



# **HOMICIDE RATES AND SUBSTANCE CONTROL POLICY**

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## Abstract

One theory of the primary cause of violent crime in the United States is that the prohibition of alcohol or drugs drives up the prices of these substances which creates a highly profitable and violent black market. In this paper I test this theory against other theories by performing a time series regression analysis between the United States' homicide rate and proxies for substance control policy, unemployment, gun control policy, religious activity, and drug use. Available data sets during the time period 1900 to 1997 are studied. My research indicates that the theory of the primary cause of violent crime in the United States which is most consistent with the available data is a violent black market caused by the War on Drugs today, and Prohibition in the 1920's.

# HOMICIDE RATES AND SUBSTANCE CONTROL POLICY

## Introduction

One theory of violent crime in the United States is that the prohibition of alcohol or drugs drives up the prices of these substances. This creates a highly profitable profession that can only be engaged in by persons who are willing to risk violent confrontation with law enforcement officials and, since this profession is outside the normal court system, with competitors as a mechanism for settling disputes. Drug and alcohol consumers could also resort to theft and violence to pay for the high cost of the substances they desire. If this theory is correct, there should be a strong correlation between the homicide rate and law enforcement activity to enforce the prohibition of alcohol or drugs. In this paper I test this theory against several other theories of the primary cause of violence in the United States by performing both simple and multiple time series regression analysis between the United States' homicide rate and proxies for substance control policy (figures 1-3), unemployment (figure 4), gun control policy (figures 5 & 6), religious activity (figure 7), and drug use (figure 8).

I used three different proxies for substance control policy: the rate of court commitments for Narcotic Drug Act and Prohibition Act violations between 1911 and 1941, the rate of persons charged with narcotic drug law and liquor law violations between 1932 and 1977, and the arrest rate for narcotic drug law violations between 1952 and 1997. As proxies for gun control policy, I used the rate of persons charged with weapons violations between 1932 and 1977, and the arrest rate for "weapons; carrying, possessing, etc." between 1952 and 1997. Drug use is measured by the percentage of high school seniors that have used different types of drugs in each graduating class from 1975 to 1997, unemployment is measured as the unemployed as a percent of the available labor force between 1900 and 1997, and religious activity is measured by church membership as a percentage of the U.S. population between 1906 and 1990. The results of the regression analyses (table 1) support the hypothesis that the prohibition of alcohol or drugs is the primary cause of violent crime in the United States.

Multiple regression analysis is used to attempt to fit the available data to the equation  $y_i = \sum m_j x_{ji} + b$  by solving for the coefficients,  $m_j$ , and the y-intercept  $b$ . For time series analysis,  $y_i$  is the homicide rate in the year  $i$ , and  $x_i$  is a data point in the year  $i$  from one of the proxies I wish to examine. When only one independent variable is tested using the equation  $y_i = mx_i + b$ , the method is called simple regression analysis. One of the requirements for multiple regression analysis to be valid is that all of the “independent” variables,  $x_i$ , be statistically independent of each other. When this is not the case the problem is called multicollinearity. Multicollinearity is a complication in the analysis I have attempted; the resolution to this problem is discussed in the section on Time Series Analysis. I also performed a cross-sectional analysis where  $y_i$  is the homicide rate in country  $i$ , and  $x_i$  is the number of arrests for drug offenses in country  $i$  (figure 9).

Regression analyses yields not only the best fit values for  $m_j$  and  $b$ , but also an indication of how good the data fit is which is reflected in the t-statistics,  $t$ , and the coefficients of determination,  $R^2$ . The t-statistic is equal to the slope,  $m$ , divided by the standard error of the slope and indicates how significant the  $x$  values are in predicting the  $y$  value; t-statistics greater than 2.6 are significant at the 1% confidence level for large samples. The  $R^2$  value is the fraction of the variation of the  $y$  value that is explained by the  $x$  values; an  $R^2 = 1$  indicates an exact fit, an  $R^2 = 0$  indicates no fit. For a discussion of regression analysis see Goldberger (1991).

## Previous Research

Many economists, such as Milton Friedman (1991: 57) and William Niskanen (1992: 238), have argued that the Drug War is responsible for the United States' crime problem. Bruce Benson et al. (1992: 679) performed a cross-sectional analysis of data from 67 Florida counties in 1986 and 1987 to determine if property crime is positively related to the intensity of drug enforcement activities. Harold Brumm et al. (1995: 509) examined data on 57 cities in 32 states in 1985 to determine if homicide rates are positively correlated with the percentage of a communities law enforcement resources that are devoted to the enforcement of drug laws. Both property crime and violent crime were determined to be positively correlated with the intensity of drug enforcement activities.

## Time Series Data Sets

### *Court Commitments by Offense (1911 - 1941)*

One of the older data sets used was the “Court Commitments by Offense” data published by the United States Department of Justice in “Federal Offenders.” A data series is available that includes Narcotic Drug Act violations (Federal 1941: 49) from 1911 until 1941 and Prohibition Act violations (Federal 1933-34: 103) for the entire period that people were imprisoned for federal prohibition violations (1920 to 1934). While Prohibition lasted from 1919 to 1933, court commitments still took place in 1934. This data set is particularly valuable since it, unlike the “Persons Charged ...” series (described below), separates Prohibition Act violations from all other liquor law violations. The data is presented as “Prisoners Received from the Courts by Federal Prisons, Reformatories and Camps, During each Fiscal Year Ending June 30 [years].” For analysis purposes, I divided this data by the estimated United States population for each year (Historical: 8) and regressed the homicide rate in year  $i$  against the commitments per 100,000 population in year  $i$ .

### *Persons Charged (1932 - 1956, 1963 - 1977)*

The data series “Persons Charged (Held for Prosecution), [year]; Number and Rates per 100,000 by Population Groups” was published by the United States Department of Justice in the “Uniform Crime Reports” from 1932 to 1956. This series was continued under the title “Disposition of Persons Formally Charged by the Police, [year]” from 1963 to 1977. From this data series I regressed the homicide rate in year  $i$  against the “weapons; carrying, possessing, etc.” series in year  $i$ . I also regressed the homicide rate in year  $i$  against the “narcotic drug laws” plus a portion of the “liquor laws” series in year  $i$ .

National prohibition was ended in 1933, but several states continued to enforce statewide prohibition laws for many more years while others prohibited the sale of hard liquor and allowed individual counties to continue prohibition. As of 1936, Alabama, Kansas, Mississippi, Oklahoma, and Tennessee still enforced statewide prohibition (Harrison 1936: 229). Kansas held out the longest and did not repeal prohibition until 1948 (Bader 1986: 253). I am interested in examining the effects of laws that are likely to give rise to a highly profitable black market; therefore, I only want to include outright prohibition violations. I do not want to include regulatory violations or violations of drinking age restrictions.

Since this data set does not separate prohibition violations from other liquor law violations it is difficult to determine what percentage of the liquor violations should be included. I choose to include all of the liquor violations from 1932 to 1934 and to phase out the inclusion of liquor violations during the next ten years. I included 90% of the liquor violations in 1935 and decreased the percentage by 10% each year until 1945. I included no liquor law violations after 1945. If no liquor violations are included after

1934, the  $R^2$  value for the regression between the homicide rate in year  $i$  and the prohibition and drug charge rate in year  $i$  falls from 0.77 to 0.69.

#### *Arrests (1952 - 1997)*

A data series entitled “Arrests, by Age Groups ..., [year]” was published by the United States Department of Justice in the Uniform Crime Reports from 1952 until after 1960. This data series gives the number of arrests and the total population of the cities covered which I used to calculate arrest rates per 100,000 population from 1952 to 1959. In 1960 a table titled “City and Rural Arrest Rates, 1960” was published and a series titled “Arrests, Number and Rate, [year], by Population Groups” was published from 1961 to present. Arrests per 100,000 population can be obtained directly from this data. From this data series I regressed the homicide rate against the “weapons; carrying, possessing, etc.” series. I also regressed the homicide rate against the “narcotic drug laws” series in year  $i$ .

#### *Unemployment (1900 - 1997)*

For the unemployed as a percent of the labor force I used a table titled “Unemployment: 1890 to 1970” (Historical 1975: 135) from 1900 to 1970, and a series of tables from the Statistical Abstracts of the United States from 1970 to 1997. From this data I regressed the homicide rate against the percent of the of the United States labor force that is unemployed.

#### *Church Membership (1906 - 1990)*

The data series “Membership of Religious Bodies, 1890 to 1970, and by Major Groups: 1951 to 1970” is available in “Historical Statistics of the United States, Colonial Times to 1970” (Historical 1975: 391). I used the available data points from this series between 1906 and 1970 and the data series “Religious Bodies -- Church Membership ...” from the “Statistical Abstract of the United States” for data points from 1970 to 1990 to obtain the number of total church members as a function of year in the United States. I then divided this data by the total United States resident population in each year to get the church membership as a percentage of the population. I then regressed the homicide rate against the church membership as a percentage of the United States population. As can be seen on figure 7 this data series is only continuous from 1944 to 1990.

#### *Drug Use (1975 - 1997)*

The percent of United States high school seniors that have used different types of drugs in each graduating class from 1975 to 1997 is available in “The World Almanac” under the title “Drug Use: America’s High School Seniors, [years]”. The data was collected by the University of Michigan Institute for Social Research and supported by the National Institute on Drug Abuse. From this data I regressed the homicide rate against the percentage of high school seniors who had ever used Cocaine, and Marijuana.

## Time Series Analysis

### *1911 - 1941*

From 1911 to 1941, I regressed the homicide rate against the prohibition and drug commitment rate and the unemployment rate. The two “independent” variables were statistically independent ( $t = 1.2921$ ) of each other. The results of the multiple regression analysis (table 1), indicate that the prohibition and drug commitment rate is statistically significant ( $t = 6.1757$ ), but the unemployment rate is not statistically significant ( $t = 0.8982$ ). The prohibition and drug commitment rate is by far the independent variable with the largest predictive power ( $R^2 = 0.5690$ ).

### *1932 - 1977*

From 1932 to 1977, I regressed the homicide rate against the prohibition and drug charge rate, the unemployment rate and the weapons charge rate during the years all of the data sets are available. Multicollinearity is apparent. The prohibition and drug charge rate is independent of the unemployment rate ( $t = 1.4322$ ), but the prohibition and drug charge rate is not independent of the weapons charge rate ( $t = 5.5479$ ), and the unemployment rate is not independent of the weapons charge rate ( $t = -3.3656$ ). By far the prohibition and drug charge rate is the dominant independent variable ( $R^2 = 0.7663$ ), but some predictive power improvement is gained by including the unemployment rate in a multiple regression model ( $R^2 = 0.8616$ ). When I further split this data set into the two periods 1932 to 1956 and 1963 to 1977 I found that the prohibition and drug charge rate is somewhat anti-correlated with the weapons charge rate during the first period ( $t = -2.0397$ ), but highly correlated with it during the second period ( $t = 6.9567$ ).

### *1952 - 1990*

From 1952 to 1990, I regressed the homicide rate against the drug arrest rate, the unemployment rate, the weapons arrest rate, and the church membership rate. None of the “independent” variables is statistically independent of the others: drug v. unemployment ( $t = 3.3037$ ), drug v. weapons ( $t = 22.3789$ ), drug v. church ( $t = -3.6348$ ). Both the drug arrest rate ( $R^2 = 0.7620$ ) and the weapons arrest rate ( $R^2 = 0.8764$ ) have significant predictive value as individual variables. So during this time period I have shown that the homicide rate is highly correlated with the drug arrest ( $t=10.8853$ ) rate which is highly correlated with the weapons arrest rate ( $t=22.3789$ ). All of the other t-statistics are negligible by comparison.

*1952 -1997*

From 1952 to 1997, I regressed the homicide rate against the drug arrest rate, the unemployment rate, and the weapons arrest rate. The drug arrest rate is on the borderline of statistical independence with respect to the unemployment rate ( $t = 2.7902$ ) and the drug arrest rate is highly correlated with the weapons arrest rate ( $t = 18.0560$ ). The unemployment rate and the weapons arrest rate are also statistically dependent ( $t=3.7094$ ). Both the drug arrest rate ( $R^2 = 0.5706$ ) and the weapons arrest rate ( $R^2 = 0.7979$ ) have significant predictive value as individual variables. Again I have shown that the homicide rate is highly correlated with the drug arrest ( $t=7.6472$ ) rate which is highly correlated with the weapons arrest rate ( $t=18.0560$ ). All other t-statistics are again small by comparison.

*1975 - 1997*

From 1975 to 1997, I regressed the homicide rate against the drug arrest rate, the unemployment rate, the weapons arrest rate, the marijuana use rate, and the cocaine use rate. Again there are significant multicollinearity problems and there is no evidence that any of the variables has significant predictive value. Due to multicollinearity, the multiple regression analysis is of little value. The simple regression analyses show that the drug arrest rate is of borderline significance, although with the opposite sign of previous time periods, and none of the other variables is statistically significant.

## Cross-sectional Analysis

As a supplement to the time series analysis discussed in the previous section, I performed a regression analysis between the per capita homicide rate in available Organization for Economic Cooperation and Development (OECD) countries and the per capita number of persons arrested for drug offenses in each of these countries. OECD countries were chosen in an attempt to obtain data from countries that were similar to the United States except for differences in substance control policy. In particular I wanted to avoid countries that had high homicide rates due to civil war or terrorist activities. I obtained the data shown in table 2 from the "International Crime Statistics: 1996," the "Uniform Crime Reports" and "The World Factbook of Criminal Justice Systems." When possible I used statistics from one of the two United States Department of Justice data sets. The Interpol data is not as reliable since it commonly includes attempted homicides under the title homicide rate.



The correlation is positive ( $m = 0.0035$ ), but the t-statistic is not significant ( $t = 1.4935$ ) and the data fit is extremely poor ( $R^2 = 0.0960$ ). I believe this is due to a combination of two factors. Several of the countries that have high drug arrest rates, such as Australia and Switzerland, are countries which have experimented with drug decriminalization. It is likely that most of the drug arrests reported for these countries resulted in a mild form of punishment more resembling a traffic ticket in the United States. The premise of this paper is that a highly profitable black market in drugs and alcohol is responsible for the United States' crime problem. It is unlikely that small fines would lead to such a black market. Most of the countries in the sample have both a much lower homicide rate and a much lower drug arrest rate than the United States. I believe the excellent correlation between substance control policy and the homicide rate in the U.S. is due to the fact that substance control policy in the U.S. has been so extreme by world standards. It is likely that in countries with both a low drug arrest rate and a low homicide rate, substance control policy does not have a significant impact on the homicide rate and that other variables are the dominant contributors to violent crime.

## Conclusion

In this paper I tested several theories of the primary cause of violent crime in the United States, by performing both multiple and simple regression analysis between the per capita homicide rate and proxies for the United States government's substance control policy, unemployment rate, gun control policy, religious activity, and drug use. The results are shown in table 1; the t-statistics are in parenthesis. Correlations between the "independent" variables are discussed in the text above. None of the correlations during the time period from 1975 to 1997 are very good ( $t < 3.0$ ). During all other time periods the correlation between the homicide rate and the substance control proxies are excellent ( $t > 6.0$ ) and during the last half of the twentieth century the correlation between the homicide rate and the gun control proxies are also excellent ( $t > 6.9$ ). While some of the other variables can be shown to be statistically significant, their predictive value is small by comparison.

The remaining question is what the strong correlation between the homicide rate, the United States' substance control policy, and, during the later half of the twentieth century the United States' weapons control policy, means. One possible theory for the correlation between the homicide rate and the substance control proxy is that homicides are caused by drug and alcohol use, and therefore homicides increase as drug and alcohol arrests increase. This theory does not explain the data. I have shown in table 1 that the fit between the homicide rate and the drug use rate is very poor, but this result is of somewhat limited value since drug use data is only available from 1975 to 1997 and none of the other proxies are significant during this time period. The best argument against the theory that substance abuse causes crime is the end of prohibition. The end of prohibition by the repeal of the 18th amendment in 1933 was a political choice unrelated to a change in alcohol use. This political choice was soon followed by a large decrease in the homicide rate. This indicates that the theory which is most consistent with the data is that changes in the homicide rate are responses to changes in substance control policy. I therefore conclude that the best theory of the primary cause of violent crime in the United States is a violent black market caused by the War on Drugs today, and Prohibition in the 1920's.

The excellent correlation of the homicide rate with the weapons arrest rate in the late twentieth century and the lack of a similar correlation during the prohibition era can be explained by studying the history of gun control legislation in the United States. The major gun control laws that have been passed by the United States Congress are the 1934 National Firearms Act, the 1938 Federal Firearms Act (Bijlefeld 1997: 61), and the Gun Control Act of 1968 (Bijlefeld 1997: 66). Guns are the dominant murder weapons today (Statistical 1994: 201) and it is probable that this was also true during the twenties. It is therefore rational that as homicides increased due to the drug war in the late twentieth century, weapons violations increased with them. Since there were no major gun control laws during most of the prohibition era, the increase in homicides during that time was not accompanied by an increase in weapons violations.

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**TABLE 1**  
**STATISTICAL RESULTS FROM REGRESSION ANALYSIS**

(t-statistics are in parenthesis)

**Homicide Rate (1911-1941) vs**

<b>Y Intercept</b>	<b>Prohibition and Drug Commitment Rate</b>	<b>Unemployment Rate</b>	<b>R<sup>2</sup></b>
6.4700 (27.3118)	0.6467 (6.1757)	0.0174 (0.8982)	0.5811
6.5654 (31.1107)	0.6208 (6.1875)		0.5690
7.1406 (19.4954)		0.0379 (1.2237)	0.0491

**Homicide Rate (1932-1977) vs**

<b>Y Intercept</b>	<b>Prohibition and Drug Charge Rate</b>	<b>Unemployment Rate</b>	<b>Weapons Charge Rate</b>	<b>R<sup>2</sup></b>
3.5862 (5.7763)	0.0134 (3.6388)	0.0354 (2.0659)	0.1430 (4.4669)	0.8763
4.8185 (26.8311)	0.02024 (12.7101)	0.08541 (5.2042)		0.8616
5.367 (28.7948)	0.0223 (11.1617)			0.7663
5.7580 (15.3907)		0.1326 (3.6293)		0.2574
5.2281 (8.7334)			0.0461 (2.9212)	0.1834

**Homicide Rate (1952-1990) vs**

<b>Y Intercept</b>	<b>Drug Arrest Rate</b>	<b>Unemployment Rate</b>	<b>Weapons Arrest Rate</b>	<b>Church Membership</b>	<b>R<sup>2</sup></b>
0.3552 (0.0843)	-0.0057 (-1.9789)	-0.0228 (-0.2664)	0.1348 (6.1321)	-0.0018 (-0.0274)	0.8900
0.8315 (0.1380)	0.0111 (8.5467)	0.0985 (0.8274)		0.0598 (0.6416)	0.7682
5.0862 (20.039)	0.0112 (10.8853)				0.7620
3.8423 (3.5230)		0.5935 (3.2267)			0.2196
1.6395 (4.501)			0.0917 (16.1905)		0.8764
31.9803 (3.5576)				-0.3997 (-2.7542)	0.1701

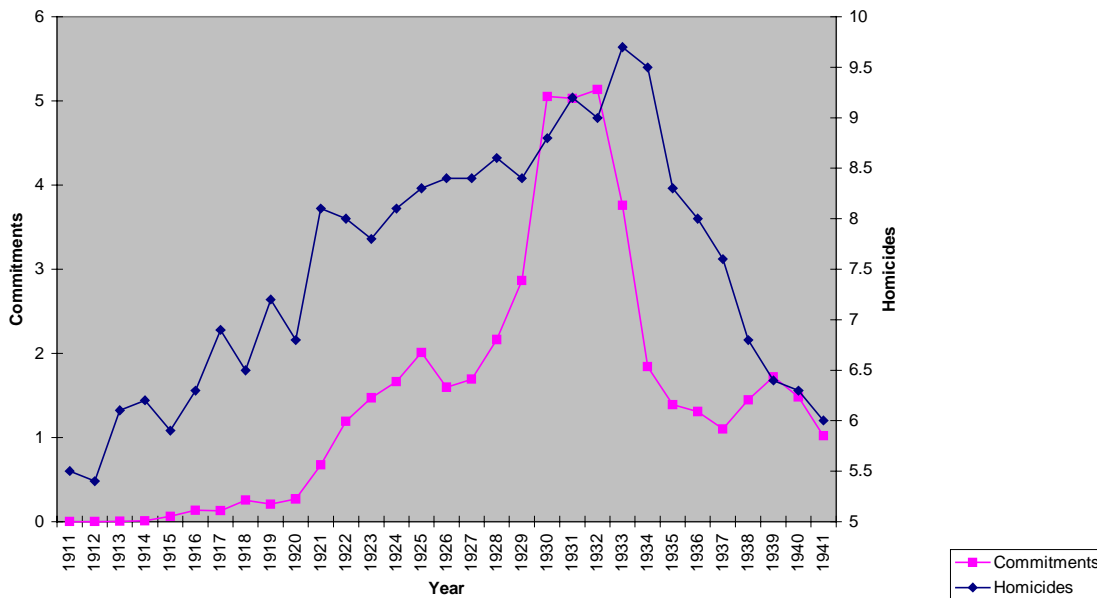
**Homicide Rate (1952-1997) vs**

<b>Y Intercept</b>	<b>Drug Arrest Rate</b>	<b>Unemployment Rate</b>	<b>Weapons Arrest Rate</b>	<b>R<sup>2</sup></b>
0.2795 (0.4400)	-0.0071 (-3.9360)	0.0252 (0.2814)	0.1322 (8.2918)	0.8562
3.9612 (5.4334)	0.0069 (6.4903)	0.3148 (2.3824)		0.6207
5.5471 (17.7377)	0.0078 (7.6472)			0.5706
3.6933 (3.6480)		0.6473 (3.8210)		0.2491
2.3354 (5.7114)			0.0772 (13.1790)	0.7979

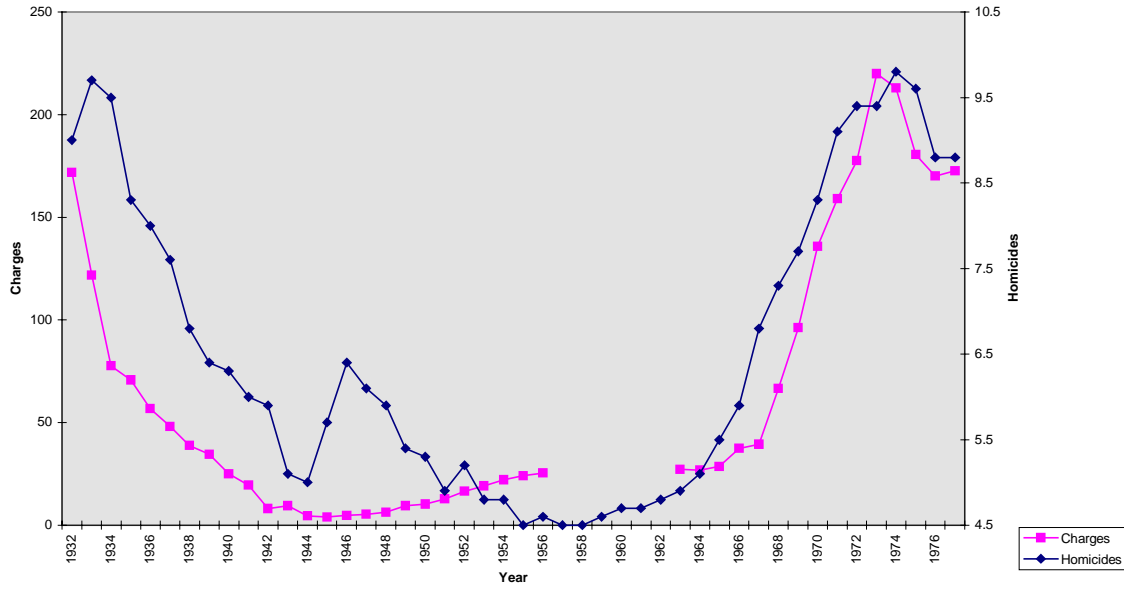
**Homicide Rate (1975-1997) vs**

<b>Y Intercept</b>	<b>Drug Arrest Rate</b>	<b>Unemployment Rate</b>	<b>Weapons Arrest Rate</b>	<b>Marijuana Use Rate</b>	<b>Cocaine Use Rate</b>	<b>R<sup>2</sup></b>
9.9351 (4.2377)	-0.0121 (-7.7303)	-0.2895 (-2.8056)	0.0751 (4.1624)	0.0078 (0.3002)	-0.0962 (-2.3003)	0.8022
10.2823 (18.8687)	-0.0038 (-2.8237)					0.2752
7.4576 (7.7439)		0.1993 (1.4208)				0.0877
8.3496 (5.4359)			0.0054 (0.2981)			0.0042
8.8601 (8.4646)				-0.0011 (-0.0541)		0.0001
8.7504 (16.1584)					0.0046 (0.1055)	0.0005

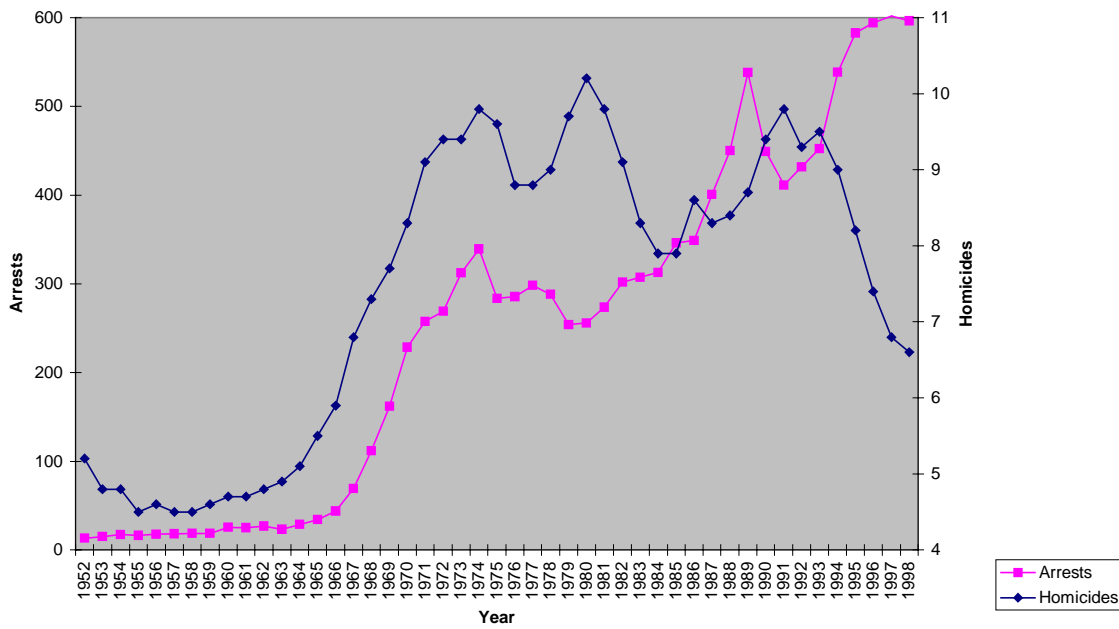
**FIGURE 1**  
**HOMICIDES AND COURT COMMITMENTS TO FEDERAL PRISONS FOR PROHIBITION AND NARCOTIC DRUG ACT VIOLATIONS PER 100,000 POPULATION AS A FUNCTION OF YEAR**



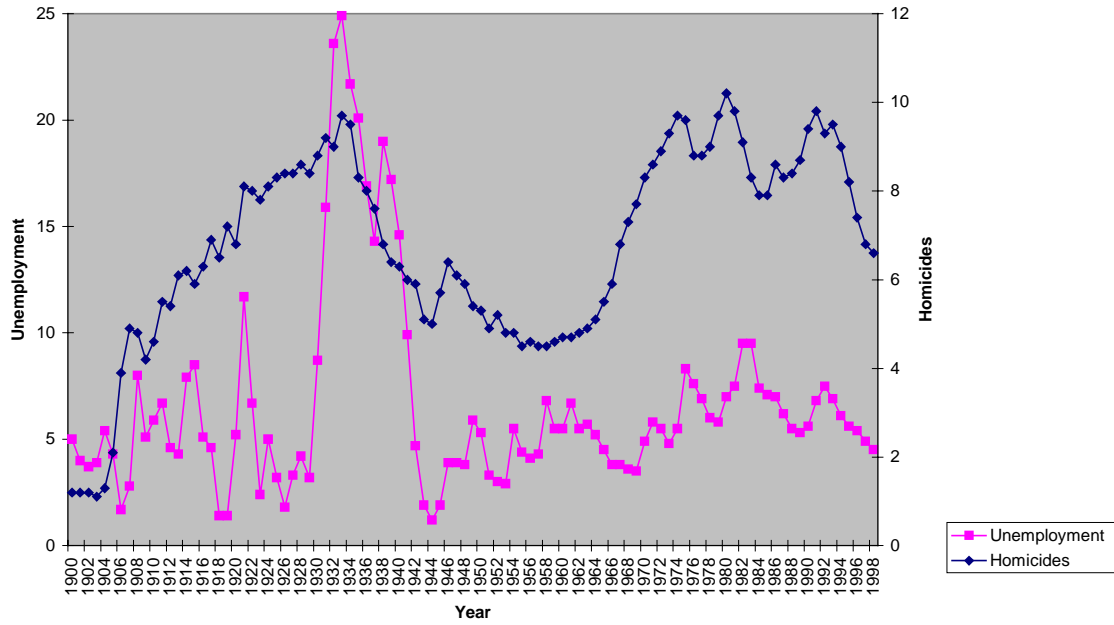
**FIGURE 2**  
**HOMICIDES AND PERSONS CHARGED WITH PROHIBITION AND NARCOTIC DRUG LAW VIOLATIONS PER 100,000 POPULATION AS A FUNCTION OF YEAR**



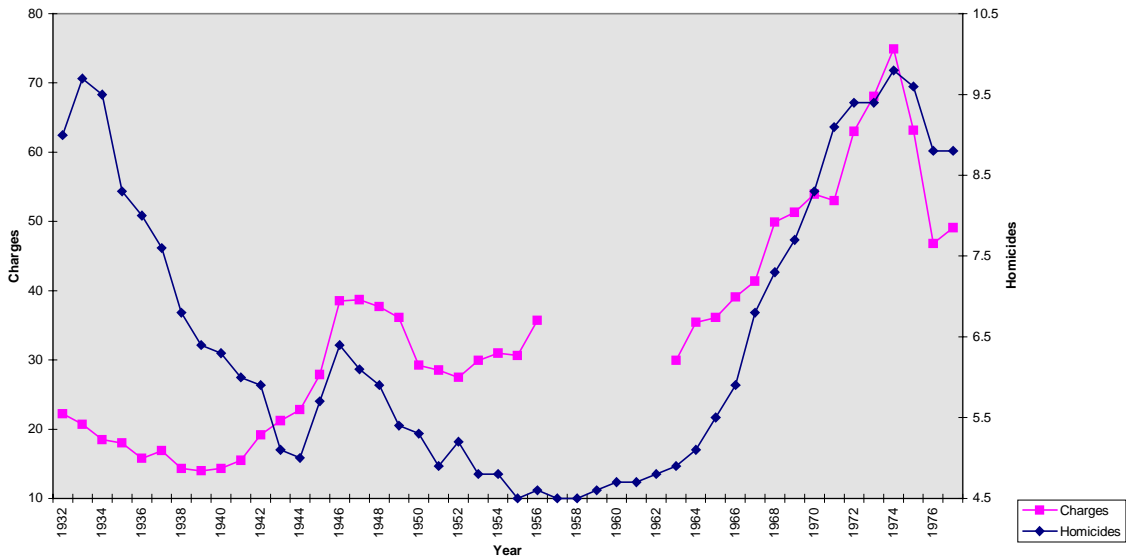
**FIGURE 3**  
**HOMICIDES AND ARRESTS FOR DRUG ABUSE VIOLATIONS PER 100,000 POPULATION AS A FUNCTION OF YEAR**



**FIGURE 4**  
**HOMICIDES PER 100,000 POPULATION AND UNEMPLOYMENT RATE AS A FUNCTION OF YEAR**

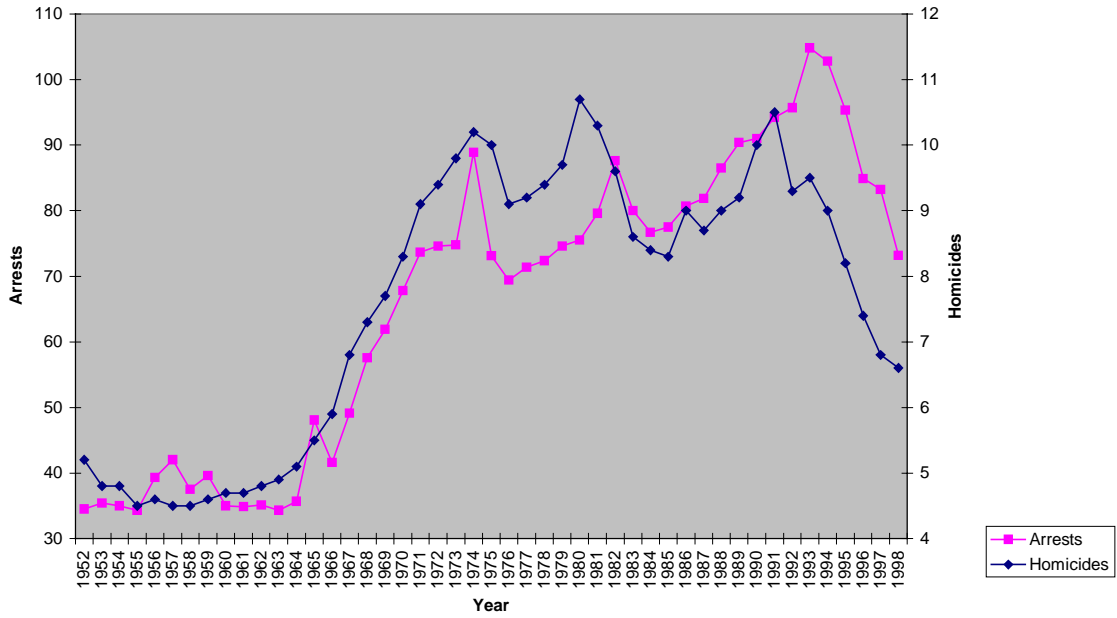


**FIGURE 5**  
**HOMICIDES AND PERSONS CHARGED WITH WEAPONS VIOLATIONS PER 100,000 POPULATION AS A FUNCTION OF YEAR**

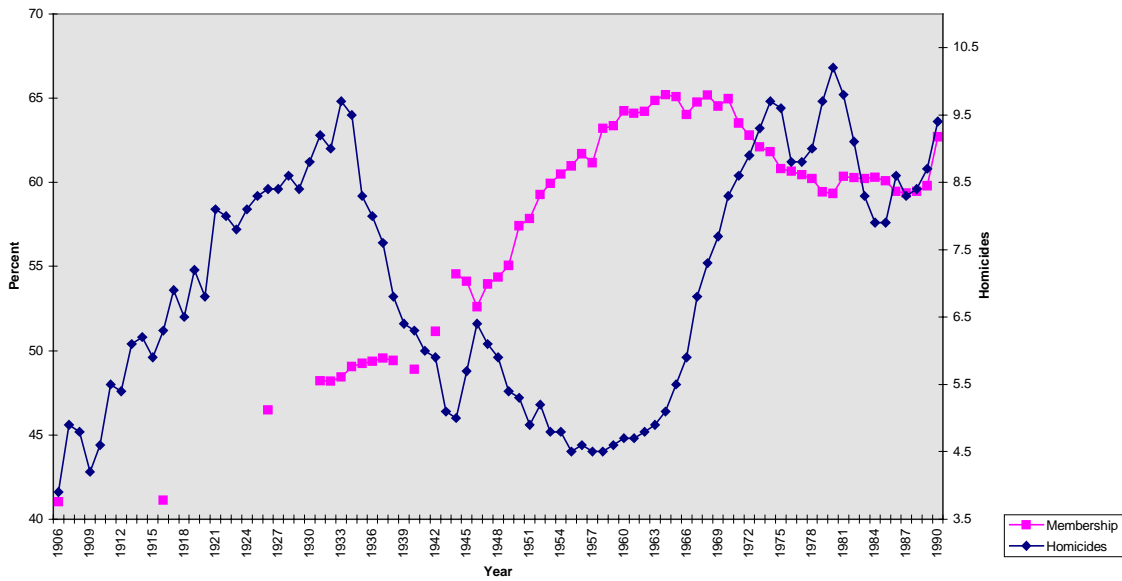




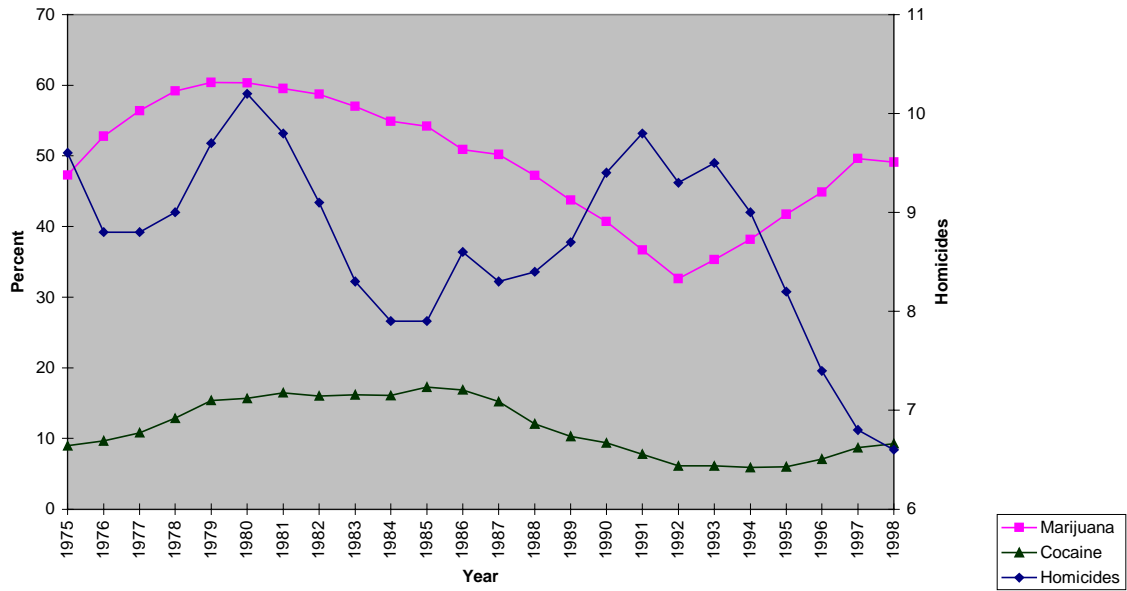
**FIGURE 6 HOMICIDES AND ARRESTS FOR WEAPONS VIOLATIONS PER 100,000 POPULATION AS A FUNCTION OF YEAR**



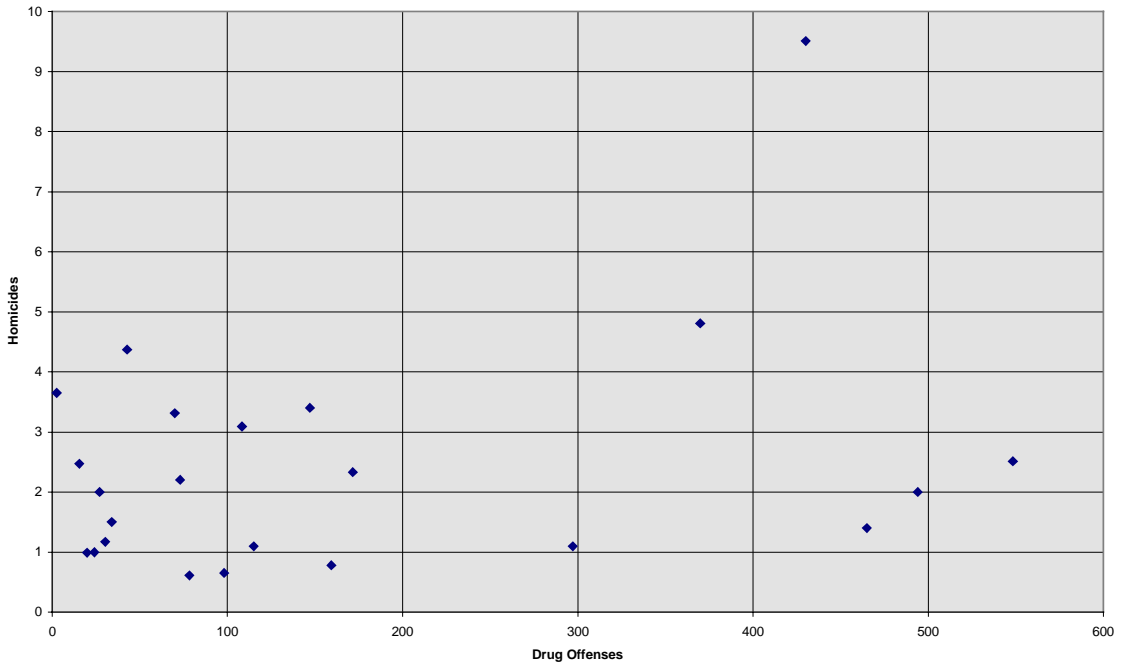
**FIGURE 7 HOMICIDES PER 100,000 POPULATION AND CHURCH MEMBERSHIP AS A PERCENT OF THE UNITED STATES POPULATION AS A FUNCTION OF YEAR**



**FIGURE 8**  
**HOMICIDES PER 100,000 POPULATION AND DRUG USE AMONG AMERICA'S HIGH SCHOOL SENIORS AS A FUNCTION OF YEAR**



**FIGURE 9**  
**HOMICIDES VS. DRUG OFFENSES PER 100,000 POPULATION FOR AVAILABLE OECD COUNTRIES**



**TABLE 2**  
**HOMICIDES AND DRUG OFFENSES PER 100,000 POPULATION IN**  
**AVAILABLE OECD COUNTRIES**

Country	Homicide Rate	Drug Offense Rate
Australia*	2.0	494
Austria	2.3	172
Belgium	3.1	108
Canada*	2.0	27
Denmark	4.8	370
Finland	0.6	78
France*	1.1	115
Germany*	3.4	147
Greece	2.5	15
Ireland*	0.7	98
Italy*	3.3	70
Japan	1.0	20
Luxembourg	0.8	159
Netherlands*	1.0	24
New Zealand*	1.5	34
Norway*	1.1	297
Portugal	4.4	43
Spain*	2.2	73
Sweden*	1.4	465
Switzerland	2.5	548
Turkey	3.7	2
United Kingdom*	1.2	30
United States**	9.5	430

Data points that are unmarked are from the “International Crime Statistics”, those marked with \* are from “The World Factbook of Criminal Justice Systems”, and those marked with \*\* are from the “Uniform Crime Reports.”