THE IMPACT OF THE MASSACHUSETTS GUN LAW ON GUN AND NON-GUN RELATED CRIME*

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THE IMPACT OF THE BARTLEY-FOX LAW ON GUN AND NON-GUN RELATED CRIME

I. Introduction

In April, 1975 Massachusetts formally implemented the Bartley-Fox Law, which mandates a one-year minimum prison term for the unlicensed carrying of a firearm. This law was explicitly intended to reduce the incidence of gun-related crimes as well as the illicit carrying of firearms. When David Bartley, one of the law's framers, first submitted the bill to the Massachusetts House of Representatives, he stated that the purpose of the law was to halt "... all unlicensed carrying of guns... and to end the temptation to use the gun when it should not even be available."

In line with these objectives, the Impact on Crime phase of the Bartley-Fox gun law study will focus on: (1) evaluating the law's impact on the incidence of gun and non-gun-related crime, and (2) interpreting the effects of the law on crime by examining, to the extent we can, how the general public and potential offenders have adapted [their patterns of weapon carrying] to the new sanctions mandated by the Bartley-Fox Law. Specifically, we will examine how adjustments in patterns of weapon carrying are translated into changes in the incidence of crime. Information on this issue is important to our understanding of how the gun law has affected violent crime and, perhaps, whether we can expect these effects to be maintained. It also provides insight into whether the results we find in Massachusetts are unique, or whether they are generalizable to other jurisdictions.

The analysis of the gun law's impact on crime is divided into six sections and has two Technical Appendices. The first section outlines the research design, data base, and statistical methodology employed in the

Impact on Crime phase of the study. The next three sections evaluate the impact of the gun law on the incidence of armed assault, armed robbery, and criminal homicide. The fifth section examines the effect of the law on the weapon carrying behavior of the general public and potential offenders. The final section concludes with a summary of the evaluation results and presents our conclusions and recommendations.

II. Research Design and Methodological Issues for The Impact on Crime Analysis

In developing the research design for The Impact on Crime phase of this study, we sought to focus on two of the major analytic problems which generally face evaluators of crime prevention programs: the fallibility of official crime statistics and the potentially confounding effects of exogenous change factors which may affect the level of crime independently of the policy intervention in question. Relative to the first issue, Professor Zimring has noted that studies of policy interventions which use crime statistics as dependent variables must rely on either officially reported crime statistics or on victimization survey data. In this study, victimization survey data could not be incorporated into the evaluation. The National Crime Panel's victimization survey does not sample a sufficient number of respondents in Massachusetts to provide accurate estimates of changes in the level of gun-related crime over time.

As a result, we must rely on official crime statistics reported to and by the police. Problems related to these statistics have been well documented, as Zimring notes. However, this study seems to face some unique problems for interpreting reported crime statistics. In particular, the implementation of the gun control law was preceded by a dramatic, and not completely accurate, two-month publicity campaign, designed to educate the public concerning the new consequences citizens faced for violating the Massachusetts gun control laws. This advertising campaign may have affected citizens' perception and reporting of gun-related crime. Our research design must take into consideration this possibility if we are to properly evaluate the impact of the Bartley-Fox law using reported crime statistics.

The potential threat of exogenous change factors to the validity of our conclusions is a second major problem we share with virtually all evaluators of crime prevention reform. As noted above, these factors may affect the level of crime quite independently of the impact of a policy intervention. Indeed, exogenous factors can overshadow or mark the effects of a particular program. This situation exists simply because social and economic forces at the societal level account for much of the variation we find in crime. As Zimring (1978:: 162) observes,

> "The macrophenomena that determine crime...are not well understood but produce considerable variance. In the natural course of events, crime statistics will vary widely between areas and over time."

Indeed, before any claims can be made concerning the law's impact we must first make certain that extraneous social and economic factors or other policy interactions have not produced a change in crime that might erroneously be attributed to the law or overshadow an actual effect.

In order to address the methodological problems confronting this evaluation, we have attempted to obtain sufficiently detailed and comprehensive crime data to allow us: (1) to control for potentially confounding exogenous change factors and (2) identify problems of measurement in reported crime statistics. To do this we have acquired computerized crime data from the FBI's Uniform Crime Reporting Program (UCR) and from the Boston Police Department (BPD). In addition we have obtained information from written police reports on gun-related crime from the manual files of the Boston Police Department.

Access to the FBI's UCR computerized crime statistics have allowed us to employ an interrupted time series control group design to evaluate the

impact of the law on crime. This is the strongest design alternative available to us to identify the potential confounding effects of exogenous change factors.[1]

The importance of obtaining adequate control groups for this type of analysis is noted by Lawrence Ross. He observes that, "The literature of quasi-experimental analysis asserts that causal conclusions based only on the comparison of conditions subsequent to a supposed cause with those prior to a supposed cause are subject to a wide variety of rival explanations." (Ross, 1977; pp 244) The design employed here allows us to compare the level of violent crime in Massachusetts over time with the level of crime in comparable jurisdictions over the same period. Presumably violent crime in Massachusetts will be subject to relatively the same types of macrophenomena as such crime in other similar jurisdictions. Thus the crime rates of control jurisdictions provide important reference points for deciding whether the Bartley-Fox Law has had an impact on crime in Massachusetts.

The logic of this type of analysis is, of course, strengthened to the extent that an investigator can select control groups which are truly comparable. Since the data we have obtained from the FBI's UCR program are based on monthly reports from over 3,900 police agencies for the period 1967 to 1976, numerous agencies similar to Massachusetts communities are available.

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[1]Other potential alternative research designs such as a randomized control and treatment group approach or a structural equation analysis are precluded by data limitations and the fact that the BF law (like most laws) was implemented in all Massachusetts communities at the same point in time. This latter fact, of course, forecloses the possibility of randomly assigning communities to treatment or control conditions. With regard to data limitations, we have a wide spectrum of crime statistics for which we simply don't have enough information on exogenous factors to consider a structural equation approach. (See Douglas Hibbs, 1978, pp ; for a discussion of the uses and imitations of structural equations for evaluating policy interventions.)

Using these data, we are able to compare: (1) statewide Massachusetts crime trends with those for the United States as a whole and for the North Central, Middle Atlantic, and New England regions individually; (2) crime trends in Boston with those in other comparably-sized cities of the New England, Middle Atlantic and North Central regions; and (3) crime trends in Massachusetts cities and towns excluding Boston with those in comparable cities and towns for each of the regions cited above.

In order to address problems of measurement that confront investigators using UCR reported crime statistics, we acquired computerized and manual record crime reports from the Boston Police Department (BPD). A major advantage of BPD crime statistics over those of the UCR program is that they provide greater offense refinement enabling us to (1) identify and examine categories of gun-related crime which we believe are relatively free of reporting unreliabilities and (2) investigate the differential impact of the law on various sub classes of crime (e.g., street gun robberies and gun robberies against commercial establishments).

BPD manual record data on police crime reports allow us to investigate the gun law's impact on reporting biases and inconsistencies. Using these records we acquired information concerning the circumstances under which citizens reported gun assaults to the police. This information enables us to examine whether the implementation of the law has increased the reporting of less serious forms of gun assault.

Finally the temporal dimension of our research design enables us to address an additional methodological issue of relevance to the evaluation. The fact that both UCR and BPD statistics can be examined on a monthly basis for extended periods prior to implementation of the law has made it possible

to take advantage of recently-developed methodological techniques for identifying statistically significant shifts in crime trends. (See Appendix A for a description of the ARIMA modeling methodology used in this analysis). These techniques help us to assess whether any changes we find in crime rates are likely to have occurred by chance and/or reflect the fluctuation that may occur in a highly variable phenomenon such as crime.

III. Aggravated Assault: Deterrence with Displacement

As noted above, the manifest purpose of the gun law was to halt the illicit carrying of firearms. However, the Massachusetts legislators who enacted the law hoped, and to some extent expected, that it would also act as a deterrent to gun-related felony type crimes. In this section we will examine the impact the law on gun and non-gun-related armed assaults. [2]

The analysis focuses first on whether the law has succeeded in reducing the incidence of gun assaults. We then examine whether any reduction in gun assaults may be offset by corresponding increases in assaults involving other deadly weapons. Here we are seeking to determine whether potential offenders who are deterred from using guns stop assaulting or simply substitute other types of deadly weapons, and if they do turn to other weapons, whether they utilize situationally available weapons or make conscious decisions to carry these other weapons.

The final question we examine in this section is whether the law and the publicity surrounding its implementation have affected the reporting of gun-related assaults to the police. Here we focus on whether the law has sensitized the public to gun crimes and, as a result, made them more likely to report less serious forms of gun assault to the police.

The analysis of assault is organized into three parts. First we examine the impact of the gun law on gun and non-gun-armed assault throughout Massachusetts. Next we examine the law's impact on regions within Massachusetts; specifically, Boston versus all other communities for which we have UCR crime statistics. Finally, we refine the Boston analysis data collected from the Boston Police Department. It is here that we focus on the question of the impact of the law on the reporting of gun assault crimes to the police by the citizens.

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[2] The analysis of aggravated assault focuses on those assaults in which a weapon is involved.

A. Massachusetts: Statewide Impact: We first examine change in Massachusetts gun and non-gun assault rates compared to those occurring in selected control jurisdictions. We then undertake an intervention point analysis which attempts to identify the specific point at which we find statistically significant shifts in the level of assaults resulting from either the implementation of the gun control law or initiation of the Bartley-Fox publicity campaign.

1. Control Group Comparisons: Tables 1 through 4 present annual armed assault statistics for Massachusetts and selected control group jurisdictions. Armed assault rates per 100,000 inhabitants are presented in Table 1. Gun assaults and non-gun aggravated assaults per 100,000 inhabitants are shown separately in Tables 2 and 3. The percentage that gun assault represent of all armed assaults are contained in Table 4. In each of these tables, we compare crime trends in Massachusetts with those in New England states excluding Massachusetts, Middle Atlantic states, North Central states and the United States as a whole (excluding Massachusetts). As a comparison group, we have also included crime trends from counties in Rhode Island, Connecticut, New York, Vermont, and New Hampshire which are contiguous to Massachusetts.

The crime statistics in these tables are based on UCR data from police agencies which have consistently reported crime statistics to the UCR program over the period 1967 through 1976. In Massachusetts these statistics come from 98 cities and towns. These agencies are responsible for approximately 75 percent of the aggravated assaults recorded by all police agencies in Massachusetts in 1976. (See Appendix B: Data Base Description, for a more complete description of these statistics).

Each of Tables 1 through 4 contain annual assault trend statistics for the period 1967 through 1976 and also indicates the annual percentage change

occurring in these trends over the 10-year period. In addition, the right hand column shows the two-year percentage change in crime rates from 1974 to 1976.

Table 1 shows the extent to which the gun law has affected the level of armed assault in Massachusetts. In examining the annual assault rates for Massachusetts, we find that armed assault showed a fairly regular increase throughout the period prior to the Bartley-Fox. The 14.7 increase in armed assault which occurs in 1975, the year the gun law was introduced, appears to be a regular extension of the prior trend. Thus we find no evidence at this point to suggest the law has had an effect on the overall armed assault rates in Massachusetts.

Since the law's primary target is gun-related crime, we might expect that the law has had a deterrent effect specific to gun assaults. Table 2 presents annual gun assault rates for Massachusetts and its control jurisdictions for 1967 through 1976. In examining annual gun assault rates for Massachusetts, we find that the first significant decline in this crime appears in 1975— the year Bartley-Fox was implemented. Gun assaults in that year were 15.7% lower than in 1974. The fact that this reduction coincided with the introduction of the Bartley-Fox law supports the hypothesis that the law has deterred some potential offenders from assaulting victims with firearms.

Comparison of these results with the gun assault trends in the control jurisdiction lends further support to the view that the gun law has reduced the incidence of gun assaults in Massachusetts. Examination of Table 2 indicates that only one of the control jurisdictions, the Middle Atlantic states, experienced any decline in gun assaults in 1975, and this was a rather minor decline. Compared to the 15.7% drop in gun assaults experienced by

Massachusetts in 1975, the Middle Atlantic states showed only a 1.5% decrease, and the New England states (excluding Massachusetts) actually showed a 10.6% increase.[3]

When we examine the gun assault rates for 1976, a general decline is observed in this type of crime perhaps resulting from various unmeasured macrosocial and economic phenomena. It should be noted that each of the control jurisdictions and Massachusetts experiences a decline in its gun assault rates ranging from 13.3% for the New England region to 4.3% for Massachusetts. A general downward trend in gun assaults appears in all the jurisdictions in 1976, when the overall two-year decline in gun assaults from 1974 to 1976 is examined we find that Massachusetts' gun assault rates have declined by 19.3% versus declines of less than 5% for all other jurisdictions except the Middle Atlantic states, which show a 12.6% decline. As we will indicate below, UCR statistics may underestimate the actual decline that occurred in Massachusetts gun assaults following the introduction of the Bartley-Fox law. In the Refinement of Boston Analysis section, we shall present data which indicate that the gun law and its publicity may have made citizens more likely to report gun assaults. To the extent that such a phenomenon exists, it would tend to artificially inflate post-Bartley-Fox UCR reported gun assault statistics.

We have now observed a considerable decline in gun assaults in Massachusetts associated with the introduction of the Bartley-Fox gun law (Table 2) but no clear change in the overall level of armed assaults after the policy intervention

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[3] We would like to point out that the gun assault rates for the counties contiguous to Massachusetts show considerably more fluctuation than the rates for either Massachusetts or the other control groups due to their relatively small population base. The instability in their statistics reduce their value as a control group.

(Table 1). This suggests that the new law has stopped people from assaulting with guns but that it has not stopped them from assaulting. The data at this point suggest a weapons displacement effect—that other weapons have displaced guns in assaultive behavior without altering the overall level of assaultive behavior.

Table 3 presents annual statistics on non-gun armed assaults in Massachusetts and its control jurisdictions. Significantly, non-gun armed assaults in Massachusetts show a 24.1% increase between 1974 and 1975, at the same time that gun assaults were showing a 15.7% decrease. When we examine the pre-intervention history of non-gun armed assaults in Massachusetts, we see that the 24.1% increase in this type of assault occurring in 1975 is much greater than any prior rise.

This evidence suggests that while the law may have induced some offenders to stop using firearms, it did not necessarily stop their assaultive behavior. Indeed, some offenders may have substituted other types of deadly weapons for the guns they carried prior to Bartley-Fox. Whether this is actually the case, and/or whether it represents a conscious choice on the part of the potential offenders to carry other weapons as opposed to their simply accessing situationally-convenient weapons when assaultive situations arise are still open questions. Later in this section we will shed more light on these issues.

The final table in this sub-section, Table 4, shows annual statistics on gun assaults as a percentage of all armed assaults. When viewed as a measure of the gun law's impact, it reflects the combined deterrent and displacement effects of the law. This, of course, makes its interpretation somewhat ambiguous. Hence, we include it here, simply as another way of looking at the gun law's impact. In referring to Table 4, we find that from 1970 through 1974 gun assaults represented approximately 23% of armed assaults in Massachusetts, whereas after implementation of the law, the gun's share of armed assaults

dropped to 16% of the total in 1976— a 30% reduction.

2. Intervention Point Analysis: So far, we have analyzed the effect of the law by comparing assault trends in Massachusetts with trends in selected control group jurisdictions. This analysis has revealed that Massachusetts experienced substantial changes in gun and non-gun related assault levels after the implementation of the Bartley-Fox Law; changes not found in the control jurisdictions.

Specifically, we found that following the introduction of the Bartley-Fox law the incidence of gun assaults showed a relatively greater decline in Massachusetts than in the control jurisdictions, and the incidence of non-gun assault showed a relatively greater increase. Now, we will turn to the question of whether the changes we have observed in Massachusetts gun and non-gun assaults rates represent statistically significant shifts in the incidence of these crimes, and if so, at what point in time the gun control law shows its first statistically significant impact on gun and non-gun assaults.

The first step in our intervention point analysis before any statistical analysis is undertaken, will be to carefully examine the period of time over which we might reasonably expect the Bartley-Fox law to show its first impact on crime. As with most policy intervention, the a priori identification of an intervention date is by no means completely clear. April, 1975, the date the gun law was formally implemented is, of course, a prime candidate as the point of impact of the law. However, the gun law's substantial two months publicity campaign prior to implementation might also have affected crime, especially allowing for citizens' possible false assumption that the publicity meant the law was already in effect. If this were the case, we might expect the gun law,

or more accurately its publicity, to have affected gun and non-gun related assaults as early as February of 1975.

On the other hand, it may have taken several months or more for many citizens to adjust their patterns of gun carrying, or perhaps even to hear about the law. In either of these two cases, we would not expect to find an impact of the gun law immediately after its implementation (i.e., April, 1975). Therefore, in this analysis we shall examine a range of hypothetical intervention points for statistically significant departures from the established trends in Massachusetts gun and non-gun related armed assault trends. We have chosen January 1975 as the earliest and August 1975 as the latest intervention points we shall examine at which we will look for a statistically significant impact of the Bartley-Fox Law. We shall test for statistically significant departures in Massachusetts crime trends in each month successively over the period January to August 1975 inclusive.

To conduct the intervention point analysis, we have drawn upon statistical techniques originally formulated by Box and Jenkins (1970) and more recently elaborated by Deutsch (1977) and Glass et al. (1975). Using these statistical techniques on monthly UCR statistics, we can characterize the pre-intervention history of Massachusetts gun and non-gun assaults trends with one of a variety of time series models, usually referred to as ARIMA models (Auto-Regressive-Integrated-Moving Average Models).[4]

For a given ARIMA model, we estimate the model's parameters by using a program (ESTIM) developed by Stuart Deutsch. These estimates in conjunction with the model selected enable us to characterize the pre-intervention history

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[4]The reader is referred to Appendix A for a description and discussion of ARIMA models and the statistical techniques employed in this section.

of the time series in terms of its long-terms trends, seasonal cycles, and moving average and/or autoregressive components. Once we have characterized the history of the time series we use this information to predict what future course the series would take if all factors affecting crime rates remained constant. This allows a test of whether the actual observed crime trends after the policy intervention exhibit statistically significant departures from the predicted future of the crime time series based on its history prior to the policy intervention, in this case, the Bartley-Fox law.

A major advantage of this methodology is that the techniques are capable of incorporating seasonal cycles which are often found in crime data. This is particularly important because seasonal fluctuations can obscure immediate or short-term effects of a policy intervention. When regular seasonal cycles are observed in the data, as has been the case with monthly assaults statistics in Massachusetts, the information from Deutsch's ESTIM program is used to de-seasonalize the data. After this step, the future of the time series is predicted in terms of its trend and ARIMA components.

Table 5 presents the results of intervention point analysis for gun assaults in Massachusetts. In this table, each column contains results on the statistical significance of departures or shifts in the level of gun assaults for successive months. The results are presented for January 1975 as the first hypothesized month of impact (in column 1) through August 1975 (in column 8) the last hypothesized impact month. The first row in the table presents results on whether there is a statistically significant shift in the level of gun assaults for the month of impact noted at the top of the column.

If a statistically significant shift in the level of assaults is maintained for a number of months, these months after the hypothesized impact month will also show statistically significant departures from the pre-impact

levels of the time series for that period. If, on the other hand, such a shift is temporary, post-impact months will begin to lose significant effects as assaults return to pre-impact levels. Each of the remaining rows presents the test results for successively later points in time after the hypothesized months of impact being examined. Thus, the first column presents results for January 1975, through December 1975, and the last column presents results for August 1975 through July 1976.

By looking across the top row of Table 5, we can identify the first month in which a statistically significant shift in gun assaults in Massachusetts occurs. We find no significant change in gun assaults in either January 1975 or February 1975. However, in March 1975 we find the first statistical significant downward shift in gun assaults. Looking down this column, we see that each successively later month after March 1975 (until the last month February1976) also exhibits statistically significant reductions in gun assaults.[5] Thus, we find a statistically significant reduction in Massachusetts gun assaults in the month prior to the implementation of the Bartley-Fox law. These findings support the suggestion that the pre-implementation publicity independently affected patterns of gun carrying among potential offenders, perhaps because they assumed the law was actually in effect. When we examine hypothetical impact points after March 1975 (the April through August columns to the right of March) we find that the estimated downward shift in gun assaults tends to disappear. This does not represent an attenuation of the law's effect over time; rather, it occurs because as we proceed from April through August 1975, we are incorporating more and more (post-impact) effects of the law into the (pre-impact) history of the time series.

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[5]These results are similar to those reported by Deutsch & Alt (1977) for gun assaults in Boston.

Table 6 addresses the issue of the law's potential impact on non-gun armed assaults in Massachusetts. As we would expect from our control group analysis (see Table 3) we find a statistically significant increase in non-gun armed assaults. Following the top row across the table, we find that non-gun armed assaults show a statistically significant upward shift in June of 1975. This change is indicated as early as May 1975, although at that point it is not statistically significant.

The results of these two tables support our earlier analysis of the gun law's effect on gun and non-gun armed assaults in Massachusetts, where we found that gun assaults began showing a statistically significant decline starting in March 1975, and non-gun armed assaults began to exhibit a significant increase in June, perhaps starting in May of 1975. These results suggest that the publicity surrounding the Bartley-Fox law discouraged gun assaults, but that shortly thereafter potential offenders turned to other types of deadly weapons without giving up assaultive behavior.

A. Regions Within Massachusetts: Boston vs. Other Massachusetts Communities:

The previous sub-section examined the overall impact of the Bartley-Fox law on gun and non-gun armed assaults throughout Massachusetts. In this section we examine whether the law has had a differential impact in different areas of the state. We have divided the state into Boston and non-Boston Massachusetts for two reasons. First, Boston is by far the largest city in Massachusetts, and over half the reported assaults occurring in Massachusetts take place in Boston. In 1975, for example, there were an estimated 11,502 aggravated assaults in the entire state, and Boston accounted for 3,290 of these or 29% of the UCR estimated total. (Boston also represented 58 percent of the UCR estimated robberies in Massachusetts in 1976) Our second reason

for separating Boston from the rest of the state in this phase of the analysis is that Boston represents a unique environment in Massachusetts not only in terms of its urban environment but also because it is a focal point for media attention. Thus, it is possible that the gun law might exhibit unique effects in Boston.

1. Impact on Boston: As we did in our analysis of Massachusetts as a whole, here we will first compare Boston assaults trends with those in selected control groups, and then proceed with an intervention point analysis.

a) Control group comparisons: Tables 7 through 11 present annual armed assault trends for Boston (the bottom row of these tables) and selected control jurisdictions. Since Boston's population has averaged approximately 600,000 inhabitants over the last decade, we have selected as our control jurisdictions cities in two size categories: 250,000 to 500,000 inhabitants and 500,000 to 1,000,000 inhabitants for the United States, the North Central region and the Middle Atlantic states. There are no cities in this population range in New England other than Boston. (The Middle Atlantic states have no cities with 500,000 to 1,000,000 residents.)

Table 7 presents annual rates of all armed assaults in Boston and its control jurisdictions. We find that Boston actually shows a 19.6 percent increase in armed assaults between 1974 and 1975. Note that none of the control cities show an increase in armed assault rates between 1974 and 1975 as great as Boston's. If anything, the gun law would appear to have increased the level of armed assaults in Boston—a result that could occur if any deterrent effect on gun assaults was more than offset by a displacement effect to non-gun armed assaults.

As noted earlier we expect the Bartley-Fox law to deter gun assaults because the law is aimed specifically at the illegal use of firearms. Table 8 displays annual gun assault rates per 100,000 residents for Boston and its

control cities for 1967 through 1976. Examining Boston's annual statistics over this period, we find that the largest decline occurs in 1975, the year the gun law was implemented. By contrast, Boston's control jurisdictions all show increases in their gun assault rates between 1974 and 1975 ranging from 1.9 percent for all cities (excluding Boston) in the United States with populations of 500,000 and 1,000,000 residents to 13.8% for cities in the North East Central region with populations of 250,000 to 500,000 inhabitants.

When the 1974 to 1976 two year change is examined, we find that Boston exhibits an overall drop of 11.7 percent in gun assaults compared to increases of 3.1% and 15.2 for cities with 250,000 to 500,000 inhabitants in the United States and North East Central region respectively, and decreases of 7.4, 7.5 and 1.4 percent for the other control groups. Although Boston's decline of 11.7% in gun assaults does not appear that much greater than the 7.4 and 7.5 decreases shown by Middle Atlantic cities of 250,000 to 500,000 and United States cities of 500,000 to 1,000,000, we will show evidence later (in the Refinement of Boston Analysis section) that indicates these statistics underestimate the impact of the Bartley-Fox law on gun assaults in Boston.

And what about the gun law's effect on assaults with deadly weapons other than guns in Boston? Table 9 presents annual non-gun armed assault rates for Boston and its control jurisdictions. Boston shows a 31.1% increase in non-gun armed assaults between 1974 and 1975 representing the greatest one year change anywhere in the table. Examination of Table 9 further shows that over the two year period 1974 to 1976 non-gun armed assaults in Boston experienced a 40 4% increase. This compares with increases of only 5.0 to 17.5% in the control cities over the same period. Evidently, the displacement effect of the gun law is present in Boston as it is statewise. Indeed, at this point

in our analysis, the displacement effect appears stronger than the deterrent effect in Boston.

As noted previously, the portion of all armed assaults that guns represent reflects the combined deterrent and displacement effects of the gun law. The annual statistics for Boston shown in Table 10 indicate that between 1970 and 1974 gun assaults represented between 24 to 27% of all armed assaults in Boston. After introduction of the Bartley-Fox law, gun assaults dropped to approximately 18% of the total armed assaults. The combined deterrent and displacement effects as reflected in these figures for Boston correspond quite closely to the statewide figures.

b) Intervention Point Analysis: Following the procedure established in the analyses of the statewide impact of the Bartley-Fox law on gun and non-gun assaults, we shall examine a range of hypothesized impact points for statistically significant departures from prior trends. We will again employ techniques developed by Stuart Deutsch to test for statistically significant shifts in Boston assault statistics.[6]

Table 11 presents the results of the intervention point analysis for gun assaults in Boston. As we did with our earlier analysis on Massachusetts gun assaults we here examine a range of hypothetical impact months from January 1975 to August 1975. For each of these points, the eleven months following the intervention month will be examined to determine whether any intervention effects are maintained over time.

The top row of Table 11 shows that the first statistically significant shift in the Boston gun assault rate occurs in March 1975—the same month identified in the state-wide analysis of the gun law's impact. The March 1975

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[6] See Appendix A for further details and the earlier statewide Intervention Point Analysis.

shift represents a 4.18 drop in the gun assault rate and is significant beyond the .01 level. The March 1975 column reveals that each month after March continues to exhibit a statistically significant reduction in gun assaults.

In Table 12 we can examine the gun law's impact on non-gun armed assaults in Boston. Following the top row across the table, we find, as in the statewide intervention point analysis (see Table 6), that non-gun armed assaults show a statistically significant upward shift in June of 1975. Also like the statewide analysis, this change appears to be emerging in May 1975.

The results of these two tables indicate that gun assaults show a statistically significant decline starting one month prior to the implementation of the gun law and that non-gun armed assaults show a significant upward shift three months after implementation. Both these results coincide with our earlier statewide intervention point analysis. We shall now examine the impact of the gun law in Massachusetts on communities other than Boston.

2. Impact on Non-Boston Massachusetts: For the analysis of Massachusetts cities and towns excluding Boston, consistent over time assault statistics were not available for all communities in the state. Over the period from 1967 to 1976, 97 Massachusetts cities and towns showed consistent reporting records to the UCR program. These communities form the basis for the non-Boston Massachusetts analysis. In 1976, they accounted for 65% of the estimated total of aggravated assaults occurring in Massachusetts, outside of Boston.

As in the earlier statewide Massachusetts and Boston analyses of armed assaults, we first compared non-Boston Massachusetts communities with those in selected control groups, and then proceeded with an intervention point

analysis.

a) Control Group Comparisons: Tables 13 through 16 present annual armed assault trends for Massachusetts communities, excluding Boston, and selected control jurisdictions. Massachusetts communities other than Boston all have fewer than 250,000 inhabitants. For the control jurisdictions, then, we used communities with populations under 250,000 for the United States, the North East Central states, the Middle Atlantic states and the New England states, excluding Massachusetts. These communities were drawn from our UCR Return A data base.

Table 13 presents armed assault rates for non-Boston Massachusetts cities and towns and control jurisdictions. This table shows that non-Boston Massachusetts experienced a 9.1% increase in armed assaults in 1975. This increase is virtually the same as the 9.4% increase non-Boston Massachusetts exhibited the year before. It is no more substantial than increases experienced in other jurisdictions and it is by no means as strong as the increase in armed assaults exhibited in Boston after the introduction of the Bartley-Fox law.

What about the law's impact on gun versus non-gun armed assaults in non-Boston Massachusetts? Table 14 presents annual gun assault statistics for non-Boston Massachusetts communities and their control jurisdictions, and Table 15 presents annual non-gun assault statistics for these same geographic areas. At this point, it is useful to note the rather wide discrepancy in the per capita incidence of armed assaults, gun assaults, and non-gun armed assaults in Boston compared to the rest of Massachusetts. In 1975, for instance, Boston had an armed assault rate of 87.8 per 100,000 versus corresponding rates in other Massachusetts communities of 80.0 and 12.3 per 100,000 residents.

The overall pattern of change we find associated with the introduction of the Bartley-Fox law is roughly similar to what we found in the analysis of Boston's gun and non-gun assault trends. Like Boston, other communities in Massachusetts showed a substantial decline (18.9%) in gun assaults between 1974 and 1975. In the following year, however, these communities, unlike Boston, continued to show a decline in their gun assault rates. Over the two-year period following the Bartley-Fox law, gun assaults showed a 30.4% decline in non-Boston Massachusetts communities versus a 11.7% decline in Boston. Importantly, the 30.4% decline experienced by non-Boston Massachusetts communities (between 1974 and 1976) is also substantially greater than that experienced by any of the non-Boston Massachusetts control jurisdictions. None of these groups showed declines in their gun assault rates greater than 5% between 1974 and 1976.

We now turn to the potential displacement effects of the gun law in non-Boston Massachusetts communities. Here we see that non-gun armed assaults rose quite markedly in these communities as they also did in Boston following the introduction of the Bartley-Fox law. However, although upward patterns in non-gun armed assaults in these non-Boston Massachusetts communities is similar to what we found in Boston, the magnitude of the change is somewhat less. Non-gun armed assaults increased 16.4% in 1975 in non-Boston Massachusetts compared to a 31.1% increase in Boston. Likewise, the overall two-year change following Bartley-Fox (1974 to 1976) was 17.1% for non-Boston Massachusetts versus a 40.4% increase for Boston. Importantly, the rise in non-gun armed assaults experienced by non-Boston Massachusetts communities, although less than Boston's increase, is nevertheless more than that exhibited by any of its control jurisdictions (see Table 15).

Table 16 presents annual statistics on the portion of all armed assaults that guns represent in non-Boston Massachusetts and its control jurisdiction. As was the case in the Boston analysis, the percent that guns represent of all armed assaults dropped after the introduction of the Bartley-Fox law from 20.7% in 1974 to 13.4% in 1975, an overall decline of 35.1% in the share that gun assaults represent of all armed assaults following the introduction of the Bartley-Fox law.

The control group analysis of Massachusetts communities of under 250,000 inhabitants has shown that following the introduction of the Bartley-Fox law gun assaults declined and the incidence of non-gun armed assaults increased. These results correspond with our earlier findings from the Boston and statewide analyses. We shall now proceed to examine whether the changes observed represent statistically significant departures from prior gun and non-gun armed assault trends.

b) Intervention Point Analysis: As in previous intervention point analyses, we shall now examine a range of hypothesized impact months for statistically significant shifts. Statistical techniques developed by Stuart Deutsch and techniques developed by Glass et. al. (1975) will again be employed to test for the significance of changes in the levels of gun and non-gun armed assaults.

Table 17 presents the results of the intervention point analysis for gun assaults in non-Boston Massachusetts. A range of hypothesized impact months from January 1975 through August 1975 are examined. For each of these points the eleven months following the hypothetical month are examined to determine whether any intervention effects discovered in the first month (the hypothesized month) are maintained over time.

The results are similar to those obtained in the Boston and Massachusetts statewide intervention analyses conducted earlier. Looking across the top row of Table 17, we find that the first statistically significant decline in gun assaults in non-Boston Massachusetts occurs in April 1975, i.e., the first month the Bartley-Fox law was formally in operation and one month later than Boston's first statistically significant decline in its gun assault rate. Examination of the month after April (looking down the April column) shows that this decline in gun assaults continued at a statistically significant level.

To summarize the results of the intervention point analyses on gun assaults, we have found that both Boston and non-Boston Massachusetts communities experienced statistically significant declines in their gun assault rates, and that these declines coincide with the introduction of the Bartley-Fox law. Boston showed a 4.18 shift in gun assaults (significant beyond the .01 level) in March 1975, the other Massachusetts cities and towns we examined showed a 5.6 decline in gun assaults (significant at the .02 level) in April one month later than Boston. Both the timing of the downward shift in gun assaults in Massachusetts communities and the statistical significance of this decline strongly support the conclusion that the Bartley-Fox law had an immediate effect in deterring gun assaults throughout Massachusetts. We now turn to the issue of the law's impact on non-gun armed assaults in non-Boston Massachusetts communities.

Table 18 presents the results of our intervention point analysis for non-Boston Massachusetts. In this table, unlike our earlier statewide and Boston analysis of non-gun armed assaults (see Tables 6 and 12), we find no statistically significant upward shifts in non-gun armed assaults for any of

the hypothesized impact months. However, closer inspection of this table reveals that borderline significant increases (near the .05 level) do appear to be emerging in May of 1975. These results are similar, although not as strong as the earlier Boston and statewide findings on non-gun armed assaults.

Thus, above analyses show that while Boston and other Massachusetts communities exhibited decreases in gun assaults coinciding with the implementation of Bartley-Fox, these decreases were followed closely by increases in non-gun armed assaults. These results suggest that although some individuals may have ceased carrying firearms the law did not reduce the likelihood of their becoming involved in assaults. When they did so, they may have either accessed situationally-convenient weapons or used different types of weapons they were carrying in place of their firearms. We shall now examine in greater detail the nature of the displacement effect of the Bartley-Fox law on non-gun armed assaults.

C. Specification of Assault Displacement Effects: This section examines two types of non-gun armed assaults: those involving knives and those involving other deadly weapons. Both the UCR program and the BPD utilize these categories to collect their assault data. Knives probably represent the major alternative to the gun as an easily concealable weapon. If the increase we see in non-gun armed assaults is primarily confined to assaults with knives, this would suggest that potential offenders are making a purposive decision to substitute one instrument for another. On the other hand, if the increase we see in non-gun armed assault occurs primarily among the category of other deadly weapons, it would suggest that offenders are not making purposive decisions to substitute other weapons for their guns,

but rather may instead be accessing situationally convenient weapons (e.g., chairs, rocks, boards, etc.) when they encounter assaultive situations.

Table 19 presents annual knife assault rates for Massachusetts, Boston, and non-Boston Massachusetts communities. These rates, as before, are based on UCR Return A statistics. The top row shows that statewide, Massachusetts experienced a slight increase in knife assaults in 1975. Further examination shows that most of the increase is confined to Boston. Boston experienced a 20.2% increase in knife assaults between 1974 and 1975 compared to only a 3.2% increase in other Massachusetts communities during this period. In neither Boston or non-Boston Massachusetts, however, are the increases we see in knife assaults nearly as great as those exhibited by assaults with other deadly weapons.

Table 20 reveals that assaults with other deadly weapons rose by 41.4% in Boston and 26.8% in non-Boston Massachusetts between 1974 and 1975 (compared to 20.2% and 3.2% increases for knife assaults in these areas). Moreover, the figures for the two-year period following the introduction of the gun law show that the incidence of assaults with other deadly weapons rose by 56.2% and 32.4% in Boston and other Massachusetts communities respectively, over that two-year period.

Analysis of the assault statistics in Tables 10 and 20 seems to indicate that Boston may have experienced two different types of weapon displacement following the introduction of the Bartley-Fox law. The increase in knife assaults which occurred in Boston (an increase of 23.6% over the 1974 to 1976 period), suggests that some offenders made purposive decisions to substitute knives for guns as the weapon they preferred to carry. However, Boston experienced an even greater increase in assaults with other deadly

weapons after Bartley-Fox was introduced. Indeed, assaults of this type showed approximately twice the increase exhibited by knife assaults between 1974 and 1975. The dramatic rise in Boston's other deadly weapon assault rate may indicate that a second, more substantial, form of weapon displacement occurred. Thus, while some offenders may have stopped carrying firearms, they did not necessarily switch to carrying other types of weapons but rather accessed situationally convenient weapons when they encountered assaultive situations.

These results also indicate that the apparent deterrent effect of the Bartley-Fox law on gun carrying has not had the additional effect of causing offenders to shy away from potentially assaultive situations. Indeed, since the displacement effects of the law appear to be greater than the law's apparent deterrent effects perhaps some offenders may actually be more likely to become involved in assaults now that they (and perhaps their adversaries) are no longer carrying a gun. Potential offenders may now feel that the consequences of an assault are less serious without a gun. Or perhaps they feel that assertive action becomes more likely or necessary when an offender doesn't carry a gun.

In contrast to Boston, non-Boston Massachusetts communities show no increase in knife assaults but, like Boston, they do exhibit a substantial rise in assaults with other deadly weapons. This may indicate that these communities experienced only one form of weapons displacement as a result of the Bartley-Fox law. Specifically, offenders who have given up carrying firearms appear not to be making a conscious decision to carry knives in these communities, but they are accessing other, perhaps situationally convenient, weapons.

Our conclusions concerning the situational character of Bartley-Fox

displacement effects are at this point tentative. We shall return briefly to this issue in a later section when we review information obtained from prison inmate interviews concerning changes they feel offenders have made in their gun carrying behavior. Further analysis of Bartley-Fox displacement effects must rely on the acquisition of additional data. In particular, information which can be obtained in Boston from police manual records would be especially useful in specifying the circumstances under which assaults occur. This type of data would allow us to identify whether offenders employed situationally available weapons (such as chairs, rocks, boards, etc.) or tended to use weapons like knives that they had made a conscious decision to carry on their person (such as blackjacks, chains, etc.).

Apart from the issue of the specific character of the gun law's impact on non-gun armed assaults, comparison of the geographical pattern of the gun law's displacement effects with the law's deterrent effects reveals somewhat contradictory findings. On the one hand, we saw in our analysis that the law appeared to have its greatest relative deterrent effect (in terms of percent of change in crime rates) in non-Boston Massachusetts. In contrast to these findings, the analysis of non-gun armed assaults indicated that the gun law had its greatest weapons displacement effects in Boston. Thus, we have the anomalous result that where there is more deterrence there is less displacement.

There are at least two major alternative hypotheses that might account for these discrepant findings. One is that factors in addition to the gun law have accounted for some of the increase we see in Boston's non-gun armed assault rate. Yet, aside from a major school desegregation controversy, Boston has not experienced any known major social or economic disruptions

over this period. Furthermore, the timing of Boston's court-ordered desegregation efforts suggests that it is probably not a factor in the rise of Boston's non-*gun armed* assault rate. Phase I of Boston's court-ordered desegregation began in September 1974, which is eight months before we saw the first statistically significant rise in Boston's non-gun armed assault rate (see Table 11). Likewise, the second phase of the Boston desegregation program (Phase II) began in September 1975, which is three months after Boston's first statistically significant increase in non-gun armed assault. Thus, it appears that Phase I of Boston's school desegregation was implemented too soon to have contributed significantly to Boston's non-gun rates, while Phase II desegregation was implemented after the rise in this type of crime had already begun. Of course, changes in the interracial character of non-gun armed assaults in Boston should be examined to give us a more definitive answer to the question of the impact of desegregation.[7] However, we believe that evidence on this point suggests that desegregation was not a major factor in the rise of Boston's non-gun armed assault rates.

A second alternative hypothesis to account for the anomalous deterrence, displacement findings is, as suggested above, that deterrent effects of the law are underestimated in Boston. Here we entertain the proposition that implementation of the Bartley-Fox law and its attendant publicity have increased the likelihood of citizens' reporting gun assaults, and that this phenomenon has been primarily a Boston phenomenon. To evaluate this alternative, we shall now focus on the gun law's effect on citizens' crime reporting behavior. This will give us a more accurate picture of the

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[7] Such information can be obtained from manual police records. However, resource constraint prevented our doing so.

Bartley-Fox law's deterrent impact on gun assaults.

D. Refinement of the Boston Analysis: Impact on Citizen Reporting:

As Block (1974) has noted, the citizen's decision to notify the police of a crime is based, in part, on a victim's "calculation of the benefits derived from notification and the costs incurred." (Block, 1974: p. 555). For example, a victim may feel he has something to gain by reporting an assault if he believes that the police can actually catch and punish an offender. On the other hand, a victim may be reluctant to report an assault committed by a close relation, for fear of harming and/or antagonizing that person.

The Bartley-Fox law may have altered the likelihood that citizens will report gun crimes, particularly gun assaults, to the police. Compared to robberies or murders, assaults are a relatively ambiguous category of offenses. That is, in some cases it is not altogether clear to the average citizen whether an assault has occurred. It is obvious when one person has been badly beaten and injured by another person that the former is the victim of an assault, but in cases of threats or implied threats with the visible display of a deadly weapon or where the existence of the weapon is implied, the citizen may feel victimized but not be sure that what has happened constitutes a criminal assault that the police will take seriously or that the courts will punish severely.

The advent of the Bartley-Fox law may have affected this situation in at least two ways. First, the relatively more severe punishment prescribed under the law may be interpreted by citizens to mean that the police and the courts will take reported offenses more seriously; that is, the citizen may expect "the law" to come to his aid with more swift, certain, and severe

punishment. Second, the fact that merely carrying a gun without a license is punishable by a minimum one-year prison sentence may convince citizens whatever their understanding of an assault, to report any incident involving a gun, and what the citizen reports as a carrying violation might later end up as an incident of gun assault. In other words, the fact that carrying of a firearm has now been singled out for more severe punishment may have the effect of communicating to the public that any gun-related behavior is a potentially serious matter that the police should know about.

Such a tendency of the new law to increase citizen reporting of gun assaults can be expected to occur in the more ambiguous categories of gun assault where threat or implied threat with a gun have occurred. On the other hand, such a tendency of the law to increase reports should be least pronounced for those categories of gun assault that would be reported to the police under any circumstances. A particularly important factor in the likelihood of an assault being reported to the police is whether the victim has been brought to the attention of medical authorities. In this case, the decision of whether to report the crime is often no longer a matter of the victim's discretion. Empirical research bears out these observations. Block (1974) indicates that assault victims who have been hospitalized or have received medical attention are significantly more likely to report the crime to the police than victims who were not injured. Thus, logic as well as empirical evidence suggests that gun assaults which result in an injury are much more likely to be reported to the police.

Thus, for a more accurate estimate of the deterrent effects of the gun law on assaultive behavior which is unbiased by possible changes in reporting behavior that the law may also be responsible for, it would be

desirable to isolate for analysis those gun assaults where force has been used or where injury has been incurred. This line of analysis could not, however, be followed using the FBI's UCR aggravated assault statistics. The FBI's definition of aggravated assaults is:

> "An unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury. This type of assault usually is accompanied by the use of a weapon or by means likely to produce death or great bodily harm."[8]

A major problem with this definition for aggravated assaults involving weapons is that it groups together assaults involving only threats or attempts to inflict "bodily harm" on a victim with those where the victim actually has been injured. With statistics based on the UCR definition of assault, it is not possible to isolate and examine those gun assaults we expect to be less subject to reporting unreliabilities.

Fortunately, the Boston Police Department's computerized crime statistics allow us to examine more refined categories of gun assaults than are available in the UCR data. Specifically, using BPD data, we can identify and independently examine gun assaults with battery and gun assaults without battery. Under Massachusetts law, assault with battery indicates that some type of force has been used on the victim. In the case of a gun assault, this would mean that the victim had in some manner been struck with either a bullet or a gun. In contrast, an assault without battery simply means that an offender has attempted to injure or threaten to injure his victim, but has not inflicted any physical harm.[9] Table 21 presents Boston Police Department statistics on gun assaults with battery, and without battery.

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[8] Uniform Crime Reporting Handbook, 1975.

[9] See the Criminal Law Reference Handbook, Second Edition, p. 6.

The top row of figures in Table 21 present the annual number of gun assaults with battery in Boston from 1969 through 1977. This is the category presently less subject to reporting unreliabilities than UCR gun assault statistics. Notably, while UCR Boston gun assault statistics (see Table 8) showed only a 11.7% decline between 1974 and 1976, BPD gun assaults with battery showed a 37.1 decline over this same period. Thus, the subcategory of gun assaults with battery showed a decrease in the two years following the introduction of the Bartley-Fox law more than three times the decrease exhibited by the UCR gun assault statistics, which subsume gun assaults both with and without battery under one rubric.

As we turn to the issue of the gun law's effect on gun assaults without battery (which are reported to the police), we see a rather sharp departure from the above findings. Quite the opposite from what we saw for gun assaults with battery, we now see that in the two years after the introduction of the law the number of gun assaults without battery actually increased by 27.4% (between 1974 and 1976).

These results clearly indicate that serious gun-related assaults with injury have declined in Boston after the introduction of the new gun law. To the extent that the likelihood of injury from a gun assault remains constant over time, these data indicate that the actual incidence of gun assaults have declined since the introduction of the Bartley-Fox law. We can also see, however, that citizens' reports of gun assaults which do not involve injury or force have increased after the introduction of the law. To the extent that this is a category of offenses subject to reporting discretion it would appear that citizens are now more likely to report gun assaults to the police.

Thus, while it appears that the gun law has had a substantial deterrent effect on gun assaults, it also appears that this effect was partially obscured by the gun law's effect on citizen crime reporting behavior.

There exists, of course, the possibility that the BPD refined assault statistics may themselves be subject to certain reporting inconsistencies. In particular, it would challenge the above interpretations if the gun law changed the way police classified gun assaults with and without battery. For instance, the police may have started to classify more gun assaults as not having battery after the gun law was introduced. A change of this sort in classification procedures could account for the divergent patterns we see in BPD statistics on gun assault with and without battery.

To check on the validity of the assumptions we made concerning BPD battery, and non-battery gun assault data, we undertook an exploratory examination of police manual records of crime reports. We collected information from one-third of all police reports of gun assaults for the years 1974, 1975 and 1976. In examining these records, we drew data primarily from police descriptions of the circumstances surrounding gun assault incidents. These descriptions were generally available in the form of brief narratives that were contained in the police logs or reports. The form on which police made their reports changed between 1974 and 1975, but the narrative portion of the report appears to have remained substantively the same over the 1974 to 1976 period. From these narratives, we attempted to code items which appeared to be routinely reported by the police and which were descriptive of the nature of the incident. Perhaps the most important information on gun assaults that was regularly available from these reports was data concerning the nature of injuries the victims received in these incidents.

Table 22 presents results based on the coded information we obtained from police reports of gun assaults. This table presents information specifically on whether a victim required medical treatment as a result of a gun assault. We can assume that if medical treatment or hospitalization was required the victim received some type of physical injury as a result of the assault.

In examining the top row of Table 22, we see that the proportion of gun assaults requiring no medical treatment rises from 53.2% to 72.0% between 1974 and 1976 in the sample of cases from BPD manual files. This parallels the pattern which appears in BPD computerized gun assault data where, as we saw in Table 21, the proportion of gun assaults without battery rises from 45% to 64% of all gun assaults in Boston between 1974 and 1976 (see the bottom row of Table 21). Thus, both the BPD computerized crime data and the manual record data indicate that the proportion (and the actual number) of less serious gun assaults increased after the gun law was introduced. We also see from Table 22 that the proportion of more serious gun assaults (as well as the number) declines over the 1974 to 1976 period, just as gun assaults with battery did in the BPD computerized data.

Information concerning the type of medical treatment gun assault victims received can also be used to test our assumptions regarding the difference between gun assaults with and without battery in BPD computerized crime data. Table 23 presents information on the type of medical treatment that gun assault victims received separately for gun assaults with battery (Table 23, Part A) and for gun assaults without battery (Table 23, Part B) over the years 1974, 1975 and 1976. Notice that the police reports we sampled made no mention of medical treatment being required in 91.1% (1974), 88.3% (1975) and 96.4% (1976) of the time for gun assaults without battery. In sharp contrast these reports made no mention of medical treatment in only

22.5% (1974), 31.3% (1975) and 32.9% (1976) of the cases of gun assaults with battery. This strongly supports our assumption that the category of gun assaults with battery generally represents a far more serious event than gun assaults without battery, and hence tends to confirm our conclusion that the decline in gun assaults with battery we saw in Table 21 reflects a real decline in this type of behavior. What is more, a closer inspection of Table 23 suggests that even the category of gun assaults with battery may be underestimating the actual decline that occurred in actual gun assaults after the introduction of the Bartley-Fox law. Note that the proportion of cases where no mention of medical treatment was made rose from 22.5% of the gun assaults with battery we examined in 1974 to 31.9% in 1976. This might occur either because certain forms of gun assault with battery not requiring medical treatment are more likely to be reported by citizens or because police are more likely to classify such assaults without medical treatment as batteries after the Bartley-Fox law was implemented. However, either of these possibilities occurring after the gun law was introduced, would mean that even the category of gun assaults with battery will underestimate the actual decline in gun assaults.

Boston gun assault with battery statistics do not, of course, directly address the issue of citizen reporting of gun assaults to the police in other parts of Massachusetts. Although one might assume the law had a uniform effect on citizen reporting behavior throughout Massachusetts, we suspect that citizens may have been more likely to report gun assaults in non-Boston Massachusetts communities than in Boston prior to the implementation of the gun law. This would mean the introduction of the Bartley-Fox law would have had less impact on citizen reporting behavior in other

communities in Massachusetts than in Boston.

We hypothesize that citizens in communities where gun assaults are a relatively infrequent event are more likely to report such an event to the police than in communities with relatively high levels of gun assaults (such as Boston).[10] The logic behind this proposition is that in communities where crime is a relatively frequent event citizens may become resigned or numbed to the occurrence of crime. Under such circumstances, citizens might be less likely to report the less serious types of gun assaults—those without battery or medical treatment to the police.

What evidence is there to support our contention that citizens in non-Boston communities are more likely to report gun assaults to the police (especially prior to the Bartley-Fox law) than Boston's citizens? We must rely on inferences which can be drawn by comparing gun homicides and gun assault statistics across different communities. The validity of this analysis rests on two assumptions. The first is simply that gun homicide statistics are an accurate and complete measure of the actual level of homicide. The second assumption is that gun assaults result in homicides at a fairly constant rate across communities. If these assumptions are correct, then we may use the percent of gun homicides of reported gun assaults as an indicator of underreporting gun assaults by citizens to the police across communities.

More specifically, to address this issue we examine the number of assault precipitated gun homicides (excluding other felon-related gun homicides and, of course all non-gun homicides) as a percentage of the

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[10] For example, Boston's UCR gun assault rates in 1974 was 101.4 per 100,000 versus a rate of 15.2 per 100,000 for other communities in Massachusetts. See Tables 9 and 14.

total pool of reported gun assaults (including assault precipitated gun homicides as well as all other incidents reported as gun assaults).

Table 24 presents the percentage assault precipitated gun homicides are of total reported gun assaults for Boston and other Massachusetts communities. Note for the period 1973 to 1975 that 7.1% of reported total gun assaults in Boston were assault precipitated gun homicides, whereas only 3.8% of reported total gun assaults in non-Boston Massachusetts were such gun homicides. This could mean gun assaults were almost twice as deadly in Boston as in non-Boston Massachusetts, or that citizens were simply less likely to report gun assaults in Boston over this period.

With respect to the former alternative, there are reasons to doubt that gun assaults are more deadly in Boston. Boston has better emergency hospital care than most other communities in Massachusetts and hospitals in Boston are probably better set up to handle gun shot wounds than non-Boston hospitals if for no other reason than they see a lot more of these types of injuries. This would suggest that in Boston gun assaults are <u>less likely</u> to become a homicide. Furthermore, since our measure of assault-precipitated homicide excludes felony-related homicides, Boston's relatively greater number of felony-related homicides does not tend to inflate these statistics for Boston relative to the rest of Massachusetts.

A further test and refinement of the hypothesis that the introduction of the Bartley-Fox law has differentially impacted citizen reporting in Boston and non-Boston Massachusetts will be achieved at a later date by comparing the ratio of assault precipitated gun homicides to reported gun assaults before and after implementation of the gun law. This will provide a measure of the relative change in citizen reporting of gun assaults after

the gun law was introduced for Boston and non-Boston Massachusetts communities.

E. Conclusions of the Assault Analysis:

The introduction of the Bartley-Fox gun law had an immediate two-fold deterrent and displacement effect on armed assaults in Massachusetts. First, the law substantially reduced the actual incidence of gun assaults even before its effective date in Massachusetts. At the same time, it also increased the likelihood of citizens reporting less serious forms of gun assaults to the police, thereby tending to obscure the deterrent effect of the law on gun assaults. The effect on citizen reporting, however, seems to have been primarily a Boston phenomenon.

Secondly, the law substantially increased non-gun assaults in Massachusetts. Although the law deterred gun-related assaults, it did not induce offenders to stay away from assaultive situations. Indeed, there was a statistically significant increase throughout Massachusetts in non-gun armed assaults shortly after the Bartley-Fox law was introduced and within a couple of months of the first significant decrease in gun assaults. It would appear that while some offenders stopped carrying guns they continued to become involved in assaultive situations but employed other types of weapons. These weapons may be purposeful substitutes for the guns offenders previously used or they may be situationally convenient weapons that are accessed when the assault situation arose.

In this concluding section of the assault analysis, we develop tentative estimates of the numbers of gun and non-gun assaults prevented or promoted by the Bartley-Fox law. These estimates will be developed by comparing Boston and non-Boston Massachusetts gun and non-gun assault trends (following the introduction of the Bartley-Fox law) with the corresponding experiences of the

selected control jurisdictions. Specifically, the observed change in the control jurisdictions' assault statistics will be subtracted from the observed changes in Boston and Massachusetts statistics to provide a measure of the effect of the Bartley-Fox law which is independent of the ongoing trends reflected in the control jurisdictions.

Given the reporting problems with UCR Boston gun assault statistics uncovered above, it would be inappropriate to use these figures to estimate the impact of the Bartley-Fox law on gun assaults in Boston. However, with the more refined Boston Police Department data, gun assaults with battery can be used as the least biased indicator of the law's actual impact (on gun assaults) in Boston. According to these statistics, gun assaults with battery fell by 37.1% in the two years following the introduction of the gun law.

To obtain an estimate of the independent effect of the Bartley-Fox law on gun assaults the percentage change in Boston gun assaults with battery is compared to the average percentage change in gun assaults with and without battery in the control jurisdiction for the same period. The changes in all gun assaults (with and without battery) can be examined in the control jurisdictions because there is no reason to suspect that the Bartley-Fox law would have affected the reporting practices of citizens in these jurisdictions. Average percentage changes are computed between 1974 and 1975 and between 1974 and 1976 for the several control jurisdictions, divided by the number of such jurisdictions.

The control jurisdictions show an average annual increase in gun assaults in the two years following the introduction of the gun law of 7.0% and 0.4%, respectively. Subtracting these values from Boston's declines of 12.2% and 37.1% in gun assaults with battery, yields an estimated 19.2% and 37.5%

reductions in gun assaults which are attributable to the introduction of the Bartley-Fox law.

To estimate the change in the absolute number of gun assaults attributable to the Bartley-Fox law we use Boston's 1974 number of gun assaults with and without battery as the best available measure of the pre-Bartley-Fox level of gun assaults. The adjusted percentage decline from 1974 to 1975 and from 1974 to 1976 in Boston gun assaults (controlling for the average gun assault trend occurring in the control jurisdictions) multiplied by the 1974 level of gun assaults in Boston (626) and added together yields a reduction of 355 gun assaults by 1976, attributable to the Bartley-Fox law.

Conservative biases are introduced into the above estimates in two ways. First, estimates of the percentage decline in gun assaults that occurred in Boston (which was based on gun assault with battery) will be underestimated to the degree that citizens' likelihood of reporting such crimes to the police increased following the introduction of the Bartley-Fox law. Second, the estimates of the absolute decline in gun assaults will be underestimated to the degree that gun assaults are underreported in 1974 (e.g., if the actual level of gun assaults in 1974 were twice the reported level, estimates of the Bartley-Fox law's impact on gun assaults in Boston should be inflated by 100%).

Turning to the impact of the gun law on non-gun assaults in Boston, we observe that the average 1974-1975 and 1974-1976 changes in non-gun armed assaults experienced by the control jurisdictions were increases of 8.3% and 12.8%. When these are subtracted from Boston's corresponding 31.1% and 40.4% increase, we obtained estimated increases of 22.8% and 27.6% in Boston's non-gun armed assaults which may be attributable to the Bartley-Fox law. These

percentages multiplied by Boston's 1974 level of non-gun armed assaults (1974) and added together yields an absolute increase of 907 non-gun armed assaults by 1976 attributable to Bartley-Fox.

Importantly, the displacement effects of the law on non-gun armed assaults in Boston appear to be more than twice as great as the deterrent effects of Bartley-Fox on gun assaults. Thus, as noted above, although introduction of the Bartley-Fox law has deterred gun-related assaults, it has not kept potential offenders away form assaultive situations. Indeed, it would appear that when potential offenders find themselves in the assaultive circumstances without their guns they are more likely to get involved in a fight perhaps because the consequences of an assault are seen as less serious if a gun is absent, or perhaps because they can't control the situation as easily without a gun.

When the relative magnitude of the deterrent and displacement effects of the gun law on armed assaults are examined for non-Bosotn Massachusetts we must rely on UCR statistics. However, since the law appears to have had little effect on citizen reporting outside of Boston this will pose no serious problem. Subtracting the average 1974-1975 and 1974-1976 changes in gun assaults experienced by the control jurisdictions, 4.5% and -2.5%, from the 18.9% and 30.4% declines experienced by non-Boston Massachusetts, yield estimated 23.4% and 27.9% reductions in non-Boston gun assaults, which may be attributed to the Bartley-Fox law, independent of ongoing socio-demographic crime trends occurring in the control jurisdictions. When the average percentage changes in non-gun armed assaults experienced by the control jurisdictions 6.9% and 9.7% are subtracted form corresponding non-Boston Massachusetts increase of 16.4% and 17.1% between 1974 and 1976 we obtain estimated 9.5% and 7.4% increases in non-gun armed assaults which are

attributable to the introduction of the gun law. These are consistently less than the 22.8% and 27.6% increases in Boston's non-gun armed assault rates.

To obtain estimates of the impact of the Bartley-Fox law on the level of gun and non-gun assaults in Massachusetts communities outside of Boston we must first adjust for incomplete coverage. Specifically, the 98 communities in our non-Boston Massachusetts UCR data base accounted for 50.2% of the reported aggravated assaults (as estimated by the FBI) in all non-Boston Massachusetts in 1974. Thus, we adjust the absolute level of gun and non-gun assaults in our 98 non-Boston communities (by a factor of 1.99) in order to obtain complete coverage estimates for non-Boston Massachusetts. We estimate there were 833 reported gun assaults in non-Boston Massachusetts in 1974 and 3190 non-gun armed assaults.

The effect of the Bartley-Fox law on the absolute number of gun and non-gun armed assaults can be obtained, as above, by multiplying the estimated 1974 levels of these crimes by their respective 1974-1976 percent changes adjusted for the average crime trends in the control jurisdictions. Thus, we estimate that the Bartley-Fox law produced a decrease of approximately 427 gun assaults in non-Boston Massachusetts by 1976 and a corresponding increase of approximately 539 in non-gun armed assaults. Interestingly, non-Boston Massachusetts' absolute deterrence and displacement effects are not too disparate, in contrast to Boston where the absolute increase in non-gun armed assaults is nearly twice the reduction in gun assaults. The figures we have used to develop these estimates are summarized for ease of reference in tabular format indirectly below.

At this point, we are led to the conclusion that while the gun control law has deterred gun-related assaults it has not prevented offenders from

Summary of Figures Used to Calculate Impact Estimates

	Boston		Non-Boston Massachusetts	
	Gun Assault	Non-Gun Armed Assault	Gun Assault	Non-Gun Armed Assault
1. Impact Area % Change 1974-75	-12.2	31.1	-18.9	16.4
2. Massachusetts % Change 1974-76	-37.1	40.4	-30.4	17.1
3. Control Group Average % Change 1974-75	7.0	8.3	4.5	6.9
4. Control Group Average % Change 1974-76	0.4	12.8	- 2.5	9.7
5. Impact Area % Change Minus the Control Group Average % Change 1974-75 (Row 1 - Row 3)	-19.2	22.8	-23.4	9.5
6. Impact Area % Change Minus the Control Group Average % Change 1975-76 (Row 2 - Row 4)	-37.5	27.6	-27.9	7.4
7. Impact Area No. of Crimes-1974 (UCR data base estimates)	626	1790	418	1600
8. Impact Area No. of Crimes Adjusted for Incomplete Coverage-1974	626	1790	833	3190
9. Estimated Change in the Number of Crimes Due to Bartley-Fox in 1975 (Row 5 X Row 8)	-120.2	408.1	-194.9	303.0
10. Estimated Change in the Number of Crimes Due to Bartley-Fox in 1976 (Row 6 X Row 8)	-234.8	499.4	-232.4	236.1
11. Total Estimated Change in the Number of Crimes Due to Bartley-Fox 1975-1976 (Row 9 + Row 10)	-355.0	907.5	-427.3	539.1

becoming involved in assaultive sitations and using alternative weapons. We estimate that throughout the entire state of Massachusetts, introduction of the Bartley-Fox law has resulted in a decrease of approximately 782 gun assaults by 1976 (this figure simply represents the sum on the Boston and non-Boston Massachusetts estimate). Conversely, we estimate that introduction of the gun law has led to a statewide increase of 1447 non-gun armed assaults by 1976.

These estimates are necessarily approximate and tentative. They can be improved substantially, we believe, by further refinements and extensions of the above analyses. Specifically, we believe that the above estimates should be refined by means of (1) improved specification of control jurisdictions, (2) use of dynamic time series statistical modeling techniques, (3) further examination of the impact of citizen reporting biases, and (4) investigation of the predictably confounding impact of alternative policy intervention. This research should also be extended (5) to examine the effects of the gun law over a longer period of time, (6) to identify the types of offenders most affected by the law, and (7) to determine the extent to which the legal sanctions imposed under the law as opposed to the accompanying publicity and public awareness are responsible for the observed deterrent effects of the law. In concluding the section of this analysis of the law's impact on violent crime (Section VI) we discuss these directions for further research in more detail.

IV. Armed Robbery: Impact on Weapons and Targets

Following the analysis of the Bartley-Fox law's impact on armed assaults, the armed robbery analysis will focus on whether the law has succeeded in reducing the incidence of armed robbery, whether such an effect is restricted to gun robberies, and whether reduction in gun robbery is offset by corresponding increases in robberies with other types of weapons. We shall also examine whether the weapons offenders choose to use in robberies are related to the targets they select to rob. Here we are seeking to determine whether offenders who are deterred from using guns also stop robbing certain types of targets.

The analysis of armed robbery is organized into three parts. First, we examine the statewide impact of the gun law on gun and non-gun related armed robbery. Next, we examine the law's impact on regions within Massachusetts; specifically, Boston versus all other communities in Massachusetts for which we have UCR crime statistics. Finally, we refine the robbery analysis using data collected from the Boston Police Department. In this final section we address the question of the relationship between the weapons offenders use and the targets they select to rob.

A. Massachusetts: Statewide Impact:

In this section we examine changes in Massachusetts gun and non-gun robbery rates compared to those occurring in selected control jurisdictions. In the robbery analysis, unlike the assault analysis, we cannot employ the intervention point methodology due to UCR data limitations with regard to armed robbery. Specifically, the UCR program did not begin collecting information on gun and non-gun armed robberies until 1974. This provided us with only one year of pre-Bartley-Fox statistics on gun robbery which is not

sufficient pre-intervention data to employ the statistical methodologies we used in the assault analysis.

Tables 25 through 28 present annual armed robbery statistics for Massachusetts and selected control groups. Table 25 presents annual armed robbery rates per 100,000 inhabitants; Table 26 presents annual gun robbery rates; and non-gun robbery rates appear in Table 27. Finally, Table 28 presents the percent that gun robberies represent of all armed robberies. In each of these tables, we compare crime trends in Massachusetts with those in New England states excluding Massachusetts, Middle Atlantic states, North Central states, and the United States as a whole (excluding Massachusetts).

Table 25 presents data relating to the gun law's impact on the level of armed robbery in Massachusetts. It shows that Massachusetts armed robbery rates increased by 12.9% between 1974 and 1975. This increase was less than that experienced by the other New England states but more than exhibited by the other control jurisdictions. Between 1975 and 1976, however, Massachusetts showed a greater decline in armed robberies than any of its control jurisdictions. Indeed, the two-year reduction in armed robberies from 1974 to 1976 of 16.8% is greater than changes in any of the other comparison jurisdictions.

In Table 26 we examine whether the gun law has had a deterrent effect specifically on gun robbery. This table presents annual gun robbery rates for Massachusetts and its control jurisdictions for the years 1974 through 1976. Examination of Massachusetts' annual gun robbery rates shows that between 1974 and 1975 the level of gun robbery did not change in Massachusetts, while the gun robbery rates of the control jurisdictions showed very minor (0.7% for the Middle Atlantic states) to moderate (20.5%

for other New England states) increases in gun robbery.

In the following year, however, Massachusetts showed a substantial decline in its gun robbery rates of 35.0% between 1975 and 1976. This decrease was more than twice as great as that shown by any of the control jurisdictions (excluding the contiguous counties' control group). Finally, in looking at the two-year period (1974 to 1976) following the introduction of the Bartley-Fox law, we see that, overall, gun robberies declined by 35.1% in Massachusetts. Significantly, this decline was more than three times greater than any of the declines in gun robbery experienced by the control jurisdictions. (The other New England states actually showed an increase in gun robbery.) These results suggest that the gun law has had a somewhat delayed, but fairly major deterrent effect on gun robbery in Massachusetts.

What about the Bartley-Fox law's impact on non-gun armed robbery? Table 27 presents the non-gun armed robbery statistics for Massachusetts and its control groups. Notice that Massachusetts shows a 30.7% increase in non-gun armed robbery between 1974 and 1975. This change in Massachusetts is fairly comparable to the increases shown by the other New England states (+23.4%) and the contiguous counties (+31.5%). On the other hand, Massachusetts' increase is four or more times greater than that experienced by the remaining control jurisdictions.

In contrast to this pattern, the following year, between 1975 and 1976, Massachusetts showed a greater decline in non-gun armed robbery than any of its selected control jurisdictions. These results suggest that Massachusetts may have experienced a temporary or short-lived displacement from gun to to non-gun robberies that was not maintained in 1976.

The final table in the analysis of Massachusetts armed robbery,

Table 28 presents the proportion that guns represent of all armed robberies. In examining this table, we see that the share guns represent of all armed robberies declined by 22% over the two-year period following the Bartley-Fox law's introduction. Significantly, none of the other control group jurisdictions showed more than 5.6% decline.

B. Regions Within Massachusetts: Boston vs. Other Massachusetts Communities

The previous section examined the impact of the Bartley-Fox law on gun and non-gun armed robbery throughout Massachusetts. In this section we examine whether the law has had a differential impact in Boston and non-Boston Massachusetts. Our reasons for this particular geographic division are elaborated in the introductory paragraph to section IIIB. of the armed assault analysis.

1. Impact on Boston: As in our analysis of Boston armed assaults, we will compare Boston armed robbery trends with those in selected control groups. Tables 29 through 32 present armed robbery trends for Boston (the bottom row of these tables) and selected control jurisdictions. As in the case of the armed assault analysis, we have selected as our control jurisdictions for Boston cities in the range of 250,000 to 500,000 inhabitants and cities in the range of 500,000 to 1,000,000 inhabitants for the United States, the North Central States and the Middle Atlantic region.

Table 29 presents annual armed robbery trends for Boston and its control jurisdictions over the period 1967 to 1976. Examining the armed robbery rates for Boston, we see that Boston experienced a 14.2% increase in armed robbery between 1974 and 1975. This increase is quite similar to the rise in armed robberies that occurred in Boston in the two previous years. In

addition, Boston's 1974 to 1975 rise in armed robbery is greater than that which occurred in four of its five control jurisdictions. These results indicate that the gun law had no noticeable deterrent effect on armed robbery during the first year of its implementation.

In the following year, 1976, Boston's armed robbery rate does decline (-26.4% between 1975 and 1976) and this decline is more than that shown by any of Boston's control jurisdictions, but not substantially greater than what occurs in at least two of the control groups between 1975 and 1976. Boston showed a 26.4% decrease in armed robberies versus decreases of 18.8% and 18.5% for North Central cities of 250,000 to 500,000 inhabitants and North Central cities of 500,000 to 1,000,000 inhabitants. When the entire two-year post intervention period is examined we find that Boston showed a 15.9% decline in armed robbery compared to changes of -9.6%, 20.4%, 4.9%, 10.1% and -0.1% in the control jurisdictions. These results do not present any clearcut suggestion that the law may have deterred armed robberies in Boston. If there were any sure effect it appears to have been minor and also delayed until a year or so after the introduction of the gun law.

We now turn to the differential impact of the Bartley-Fox law on subclasses of armed robberies. Gun robbery statistics are presented in Table 30. Here we see that while Boston shows a minor decline in gun robberies between 1975 and 1976 (-1.87%) each of the control jurisdictions show increases ranging from a low of 4.0% to a high of 24.3%. Between 1975 and 1976 Boston and each of its control jurisdictions show fairly substantial declines in gun robbery, but significantly, Boston's decrease is the largest. When the entire 1974 to 1976 period is examined Boston shows a 35.5% decrease in gun robbery versus changes in the control

jurisdictions ranging from no decline at all in North Central cities of 500,000 to 1,000,000 inhabitants to a 20.9% decrease in North Central cities of 250,000 to 500,000 inhabitants. Thus, it appears that in the two years following the introduction of the Bartley-Fox law, Boston experienced a greater relative decline in gun robbery than any of its control jurisdictions, and that most of this relative decrease occurred between 1975 and 1976. This suggests that the introduction of the Bartley-Fox law induced some potential offenders not to commit robbery with a gun.

Table 31 presents non-gun armed robbery statistics for 1974 through 1976 for Boston and its control jurisdictions. Note that Boston experiences an increase (32.4%) in non-gun armed robbery between 1974 and 1975 and that this rise is almost twice that occurring in any of its control jurisdictions. In the following year (1975 to 1976) Boston shows the greatest decline in non-gun armed robbery. This pattern suggests that robbery offenders in Boston may have briefly switched from guns to other types of weapons.

Annual estimates of the percentage of all armed robberies that involve a gun are shown in Table 32 for Boston and its control jurisdictions. Examining the period immediately following the introduction of the Bartley-Fox law (1974 to 1975) we see that only Boston showed a decline in the percentage of guns used in armed robberies. In the following year (1975 to 1976) all groups showed a decline in the share guns were of armed robberies, but Boston experienced the greatest decline. This continuing decline in the proportion of guns used in armed robbery in Boston following the introduction of the Bartley-Fox law suggests that the law may have caused some offenders to switch from guns to other weapons when committing robbery. Why this may have occurred given that the pre-existing penalties for armed robbery are

far more severe than the penalty for a Bartley-Fox offense needs further investigation. We shall pursue the issue further in the refinement of the Boston analysis of weapon and target choice.

2. Impact on Non-Boston Massachusetts Communities: The analysis of the impact of the Bartley-Fox law on non-Boston Massachusetts will be based on UCR Return A robbery incidents data drawn from the same 97 Massachusetts communities (those which showed consistent reporting records throughout the 1967 to 1976 period) employed in the above analysis of armed assaults (see Section IIIB.2). Tables 33 through 36 present annual armed robbery statistics for non-Boston Massachusetts communities and selected control jurisdictions. Also, as we did earlier in the armed assault analysis, we have selected for control jurisdictions communities (outside of Massachusetts) with populations of under 250,000 inhabitants for the United States, the North East Central states, the Middle Atlantic states and the New England states, excluding Massachusetts. These are the same communities originally drawn from our UCR Return A data base for the armed assault analysis.

Table 33 addresses the issue of the gun law's impact on armed robbery in non-Boston Massachusetts. Examination of Table 33 shows that between 1974 and 1975 non-Boston Massachusetts communities showed a 10.3% increase in armed robbery. This was less than the increase exhibited by two of the control jurisdictions but greater than that increase experienced by the other two groups. In the following year, 1975 to 1976, however, non-Boston Massachusetts did show a larger decline in armed robbery than any of its control jurisdictions. Finally, when the two-year post-intervention period is examined, we see that non-Boston Massachusetts showed the greatest

decline in gun robberies over the 1974 to 1976 period: -18.1% in non-Boston versus decreases of 8.8%, 12.0%, 10.2% and 14.7% in the control jurisdictions. In these results there is at least a hint of deterrent impact of the gun law on armed robberies in non-Boston Massachusetts.

We shall now examine the differential impact of the Bartley-Fox law on gun versus non-gun armed robbery in Massachusetts communities outside of Boston. Table 34 presents annual gun robbery statistics for non-Boston Massachusetts communities and the control jurisdictions and Table 35 presents the non-gun armed robbery statistics.

Non-Boston Massachusetts communities show a pattern of change in gun robbery after implementation of the law somewhat similar to what was observed in the previous Boston analyses (see Tables 30 and 33). In the year (1974 to 1975) following introduction of the Bartley-Fox law, non-Boston Massachusetts communities showed a minor increase in gun robbery. This increase was obviously less than that which occurred in two of the control jurisdictions (3.3% for non-Boston Massachusetts versus 21.9% and 9.3%) and fairly comparable to the changes in the other two control groups (which showed increases of 3.7% and 5.5%). In the following year, between 1975 and 1976, non-Boston Massachusetts, showed a greater decline in gun robberies than any of the control jurisdictions; -36.1 for non-Boston Massachusetts versus decreases of 16.8, 22.7, 12.0 and 9.3 for the control jurisdictions. Finally, when the two-year period (1974 to 1976) following the Bartley-Fox law is considered we observe that gun robberies in non-Boston Massachusetts have declined more than twice as much as gun robberies in any of the selected control jurisdictions. This is similar to what was found in the previous Boston analyses and certainly indicates that

gun robbery has shown a relatively greater decline in Massachusetts (both in and out of Boston) in the two years since the Bartley-Fox law was introduced than has occurred in comparable selected communities elsewhere in the United States.

We will now examine the question of the gun law's impact on non-gun armed robberies in communities in Massachusetts outside of Boston. Table 35 presents annual non-gun armed robbery statistics. Similar to what was observed previously in the Boston analysis, other communities in Massachusetts do show an increase in non-gun armed robbery following the implementation of the gun law. However, unlike the case of Boston, the increase non-Boston Massachusetts experienced in non-gun armed robberies is matched by two of its selected control jurisdictions. In the next year (1975 to 1976) non-Boston Massachusetts showed a small decline in non-gun armed robbery. Overall when the two-year period following the introduction of the Bartley-Fox is examined, non-Boston Massachusetts exhibits an increase in armed robbery which is greater than all but one of the control jurisdictions (a 17.4% increase for non-Boston Massachusetts versus changes of 1.7%, 1.6%, -12.2% and 20.5% in the control jurisdictions). Thus, in non-Boston Massachusetts communities there is a suggestion of a temporary shift by offenders to other deadly weapons after the Bartley-Fox law was introduced. However, the changes in non-gun armed robbery between 1974 to 1976 (an increase in armed robbery followed by a decrease) which occurred in non-Boston Massachusetts communities are also observed to a similar degree in two of the control jurisdictions (the North Central states, and the New England states). This suggests that the changes that occurred in non-Boston Massachusetts following the implementation of the Bartley-Fox, may simply reflect ongoing trends in crime which

at least some other communities in the United States also experienced.

The proportion that gun robbery represents of all armed robbery is presented in Table 36. Between 1974 and 1975 non-Boston Massachusetts communities experienced a 6.3% drop in the percent that guns represent of all armed robbery and in the following year they experienced a further decrease of 14.0%. Over the two-year period following the introduction of the Bartley-Fox law non-Boston Massachusetts showed a 19.4% decrease in the proportion of guns used in armed robbery. Significantly, this decrease was five or more times greater than the decrease that occurred in the control jurisdictions.

In reviewing the results so far, it is interesting to note that Boston and other communities in Massachusetts showed a decline in armed robbery following the implementation of the Bartley-Fox law. In both cases, however, these decreases did not appear substantially different from that which occurred in at least some of the selected control jurisdictions. With regard to gun robbery both Boston and non-Boston Massachusetts communities showed substantial and almost comparable declines in gun robbery following the Bartley-Fox law. However, only in Boston do we observe a definite, if temporary, weapons displacement effect after the gun law was introduced.

An important question concerning the impact of Bartley-Fox on gun robberies throughout Massachusetts is why a major part of the impact appears to have occurred in the second year following the introduction of the gun law. It may be that robbery offenders found it more costly to give up gun carrying than other types of gun offenders who do not depend on guns to bring in money. Perhaps it is also true that gun robbery offenders adopted a "wait and see" attitude on the gun law as to how it would be

applied. Either of these explanations, although we presently lack empirical evidence to estimate them, would help account for a dealyed effect of the gun law on gun robberies in Massachusetts.

Another important question is whether the gun law had a differential impact on different types of gun robbery. We might expect the law to have the greatest impact on robberies that were the least lucrative and perhaps robberies that required the least amount of experience to undertake. For instance, we might expect the law to have more effect on street gun robberies than robberies against commercial establishments. Following this reasoning, offenders who engaged in street robberies might have less to lose in giving up their guns than offenders who rob commercial establishments or offenders who are less experienced may be less committed to robbery as a way of life and are more likely to stop using their guns. Fortunately, information on the types of targets offenders rob as well as the types of weapons they use is available from more refined robbery offense data of the Boston Police Department.

C. Refined Boston Analysis of Weapon and Target Choice

The Boston Police Department's computerized crime incident files have information on the type of targets robbed as well as the type of weapons used from 1975 on. We have supplemented this data with information collected from police manual record crime reports for 1974. This gave us one year's worth of weapon and target armed robbery data prior to the Bartley-Fox law.

Tables 37 through 39 present data on armed robbery, gun robbery, and non-gun robbery by location or target of the robbery for the years 1974 through 1977. The annual number of street, residential, taxi cab, commercial establishment, and other miscellaneous armed robberies over this four-year

period are shown in Table 37. In the first year after the Bartley-Fox law's introduction, armed robberies increased specifically in street, residential and miscellaneous locations, but not among taxi cabs or commercial establishments. In the second year after the Bartley-Fox law, armed robberies decreased in all categories of locations. Considering the two principal locations in which armed robberies occur, the decrease was relatively slight for street robberies and relatively marked for commercial robberies. Notably, the decrease in armed robberies continues through 1977 for all categories of targets except taxi cabs. Again, the decline in commercial robberies was among the greatest and the decline in street robberies continued to be among the least in the third year after the law's inplementation.

Notably, the category of commercial robberies is the one in which guns most commonly appear as the weapon; guns were used in eight out of ten of these robberies over this four-year period. By contrast, street robberies is the category in which the use of guns are least common; they were used in about three of ten such robberies during these four years. Thus, the relatively greater decline in commercial as compared to street robberies after the Bartley-Fox law may reflect a generalized tendency of the law to reduce gun robberies wherever they occur. Because gun robberies are relatively most common against commercial establishments and relatively least common on the street, the law's impact may be most pronounced on commercial robberies and least so on street robberies.

Are gun robberies affected equally across all categories of targets or locations? Table 38 shows that in the first year after the new law gun robberies declined in the three largest categories, they increased only in residential and miscellaneous locations. Thus, Table 38 reveals no clear

tendency for offenders who use guns by turning to less formidable targets, perhaps on the assumption that their chances of being apprehended and convicted and thus being subject to a Bartley-Fox charge, are less in these kinds of robberies. Initially, at least, the Bartley-Fox law did not cause robbers who continue to use guns to hit less risky, and probably less lucrative targets.

What about the decision to stop using guns among robbers, in the year immediately after the law's introduction? We have seen evidence of a weapon displacement effect from gun to non-gun robberies in the year immediately after the new law in Table 31. Is there any indication that robbers who have stopped using guns have also turned to less risky tartets? After all, without a gun, robbers may be less ready to face a store keeper or cab driver who might have a gun. Table 39 shows non-gun armed robberies by location/target annually from 1974 through 1977. It reveals no particular tendency for non-gun armed robberies to accumulate in the street robbery category, although robberies of residences and other miscellaneous targets do show substantial increases in non-gun armed robberies.

It would be typical for newcomers to start careers in robbery without guns and at the least risky and least lucrative locations and targets. The fact that non-gun street robberies do not increase disproportionately suggests that the increase in non-gun armed robberies that does occur is not the result of an influx of newcomers and first offenders to the robbery business. Perhaps, instead, the across the board increase in non-gun robberies reflects a tendency among robbers who give up gun use to stick with locations and targets they have previously robbed.

As we observed earlier (Table 30) the deterrent impact on the law was

most pronounced in the second year after the law's introduction (between 1975 and 1976). Here we examine how that deterrent effect was distributed over the various locations of gun robbery and whether any further evidence of displacement emerges. Table 38 makes it clear that gun robberies declined in all location/target categories between 1975 and 1976. Indeed, except for street robberies, all other categories dropped by a third or more (ranging from 32.3% to 63.2%). Here again, the data suggest the possibility of a target displacement effect among gun robberies. Although all categories of gun robbery shrank, the fact that street gun robberies shrank less than the others suggests that some of those who had previously robbed more difficult and risky targets may have shifted to the less problematic street robberies.

In a similar fashion, non-gun armed robberies drop off substantially between 1975 and 1976 in all categories of location, but less so for street robberies (7.6%) than for the other categories of robberies which range in declines from 26.0% to 55.1%. We observed earlier (Table 31) the assault movement away from guns is no greater in Boston than in other comparison jurisdictions during this period. However, the fact that non-gun street robberies lag behind in this decline at least suggests that some who previously robbed other targets may have moved to the street, or that the overall decline was felt less by street robbers who may be younger and newer to the robbery business. Without further data on the circumstances of these incidents and the characteristics of offenders either from victim reports or arrestee data, we cannot be sure which, if either, of these interpretations is correct.

Tables 37 through 39 permit us, for the first time, to examine the effect of the Bartley-Fox law on robbery through 1977, a third year after

the introduction of the new law. It is over this longer period that we might expect to see a tendency for the law's effects to be neutralized. Our examination of trends in all armed robberies over this longer period, as shown in Table 37, gave no indication of a return to earlier armed robbery levels, although it did indicate that further declines in armed robbery were relatively slight. When we turn specifically to gun robberies, as shown in Table 38, we see a contrasting picture. Between 1976 and 1977 there is an increase in gun robberies of greater than 20% in three categories—street, residential and taxi robberies—in all but the commercial and miscellaneous categories. Evidently, by this time guns are beginning to return to more common use, except in the forms of armed robbery in which they have been most common. Perhaps those who gave up gun use between 1975 and 1976 have changed their minds about the risks and/or costs of having a Bartley-Fox charge filed against them or about the wisdom of confronting potential victims without a gun.

In the third year after the introduction of the Bartley-Fox law, non-gun armed robberies continue to decline in all categories of locations and targets (Table 39). This is particularly significant because it indicates that the upturn in the use of hand guns in street, residential and taxi robberies at this time is not part of an overall trend toward increasing armed robbery, but rather a return to the use of guns, as opposed to other deadly weapons, in most categories of robbery. Since newcomers to the ranks of robbers, as we argued above, would be likely to show up in the non-gun robbery categories, this table tends to support the notion that more experienced robbers have started switching back to guns after a period of trying other weapons.

The upturn in gun robberies in 1977 raises a number of important questions about the impact of the law and its implementation that should be followed up in further research. It is critical to see whether this tendency for guns to return in armed robbery will continue until the pre-Bartley-Fox level is again achieved or stabilizes short of that tendency. The risks of robbery without a gun may cause some potential offenders to stay out of this activity altogether rather than risk a Bartley-Fox charge. This, in turn, may depend on the handling of cases by the police and in the courts, especially the extent to which the Bartley-Fox law is adding to the sentences served by convicted gun robbers. If carrying violations are not being charged or sentences are being imposed concurrently for robbery and a Bartley-Fox violation, the law may have no real impact on the potential robber . . . Finally, to determine what impact the law is having on the movement of potential offenders in and out of the robbery business, and particularly the business of robbery with a gun, we need to examine the characteristics of those who commit robberies over time as revealed in data on those arrested and from those victimized as recorded in police records.

D. Conclusions of the Robbery Analysis:

Although information on the incidence of gun and non-gun robberies has been available only since 1974—one year prior to the introduction of the Bartley-Fox law—examination of the available data leads us to conclude that the Bartley-Fox law has deterred gun robberies throughout Massachusetts. While data limitations precluded an intervention point analysis to identify the month in which gun robberies showed their first statistical significant decrease, examination of the tabular analysis suggests that the gun law had a moderate deterrent effect on gun robberies in 1975 in Boston and to a lesser extent

also possibly in non-Boston Massachusetts. In the following year, 1976, the apparent deterrent effect of the law was much more pronounced and appears to be of approximately equal magnitude in Boston and non-Boston Massachusetts.

In contrast to the assault analysis, the displacement effects of the Bartley-Fox law on armed robbery are less clear cut. Boston experienced an increase in non-gun armed robberies in 1975, the first year following the introduction of the Bartley-Fox law. In the following year, this initial increase in non-gun armed robberies appears to have diminished, but not enitrely disappeared. In non-Boston Massachusetts, there was only a hint of a weapons displacement effect and if it existed it was much smaller than that which occurred in Boston.

Finally, we may be observing by 1977 the beginning of a shift back to using guns in robberies at least for certain types of targets. In 1977, Boston experienced an increase, for the first time in three years, in street, taxi and residential gun robberies. However, there was no such increase in commercial establishment gun robberies. As hypothesized, the continued downward trend in commercial establishment gun robberies may represent the results of target hardening efforts (such as hiring guards, or not keeping cash on hand) on the part of commercial establishments. It also is possible that the increase in street, taxi, and residential gun robberies reflects the entry of new and younger offenders into the robbery "market" who are less concerned than previous offenders with Bartley-Fox sanctions for this type of crime. This might also suggest that the failure to see any increase in commercial establishment gun robberies in 1977 may, in part, represent the fact that such new offenders have not yet "graduated" to robbing the more difficult targets. However, to actually determine what impact the law is

having on the movement of potential offenders in and out of the robbery business and in particular, robbery with a gun, it will be necessary to examine the characteristics of those who commit robberies over time.

We shall now conclude the robbery analysis with tentative estimates of members of the gun and non-gun armed robberies prevented or promoted by the Bartley-Fox law. As in the assault analysis, these estimates will be developed by comparing Boston and non-Boston Massachusetts gun and non-gun armed robbery trends (following the introduction of the Bartley-Fox law) with the corresponding experience of the selected control jurisdictions. The figures we have used to obtain these estimates are summarized for ease of reference in tabular format at the end of this section.

To estimate the independent effects of the Bartley-Fox law on gun robberies and non-gun armed robberies in Boston and non-Boston Massachusetts, the percentage changes in these crimes for the impact jurisdictions (Boston and non-Boston Massachusetts) are compared to the average percentage change in the corresponding control jursidictions. Following the same procedures employed in the assault analysis, the average percentage changes are computed between 1974 and 1975 and between 1974 and 1976 for the several control jurisdictions divided by the number of such jurisdictions.

For Boston, the control jurisdictions showed an average increase in gun robberies in the two years following the introduction of the gun law of 11.6% and -10.1% for the 1974 to 1975 change and the 1974 to 1976 change respectively. Subtracting these control group average changes in gun robberies from the corresponding declines in gun robberies yields an estimated -13.4% and -25.4% reductions in gun robberies which are attributable to the introduction of the Bartley-Fox law.

To estimate the change in the absolute number of gun robberies attributable to the Bartley-Fox law, we multiply Boston's adjusted percentage declines from 1974 to 1975 and from 1974 to 1976 (which control for the average gun robbery trend occurring in the control jurisdictions) by the 1974 level of gun robberies in Boston (2243). These calculations yield an estimated reduction of 300 gun robberies in Boston in 1975 and 569 in 1976 which are attributable to the Bartley-Fox law. Added together we obtain an estimated reduction of 870 in Boston gun robberies by 1976 due to the introduction of the Bartley-Fox law.

Turning to the impact of the gun law on non-gun armed robberies, we find that the control jurisdiction experienced average changes in non-gun armed robbery of 2.3% between 1974 and 1975, and -6.5% between 1974 and 1976. Subtracting these changes from Boston's corresponding 32.4% and 6.3% increases we obtain estimated adjusted increases of 30.1% (1974 to 1975) and 12.8% (1974 to 1976) in Boston's non-gun armed robberies. When these percentages are multiplied by Boston's 1974 level of non-gun armed robberies, we obtain an estimated increase of approximately 594 gun robberies in 1975 over 1974 and 253 gun robberies in 1976 over 1974 attributable to the Bartley-Fox law. The above estimates of the gun law's impact on non-gun armed robbery initially seems to support the observation that the Bartley-Fox law has had an immediate, but primarily short-term weapons displacement effect on armed robbery in Boston. However, comparison of these estimates with those just developed for gun robbery reveals some patterns of change in gun and non-gun armed robbery which appear to be contradictory if we interpret them solely as a function of the Bartley-Fox law's impact. Specifically, the estimated displacement effects of the gun law in 1975 are nearly twice the deterrent effects, whereas the deterrent effects are slightly more than twice the displacement effects in 1976.

When we examine deterrent and displacement effects of the Bartley-Fox law for non-Boston Massachusetts, we find evidence of a substantial deterrent effect on gun robberies but evidence of only minor displacement effects. Following the procedures used above (see the summary table for specific calculations) we estimate that the gun law deterred 149 gun robberies in 1975 and 490 gun robberies in 1976 for a total reduction of 636 gun robberies in non-Boston Massachusetts through 1976. In contrast, we estimate that the Bartley-Fox law resulted in an estimated increase of only 227 non-gun robberies over the 1975-76 period.

The results we have obtained above raise some questions about the reliability of the estimated deterrence and displacement effects of the law on gun and non-gun robbery. In particular, the fact that the displacement effect exceeds the deterrent effect in Boston in 1975 suggests that something more is going on than simply a switch among offenders from guns to other weapons. The substantial reversal a year later in Boston in relative magnitude of deterrence and displacement effects raises the possibility that something more than the Bartley-Fox law has entered into the picture.

These anomalies might reflect the effects of other exogenous factors in addition to the Bartley-Fox law. Two candidates which overlap with the potential impact period of the gun law are public school desegregation in Boston and the Alcohol, Tobacco, and Firearms (ATF) Concentrated Urban Enforcement (CUE) program. The desegregation of Boston's public schools, as noted in Section III-D of the assault analysis, increased intergroup tensions in Boston in 1975, and may well have increased criminal violence, including armed robbery. This would tend to inflate our 1975 estimated displacement effect and to deflate our 1975 estimated deterrent effect in Boston. The CUE program initiated in July 1976 was explicitly designed to

halt the large scale illicit sale of firearms. By restricting the availability of guns, this program might have reduced gun robberies in Boston and perhaps as well in the rest of Massachusetts in 1976. This would cause us to overestimate the deterrent effect of the gun law on gun robberies. To the extent that these factors were at work, these effects should be independently estimated (see the discussion in the Section IV above) and removed from our deterrent and displacement estimates.

Another possible explanation for these anomalies is that Boston and its control jurisdictions are out of phase with respect to changes in armed robbery. Thus, if all jurisdictions experienced the same change (for example, a 20% reduction in both gun and non-gun robberies over a twelve-month period), but the trend got started a year earlier in the control jurisdictions than it did in Boston, subtracting the changes in the control jurisdictions from those in Boston would result in an overestimate of the displacement effect and an underestimate of the deterrent effect. A year later when Boston would be declining and the control jurisdictions would have stabilized at the lower level, the reverse would be true: our estimates would underrepresent the displacement effect and overrepresent the deterrent effect.

Still another problem arises if the control jurisdictions are out of phase among themselves. Suppose again that all jurisdictions experience the same trends (e.g., a 20% reduction over a twelve-month interval), but that it occurred a year earlier in some, concurrently with Boston's in some, and a year later in some. This situation would also cause us to overestimate displacement and overestimate deterrence in the first year and vice versa in

the second year, though to a lesser extent than the former phasing problem.

The data we have examined in the above analysis bear, to some extent, on these issues of phasing. Thus, Table 29 which presents the rates of armed robbery from 1967 through 1976 for Boston and five control jurisdictions, shows a relatively uniform pattern of change in the control jurisdictions which appears to coincide with Boston's. Between 1973 and 1974, it shows increasing armed robbery rates in all groups of jurisdictions; between 1974 and 1975, it shows the increase continuing but less pronounced with two minor exceptions (in one case the latter increase is greater and in the other a slight downturn has set in); and then between 1975 and 1976 it shows a remarkably consistent downturn ranging from -12.6% to -18.8% for the five control jurisdictions as compared to -26.4% for Boston. The two exceptions to the pattern between 1974 and 1975 tend to offset one another and the relatively consistent 1975-1976 control group changes suggest no gross phasing problems.

What the table does not show, however, is the possible variability of cities within the comparison groups which is to say, the extent to which cities more like Boston in each of these groups might have displayed, for example, greater declines in armed robbery between 1975 and 1976. A further indication that this kind of refinement of control jurisidictions is called for can be seen by examining the long-term trends in Table 29. Note that in 1967 Boston's armed robbery rate was the lowest in the table but that by the mid-1970's this rate had risen to about twice the level of the rates in the comparison groups. This points to the need to identify a subgroup of comparison cities with a history of armed robbery that corresponds more

Summary of Figures Used to Calculate Impact Estimates

	Boston		Non-Boston Massachusetts	
	Gun Robbery	Non-Gun Armed Robbery	Gun Robbery	Non-Gun Armed Robbery
1. Impact Area % Change 1974-75	- 1.8	32.4	3.3	25.6
2. Impact Area % Change 1974-76	-35.5	6.3	-34.0	17.0
3. Control Group Average % Change 1974-75	11.6	2.3	10.1	16.9
4. Control Group Average % Change 1974-76	-10.1	- 6.5	-11.7	2.9
5. Impact Area % Change Minus the Control Group Average % Change 1974-75 (Row 1 - Row 3)	-13.4	30.1	- 6.8	8.7
6. Impact Area % Change Minus the Control Group Average % Change 1975-1976 (Row 2 - Row 4)	-25.4	12.8	-22.3	14.1
7. Impact Area No. of Crimes-1974 (UCR data base estimates)	2243	1973	1297	589
8. Impact Area No. of Crimes Adjusted for Incomplete Coverage 1974	2243	1973	2197	998
9. Estimated Change in the Number of Crimes Due to Bartley-Fox in 1975 (Row 5 X Row 8)	-300.6	593.9	-149.4	86.8
10. Estimated Change in the Number of Crimes Due to Bartley-Fox in 1976 (Row 6 X Row 8)	-569.7	252.5	-490.0	141.0
11. Total Estimated Change in the Number of Crimes Due to Bartley-Fox 1975-76 (Row 9 + 10)	-870.3	846.4	-639.4	227.8

closely to Boston's. In such a subgroup of cities it would then be desirable to examine the movement of offense rates on a monthly basis in order to identify turning points and possibly adjust for phasing problems.

It should be noted that these phasing problems could be specific either to gun or non-gun robberies, further complicating the nature of the biases that may be introduced into our estimates. In this regard, Table 30 shows that for gun robberies in Boston the 1975-1976 downturn is remarkably uniform for the control jurisdictions, ranging from -16.0 through -23.9 for the five control groups as opposed to -34.4% for Boston. This lends support to our deterrence estimates of the law's effect on gun robberies.

We have data only from 1974 on gun and non-gun robberies, thus limiting our ability to identify truly comparable cities in terms of their histories of these specific varieties of armed robbery. However, among cities like Boston in their histories of armed robbery since 1967, it should be possible to identify a subgroup which is like Boston in levels and trends of gun and/or non-gun robberies from 1976 on.

V. Criminal Homicide: Intent Versus Happenstance

To the extent that homicide is a function of an offender's premeditated, willful intention to kill his victim, we would have little reason to expect that the Bartley-Fox law would deter gun-related homicides. The assumption is that an offender who is willing to risk the legal sanction for murder would also be willing to risk the sanction for a Bartley-Fox offense. On the other hand, if as Block (1977) proposes, homicides occur not primarily as a result of an offender's determination to kill, but rather as something which sometimes happens during the course of other criminal activities (such as robbery or assaults), then the introduction of the gun law might be expected to have a derivative deterrent effect on gun homicide. That is, the gun law might reduce gun-related homicides not by affecting potential offenders' decisions to kill, but by affecting their decisions about other criminal activities, including carrying a firearm without a license. We have seen that the introduction of the Bartley-Fox law prevented some potential offenders from becoming involved in assaults and robberies with a gun. As a result, this may indirectly have prevented some of them from killing with a gun. Of course, potential offenders who did stop carrying and using guns may have subsequently committed a crime involving murder with some other type of weapon. However, the extent to which a switch to weapons other than guns results in an increase in non-gun homicides depend in part on how deadly these alternative types of weapons prove to be.

The analysis of the impact of the Bartley-Fox law on homicides will examine the potential derivative effect of the law on both gun and non-gun homicide. In addition, since a majority of homicides result directly from

assaults on victims with no other apparent criminal motives (such as the intent to rob or rape) the analyses will further focus specifically on those gun and non-gun homicides which arise directly from assaults and from other types of crime. Due to data limitations the homicide analysis will be restricted to the impact of Bartley-Fox on homicides in Boston.

The primary source of data for the analyses of homicide is the UCR's Supplementary Homicide Report (SHR). The SHR is a monthly report which collects information on the characteristics of each homicide that occurs within a given police agency's jurisdiction. This data allows us to independently examine the impact of the law on assault precipitated homicides, as well as all gun and non-gun related homicides. Two data limitations currently restrict our use of SHR homicide statistics. First, police agencies only send SHR reports to the UCR program when one or more homicides have occurred within their jurisdictions in a given month. This means that it is not possible to determine whether smaller agencies (which often have no homicide in a given month) have experienced no homicides in their jurisdiction or have simply failed to report homicides that did occur. The trouble is that it is not possible to identify a subset of police agencies that have consistently reported SHR homicide statistics to the UCR program over the period under study. This is particularly important because a sizable number of agencies first began sending in SHR reports to the Uniform Crime Reporting program during the 1970's. If these agencies were not excluded from our data base it would create the illusion that all types of homicide were on the increase.

Since we are not able to identify and select police agencies which

consistently reported SHR data to the UCR program for communities with less than 250,000 inhabitants,it is not possible at this time to conduct a statistical analysis for Massachusetts communities other than Boston. However, using SHR data we can examine homicides in Boston and selected control jurisdictions for Boston. This is possible because for cities in Boston's population range we can identify whether agencies have consistently reported SHR data to the UCR program. We can safely assume that cities in this population range would never have a series of months with no homicides. Therefore, we exclude from the analysis cities in this population range which show several consecutive months of no homicides on the assumption that this indicates they have failed to report their homicides to the UCR program.

A further problem is that for some cities that show consistent reporting records, the number of homicides reported on the SHR form does not always correspond with the number of homicides the same agencies report on their Return A report. This difficulty could be overcome by selecting only those agencies whose Return A and SHR totals correspond. Given time and resource constraints, we were not able to take this step. However, for Boston at least, we were able to obtain from the Boston Police Department the copies of Boston's SHR reports that were sent to the UCR program. Our independent tabulations of these reports produced statistics which corresponded exactly to Boston's Return A homicide totals, but differed in some years from the SHR data the UCR program provided to us. We believe that our independent tabulations of Boston SHR reports provide the best available estimate of the incidence of gun and non-gun homicides in Boston.

A. Impact in Boston:

We shall now examine the impact of the Bartley-Fox law on homicides in Boston. As in the robbery and assault analyses, we will compare homicide

trends for Boston with those in selected control jurisdictions. We have selected as our control group cities in the range of 250,000 to 1,000,000 inhabitants in the Middle Atlantic states, the North Central states and all United States cities (except Boston).

The number of criminal homicides in Boston and its control jurisdictions over the period from 1971 through 1976 is shown in Table 40. In Part A of the table these figures are aggregated annually as in the earlier assault and robbery tabulations. In Part B of the table, the figures are grouped biannually to provide more stable indications of change before and after the implementation of the Bartley-Fox law. These latter statistics are less subject to the substantial fluctuations which characterize tabulations of relatively infrequent events such as criminal homicide. The additional stability of the biannual figures labeled seem to provide a more reliable picture of the gun law's impact on criminal homicide, especially as we move to even smaller numbers in subcategories of homicide later in this section.

In the year immediately after the Bartley-Fox law was introduced (between 1974 and 1975) Boston experienced a greater decline in homicides (-11.1%) than any of its comparison jurisdictions (ranging from .03% to -7.8%). In the next year of the law's implementation (between 1975 and 1976) Boston again experienced a greater decline in homicides (3.0%) than any of the control jurisdictions (ranging from -17.5% to -27.2%). Over a two-year period (between 1974 and 1976) in which large cities were experiencing a consistent decline in homicides of almost 20%, Boston showed a drop approaching 40%. Comparing homicides in the two years before and after Bartley-Fox (between 1973-1974 and 1975-1976) we find that homicides in Boston dropped roughly 25% as compared to 15% or less in the comparison jurisdictions. By these

indications, then, the introduction of the Bartley-Fox law in Massachusetts had a deterrent effect on the incidence of homicides. Whether that deterrent effect was restricted to gun homicides and whether it was largely derivative from the law's impact on gun assaults remains to be seen.

Table 41 presents gun homicide statistics for Boston and its control jurisdictions over the period 1971 to 1976 aggregated annually and biannually. Examination of these figures indicates that gun homicides in Boston decreased by 21.4% between 1974 and 1975, twice the decline experienced in any of the control jursidictions. In the following year between 1975 and 1976, there was a general decline in gun homicides with Boston leading the group. Whereas gun homicides in the control jurisdiction showed declines ranging from -17.5% to -27.6%, Boston experienced a decline of -43.6%. Over the two-year period following the introduction of the Bartley-Fox law (1974 to 1976) Boston showed a decline of -55.7% in gun homicides, twice any of the control jurisdictions. Indeed, when we compare the two years prior to Bartley-Fox with the following two years (1973-1974 to 1975-1976) the decline in gun homicides in Boston (-43.0%) is virtually three times the decline for the closest comparison jurisdiction (-14.7% for cities in the North Central Region).

The issue of the gun law's impact on non-gun homicides is addressed in Table 42. Boston's trend in non-gun homicides after the introduction of the Bartley-Fox law is reasonably comparable to those of the control jurisdictions. In the first year after the gun law became effective there was no change in non-gun homicides in Boston; in the second year there were fourteen fewer, a decline of 20.3%. The decline between 1975 and 1976 is greater in Boston than in the comparison cities, but because it is based on a

relatively small number of cases (14/64) its reliability as reflecting a trend is doubtful. When we group the two years before and the two years after the law's implementation, we find that Boston's change in non-gun homicides (-2.5%) falls about midway between the extremes of the control jurisdictions (18.5% and -17.1%). There is definitely no evidence of a displacement effect with respect to non-gun homicides in Boston. Thus, examination of Tables 41 and 42 strongly suggests that the gun law had a derivative deterrent impact on gun homicides without a derivative displacement effect on non-gun homicides.

Table 43 presents another view of the gun law's impact on homicides, the percent that gun homicides represent of all homicides annually and biannually, 1971-1976. The table shows that the gun share of criminal homicides dropped six percentage points in Boston between 1974 and 1975 and fourteen percentage points in Boston between 1975 and 1976. The 1974 to 1975 decline is rivaled by cities in the North Central Region, but otherwise the decline in gun homicides as a proportion of all homicides is most pronounced in Boston after 1974. The biannual figures in Part B of Table 43 make this point quite clear. They show a 14.4% decline in Boston between the two years before and the two years after Bartley-Fox, which is more than twice the next closest decline of 6.4%.

B. Refined Boston Analysis: Assault-Precipitated and Robbery Related Homicides:

Having established a substantial reduction in gun homicides after the introduction of the Bartley-Fox law, we are now ready to carry the analysis a step further by asking whether this effect derives from the law's impact on gun assaults, or its impact on gun robberies, or both. Thus, we will further explore the deterrent effect of the gun law by dividing gun homicides into two groups: "felony-related homicides" which include all those cases in

which the killing occurred in the course of another crime; and "assault-precipitated gun homicides" for which there is no evidence of an accompanying felony that the killing was the result of an assaultive situation. Table 44 and 45 present, respectively, assault-precipitated gun homicides and felony-related gun homicides for Boston and its comparison cities over the period 1971 to 1976 with data grouped annually and biannually.

Looking first at the annual changes in Table 44, Part A, we see that assault-precipitated gun homicides in Boston dropped off 14.0% between 1974 and 1975 and 34.8% between 1975 and 1976, for an overall 1974 to 1976 decline of 44.0%. The first year's decline is rivaled by cities in the North Central Region; the second year's decline is rivaled by cities in the Middle Atlantic Region; but the overall decline between 1974 and 1976 in Boston is unrivaled by the comparison cities (where the next greatest decline is 32.0%).

When we examine the biannual changes in Table 44, Part B, the decline in Boston's assault-precipitated gun homicides stands out more sharply in relief; it was more than twice that in any of the other groups of cities (40.3% in Boston and 19.7% in the closest comparison cities).

Roughly four out of five gun homicides are assault-precipitated as opposed to felony-related. In view of the deterrence findings in Table 41 on all gun homicides it is not too surprising, therefore, to find that the law has reduced assault-precipitated gun homicides. The extent of its effect on assault-precipitated gun homicides was the chief question. The situation is different for the remaining one out of five gun homicides which are felony-related. Here it is an open question whether the gun law has actually had a deterrent effect and one more difficult to answer because of the much smaller number of these crimes for analysis.

Although the numbers are small, the pattern is dramatic. Felony-related gun homicides in Boston decline 40.0% between 1974 and 1975, 75.0% between 1975 and 1976, and 85.0% between 1974 and 1976. The comparison cities show no remotely similar pattern. When we examine the data grouped biannually, Boston's pre-to-post-Bartley-Fox decline is 53.1%; the next greatest decline in the biannual data is 2.0% for the Middle Atlantic cities. The reduction in felony-related gun homicides in Boston is clearly unique and unrivaled.

A closer examination of Table 45 reveals that felony-related gun homicides reach a high point in the year immediately prior to the effective data of the Bartley-Fox law. More than a third of these crimes reported over the six years from 1971 through 1976 occurred in 1974. This raises the possibility that felony-related gun homicides were "abnormally" high in 1974 and, therefore, that the post-Bartley-Fox reduction in these homicides is simply a return to "normal" levels, which cannot be legitimately discredited as an effect of the new law. Indeed, the conspicuously high level of felony-related gun homicides in 1974 might actually have contributed to the framing and passage of the law itself. After all, felony-related gun homicides more than tripled between 1971-1972 and 1973-1974.

If we look back to Table 44, we can detect a similar if less pronounced, pattern. Here again the 1973-1974 period is relatively high in assault-precipitated gun homicides, up by 24.0% over the 1971-1972 period. In this instance the conspicuously high level of such homicides occurred in 1973, when almost a quarter of those over the six-year period from 1971-1976 occurred. Certainly, this peaking of assault-precipitated gun homicides in 1973, like the peaking of felony-related gun homicides in 1974, could have contributed to a climate of public support for gun control legislation.

The problem from the viewpoint of our crime impact analysis is to determine whether the conspicuously high levels of gun homicides in 1973 and 1974 were abnormal departures from consistently lower levels of represented actual movements or trends toward consistently higher levels of gun homicide in the community. Specifically, for the purposes of our analysis, if the 1973-1974 levels of gun homicide are abnormally high, then the reductions in 1975-1976 are not a reflection of the gun law's effects but a statistically predictable return to normal levels (regression to the mean). If, on the other hand, the 1973-1974 levels of gun homicide reflect a basic shift to higher levels of such crime in the community that would tend to be sustained, the 1975-1976 reduction may be attributable to the deterrent impact of the Bartley-Fox law.

To help choose between these alternative assumptions, we present "kill rates" for gun assaults and for gun robberies in Table 46. These kill rates reflect the likelihood that a serious assault with battery will result in death and that a gun robbery will result in death. The data to compute these kill rates are available from 1971 through 1977 for gun assaults, but only from 1974 through 1977 for gun robberies in Boston. Our assumption is that gun assaults and gun robberies will remain equally deadly, or likely to result in a homicide, over time. To illustrate, a steady increase in gun assaults over time should produce a steady (proportional) increase in assault-precipitated gun homicides over time, or a constant kill rate (assault-precipitated gun homicides/gun assaults with battery + assault-precipitated gun homicides). Departures from a relatively constant kill rate would indicate abnormally high or low levels of assault-precipitated gun homicides. Changes in the level of assault-precipitated gun homicides which occur without a change in

the kill rate may be regarded as secular trends or basic shifts in the levels of such homicides. The underlying assumption here is, of course, that variations in assault-precipitated and robbery-related gun homicides are derivative from variations in gun assaults and gun robberies, respectively. Kill rates might, of course, change over time as a result of changes in the characteristics of offenders committing gun assaults or gun robberies, of the locations or target they choose, or of changes in the willingness of victims and witnesses to report such crimes. Lacking evidence of such changes except with respect to the reporting of gun assaults, we will assume a constant kill rate as a standard for distinguishing between normal and abnormal fluctuations in assault-precipitated and felony-related gun homicides (except in the case of post-Bartley-Fox gun assaults where increased reporting of this offense after the introduction of the new law has occurred).

Looking first at the kill rates for gun robbery in Part B of Table 46, we see that less than one in a hundred gun robberies end in death throughout the 1974-1977 period; this varies from a high of .0088 in 1974 to a low of .0021 in 1976. It is evident that the post-Bartley-Fox reductions in robbery-related gun homicides outstripped the reductions in gun robbery to a degree that could hardly be attributed to the effects of the gun law, at least not without additional assumptions about the law's effects on robbery-related gun homicides. Certainly, the low kill rate for gun robberies leaves a great deal of room for change variation without a very large aggregate of gun robberies.

Turning to the kill rates for gun assault in Part A of Table 46, we see that roughly 15 out of a hundred gun assaults with battery end up as assault-precipitated gun homicides. Note that the kill rate for 1973, when

the peak in assault-precipitated gun homicides occurs, is above the average for the pre-Bartley-Fox period suggesting that the number of such homicides in this year was abnormally high. Note further, however, that the kill rate for the following year 1974 was below the pre-Bartley-Fox average thus suggesting an abnormally low level of assault-precipitated gun homicides in 1974. The implication of this latter point is that our previous method of estimating the law's impact on the numbers of offenses prevented or promoted in the post-Bartley-Fox period will yield a conservative estimate. That is, if the number of assault-precipitated homicides in 1974 is abnormally low, reductions calculated from this level as a baseline will underestimate the number of lives saved by the Bartley-Fox law.

This pattern led us to work with the homicide data aggregated at the biannual as well as the annual level in the tables of this section. It also recommends the use of biannual data in estimating the number of such offenses the law has prevented. Observe that combining the number of assault-precipitated gun homicides in 1973 and 1974 yields an aggregate kill rate very near the level in the previous two years. In effect, the increase in assault-precipitated gun homicides between 1971-1972 and 1973-1974 of approximately 24% (Table 44, Part B) occurred with an essentially constant kill rate—the condition we specified for assuming that changes between one year (or group of years) and the next are not abnormal. Thus, in the final subsection of the homicide analysis we will also estimate the impact of the law on the number of assault-precipitated gun homicides with the data grouped biannually.

It should be noted that the post-Bartley-Fox kill rates for assault-precipitated gun homicides are slightly but consistently below the earlier levels. We take this as a reflection of the tendency (uncovered earlier in

the assault analysis) for citizens to be more likely to report gun assaults to the police after the implementation of the Bartley-Fox law. This tendency to increase the reporting of gun assaults as a group is what led us to work with gun assaults with battery in forming the kill rates in Table 46. Although the assault with battery category is much less subject to reporting changes, there is evidence in the preceding analysis of an increased willingness of victims and witnesses to report this crime to the police after the law's implementation.

C. Conclusions of the Homicide Analysis:

We have taken the view in this analysis that homicide is essentially a derivative crime resulting from involvement in other forms of criminal behavior such as assaults and robberies. In sections III and IV above we established that the Bartley-Fox law has reduced gun assault and gun robbery. In this section (Table 44) we have shown that gun homicides dropped off more substantially in the two years after the Bartley-Fox law in Boston than they did in other comparison cities. Non-gun homicides did not show a change in Boston different from their patterns over time on other comparable cities. Thus, there is evidence of a deterrent effect on gun homicides but no evidence of a displacement effect on non-gun homicides. Since guns are the target of the law and the most lethal of weapons, it should not be surprising to find that the derivative effect of the law on homicides is confined to gun homicides.

To carry the analysis a step further we observed that reduction in gun homicides was present for both felony-related and assault-precipitated gun homicides, but that there were also indications that the pre-Bartley-Fox levels of these crimes may have been abnormally high. Drawing on the assumption that these forms of homicide are derivative from gun assaults and gun robberies we calculated kill rates for the latter two categories of

offenses which enable us to identify especially inflated or deflated levels of assault-precipitated and robbery-related gun homicides. Our analysis of felony-related gun homicides leads to the conclusion that the pre-Bartley-Fox level of these offenses was inflated and, therefore, that lower post-Bartley-Fox levels of this crime cannot legitimately be attributed to the deterrent impact of the law.

In the case of assault-precipitated gun homicide, we established that the 1974 level of this offense may be abnormally low but that the 1973-1974 level was consistent with prior levels in terms of kill rates. We have decided, therefore, in this concluding section of the homicide analysis to present two alternative estimates of the gun law's effect on assault-precipitated gun homicides: the first based on annual homicide data following the procedures used in the assault and robbery analyses, and the second based on homicide data aggregated biannually and following similar procedures.

Boston experienced reductions in assault-precipitated gun homicide of 14.0% and 44.0% between 1974 and 1975 and between 1974 and 1976, respectively. The corresponding changes in comparison cities were -8.7% and -29.1%, leaving as Boston's adjusted reductions for these two years -5.3% and -14.9%. Multiplying these two percentage changes by Boston's 1974 assault-precipitated gun homicides (50) yields estimated reductions of 2.7 homicides in 1975 and 7.4 homicides in 1976, for a <u>total reduction of 10.1 homicides in Boston by 1976</u>, which can be attributed to the introduction of the Bartley-Fox law.

The suggestion that the 1974 number of assault-precipitated gun homicides may be abnormally low has prompted us to derive an alternative estimate of the law's impact based on the number of such homicides occurring in 1973 and 1974 combined. Boston's percentage change between this pre-Bartley-Fox period

and the two years after Bartley-Fox, 1975-76, was -20.3%. The average percentage change of the control cities was -13.5%, yielding an adjusted change for Boston of -23.8%. This percentage reduction applied to the 1973-74 number of such homicides (119) yields an estimated reduction of 28.3 assault-precipitated gun homicides in Boston by 1976, which can be attributable to the effects of the Bartley-Fox law.

Further refinements and extensions of the homicide analysis should be conducted to improve our estimates of the law's impact on criminal homicide. As noted in the case of robbery estimates, averaging and phasing changes in the control jurisdictions may be responsible for misleading estimates of the changes to be expected in Boston. Although it was not possible in the robbery analysis because of missing data prior to 1974, intervention point analyses of the type conducted with the armed assault data, should also be carried out with the homicide data to help establish a significant departure from previous levels of homicide in Boston. Dynamic modeling techniques can help to improve our estimates of the law's effects on homicides by minimizing the role of change fluctuations in our estimation procedure.

In this connection it will be especially important to extend the period under analysis. The infrequency of these crimes, and thus the relatively small numbers of cases for statistical analysis, strongly recommends extending the post-Bartley-Fox impact period.

Obviously, as mentioned earlier, it would be desirable to carry the analysis forward for non-Boston Massachusetts and to validate the homicide data by comparing the SHR reports with the Schedule A reports for potential control jurisdictions. Until these extensions and refinements can be

Summary of Figures Used to Calculate Impact Estimate

a. Annual Assault Precipitated Gun Homicide Impact Estimates

1.	Boston % Change, 1974-1975	-14.0
2.	Boston % Change, 1974-1976	-44.0
3.	Control Group Average % Change, 1974-1975	- 8.7
4.	Control Group Average % Change, 1974-1976	-29.1
5.	Boston % Change Minus the Control Group Average % Change, 1974-1975 (Row 1 - Row 3)	- 5.3
6.	Boston % Change Minus the Control Group Average % Change, 1974 1976 (Row 2 - Row 4)	-14.9
7.	Boston Number of Homicides, 1974	50
8.	Estimated Change in the Number of Homicides Due to Bartley-Fox in 1975 (Row 5 x Row 8)	- 2.7
9.	Estimated Change in the Number of Homicides Due to Bartley-Fox in 1976 (Row 6 x Row 8)	- 7.4
10.	Total Estimated Change in the Number of Homicides Due to Bartley-Fox in 1976 (Row 6 x Row 8)	-10.1

b. Biannual Assault Precipitated Gun Homicide Impact Estimates

1.	Boston % Change, 1973/1974 - 1975/1976	-40.3
2.	Control Group Average % Change, 1973/1974 - 1975/1976	-16.5
3.	Boston % Change, 1973/1974 - 1975/1976 Minus the Control Group % Change, 1973/1974 - 1975/1976 (Row 1 - Row 2)	-23.8
4.	Boston Number of Homicides, 1973/1974	119
5.	Total Estimated Change in the Number of Homicides Due to Bartley-Fox, 1973/1974 - 1975/1976	-28.3

completed, we would regard the homicide estimates as more tentative than those established in the assault and robbery analysis. An additional refinement that should be incorporated into the homicide analysis is the examination of cases on an individual basis to isolate multiple offender and multiple victim incidents which may tend to inflate the homicide figures for a given year. Thus, for example, after observing the exceptionally high level of assault-precipitated homicides in 1973, we reviewed these cases that year from the SHR data and discovered that one offense involved the killing of six members of a family by one offender. This will tend to introduce chance fluctuations and to inflate estimated kill rates.

VI. Conclusion

In this final section we provide an overview of the findings from our analyses of armed assault, armed robbery, and criminal homicide, and we recommend directions for further research on the impact of the Bartley-Fox law. In the overview of findings we summarize the chief results of the analyses in each of the three preceding sections and draw together our estimates of deterrent and displacement effects. In our discussion of directions for further research, we present eight recommendations for refinements and extensions of the present study.

A. Overview of Findings

In the preceding three sections of this analysis we have examined the impact of the Bartley-Fox law on armed assault, armed robbery, and criminal homicide. At the conclusions of each of these sections we estimated the deterrent effect of the law on gun related forms of these offenses and the displacement effects of the law on non-gun related forms of these offenses. In this final section we have brought these estimates of increases and decreases in criminal behavior attributable to the Bartley-Fox law together into a single summary table which appears below. The table presents our estimates of the law's impact in Boston, in non-Boston Massachusetts and in the state as a whole for 1975, 1976, and the combined 1975-76 period. As we have indicated in the earlier sections, these estimates are approximate and tentative. We believe they can and should be improved by further refinements and extensions of the present analysis. The qualifications and limitations on our estimates are presented in detail in the respective sections in which they were developed.

1. Armed Assault

In the assault analysis, we concluded that introduction of the Bartley-Fox law had an immediate two-fold effect on armed assaults in Massachusetts. First, the law substantially reduced the actual incidence of gun assaults even before its effective date in Massachusetts. Second, the law substantially increased non-gun assaults in Massachusetts. Indeed, there was a statistically significant increase throughout the state in non-gun armed assaults shortly after the Bartley-Fox law went into effect and within a couple of months of the earlier statistically significant decrease in gun assaults. Thus, although the law discouraged gun related assaults, it encouraged non-gun armed assaults, perhaps because it did not keep offenders away from assaultive situations.

The introduction of the Bartley-Fox law also had the unanticipated effect of stretching the crime reporting behavior of citizens. Specifically, citizens were more likely to report less serious forms of gun assaults to the police after implementation of the gun law. This was most pronounced in Boston and it tended to obscure the magnitude of the law's deterrent effects. Importantly, we were able to control for this reporting bias in making our estimates of the deterrent effect of the law on gun assaults by using more refined Boston Police Department (BPD) assault data. Significantly, these results suggest the UCR program should collect assault data in more refined categories than it presently does in order to provide more reliable estimates of the level and change in aggravated assaults.

For assaults, the summary table presents our estimates of the impact of the Bartley-Fox law on gun and non-gun armed assault for Boston, non-Boston Massachusetts and the state as a whole for 1975, 1976, and the combined 1975-76 period. These estimates indicate that the gun law resulted in a

reduction of 355 gun assaults in Boston and 427 gun assaults in non-Boston Massachusetts for a total reduction throughout Massachusetts of 782 gun assaults by 1976. Conversely, the gun law has resulted in more than offsetting increases in non-gun armed assaults of 907 in Boston, 539 in non-Boston Massachusetts, and 1446 throughout Massachusetts by 1976. The displacement effects are more than twice the deterrent effect in Boston, while the deterrent effects are nearly equal to the displacement effects in non-Boston Massachusetts. This suggests the possibility that factors other than the Bartley-Fox law may have contributed to 1975 and 1976 non-gun armed assaults in Boston. Specifically, court-ordered desegregation of the public schools in Boston may have partially contributed to these observed increases in non-gun armed assaults. Further research, however, is needed to investigate this hypothesis.

2. Armed Robbery: Our analysis indicates that the gun law had a moderate deterrent effect on gun robberies in 1975 in Boston and to a lesser extent also in non-Boston Massachusetts. In the following year, 1976, the estimated deterrent effect of the law was much more pronounced and was of approximately equal magnitude in Boston and non-Boston Massachusetts. The displacement effects of the Bartley-Fox law on non-gun armed robbery are less consistent and less pronounced than in the case of non-gun armed assaults. Since information on the incidence of gun and non-gun robberies has been available only since 1974, data limitations precluded an intervention point analysis similar to the ones conducted for gun and non-gun armed assaults.

In contrast to the assault findings, we observed, in Boston by 1977, the beginning of a shifts back to using guns in robberies at least for certain types of targets; specifically, in street, taxi, and residential gun robberies. This upturn in gun robberies points to the need for analysis over a longer

potential impact period. It is critical to see whether this tendency for guns to return in armed robbery will continue until the pre-Bartley-Fox level is achieved or whether it stabilizes short of that level.

The summary table presents our estimates of the law's impact on armed robbery. In Boston, we estimate that the law resulted in a reduction of 300 gun robberies in 1975 and 569 in 1976, or an estimated reduction of 870 in Boston gun robberies by 1976. With regard to displacement in Boston, the gun law resulted in an increase of approximately 594 non-gun robberies in 1975, and 253 non-gun robberies in 1976 for a total increase of 846 non-gun robberies by 1976 in Boston.

The estimated deterrent and displacement effects for non-Boston Massachusetts indicate the gun law deterred 149 gun robberies in 1975 and 490 gun robberies in 1976 for a total two year reduction of 539 gun robberies. In contrast, we estimate that the law resulted in a total increase of only 227 non-gun robberies over the 1975-76 period.

The results obtained above raise some questions about the reliability of the estimated deterrence and displacement effects. The fact that the displacement effect exceeds the deterrent effect in Boston in 1975 suggests something more than simply a switch among offenders from guns to other weapons. Similarly, the substantial reversal a year later in the magnitude of deterrence and displacement effects again raises the possibility of exogenous influences or estimation problems. More specifically, these anomalies may reflect the influences of school desegregation in Boston or the implementation of the AFT CUE program on the one hand, or problems associated with the timing or phasing of changes in Boston and its control jurisdictions, on the other.

3. Criminal Homicide: Due to data limitations, the analysis of criminal

homicides was restricted to Boston and its control jurisdictions. The results of the analysis showed evidence of a deterrent effect of the law on gun homicides, but no indication of displacement effects on non-gun homicides in Boston. Further refinements of the homicide analysis revealed that the deterrent effect of the law occurred principally among assault precipitated gun homicides as opposed to felony related gun homicides. The latter type were too infrequent and erratic in occurance to give reliable evidence of a deterrent effect.

In order to establish the reliability of the deterrent effect with respect to assault precipitated gun homicides, kill rates were computed using gun assaults with battery as the base. On the assumption that gun assaults with battery will remain equally deadly over this period, the kill rates provide a check on abnormal fluctuations in the numbers of homicides that cannot reasonably be attributed to the systematic effects of a policy intervention such as the Bartley-Fox law. This testing for random fluctuation led to two alternative estimates of the deterrent effects of the law.

Following the procedures developed and applied in the assault and robbery analyses, we estimated that the law produced a reduction of 10 assault precipitated gun homicides. Inspection of the kill rates for 1974 which serves as the base figure for this estimate, however, revealed that the number of assault precipitated gun homicides was abnormally low that year. Therefore, an alternative estimate based on the combined (biannual) number of assault precipitated gun homicides for 1973 and 1974 was conducted and yielded an estimated reduction of 38 assault precipitated gun homicides up to 1976 in Boston.

4. Interpretive Note: This analysis reveals that the Bartley-Fox gun law has affected the character of violent crime in Massachusetts. We see substantial decreases in gun related assaults, robberies, and homicides;

and conversely, more or less offsetting increases in non-gun armed assaults and robberies. This represents a shift from more serious to less serious forms of criminal activity since these crimes are more likely to result in injury and death when committed with guns. Indeed, gun assaults with battery and assault precipitated gun homicides were among the offenses experiencing proportionally the most substantial reductions. Thus, the shift from gun to non-gun armed assault and robbery is a move toward less potentially harmful and lethal forms of crime.

What we do not know is how the Bartley-Fox law accomplished these effects. Thus, we do not know whether the threat of punishment provided for by the law or the actual imposition of punishment under the law was responsible for the changing pattern of crime. The relatively immediate changes in gun and non-gun assault rates suggest that it was the law's punishment potential that altered assaultive behavior. The more delayed reduction in gun robberies suggests that the actual implementation of the law in the courts may have been more important in altering robbery behavior.

Moreover, we have not reached the point of knowing whether it is changes in punishments imposed for committing assault or robbery with a gun, or simply for carrying a gun without a license which is responsible for the altered crime pattern. This is, of course, critical for evaluating the relative advantages in terms of crime control of felony firearms laws which mandate additional punishment for crimes committed with a gun as compared to new felony firearms laws aimed at the ownership, possession and/or carrying of firearms, such as Bartley-Fox.

We do know from the analysis of court processing that carrying a firearm without a license was elevated by the Bartley-Fox law from a minor to a major crime in Massachusetts. Before the law, it was typically handled in the lower courts; after the law, such cases have typically been bound over or appealed

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to the superior courts. In the two tier court system of Massachusetts, with trial de neuvo at the superior court level, this amounted to a distinct change in the status of the offense within the criminal justice system. This change of status was accomplished in part by the increased severity of the prescribed punishment and in part by the limits set on judicial discretion under the law.

What we cannot say at this point is that mandatory sentencing or a one year minimum prison term are independently responsible for the observed changes in criminal behavior. First, we must establish the law's impact on the actual severity, certainty, and swiftness of punishments imposed, and then we must relate these variations in severity, certainty, and swiftness of punishment by court jurisdictions to jurisdictionally specific changes in the patterns of crime. In other words, we do not know whether the observed effects are a result of the certainty and severity of punishment being imposed under the new law, the altered way in which the criminal justice system is handling such cases, or the impression the new law has made upon the public apart from criminal justice processing changes.

We can address these questions by refining and extending the present analysis. The needed refinements will give us better estimates of the magnitude, timing, and duration of the law's effects. The needed extension will enable us to examine these effects over longer periods of time, on different types of offenders, and in the various court jurisdictions which may have handled such cases differently. The refinements and extensions we recommend are described in more detail in the following and final section of this analysis.

Summary of Impact Estimates on
Assault Robbery and Homicide in Massachusetts

	Boston			Non-Boston Massachusetts			Massachusetts		
Impact	1975	1976	Total	1975	1976	Total	1975	1976	Total
Gun Assault	-120.2	-234.8	-355.0	-194.9	-232.4	-427.3	-315.1	-467.2	-782.3
Non-gun Assault	+408.1	+499.4	+907.5	+303.0	+236.1	+539.1	+711.1	+735.5	+1446.6
Gun Robbery	-300.6	-569.7	-870.3	-149.4	-490.0	-639.4	-450.0	-1059.7	-1509.7
Non-gun Robbery	+593.9	+252.5	+846.4	+86.8	+141.0	+227.8	+680.7	+393.5	+1074.2
Assault Precipitated Gun Homicide (annual data)	-2.7	-7.4	-10.1	---	---	---	---	---	---
Assault Precipitated Non-gun Homicide (biannual data)	---	---	-28.3	---	---	---	---	---	---

B. Direction for Further Research

In most research endeavors there are findings that need further investigation, estimates that need refinement and relevant questions that time and resources prevented researchers from answering or even addressing. This project is certainly no exception. Such shortcomings and limitations must be acknowledged, but they presently indicate that further research should be conducted. In this case, however, the strength of the present study's findings and the potential of such a law for controlling criminal violence make it important, indeed critical in our view, to conduct further research on the impact of the Bartley-Fox law.

Below we detail the steps that we believe should be undertaken to refine and extend the present study. Specifically, we recommend that the estimates we have obtained in the current study be refined by (1)use of dynamic time series statistical modeling techniques, (2)improved specification of control jurisdictions, (3)investigation of the predictably confounding impact of alternative policy intervention, and (4)further examination of the impact of citizen reporting biases. We further recommend that this research be extended by (5) examining the effects of the gun law over a longer period of time, (6)separating the effects of legal sanctions actually imposed under the law from the effects of the accompanying publicity, (7)investigating offender specific adaptations to the law, and (8)exploring the potential uses of National Crime Panel (NCP) victimization survey data for alternative estimates and further analyses of deterrence, displacement, and reporting effects.

1. Use of Dynamic Modeling Techniques: Estimates of the gun law's effect should be refined through the application of dynamic intervention modeling techniques. To date, short-term intervention point techniques have established that significant shifts occurred following the introduction of publicity about the gun law. Previous research suggests that the initial deterrent effect of the law may be neutralized as information concerning the judicial processing of

Bartley-Fox cases becomes known. With dynamic modeling techniques developed by Deutsch and Sims (1978), Pack (1977), and others, we will be able to estimate the nature and duration of the law's impact as well as the initial point of significant shift in crime rates. These techniques will allow us to identify the form of trends or over time behavior of crime after the introduction of the Bartley-Fox law. The identification of the long-term pattern of post-intervention effects of the law is particularly important for making substantive understanding of how policy intervention affects criminal behavior. Importantly, these techniques will provide not only point estimates but also confidence intervals which indicate a range of statistically predictable estimates (at a given confidence level).

2. Improved Specification of Control Jurisdictions: The selection of control jurisdictions for the present analyses was made in terms of geographical location and community size. While these two criteria provide control groups similar on a variety of cultural and socio-demographic characteristics (to Boston and non-Boston Massachusetts), a more systematic selection of control jurisdictions is clearly possible and desirable. Control jurisdictions can be selected in terms of specific cross-sectional data (from the Census) and longitudinal characteristics (from the Department of Labor) as well as in terms of pre-intervention crime trends. The type of selection will identify control groups which more closely correspond to Boston and the rest of Massachusetts in terms of criteria which are thought to have an important effect on the level of crime and/or accurately predict future trends in crime.

The cross-sectional, socio-demographic data and characteristics of pre-policy intervention crime trends should be used to make initial selections of control jurisdictions. The longitudinal data (such as unemployment rates and income earnings which are available over time for many SMSA's) will be used

when they are available to provide measures of socio-demographic trends in the control jurisdictions and in Boston and Massachusetts. These data can be compared for the post-intervention periods. Control jurisdictions which exhibit substantially different trends from those in the Boston or non-Boston areas can then be eliminated. This process of control group identification will yield specific selecting criteria that will be explicit and, therefore, open to the review of other investigators.

3. Adjustment for Alternative Intervention Effects: Policy intervention effects can be obscured not only by ongoing socio-demographic trends which may independently affect the incidence of gun and non-gun related crime, but also by alternative policy intervention whose implementation has approximately coincided with the law or the period of its effect. Thus, a major policy intervention that may have independently affected the level of gun and non-gun criminal violence in Boston is the court-ordered desegregation of Boston's public schools. Desegregation proceeded in two major phases in Boston. The first phase was implemented in September 1974 and the second phase was implemented a year later. These interventions may have increased racial tension in the city and also interracial assaults and robberies without guns thereby spuriously inflating the displacement effects we have observed in Boston. With Boston Police Department manual record policy reports it will be possible to identify desegregation related crimes.

Another policy intervention which may have independently affected the level of gun crimes in Boston and the rest of Massachusetts is the Alcohol, Tobacco, and Firearm Commission (ATF) CUES program. The CUES program, initiated in 1976, was specifically designed to reduce the illegal sale of firearms. Estimating the potentially confounding effects of this policy intervention can be achieved with the acquisition of information concerning the timing and magnitude of various aspects of the CUES program. Information on CUES' program staff increases, weapon busts, prosecutions, investigations, etc. can be obtained

from the BDM Corporation's study of the CUES program in Boston, Chicago and Washington. Additional indicators of the CUES program's direct impact on offenders can be derived from information on the characteristics of guns used in crimes. The age and value of guns used in crimes, for instance, has been used by previous investigators (Zimring, 1975) as a measure of weapon availability. It should also be noted that certain characteristics of guns such as barrel length (which is an indicator of weapon concealability) may provide additional information about the impact of the Bartley-Fox law on offenders' behavior. In Boston, the serial number of all guns confiscated in crimes can be obtained from the Ballistics Unit of the Boston Police Department. The information on the characteristics of the weapon used by offenders in Boston for major crimes can be obtained from the ATF.

4. Further Adjustments for Possible Reporting Biases: Estimates of the gun law's effect should also be refined through further examination of the impact of biases and unreliabilities in reported crime statistics. For one thing, the above analysis of variation in assault precipitated homicides relative to reported gun assaults in Boston versus non-Boston Massachusetts should be extended to obtain pre- and post-Bartley-Fox values of this indicator in both impact and control jurisdictions on the assumption that in the aggregate, this will reflect the relative likelihood of citizens (over time and/or between jurisdictions) reporting gun assaults to the police. By extending the analyses to both pre- and post-Bartley-Fox periods, more precise estimates of the differential impact of the gun law on citizen reporting in Boston and non-Boston Massachusetts can be obtained.

In addition to refining the analysis of biases in reported assaults statistics we should also investigate potential reporting biases in robbery statistics. This can be undertaken for Boston with refined Boston Police Department crime statistics which, unlike the UCR's robbery statistics, differentiates between attempted and completed gun and non-gun armed robberies. Thus, as we did in the

analysis of gun assaults, we can examine the question of whether the relative number of less serious gun related robberies reported to the Police increased after the introduction of the gun law. If this occurred it would tend to obscure deterrent effects of the law on gun robbery.

5. Extension of the Impact Period Under Analysis: Beyond obtaining more accurate estimates of the gun law's impact, the present study should also be extended to examine the longer term impact of the Bartley-Fox law. Previous studies of policy interventions have tended to show a neutralized effect or the dissipation of intervention effects over time (Ross, 1976). In fact, in our refined robbery analysis for Boston, which could be extended through 1977, we observed a definite upturn in gun as opposed to non-gun armed robberies between 1976 and 1977 (Tables 38 and 39). This neutralization pattern has generally been interpreted as the result of compensatory movement among the sanctioning variables for the target offense, e.g., as the punishments for a given offense increase in accordance with a policy intervention, police become more reluctant to arrest or charge citizens with the offense. However, another possibility is that such a dissipation of intervention effects occurs quite independently of changes in sanctioning practices. It may be that the initial implementation of the law and the attendant publicity produce a period of cautious compliance until public attention and awareness fade.

6. Separation of Intervention and Deterrent Effects: We know from the evidence on court processing that the Bartley-Fox law has been followed by increases in severity of punishments varying by court jurisdictions. This research, however, does not establish whether the observed reduction in gun related crime rates is attributable to increased legal punishments; it may simply be a product of the policy intervention and people's beliefs and expectations about it, resulting perhaps from the attendant publicity. For instance, the significant reduction in gun assaults actually occurring before the effective

date of the law represents an intervention effect independent of (prior to) actual changes in sanctioning practices. This illustrates how policy interventions may create the illusion of deterrent effects without actual changes in sanctioning levels. To address this issue, variations in offense rates, reflecting gun related armed offenses, should be examined as a function of cross-sectional and over time variations in certainty and severity of the sanctioning practices of the respective court jurisdictions, thus enabling us to separate deterrence from intervention effects.

7. Analysis of Offender Specific Adaptations: The current research should be extended to study offender specific adaptations to the gun control law. Initial evidence already suggests that most potential gun offenders were not licensed to carry a gun, and that they did not become licensed in response to the gun law. Information on the types of offenders affected by the gun law and the patterns of adjustments offenders have made can be obtained from Parole and Probation Department data in Massachusetts. With a sample of offenders who committed gun related offenses prior to the Bartley-Fox law, we can track their subsequent history of offenses, and determine which ones continued to use firearms, which ones have switched to other weapons, and which ones have kept out of further trouble. A group of offenders who committed gun and non-gun related felonies after Bartley-Fox should be examined for their prior criminal records, specifically for the existence of prior gun related crime. With this data we can examine (at least for offenders with probation records) whether adaptations are specific to certain types of offenders, and whether these changes represent permanent modifications in offenders' behavior.

8. Possible Uses of National Crime Panel Victimization Survey Data: Finally, it is well known that not all crimes are reported to the police by victims or witnesses. Among the forms of criminal behavior we have examined here, assaultive behavior is the most subject to underreporting. Armed robberies

are less likely to be unreported, although non-gun armed robberies go unreported in substantial numbers. Homicides are the least likely to be missed in official statistics, although they may occasionally be misclassified as suicides or missing persons. Since the findings of the above analyses are based on reported assaults, robberies, and homicides, they undoubtedly underrepresent the law's impact on the actual (reported as well as unreported) occurance of criminal violence. With victimization survey data from the National Crime Panel (NCP) sampling points in Massachusetts, it may be possible to estimate the degree of underreporting of the offenses analyzed here, and thus to adjust our impact estimates to reflect the actual incidence of crimes occurring before and after Bartley-Fox implementation.

A further point that should be investigated is the possible use of the NCP victimization data to independently evaluate the impact of the law on serious criminal behavior. In view of the restricted sub-sample of cases available from Massachusetts, this could probably be accomplished only for the aggregate before and after Bartley-Fox periods and perhaps only for aggregate categories of criminal behavior. However, now that we have identified categories of crime for which substantial deterrence and displacement effects have been established, it might be possible to obtain reliable estimates for composite crime categories from the victimization data by grouping the categories of offenses which show a common effect (e.g., for a composite deterrence estimate group, gun assaults and gun robberies; for a composite displacement estimate group, non-gun assaults and non-gun robberies). In this way alternative impact estimates might be obtained quite apart from the UCR data, and thus serve as an independent check on the results developed in this analysis.

Moreover, the NCP victimization data contain information on the reporting of crimes by their victims. Thus, in addition to comparing UCR and NCP estimates for similar categories to obtain evidence of reporting bias, it may be possible

to analyze the characteristics of victims who report, and their reasons for reporting to determine what aspects of the law may have stimulated citizen reporting behavior. We have evidence of changes in reporting behavior at least with respect to gun assaults; this could provide us with an opportunity to gain a better understanding of how and why such changes came about.

The use of victimization survey data from the NCP has long been recommended for the evaluation of localized policy interventions (see the National Academy of Sciences report Surveying Crime pp. 49-62). The Bartley-Fox law and its impact in Massachusetts may provide us with such an opportunity. Potentially, these data may yield relatively unbiased estimates of the law's impact on criminal violence, and explain changes in reporting behavior which is an important focus of the victimization survey. These possibilities also deserve further investigation for their value in demonstrating the applicability and utility of the NCP data for local policy intervention analyses.

TABLES REFERENCED IN THE ANALYSIS

Table 1

Armed Assaults Per 100,000 in Massachusetts and Regional Comparison Groups for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	121.9	137.6	150.7	158.4	167.2	171.5	179.8	194.9	204.5	201.5	+ 3.4
	% Change		12.9	9-5	5.1	5.6	2.5	4.9	8.4	4.9	-1.5	
North Central States	Rate	96.2	104.5	118.2	123.3	123.2	130.5	142.7	159.2	168.9	164.3	+ 3.2
	% Change		8.6	13.1	4.3	-.1	5.9	9.3	11.5	6.2	-2.7	
Middle Atlantic States	Rate	128.0	142.0	149.8	159.9	178.8	192.2	198.2	210.0	213.4	194.8	- 7.3
	% Change		10.9	5.5	6.7	11.8	7.4	3.2	6.0	1.6	-8.7	
New England Without Massachusetts	Rate	43.7	56.6	62.7	72.7	75.8	70.6	71.3	78.2	81.8	81.7	+ 4.4
	% Change		29.6	10.8	16.0	4.3	-6.9	1.0	9.6	4.6	-.0	
Counties Contiguous to Massachusetts	Rate	49.4	60.6	67.0	78.7	84.8	77.1	84.1	87.2	86.9	96.4	+10.5
	% Change		22.8	10.6	17.4	7.7	-9.0	9.1	3.7	-.4	11.0	
Massachusetts	Rate	56.7	65.5	71.1	79.0	90.7	98.8	117.3	131.6	150.9	154.9	+17.7
	% Change		15.5	8.6	11.1	14.9	8.9	18.7	12.2	14.7	2.7	

Table 2

Gun Assaults per 100,000 in Massachusetts and Regional Comparison Groups for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	32.2	39.8	44.7	49.3	54.4	57.5	62.6	66.9	68.2	64.0	
	% Change		23.5	12.4	10.3	10.3	5.7	8.8	6.9	1.9	-6.0	- 4.2
North Central States	Rate	27.6	34.3	41.0	45.5	46.3	48.7	54.6	60.7	63.5	59.1	
	% Change		24.3	19.6	10.9	1.8	5.2	12.0	11.1	4.7	-6.9	- 2.5
Middle Atlantic States	Rate	20.9	26.5	28.6	32.4	40.7	47.2	51.1	51.0	50.2	44.5	
	% Change		26.8	7.9	13.6	25.6	16.0	8.2	-.3	-1.5	-11.3	-12.6
New England Without Massachuestts	Rate	10.6	14.0	16.6	18.7	19.4	14.6	17.0	15.8	17.5	15.1	
	% Change		32.1	18.6	12.7	3.9	-24.6	16.2	-6.9	10.6	-13.9	- 4.8
Counties Contiguous to Massachusetts	Rate	11.1	13.9	16.3	19.9	20.5	14.7	17.0	14.2	16.1	14.2	
	% Change		25.1	17.6	22.0	2.9	-28.3	15.2	-16.3	13.3	-11.7	.0
Massachusetts	Rate	11.1	13.6	14.3	18.4	22.4	22.4	27.2	31.0	26.1	25.0	-19.3
	% Change		22.1	5.1	28.8	22.0	-.2	21.3	14.1	-15.7	-4.3	

Table 3

Non Gun Armed Assaults Per 100,000 in Massachusetts and Regional Comparison Groups for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	89.7	97.8	106.0	109.1	112.8	114.0	117.2	128.1	136.4	137.4	
	% Change		9.0	8.3	2.9	3.4	1.0	2.9	9.2	6.5	.8	7.3
North Central States	Rate	68.6	70.2	77.2	77.8	76.9	81.8	88.1	98.5	105.4	105.2	
	% Change		2.3	9.9	.8	-1.1	6.3	7.7	11.8	7.1	-.2	6.8
Middle Atlantic States	Rate	107.1	115.5	121.2	127.4	138.0	144.8	147.0	159.0	163.2	150.2	
	% Change		7.8	5.0	5.1	8.3	4.9	1.5	8.1	2.6	-7.9	-5.5
New England Without Massachusetts	Rate	33.1	42.6	46.1	54.1	56.5	56.0	54.3	62.4	64.3	66.7	
	% Change		28.7	8.3	17.2	4.4	-.9	-2.9	14.7	3.1	3.8	6.9
Counties Contiguous to Massachusetts	Rate	38.2	46.7	50.7	58.7	64.2	62.4	67.2	73.1	70.8	82.2	
	% Change		22.2	8.5	15.9	9.4	-2.8	7.7	8.7	-3.1	16.1	12.5
Massachusetts	Rate	45.6	51.9	56.8	60.6	68.3	76.4	90.1	100.6	124.8	130.0	
	% Change		13.9	9.5	6.6	12.7	11.9	17.9	11.6	24.1	4.1	29.2

Table 4

Percent Gun Assaults of Total Armed Assaults in Massachusetts and Regional Comparison Groups for the period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Percent	26.4	28.9	29.7	31.1	32.5	33.5	34.8	34.3	33.3	31.8	- 7.3
	% Change		9.5	2.7	4.9	4.5	3.1	3.8	-1.4	-2.9	-4.6	
North Central States	Percent	28.7	32.8	34.7	36.9	37.6	37.4	38.3	38.1	37.6	36.0	- 5.6
	% Change		14.4	5.8	6.3	1.9	-.6	2.5	-.4	-1.4	-4.3	
Middle Atlantic States	Percent	16.3	18.7	19.1	20.3	22.8	24.6	25.8	24.3	23.5	22.9	- 5.8
	% Change		14.3	2.2	6.4	12.3	7.9	4.9	-5.9	-3.1	-2.8	
New England Without Massachusetts	Percent	24.2	24.7	26.4	25.7	25.6	20.7	23.8	20.2	21.4	18.4	- 8.9
	% Change		2.0	7.0	-2.8	-.4	-19.0	15.0	-15.0	5.8	-13.9	
Counties Contiguous to Massachusetts	Percent	22.5	22.9	24.4	25.4	24.2	19.1	20.1	16.3	18.5	14.7	- 9.5
	% Change		1.8	6.4	3.9	-4.5	-21.2	5.6	-19.3	13.7	-20.4	
Massachusetts	Percent	19.6	20.7	20.1	23.3	24.7	22.7	23.2	23.5	17.3	16.1	-31.5
	% Change		5.7	-3.3	16.0	6.2	-8.4	2.2	1.7	-26.5	-6.8	

Table 5

Estimated Shift in Gun Assaults Per 100,000 Inhabitants in Massachusetts for Successively Later Post-Intervention Points in 1975

# of Post-Intervention Months	Month of Intervention															
	Jan.		Feb.		March		April		May		June		July		August	
	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.
1	-.25	.48	-.06	.86	-.91	.01	-.49	.18	-.42	.26	-.13	.72	-.28	.44	-.43	.24
2	-.19	.50	-.48	.09	-.79	.00	-.50	.07	-.32	.26	-.22	.44	-.38	.18	-.22	.43
3	-.43	.09	-.53	.03	-.76	.00	-.45	.07	-.35	.16	-.31	.22	-.29	.27	-.23	.37
4	-.49	.04	-.57	.01	-.71	.00	-.47	.05	-.41	.08	-.26	.27	-.29	.23	-.21	.39
5	-.53	.02	-.55	.01	-.71	.00	-.51	.02	-.38	.10	-.27	.24	-.28	.24	-.16	.49
6	-.52	.02	-.57	.01	-.74	.00	-.48	.03	-.38	.09	-.27	.24	-.24	.30	-.19	.40
7	-.54	.01	-.60	.00	-.71	.00	-.49	.02	-.38	.08	-.24	.28	-.26	.24	-.20	.38
8	-.56	.01	-.58	.00	-.71	.00	-.48	.02	-.35	.10	-.26	.24	-.27	.22	-.20	.37
9	-.55	.01	-.59	.00	-.71	.00	-.46	.03	-.37	.08	-.26	.23	-.27	.22	-.19	.39
10	-.56	.01	-.59	.00	-.69	.00	-.48	.02	-.37	.08	-.27	.22	-.26	.24	-.19	.39
11	-.56	.01	-.57	.00	-.70	.00	-.48	.02	-.38	.07	-.26	.23	-.26	.24	-.19	.39
12	-.55	.01	-.58	.00	-.71	.00	-.48	.02	-.37	.08	-.26	.23	-.26	.23	-.17	.45

Table 6

Estimated Shift in Non Gun Armed Assaults per 100,000 Inhabitants in Massachusetts for Successively Later Post-Intervention Points in 1975

# of Post-Intervention Months	Month of Intervention															
	Jan		Feb		March		April		May		June		July		August	
	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.
1	.48	.55	.30	.67	.07	.92	.43	.54	.81	.25	1.81	.01	1.88	.01	2.35	.00
2	.42	.46	.23	.68	.25	.66	.66	.24	1.40	.01	2.15	.00	2.55	.00	.98	.16
3	.38	.47	.32	.54	.45	.39	1.10	.04	1.79	.00	2.65	.00	1.86	.00	.66	.33
4	.44	.39	.45	.36	.77	.13	1.42	.00	2.22	.00	2.25	.00	1.59	.00	.65	.33
5	.52	.30	.69	.17	1.03	.05	1.77	.00	1.99	.00	2.06	.00	1.55	.00	.55	.42
6	.67	.19	.88	.09	1.29	.02	1.63	.00	1.87	.00	2.03	.00	1.43	.01	.49	.47
7	.79	.14	1.08	.05	1.20	.03	1.55	.00	1.85	.00	1.92	.00	1.34	.03	.48	.48
8	.91	.11	1.02	.06	1.15	.03	1.54	.00	1.77	.00	1.84	.00	1.31	.03	.48	.48
9	.87	.13	.98	.08	1.15	.03	1.48	.00	1.69	.00	1.81	.00	1.31	.03	.48	.47
10	.85	.14	.98	.07	1.11	.04	1.43	.01	1.67	.00	1.81	.00	1.32	.03	.49	.47
11	.85	.13	.95	.09	1.07	.06	1.41	.01	1.67	.00	1.82	.00	1.33	.03	.49	.47
12	.83	.15	.92	.10	1.06	.06	1.41	.01	1.67	.00	1.83	.00	1.33	.03	.49	.48

Table 7

Armed Assaults per 100,000 in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Cities 250,000 - 500,000

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	172.6	204.6	226.7	240.2	256.4	252.9	267.0	289.5	313.6	324.5	
	% Change		18.5	10.8	6.0	6.7	-1.4	5.6	8.4	8.4	3.5	12.1
North Central States	Rate	135.4	159.5	176.2	189.3	183.1	203.6	209.9	255.9	278.0	292.3	
	% Change		17.8	10.4	7.4	-3.2	11.2	3.1	21.9	8.6	5.1	14.2
Middle Atlantic States	Rate	175.3	210.5	236.9	251.0	278.6	268.9	260.6	238.4	268.4	263.3	
	% Change		20.1	12.5	5.9	11.0	-3.5	-3.1	-8.5	12.6	-1.9	10.4

Cities 500,000 - 1,000,000

United States Without Massachusetts	Rate	206.8	248.1	296.7	295.9	294.8	280.9	278.2	290.2	298.3	290.8	
	% Change		20.0	19.6	-.3	-.4	-4.7	-.9	4.3	2.8	-2.5	.2
North Central States	Rate	148.7	174.2	229.0	229.8	216.4	212.9	214.0	252.5	272.8	266.6	
	% Change		17.2	31.4	.3	-5.8	-1.6	.5	18.0	8.1	-2.3	5.6
Massachusetts (Boston)	Rate	193.2	241.2	246.5	249.8	292.7	309.7	340.1	391.4	468.0	496.6	
	% Change		24.8	2.2	1.3	17.2	5.8	9.8	15.1	19.6	6.1	26.9

Table 8

Gun Assaults per 100,000 in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
Cities 250,000 - 500,000												
United States Without Massachusetts	Rate	51.0	64.9	73.9	78.2	88.1	89.7	99.1	108.1	115.4	111.5	
	% Change		27.2	14.9	5.8	12.7	1.9	10.5	9.1	6.7	-3.4	3.1
North Central States	Rate	42.6	58.4	66.4	72.3	68.4	76.7	83.0	101.6	115.7	117.1	
	% Change		37.0	13.7	8.8	-5.4	12.2	8.2	22.4	13.8	1.2	15.2
Middle Atlantic States	Rate	32.9	45.5	49.3	50.8	70.8	65.4	63.9	57.4	60.2	53.2	
	% Change		38.2	8.5	3.0	39.3	-7.6	-2.3	-10.1	4.8	-11.6	-7.4
Cities 500,000 - 1,000,000												
United States Without Massachusetts	Rate	58.3	78.5	99.2	102.7	106.7	104.7	105.9	111.7	113.8	103.3	
	% Change		34.6	26.4	3.5	3.9	-1.9	1.2	5.4	1.9	-9.2	-7.5
North Central States	Rate	57.5	76.8	111.2	106.4	102.4	98.3	101.6	120.9	130.0	119.2	
	% Change		33.5	44.7	-4.3	-3.7	-4.0	3.3	19.0	7.6	-8.3	-1.4
Massachusetts (Boston)	Rate	43.2	55.1	54.4	60.6	79.8	76.4	89.2	101.4	87.8	89.6	
	% Change		27.7	-1.3	11.4	31.6	-4.3	16.8	13.7	-13.5	2.0	-11.7

Table 9

Non Gun Armed Assaults per 100,000 in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Cities 250,000 - 500,000

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	121.6	139.7	152.8	162.1	168.4	163.2	167.9	181.3	198.2	213.0	
	% Change		14.8	9.4	6.0	3.9	-3.1	2.8	8.0	9.3	7.5	17.5
North Central States	Rate	92.7	101.1	109.7	117.0	114.8	126.9	126.8	154.2	162.3	175.2	
	% Change		9.0	8.5	6.6	-1.9	10.6	-.0	21.6	5.2	8.0	13.6
Middle Atlantic States	Rate	142.4	165.1	187.6	200.1	207.8	203.5	196.7	181.1	208.2	210.1	
	% Change		15.9	13.6	6.7	3.9	-2.1	-3.4	-8.0	15.0	.9	16.1

Cities 500,000 - 1,000,000

United States Without Massachusetts	Rate	148.5	169.6	197.4	193.1	188.1	176.2	172.3	178.5	184.6	187.5	
	% Change		14.2	16.4	-2.2	-2.6	-6.3	-2.2	3.6	3.4	1.6	5.0
North Central States	Rate	91.2	97.4	117.8	123.4	114.0	114.6	112.5	131.6	142.8	147.4	
	% Change		6.9	21.0	4.7	-7.6	.5	-1.9	17.1	8.5	3.2	12.0
Massachusetts (Boston)	Rate	150.0	186.0	192.1	189.2	212.9	233.3	250.9	290.0	380.2	407.0	
	% Change		24.0	3.2	-1.5	12.6	9.6	7.6	15.6	31.1	7.0	40.4

Table 10

Percent Gun Assaults of Total Armed Assaults in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
Cities 250,000 - 500,000												
United States Without Massachusetts	Percent	29.5	31.7	32.6	32.5	34.4	35.5	37.1	37.4	36.8	34.4	
	% Change		7.4	2.8	-.1	5.5	3.3	4.7	.6	-1.5	-6.6	- 8.7
North Central States	Percent	31.5	36.6	37.7	38.2	37.3	37.7	39.6	39.7	41.6	40.0	
	% Change		16.3	3.0	1.3	-2.2	.9	5.0	.4	4.8	-3.8	.8
Middle Atlantic States	Percent	18.8	21.6	20.8	20.3	25.4	24.3	24.5	24.1	22.4	20.2	
	% Change		15.0	-3.6	-2.7	25.4	-4.3	.9	-1.8	-6.9	-9.9	-16.1
Cities 500,000 - 1,000,000												
United States Without Massachusetts	Percent	26.2	31.6	33.4	34.7	36.2	37.3	38.1	38.5	38.1	35.5	
	% Change		12.2	5.7	3.8	4.3	2.9	2.2	1.1	-.9	-6.8	- 7.7
North Central States	Percent	38.7	44.1	48.5	46.3	47.3	46.2	47.5	47.9	47.7	44.7	
	% Change		13.9	10.1	-4.6	2.2	-2.4	2.7	.9	-.4	-6.2	- 6.6
Massachusetts (Boston)	Percent	22.4	22.9	22.1	24.3	27.3	24.7	26.2	25.9	18.8	18.0	
	% Change		2.3	-3.4	10.0	12.3	-9.5	6.3	-1.2	-27.6	-3.8	-30.4

Table 11

Estimated Shift in Gun Assaults per 100,000 INhabitants in Boston for Successively Later Post-Intervention Points in 1975

# of Post-Intervention Months	Month of Intervention															
	Jan.		Feb.		March		April		May		June		July		August	
	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.
1	-.41	.75	-.04	.97	-4.18	.00	-2.70	.05	.55	.69	-1.12	.41	1.04	.45	-1.13	.41
2	-.32	.76	-2.05	.05	-3.88	.00	-1.50	.16	-.14	.89	-.24	.82	.14	.89	-.58	.59
3	-1.50	.14	-2.47	.01	-3.03	.00	-1.59	.09	.18	.84	-.54	.58	.21	.82	-.33	.73
4	-1.87	.06	-2.14	.02	-2.97	.00	-1.22	.17	-.05	.95	-.44	.63	.30	.75	-.20	.82
5	-1.70	.08	-2.19	.01	-2.66	.00	-1.33	.12	-.00	.99	-.34	.70	.36	.69	-.29	.74
6	-1.77	.06	-2.01	.02	-2.70	.00	-1.26	.13	.04	.95	-.27	.75	.28	.75	-.40	.64
7	-1.67	.08	-2.07	.01	-2.63	.00	-1.18	.15	.08	.92	-.33	.70	.20	.82	-.35	.68
8	-1.71	.07	-2.03	.01	-2.57	.00	-1.13	.16	.04	.95	-.39	.65	.23	.79	-.35	.68
9	-1.70	.07	-2.00	.01	-2.52	.00	-1.16	.15	.00	.99	-.36	.67	.23	.79	-.34	.68
10	-1.68	.07	-1.97	.02	-2.54	.00	-1.20	.13	.02	.98	-.36	.66	.23	.79	-.34	.68
11	-1.67	.07	-1.98	.01	-2.57	.00	-1.18	.14	.02	.98	-.36	.67	.22	.80	-.35	.67
12	-1.68	.07	-2.01	.01	-2.55	.00	-1.18	.13	.02	.97	-.37	.65	.22	.79	-.27	.74

Table 12

Estimated Shift in Non Gun Armed Assaults per 100,000 Inhabitants in Boston for Successively Later Post-Intervention Points in 1975

# of Post-Intervention Months	Month of Intervention															
	Jan.		Feb.		March		April		May		June		July		August	
	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.
1	2.71	.32	.35	.89	.84	.75	.87	.74	4.37	.10	6.71	.01	10.07	.00	8.29	.00
2	1.94	.38	.63	.77	.96	.65	2.65	.22	6.08	.00	7.61	.00	12.18	.00	2.48	.41
3	1.88	.35	.79	.69	2.10	.29	4.25	.03	8.48	.00	12.00	.00	8.68	.00	1.92	.52
4	1.91	.32	1.61	.40	3.31	.09	6.21	.00	10.46	.00	9.73	.00	7.81	.00	2.04	.50
5	2.43	.20	2.52	.18	4.82	.01	7.84	.00	9.06	.00	8.92	.00	7.81	.00	1.85	.55
6	3.03	.12	3.67	.07	6.10	.00	6.97	.00	8.53	.00	8.87	.00	7.37	.00	1.85	.54
7	3.77	.07	4.64	.03	5.51	.01	6.65	.00	8.52	.00	8.25	.00	7.30	.00	1.84	.54
8	4.39	.05	4.24	.06	5.30	.01	6.68	.00	8.04	.00	8.08	.00	7.27	.00	1.84	.54
9	4.12	.07	4.09	.06	5.34	.02	6.34	.00	7.90	.00	7.98	.00	7.28	.00	1.85	.54
10	4.03	.08	4.13	.06	5.09	.02	6.25	.00	7.81	.00	7.98	.00	7.31	.00	1.85	.54
11	4.05	.07	3.95	.08	5.02	.02	6.18	.00	7.80	.00	8.05	.00	7.33	.00	1.85	.54
12	3.95	.09	3.90	.08	4.98	.02	6.18	.00	7.86	.00	8.10	.00	7.32	.00	1.85	.55

Table 13

Armed Assaults per 100,000 in Massachusetts Excluding Boston and Comparison Cities of Under 250,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	74.3	80.0	87.5	97.2	104.1	110.3	119.7	134.7	145.6	146.4	
	% Change		7.7	9.3	11.1	7.1	5.9	8.5	12.6	8.1	.5	8.7
North Central States	Rate	56.9	65.5	76.2	86.2	85.7	93.3	105.1	115.9	127.2	123.0	
	% Change		15.1	16.2	13.2	-.7	8.9	12.7	10.2	9.7	-3.3	6.2
Middle Atlantic States	Rate	49.5	39.0	41.1	44.7	54.1	63.1	70.8	76.4	76.2	77.0	
	% Change		-21.2	5.4	8.7	20.9	16.8	12.2	7.9	-.3	1.0	.7
New England Without Massachusetts	Rate	45.1	58.5	65.3	75.9	78.9	73.4	74.0	80.7	85.5	88.1	
	% Change		29.7	11.6	16.3	4.0	-7.0	.9	8.9	6.0	3.1	9.2
Massachusetts	Rate	25.0	25.9	31.3	38.9	44.1	50.7	67.0	73.3	80.0	78.7	
	% Change		3.7	20.7	24.2	13.5	14.9	32.3	9.4	9.1	-1.6	7.3

Table 14

Gun Assaults per 100,000 in Massachusetts Excluding Boston and Comparison Cities of Under 250,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	20.4	23.6	26.3	30.5	34.0	36.5	40.6	45.8	47.7	45.2	
	% Change		15.3	11.6	15.9	11.6	7.4	11.1	12.8	4.1	- 5.3	- 1.4
North Central States	Rate	16.5	20.2	24.7	28.8	30.6	34.3	40.1	44.5	46.9	43.8	
	% Change		22.2	22.4	16.6	6.4	12.2	16.9	10.9	5.4	- 6.6	- 1.6
Middle Atlantic States	Rate	8.7	7.4	8.7	9.3	11.9	14.1	15.3	15.9	15.2	15.0	
	% Change		-15.0	17.6	7.2	27.5	18.6	8.4	3.9	- 3.8	- 1.4	- 5.2
New England States Without Massachusetts	Rate	10.8	14.4	17.2	19.4	20.1	15.1	17.6	16.1	18.1	16.0	
	% Change		32.5	19.3	13.0	3.5	-24.6	16.5	- 8.9	12.4	-11.4	- .4
Massachusetts	Rate	3.7	4.2	5.2	8.5	9.2	10.1	13.2	15.2	12.3	10.6	
	% Change		14.7	21.9	64.3	8.6	9.5	30.8	15.4	-18.9	-14.2	-30.4

Table 15

Non-Gun Armed Assaults per 100,000 in Massachusetts Excluding Boston and Comparison Cities of Under 250,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	53.8	56.5	61.2	66.7	70.1	73.7	79.1	88.9	97.9	101.2	
	% Change		4.9	8.4	9.0	5.1	5.2	7.2	12.4	10.2	3.3	13.8
North Central States	Rate	40.4	45.4	51.5	57.5	55.1	58.9	65.0	71.4	80.3	79.2	
	% Change		12.2	13.5	11.6	- 4.2	7.0	10.3	9.8	12.5	- 1.3	11.0
Middle Atlantic States	Rate	40.8	31.6	32.4	35.4	42.2	49.0	55.6	60.6	61.0	62.0	
	% Change		-22.6	2.6	9.1	19.2	16.2	13.3	9.0	.6	1.6	2.3
New England States Without Massachusetts	Rate	34.2	44.1	48.1	56.5	58.8	58.2	56.4	64.6	67.4	72.1	
	% Change		28.9	9.0	17.4	4.2	- 1.0	- 3.1	14.5	4.4	6.9	11.6
Massachusetts	Rate	21.3	21.7	26.1	30.4	34.9	40.6	53.9	58.1	67.6	68.1	
	% Change		1.9	20.4	16.3	14.9	16.3	32.6	7.9	16.4	.7	17.1

Table 16

Percent Gun Assaults of Total Armed Assaults per 100,000 in Massachusetts Excluding Boston and Comparison Cities of under 250,000 Inhabitants

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	27.5	29.4	30.1	31.4	32.7	33.1	33.9	34.0	32.7	30.9	
	% Change		7.0	2.1	4.4	4.1	1.4	2.4	.2	-3.7	-5.8	- 9.2
North Central States	Rate	29.0	30.8	32.4	33.4	35.7	36.8	38.2	38.4	36.9	35.6	
	Change		6.2	5.3	3.0	7.1	3.1	3.7	.6	-4.0	-3.4	- 7.3
Middle Atlantic States	Rate	17.6	18.9	21.1	20.8	22.0	22.3	21.6	20.7	20.0	19.5	
	% Change		7.9	11.6	-1.4	5.4	1.6	-3.4	-3.7	-3.6	-2.4	- 5.9
New England Without Massachusetts	Rate	24.1	24.6	26.3	25.6	25.4	20.6	23.8	19.9	21.1	18.2	
	% Change		2.1	7.0	-2.8	-.5	-18.9	15.5	-16.3	6.1	-14.0	- 8.8
Massachusetts	Rate	14.7	16.3	16.5	21.8	20.8	19.9	19.6	20.7	15.4	13.4	
	% Change		10.6	1.0	32.3	-4.3	-4.7	-1.1	5.5	-25.6	-12.7	-35.1

Table 17

Estimated shift in Gun Assaults per 100,000 in Massachusetts Excluding Boston for Successively Later Post-Intervention Points in 1975

Month of Intervention

# of Post-Intervention Months	January		February		March		April		May		June		July		August	
	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.
1	-.06	.80	-.18	.47	.03	.91	-.56	.02	.17	.50	-.61	.01	-.23	.39		
2	-.13	.53	-.11	.59	-.25	.24	-.31	.14	-.17	.42	-.53	.01	-.12	.58		
3	-.10	.60	-.27	.16	-.16	.41	-.44	.02	-.21	.27	-.41	.03	-.18	.36		
4	-.21	.24	-.20	.26	-.27	.14	-.44	.01	-.18	.34	-.43	.01	-.18	.32		
5	-.18	.32	-.29	.10	-.29	.10	-.40	.02	-.21	.24	-.42	.01	-.13	.42		
6	-.25	.16	-.31	.07	-.27	.11	-.42	.01	-.21	.22	-.32	.04	-.13	.48		
7	-.26	.13	-.30	.08	-.29	.09	-.42	.01	-.16	.35	-.35	.02	-.14	.41		
8	-.25	.14	-.31	.07	-.30	.08	-.38	.02	-.18	.29	-.36	.01	-.15	.37		
9	-.27	.12	-.32	.06	-.27	.12	-.39	.02	-.19	.26	-.37	.01	-.14	.41		
10	-.27	.11	-.29	.09	-.30	.05	-.40	.01	-.20	.24	-.35	.01	-.18	.21		
11	-.25	.14	-.30	.08	-.31	.05	-.41	.01	-.19	.26	-.33	.02	-.19	.19		
12	-.26	.13	-.31	.07	-.29	.09	-.40	.01	-.19	.27	-.34	.01	-.17	.23		

Table 18

Estimated Shift in Non Gun Armed Assaults per 100,000 in Massachusetts Excluding Boston for Successively Later Post-Intervention Points in 1975

Month of Intervention

# of Post-Intervention Months	January		February		March		April		May		June		July		August	
	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.	Shift	Sig.
1	.02	.95	.07	.89	.27	.62	.21	.70	.95	.09	.32	.56	.79	.16	.01	.98
2	.05	.90	.18	.70	.29	.53	.58	.22	.84	.07	.59	.22	.61	.20	-.17	.72
3	.12	.79	.21	.63	.50	.26	.61	.17	.97	.03	.56	.22	.47	.31	-.28	.55
4	.14	.74	.35	.43	.89	.22	.71	.11	.95	.03	.49	.28	.39	.39	-.31	.51
5	.23	.60	.38	.39	.61	.17	.71	.10	.90	.04	.44	.33	.36	.42	-.41	.39
6	.25	.57	.42	.34	.61	.16	.69	.11	.87	.04	.42	.34	.29	.54	-.42	.38
7	.28	.53	.42	.33	.60	.17	.67	.12	.85	.05	.37	.42	.27	.55	-.41	.39
8	.28	.52	.42	.34	.58	.18	.66	.13	.82	.07	.36	.43	.28	.54	-.41	.38
9	.27	.53	.41	.35	.58	.18	.64	.16	.81	.07	.37	.42	.28	.54	-.41	.39
10	.27	.53	.40	.35	.56	.21	.63	.16	.81	.07	.36	.42	.28	.54	-.40	.40
11	.27	.53	.40	.38	.56	.21	.63	.16	.81	.07	.37	.42	.28	.54	-.40	.43
12	.27	.53	.39	.38	.56	.21	.63	.15	.81	.07	.37	.42	.29	.56	-.40	.43

TABLE 19

Knife assaults per 100,000 in Massachusetts, Boston, and Massachusetts Communities Excluding Boston

Regions	and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % of Change
Massachusetts	Rate	24.0	28.4	30.9	31.2	35.4	38.4	43.6	47.0	52.8	52.6	
	Change		18.3	8.9	.9	13.7	8.3	13.5	7.8	12.5	-.5	11.9
Boston	Rate	79.2	102.6	106.8	106.3	121.4	126.9	128.3	141.5	170.0	174.9	
	Change		29.4	4.1	-.5	14.2	4.5	1.2	10.2	20.2	2.9	23.6
Non Boston Massachusetts	Rate	11.2	11.7	13.6	13.6	15.6	18.2	24.5	25.8	26.6	25.2	
	% Change		4.8	16.4	-.4	15.0	16.5	34.5	5.4	3.2	-5.2	-2.1

TABLE 20

Other Deadly Weapons Assaults per 100,000 in Massachusetts, Boston, and Massachusetts Communities Excluding Boston

Regions	Annual Rate and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
Massachusetts	Rate	1.6	23.5	25.9	29.4	32.8	38.0	46.6	53.6	71.9	77.4	
	% Change		9.1	9.9	13.6	11.8	15.8	22.5	15.2	34.1	7.6	44.3
Boston	Rate	70.9	83.8	84.5	82.9	91.5	106.5	122.7	148.6	210.2	232.1	
	% Change		18.1	.9	-1.9	10.4	16.3	15.2	21.1	41.4	10.4	56.2
Non Boston Massachusetts	Rate	10.1	10.0	12.5	16.8	19.3	22.4	29.4	32.2	41.0	42.8	
	% Change		-1.4	25.0	34.5	14.8	16.1	31.2	10.0	26.8	4.4	32.4

Table 21

Gun Assaults with Battery and without Battery in Boston for the Period 1969 to 1977

Year		1969	1970	1971	1972	1973	1974	1975	1976	1977	1974-1976 % Change
Gun Assaults With Battery	Number	144	205	282	247	298	329	289	207	185	-37.1
	Annual % Change		+61.0	+37.6	-12.4	+20.6	+13.8	-12.2	-24.9	-10.6	
Gun Assaults Without Battery	Number	165	178	216	217	240	266	236	339	331	+27.4
	Annual % Change		+7.9	+21.3	+.4	+10.6	+10.8	-10.3	+43.6	-2.4	
% Gun Assaults Without Battery of All Gun Assaults	%	53.4	46.5	43.4	46.8	44.6	44.7	45.0	62.1	64.1	
	Total #	(309)	(383)	(489)	(464)	(538)	(595)	(525)	(546)	(516)	

Table 22

Percent of Gun Assaults Receiving Medical Treatment in Boston for the Years 1974, 1975 and 1976

	Year		
	1974	1975	1976
	%	%	%
Treatment			
Hospitalized	40.8	36.4	22.5
Other Medical Treatment	6.0	8.0	5.5
No Medical Treatment Mentioned	53.2	55.7	72.0
Total Number*	(201)	(176)1	(182)

*Based on 1/3 sample of manual record police reports in 1974,1975 and 1976

Table 23

Percent of Gun Assaults with Battery and Without Battery Requiring Medical Treatment in Boston for the Years 1974, 1975 and 1976

	a. With Battery			b. Without Battery		
	1974	1975	1976	1974	1975	1976
Treatment	%	%	%	%	%	%
Hospitalized	69.4	58.6	56.5	5.6	7.8	1.8
Other Medical Treatment	8.1	11.1	11.6	3.3	3.9	1.8
No Medical Treatment Mentioned	22.5	30.3	31.9	91.1	88.3	96.5
Total Number*	(111)	(99)	(69)	(90)	(77)	(113)

*Based on 1/3 sample of manual record police reports in 1974, 1975 and 1976

Table 24

Percent Gun Assaults Precipitated Homicides to Total Pool of Assaults in Boston and Non Boston Massachusetts for the years 1973-1975

	Total Gun Assaults (gun assaults & gun assault homicides)	Gun Assault Homicides	% Total Gun Assaults Resulting in Gun Homicides (Death)
Boston	1723	122	7.1
Non-Boston Massachusetts	1121	43	3.8

Table 25

Armed Robberies per 100,000 in Massachusetts and Regional Comparison Groups for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	84.6	111.7	130.1	156.8	176.8	168.6	169.6	189.8	195.8	172.2	
	% Change		32.0	16.5	20.5	12.7	-4.6	.6	11.9	3.2	-12.0	- 9.3
North Central States	Rate	85.0	97.5	120.6	146.8	150.6	146.1	152.1	178.4	189.4	160.8	
	% Change		14.7	23.7	21.7	2.6	-2.9	4.1	17.3	6.2	-15.1	- 9.9
Middle Atlantic States	Rate	116.4	172.8	193.1	254.1	330.8	298.7	274.7	291.4	298.0	261.9	
	% Change		48.5	11.8	31.5	30.2	-9.7	-8.0	6.1	2.2	-12.1	-10.1
New England Without Massachusetts	Rate	17.2	24.4	30.6	38.3	45.0	50.3	49.8	54.9	66.8	60.3	
	% Change		42.0	25.3	25.1	17.5	11.8	-1.0	10.4	21.7	-9.8	9.8
Counties Contiguous to Massachusetts	Rate	22.6	31.3	35.8	44.1	47.7	48.8	51.7	56.4	74.2	61.9	
	% Change		38.4	14.6	23.0	8.3	2.3	5.8	9.1	31.6	-16.5	9.8
Massachusetts	Rate	34.8	55.3	61.2	76.4	107.9	138.5	158.6	181.1	204.3	150.7	
	% Change		59.2	10.5	24.9	41.2	28.4	14.5	14.2	12.9	-26.2	-16.8

Table 26

Gun Robberies per 100,000 in Massachusetts and Regional Comparison Groups for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate								130.6	134.4	115.3	
	% Change									2.9	-14.2	-11.7
North Central States	Rate								142.9	151.5	126.4	
	% Change									6.0	-16.5	-11.5
Middle Atlantic States	Rate								146.2	147.3	130.6	
	% Change									.7	-11.3	-10.6
New England Without Massachusetts	Rate								32.0	38.5	34.0	
	% Change									20.5	-11.9	6.2
Counties Contiguous to Massachusetts	Rate								31.2	41.1	32.4	
	% Change									31.7	-21.3	3.7
Massachusetts	Rate								105.0	105.0	68.2	
	% Change									-.0	-35.0	-35.1

Table 27

Non Gun Armed Robberies per 100,000 in Massachusetts and Regional Comparison Groups for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate								59.2	61.4	56.9	
	% Change									3.7	-7.3	- 3.9
North Central States	Rate								35.5	37.9	34.3	
	% Change									6.8	-9.5	- 3.3
Middle Atlantic States	Rate								145.3	150.7	131.3	
	% Change									3.7	-12.9	- 9.6
New England Without Massachusetts	Rate								22.9	28.3	26.4	
	% Change									23.4	-6.9	14.9
Counties Contiguous to Massachusetts	Rate								25.2	33.1	29.5	
	% Change									31.5	-10.7	17.4
Massachusetts	Rate								76.0	99.3	82.5	
	% Change									30.7	-16.9	8.5

Table 28

Percent Gun Robberies of Total Armed Robberies in Massachusetts and Regional Comparison Groups for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Percent								68.8	68.6	66.9	
	% Change									-.2	-.2	- 2.7
North Central States	Percent								80.1	80.0	78.6	
	% Change									-.1	-1.7	- 1.8
Middle Atlantic States	Percent								50.2	49.4	49.9	
	% Change									-1.5	.9	- .5
New England Without Massachusetts	Percent								58.2	57.6	56.3	
	% Change									-1.0	-2.3	- 3.3
Counties Contiguous to Massachusetts	Percent								55.4	55.4	52.3	
	% Change									.1	-5.7	- 5.6
Massachusetts	Percent								58.0	51.4	45.3	
	% Change									-11.4	-11.9	-22.0

Table 29

Armed Robberies per 100,000 in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Cities 250,000 - 500,000

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	115.9	151.9	164.1	204.7	220.7	227.2	241.9	268.4	277.4	242.5	
	% Change		31.1	8.0	24.2	8.3	2.9	6.4	11.0	3.3	-12.6	- 9.6
North Central States	Rate	124.3	136.3	146.6	185.9	167.4	172.1	192.4	254.0	248.1	202.1	
	% Change		9.6	7.6	26.8	-10.0	2.8	11.8	32.0	-2.3	-18.5	-20.4
Middle Atlantic States	Rate	141.1	242.6	234.1	293.4	350.8	326.8	319.4	325.1	366.1	309.3	
	% Change		71.9	-3.5	25.4	19.6	-6.8	-2.3	1.8	12.6	-15.5	- 4.9

Cities 500,000 - 1,000,000

United States Without Massachusetts	Rate	155.8	228.3	283.9	304.9	300.9	269.3	276.6	330.8	353.3	297.3	
	% Change		46.6	24.4	7.4	-1.3	-10.5	2.7	19.6	6.8	-15.8	-10.1
North Central States	Rate	165.2	204.6	261.3	293.4	304.4	295.1	292.8	384.5	473.1	384.0	
	% Change		23.9	27.7	12.3	3.8	-3.1	-.8	31.3	23.0	-18.8	- 0.1
Massachusetts (Boston)	Rate	110.0	197.4	222.3	274.7	395.6	522.7	603.0	683.1	780.1	574.2	
	% Change		79.6	12.6	23.6	44.0	32.1	15.4	13.3	14.2	-26.4	-15.9

Table 30

Gun Robberies per 100,000 in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Cities 250,000 - 500,000

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate								194.2	203.7	171.2	
	% Change									4.9	-16.0	-11.8
North Central States	Rate								181.1	188.3	143.3	
	% Change									4.0	-23.9	-20.9
Middle Atlantic States	Rate								179.7	211.1	169.9	
	% Change									17.5	-19.5	- 5.5

Cities 500,000 - 1,000,000

United States Without Massachusetts	Rate								249.9	268.1	219.7	
	% Change									7.3	-18.0	-12.1
North Central States	Rate								300.9	374.0	301.1	
	% Change									24.3	-19.5	.1
Massachusetts (Boston)	Rate								363.4	356.9	234.4	
	% Change									-1.8	-34.3	-35.5

Table 31

Non Gun Armed Robberies per 100,000 in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Cities 250,000 - 500,000

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate								74.2	73.7	71.3	
	% Change									-.8	-3.2	- 3.9
North Central States	Rate								73.0	59.8	58.8	
	% Change									-18.0	-1.7	-19.5
Middle Atlantic States	Rate								145.4	155.0	139.4	
	% Change									6.7	-10.1	- 4.1

Cities 500,000 - 1,000,000

United States Without Massachusetts	Rate								80.9	85.2	77.6	
	% Change									5.3	-8.9	- 4.1
North Central States	Rate								83.6	99.1	82.9	
	% Change									18.5	-16.3	- 0.8
Massachusetts (Boston)	Rate								319.7	423.2	339.9	
	% Change									32.4	-19.7	+ 6.3

Table 32

Percent Gun Robberies of Total Armed Robberies in Boston and Comparison Cities with 250,000 to 1,000,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
Cities 250,000 - 500,000												
United States Without Massachusetts	Percent								72.4	73.4	70.6	
	% Change									1.5	-3.9	- 2.4
North Central States	Percent								71.3	75.9	70.9	
	% Change									6.5	-6.6	- .5
Middle Atlantic States	Percent								55.3	57.7	54.9	
	% Change									4.3	-4.7	- .7
Cities 500,000 - 1,000,000												
United States Without Massachusetts	Percent								75.5	75.9	73.9	
	% Change									.5	-2.6	- 2.2
North Central States	Percent								78.2	79.0	78.4	
	% Change									1.0	-.8	.2
Massachusetts (Boston)	Percent								53.2	45.8	40.8	
	% Change									-14.0	-10.8	-23.3

1. See Footnote 1 Table
2. See Footnote 2 Table
3. See Footnote 3 Table

Table 33

Armed Robberies per 100,000 in Massachusetts Excluding Boston and Comparison Cities of Under 250,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate	5.8	38.8	45.6	56.1	66.4	72.2	78.0	91.8	98.4	83.8	
	% Change		8.4	17.7	23.0	18.4	8.7	8.0	17.8	7.2	-14.9	- 8.8
North Central States	Rate	5.2	38.0	46.2	58.1	66.2	68.4	73.3	84.1	94.4	74.0	
	% Change		7.8	31.7	25.8	13.9	3.3	7.0	14.8	12.2	-21.6	-12.0
Middle Atlantic States	Rate	40.6	28.8	30.9	40.6	56.4	61.7	61.4	68.1	71.4	61.2	
	% Change		-28.9	7.3	31.2	38.9	9.4	- .5	11.0	4.8	-14.3	-10.2
New England States Without Massachusetts	Rate	17.9	25.3	31.8	40.0	46.8	52.4	51.8	57.1	70.5	65.5	
	% Change		41.4	25.7	25.8	17.1	12.0	- 1.2	10.2	23.4	- 7.0	-14.7
Massachusetts	Rate	17.3	23.4	24.6	29.8	41.5	50.8	58.4	68.5	75.5	56.1	
	% Change		34.9	5.3	21.3	39.1	22.4	14.9	17.3	10.3	-25.7	-18.1

Table 34

Gun Robberies per 100,000 in Massachusetts Excluding Boston and Comparison Cities of Under 250,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate								68.7	72.5	60.3	
	% Change									5.5	-16.8	-12.2
North Central States	Rate								67.0	73.2	56.6	
	% Change									9.3	-22.7	-15.4
Middle Atlantic States	Rate								41.7	43.2	38.0	
	% Change									3.7	-12.0	- 8.9
New England States Without Massachusetts	Rate								33.3	40.6	36.8	
	% Change									21.9	- 9.3	10.5
Massachusetts	Rate								47.1	48.7	31.1	
	% Change									3.3	-36.1	-34.0

Table 35

Non-Gun Armed Robberies per 100,000 in Massachusetts Excluding Boston and Comparison Cities of Under 250,000 Inhabitants for the Period 1967 to 1976

Regions	Annual Rates and % Change	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts	Rate								23.1	25.9	23.5	
	% Change									12.3	- 9.4	1.7
North Central States	Rate								17.1	21.2	17.4	
	% Change									23.5	-17.7	1.6
Middle Atlantic States	Rate								26.4	28.1	23.2	
	% Change									6.5	-17.6	-12.2
New England States Without Massachusetts	Rate								23.8	29.9	28.7	
	% Change									25.4	- 3.9	20.5
Massachusetts	Rate								21.4	26.9	25.0	
	% Change									25.6	- 6.9	17.0

Table 36

Percent Gun Robberies of Total Armed Robberies in Massachusetts Excluding Boston and Comparison Citites of Under 250,000 Inhabitants for the Period 1967 to 1976

	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1974-1976 % Change
United States Without Massachusetts								74.8	73.7 -1.6	72.0 -2.3	- 3.9
North Central States								79.6	77.6 -2.6	76.5 -1.4	- 3.9
Middle Atlantic States								61.2	60.6 -1.0	62.1 2.5	1.5
New England Without Massachusetts								58.3	57.6 -1.2	56.2 -2.5	- 3.6
Massachusetts								68.8	64.4 -6.3	55.4 -14.0	-19.4

Table 37

Armed Robberies by Location in Boston for the Period 1974 to 1976

Location	Annual Number and % Change	Year 1974	1975	1976	1977
Street	Number	1946	2293	2059	2012
	% Change		+17.8%	-10.2%	- 2.3%
Residence	Number	351	540	287	275
	% Change		+53.8%	-46.9%	- 4.2%
Taxi Cab	Number	638	611	340	409
	% Change		- 4.2%	-44.4%	+20.3%
Commercial Establishment	Number	1028	1019	703	543
	% Change		- .9%	-31.0%	-22.8%
Miscellaneous	Number	252	312	125	72
	% Change		+23.8%	-59.9%	-42.4%

Table 38

Gun Robberies by Location in Boston for the Period 1974 to 1977

Location	Annual Number and % Change	1974	1975	1976	1977
Street	Number	674	672	562	700
	% Change		- .2%	-16.4%	+24.6%
Residence	Number	144	193	97	120
	% Change		+34.0%	-49.7%	+23.7%
Taxi Cab	Number	390	302	178	218
	% Change		-22.6%	-41.0%	+22.5%
Commercial Establishment	Number	861	823	558	417
	% Change		- 4.4%	-32.2%	-25.3%
Miscellaneous	Number	167	185	68	29
	% Change		+10.8%	-63.2%	-57.4%

Table 39

Non-Gun Robberies by Location in Boston for the Period 1974 to 1977

Location	Annual Number and % Change	Year 1974	1975	1976	1977
Street	Number	1272	1621	1497	1312
	% Change		+27.4%	- 7.6%	-12.4%
Residence	Number	207	347	190	155
	% Change		+67.6%	-45.2%	-18.4%
Taxi Cab	Number	248	309	162	191
	% Change		+24.6%	-47.6%	-17.9%
Commercial Establishment	Number	167	196	145	126
	% Change		+17.4%	-26.0%	-13.1%
Miscellaneous	Number	85	127	57	43
	% Change		+49.4%	-55.1%	-24.6%

Table 40

Criminal Homicides in Boston and Comparison Cities of 250,000 to 1,000,000 Inhabitants, 1971-1976

a. Annual Criminal Homicides

Regions	Annual Number and % Change	1971	1972	1973	1974	1975	1976	1974-76 % Change
All United States Cities Except Boston	Number	3970	4164	4273	4519	4440	3786	
	% Change		+ 4.9	+ 2.6	+ 5.8	- 1.7	- 1.5	-16.2
North Central Cities	Number	544	596	580	609	613	494	
	% Change		+9.6	-2.7	+5.0	+6.6	-1.9	-18.8
Middle Atlantic Cities	Number	399	334	352	335	311	269	
	% Change		-1.5	+5.4	-4.8	-7.2	-1.4	-19.7
Boston	Number	115	104	135	134	119	82	
	% Change		-9.5	+29.8	-.74	-11.1	-31.0	-38.8

b. Biannual Criminal Homicides

Regions	Biannual Number and % Change	1971/72	1973/74	1975/76
All United States Cities Except Boston	Number	8134	8792	8226
	% Change		+ 8.1	- 6.4
North Central Cities	Number	1140	1189	1107
	% Change		+ 4.3	- 6.9
Middle Atlantic Cities	Number	673	687	580
	% Change		+ 2.1	-15.5
Boston	Number	219	269	201
	% Change		+22.8	-25.2

Table 41

Gun Homicides in Boston and Comparison Cities of 250,000 to 1,000,000 Inhabitants, 1971-1976

a. Annual Gun Homicides

Regions	Annual Number and % Change	1971	1972	1973	1974	1975	1976	1974-76 % Change
All United States Cities Except Boston	Number	2680	2828	2882	3140	2933	2417	
	% Change		+ 5.5	+ 1.9	8.9	- 6.5	-17.5	-23.0
North Central Cities	Number	394	444	438	470	427	347	
	% Change		+12.6	-1.3	+7.3	-9.1	-18.7	-26.1
Middle Atlantic Cities	Number	173	176	162	164	163	118	
	% Change		+ 1.7	- 7.9	+ 1.2	- 0.6	-27.6	-28.0
Boston	Number	55	50	81	70	55	31	
	% Change		-9.0	+62.	+13.5	-21.4	-43.6	-55.7

b. Biannual Gun Homicides

Regions	Biannual Number and % Change	1971/72	1975/76	1975/76
All United States Cities Except Boston	Number	5508	6022	5350
	% Change		+ 9.3	-11.1
North Central Cities	Number	838	908	774
	% Change		+ 8.4	-14.7
Middle Atlantic Cities	Number	349	326	281
	% Change		- 6.5	-13.8
Boston	Number	105	151	86
	% Change		+43.8	-43.0

Table 42

Non-Gun Homicides in Boston and Comparison Cities of 250,000 to 1,000,000 Inhabitants, 1971-1976

a. Annual Non-Gun Homicides

Regions	Annual Number and % Change	1971	1972	1973	1974	1975	1976	1974-76 % Change
All United States Cities Except Boston	Number	1290	1336	1391	1379	1507	1369	
	% Change		+ 3.6	+ 4.1	- 8.6	+ 9.3	- 9.2	- 0.7
North Central Cities	Number	150	152	142	139	186	147	
	% Change		+1.3	-6.6	-2.1	+3.4	-2.0	- 5.7
Middle Atlantic Cities	Number	166	158	190	171	148	151	
	% Change		-4.8	+2.0	-1.0	-1.3	+2.0	-11.6
Boston	Number	60	54	54	64	64	51	
	% Change		-1.0	0.0	+18.5	0.0	-20.3	-20.3

b. Biannual Non-Gun Homicides

Regions	Biannual Number and % Change	1971/72	1973/74	1975/76
All United States Cities Except Boston	Number	2626	2770	2876
	% Change		+ 5.4	- 3.8
North Central Cities	Number	302	281	333
	% Change		- 2.1	+18.5
Middle Atlantic Cities	Number	324	361	299
	% Change		+11.2	-17.1
Boston	Number	114	118	115
	% Change		+ 3.5	- 2.5

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Table 43

Percent Gun Homicides of Total Criminal Homicides in Boston and Comparison Cities of 250,000 to 1,000,000 Inhabitants, 1971-1976

a. Annual Percent Gun of Total Homicides

Regions	Annual Percent	1971	1972	1973	1974	1975	1976
All United States Cities Except Boston	Percent	67.5	67.9	67.4	69.5	66.1	63.8
North Central Cities	Percent	72.4	74.5	75.5	77.2	69.7	70.2
Middle Atlantic Cities	Percent	51.0	52.7	46.0	49.0	52.4	43.9
Boston	Percent	47.8	48.0	60.0	52.2	46.2	37.8

b. Biannual Percent Gun of Total Homicides

Regions	Biannual Percent	1971/72	1973/74	1975/76
All United States Cities Except Boston	Percent	67.7	68.4	65.0
North Central Cities	Percent	73.5	76.3	69.9
Middle Atlantic Cities	Percent	51.8	47.5	48.4
Boston	Percent	47.9	56.1	42.7

Table 44

Assault-Precipitated Gun Homicides in Boston and Comparison Cities of 250,000 to 1,000,000 Inhabitants, 1971-1976

a. Annual Assault-Precipitated Gun Homicides

Regions	Annual Number and % Change	1971	1972	1973	1974	1975	1976	1974-76 % Change
All United States Cities Except Boston	Number	2304	2390	2376	2586	2341	1948	
	% Change		+ 3.7	- 5.8	+ 8.8	- 9.4	-16.7	-24.6
North Central Cities	Number	332	372	354	402	337	273	
	% Change		+12.0	- 4.8	+13.5	-16.1	-18.9	-32.0
Middle Atlantic Cities	Number	140	140	138	137	136	95	
	% Change		0	- 1.4	- .72	- .72	-30.1	-30.6
Boston	Number	51	45	69	50	43	28	
	% Change		-11.7	53.5	-27.5	-14.0	-34.8	-44.0

b. Biannual Assault-Precipitated Gun Homicides

Regions	Biannual Number and % Change	1971/72	1973/74	1975/76
All United States Cities Except Boston	Number	4694	4962	4289
	% Change		+ 5.7	- 13.9
North Central Cities	Number	704	756	607
	% Change		+ 7.4	-19.7
Middle Atlantic Cities	Number	280	275	231
	% Change		- 1.8	-16.0
Boston	Number	96	119	71
	% Change		+24.0	-40.3

Table 45

Felony-Related Gun Homicids in Boston and Comparison Cities of 250,000 to 1,000,000 Inhabitants, 1971-1976

a. Annual-Felony Related Gun Homicides

Regions	Annual Number and % Change	1971	1972	1973	1974	1975	1976	1974-76 % Change
All United States Cities Except Boston	Number	376	438	506	554	592	469	
	% Change		+16.5	+15.5	+ 9.5	+ 6.2	-20.8	-15.4
North Central Cities	Number	62	72	84	68	90	74	
	% Change		+16.1	+16.7	-19.0	+32.3	-17.8	+ 8.9
Middle Atlantic Cities	Number	33	36	24	27	27	23	
	% Change		+ 9.1	-33.3	-12.5	0.0	-14.8	-14.8
Boston	Number	4	5	12	20	12	3	
	% Change[1]	--	--	--	+66.7	-40.0	-75.0	-85.0

b. Biannual Felony-Related Gun Homicides

Regions	Biannual Number and % Change	1971/72	1973/74	1975/76
All United States Cities Except Boston	Number	814	1060	1061
	% Change		+ 30.2	+ .1
North Central Cities	Number	134	152	167
	% Change		+ 13.4	+ 9.8
Middle Atlantic Cities	Number	69	51	50
	% Change		- 26.1	- 2.0
Boston	Number	9	32	15
	% Change[1]		—	-53.1

[1]Percent change estimates have not been calculated for percents with base number lower than 10.

Table 46

Kill Rates for Gun Assaults and Gun Robberies in Boston, 1971-1976

a. Assault-Precipitated Kill Rates

	1971	1972	1973	1974	1975	1976	1977
Rates	.153	.154	.188	.132	.130	.119	.123
Gun Assault-Precipitated Homicides	51	45	69	50	43	28	26
Gun Assaults (with battery)	282	247	298	329	289	207	185
Total of Assaults Plus Homicides	333	292	367	379	332	235	211

b. Robbery-Related Kill Rates

	1971	1972	1973	1974	1975	1976	1977
Rates	--	--	--	.0088	.0054	.0021	.0034
Gun Robbery-Related Homicides	4	4	11	20	12	3	5
Gun Robbery	--	--	--	2243	2204	1455	1485
Total Homicides Plus Robbery	--	--	--	2263	2216	1458	1490

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