are made through state or private dealers. Since regulations defining precisely which transactions require background checks vary widely from state to state and over time, it is problematic to compare this metric between states or years.

The way check numbers are aggregated is also important. The total number of NICS checks includes, among others, checks that are undergone when one *pawns* her firearm or applies for a firearm permit,¹⁴ as

¹¹Some opt to use circulation of *Field & Stream*, which is more hunting-oriented. We believe that our measure of hunting licenses per capita adequately captures the hunting pathway of gun ownership, and therefore utilize *Guns & Ammo*, which caters to a broader audience.

¹²This proxy is also vulnerable to significant year-to-year fluctuations due to animal movements and the like. However, because we have such a large sample on this variable (57 years for each state), we feel comfortable looking at its long-term trend nonetheless.

¹³One must also assume that each background check represents one gun purchase. Close inspection of the NICS data reveals that most checks for gun sales seem to represent only one gun type—that is, either handgun(s) or long gun(s). However, as the FBI itself warns, “based on varying state laws and purchase scenarios, a one-to-one correlation cannot be made between a firearm background check and a firearm sale.”

¹⁴Thirteen states and the District of Columbia have laws requiring a background check to purchase or possess a firearm (commonly known as “permit-to-purchase” laws). For these states, some proportion of the checks undergone for a firearm

well as administrative checks—essentially system tests—that are run when no firearm transaction is made at all. Moreover, when A sells a gun to B in a private transaction that is subject to a background check, the count of checks is augmented, but there is no change in gun prevalence. (Only the owner of the firearm has changed.) In the last ten years alone, four states—Colorado, Delaware, Oregon, and Washington—have adopted laws mandating universal background checks on private sales, thereby expanding the number of purchases that are counted without increasing the number of guns in circulation. We limit the checks we count to those resulting from the non-private purchases of handguns, rifles, shotguns, other gun types, and multiple gun types.¹⁵

We construct indices of each proxy, indexing values to the first observation of the series within a state or Division,¹⁶ and track their progress over the study period. Figure 3 shows that, at the national level, since 1980 four of our gun prevalence proxies have undergone decreases, ranging from 15% for FS/S to 85% for the accidental firearm death rate. Figure 4 shows a starkly different pattern for firearm background checks. We address this discrepancy in the next section.

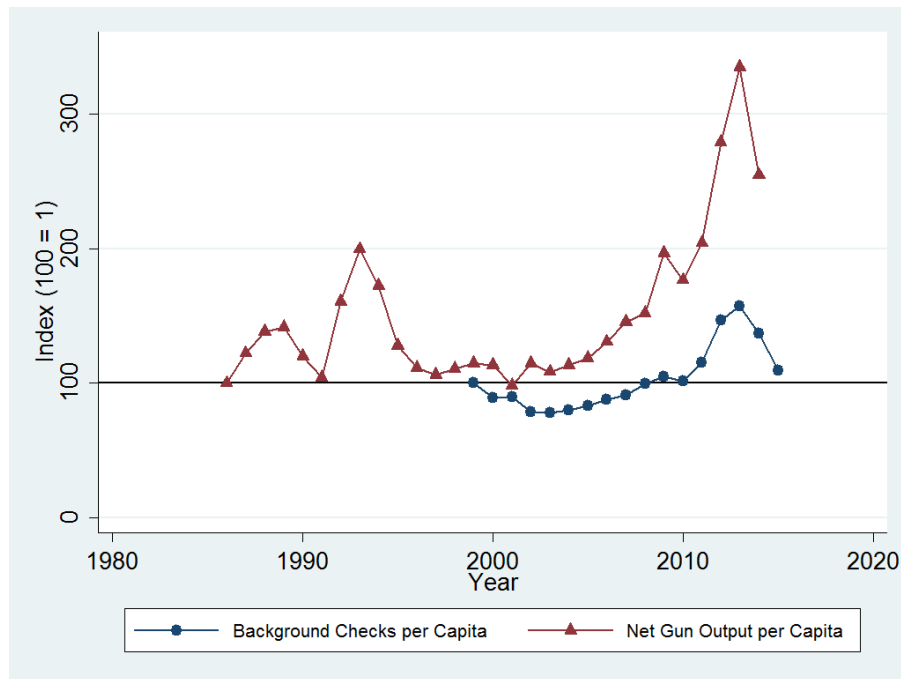


Figure 4: Trends in Gun Sales, 1986 - 2015.

Ownership Concentration

The increase in (per capita) NICS checks seems to indicate that the (per capita) number of guns in circulation has risen considerably, which is consistent with data from the Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF) U.S. Firearms Commerce Report (Department of Justice, 2015). As Figure 4 shows, per capita net output of firearms, where net output is defined as manufactures plus net imports, has increased

permit actually represent a purchase as well. After reviewing these states' laws, and consulting at length with FBI staff on how exactly checks are counted, we decided not to count permit checks towards the NICS metric, with one exception—Hawaii, which conducts solely permit checks because its firearm dealers opt not to re-check permit holders at the point of sale.

¹⁵To give readers an idea of this dataset, as of 2015, NICS check numbers are broken down into the following categories: Pre-Pawn, Redemption, Returned/Disposition, Rentals, Private Sale, Return to Seller - Private Sale, Permit, and four non-private sale categories representing the type(s) of gun being sold. It is these four columns (plus permit checks, for Hawaii) that go into our metric.

¹⁶The exception is the Guns & Ammo proxy, which we index to its 1980 value, as its initial movements more likely reflect the magazine's initial popularization—circulation began in 1958—than underlying gun ownership trends.

dramatically since the mid-2000s. An increase in privately held guns may seem counterintuitive in light of the evidence that household gun ownership has decreased. However, it is possible, given that the number of households has increased over the study period, that newer households have been less likely to buy guns than existing households, which are acquiring more of them. This would tend to increase the number of firearms in circulation but decrease overall prevalence.

Indeed, there is empirical evidence that individual households have been accumulating multiple firearms. Cook & Ludwig (1997), examining the results of the 1994 National Survey of Private Ownership of Firearms, found that 74% of gun owners owned two or more firearms, and that the 20% of owners who possessed the most guns collectively controlled 55% of privately owned firearms. Ten years later, Hepburn *et al.* (2007), looking at another national survey, found that of all individuals (households) that possessed a firearm, 48% (41%) owned at least four, and that the top 20% of owners controlled 65% of the country's guns. And most recently, in the 2015 iteration of the same survey, Azrael *et al.* (2017) find that 74% of owners have more than one gun, and that the top 20% possess 60% of the stock.¹⁷ Thus to the extent that NICS checks provide a useful proxy, it is crucial that they be interpreted as a proxy for firearm *sales*, and not for ownership, or they will tell a misleading story.

The Mexican Gun Trade

Another factor that compromises the validity of the NICS checks as a U.S. gun prevalence proxy is the scope of the illegal firearms trade, which exports many American-purchased guns to the rest of the world. According to the ATF's Firearms Tracing System, which traces guns recovered at crime scenes and logs their origins, 87,253, or 70.3%, of the firearms recovered in Mexico from 2009 to 2015 came from the US.¹⁸ The Government Accountability Office (2016) finds, further, that most of these had been bought legally at gun shops and gun shows in Texas, Arizona, and California. Another study estimated that from 2010 to 2012, 2.2% of domestic arms sales were attributable to U.S.-Mexico traffic, and 46.7% of federally licensed firearms dealers depended in part on demand from this trade to stay in business (McDougal *et al.*, 2015). To the extent that Mexico-bound guns are bought from federally licensed dealers, which are required to run background checks on unlicensed purchasers, or from state or private dealers that do run background checks, the NICS checks resulting from them artificially inflate the checks per capita proxy.

Explanations

Hunting

The most common purposes that firearm owners give for possessing a gun have consistently been self-protection and hunting (Azrael *et al.*, 2017; Hepburn *et al.*, 2007; Pew Research Center, 2013; Jelen, 2012). (The proportion that cites political beliefs as a reason is quite small.) Thus if gun prevalence has indeed declined on the scale we have suggested—and assuming supply-side factors have remained relatively stable—it is probably due to a decline in either the perceived need for self-defense, interest in hunting, or both. In Figure 5 we plot the evolution of the GSS-reported hunting rate alongside hunting licensees per capita; both indicate that Americans' tastes for hunting have abated steadily and substantially since the late 1970s. Whereas in 1977, 31.6% of adults reported being a hunter or married to one, in 2016 the corresponding rate was only 17.1%.

¹⁷An analysis of California's gun market from 1996 to 2015 finds that among dealerships, sales are highly and increasingly concentrated, with the top dealership handling over 10% of transactions (California Department of Justice, n.d.). If perennial gun buyers tend to stay loyal to particular dealerships over time, then this increase in dealership concentration could be consistent with an increase in ownership concentration, through a smaller gun-buying demographic buying more guns from a smaller pool of sellers.

¹⁸This figure consists of all recovered firearms "that were determined by ATF to be manufactured in the U.S. or legally imported into the U.S. by a Federal firearms licensee" (Bureau of Alcohol & Explosives, 2015, 2016). It is also likely an underestimate, as, for the other 29.7% of recovered firearms, the ATF cannot determine whether "the firearms were imported directly into Mexico, or if the firearms were legally imported into the U.S. or went to another country and then made their way to Mexico by legal or illegal means."

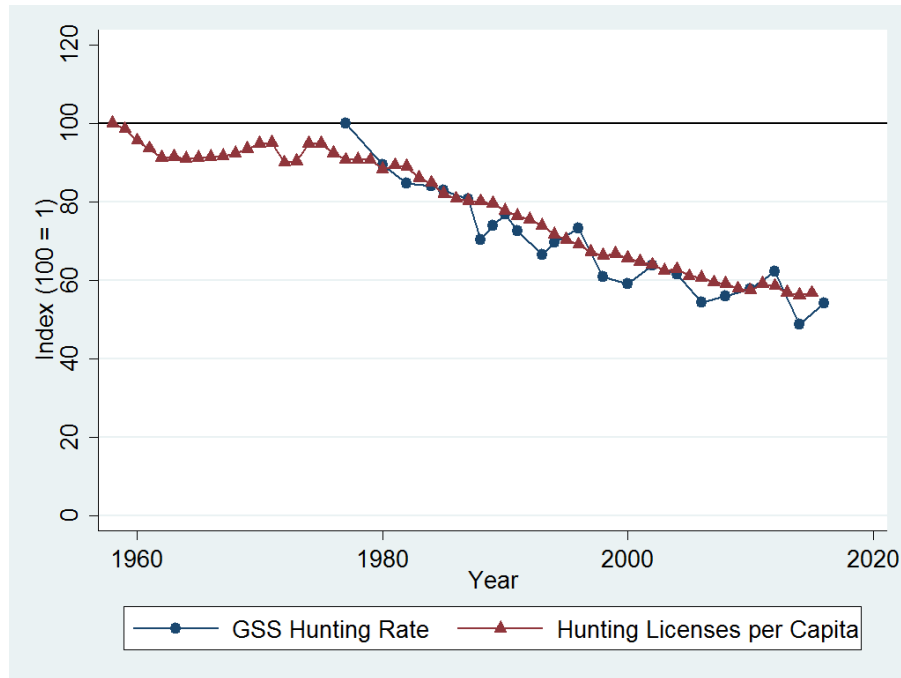


Figure 5: Trends in Hunting, 1977 - 2015.

If gun prevalence has declined through reduced interest in hunting, one would also expect to observe decreases in ownership of long guns—that is, rifles and shotguns—as these are disproportionately used by hunters. And indeed, between 1973 and 2016, the rate of handgun ownership remained relatively stable while that of long guns decreased dramatically, from 39.8% to 23.2% (Figure 6a). Furthermore, when we decompose per capita federal background checks based on whether they went towards handgun or long gun purchases, we find that the increase in checks noted above—and often cited in the press as indicating that overall ownership is actually increasing—has been overwhelmingly driven by increased handgun sales (Figure 6b). As we show in the Appendix, these findings are not confined to a particular region, but are consistent throughout the country.



(a) Household Gun Ownership by Type, 1973 - 2016. (b) Federal Background Checks per Capita, 1999 - 2015.

Figure 6: Handgun and Long Gun Trends.

Demographics

Demographic shifts could also partially explain the decrease in firearm prevalence. If certain groups own guns at systematically lower rates than their complements, and the proportion of the population in the lower-ownership groups increases, then overall gun ownership mechanically decreases as well. This seems a plausible story in the U.S., whose gun ownership rate varies significantly by sex, race, and other dimensions. In particular, going by national GSS ownership data, from 1980 to 2016 gun ownership was on average 31 percentage points higher among males than females, and 12 and 15 percentage points higher among Whites than Blacks and other-race respondents, respectively. The proportion of Whites in the U.S. population has decreased steadily by 10 percentage points since 1970, which would indeed tend to reduce overall gun ownership. The male proportion of the population, however, has actually increased by 1 percentage point since 1980, so shifts in the gender distribution cannot have been a channel of general ownership decreases.

Several publications have reported that interest in firearms and shooting sports has been increasing among women in recent years (Goode, 2013; Mann, 2012). Tabulating gun ownership by demographic, however, we find that female ownership has remained stable between 10 and 14% since 1980 (Figure 7).

Urbanization could also explain part of the gun prevalence decline. In the 2015 National Firearms Survey, 15% of urban, 19% of suburban, and 33% of rural dwellers owned at least one firearm. (Previous iterations of this survey yielded similar relative proportions.) From 1977 to 2015, the percentage of the U.S. population living in Census-designated Metropolitan Statistical Areas increased from 66 to 85%.¹⁹

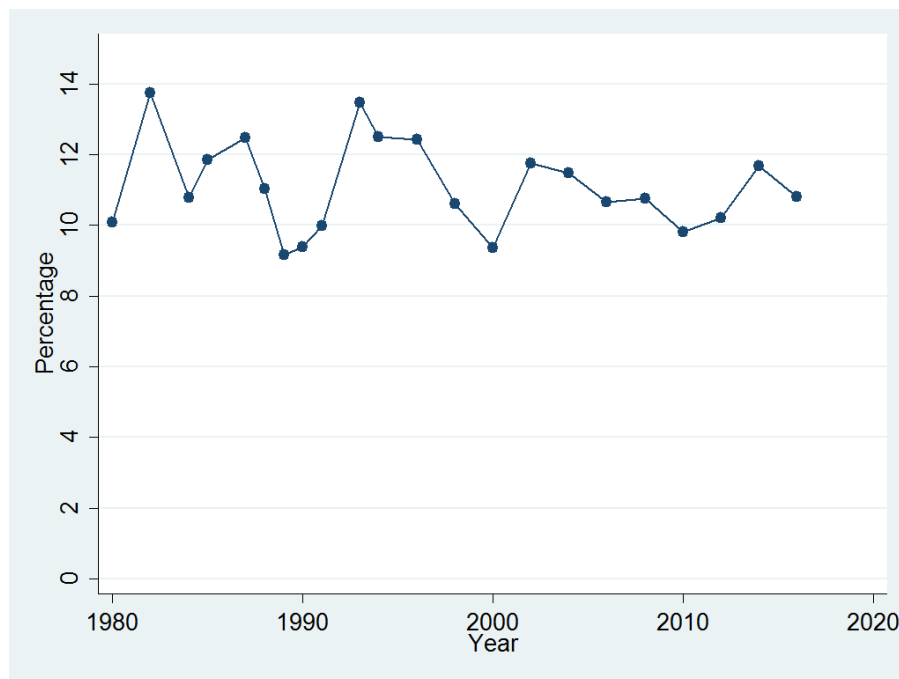


Figure 7: Gun Ownership Among Women, 1973 - 2016.

Crime and Other Factors

Given that a plurality of handgun owners possess handguns for self-defense, it seems likely that handgun ownership in a given time and place is largely determined by the perceived fear of danger there. To track this variable, we examine the GSS question about whether the respondent is afraid of walking around his

¹⁹While part of this could be attributed to non-gun owners self-sorting into urban areas, it is also true that urban jurisdictions tend to have stricter gun laws than rural ones, thereby curtailing ownership among people who may have otherwise had one.

neighborhood at night.²⁰ As one would expect given the large decline in crime that occurred starting in the early 1990s, this measure of fear decreased significantly over a similar period (Figure 8).

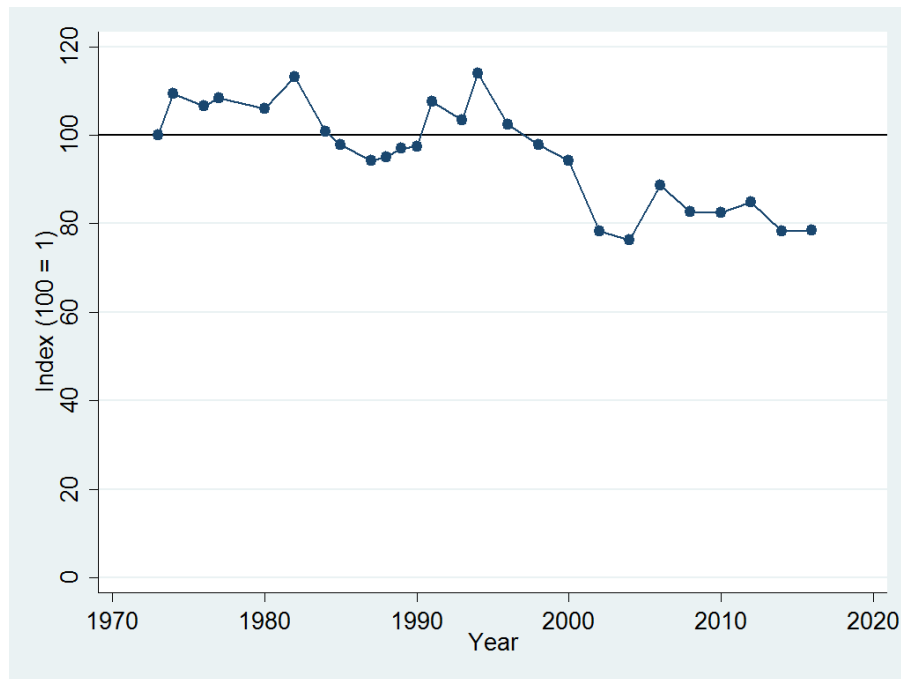


Figure 8: Neighborhood Fear Index.

However, this leaves us with the puzzle of why handgun ownership has remained stable over the study period if crime, as well as the fear resulting from it, have both gone down so dramatically. (Indeed, the decline in hunting also should have contributed to a decrease in handgun ownership.) Going by Figure 9, which plots handgun ownership against the fear rate for each Census Division, it would appear that even within any region, there is no relationship between the two variables. One explanation for this is that we have hitherto ignored (handgun-specific) supply-side dynamics that have served to increase ownership, such as reductions in manufacturing costs or the market becoming less concentrated. The latter is not the case: The Herfindahl-Hirschman Indices for the pistol and revolver markets have not changed significantly since 1986 (Brauer, 2013). The cost explanation is also unlikely, as the price of steel mill products, a strong determinant of costs to gun manufacturers (First Research, 2012), has increased precipitously over the study period, reaching over five times its 1973 level in late-2008 (Bureau of Labor Statistics, 2016). Another possibility is that we have misidentified the direction of causality: Perhaps reduced fear of danger does not significantly reduce the desire to own a handgun, but owning a handgun does reduce one's fear—and this mechanism is prevalent enough to scale up to a general trend. Finally, because much of the wear-and-tear on a firearm occurs through the number of rounds fired, and handguns bought for concealed-carry or home self-defense purposes are not likely to be fired very many times (especially relative to long guns bought for target shooting or hunting), it is plausible that the average handgun would last much longer than the average long gun (perhaps by decades),²¹ resulting in the trends documented above.

²⁰The exact wording is: "Is there any area right around here—that is, within a mile—where you would be afraid to walk alone at night?"

²¹There is little hard data on the life spans of different guns or their determinants, but the bulk of opinions shared on online firearm enthusiast forums suggest that certain parts in every gun need to be replaced after some number of rounds are fired, and that this "round ceiling" is the main limiting factor on a firearm's longevity.

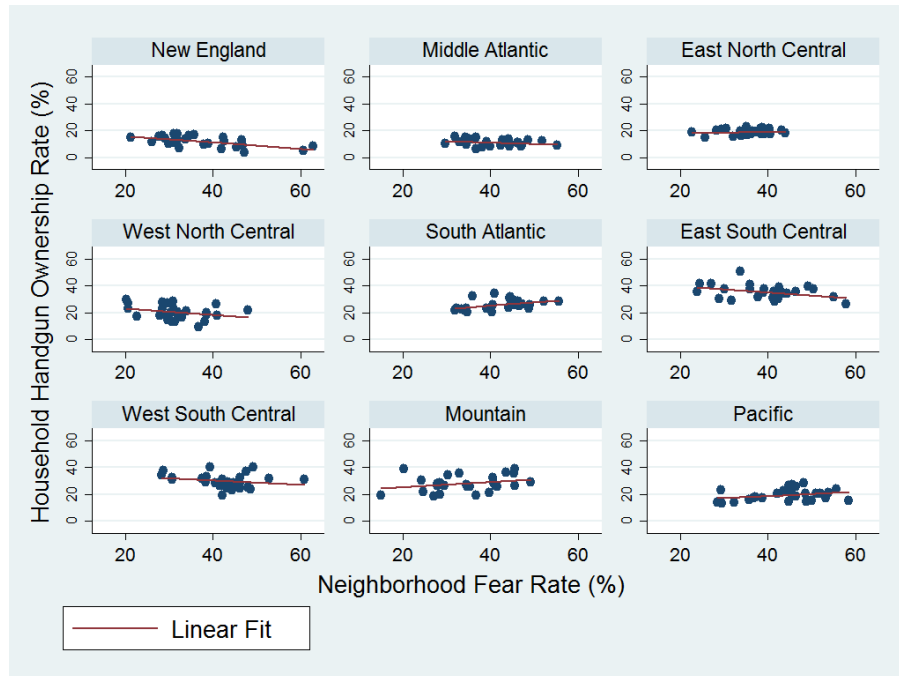


Figure 9: Handgun Ownership and Neighborhood Fear by Census Division. $r = -0.013$

Conclusion

Those advocating weaker regulations on guns often claim that gun ownership has increased substantially since the early 1990s, and that the concurrent drops in violent crime rates can be attributed to this trend (National Rifle Association, 2010). And indeed, the claim that violent crime is down is accurate: From 1990 to 2015, the national murder, aggravated assault, and robbery rates have dropped by roughly 48, 44, and 60%, respectively. However, for the nation as a whole and for 7 of 9 Census Divisions, gun ownership also seems to be down considerably—though those with guns have acquired larger stocks.

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Appendix

Proxy Correlations

Table 2 presents pairwise correlations, at the state, Census Division, and national levels, between the gun ownership proxies and a survey measure of gun ownership. At the state level, proxies are compared to gun ownership as captured by the BRFSS household rate in 2001, 2002, and 2004, while at the Census Division and national levels, the GSS household rate is the survey metric. Because correlations at the state level between our proxies and the BRFSS ownership rate are based on only three years of data, it is important to note that they largely capture inter-spatial, rather than inter-temporal, similarities. The same issue does not exist at the coarser levels, since we have national and Census Division-level ownership rates for many more years.

		GSS	
	BRFSS	FS/S	0.836***
Licenses per Capita	0.792***	Accidental Death Rate	0.830***
NICS Checks per Capita	0.806***	Licenses per Capita	0.694***
FS/S	0.770***	Circulation per Capita	0.576***
		NICS Checks per Capita	0.639***
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$		* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	
(a) State Level		(b) Census-Division Level	
		GSS	
		FS/S	0.822***
		Accidental Death Rate	0.932***
		Licenses per Capita	0.945***
		Circulation per Capita	0.734
		NICS Checks per Capita	-0.422
		* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$	
		(c) National Level	

Table 2: Correlations Between Surveyed Gun Ownership Rates and Proxies.

Regional Trends

One potential objection to our claims would be that the national trends illustrated above mask significant regional heterogeneity. Perhaps it is only in certain areas that the prevalence of long guns has decreased relative to that of handguns, or perhaps the decline in overall ownership is confined to relatively populous regions (whereas other areas have even experienced increases). As it turns out, data at the Census Division level confirm that these patterns are mostly consistent across regions. In Figures 10, 11, and 12 we reproduce three of the previous charts, plotted for each individual Census Division. (Figure 13 is a map of the Divisions.) With the exceptions of two Divisions, it appears that the decreases in access to firearms and interest in hunting, as well as the convergence between handgun and long gun ownership rates, are not limited to a particular area, but are present throughout the country. The exceptions, New England and West North Central, are also the only Divisions for which we also do not observe a downward trend in prevalence.

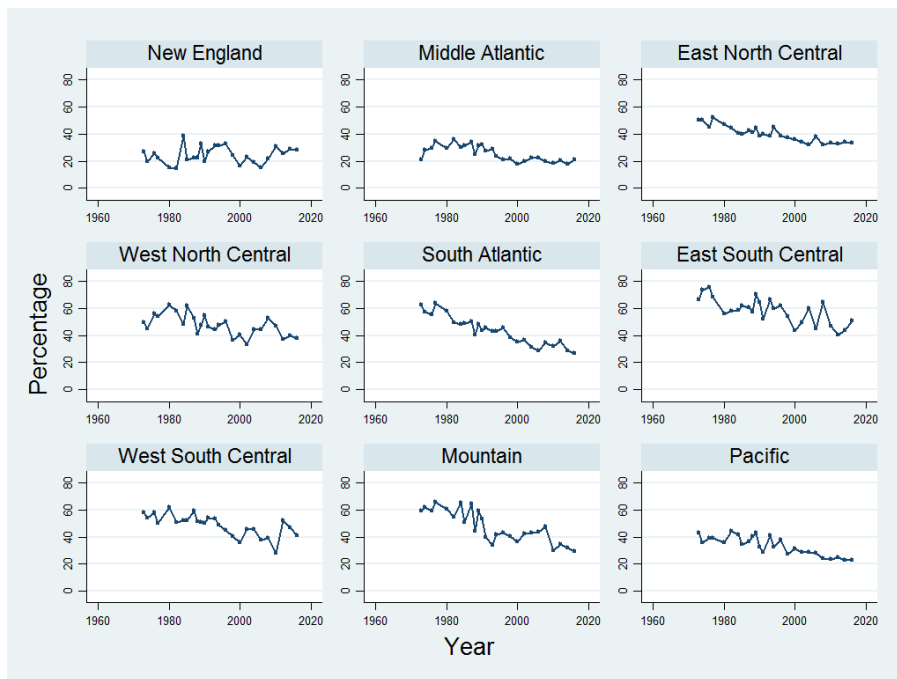


Figure 10: Household Gun Ownership by Census Division, 1973 - 2016.

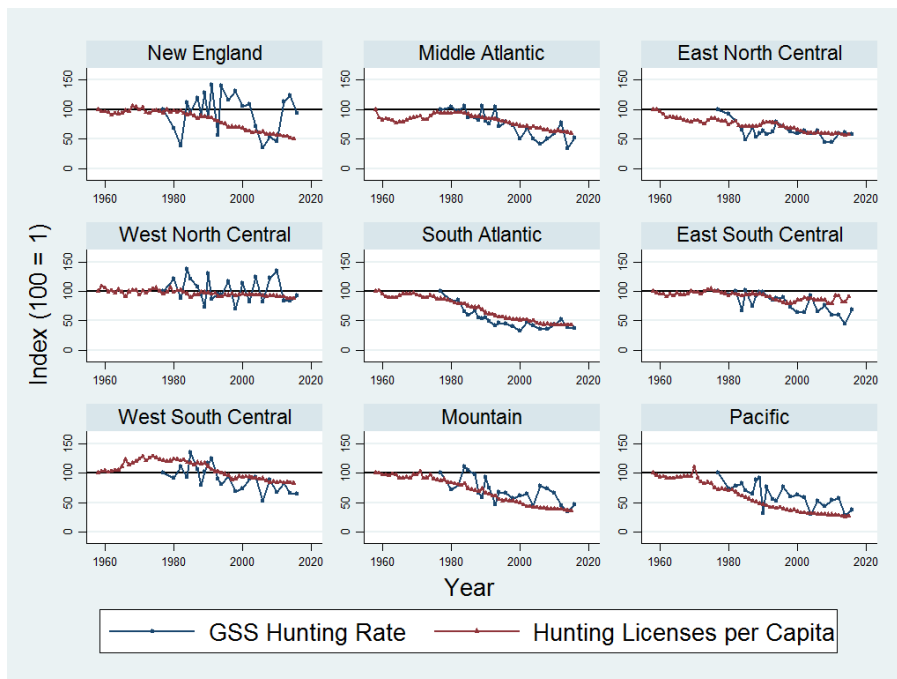


Figure 11: Trends in Hunting by Census Division, 1977 - 2015.

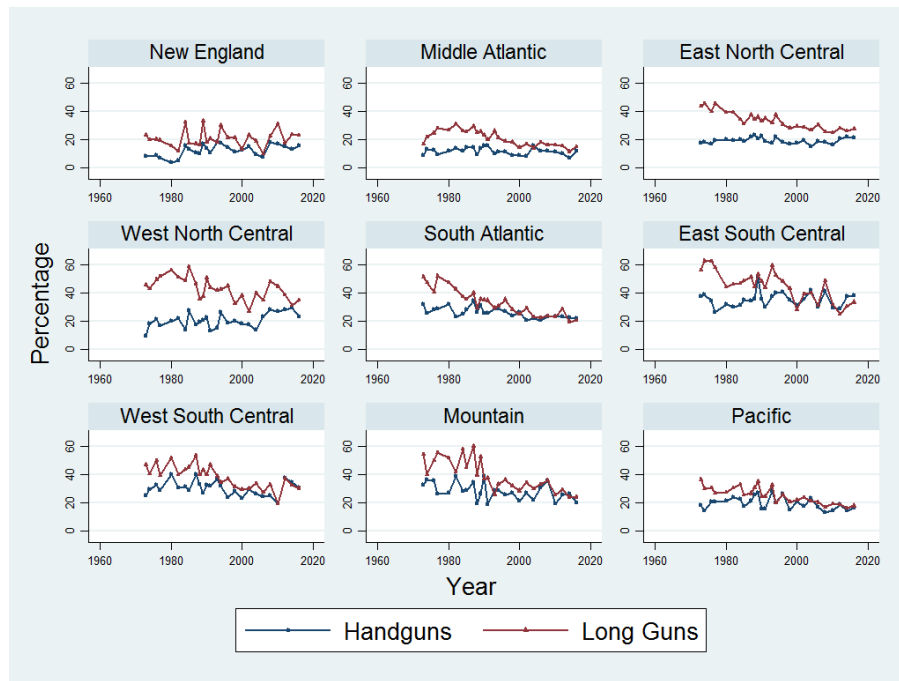


Figure 12: Household Gun Ownership by Type and Census Division, 1973 - 2016.

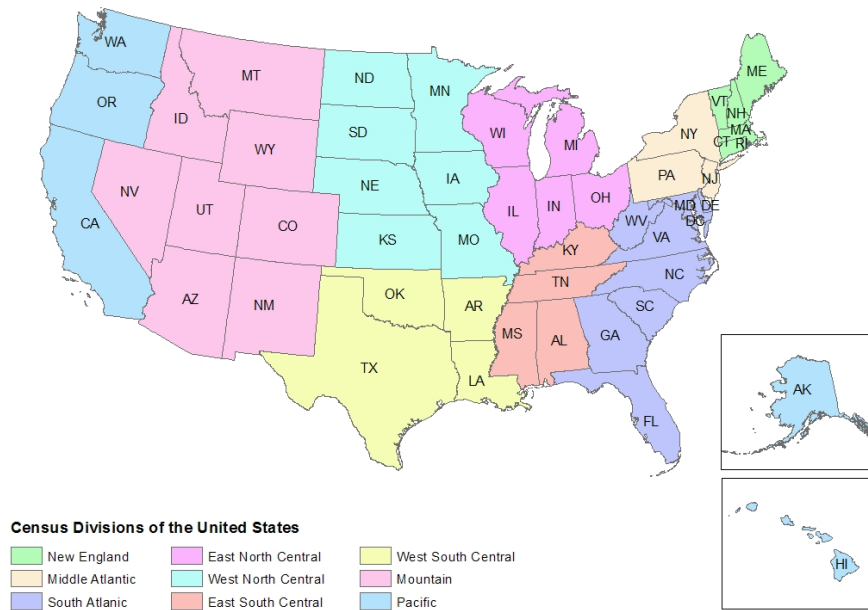


Figure 13: Map of Census Divisions. Courtesy of Iowa State University.

Exhibit C

The Stock and Flow of US Firearms: Results from the 2015 National Firearms Survey

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ABSTRACT

We estimate that, as of 2015, there were approximately 270 million guns in the US civilian gun stock, an increase of approximately 70 million guns since the mid 1990's. Over that time, the fraction of the gun stock that is handguns – most often bought for self-protection – has grown (to over 40%), as has the fraction of gun owners who own both handguns and long guns (to over 75%). While the fraction of US adults who report owning guns has declined only modestly, from 25% in 1994 to 22% in 2015, current gun owners are likely to own more guns (the mean number of guns has increased from 4 to 5). Despite the increase in the average number of guns, the median gun owner owns only two guns, while the 8% of all gun owners who own 10 or more guns account for 39% of the gun stock. With respect to firearm transfers, we estimate that approximately 70 million firearms changed hands within the past five years, the large majority of which were purchased, more so in the past two years (86%) than more distally (79% 2-5 years ago; 61% more than 5 years ago). Across all three time periods, the most commonly acquired firearm was a handgun. Guns not only move into, but also out of the hands of US gun owners. Five percent (5%) of gun owners in our sample reported having disposed of a gun within the past 5 years, most often (35%) through a sale to family or friends. Another 2.5% of our sample reported having had a gun stolen within the past 5 years, accounting for an estimated 400,000 guns per year.

Keywords: Firearms, Guns, Gunstock, Handguns

INTRODUCTION

The US is widely described as having more firearms in civilian hands than any other nation in the world. The empirical basis of this claim is derived primarily from aggregate firearm sales and importation/exportation data that are collected by the Federal Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF). ATF data indicate that between 1899-2103, more than 360 million firearms entered the US firearms market, with annual additions to the stock growing in recent years (e.g., by approximately 16 million guns in 2013)(Bureau of Alcohol Tobacco Firearms and Explosives, 2015). ATF's figures, however, fail to account for guns no longer in circulation and do not speak to the extent to which guns in the U.S. are concentrated within subpopulations (e.g., by sex, age, race, SES, geography, etc.).¹

While many surveys(Gallup, 2016; Morin, 2014; Smith & Son, 2015) ask respondents about whether or not there is a gun in the home, it is rare for surveys to ask about the number of

¹ Several national surveys, most notably the General Social Survey, regularly collect information on

guns respondents own. The best and most widely used estimates of the number and distribution of firearms across the US are derived from the two national surveys dedicated to producing detailed, disaggregated, estimates of the U.S. gun stock, one conducted in 1994 (Cook & Ludwig, 1996, 1997), the other in 2004, by members of the current research team (LH, MM, DA, DH) (Hepburn, Miller, Azrael, & Hemenway, 2007). These two surveys carefully characterized gun ownership and produced aggregate estimates of the total number of firearms in the US civilian gun stock. The surveys, taken together, suggested several important trends in firearm ownership in the U.S: 1) a steady increase in the number of firearms in civilian hands, 2) a growing proportion of the gun stock represented by handguns, and 3) concentration of firearms among fewer gun owners. In the 1994 survey, sponsored by the National Institute of Justice (NIJ), Philip Cook and Jens Ludwig estimated that American civilians owned approximately 192 million firearms, approximately one third of which (65 million) were handguns. In 2004, we updated this estimate to approximately 283 million firearms (more than four per owner), 40% of which were handguns.

Less is known about the movement of firearms into and out of US civilian hands than is known about the gun stock. Firearm manufacturing data provide one measure of the annual number of new guns available to be purchased (flow of new guns into the market), while other data collected by the ATF provide a related, but overlapping measure: the annual number of adults who undergo a background check before acquiring (or attempting to acquire) one or more guns.² Other movements of firearms, such as dispositions by the police and military are not centrally recorded (Cook & Ludwig, 1996; Wright, Rossi, & Daly, 1983). The National Crime

² Federal law requires that those involved in the business of firearm commerce have a federal firearms license (FFL). Since 1994, the buyer in all gun sales originating with an FFL must undergo a background check. Other transactions, such as private sales, inheritance, etc. do not require a background check (or associated Federal record of the transaction) under Federal and many state laws.

Victimization Survey (NCVS) collects information on firearm theft (Langton, 2012; Rand, 1994), with recent estimates suggesting that between 2005 and 2010, approximately 250 thousand guns were stolen annually (Langton, 2012), but no single source provides an estimate of the flow of guns. In consequence, as with the gun stock, the best available evidence to date regarding the frequency of gun transfers, and the number of guns transferred, comes from the 1994 and 2004 surveys.

To learn more about private ownership and use of firearms in the US today, as well as to characterize where and to what extent new and used firearms have exchanged hands over the past five years, in 2015 we conducted the first nationally representative survey of firearm ownership and use in over a decade (the National Firearms Survey, NFS). In this article we focus on features related to the gun stock (e.g., its size, composition, and distribution; the reasons for private gun ownership) and also characterize salient aspects firearm transfers between parties, such as where current firearm owners acquired their most recent firearm, by type of gun and recency of acquisition.

METHODS

Data for this study come from a national web-based survey (N=3949) conducted in January 2015 by the survey research firm GfK. Respondents were drawn from GfK's KnowledgePanel (KP), an on-line panel that includes approximately 55,000 U.S. adults. The KP panel is selected (on an ongoing basis), using an equal probability of selection design so as to provide samples, after minor adjustments for deviations from equal probability selection (base weights), that are representative of the US population. Prior to selection of a study sample, GfK adjusts panel base weights to account for any discrepancies between panel composition and the distribution of key demographic characteristics of the US population as reflected in the most recent Current Population Survey (GfK, 2013). We oversampled gun owners (n=2072) and veterans (n=1004).

The final study weights provided by GfK combined pre-sample weights with a set of study-specific post-stratification weights accounting for oversampling and for survey nonresponse.

For our survey, 7,318 KP panel members received an invitation to participate. Of these, 3,949 completed the survey, yielding a survey completion rate of 54.6%. In contrast, non-probability, opt-in, online panels typically achieve a survey completion rate between 2% to 16%(Callegaro & DiSogra). All panel members, except those currently serving in the US armed forces were eligible to participate.

Following earlier work (cite Cook and Hepburn), our estimates of the magnitude and distribution of the US gun stock, as well as gun transfers and theft come from the reports of those who personally own guns. Gun owners were identified through two questions: “Do you or does anyone else you live with currently own any type of guns?” followed by, among all respondents who answered in the affirmative: “Do you personally own a gun?” Gun owners were then asked about the types of guns they owned (handguns, broken into pistols and revolvers; long guns, and “other” guns) and the number of each type of gun they owned. Respondents were also asked about their most recent firearm acquisition, including whether they bought the gun or acquired it in some other way (e.g., via an inheritance), and whether, and if so how many, guns had been stolen from them in the past five years. Data for this paper come from respondents who personally own guns.

A supplement to our survey was conducted by GfK in November 2015. For the supplement, all gun owners from the original survey (n=2072) who were still in the KP panel (n=1880) were invited to answer an additional set of questions about the timing of their most recent gun acquisition, the number of guns they had acquired in the past 5 years and the number of guns that had been stolen from them in the past 5 years. Of those eligible for the survey (n=1880), 1613 responded (86%). The respondents to the supplemental survey did not differ

from respondents to the original survey with respect to age, gender, race, type of gun most recently acquired or acquisition patterns. Non-responders (n=267) were more likely than responders to be younger and female and to have acquired their most recent firearm as a gift or inheritance rather than by purchase. Respondents to the original survey who were no longer in the GfK panel (n=192) were more likely to be younger and have refused to describe the type of gun they most recently acquired than those in the original sample. They were also less likely to have purchased their most recent firearm. These differences did not affect the overall similarities between the supplemental and original samples. We use the original survey weight provide by GfK for analyses using the supplemental survey.

The Northeastern University Institutional Review Board approved this study.

RESULTS

1. The Gun Stock

Twenty-two percent (22%) of our sample reported that they personally owned a gun (0.223, CI: 0.207-0.240). Extrapolating to the US population of adults 18 and older (245,157,000 in 2014) (Colby & Ortman, 2015), we estimate that there are 54.7 million gun owners in the US (CI: 50.7-58.8). Sixty (60) respondents who said that they owned guns did not answer our questions about how many guns they owned. We use results from the 2,012 respondents who did provide an answer to estimate the mean number of guns owned by our gun owners: 4.8 (CI: 4.37-5.32), yielding a gun stock of 265 million (CI: 245 million-285 million).³

Of the estimated 265 million guns in civilian hands in the US, approximately 4 of 10 guns (42%) are handguns, with the remainder consisting primarily (53%) of long guns (4% are

³ Including or excluding those who reported being a gun owner, but reported owning 0 guns, or calculating the mean number of guns per gun owner including those who reported owning 0 guns does not materially change our estimates (21.8% personal gun ownership; mean number of guns, 4.7).

“other” guns). Among handguns, the majority are semi-automatic pistols (62%), and revolvers (29%), with the remainder described by respondents as “other” handguns. Approximately six out of 10 long guns (62%) are rifles and 4 of 10 (38%) shotguns (Figure 1).

Although the majority of guns in the US gun stock are long guns, in terms of the distribution of gun types among current gun owners, only one in five gun owners (21%) own long guns only, 25% of gun owners own handguns only (2% report own “other guns” only), and half of gun owners own both handguns and long guns (44%) or handguns, long guns and other guns (6%). The remainder of gun owners (4%) reported owning either “other guns” along with handguns or long guns, or did not specify what types of guns they own. Among those who own handguns only, two thirds (67%) own one gun; for those owning long guns only, 43% own only a single gun (Figure 2).

Gun owning respondents owned an average of 4.85 firearms (range: 1-140); the median gun owner reported owning approximately two guns. As can be seen in Figure 3, approximately half (48%) of gun owners report owning 1 or 2 guns, accounting for 14% of the total US gun stock, while those who own 10 or more guns (8% of all gun owners), own 39% of the gun stock. Put another way, one half of the gun stock (~130 million guns) is owned by approximately 86% of gun owners, while the other half is owned by 14% of gun owners (14% of gun owners equals 7.6 million adults, or 3% of the adult US population).

Table 1 describes the demographic characteristics of respondents who own handguns only, long guns only, and both handguns and long guns (i.e., for simplicity of presentation, it does not include the small number of respondents (91) who are not in one of these three categories). The demographic characteristics of gun owners have been well established in multiple surveys. Consistent with these surveys, we find that gun owners overall are disproportionately male, white, older, non-urban and from the South.

Differences among gun owners emerge, however, when those who own handguns only and those who own long guns only are compared to those who own both types of guns. Handgun only owners, in particular, appear to be a distinct group, more likely to be female, non-white and urban (compared with other gun owners), and less likely to have grown up in a house with a gun. For example, while approximately 20% of long gun owners are female, among those who own handguns only, 43% are women, and almost a quarter (23%) live in urban areas, compared to 13% of long gun owners and 14% of those who own both handguns and long guns.

Table 2 describes the reasons for gun ownership. Almost 2 out of 3 gun owners (63%) reported that one of the primary reasons they own their guns is for protection against people. Three quarters of handgun owners (76%) reported that they owned a handgun primarily for protection (not shown). Other reasons for ownership include hunting (40%), for a collection (34%), sporting use (28%), protection against animals (20%), and for some other reason (40%). Other reasons volunteered by respondents included that they owned guns as a result of a gift or inheritance or because they had a “right” to have them.

Reasons for ownership varied significantly depending on what types of guns respondents owned (handguns only, long guns only or both) and by demographic characteristics. Overall, those who own only handguns or both handguns and long guns were similar to one another with respect to owning guns for protection, while those who own only long guns and those who own both were similar with respect to hunting and sporting use. For example, while almost 8 out of 10 people who own handguns only cite protection against strangers as a primary reason for ownership, as do 72% of those who own both handguns and long guns, only 31% of those who own long guns only do. Likewise, while only 2% of those who own handguns only report that hunting is one of the primary reasons for gun ownership, 57% of those who own long guns only and 55% of those who own handguns and long guns do.

Across demographic characteristics, female gun owners were more likely than were male gun owners to report owning any gun for protection, and less likely to report owning a gun for any other reasons (Table 2). Reasons for ownership were relatively consistent across age groups, although owning a gun for protection was less common among older gun owners. Strikingly, protection was cited as a primary reason for ownership far more often by those from the South (73%) than those from any other region of the country.

2. Gun Transfers

In addition to characterizing the stock of firearms in civilian hands, our survey provided information on the flow of guns in the US over the past 5 years, including gun acquisitions, dispositions and theft.

Firearms acquisitions: We asked current gun owners a series of questions about the firearm they had acquired most recently. Approximately half had acquired their most recent gun within the past 5 years (28% within the past two years, 21% between 3 and 5 years ago) and half (50%) more than five years ago (Table 3). Extrapolating to the US population, we estimate that our firearm owners acquired approximately 70 million guns in the past 5 years⁴.

⁴ The NFS asked respondents who reported that they were current gun owners to describe when they acquired their most recently acquired firearm still in their possession and, separately, how many guns they had acquired in the past five years (irrespective of whether those guns were still in their possession). Some respondents reported that they had acquired one or more guns during the past five years even though they had previously indicated that their most recent firearm acquisition (among the guns they currently owned) took place more than five years ago. Overall, when directly asked when they had most recently acquired a gun in their possession, 49% of people reported doing so within the past five years, whereas 62% said that they had acquired one or more firearms in the past five years when prompted to provide the number of firearms acquired (irrespective of whether or not those guns were still in their possession). In estimating that 70 million firearms were acquired over the past five years, we privileged the stem question to mitigate the well established phenomenon of telescoping (i.e., we excluded from our five year estimate the 23% of respondents who reported acquiring at least one gun in the past five years but also indicated their last acquisition was more than five years ago) (see Appendix 1). Including respondents who initially reported that their most recent acquisition was more than five years ago increases our estimate of the total number of guns acquired over the past five years to 85 million. One possible explanation for this discrepancy is the tendency to telescope, which may have inflated the latter estimate. Alternatively, since only the second question explicitly asked respondents to consider guns that are no

The large majority of gun owners purchased their most recently acquired gun, with purchase more common for guns acquired in the past one to two years (86%) than for those acquired more distally (79% 2-5 years ago; 61% more than 5 years ago). Across all three time periods, the most commonly acquired firearm was a handgun, with handguns constituting almost 6 of 10 guns acquired in the past 5 years, and 5 of 10 guns acquired more than 5 years ago. Stores (gun stores, sporting good stores, etc.) were the most common source of purchased guns, while gifts and inheritance were the most common form of non-purchase transfer.

Firearms most recently acquired by gun owners tended to be new, rather than used (Table 4). The proportion of new guns was higher among those acquired more recently; used guns account for 4 of 10 firearms acquired more than five years ago, but only 3 of 10 acquired in the past two years. The majority of new guns were purchased (89% in the past two years, 91% 2-5 years ago, 78% more than 5 years ago). Among used guns, nearly 6 of 10 acquired more than five years ago were not purchased, compared with only one-third of those acquired within the past two years. Inherited guns constitute 40% of used guns acquired more than five years ago, but only 16% of those acquired in the past two years, mirroring a decrease in the overall share of guns obtained by inheritance from 21% of those acquired more than 5 years ago to 4% of those acquired in the past two years.

The cost of the most recent firearm purchased (among respondents whose most recently acquired gun was purchased) was relatively evenly distributed around the mode of \$250-\$500 (48%; Table 5). Overall, used guns were less expensive than new guns and guns that were acquired longer ago were less expensive than guns purchased more recently. The most

longer in their possession, these guns may have been excluded when respondents considered the first question.

commonly cited reason for buying a firearm was for self-protection, a reason that was more common for firearms purchased within the last 5 years (43%) than more than 5 years ago (35%).

Gun dispositions: Approximately 5% of gun owners reported that they had sold, or otherwise gotten rid of a gun in the past 5 years (average number of guns disposed of=2.0). Of these, the large majority (71%) had sold the gun they disposed of most recently, while 13% had given the gun to someone else as a gift, and 10% had traded it for something else. A very small number of gun owners who had disposed of a gun (1%) reported having gotten rid of the gun through a gun buy back program. When gun owners sold guns, they most often sold them to a friend directly (35%) or to a gun dealer (32%), with 12% reporting that they had sold the gun via an on-line advertisement and another 14% having sold it to a family member.

Approximately 2.5% of gun owners reported having had a gun (or guns) stolen from them in the past 5 years, with a mean number of guns stolen of 1.49 (range 1 to 6; CI: 1.02-1.96). Assuming that theft was evenly distributed across the 5 years, we estimate that approximately 2.04 million guns were stolen over the past five years (CI: 1.40-2.68 million). Assuming that theft was evenly distributed across the 5 years, this implies that approximately 400,000 guns are stolen annually.

DISCUSSION

The stock of guns in the US is exceptionally large and growing. In 1994, when the NSPOF was conducted, Cook and Ludwig estimated that there were approximately 192 million guns in the hands of US civilians(Cook & Ludwig, 1997). In 2015, we estimate that that number has grown by more than 70 million guns, to approximately 265 million. The guns acquired over the past 20 years, are disproportionately handguns; of the total gun stock the share of handguns is 42%, compared to approximately one third of guns in 1994, while the share of long guns has fallen commensurately from 66% in 1994 to 53% in 2015.

The shift we observe in the gun stock towards a greater proportion of handguns may reflect the decline in hunting and indicate a change in motivations and use of firearm ownership (Smith, 2001). Indeed, a perceived, and growing, need for self-protection appears to drive contemporary gun ownership in the US (Center, 2013). Consistent with our findings that the majority of the guns that have been added to the gun stock are handguns and that gun owners in 2015 were more likely than gun owners in 1994 to report that they owned any handgun primarily for self-protection (76% vs. 48%), we find that almost 7 out of 10 gun owners report that a primary reason for owning a gun is protection against people. Consistent with this trend towards owning firearms for protection, we find that respondents who owned only handguns were just as likely to live in an urban environment as a rural one and to be demographically more diverse compared with owners of long guns (who, as a group, are more likely to be white, male, and live in a rural area).

Not only are there many more guns overall, there are also more gun owners (54.7 million from the NFS compared to 44.3 million from the NSPOF), although the percentage of the adult population who own guns has declined, from 25% in 1994 to 22% in 2015. Indeed, gun owners today each own, on average, more guns (4.8 in the NFS compared to approximately 4.3 in the NSPOF). Moreover, gun ownership appears to be even more concentrated in 2015 than it was in 1994: while the top 20% of gun owners owned 55% of the gun stock in 1994, they now own 60%.

In the absence of a gold standard to which to compare our estimates (of the sort that would render survey-based estimates largely unnecessary), two sources of administrative data – from the ATF (Bureau of Alcohol Tobacco Firearms and Explosives, 2015), FBI (Federal Bureau of Investigation, 2016) – provide an opportunity to grossly validate results. Firearm manufacturing and import/export data, available from the ATF, suggest that, from 1899 through

2013 (the last year for which data are available), approximately 363 million firearms have been available for sale in the US (Appendix I).⁵ While guns are highly durable, it is reasonable to expect that every year some fraction is permanently removed from the marketplace (through seizure, irrecoverable loss or breakage). Applying a 1% per year depreciation (permanent removal from use) rate to the available manufacturing data yields an estimated gun stock in 2013 of approximately 270 million guns. Assuming the number of guns was added to the market in 2014 (the last full year before our survey) was the same as the number added in 2015 (16 million; the largest number of guns manufactured/imported in US history), our estimate of the US gun stock increases to 285 million guns, a figure close to the 265 million guns we estimate from our survey.⁶

Our estimate that approximately 70 million firearms changed hands within the past five years is also broadly consistent with estimates derived separately using 1) ATF data on firearm manufacturing, imports, and exports (which should track our estimates of new firearms acquired), and 2) NICS background check data (which should correspond to the number of people who acquired firearms and underwent a background check). Given the percentage of people in the NFS who report that their most recently acquired gun was new (rather than used)

⁵ The data series presented in Table 1 combines a summary (1899-1968), assembled from ATF reports (manufacturing plus imports) by Newton and Zimring (Newton & Zimring, 1968), ATF data compiled by Gary Kleck (1969-1986) (Kleck, 1991) and the remainder from on-line data available from ATF (Bureau of Alcohol Tobacco Firearms and Explosives, 2015).

⁶ The NSPOF estimate of 192 million guns in 1994 is also remarkably consonant with ATF data up to 1994 applying the same 1% annual removal from market estimate. However, our estimate is 30%, not 15% lower than ATF figures. The estimate of approximately 270 million guns from our 2004 random digit dial telephone survey, appears to be an overestimate. Extrapolating from surveys to the US population, especially for relatively rare events (such as owning an extremely large number of guns), has been shown to have the potential to lead to large overestimates. In the 2004 survey, two factors came into play: first, by 2004 RDD surveys were increasingly plagued, as our survey was, by low response rates, suggesting the possibility that even with the application of post-stratification weights, that results may not have been generalizable (and thus suitable for extrapolation) to the US population. Second, because ownership of large numbers of guns is relatively uncommon, our estimates of the gun stock were sensitive to the inclusion (or exclusion) of respondents who reported that they owned large numbers of guns.

and assuming that new guns correspond to the firearms that the ATF report enumerates, the total number of firearms acquired over the past five years should be approximately 82 million.⁷ It is important to note that our estimates based on ATF data may be an underestimate because they were calculated based on commerce data from a five-year period ending in 2013, the most recent year for which ATF data is available (and sales have been accelerating upwards). Nonetheless, our estimates of the total number of guns acquired in the past five years using NICS data are remarkably similar: 83 million (derived using our soon to be published finding that the percentage of respondents who report undergoing a background check over the past five years is 75%, not shown).⁸

Our estimate of the number of guns stolen annually also squares well with external data sources, although our estimate that 400,000 guns are stolen annually is somewhat higher than the most recent gun theft estimate (233,000) reported from the NCVS. Overall, however, the number of guns stolen appears to have remained relatively stable over time. In the late 1980's the NCVS estimated that there were approximately 340,000 firearms stolen each year. While, in an estimate

⁷ Missing answers as to whether the most recently acquired gun was new (i.e., as opposed to used) were imputed, based on the assumption that the three percent of respondents with missing data with respect to whether their most recently acquired firearm was new or old, were missing at random. The estimate we arrive at using ATF data is higher (i.e., 91 million vs. 70 million) if we do not restrict respondents to those who indicated in a stem question that they had acquired the last firearm currently in their possession within the past five years. The reason for this is that some of these respondents indicated that they had acquired a non zero number of firearms in the past five years when asked directly how many firearms they had acquired regardless of whether they still had the firearm in their possession. Incorporating these respondents' answers into our estimate of the gun flow increased the estimate we arrived at using ATF data because the flow of all guns (i.e., both new and used) is derived by dividing the ATF enumeration of new guns by the percentage of new guns that our respondents reported were acquired in the past five year period (and, ignoring the stem question restriction decreased the percentage of new guns from 68% to 62%).

⁸ If respondents were not required to indicate in the stem question that their most recently acquired firearm was acquired within the past five years, 69% of gun owners reported having undergone a background check with respect to their most recently acquired gun (and therefore the estimate of the number of firearms acquired over the past five years increases to 91 million). NB this number is likely to be an underestimate given that each NICS background check may result in the acquisition of more than one firearm.

that combined data on the fraction of US adults who reported that they had had a firearm stolen from them in the past 5 years with data from a state-level survey that estimated the number of guns stolen per theft incident in that state, the NSPOF estimated that slightly fewer than 500,000 guns/year are stolen in the US.

The NFS used an existing probability based on-line panel (Knowledge Panel) to examine US gun ownership, whereas our 2004 survey and the NSPOF both relied on random digit dialing to produce their sample. It is possible that on-line panel surveys and RDD surveys elicit systematically different responses from survey participants, suggesting that comparisons over time (and across survey modes) should be undertaken with some caution. Even if it were possible (or desired) to conduct an RDD survey about gun ownership today, such a survey would be unlikely to be comparable to surveys from 1994 or 2004 due to increasingly poor response rates on telephone surveys(Link, Battaglia, Frankel, Osborn, & Mokdad). Moreover, probability-based on line samples have been found to reduce social desirability bias and yield more accurate results than telephone surveys(Chang & Krosnick).

While the NFS is thus likely to produce a good estimate of firearms in civilian hands, as well as to accurately characterize the flow of guns and other characteristics of gun ownership, some gun owners may nevertheless have chosen not to report their gun ownership on a survey, and some non-gun owners may have reported owning guns when in fact they do not. What evidence there is, however, suggests that gun owners appear to respond accurately with respect to their firearm ownership on surveys. Studies that have validated survey reports of gun ownership against administrative data have reported low levels of false negative reports (approximately 10%), and virtually no false positive reports(Kellermann, Rivara , Banton, Reay, & Fligner, 1990; Rafferty, Thrush, Smith, & McGee, 1995). In the NFS, less than one percent of respondents refused to answer our stem question about household gun ownership, and none

refused the subsequent question regarding whether they personally owned a gun. Nonetheless, it is likely that some groups of gun owners (e.g., those who possess firearms illegally, such as someone with a felony conviction), are not reflected in our estimates, and possible that non-response to some questions affect the validity of our findings if those choosing not to answer a question differed systematically from those who did. Given that 2% or fewer of respondents refused to answer the vast majority of our questions about firearms, non-response bias among those in our survey is unlikely to have had a material influence on our findings.

CONCLUSION

As of 2015, we estimate there were approximately 270 million guns in the US civilian gun stock, an increase of approximately 70 million guns since the mid 1990's. Over that time, the fraction of the gun stock that is handguns – most often bought for self-protection – has grown (to over 40%), as has the fraction of gun owners who own both handguns and long guns (to over 75%). While the fraction of US adults who report owning guns has declined only modestly, from 25% in 1994 to 22% in 2015, current gun owners are less likely to be male (32% in 2015 vs. 42% in 1994), more likely to be female (12% in 2015 vs. 9% in 1994), and more likely to own more guns (the mean number of guns has increased from 4 to 5). Despite the increase in the average number of guns, the median gun owner owns only two guns (28% of gun owners own 1 gun and 31% own 2 guns, accounting for 14% of the total US gun stock), while the 8% of all gun owners who own 10 or more guns account for 39% of the gun stock (and 14% of gun owners own half the US gun stock).

With respect to firearm transfers, we estimate that approximately 70 million firearms changed hands within the past five years, a number broadly consistent with manufacturing data from the ATF, the large majority of which were purchased, more so in the past two years (86%)

than for those acquired more remotely (79% 2-5 years ago; 61% more than 5 years ago). Across all three time periods, the most commonly acquired firearm was a handgun.

Guns not only move into, but also out of the hands of US gun owners. Five percent (5%) of gun owners in our sample reported having disposed of a gun within the past 5 years, most often (35%) through a sale to family or friends. Another 2.5% of our sample reports having had a gun stolen within the past 5 years, accounting for an estimated 400,000 guns per year.

The National Firearm Survey provides the first nationally representative data about the stock and flow of guns in the US since 2004 (and before that 1994). These data have the potential to ground public health, public safety and public policy discussions about guns and gun transfers in what we assume is largely the legal firearms market, which is where firearms, even those that end up in the gray or black market, all start out.

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Figure 1. Distribution of US Gun Stock by Gun Type

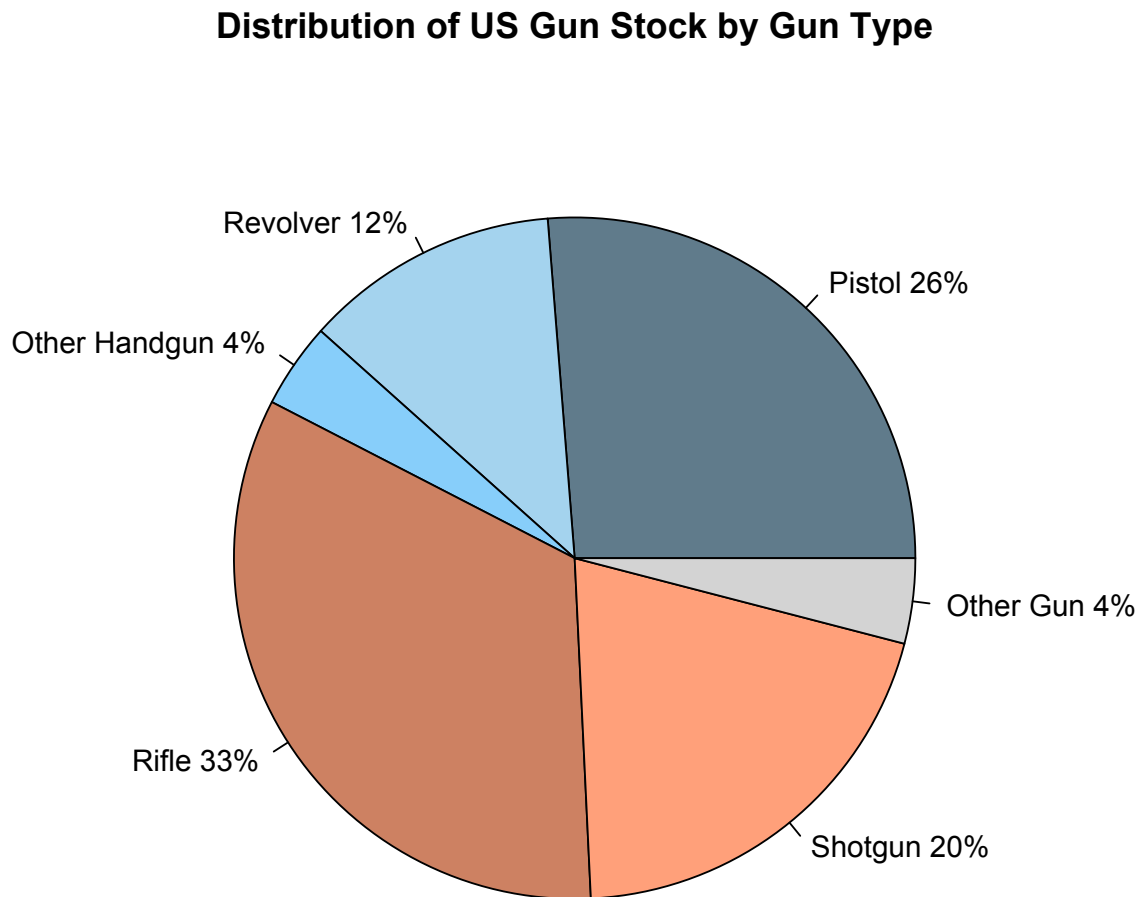


Figure 2. Distribution of US Gun Ownership by Number and Type of Firearm

Distribution of Gun Ownership by Number (1 or >1) and Type

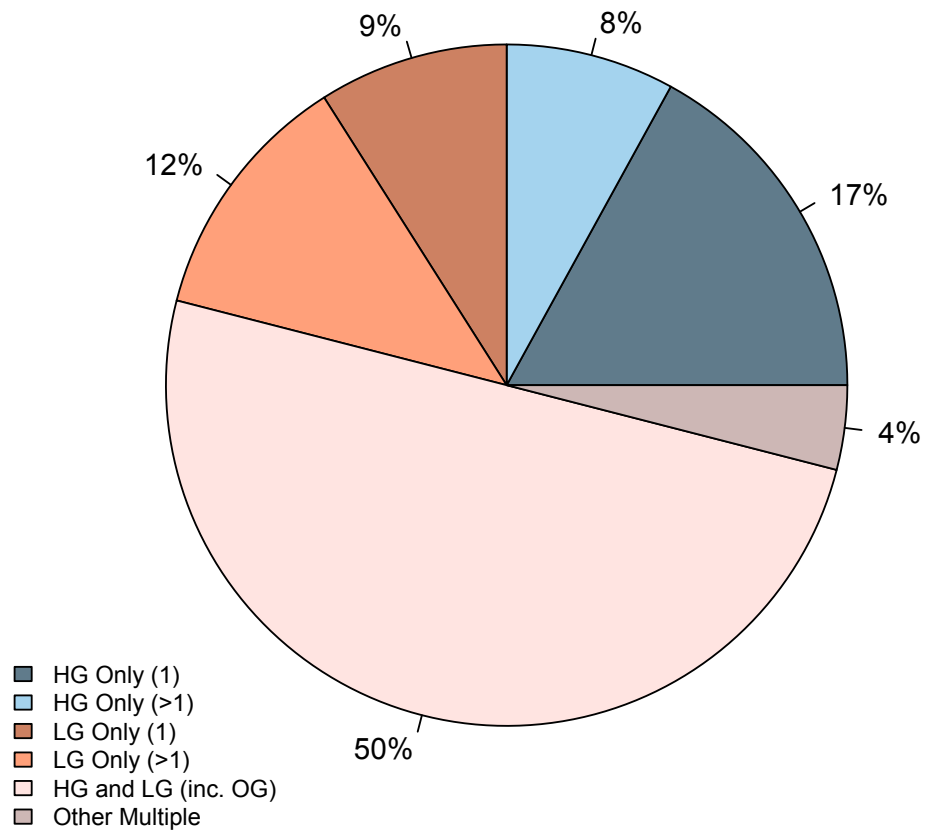


Figure 3: Cumulative distribution of gun stock

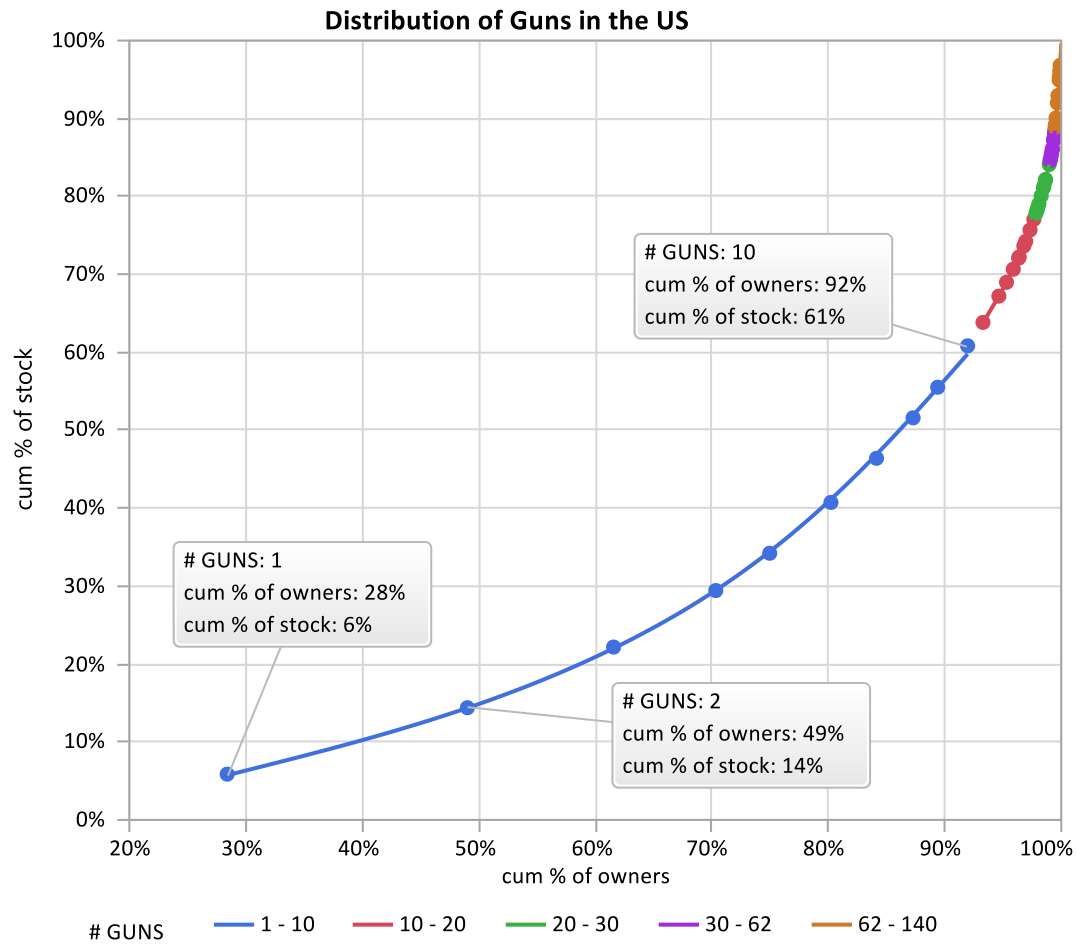


Table 1: Demographic characteristics of gun owners. Reported values are percent of respondents indicating ownership of the specified firearm(s).

Demographic (% Total Survey Population)		Any Firearm	Handgun Only	Long Gun Only	Both
All Respondents		22	6	5	11
Age	18–29 (19.1)	13	3	4	6
	30–44 (23.5)	21	6	4	10
	45–59 (28.2)	24	6	5	13
	≥ 60 (29.2)	25	6	5	14
Sex	Male (48.3)	32	7	8	18
	Female (51.7)	12	5	2	5
Race	White (70.5)	25	5	6	13
	Hispanic (11.7)	16	6	3	7
	Black (11.0)	14	8	1	5
	Multi-racial (1.4)	25	4	6	15
	Other(5.5)	8	3	<1	5
Marital Status	Married (54.0)	26	6	6	14
	Never Married (23.6)	12	3	3	5
	Divorced (9.2)	23	6	5	12
	Living with Partner (6.9)	19	6	4	9
	Widowed (5.4)	21	5	4	12
	Separated (1.0)	24	14	2	8
Community	Urban (23.0)	15	6	3	7
	Suburban (50.3)	19	6	4	10
	Rural (26.1)	33	5	9	19
Education	Less than High School (10.5)	11	4	3	5
	High School (29.5)	23	6	5	12
	Some College (28.6)	26	6	5	15
	College (31.4)	20	5	5	10
Annual Income	<25,000 (16.9)	13	4	3	6
	25,000–59,999 (29.2)	22	6	5	11
	60,000–99,999 (27.6)	24	7	4	12
	≥100,000 (26.3)	25	5	6	14
Military Service	Veteran (9.7)	44	10	9	25
	Non-Veteran (90.3)	19	5	4	10
Political Views	Liberal (20.2)	14	5	3	7
	Moderate (46.3)	19	6	4	9
	Conservative (31.5)	30	6	7	17
Region	Northeast (18.3)	15	3	4	7
	Midwest (22.4)	23	4	6	12
	South (36.9)	25	8	4	13
	West (22.4)	20	5	4	11
Child <18	Yes (29.8)	19	5	7	9
	No (70.2)	23	6	5	12
Grew Up with a Gun	Yes (47.5)	35	7	8	20
	No (48.0)	9	4	2	3
	Don't Know (3.2)	17	9	4	4

Table 2: Given reasons for gun ownership.

	Own any gun for:					
	Protection from:		Hunting	Other Sporting Use	Collection	Other Reason
	People	Animals				
Gun Type						
Handgun only, 1	0.78	0.10	0.03	0.00	0.16	0.03
Handgun only, >1	0.83	0.12	0.01	0.00	0.18	0.01
Long gun only, 1	0.36	0.14	0.46	0.17	0.11	0.46
Long gun only, >1	0.27	0.20	0.65	0.41	0.21	0.65
Handgun and Long gun	0.72	0.27	0.55	0.47	0.36	0.55
Sex						
Male	0.60	0.20	0.49	0.32	0.37	0.44
Female	0.69	0.21	0.32	0.21	0.28	0.32
Age						
18–29	0.60	0.21	0.38	0.26	0.39	0.38
30–44	0.67	0.18	0.41	0.30	0.38	0.41
45–59	0.65	0.24	0.41	0.27	0.33	0.41
≥60	0.58	0.18	0.41	0.29	0.32	0.41
Census Region						
Northeast	0.53	0.18	0.40	0.29	0.37	0.40
Midwest	0.55	0.16	0.51	0.38	0.36	0.51
South	0.73	0.23	0.37	0.25	0.28	0.37
West	0.56	0.18	0.35	0.25	0.42	0.35

Table 3: Distribution of where current firearm owners acquired their most recent firearm (as a % of all transfers), by type of gun and reported time of acquisition since survey administration (2015).

% Purchased at/from	Less than 2 years (28%)				2 to 5 years prior (21%)				More than 5 years prior (50%)			
	All Guns (100%)	Handguns (59%)	Long guns (40%)		All Guns (100%)	Handguns (60%)	Long guns (39%)		All Guns (100%)	Handguns (51%)	Long guns (48%)	
% Purchased at/from												
Any Store	62	65	54		54	48	58		42	42	42	
Family	2	3	1		3	2	4		3	2	2	
Friend/Acquaintance	6	6	7		9	11	8		7	9	9	
Gun Show	4	3	5		3	4	2		2	3	3	
Pawn Shop	5	4	6		6	7	3		3	4	4	
Online	2	2	2		1	1	2		11	1	1	
Other	3	3	4		3	3	4		3	4	4	
All purchased firearms	84	86	79		79	76	81		61	65	57	
% Non-purchased transfers												
Gift	8	8	9		11	16	8		15	13	13	
Inheritance	4	3	8		8	6	9		21	17	22	
Trade	0	0	0		1	0	1		0	0	0	
Other	5	4	6		1	2	1		3	4	4	
All non-purchased firearms	17	15	23		21	24	19		39	34	43	
All Transfers	100				100				100			

Table 4: Percentage of where current firearm owners most recent firearm transfer occurred, by type of gun and reported time of acquisition relative survey administration in the spring of 2015.

	Less than 2 years (28%)			2 to 5 years prior (21%)			More than 5 years prior (50%)		
	% Transfers (100%)	New (71%)	Used (26%)	% Transfers (100%)	New (61%)	Used (37%)	% Transfers (100%)	New (54%)	Used (43%)
% Purchased at/from									
Any Store	62	78	16	54	79	10	42	69	9
Family	2	0	6	3	1	6	3	0	6
Friend/Acquaintance	6	1	19	9	1	23	7	1	15
Gun Show	4	3	6	3	3	3	2	3	2
Pawn Shop	5	2	11	6	3	10	3	1	5
Online	2	1	5	1	1	2	1	1	0
Other	3	3	4	3	3	2	3	4	3
All purchased firearms	84	89	67	79	91	56	61	78	40
% Non-purchased transfers									
Gift	8	6	12	11	9	20	15	14	15
Inheritance	4	0	16	8	0	20	21	3	41
Trade	0	0	0	1	0	1	0	0	1
Other	5	5	5	1	1	0	3	3	2
All non-purchased firearms	17	11	33	21	10	41	39	20	59
All Transfers	100			100			100		

Table 5: Cost of purchased firearms, in US dollars. Values are percentages.

	All	Handguns	Long guns	New	Used	<5 years	>5 years	Protection from Strangers	Hunting	Sport Shooting	Collection
\$0-99	4.2	3.1	5.1	2.5	9.1	2.3	6.9	3.6	4.2	6.7	2.6
\$100-249	18.0	14.3	22.8	14.3	29.1	11.6	26.1	15.3	24.5	15.3	17.7
\$250-499	48.1	50.3	45.4	49.9	41.9	48.6	46.7	51.0	45.7	48.9	42.4
\$500-999	251	29.6	19.3	28.0	17.3	30.2	18.6	27.1	18.9	25.2	28.2
\$≥1000	4.6	2.7	7.5	5.3	2.7	7.4	1.7	3.1	6.7	5.0	9.0

Appendix 1: Estimation of gun stock using gun manufacturing data. Data come from Newton and Zimring, Kleck, and ATF. We apply a 1% depreciation (permanent removal from use) rate to each year's adjusted "stock." Pre 1969 figures do not appear to include import (and net out export) data.

Year	Millions of guns added	Δ	Adjusted Estimate (.99)
1899-1945	47		
1946	48	1	48
1947	51	3	50
1948	53	2	52
1949	55	2	53
1950	58	3	56
1951	60	2	57
1952	62	2	58
1953	64	2	60
1954	66	2	61
1955	67	1	62
1956	69	2	63
1957	71	2	64
1958	73	2	66
1959	75	2	67
1960	78	3	69
1961	80	2	71
1962	81	1	71
1963	84	3	73
1964	86	2	75
1965	89	3	77
1966	93	4	80
1967	97	4	83
1968	102	5	87
1969	107	5	92
1970	112	5	96
1971	117	5	100
1972	122	5	104
1973	128	6	109
1974	135	7	115
1975	140	5	118
1976	146	6	123
1977	151	5	127
1978	156	5	131
1979	162	6	135
1980	168	6	140
1981	173	5	144
1982	178	5	147
1983	182	4	150
1984	186	4	152

1985	191	5	156
1986	194	3	157
1987	198	4	160
1988	203	5	163
1989	209	6	167
1990	213	4	170
1991	217	4	172
1992	223	6	176
1993	231	8	182
1994	238	7	188
1995	243	5	191
1996	247	4	193
1997	252	5	196
1998	256	4	198
1999	261	5	201
2000	265	4	203
2001	270	5	206
2002	274	4	208
2003	279	5	211
2004	284	5	214
2005	289	5	217
2006	295	6	220
2007	301	6	224
2008	308	7	229
2009	316	8	235
2010	325	9	241
2011	334	9	248
2012	347	13	258
2013	363	16	272