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Valuing the benefits of reducing firearm violence in the United States

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Justifying a proposed government regulation intended to reduce firearm violence requires a conceptually sound estimate of the monetized value of that impact and how that value is distributed across the population. Some previous estimates do not serve as a valid basis for policy evaluation or are out of date. A nationally representative survey was conducted by the AP-NORC Center for Public Affairs Research in August 2022 (n = 660). The authors designed and added a series of contingent-valuation items to the questionnaire. Double-bounded estimates of willingness-to-pay (WTP) were derived from a regression analysis of responses regarding voting on a hypothetical referendum on a state-wide package of measures designed to reduce gun violence at specified cost to taxpayers. Average WTP for a reduction of 20% in the state rate of gun violence was $744 per household (IQR:$668–$928), implying a national total of $97.6 billion. Household WTP was positively associated with household income, the respondent's assessment of the seriousness of gun violence in their community and the subjective likelihood that they would become a victim of gun violence. A variety of tests support the claim that this application of the contingent-valuation method provided valid results. WTP is the recognized basis for assessing the value of proposed federal regulations. The estimated WTP for reducing gun violence is about twice as high as a recent cost-of-injury estimate and provides a much different picture of the incidence of costs by income and demographic characteristics.

gun violence | willingness to pay | contingent valuation | cost benefit analysis | public value

Significance

Gun violence imposes significant costs, but the best way to quantify these costs is controversial. In line with standard practice in economics and federal directives, we use the contingent valuation method to estimate Americans' willingness-to-pay (WTP) to reduce gun violence. Households are willing to pay an average of $744 annually for a 20% reduction in gun violence, totaling $97.6 billion nationwide. This estimate is twice as high as a recent cost-of-injury (COI) estimate, suggesting that that method, widely used in health-policy analysis, underestimates the full societal impact of gun violence. Unlike the COI metric, WTP is not strongly correlated with demographic characteristics. The benefits of reducing gun violence are more closely associated with subjective concerns than observed victimization rates.

The recent creation of the first-ever federal Office of Gun Violence Prevention within the executive branch brings with it the possibility of renewed efforts to address an urgent public health challenge (1). By what criteria should the federal government judge proposed reforms? Programs targeted on reducing interpersonal firearm violence must be justified by a comparison of costs with projected benefits—a legal requirement for most federal regulations (2). There are two commonly used methods for placing a monetary value on safety: the "cost of illness or injury" (COI) method utilized in public health (1) and the "willingness-to-pay" (WTP) approach utilized by economists and endorsed by the U.S. Office of Management and the Budget (3, 4). The two methods differ in their characterization of the benefits of reducing firearm violence, and in how that benefit is distributed across the population.

The WTP approach is grounded in the principle that the total value of a public good such as a reduced threat of firearm violence is equal to the sum of the valuations of members of the relevant population. A standard method for estimating these subjective values is through a survey of the population using the contingent-valuation method (CVM), one of a class of "stated preference" methods, which includes carefully constructed questions to elicit WTP for the public good (5, 6). We implement this method by use of a survey of a nationally representative sample of individuals that also included items on the respondents' background, circumstances, experience with gun violence, and views on government and firearms regulation. Where the CVM is forward-looking, focused on public valuation of a future decline in the risk of gun violence victimization, the COI is backward-looking, valuing the morbidity, mortality, lost earnings, and medical costs of those who have been directly victimized in some previous period.

The CVM, unlike the COI method, provides a comprehensive measure of the monetary value of reducing the threat of interpersonal firearm violence. That threat has pervasive effects on individuals' quality of life, beginning with concern for personal safety and that of loved ones. That concern may induce costly avoidance behaviors, affecting choices of where to live, work, and travel (7). The CVM thus aligns with the recent Surgeon General's Advisory on Firearms Violence, which emphasizes that most of the US public is affected, either directly or indirectly (8).

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Methods

Data were collected and analyzed using up-to-date methods with respect to sampling, survey-instrument design, and estimation methods. In particular, the survey instrument, which was subjected to extensive pretesting, prompted respondents to consider their answers carefully, and provided several tests to determine whether the patterns of responses met reasonable expectations.

Survey Preparation and Sample Design. The study draws on the existing NORC AmeriSpeak Omnibus multistage, probability-based panel which was selected to be representative of US households (9). It is used to conduct biweekly surveys on a variety of topics. The sample was randomly selected from the AmeriSpeak panel. Data were collected between July 28th and August 1st, 2022. The final-stage completion rate was 14.6%. Sample weights were calculated following data collection to make the weighted sample representative of the US adult population with respect to age, gender, census division, race/ethnicity, and education. The authors worked with NORC and the Associated Press to field a survey on perceptions of gun violence and gun control, to which we added a WTP CVM module.

This research was approved by the Social and Behavioral Sciences Institutional Review Board of the University of Chicago, Reference IRB22 – 1,023. The NORC IRB approved consent procedures used in the AmeriSpeak panel. NORC obtains and documents research subjects' informed consent and agreement to the study's Privacy Policy and Terms and Conditions during the registration process. An online consent screen was used for versions of the survey that occurred online; a telephone consent screen was used for versions of the survey that occurred over the phone.

The panel provides a number of socioeconomic and demographic variables in addition to data on questions asked during customized surveys (10). The sampling frame is representative of over 97 percent of US households and includes additional coverage of hard-to-survey population segments that are underrepresented in other sample frames.

The final sample consisted of 660 respondents. Links to the survey were sent to respondents selected from the existing sampling frame and known to have access to the internet (n = 617); a small set of respondents (n = 43) selected from the sampling frame did not have such confirmed access and were therefore interviewed by phone. Residents of urban counties were oversampled in order to obtain better coverage in areas where victimization rates tend to be higher. Sample statistics are computed using sampling weights to obtain nationally representative estimates.

Given the large literature on sources of bias in CVM studies and approaches to mitigate them (11, 12), extensive testing of the survey instrument was undertaken. A draft instrument was used in focus-group discussions, where the main purpose was to test overall comprehension of the questions asked and to determine whether an incentive-compatible scenario script with a voting and taxation mechanism for reduced gun violence was credible and realistic. The survey began with ten general questions constituting the AmeriSpeak Omnibus poll on opinions about the importance of gun-violence and gun-control measures; beliefs about what gun control would achieve; personal experience with gun violence; and presence of guns in respondents' homes. The remainder of the survey was tailored to the current project. Section 2, the CVM scenario, elicited WTP responses using a double-bounded dichotomous choice design and debriefed those responses. Section 3 asked about respondents' behaviors and actions taken to minimize exposure to gun violence and crime. Finally, Section 4 probed respondents' views of government effectiveness, taxes, police, and local gun violence.

The focus-group discussions were carried out with a convenience sample recruited at Mindworks, a social-science laboratory affiliated with the University of Chicago located in downtown Chicago and open to the public. Participants in the focus groups were a mix of local residents and out-of-town visitors from diverse locations. In each focus group, participants filled out a printed preliminary version of the survey. The study authors then initiated a discussion to collect detailed feedback on respondents' comprehension and views of the CVM scenario framing and questions and on their reactions to the initial "price" bids that they saw. The results of the focus-group discussions guided subsequent modifications of the questionnaire.

Subsequently, a round of pretest surveys (n = 114) was conducted again using convenience samples recruited at Mindworks. This time, respondents completed the revised survey on tablets to simulate the online platform for the main survey. This pretest resulted in additional minor modifications.

The CVM Experiment. The CVM survey incorporated contemporary best practices for stated preference surveys (6). In particular, the survey asked respondents to vote on a referendum that was designed to reveal the monetary value they placed on a specified reduction in gun violence.

The full CVM script is included as S1 in a supplementary appendix. It begins by defining "gun violence" as "all crimes that involve a gun: mass shootings, murders, shootings, and armed robberies with guns." It then listed a package of several state-level policies, indicating that they would reduce gun violence by either 20% or 40%. Reductions of this magnitude are plausible given recent findings regarding police enforcement and cognitive-behavioral interventions (13–16).

The WTP question was framed as a vote on a referendum on whether to implement these policies, given that they would require a specified tax increase. This is an incentive-compatible framing for a public good such as gun violence reduction. Since this choice was hypothetical, the survey instrument included reminders about budget constraints and examples of various reasons why respondents might vote for or against the policy proposal. Finally, just prior to the WTP question, there was a comprehension question to test that respondents understood the premise, offering feedback to those who answered incorrectly.

An experimental design was utilized, with two separate randomizations of respondents (Fig. 1):

1. Randomization into lower (20% reduction) and higher (40% reduction) effectiveness of the specified programs;
2. Randomization into one of four tax increases for the respondent if the referendum was adopted, namely $75, $200, $500, and $1,200 per year.

The first randomization served as a scope test (5); respondents on average should have greater WTP for a more effective policy package, though WTP may not increase proportionally due to budget constraints or nonlinear risk preferences. The second randomization allows determination of the demand for a reduction in gun violence, and it was expected that the share of respondents willing to pay for the intervention would decrease in price.

A double-bounded dichotomous choice design was utilized to estimate WTP more precisely (17). Respondents willing to pay the first bid amount were asked, in a subsequent question, about a price that was twice as high, and those

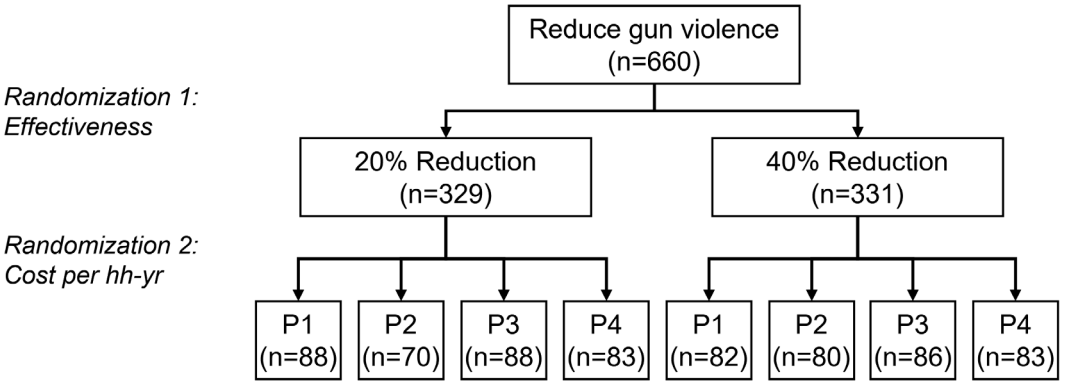

Fig. 1. Experimental design. Notes: P1 = US$75, P2 = US$200, P3 = US$500, and P4 = US$1200.

unwilling received half of the first bid price. There are well-documented tradeoffs in such designs between bias (from anchoring on the first price offer) and precision, which is improved given the richer demand information in the double-bounded design (6, 18).

Using respondents' votes on the CVM scenario, we estimate their WTP using regression methods that relate the bid price and the effectiveness of the policy package to affirmative WTP responses. In addition to providing the basis for an estimate of the mean WTP value of a reduction in gun violence, the multivariate regression results provide descriptive information on how WTP differs across the members of the population with respect to respondent and household characteristics and their experiences and preferences. It is expected that WTP will be relatively high for the following groups:

- Those who think gun violence is a major problem;
- Those who perceive a relatively high risk of becoming a victim of gun violence within 5 y;
- Those who state that avoiding gun violence had a strong influence on their choice of where to live;
- Those respondents coming from larger households; and
- Those who do not believe that their taxes should be reduced.

Finally, debriefing questions probed about respondents' rationale for "yes" or "no/uncertain" responses to the first price offer and the certainty of their answers. Those rejecting both bid levels were asked whether they would support the policy package if it would cost them nothing, to identify those who rejected any scenario of government actions to reduce gun violence. A comprehension question was included to test whether respondents were paying attention to both the effectiveness level and the overall scenario framing and corrected those who missed the right answer, to make those aspects salient.

Results

Sample Description. Applying the AmeriSpeak sampling weights to obtain a nationally representative sample, the median respondent is 49 y old and is in a household with an average of 2.9 members. There is a nearly even split between male and female respondents. Thirteen percent of the sample identifies as Black and 18% as Hispanic. Nearly three quarters of respondents are homeowners, and 32% have a college degree. These statistics are compared with Census estimates in *SI Appendix*, Table S2.

The weighted sample distribution across US regions is 40% in the South, 22% West, 22% Midwest, and 16% Northeast. A majority reside in suburban (55%) areas, with the remainder in urban or rural areas. Political views are suitably diverse, as measured by a political ideology scale: 27% self-identify "conservative" and 21% as "liberal", with the other half "moderate". 43% of respondents believe that their household taxes should be reduced.

Finally, regarding perceptions of gun violence and crime, 48% do not consider gun violence to be a serious problem in their own community, compared to 52% who say it is "serious" or "don't know". Relatedly, 43% believe they are likely or somewhat likely to be victims of gun violence in the next 5 y. Over a third report that the risk of gun violence was an important factor in their choice of where to live. Moreover, 74% of respondents believe that gun control should be made stricter, while 17% believe that no changes are necessary and fewer than 10% believe such laws should be loosened.

Estimates for Price and Effectiveness. Fig. 2 presents the raw responses to the WTP question across the randomized price levels in the CVM script, and also by randomized levels of policy effectiveness (20% or 40% reduction). As expected, the share of respondents who would vote yes on a referendum to adopt gun-violence-prevention measures declines as a function of price (the increase in tax), and the share of respondents being willing to pay the amount indicated on the X-axis is consistently higher when the policy is more effective.

Table 1 presents the estimates from alternative specifications of the probit regression on how the respondent would vote on the referendum, given the first randomized price offer. The coefficient estimates for price are similar across Specifications 1 and 2, as are the coefficient estimates for the effectiveness measure (20% vs. 40% reduction). The corresponding coefficients for Specification 3 are somewhat larger in absolute value; it is likely that the experimental

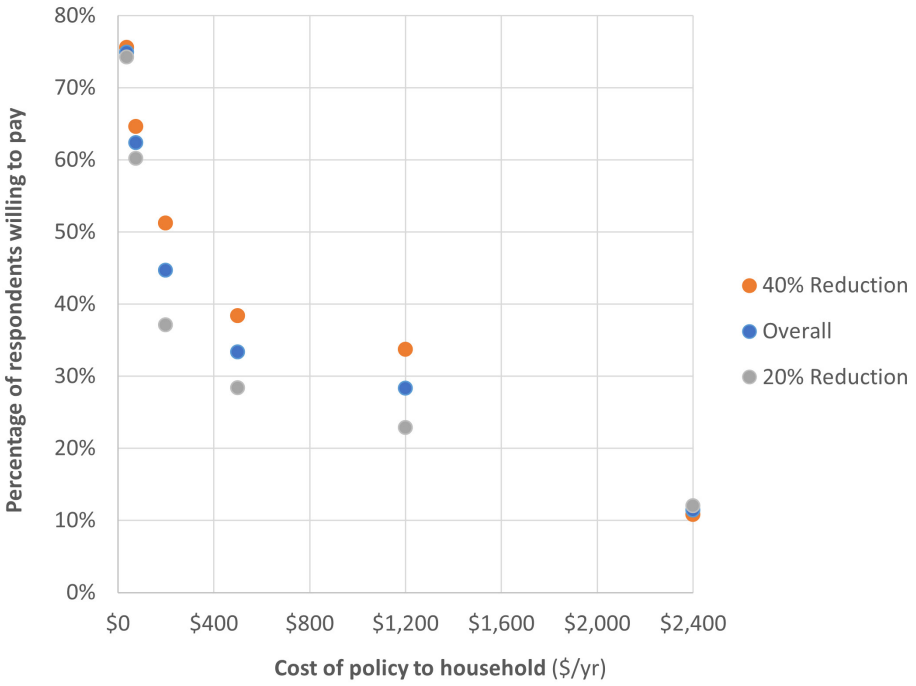

Fig. 2. Percentage of yes votes (raw data, not adjusted for sample weights). (Notes: The responses for the lowest ($37.5) and highest ($2400) prices shown are those for the second price offers conditional on "no" and "yes" responses to the lowest ($75) and highest ($1200) first prices, respectively, while the responses for the four middle prices are for the first price only.)

Table 1. Likelihood of Voting yes on program to reduce firearm violence: Probit Estimates

Variable (Prevalence*)	Specification 1	Specification 2	Specification 3
First price ('000 US$/y)	−0.57***	−0.57***	−0.68***
	(0.18)	(0.18)	(0.17)
40% effectiveness	0.30***	0.33**	0.35**
	(0.15)	(0.13)	(0.15)
Male (.50)		0.04	0.22
		(0.14)	(0.15)
Age: default < 35 y.o.			
35 to 49 (.22)		0.10	0.20
		(0.20)	(0.21)
50 to 64 (.24)		−0.39*	−0.00
		(0.20)	(0.20)
65+ (.26)		−0.24	−0.17
		(0.22)	(0.22)
Race/ethnic: default white non-Hispanic of other			
Black (.13)		0.15	−0.22
		(0.22)	(0.25)
Hispanic (.18)		−0.31	−0.40*
		(0.21)	(0.22)
Household size: default 1 member			
2 (.34)		−0.09	−0.11
		(0.19)	(0.20)
3 to 4 (.29)		0.01	−0.12
		(0.22)	(0.22)
5 + (.15)		−0.31	−0.39
		(0.25)	(0.26)
Size of place: default rural			
Urban (.23)		0.44**	0.31
		(0.19)	(0.21)
Suburban (.55)		0.25	0.13
		(0.19)	(0.20)
Region: default West			
Northeast (.16)		0.35	0.55**
		(0.22)	(0.24)
Midwest (.22)		−0.07	−0.10
		(0.22)	(0.21)
South (.40)		−0.31*	−0.36*
		(0.19)	(0.20)
Own home (.74)		0.20	0.35*
		(0.17)	(0.18)
Income: default<$30,000			
$30-60,000 (.30)		0.22	0.14
		(0.20)	(0.22)
$60-100,000 (.21)		0.40*	0.42*
		(0.22)	(0.23
$100,000+ (.25)		0.58**	0.45*
		(0.25)	(0.26)
Finished college (.32)		0.38**	0.19
		(0.15)	(0.16)
Ideology: default neither right nor left			
Lean left (.23)			0.29*
			(0.18)
Lean right (.25)			−0.39**
			(0.18)

Table 1. (Continued)

Variable (Prevalence*)	Specification 1	Specification 2	Specification 3
R asserts gun violence not a serious problem in R's community (.48)			−0.42** (0.16)
R asserts Likely (somewhat, very, extremely) to be victim of GV in next 5 y (.43)			0.33** (0.15)
R asserts GV was important or somewhat important to household location choice (.35)			0.38** (0.16)
R believes that taxes should be lowered (.43)			−0.55*** (0.17)
Gun owner (??)			−0.09 (.15)
Constant	−0.17 (0.13)	−0.71** (.30)	−0.35 (0.39)
N	660	660	660

Note: indicators for nonresponses are not included in this table.
*Weighted by applying the AmeriSpeak sampling weights to obtain a nationally representative sample.

questions regarding the referendum influenced responses to some of the subsequent questions regarding perceptions and values.

Correlates of Propensity to Vote for the Gun-Violence-Reduction Referendum. In Table 1, specifications 2 and 3 include a number of covariates in addition to the price and "effectiveness" variables. A positive coefficient indicates a greater likelihood of voting in favor of the referendum, which translates into a higher individual WTP.

The coefficient estimates for Specification 2 suggest that demographic characteristics have only a weak association with whether they would vote yes on the referendum, with the exception that urban dwellers are more likely to support it than those in rural areas. The number of household members has little effect on WTP.

Support tends to increase with income and is higher for college graduates compared to those with less education. Specification 3 adds additional covariates for political attitudes and perceptions of gun violence. Referendum support tends to be relatively low for conservative respondents, those who believe that taxes should be reduced, and those who do not perceive gun violence to be a serious problem in their communities. Respondents who say that gun violence influenced their choice of residential location, and who expect to be victimized within the next 5 y, are more likely to support the referendum. With the exception of household size, all of these results align with the hypotheses stated in the methods section.

Estimates of WTP. The single- and double-bounded estimate of mean WTP can be obtained from any of the three specifications presented in Table 1 (these WTP estimates are summarized in Table 2, assuming a log-normal relationship between price and the share of responses in support of the policy). Results discussed here are for the more precise double-bounded estimates. (CI for the two types of estimates overlap.) Also, given the concern that the randomized prices may have influenced the responses to subsequent items on attitudes, our preferred specifications are 1 and 2, which include only factors that are plausibly exogenous determinants of demand. These two specifications have nearly identical estimates for the price effect, and very similar estimates for mean WTP (Table 2). Our preferred estimate is from Specification 2, which is somewhat more precise. The mean WTP for a 20% reduction in interpersonal firearm violence is $743.8 per year, with interquartile range of $668.1 to $928.1.

Table 2. Double-bounded estimates of mean WTP for two effectiveness levels

	Specification 1	Specification 2
Mean WTP		
20% reduction IQR	744.1 (664.7, 985.4)	743.8 (668.1, 928.1)
40% reduction IQR	957.4 (844.4,1313.1)	891.0 (795.4,1092.6)
Median WTP		
20% reduction IQR	744.1 (664.7, 985.4)	364.3 (303.9, 586.7)
40% reduction IQR	957.4 (844.4,1313.1)	434.8 (364.3, 697.7)

Notes: Computations, explained in Methods Section, utilize results from the double-bounded WTP estimations corresponding to specifications 1 and 2 of Table 1, after applying sample weights and correcting for bias based on 5,000 bootstrapped replications. The mean and median WTP estimates for specification 1 are equivalent, because no covariates are included in the model, while these differ for specification 2 due to the skewness of the WTP distribution and covariates.

There were 131,202,000 households in the United States in 2022 (19). The point estimate of the total benefits of a 20% reduction in gun violence is thus $97.6 billion per year (IQR $87.7,$121).

It should be noted that the average WTP does not reflect the preferences of the median household (20). As noted above, and also consistent with the raw data shown in Fig. 2, we adopt a standard assumption that the population distribution of WTP is log normal, which implies that the mean exceeds the median due to the influence on the mean (but not the median) of households at the right "tail" of this asymmetric distribution.

Fig. 3 depicts the relationship between WTP and each of several covariates included in specification 3. Many CIs overlap zero, but there are some clear statistical patterns. WTP appears positively associated with income, education, residence in the northeast region, residence in nonrural areas, liberal political views, and perception of the likelihood of being shot in the next 5 y. Those who express antitax sentiments have a distinctly lower WTP than others.

Discussion

The only previous CVM estimate of the value of a reduction in interpersonal firearm violence was based on a national survey conducted in 1998 (21). The point estimate of the value for a 30% reduction in interpersonal firearm violence was $24.5 billion, or $44.6 billion adjusted for inflation to 2022 dollars. The new, larger estimate of $97.6 billion for a smaller gain (20%) apparently reflects a substantial increase in the demand for reducing gun violence, which is to be expected given increases in income, population, and rates of gun violence. During that 24-y period, *per capita* real disposable personal income increased by 44% (22), and

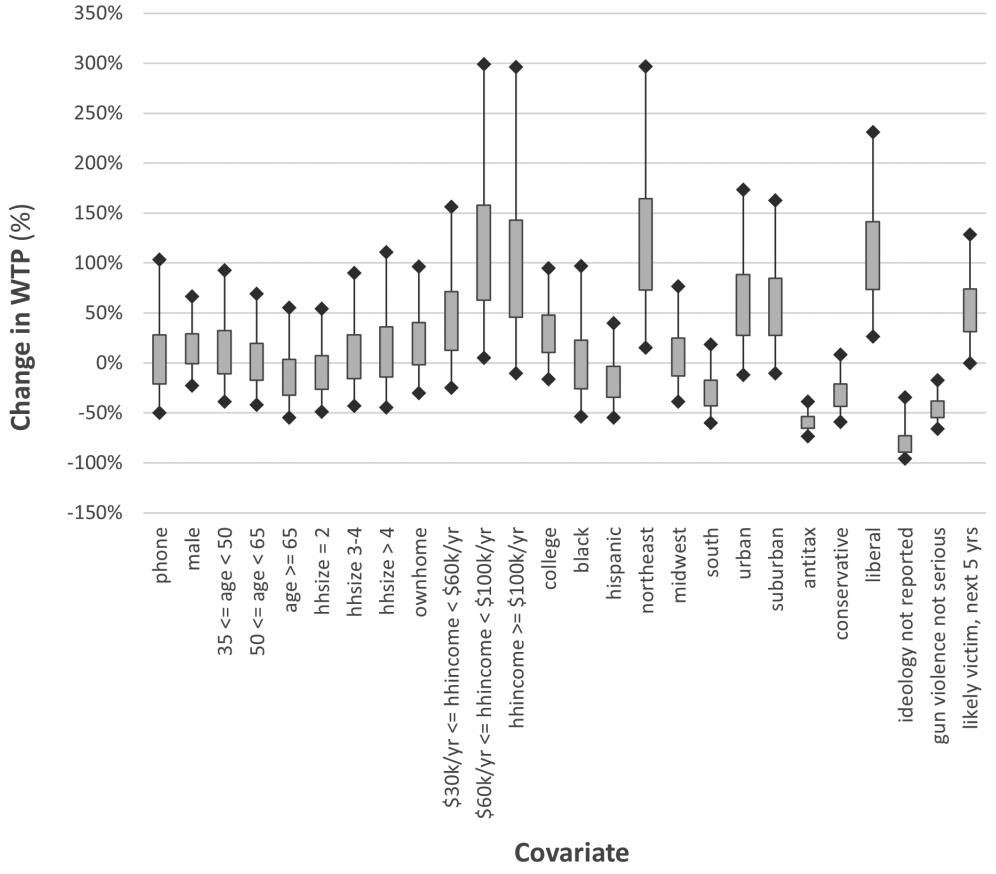

Fig. 3. Effect of covariates on WTP. (Notes: The box plots edges show the interquartile range for the effect of a covariate on WTP, and the end of the whiskers shows the 95% CI; omitted reference categories for nonbinary variables are age < 35; household income < $30 k/y; west region; rural; and moderate ideology).

the US population increased by 21% (23). The firearms homicide rate increased from 4.3/100,000 to 5.9/100,000 during that interval (24), and the number of mass shootings increased sharply (25).

A recent COI analysis concluded that fatal and nonfatal injuries in firearms "assault" circumstances cost a total of $235.9 billion (26). A 20% reduction would then represent a cost savings of $47.2 billion—about half of our CVM estimate of $97.6 billion. Over 90% of the COI estimate comes from multiplying the number of firearms homicide victims by the "value of a statistical life" [which the authors adjusted for age, using a mean of $10.7 million (27)]. The remainder included medical costs, lost earnings, and the value placed on the disability associated with nonfatal injuries. The large difference in the COI and CVM estimates is primarily due to differences in methods. The COI places a value on actual lost lives during a previous period, while CVM elicits a valuation of a future increase in safety for everyone. In principle the CVM method is more comprehensive, in particular taking account of costly avoidance actions as well as fear and concern. Because the CVM is forward looking and directly based on the individual preferences of members of the relevant population, it is more directly relevant for evaluating proposed policies.

Perhaps the starkest contrast between the two methods is with respect to the estimated distribution of benefits for a reduction in firearm violence. The COI study finds that over half (54.1%) of their total cost estimate is due to young (age 10 to 44) non-Hispanic Black people, a group that constitutes only 6.7% of the US population. By contrast, average WTP for a reduction in firearm violence is not higher for Black or youthful respondents, after controlling for other sociodemographic characteristics.

We note several potential limitations of the current study. First, a larger sample size would be desirable in order to generate more precise estimates. Second, some respondents may not believe that the proposed programmatic measures would accomplish the stated reduction in gun violence (20% or 40%)—or they may object to one or more of these measures for other reasons. If that is the case, our mean WTP estimate understates the value of reducing gun violence.

It should be noted that our estimate of mean WTP should not be interpreted as a guide to the politics of gun-violence prevention. Given that the population distribution of WTP is skewed, the mean exceeds the median. One implication is that an actual referendum that specified the mean WTP as the price would be defeated by a majority of voters. To garner broader support would require replacing a uniform tax with a tax scheme in which the rate was correlated with WTP. A tax proportional to income would accomplish that purpose. In any event, it is the mean WTP that is relevant to estimating the overall societal benefit of gun-violence reduction.

The value of a reduced rate of firearm violence is shared by all those who fear for themselves and their loved ones, and whose decisions about where and when to live, work, travel, and recreate are impacted by this fear. That perspective, incorporated in the CVM, is in accord with the recent US Surgeon General's Advisory, which emphasizes the "cascading harm" of gun violence that reaches a large majority of the population, and reports that nearly 6 in 10 US adults say that they worry "sometimes," "almost every day," or "every day," about a loved one being a victim of firearm violence (8).

Methods

Using respondents' votes on the CVM scenario, we estimate their WTP using regression methods that relate the bid price to affirmative WTP responses. Our

approach rests on the technical assumption that individual *i*'s true WTP (y) for a policy package that reduces gun violence can be expressed as follows:

$$\ln(y_i) = X_i \bullet \beta + E \bullet \beta_e + \varepsilon_i. \quad [1]$$

X in Eq. **1** is a vector of explanatory variables (e.g., socioeconomic status, attitudes toward crime and gun violence), **E** is the effectiveness of the interventions (in terms of % reduction of crime/gun violence), and ε_i is a normally distributed disturbance term where $\varepsilon \backsim N(0, \sigma^2)$. Hence, when a randomly chosen individual is faced with a bid of B for reducing gun violence, the probability of voting Yes is

$$P(Vote = \text{Yes} \vee X_i) = P(\exp(X_i \bullet \beta + E \bullet \beta_e + \varepsilon_i) >>> B). \quad [2]$$

Single (First) Price Analysis. Using the responses to the first randomized bid, we first assume that the expression in Eq. **2** conforms to a standard normal cumulative probability normalized by the disturbance term. Hence, the probability distribution for individual *i* can be expressed as

$$P(Vote = \text{Yes} \vee X_i) = 1 - \Phi\left(\frac{B \bullet \beta_p - X_i \bullet \beta - E \bullet \beta_e}{\sigma^2}\right). \quad [3]$$

Eq. **3** is estimated using a probit model with the following likelihood function:

$$L = \prod_{y=1}\left[1 - \Phi\left(\frac{B \bullet \beta_p - X_i \bullet \beta - E \bullet \beta_e}{\sigma^2}\right)\right] \bullet \prod_{y=0}\Phi\left(\frac{B \bullet \beta_p - X_i \bullet \beta - E \bullet \beta_e}{\sigma^2}\right). \quad [4]$$

From this estimation, we recover the $\widehat{\beta}s$. Mean WTP is then obtained by integrating the expression for an exponential demand function over all prices (or bids) using the estimated coefficients as shown in Eq. **5**:

$$y_i = \int_0^{\infty} \exp(B \bullet \beta_p + X_i \bullet \beta + E \bullet \beta_e) dB. \quad [5]$$

This procedure yields the following analytical solution for average willingness to pay ($\overline{WTP}$), given effectiveness level E:

$$\overline{WTP} = \exp[-(\overline{X} \bullet \beta + E \bullet \beta_e)/\beta_p]. \quad [6]$$

In our empirical analysis, we estimate several specifications of Eq. **3**. In the most basic specifications, we only include the randomized price B and the indicator for the experimental treatment of effectiveness (20% vs. 40% reduction in gun violence). A second specification adds demographics, income, and education, while Specification 3 adds covariates for political ideology, perceived seriousness of gun violence in their community, expectation concerning victimization, indication of whether gun violence influenced their decision of where to live, and an indicator of whether they believed taxes were too high. Finally, because the estimated WTP is a ratio that combines multiple estimated coefficients, we use bootstrapping methods to estimate CI, based on 5,000 replications. All regression models were estimated using STATA SE 18 software.

Double-Bounded Price Analysis. As discussed in the manuscript, a double-bounded dichotomous choice CVM design was utilized to allow for increased precision of the estimates of WTP, similarly to the procedure previously described in Ludwig and Cook (21). In this case, individuals are faced with two successive bids of B_1 and B_2 for reducing gun violence, where B_2 is equal to half (when the response to $B_1$is negative) or double (when that response is affirmative) B_1. From this, we can write the probabilities corresponding to the four distinct choice combinations as

$$P(Vote = \text{Yes}, \text{Yes} \vee X_i) = P(y_i \geq 2B_1 > B_1) = P(y_i \geq 2B_1) = \left\{1 - F\left(\frac{\log 2B_1 - \beta}{\sigma}\right)\right\}, \quad [7]$$

$$P(Vote = \text{No}, \text{No} \vee X_i) = P(y_i < 0.5B_1 < B_1) = P(y_i < 0.5B_1) = \left\{F\left(\frac{\log 0.5B_1 - \beta}{\sigma}\right)\right\}, \quad [8]$$

$$P(Vote = \text{Yes}, \text{No} \vee X_i) = P(B_1 \leq y_i < 2B_1) = P(y_i < 2B_1) - P(y_i < B_1) = \left\{F\left(\frac{\log 2B_1 - \beta}{\sigma}\right) - F\left(\frac{\log B_1 - \beta}{\sigma}\right)\right\}, \quad [9]$$

$$P(Vote = \text{No}, \text{Yes} \vee X_i) = P(0.5B_1 \leq y_i < B_1) = P(y_i < B_1) - P(y_i < 0.5B_1) = \left\{F\left(\frac{logB_1 - \beta}{\sigma}\right) - F\left(\frac{log 0.5B_1 - \beta}{\sigma}\right)\right\}. \quad [10]$$

We use these expressions to then apply maximum likelihood estimation procedure as specified in Eq. **8**:

$$\begin{aligned} \ln L = & \sum_i (I_{1i})(I_{2i})\left\{1 - F\left(\frac{\log 2B_1 - \beta}{\sigma}\right)\right\} \\ & + (1 - I_{1i})(1 - I_{2i})\left\{F\left(\frac{\log 0.5B_1 - \beta}{\sigma}\right)\right\} \\ & + (I_{1i})(1 - I_{2i})\left\{F\left(\frac{\log 2B_1 - \beta}{\sigma}\right) - F\left(\frac{\log B_1 - \beta}{\sigma}\right)\right\} \\ & + (1 - I_{1i})(I_{2i})\left\{F\left(\frac{\log B_1 - \beta}{\sigma}\right) - F\left(\frac{\log 0.5B_1 - \beta}{\sigma}\right)\right\}, \end{aligned} \quad [11]$$

where I_{ki} are binary indicators for an affirmative WTP response (yes = 1; no = 0) given the bid level B_i presented to respondents for choices $i = \{1,2\}$. The coefficient estimate for the variables B_{ki} is an estimate for $1/\sigma$, which in turn allows identification of an estimate b for the parameter β. This parameter b corresponds to an unbiased estimate of log(WTP), given the log-normal functional form of the demand curve. To transform this estimate to a mean WTP, we must then take the product of exp(b) x exp($0.5\sigma^2$). This model was again estimated using STATA SE 18 software, and the doubleb command, which was developed for this purpose (28). For the models including covariates, mean WTP was calculated to correspond to a respondent household having the sample-weighted mean values of those covariates.

Median vs. Mean. The assumption that y has a log normal distribution is standard in the CV literature (20), and such an assumption is generally consistent with the raw response data shown in Fig. 2. The assumption implies that y has only positive values (i.e., that everyone places some positive value on reducing gun violence) and that its distribution is skewed to the right. The mean exceeds the median by a factor that increases with the variance of the distribution.

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Data, Materials, and Software Availability. Survey data have been deposited in Harvard Dataverse (https://doi.org/10.7910/DVN/MGNER1) (29).

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