Banning Handguns in the United States

George Onoyama Hageman
Lee Ching Yu Jason
Rana Al Mutawa

Table of Contents

1. Executive Summary

Every 24 minutes, another American is killed by a handgun. Handguns are particularly deadly because they are easily trafficked, easily carried, easily concealed, and easily fired. There are 114 million of them in the United States today—more per capita than any other country in the world.

Several prominent American voices have called for a nationwide ban on these handguns. The policy would apply to both semi-automatic pistols and revolvers, and there would be no exceptions for hunting, sporting, or self-defense purposes. In this study, we seek to determine the economic value of such a ban by conducting a cost benefit analysis. We determine, ultimately, that the United States should institute a ban on handguns.

In terms of benefits, we focus on reductions in four major crimes: homicides, suicides, robberies, and assaults. In each case, we multiply the number of handgun-related incidents by the estimated victim/criminal justice costs of an incident using established shadow price values. We also adjust for substitution rate, expecting that some criminals will still commit their crimes even without having access to a handgun. Of course, other crimes will likely be affected as well, but their economic impacts are negligible and are thus excluded from this study.

In terms of costs, we focus on four components. First, we estimate the tax distortion caused by buying all 114 million handguns back from their owners, using the Australian buyback model to set the level of compensation. Second, we estimate the economic impact of lost jobs in the firearm industry by calculating the amount of unemployment benefits needed to support laid-off workers as they find new jobs. Third, we estimate the economic impact of lost handgun-based tax revenue by assessing current revenues from the handgun industry. Fourth, we estimate the lost sense of security among gun owners by ascertaining their aggregate willingness to pay for their weapons.

We also assess the effects of a handgun ban on secondary markets like the rifle, shotgun, and knife markets. In addition, we consider the legal as well as the international ramifications of an American handgun ban. The former is centered largely on the debate over the true meaning of the Second Amendment of the Constitution, while the latter is centered largely on firearm exports and imports to and from Mexico and Canada. Given the breadth of these issues, we restrict ourselves to a qualitative analysis and determine that they are either impossible to estimate or that their impacts are negligible.

Combining all of these elements, we find that the United States should in fact institute a nationwide ban on handguns. This recommendation is based on a ten-year study of the

aforementioned benefits and costs. We chose to limit our study to ten years because the last American firearms ban (the Federal Assault Weapons Ban) was also instituted for a period of ten years (1994-2003). Over these ten years, we adjust for two additional factors. First, we discount future values with the understanding that benefits and costs in the future are felt less strongly than benefits and costs in the present. Second, we acknowledge that compliance will be nowhere near 100%, as many will try to hide their handguns from law enforcement authorities (if they already own one) or will try to purchase a handgun from black market merchants (if they do not already own one).

Ultimately, we arrive at a total social surplus of $178 billion and a benefit-cost ratio of 1.75:1. Alternatively, a nationwide ban on handguns has an equivalent annual net benefit of nearly $21.5 billion over ten years. A sensitivity analysis reveals that the final results vary only slightly depending on the values of the social discount rate and the compliance rate. Thus, it is our recommendation that the United States institute a ban on handguns as soon as possible.

Table 1.1

Total Benefits	$416,457,431,196
Total Costs	$238,095,125,730
Total Value	$178,362,305,466
Benefit-Cost Ratio	1.75 : 1
Equivalent Annual Net Benefits	$21,446,541,311

2. Introduction

Background Information

The United States has a strong gun culture dating back to colonial militias and the revolutionary "minutemen" of the 17th and 18th centuries. This culture has been enshrined in the Second Amendment of the Constitution, which still holds that "a well-regulated militia, being necessary to the security of a free State, the right of the people to keep and bear Arms, shall not be infringed".[1]

Although this gun tradition is robust, it is not absolute. Modern weapons are increasingly lethal, and the United States government has restricted some of the more dangerous items (ex. fully automatic machine guns) from civilian possession. Still, the United States has by far the least strict gun control measures in the developed world, and it is paying the price in firearms-related deaths and injuries.

Policy Overview

Of all the policies proposed by gun control advocates, perhaps the most compelling is the ban on handguns. A handgun is defined as "a firearm which has a short stock and is designed to be held and fired by the use of a single hand".[2] This includes both revolvers in which the ammunition is fed through a revolving cylinder, as well as semi-automatic pistols in which the ammunition is fed automatically through a removable magazine. At 114 million of the stiamted 310 million total firearms in the United States, it is the most common firearm in use today.[3]

Handguns are particularly devastating because they can be trafficked in large quantities, easily concealed under clothing, and rapidly disposed of after the commission of a crime. Given their availability and ease of use, they allow users to immediately act on their violent impulses before they have had a chance to calm down.

In addition, they are particularly suitable for a ban because they have no hunting value or sporting value. Thus, there is no long-lasting familial/cultural tradition of handgun ownership as with rifles and shotguns. In fact, handgun bans have already been instituted in two major American cities (in Washington from 1976 to 2008 and Chicago from 1982 to 2010), and there have been dozens of handgun buyback initiatives across the country.

---

[1] United States Constitution, Amendment II.
[2] Gun Control Act of 1968, 18 United States Code, Section 921(a)(29).
[3] Daniel W. Webster et al., *The Case for Gun Policy Reforms in America* (Baltimore, MD: Johns Hopkins Center for Gun Policy and Research, 2012).

Goal of the Study

Our goal is to assess the costs and benefits of instituting a national handgun ban in the United States. Our "without" condition will estimate the social surplus under the United States' current handgun policy whereby all handguns can be purchased as long as the following conditions are met:

- The purchaser is over 21 years of age
- The handgun is registered in the owner's state of residence
- The owner has passed a background check under the National Instant Criminal Background Check System
- The owner has endured a waiting period of 3-10 days (depending on the state) between the purchase and receipt of the handgun

Our "with" condition will estimate the social surplus under a nationwide handgun ban, applicable in all fifty states and territories, in light of the fact that previous handgun bans were only partially successful due to the ease with which handguns could be "imported" from neighboring cities and states where handguns remained legal. The conditions of the ban will be based on the Firearms Control Regulation Act of 1975 whereby "no person or organization shall, within the District possess or have under his or its control any pistol."[4] This condition will be slightly amended, replacing "District" with "United States" and "pistol" with "handgun."

The restrictions on all other firearms (i.e. rifles and shotguns) will remain unaffected in both the "with" and "without" conditions. Thus, we evaluate the benefits and costs of banning handguns (and only handguns) and find that the annual net benefits of a ban would be $21,446,541,311. As a result, we recommend that American policymakers institute a ban on handguns.

3. Analysis of Benefits

In this section, we will analyze the benefits of instituting a nationwide handgun ban in the United States. We expect reductions in four crimes: homicides, suicides, robberies, and assaults. Although the ban will likely affect other crimes as well, we assume that the impacts are negligible. Table 3.1 (below) shows the expected annual benefits of reductions in these four crimes, before adjusting for the discount rate and the compliance rate (that is, the size of the black market)which will be done in Section 5.

---

[4] Firearms Control Regulation Act of 1975, Title II, Section 201.

Table 3.1

Benefits	Value
Reduction in Homicides	$20,872,037,550 per year
Reduction in Suicides	$58,326,378,348 per year
Reduction in Robberies	$1,163,809,440 per year
Reduction in Assaults	$274,507,650 per year

Reduction in Homicides

Homicide is defined here as "murder and nonnegligent manslaughter, which is the willful killing of one human being by another."[5] In the year 2008 (the last year in which all necessary data is available), there were 16,272 homicides. Of those, 11,050 were committed with a firearm, and of those, 7,930 were committed with a handgun.[6] Since 2008, the number of homicides has stayed roughly constant, and it is expected to remain roughly constant in the near future.

A ban on handguns would presumably end all handgun-related homicides, except those that are committed by people who fail to comply with the ban (this will be discussed in Section 5). However, it is likely that some percentage of criminals will still commit homicides, substituting their handguns with other weapons (such as rifles, shotguns, and knives). We estimate this percentage to be 50%, for that is the number cited in an *American Law and Economics Review* study of a similar nationwide gun control program in Australia, a country with similar political and geographical considerations to the United States, after adjusting for natural crime trends and differences across region.[7] Thus, we expect that there will be 3965 fewer homicides each year as a result of the handgun ban.

In monetary terms, each homicide can be valued at $5,264,070. This is an inflation-adjusted figure based on Boardman et al.'s $4,853,750 estimate for the total cost of a homicide.[8] This figure combines both the victim cost per incident (including lost productivity,

---

[5] Alexia Cooper and Erica L. Smith, "Homicide Trends in the United States, 1980-2008," *Bureau of Justice Statistics: Patterns & Trends (U.S. Department of Justice)*, November 2011: 34.
[6] Michael Planty and Jennifer Truman, "Firearm Violence, 1993-2011," *Bureau of Justice Statistics: Special Report (U.S. Department of Justice)*, May 2013: 3.
[7] Andrew Leigh and Christine Neill, "Do Gun Buybacks Save Lives? Evidence from Panel Data," *American Law and Economics Review* 12, no. 2 (2010): 545.
[8] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice* (New York: Prentice Hall, 2010): 417.

medical/emergency care, mental health care, police/fire services, social victim services, property damage, and pain and suffering) and the criminal justice cost per incident.

Combining all of these factors, we get the following equation and the following benefit estimate:

$$\# \ of \ Homicides * (1 - Substitution \ Rate) * Total \ Cost \ per \ Homicide =$$
$$7,930 * (1 - 0.50) * \$5,264,070 =$$
$$\$20,872,037,550 \ per \ year$$

Reduction in Suicides

Suicide is defined here as "death caused by self-directed injurious behavior with any intent to die as a result of the behavior."[9] In the year 2009 (the last year in which all necessary data was available), there were 36,891 suicides. Of those, 18,735 were committed with a firearm, and of those, an estimated 13,445 were committed with a handgun.[10] Since 2009, the number of suicides has stayed roughly constant, and it is expected to remain roughly constant in the near future.

A ban on handguns would presumably end all handgun-related suicides, except those that are committed by people who fail to comply with the ban (this will be discussed in Section 5). However, it is likely that some percentage of people will still commit suicide, substituting their handguns with other means (such as hanging, jumping, and overdosing). We estimate this percentage to be 20% because in Australia, a handgun buyback program "reduced the firearm suicide rate by close to 80% and had no statistically significant effect on non-firearm death rates".[11] The number is understandably low because many people are drawn to the relative "ease" of committing suicide by handgun. Thus, we expect that there will be 10,756 fewer suicides each year as a result of the handgun ban.

In monetary terms, each suicide can be valued at $5,422,683. This is an inflation-adjusted figure based on Boardman et al.'s $5,000,000 estimate for the value of statistical life in the United States.[12] This figure is based on contingent valuation studies of how much people are willing to pay to decrease their risk of fatality.

---

[9] Centers for Disease Control and Prevention, "Suicide Prevention," *CDC*, 26 April 2013, http://www.cdc.gov/violenceprevention/suicide/index.html.
[10] William J. Krouse, *Gun Control Legislation* (Washington, DC: Congressional Research Service, 2012): 11.
[11] Andrew Leigh and Christine Neill, "Do Gun Buybacks Save Lives? Evidence from Panel Data," *American Law and Economics Review* 12, no. 2 (2010): 511.
[12] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice* (New York: Prentice Hall, 2010): 410.

Combining all of these factors, we get the following equation and the following benefit estimate:

$$\# \ of \ Suicides * (1 - Substitution \ Rate) * Total \ Cost \ per \ Suicide =$$
$$13,445 * (1 - 0.20) * \$5,422,683 =$$
$$\$58,326,378,348 \ per \ year$$

Reduction in Robberies

Robbery is defined here as "completed or attempted theft, directly from a person, of property or cash by force or threat of force."[13] In the year 2008 (the last year in which all necessary data was available), there were 504,110 robberies. Of those, 119,474 were committed with a firearm, and of those, 107,880 were committed with a handgun.[14] Since 2008, the number of robberies has stayed roughly constant, and it is expected to remain roughly constant in the near future.

As with suicides, a ban on handguns would presumably end all handgun-related robberies, except those that are committed by people who fail to comply with the ban (this will be discussed in Section 5). However, it is likely that some percentage of criminals will still commit robberies, substituting their handguns with other weapons (such as rifles, shotguns, and knives). We estimate this percentage to be 75% because that is the degree to which armed robberies declined following the 2003 handgun ban in Australia.[15] Thus, we expect that there will be 26,970 fewer robberies each year as a result of the handgun ban.

In monetary terms, each robbery can be valued at $43,152. This is an inflation-adjusted figure based on Boardman et al.'s $39,788 estimate for the total cost of a robbery.[16] This figure combines both the victim cost per incident (including direct costs, pain, and suffering) and the criminal justice cost per incident.

Combining all of these factors, we get the following equation and the following benefit estimate:

$$\# \ of \ Robberies * (1 - Substitution \ Rate) * Total \ Cost \ per \ Robbery =$$
$$107,880 * (1 - 0.75) * \$43,152 =$$

---

[13] Bureau of Justice Statistics, *Criminal Victimizations in the United States, 2008 Statistical Tables* (Washington, DC: U.S. Department of Justice, 2010): Glossary.
[14] Ibid, Table 66.
[15] Lance Smith, Kym Dossetor, and Maria Borzycki, *Armed Robbery in Australia: 2008 National Armed Robbery Monitoring Program Annual Report* (Canberra: Australian Institute of Criminology, 2011): 4.
[16] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice* (New York: Prentice Hall, 2010): 417.

$$\$1,163,809,440 \; per \; year$$

Reduction in Assaults

Assault is defined here as "an unlawful physical attack or threat of attack" ranging in severity from "minor threat to incidents which are nearly fatal."[17] In the year 2008 (the last year in which all necessary data was available), there were 3,876,640 assaults. Of those, 186,079 were committed with a firearm, and of those, 155,066 were committed with a handgun.[18] Since 2008, the number of assaults has stayed roughly constant, and it is expected to remain roughly constant in the near future.

As with robberies, a ban on handguns would presumably end all handgun-related assaults, except those that are committed by people who fail to comply with the ban (this will be discussed in Section 5). However, it is likely that some percentage of criminals will still commit assaults, substituting their handguns with other weapons (such as rifles, shotguns, and knives). We estimate this percentage to be 95% because that is the degree to which assaults declined following the 2003 handgun ban in Australia.[19] This is not surprising, given the broad definition of "assault" and the fact that only 5% of assaults use handguns to begin with. Thus, we expect that there will be 7753 fewer assaults each year as a result of the handgun ban.

In monetary terms, each assault can be valued at $48,303. This is an inflation-adjusted figure based on Boardman et al.'s $44,538 estimate for the total cost of an assault.[20] This figure combines both the victim cost per incident (including direct costs, pain, and suffering) and the criminal justice cost per incident.

Combining all of these factors, we get the following equation and the following benefit estimate:

$$\# \; of \; Assaults * (1 - Substitution \; Rate) * Total \; Cost \; per \; Assault =$$
$$155,066 * (1 - 0.95) * \$48,303 =$$
$$\$374,507,650 \; per \; year$$

---

[17] Bureau of Justice Statistics, *Criminal Victimizations in the United States, 2008 Statistical Tables* (Washington, DC: U.S. Department of Justice, 2010): Glossary.
[18] Ibid, Table 66.
[19] Australian Institute of Criminology, "Assault," *AIC,* 2 July 2009, http://www.aic.gov.au/statistics/violent%20crime/assault.html.
[20] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice* (New York: Prentice Hall, 2010): 417.

4. Analysis of Costs

In this section, we will analyze the costs of instituting a nationwide handgun ban in the United States. The most direct cost will, of course, be the cost of collecting and destroying the handguns themselves. However, there are also three major indirect costs: lost jobs in the handgun industry, lost tax revenue from the handgun industry, and the lost sense of security among gun owners. Table 4.1 (below) shows our estimates for each of these costs.

Table 4.1

Benefits	Value
Gun Buyback	$45,490,560,000 (one-time)
Lost Jobs in the Handgun Industry	$1,650,191,268 (one-time)
Lost Taxes from the Handgun Industry	$2,513,826,424 per year
Lost Sense of Security among Gun Owners	$37,983,040,000 per year

Gun Buyback

A nationwide ban on handguns would require more than just stopping their manufacture and sale—it would require the reclamation of all 114 million handguns currently possessed within the United States.[21] In order to reclaim these handguns, the federal government will need to institute a nationwide buyback program similar to ones already offered in cities like Seattle, Boulder, Phoenix, and San Francisco. In this buyback program, it will need to offer significant compensation for each handgun. Otherwise, compliance with the new ban will be far too low and the ban will be ineffective.

In setting the level of compensation, one can look to Australia which, in 2003, passed the National Handgun Buyback Act, granting AUD $118 million for the reclamation of 65,000 handguns. This model is useful because of the similarities between Australian and American gun culture: both are traditional "frontier spirit" nations, both have sizeable suburban and rural populations, and both have strong hunting and sporting traditions. Also, ever since the 1996 National Firearms Agreement, there have been only a few legally acceptable reasons to possess a handgun, meaning that the 2003 buyback was largely compulsory.[22]

---

[21] William J. Krouse, *Gun Control Legislation* (Washington, DC: Congressional Research Service, 2012): 8.

[22] Australasian Police Ministers' Council, *1996 National Firearms Agreement* (Canberra: Australian Government Attorney-General's Department, 1996).

During this buyback, the Australian government paid "between [AUD] $500 and $2000…for the most popular types of handguns" and AUD $731.45 for a Glock 22.[23] Given that the Glock 22 is one of the most popular handguns in the United States, we use this figure as the average level of compensation.[24] After adjusting for inflation and converting the currency, we get USD $928 in compensation per handgun.

However, given that this is a transfer payment (from the government to the people), the bulk of this cost is irrelevant from an economic analysis perspective. The only actual cost is the marginal excess tax burden created by the buyback—that is, the deadweight loss caused by government spending. In this study, we use 0.43 or 43%—the figure cited by Stuart as referred to in *Cost-Benefit Analysis: Concepts and Practice*.[25] Thus, the final cost of the buyback (before adjusting for compliance in section 5) is as follows:

$$\# \ of \ Handguns * Compensation/Handgun * Marginal \ Excess \ Tax \ Burden \ =$$
$$114{,}000{,}000 * \$928 * 0.43 =$$
$$\$45{,}490{,}560{,}000$$

Lost Jobs in the Handgun Industry

A nationwide ban on handguns would eradicate all jobs in the handgun industry. This includes lost jobs among manufacturers that build handguns and handgun ammunition (like Remington, Smith & Wesson, and Ruger), among retailers that sell handguns and handgun ammunition (like Walmart and Cabela's), and among service providers that cater to handgun owners (like handgun firing ranges and handgun repair shops).

Although it is known that there are 220,130 jobs in the firearm industry, there are no studies regarding the relative size of the handgun industry within the greater firearms industry.[26] However, a report by the Bureau of Alcohol, Tobacco, Firearms, and Explosives (ATF) shows that of all the firearms manufactured in the United States in 2011, 39.71% were

[23] Phillip Hudson, "Prices Set in Handgun Crackdown," *The Age*, 30 June 2003, http://www.theage.com.au/articles/2003/06/29/1056825278337.html.
[24] National Public Radio, "How the Glock Became America's Weapon of Choice," *NPR*, 24 January 2012, http://www.npr.org/2012/01/24/145640473/how-the-glock-became-americas-weapon-of-choice.
[25] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice* (New York: Prentice Hall, 2010): 432.
[26] National Shooting Sports Foundation, *Firearms and Ammunition Industry Economic Impact Report 2012* (Newtown, CT: National Shooting Sports Foundation, 2012): 3.

pistols and 8.76% were revolvers.[27] From this, we extrapolate that 48.47% of the firearm industry is devoted to handguns, and that there are 106,698 jobs in the handgun industry.

Most of these workers would be able to find new jobs in other industries. However, there would still be a period of unemployment during which time these workers would receive government unemployment benefits. Under current law, unemployed Americans are covered for up to 26 weeks by their state, and up to an additional 13 weeks by the federal government. In this study, we estimate an unemployment period of 37 weeks because that was the mean duration of unemployment during 2012 according to the Department of Labor's Bureau of Labor Statistics.[28]

During these 37 weeks, claimants receive a percentage of their previous weekly salary. The percentage depends on the state, and according to the Center on Budget and Policy Priorities, the average percentage across the fifty states is 46%.[29] Thus, given that the average weekly salary of a firearms industry employee is $909, the average weekly payment accorded to an unemployed former employee of the handgun industry will be $418.[30] In sum, the economic impact of lost jobs is as follows:

$$\# \ of \ Unemployed \ Workers * Duration \ in \ Weeks * Benefits \ in \ Dollars \ =$$
$$106,698 * 37 * \$418 =$$
$$\$1,650,191,268$$

Lost Taxes from the Handgun Industry

A ban on handguns would, as mentioned previously, completely wipe out the handgun industry in the United States. Again, this would significantly impact three different levels of business: manufacturers, retailers, and service providers. Apart from the loss of jobs mentioned previously, this would also reduce government tax revenue.

A 2012 study on the firearms industry found that tax revenue amounted to $5,099, 510,346 per year.[31] Of this total, 9% was attributed to federal excise taxes, 50% was attributed to federal business taxes, and 41% was attributed to state business taxes. After

---

[27] Bureau of Alcohol, Tobacco, Firearms, and Explosives, *Firearms Commerce in the United States: Annual Statistical Update 2013* (Washington, DC: United States Department of Justice, 2013): 1.

[28] Bureau of Labor Statistics, "Table A-12. Unemployed Persons by Duration of Unemployment," *United States Department of Labor*, 5 July 2013, http://www.bls.gov/news.release/empsit.t12.htm.

[29] Chad Stone and William Chen, *Introduction to Unemployment Insurance* (Washington, DC: Center on Budget and Policy Priorities, 2013): 4.

[30] National Shooting Sports Foundation, *Firearms and Ammunition Industry Economic Impact Report 2012* (Newtown, CT: National Shooting Sports Foundation, 2012): 5.

[31] Ibid, 3.

adjusting for inflation, the annual tax revenue generated by the firearm industry can be estimated to be $5,186,355,320.

Again, there are no studies regarding the relative size of the handgun industry within the greater firearms industry. However, from the *Firearms Commerce* report by the Bureau of Alcohol, Tobacco, Firearms, and Explosive, we can again extrapolate that 48.47% of the firearm industry is devoted to handguns.[32] Thus, the final cost of lost handgun tax revenue is as follows:

$$Tax\ Revenue\ from\ the\ Firearms\ Industry * Relative\ Size\ of\ Handgun\ Industry =$$
$$\$5,186,355,320 * 0.4847 =$$
$$\$2,513,826,424\ per\ year$$

Lost Sense of Security among Gun Owners

People purchase handguns because they get some sense of security out of owning and possessing one. Of course, this is extremely difficult to quantify, and there are no contingent valuation surveys asking gun owners to put a monetary value on this "sense of security." Nevertheless, it is an important component and so we proceed on the assumption that how much handgun owners paid for their handgun—that is, their willingness to pay—can serve as a proxy for how much they value this sense of security. For this, we again use the same, average, fee-inclusive price of a Glock handgun used in the section above: $928.

We further assume that only the first handgun purchase causes a significant effect on one's sense of security—that is, gun collectors do not feel any more secure than people who own only a single gun. How many handgun owners are there in the United States? This is a difficult thing to estimate, given people's reluctance to reveal whether or not they own a gun for social and security reasons.[33] However, we do know that 37% (approximately 42.55 million) of American households own at least one firearm.[34] Since approximately 37% of firearm owners are handgun owners,[35] and since the average American household consists of

---

[32] Bureau of Alcohol, Tobacco, Firearms, and Explosives, *Firearms Commerce in the United States: Annual Statistical Update 2013* (Washington, DC: United States Department of Justice, 2013): 1.

[33] For example, some may be embarrassed to admit that they own a firearm, while others may not want their children to know that they own one (lest the children go looking for it). Still others may not want neighbors to know that they do or do not have one, lest a criminal take advantage of this knowledge.

[34] Pew Research Center, *Why Own a Gun? Protection is Now a Top Priority* (Washington, DC: Pew Research Center, 2013): 2.

[35] William J. Krouse, *Gun Control Legislation* (Washington, DC: Congressional Research Service, 2012): 8.

2.6 people,[36] we can therefore estimate that there are 40.93 million Americans who feel an increased sense of security as a result of handguns.

Thus, the total cost for the lost sense of security among gun owners is as follows:

$$Sense\ of\ Security\ per\ Handgun * Number\ of\ Handgun\ Owners\ =$$
$$\$928 * 40{,}930{,}000 =$$
$$\$37{,}983{,}040{,}000\ per\ year$$

5. Sensitivity Analysis

As in any economic analysis, there are a number of factors that could affect our final values. In order to limit the bias that could result from these factors, we focus on two variables of particular interest: the social discount rate and the compliance rate (i.e. the size of the black market). Depending on our estimates for these two variables, we find that the equivalent annual net benefits of this handgun ban (after ten years) could range from $15,893,991,796 to $26,927,601,172, and that the benefit-cost ratio could range from 1.73:1 to 1.76:1. Therefore, even with these variations, our results are quite robust.

Table 5.1

Variable	Annual Net Benefits
Social Discount Rate = 2%	$23,052,455,093
Social Discount Rate = 6%	$19,112,474,431
Compliance Rate = 50%	$17,839,047,529
Compliance Rate = 70%	$25,054,035,093

Social Discount Rate

The social discount rate reflects the fact that benefits and costs realized today weigh more than benefits and costs realized in the future. In our analysis, we use a social discount rate of 3.5%. This figure is in line with other studies conducted in developed nations like the United States, and it is the figure used in similar studies (such as by Boardman et al. when estimating the value of a life-year).[37] We choose to conduct a sensitivity analysis at 2% and 6%, again as per Boardman et al.'s recommendation. At a social discount rate of 2%, we find the equivalent annual net benefit to be $23,052,455,093. At a social discount rate of 6%, we

---

[36] United States Census Bureau, "State & County Quick Facts," *United States Census Bureau*, 27 June 2013, http://quickfacts.census.gov/qfd/states/00000.html.
[37] Anthony E. Boardman, David H. Greenberg, Aidan R. Vining, and David L. Weimer, *Cost-Benefit Analysis: Concepts and Practice* (New York: Prentice Hall, 2010): 412.

find the equivalent annual net benefit to be $19,112,474,431. The results change, but the recommendation remains the same.

Compliance Rate

The compliance rate refers to the percentage of people who will abide by the new law. In other words, if the ban were instituted, how many people will either refuse to turn in their handgun (if they already own one) or acquire one illegally through the black market that would inevitably crop up? In our analysis, we estimate that compliance would be 60% due to the fact that in the United States today, "40 percent of firearm acquisitions are from individuals who are not licensed gun dealers".[38] This figure is reflected in other studies as well.[39] We assume that if individuals are willing to circumvent current laws in order to acquire a firearm, then they would also be willing to circumvent future handgun regulations in order to acquire (or retain) their handguns. Of course, additional Americans would intentionally disobey due to their passion for gun rights, while others would be especially persuaded to comply due to the heightened probability of getting caught. Thus, we conduct a sensitivity analysis at 50% and 70% and find an equivalent annual net benefit of $17,839,047,529 and $25,054,035,093, respectively.

6. Secondary Markets

Rifles and Shotguns

If handguns are banned in the United States, then it is reasonable to assume that the demand for other firearms will increase. However, given the nature of handguns as compared to rifles and shotguns, we expect this effect to be quite small. First, handguns are used primarily as personal self-defense weapons. People buy handguns in order to carry a weapon on them at all times—sometimes in an overt manner, but more likely in a concealed manner.[40] If the law prohibits them from carrying a handgun, it is unlikely that they would carry a rifle or shotgun instead, for rifles and shotguns are far too large and unwieldy to be practical. Of course, there are those who would still carry handguns (illegally), but these individuals are incorporated into the compliance rate mentioned in section 5.

---

[38] Daniel Webster et al., *The Case for Gun Policy Reforms in America* (Baltimore, MD: Johns Hopkins Center for Gun Policy and Research, 2012): 6.
[39] Marianne W. Zawitz, "Guns Used in Crime," *Bureau of Justice Statistics: Selected Findings (U.S. Department of Justice)*, July 1995: 3.
[40] John R. Lott Jr. and David B. Mustard, "Crime, Deterrence, and Right-to-Carry Concealed Handguns," *Journal of Legal Studies* 26, no. 1 (1997): 4.

Second, handguns are almost never used as home defense weapons or sporting weapons. Regarding the former usage, handguns are far less accurate and far less intimidating than shotguns, so it is unlikely that people who purchase firearms for home defense would make any new purchases as a result of the handgun ban. Regarding the latter usage, handguns are again too inaccurate and too weak to be useful for hunting, so it is again unlikely that people who purchase firearms for hunting purposes would make any new purchases after the ban. Indeed, the lack of data regarding the impacts of a handgun ban on alternative firearms markets implies that the effects are insignificant.

Knives

Although a ban on handguns would likely increase the *use* of knives—particularly in the commission of violent crimes as shown by the substitution rates used in section 3—we expect that there would be no significant effect on the *purchase* of knives. Knives are already ubiquitous for a multitude of other purposes, and potential criminals most likely already have one in their possession. Likewise, law-abiding citizens seeking to protect themselves likely already own a knife, and should they desire to carry one for self-defense, they would not need to purchase a new one. Knives, moreover, are extremely cheap, and the economic impact of any increase in sales would be insignificant. Finally, the lack of data regarding the impacts of a handgun ban on the knife market again implies that the effects would be negligible.

7. Qualitative Analysis

Legal Ramifications

The United States was born from armed revolution and aggressive frontier expansion. Its gun culture is so robust that "the right of the people to keep and bear Arms" is the Second Amendment of the Constitution, directly after the all-important freedom of speech.[41] Centuries later, many Americans still cling to their gun rights as a central part of their American identity.

Compared to rifles and shotguns, handguns are much less critical to the American psyche. They have absolutely no hunting value. They have limited home defense value, compared to shotguns and rifles, and their use as personal defense weapons is a relatively recent trend that accompanied the country's increased urbanization. And, they have limited

---

[41] United States Constitution. Amendment II.

sporting value, compared especially to shotguns which are used in the popular sport of trap/skeet shooting.

However, given the passionate support for gun rights, it is likely that any firearm ban (even one limited to handguns) would generate legal challenges. There is no correct answer. The Second Amendment has been closely analyzed in only two Supreme Court cases: *United States v. Miller* and *District of Columbia v. Heller.* The former held that the "Second Amendment…imposed no barrier to gun control [and] did not give private individuals a right to bear arms".[42] The latter held that the "Second Amendment protects an individual right to possess a firearm…and to use that arm for traditionally lawful purposes, such as self-defense within the home".[43]

Given this ambiguity, this study assumes that there will always be controversy regarding the legal justifications for gun control and gun ownership.[44] On the one hand, a nationwide ban on handguns would increase pro-gun protests. On the other hand, it would decrease anti-gun protests. The net effect is thus likely to be negligible.

International Ramifications

In a globalized world, no public policy exists in a vacuum. An American ban on handguns would be no exception. For example, scholars note that "US gun laws have exerted an unanticipated spillover on gun supply in Mexico, and this increase in arms has fueled rising violence south of the border".[45] Since the vast majority of firearms used in Mexico are illegally acquired from the United States, a handgun ban (north of the border) would severely reduce handgun supply (south of the border). Indeed, the number of firearms trafficked into Mexico increased by 165,000 when the United States Federal Assault Weapon Ban expired.[46]

Just as in the United States, the decrease in handguns in Mexico would severely curtail handgun-related deaths and handgun-related injuries. Canada would likely benefit from a handgun ban as well, although to a much lesser extent since gun-related violence is much less of a problem to begin with. At the same time, a handgun ban in the United States could potentially increase the power of Mexican drug cartels since they could smuggle

---

[42] Jeffrey Toobin, *The Oath: The Obama White House and the Supreme Court* (New York: First Anchor Books, 2013): 21.

[43] *District of Columbia v. Heller*, 554 U.S. 570 (2008)

[44] Gallup, "Guns," *Gallup*, 2013, http://www.gallup.com/poll/1645/guns.aspx.

[45] Arindrajit Dube, Oeindrila Dube, and Omar Garcia-Ponce, "Cross-Border Spillover: U.S. Gun Laws and Violence in Mexico," *APSA 2012 Annual Meeting Paper* (2012): 1.

[46] Topher McDougal, David A. Shirk, Robert Muggah, and John H. Patterson, "The Way of the Gun: Estimating Firearms Traffic Across the U.S.-Mexico Border," *University of San Diego Trans-Border Institute* (2013): 2.

handguns into the United States (just as they currently smuggle drugs) and profit from the handgun black market that would inevitably arise after the ban.

In sum, the international ramifications would most likely be significant, but they remain too difficult to estimate and are thus outside the scope of this study.

8. Conclusion

Summary of Results

A nationwide ban on handguns—whereby no person or organization shall, within the United States possess or have under his or its control any handgun—would result in a social surplus of $178,362,305,466 and a benefit-cost ratio of 1.75:1.

This was found by computing four benefits (reduction in homicides, reduction in suicides, reduction in robberies, reduction in assaults) as well as four costs (gun buyback, lost jobs in the handgun industry, lost tax revenue from the handgun industry, lost sense of security among gun owners). These benefits and costs were adjusted for a compliance rate of 60% and a social discount rate of 3.5%, as justified in section 5. The study spanned ten years, based on the fact that the last major firearms-related ban in the United States—the Federal Assault Weapons Ban—expired after ten years as well (from 1994-2003).[47]

Alternatively, we can judge this policy using the equivalent annual net benefits method. With a net present value of $178 billion and an annuity factor of 8.3166 (assuming a duration of ten years and a 3.5% discount rate), the annual net benefit of a handgun ban is $21,446,541,311 or $21.5 billion. We arrive at the same conclusion: the United States should institute a ban on handguns.

Table 8.1: Benefits

Year	Reduction in Homicides	Reduction in Suicides	Reduction in Robberies	Reduction in Assaults
1	12,523,222,530	34,995,827,009	698,285,664	164,704,590
2	12,099,731,913	33,812,393,245	674,672,139	159,134,870
3	11,690,562,235	32,668,978,981	651,857,139	153,753,497
4	11,295,229,212	31,564,230,899	629,813,661	148,554,104

---

[47] Violent Crime Control and Law Enforcement Act of 1994, Public Law 103-322, Section 110105, 108 Stat. 2000.

5	10,913,264,940	30,496,841,449	608,515,615	143,530,535
6	10,544,217,333	29,465,547,293	587,937,792	138,676,845
7	10,187,649,597	28,469,127,820	568,055,838	133,987,290
8	9,843,139,707	27,506,403,691	548,846,220	129,456,319
9	9,510,279,910	26,576,235,450	530,286,203	125,078,569
10	9,188,676,242	25,677,522,174	512,353,819	120,848,859
Total	107,796,000,000	301,233,000,000	6,010,624,089	1,417,725,477

Table 8.2: Costs

Year	Gun Buyback	Lost Jobs in Industry	Lost Taxes from Industry	Lost Sense of Security
1	27,294,336,000	1,650,191,268	1,508,295,854	22,789,824,000
2	0	0	1,457,290,681	22,019,153,623
3	0	0	1,408,010,319	21,274,544,563
4	0	0	1,360,396,444	20,555,115,520
5	0	0	1,314,392,699	19,860,014,995
6	0	0	1,269,944,637	19,188,420,285
7	0	0	1,226,999,649	18,539,536,508
8	0	0	1,185,506,908	17,912,595,660
9	0	0	1,145,417,302	17,306,855,710
10	0	0	1,106,683,384	16,721,599,720
Total	27,294,336,000	1,650,191,268	12,982,937,877	196,168,000,000

Table 8.3: Totals

Total Benefits	$416,457,431,196
Total Costs	$238,095,125,730
Total Value	$178,362,305,466
Benefit-Cost Ratio	1.75 : 1
Equivalent Annual Net Benefits	$21,446,541,311

Study Limitations

Of course, our study is not without its limitations and there is always room for improvement. Although the final recommendation will probably remain the same, a longer, more in-depth study would likely produce more accurate figures. We list some of these limitations below:

First, we assume that there will be no major psychological changes among Americans as a result of the handgun ban. This may not be entirely accurate. Americans have been born and raised in an environment where handguns are ubiquitous, and they have adjusted every aspect of their daily lives as a result. If handguns are no longer in the picture, it is possible that Americans will become less violent (psychologically) and that crime will naturally drop over time. This potential shift in attitudes is not accounted for in our study.

Second, we have relatively little data to work with, given the lack of handgun bans within the United States and the lack of recent handgun bans in countries with similar gun cultures (Australia being the notable exception). This makes it difficult to estimate substitution rates for individual crimes (i.e. how many criminals will simply use another weapon to commit their crime) as well as the impacts on secondary markets (i.e. how many people will buy knives instead). With more precedents and more data, one could find more reliable estimates.

Third, we assume that the American economy will have roughly the same level of growth over the next ten years. Of course, the strength of the economy is subject to a number of different variables, all of which could significantly impact the level of compensation in a gun buyback, the period of unemployment for former handgun industry employees, and the lost tax revenue from the handgun industry. There are studies predicting the path of the American economy over the next ten years, and incorporating these patterns more fully into our study would provide better results.

Fourth, there are no relevant contingent valuation surveys available. Such surveys could have shed light on the compliance rate (by asking "would you relinquish your handgun to the government") as well as on the lost sense of security (by asking "how much value do you place on owning your handgun"). We did not conduct any of our own contingent valuation surveys, but a more extensive study of this policy should most certainly attempt to do so.

9. Acknowledgments

First and foremost, we would like to thank Professor Yoshitsugu Kanemoto. All three of us began this semester with no knowledge of economic analysis, and it was only through his informative lectures and insightful presentations that we were able to complete this project. Professor Kanemoto patiently answered all of our questions and guided us through every step of this process, and we could not have done it without his support.

We would also like to thank Tsenguun Enkhbaatar (teaching assistant), as well as our classmates (Yuri, Gu, Kenji, Felipe, Zhao, Gaye, and Marcin) for their helpful comments and advice. We wish everyone the best as they continue their studies, at the University of Tokyo and beyond.

We are extremely grateful for the opportunity to work on this project, for these skills will be useful throughout our academic and professional careers. Of course, we still have much to learn, and we take full responsibility for any and all errors found in this report.

10. References

Australasian Police Ministers' Council. *1996 National Firearms Agreement.* Canberra: Australian Government Attorney-General's Department, 1996.

Australian Institute of Criminology. "Assault." *AIC.* 2 July 2009. http://www.aic.gov.au/statistics/violent%20crime/assault.html.

Boardman, Anthony E., David H. Greenberg, Aidan R. Vining, and David L. Weimer. *Cost-Benefit Analysis: Concepts and Practice*. New York: Prentice Hall, 2010.

Bureau of Alcohol, Tobacco, Firearms, and Explosives. *Firearms Commerce in the United States: Annual Statistical Update 2013.* Washington, DC: United States Department of Justice, 2013.

Bureau of Labor Statistics. "Table A-12. Unemployed Persons by Duration of Unemployment." *United States Department of Labor*. 5 July 2013. http://www.bls.gov/news.release/empsit.t12.htm.

Bureau of Justice Statistics. *Criminal Victimizations in the United States, 2008 Statistical Tables.* Washington, DC: U.S. Department of Justice, 2010.

Centers for Disease Control and Prevention. "Suicide Prevention." *CDC.* 26 April 2013. http://www.cdc.gov/violenceprevention/suicide/index.html.

Cooper, Alexia, and Erica L. Smith. "Homicide Trends in the United States, 1980-2008." *Bureau of Justice Statistics: Patterns & Trends (U.S. Department of Justice)*. November 2011.

District of Columbia v. Heller. 554 U.S. 570. 2008.

Dube, Arindrajit, Oeindrila Dube, and Omar Garcia-Ponce. "Cross-Border Spillover: U.S. Gun Laws and Violence in Mexico." *APSA 2012 Annual Meeting Paper*. 2012.

Firearms Control Regulation Act of 1975.

Gallup. "Guns." *Gallup*. 2013. http://www.gallup.com/poll/1645/guns.aspx.

Gun Control Act of 1968. 18 U.S.C. § 921.

Hudson, Phillip. "Prices Set in Handgun Crackdown." *The Age*. 30 June 2003. http://www.theage.com.au/articles/2003/06/29/1056825278337.html.

Krouse, William J. *Gun Control Legislation.* Washington, DC: Congressional Research Service, 2012.

Leigh, Andrew, and Christine Neill. "Do Gun Buybacks Save Lives? Evidence from Panel Data." *American Law and Economics Review* 12, no. 2 (2010): 509-557.

Lott Jr., John R., and David B. Mustard. "Crime, Deterrence, and Right-to-Carry Concealed Handguns." *Journal of Legal Studies* 26, no. 1 (1997): 1-68.

McDougal, Topher, David A. Shirk, Robert Muggah, and John H. Patterson. "The Way of the Gun: Estimating Firearms Traffic Across the U.S.-Mexico Border." *University of San Diego Trans-Border Institute*. 2013.

National Public Radio. "How the Glock Became America's Weapon of Choice." *NPR*. 24 January 2012. http://www.npr.org/2012/01/24/145640473/how-the-glock-became-americas-weapon-of-choice.

National Shooting Sports Foundation. *Firearms and Ammunition Industry Economic Impact Report 2012.* Newtown, CT: National Shooting Sports Foundation, 2012.

Pew Research Center. *Why Own a Gun? Protection is Now a Top Priority.* Washington, DC: Pew Research Center, 2013.

Planty, Michael, and Jennifer Truman. "Firearm Violence, 1993-2011." *Bureau of Justice Statistics: Special Report (U.S. Department of Justice)*. May 2013.

Smith, Lance, Kym Dossetor, and Maria Borzycki. *Armed Robbery in Australia: 2008 National Armed Robbery Monitoring Program Annual Report.* Canberra: Australian Institute of Criminology, 2011.

Stone, Chad, and William Chen. *Introduction to Unemployment Insurance.* Washington, DC: Center on Budget and Policy Priorities, 2013.

Toobin, Jeffrey. *The Oath: The Obama White House and the Supreme Court*. New York: First Anchor Books, 2013.

United States Census Bureau. "State & County Quick Facts." *United States Census Bureau*. 27 June 2013. http://quickfacts.census.gov/qfd/states/00000.html.

United States Constitution. 1791.

Violent Crime Control and Law Enforcement Act of 1994. Public Law 103-322. §
110105.108 Stat. 2000.

Webster, Daniel W., et al. *The Case for Gun Policy Reforms in America*. Baltimore, MD:
Johns Hopkins Center for Gun Policy and Research, 2012.

Zawitz, Marianne W. "Guns Used in Crime." *Bureau of Justice Statistics: Selected Findings
(U.S. Department of Justice)*. July 1995.