

Does Gun Control Reduce Criminal Violence?  
An Econometric Evaluation of Canadian Firearm Laws

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By

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Introduction

1. Over the past few decades, in an effort to reduce firearm problems, Canada has introduced increasingly restrictive firearm legislation: first, in 1977, then in 1991, and then again, in 1995.

But have these laws worked to reduce violent crime? Or, have they backfired, as they have in England?

For some, Canada serves as a model.

Strict firearm laws; low crime rates.

However, it is illogical to credit the gun law with causing the low crime rates, as Canada had low crime rates before the gun laws were introduced. Why is it?

Culture? Social cohesion? Less poverty than the US?

Less racism?

2. Whatever the reason, it is important, as a matter of public policy, for both Americans and Canadians, to discover if the recent Canadian gun laws have actually reduced criminal violence.

3. The theory is straight forward behind restrictive gun laws:

- a) The availability of firearms to the general public exacerbates violence, so
- b) if access to guns is restricted for the general public,  
then criminal violence will be reduced.

4. This paper examines the effect of both the 1977 and the 1991 gun laws on robbery rates. This is the first study to evaluate the effectiveness of the 1991 law in reducing firearm violence.

**The most notable features of the 1977 Canadian firearm legislation were:**

- [a] the requirement of a police check of prospective firearm purchasers, and
- [b] the elimination of property protection as a reason to register a firearm.

[When I began this project, I thought this type of firearm law would prove to be effective.]

**The most important features of the 1991 law were:**

- [a] the prohibition of “military style semi-automatic weapons” or [MSSA],
- [b] the prohibition of high-capacity magazines,
- [c] the tightening up on the requirements to purchase rifles and shotguns, and
- [d] the introduction of safe-storage regulations.

6. We selected robbery to analyze because it is a serious violent crime that the gun laws were intended to reduce, and no other researcher had examined it.

Robberies cost individual Canadian citizens about \$90 million per year [Fraser Institute, 1996]. \$90 million Canadian dollars. Between \$40 and \$50 million US.

Come up and visit us, your dollar will go farther.

O/H - Canadian robbery rate

7. All previous methodologically solid research has focused on the 1977 law. Regardless of their position on gun control, no independent researcher has been able to find that the law actually reduced any violent crime rate.

O/H – previous research

Two exceptions deserve mention. First, a study by the government found that the 1977 law **did** reduce homicide rates.

Second, one independent study [ours] found that the 1977 law acted perversely, that is, to increase armed robbery. This article is forthcoming in Applied Economics.

In our Applied Economics analysis, we found that, after confounding factors had been accounted for, the 1977 gun law was associated with **increases** in all three Dependent Variables: armed robbery, robbery involving a firearm, and [total] robbery.

9. Another reason for examining robbery is that our interest was piqued by the failure of the Canadian Department of Justice to complete their analysis. The DOJ abandoned their attempt to analyze robbery because, they said, there was “excessive autocorrelation.”

Neither of our two studies found “excessive autocorrelation.” One possible reason for the discrepancy could be the independent variables chosen. Another might be the minimal measurement period prior to the introduction of the legislation. This study examines both of these hypotheses.

Methods

1. In order to evaluate the effects of legislation, there are two primary considerations: [a] comparing before and after periods, and [b] excluding other possible causal variables. All legislation takes place in context with many other changing factors.

In this paper, we compare the following time periods:

17 years before the 1977 law, [62 - 78] and 19 years afterwards [79 through 97].

30 years before the 1991 law, [62 - 92] and 5 years afterwards [93 through 97]. 5 is the minimum time period one can use.

This database differs from the database we used in our earlier paper in several important ways.

This study has the longest data series yet collected in Canada to evaluate legislation. Our data set in this paper extends from 1962 through 1997, while the database used in our Applied Economics paper runs from 1974 through 1992, as does the DOJ study.

2. Success has many fathers, but failure is an orphan.

After gradually increasing throughout the 1970s and 1980s, the robbery rate started declining in the 1990s.

One of the goals of this paper is to see if these changes were influenced by the gun laws.

Changes MAY have been due to legislation, but many other important events occurred at the same time. It is possible that these other factors are more important in causing the observed change.

eg,

- aging population,
- immigration rates or patterns,
- economic conditions,
- social conditions,
- police numbers or activity.

3. To be responsible, we must include other independent variables [as confounding factors] to see if we can account for the changes in the dependent variable [in this case, the robbery rate].

O/H – Table 1. Variables in the Model
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In our study we included 9 other important independent variables to investigate as possible confounding factors. Some of the most important are:

Social:	YOUTH – young males IMM – foreign immigrants IPM – internal immigrants INDR – Indian
Economic -	PDYPC – personal income UIR – new unemployment claims TPGTPPC – transfer payments [welfare]
Crim -	POLPC – police density RCR – clearance rate

4. We used a pooled, cross section, time series model. A Kmenta GLS model. Generalized least squares.

There are a few technical questions that must be dealt with in any time series model.

A. What to do with heteroscedasticity and autocorrelation?

We did not run into the same problem as the DOJ. In our analysis we found low autocorrelation, but high heteroscedasticity.

O/H - Fig 1

Heteroscedasticity was primarily due to the case of Quebec, which has 5 - 10 times more variance in crime rates than any other province.

We decided that the best option was to deal with the problem by running GLS rather than OLS. In the OLS analysis, the Quebec variance dominates the national result.

B. The second methodological question that must be dealt with is specification error. Ie, Which IV's to include?

One of the subtle but important differences between econometric models is the IV's they use. The choice may have strong implications for the results.

Results can be very sensitive to which IV's are included in the model. If important IV's are omitted, this may introduce a spurious correlation between the gun law and crime rate being used as a dependent variable.

Specification error is particularly important in criminology, where theory is too weak to completely identify which variables should be included or excluded from regression analyses.

The DOJ did not examine migrants, numbers of police, but they included social variables which we do not, eg divorce rate, and the university graduation rate.

Leamer (1983) suggests estimating the size of model uncertainty by testing the sensitivity of the results to many different model specifications.

Our approach is to look at ALL possible subsets of IV's.

This approach is similar to Bartley WA, Cohen MA. "The effect of concealed weapons laws: An extreme bound analysis." Economic Inquiry 36: (2) 258-265, APR 1998, and Carl Moody's article in The Journal of Law and economics, special issue devoted to firearms.

O/H – the 512 combinations

### Results

1. [To attempt to deal with heteroscedasticity and autocorrelation], we ran the GLS model.

O/H - Table 3 – GLS results

2. The GLS model could not find a significant effect from either the 1977 gun law or the 1991 gun law.

3. The independent variables have the expected signs. The only exception is TPGTPPC (transfer payments from government to persons per capita). It is unclear why this is so.

4. We tend to think the GLS model a good job of analysis because it deals with heteroscedasticity and autocorrelation. Both of these problems are essentially ignored in the OLS model.

5. To evaluate the problem of specification error, we looked at all possible subsets. Our conclusions were strengthened. Our results are not a product of a particular combination of IV's.

O/H - Table 4 – the results of the 512 runs

### Conclusions

The results are consistent with the bulk of previous studies of the 1977 law: no effect can be found for Canadian gun laws on violent crime rates. Other researchers have found the same result for the suicide rate.

These are null results. We have not shown that these gun laws have no effect; we have merely been unable to find any effect. Someone else, possibly using a different approach might be able to find a significant effect. However, no independent study, conducted properly, has yet been able to do so.

The proponents have the responsibility for showing that restrictive gun laws can reduce criminal violence. There are other ways to fight crime, such as hiring more police, building more prisons, or increasing job-training efforts. If passing laws regulating guns cannot be shown to have actually reduced crime, it may be reasonable to start exploring alternative approaches to protecting public safety.

In hindsight, it is surprising that anyone would ever have believed that increased restrictions on rifles and shotguns would have an impact on armed crime, almost all of which is committed with handguns. Although Canadians seemed to believe it at the time.

Handguns have been registered since 1934. The vast bulk of handgun crime is committed with smuggled guns, not stolen guns. Handgun homicide has been increasing throughout the past decade.

Gun laws are not cost free. The Canadian firearm registration program, for example, which was promised to cost only \$85 M is now estimated to have cost the Canadian taxpayer an estimated \$1 BILLION so far. Canadian dollars, so it's only half that in US dollars.

One billion may not sound like a lot to Americans. But it is a significant expenditure for the Canadian government.

Real policing problems are being ignored  
RCMP funding has declined over the past 10 years.  
Not enough funding is available for police for tracking or prosecuting organized crime or terrorists.  
Not enough funding is available for Immigration Canada to track terrorists or even those with serious criminal charges.

BTW, given the present fiscal constraints, it is easy to see why there is no pressure for 'ballistic fingerprinting.' It would be impossible to require sample bullets and casings from firearm owners. It would be impossible for the government to afford such a data base.

The government has difficulty in affording the current firearm program. In order to encourage participation, the government has had to slash charges for owners to register their firearms. It is estimated that less than two-thirds of so-called 'responsible' firearm owners will cooperate with the current requirements to register their firearms.

Word count; 1,800

References and notes:

A California Dept. of Justice study, "Technical evaluation: feasibility of a ballistics imaging database for all new handgun sales" at [http://www.nssf.org/PDF/CA\\_study.pdf](http://www.nssf.org/PDF/CA_study.pdf)

See also <http://www.foxnews.com/story/0,2933,66007,00.html>

Juristat, 2001, Vol. 22, No 6.

2001 figures show that in Canada

29,414 robberies  
14,195 armed robberies  
3,833 robberies with firearms

In Canada, robberies involving a firearm have been dropping over the 90s, but robberies with other weapons have increased by the same percentage. In 2001,

27% of armed robberies involve firearms  
48% of robberies are armed robberies.

The clearance rate is only 33%

Should clearance rates be lagged or unlagged? We lean to unlagged clearance rates.

Previous research has shown that violent criminals have short time horizons. Last month is more important than last year. To check, we ran both lagged and unlagged. Only unlagged are reported here.

There were no important differences between the pattern of results in the lagged or unlagged analyses.

OLS model

An alternative to using GLS to deal with the Heteroscedasticity problem is to ignore the problem, and run OLS. We did this to compare with the GLS approach.

The OLS model could not find a significant effect from the 1977 gun law; but it found that the 1991 gun law had a perverse effect, i.e., the 1991 gun law acted to increase criminal violence.

We believe the OLS model is not as satisfactory as the GLS model because it fails to account for heteroscedasticity and autocorrelation.

O/H - Table 2 – OLS model