DETERMINANTS OF POLICE STRENGTH IN LARGE U.S. CITIES DURING THE 1990s: A FIXED-EFFECTS PANEL ANALYSIS

The 1990s represented a unique decade in which to analyze the determinants of police strength in the United States. This decade was a time in which crime initially increased then substantially decreased. Further, this decade also was characterized by increases in the minority population throughout large American cities. Finally, the 1990s were characterized by increasing police budgets. These realities have direct implications for the competing theories of police growth. This research examines the determinants of police strength in large U.S. cities from 1990-2000. A fixed-effects panel analysis was used to assess the number of sworn police officers per 100,000 population. The findings support the resource dependency and social conflict perspectives. Additionally, no support was found for the rational public choice perspective.

Introduction

The evolution of American police departments has been thoroughly detailed in scholarly research. Researchers have painstakingly documented the origin and historical development of police agencies, particularly in large cities (e.g., Fogelson, 1977; Lane, 1980; Monkkonen, 1981; Walker, 1977). There seems to be a consensus about how American police have changed from a semi-professional occupation under the control of a local political machine over a century ago to a well-organized and largely independent organization today (Greene, 2000; Kelling & Moore, 1988; Reiss, 1992; Uchida, 1993). There is a lack of agreement, however, on the factors associated with the development of American police in a democratic society.

The debate over the role and development of American police continues today (see Jacobs & Helms, 1997; Kent & Jacobs, 2005; Nalla, Lynch, & Leiber, 1997; Stucky, 2005). Three specific approaches seek to explain the fluctuation in the number of police officers; namely: the rational public choice theory, social conflict theory (economic and racial), and resource dependency theory. Each approach takes a unique view to explain the growth of American police departments.

Drawing upon these three perspectives, the purpose of this study is to advance knowledge on the growth of large American police departments during the 1990s, which represents a very unique period of time for two reasons. First, the 1990s represented the first decade in forty years in which the crime rate first increased then substantially decreased. This change was especially pronounced in large cities, which are the focus of the current study (Zhao, Scheider, & Thurman, 2002). Similarly, the tumultuous national economy during 1990s went from a healthy economic situation, to a pronounced downturn, and then ended in unprecedented prosperity. Despite these factors the number of officers has continued to rise, from 226.5 officers per 100,000 residents in

1990 to 242.8 officers per 100,000 residents in 2000, a net gain of 7.2 percent (Law Enforcement Officers Killed and Assaulted (LEOKA), 1990, 2000). Second, the decade from 1990 to 2000 represented a time in which both the population of minority residents and the size of police budgets continued to rise while the unemployment rate continued to fall**.** To date, there has been no empirical study that examines this unique period during the last decade of the twentieth century. The sample in this study includes all large cities with a population of over 150,000 people in the United States when data were available. A two-factor fixed-effects panel analysis is used to estimate the relative contribution of the three competing theories.

Literature Review

After a review of the existing literature, three major perspectives that attempt to explain changes in police strength were identified: rational public choice theory, social conflict theory (economic and racial), and resource dependency theory. Each theory offers a unique approach to explaining the reason for an increase in the size of a police force.

Rational Public Choice

Rational public choice theory posits that the supply of public goods and services is determined by the demands of the citizens similar to the general law of supply and demand. Citizens act rationally in response to escalating crime rates by demanding an increase in municipal services, like a greater police presence. Bergstrom and Goodman (1973) argued that decisions about the quantities of goods and services provided must be made collectively by the citizenry based on an objective assessment of the external environment. Consequently, a collective electorate, aware of the environment surrounding them, demands the optimal level of governmental services, like the proper amount of police officers employed (Borcherding & Deacon, 1972). In addition, the rational public choice perspective implies that citizens are aware

of the crime rates in their communities; thus, municipal police size should be proportional to the reported crime rate (Liska, Lawrence, & Benson, 1981)

Studies using quantitative methods to analyze the increase in police during the second half of the twentieth century reported mixed findings concerning this perspective. In a cross-sectional analysis of 91 Standard Metropolitan Statistical Areas (SMSAs) in the United States, Jacobs (1979) found that crime rates had a positive and significant effect on police and detectives per capita and all law enforcement per capita in the 1970s. While empirical support does exist for the rational public choice theory, other studies have not reported a relationship between crime rates and police strength (see Jackson & Carroll, 1981; Loftin & McDowall, 1982). For example, Greenberg, Kessler, and Loftin (1985) used a panel design to analyze the determinants of social control in cities with 50,000+ residents in the United States from 1950 to 1980. The authors found that both violent and property crime rates had no effect on the number of full-time police employees.

Other studies seeking to analyze the rational public choice perspective at different units of analysis have also produced mixed results. For example, Jacobs and Helms (1997) found support for the rational public choice theory at the national level. Their time-series analysis of the number of federal, state, and local police employees in the United States from 1952 to 1991 indicated that an increase in the crime rate resulted in an escalating law enforcement presence in the following year. Nalla (1992) also found support for the rational public choice theory at the national level between 1948 and 1984. In a time series analysis, the crime rate, operationalized as the number of personal and property offenses per 100,000 persons, had a positive and significant effect on police expenditures in the United States (Nalla, 1992). Prior studies that analyzed individual cities, however, have not found support for the rational public choice

perspective. For example, McDowall and Loftin's (1986) time-series analysis of Detroit from 1928 to 1976 indicated that serious crime did not influence the number of police employees.

Although researchers have operationalized and discussed the rational public choice theory in terms of many different types of crime, the central attention of crime control policy is usually paid to violent crime incidents. Some policing scholars are particularly frank about this point. For example, James Q. Wilson (1975) singled out violent street crime as the predominant concern of American society. He argued "… predatory crime, in particular crime committed by strangers on innocent victims, causes the kind of fear that drives people apart from one another and thus impedes or even prevents the formation of meaningful human communities (Wilson, 1975, p. 5)." Following this logic, the current study focuses on the relation between violent crime and police strength.

Social Conflict Theory

Social conflict theory traces the increase in the number of police officers to both economic and racial conflict (Turk, 1969). Although they are both steeped in conflict theory, economic and racial conflict perspectives are often separated because they each have unique measures and associated underlying logic.

Economic Conflict Theory. Economic conflict theorists argue that the law is not administered impartially for the benefit of the majority in society. On the contrary, differences in economic status allow those who possess resources to subjugate those who do not possess resources (see Chambliss, 1976; Chambliss & Seidman, 1982; Jacobs, 1979; Quinney, 1974, 1975). The best way to maintain the status quo is through a strong police force that controls the economically disadvantaged class (Jacobs, 1979; Turk, 1969). In addition to possessing economic resources, those with power are easily able to gain political influence (Chambliss &

Seidman, 1982). Economic conflict theorists thus propose that increased formal control mechanisms, like the police, are a result of the wishes of those with power who attempt to advance their own interests. Researchers have commonly used the unemployment rate to measure economic conflict with the expectation that high status individuals will view the unemployed as a threat to the existing social order (Kent & Jacobs, 2005).

The results of research seeking to link economic inequality to police strength have been mixed. In a cross-sectional study of all SMSAs with a population of greater than 250,000 in 1960 and 1970, Jacobs (1979) found that economic inequality had a positive and significant relationship with police and detectives per capita and all law enforcement personnel per capita. Recently, Kent and Jacobs (2005) utilized the natural log of the unemployment rate to assess the effect of economic inequality on police strength.[1] In their panel analysis of 125 cities in the United States with populations of at least 100,000 residents over three waves from 1980 to 2000, Kent and Jacobs (2005) found that the unemployment rate was a significant and positive predictor of police strength. The historical schism between those with economic status and those without economic status has been supported through prior qualitative research. Silver (1966) found that the police were initially intended to protect those with property, particularly in the South in the 19th century. One hundred years later, the National Advisory Commission on Civil Disorders (1968) chronicled the gulf between the decision-makers in local governments and the residents of the ghettos in the city. In essence, the impasse between the economically privileged and the economically unprivileged has been an enduring theme over time.

While considerable support does exist for the relationship between economic inequality and police strength, other studies have been forced to rely on suspect indicators of economic conflict or have found no support for the theory. Chamlin (1990), for example, was forced to

utilize the unemployment rate for the entire United States in a longitudinal analysis of police expenditures in Chicago because data of that nature were not available for that specific city.[2] Other research on the relationship between economic inequality and police strength has either found no significant relationship (Greenberg et al., 1985) or a significant and negative relationship (Nalla, 1992) that contradicts the underpinnings of the theory.

Racial Conflict Theory. While the economic conflict model argues class differences result in an increased police presence, racial conflict theorists argue that police strength is the result of a greater presence of racial and ethnic minorities (Turk, 1969). An increasingly visible minority population can be perceived as a crime problem (Blalock, 1967). As this perceived criminal threat from racial and ethnic groups becomes more salient, racial conflict theorists state that the majority White population often makes successful political demands for an additional police presence to quell the fear (Jacobs, 1979; Liska et al., 1981). The actual measured crime rate thus has a less substantial effect on the number of police officers than the perceived threat of criminal activity as influenced by the population of racial and ethnic minorities.

Empirical research has indicated a fairly consistent relationship between the size of the minority population and the strength of the police (see Chamlin, 1990; Greenberg et al., 1985; Huff & Stahura, 1980; Jackson & Carroll, 1981; Jacobs, 1979; Kent & Jacobs, 2005; Liska et al., 1981; Sharp, 2006). In their panel study of large U.S. cities between 1980 and 2000, Kent and Jacobs (2005) found a significant and positive relationship between racial composition, as measured by the natural log of the percentage of the Black population, and the strength of police. In addition, they found that the relationship between the percentage of African Americans and the per capita police officers has become stronger in the recent two Census years (1990 and 2000) (Kent & Jacobs, 2005). These findings indicate that the link between the size of the

minority population and the size of the police force may still be enduring despite the progress in race relations since the civil rights era (Kent & Jacobs, 2005). Other researchers have also found a significant relation between the African American population and police strength. In a time-series analysis of Milwaukee, Brandl, Chamlin, and Frank (1995) found that the percentage of Black residents had a significant and positive effect on the number of patrol officers.

While the aforementioned two studies focused specifically on the African American population, there has been debate about how to best operationalize the minority population. Liska et al. (1981) for example, focused on the total percentage of non-White residents. Other researchers have focused on the population of Hispanic residents (e.g., Jackson & Carroll, 1981) or the total percentage of minority residents (e.g., Nalla et al., 1997). In a thorough review and analysis of the relationship between minority populations and police strength, Sever (2001) found that the percentage of Black residents had the most consistent effect on police strength. Following the logic of Sever (2001), the current study focuses primarily on the relation between the African American population and police strength during the 1990s.

Resource Dependency Theory

Resource dependency theory states that the number of police officers is contingent on the amount of available financial resources within an organization (Donaldson, 1995; Pfeffer & Salancik, 1978). The theory holds that external resources and the ability to change are vital for organizations to survive and those resources that are so pivotal for survival and change are also scarce and limited (Pfeffer & Salancik, 1978). This theory remains popular in management science today (Casciaro & Piskorski, 2005; Pfeffer & Salancik, 2003). Applying the resource dependency perspective to the growth of police officers, the theory posits that change in police personnel is highly dependent on the availability of budgetary resources.

Prior research has mostly supported the resource dependency perspective at numerous different units of analysis. At the city level, Greenberg et al. (1985) analyzed revenue per capita as a determinant of police growth in their panel study of police employees in 259 U.S. cities between 1950 and 1980. The authors found the city revenue per capita variable had a positive relationship with police strength until the 1970 to 1980 panel (Greenberg et al., 1985). Research analyzing individual cities has also supported the resource dependency perspective. Nalla et al. (1997) found that police expenditures in Phoenix, Arizona, had a positive and significant effect on police expenditures in the following year. McDowall and Loftin (1986) used multiple indicators of revenue in analyzing the determinants of police growth in Detroit between 1928 and 1976. The variable measuring per capita revenues generated by the city of Detroit had a positive and significant effect on the number of police officers (McDowall & Loftin, 1986).

The current study hopes to add to the body of knowledge about the determinants of police strength by studying large American police departments. In addition, the current research analyzes the determinants of police strength during the 1990s, which represents the first decade in forty years in which the crime rate first increased and then substantially decreased. To date, this is the only study that focuses specifically on the 1990s when seeking to assess the determinants of police strength in American police departments.

Methodology

Sources of Data

The data used in this analysis were derived from five principal sources. The first source was obtained through the Police Employee (LEOKA) data, which is one of four types of files found in the Uniform Crime Reports (UCR). These data are intended to provide information about law enforcement officers killed or assaulted in the line of duty. In addition, the Police

Employee data provide more general information about the number of officers and the ratio of sworn police officers per population for police departments throughout the nation. The Police Employee annual data for the period from 1991 to 2000 were downloaded from the ICPSR web site (http://www.icpsr.umich.edu). A second type of data was obtained through the Annual Finance Survey of City Government conducted by the U.S. Census Bureau. The survey of local government finance officials asked questions concerning a wide variety of financial situations in a city government with respect to revenues, expenditures, debts incurred, and assets (cash, capital possessions, and security holdings). A unique feature of this annual financial survey was that all cities were required to complete the survey and submit it to the U.S. Census Bureau annually. In this study, financial information such as total expenditures for each city for the period from 1991 to 2000 was downloaded from the Census Bureau's website (http://www.census.gov/govs/).

The third source of data is the Uniform Crime Reports (UCR) published annually by the Federal Bureau of Investigation (FBI). UCR data reflect a nation-wide effort to collect criminal activity data from approximately 17,000 state, county, and municipal law enforcement agencies voluntarily reporting crimes that have been brought to their attention. These data on "crimes known to the police" contained in the UCR database for the period from 1990 to 1999 were also downloaded from the ICPSR web site. The fourth type of data gathered is the annual unemployment rate data for the period from 1991 to 2000 obtained from the Bureau of Labor Statistics website, which contains annual information about cities with over 25,000 residents (http://www.bls.gov). Finally, demographic information at the city level is also included from the 1990 and 2000 United States Census. The 1990 and 2000 data were obtained from the DVD disks published by the U.S. Census Bureau.

Variables in the Analysis

Dependent Variable. The dependent variable for this study is police strength, measured as the number of sworn police officers per 100,000 residents. Following prior research, a ratio of the number of sworn officers per population was utilized (see Jacobs & Helms, 1997; Kent & Jacobs, 2005; Nalla et al., 1997).

Independent Variables. Five independent variables were utilized to represent the rational public choice theory, conflict theory, and resource dependency theory. The violent crime rate represents the rational public choice theory.[3] It reflected the sum of the incidences of four specific crimes against persons (murder, rape, robbery, and aggravated assault) divided by each city's population and multiplied by 100,000. The authors selected this variable because violent crimes were the most salient type of crimes with respect to media coverage and public discussion, and they served as the centerpiece of the policy propositions in criminal justice and in the marketplace of political ideas and election campaign debates (Currie, 1985; Walker, 1985; Wilson, 1975). The violent crime rate variable was lagged for one year in the analysis, as was the common practice in the analysis of panel data to tap into the simultaneous relationship between crime and police strength (e.g., Marvell & Moody, 1996). For example, the 1990 violent crime rate was used to predict police strength in 1991. Such a lag effect was presumed throughout the analysis to follow.

Three variables were included to represent the conflict theory. First, the unemployment rate and per capita income were included as the measures of economic conflict in this study. There are a variety of different ways to measure economic inequality (see Alker & Russett, 1964). The unemployment rate was chosen as the measure of economic inequality in this study since it is plausible that the economically and politically elite will view a growing population of

individuals without work as a threat to the existing social structure (Chambliss, 1964; Kent & Jacobs, 2005). Further, an increasing number of unemployed individuals may cause resentment against the underclass and subsequently encourage demands for a stronger police force (Kent & Jacobs, 2005). The time-varying city level unemployment rates were obtained from the Bureau of Labor Statistics. Per capita income has long been used as a measure of poverty level as well as an indicator of the economic health of an area in prior studies (e.g., Marvell & Moody, 2001; Worrall, 2004). A per capita measure rather than the median family income was used to adjust for differences across cities and family size (Ross & Sawhill, 1975). In order to adjust for inflation, the annual Consumer Price Index (CPI) was used to convert the nominal dollars of per capita income from 1991 to 2000 to constant 2000 dollars. The CPI, reported by the Bureau of Labor Statistics, is the most commonly used indicator of inflation.

Second, following previous research, the percentage of the population that is Black was used to represent racial conflict (see Kent & Jacobs, 2005; Sever, 2001). The percent Black variable was calculated at the city level by adding the number of Black residents and dividing by the total number of residents. Data were obtained from the U.S. Census Bureau website. Since the U.S. Census is taken on a decennial basis, the estimated percentages for the missing years were calculated by using linear interpolation.

Finally, the annual city expenditure per resident was used as a measure of the resource dependency theory. City expenditure is defined as "all amounts of money paid out by a government during its fiscal year…Expenditure includes amounts spent by all agencies, boards, commissions, or other organizations categorized as dependent on the government concerned" (Annual Finance Survey of City Government). It was measured as the total amount of annual city expenditure divided by the city's population for the given year, adjusted by the annual CPI.

Control Variables. Five control variables designed to account for the socioeconomic health of cities also were included. The social disorganization perspective (Shaw & McKay, 1942) provides a framework for the inclusion of these variables in the current analysis (see also Bursik, 1988; Smith & Jarjoura, 1988). Recently, Garland (2000) argued that social disorganization increases demands for order. The crime rate may not capture all elements of social disorganization, but a greater perception of these threatening acts may still increase anxiety and lead to greater demands for a stronger police presence (Garland, 2001; Tyler & Boeckman, 1997). For this reason, it is necessary to control for various aspects of social disorganization that may not be captured by the crime rate. In this study, social disorganization is measured by five variables: the percentage of single-parent households, percentage of young people between the ages of fifteen to twenty-four, the percentage of home ownership, the population density (number of people in a square mile), and the percentage of people having lived at the same address for five years or more before the census. Researchers have consistently included variables measuring social disorganization in previous studies of police strength (see Kent & Jacobs, 2005; Nalla et al., 1997). Since census data on these measures were available only for every decade, linear interpolation was used to compute the missing values of these socioeconomic variables from 1991 through 1999 (Kovandzic, Sloan, & Vieraitis, 2002; Worrall & Kovandzic, 2007).

There were 112 cities in 1990 that reached the population of 150,000 or more residents. Among these municipalities, some 85 cities had complete data for police strength, violent crime rates, unemployment rate, per capita income, percentage of Blacks, annual municipal expenditures, and five control variables. Data for these 85 cities were used for the analysis.

Statistical Model Specification

This study used a panel design (longitudinal data, cross-sectional time series data, or multiple time-series design), which has long been considered the preferred method for the study of causation. For example, Campbell and Stanley (1967, pp. 55-57) referred to panel models as "excellent quasi-experimental designs, perhaps the best of the more feasible designs." Still other researchers argued that panel techniques were essential to the causal analysis of correlation findings derived from cross-sectional studies (e.g., Hsiao, 2003; Stimson, 1985).

More specifically, a two-factor fixed-effects panel analysis was employed to analyze the effects of rational public choice, social conflict, and resource dependency variables on police strength in 85 large cities in the United States from 1991 to 2000.[4] A fixed-effects panel model allows the analysis to control for unobserved systematic (nonrandom) variation (Hsiao, 2003; see also Kent & Jacobs, 2005, p. 740). The "two-factor" approach accommodates a geographic component represented by the cities in which police agencies reside, and a time-specific component represented by the ten years of data for each of the 85 cities. By investigating the "first factor" (the geographic component) through the inclusion of a cross-sectional dummy variable for each city in which the police agencies reside, the difference in police strength caused by unobserved variance occurring in each city was estimated. Each city was allowed to have its own intercept but shared the slope coefficients with the other cities, a total of 84 city dummies (Marvell & Moody, 1995; Pindyck & Rubinfeld, 1998). Similarly, the "second factor" (the time-specific component) involved the inclusion of year dummy variables (nine year dummy variables) that permitted the authors to control for those unknown factors (omitted variables) affecting police strength in these large cities that were not accounted for by the other

independent and socioeconomic variables. The two-factor, fixed-effects model has the following symbolic form:

$$Y_{it} = \alpha + \beta_1 CRIME_{i(t-1)} + \beta_2 UNEMPLOY_{it} + \beta_3 INCOME_{it} + \beta_4 BLACK_{it} + \beta_5 EXPENDITURES_{it} + \beta_6 COMM_{it} + \gamma_2 W_{2t} + \gamma_3 W_{3t} + \ldots + \gamma_N W_{Nt} + \delta_2 Z_{i2} + \delta_3 Z_{i3} + \ldots + \delta_T Z_{iT} + \varepsilon_{it}$$

where

$$W_{it} = \begin{cases} 1 \text{ for } \textit{ith} \text{ individual, i=2, …, N} \\ 0 \text{ otherwise} \end{cases}$$

$$Z_{it} = \begin{cases} 1 \text{ for } \textit{t}\text{th time period, t= 2, …, T} \\ 0 \text{ otherwise} \end{cases}$$

where Y_{it} is the number of sworn police officers per 100,000 residents for city *i* at year *t*. $\gamma_N W_{Nt}$ is the fixed effects for city *i* to be estimated. $\delta_T Z_{iT}$ is the fixed effects for year *t*. $CRIME_{it}$ is the total violent crime rate for city *i* at year *t-1*, representing the rational public choice theory. $UNEMPLOY_{it}$, $INCOME_{it}$, and $BLACK_{it}$ represent the three measurements of social conflict theory for city *i* at year *t.* $EXPENDITURES_{it}$ is the city expenditure per resident, while $COMM_{it}$ are the five control variables representing community characteristics. These symbols β_i (*i=1,2,3,4,5,6*) represented the associated coefficients to be estimated. Finally, ε_{it} is the error term. All statistical diagnoses, analyses and estimations were carried out in STATA.[5]

Findings

Figure 1 presents a graphic display of changes over time for the dependent variable and the five primary independent variables. Among these 85 cities, police strength began increasing in 1992, and the police ratio reached its highest point in 1999. More specifically, police strength went up from 221.06 in 1992 to 249.65 in 1999, a relative increase of 12.93 percent and an absolute growth of 28.59 officers per 100,000 population. The violent crime rate demonstrates an opposite trend. It started dropping in 1993, and the downward trend continued until 1999. The violent crime rate decreased from its peak level of 1,594.94 per 100,000 population in 1993

to 964.14 in 1999 in these 85 large cities, consistent with the national crime drop during the same period of time. While the unemployment rate exhibited a sharp decrease over the period of the 1990s, per capita income steadily went up from $18205.06 (in 2000 dollar) in 1991 to $19993.94 in 2000. The percentage of the population that is Black remained nearly constant among these 85 cities with a slight difference of 1.32% between 1991 and 2000. Finally, city expenditure per resident exhibited a steady increase over the course of the decade. City expenditure per capita increased from $1963.18 (in 2000 dollar) in 1991 to $2290.65 in 2000.

------ Figure 1 About Here ------

The descriptive statistics shown in Table 1 represent the average of 10-year means of each variable used in the panel study analysis. The grand mean of police strength in the 85 cities was 235.16 sworn officers per 100,000 population. In terms of the independent variables, the average violent crime rate for the 85 cities was 1295.53 incidents per 100,000 residents. The average total unemployment rate was 6.09 percent of the population in the 85 cities. In addition, per capita income was $19,099 (in 2000 dollars) on average and 23.09 percent of the residents living in these 85 cities identified themselves as Black. Finally, the average city expenditure for the 85 cities in the analysis was $2082.93 per resident during the period of ten years.

--- Table 1 About Here---

The demographic variables are based on two waves of Census data, using linear interpolation to fill in the intervening years. The demographic variables show that 36.03 percent of the households were headed by single parent. In addition, the percentage of young people ages fifteen to twenty-four was 16.03, and over half the population (51.61 percent) resided in owner-occupied dwellings. The average density of these cities between 1991 and 2000 was 4577.67 residents per square mile. Finally, the percentage of residents living in the same house

was 47.89. A complete list of the means of all variables for 10-wave data is included in Appendix A.

The results from the multivariate analysis are reported in Table 2. The initial theory attempting to explain changes in police strength is rational public choice, which posits that increases in violent crime will cause increases in police strength. The current analysis does not support the rational public choice perspective. More specifically, the violent crime rate does not have a significant impact on police force strength in the 85 cities during the 1990s.[6]

The next theory, social conflict, is measured through three variables. The first two variables, the unemployment rate and per capita income, represent the economic conflict theory. The analysis indicates that the unemployment variable is not a significant predictor of police strength, while per capita income is negatively correlated with the dependent variable. The coefficient for the per capita income variable suggests that an increase in $1 per resident in the annual income led to a decrease of about .004 sworn police officers per 100,000 in large U.S. cities over the period 1990 to 2000. In other words, every $1000 increase per resident annually will cause a decrease of 4 sworn officers per 100,000 population. This finding lends support to the economic conflict theory. The third variable, percentage of Black population, representing the racial conflict theory, manifests highly significant effects. An increase in 1 percent of Black population is associated with an increase in 5.54 police officers per 100,000 residents.[7] The significance of the Black population on police strength offers support for the racial conflict theory.

The final theory attempting to explain changes in police strength is resource dependency, which holds that police strength is influenced by municipal financial considerations. The

findings lend strong support for the resource dependency theory. An increase of $100 in city expenditures per resident will result in an increase of 2 officers per 100,000 residents.

--- Table 2 About Here ---

In addition to the findings regarding the three theories, two demographic predictors in the model manifested significant effects. An increase of 100 residents per square mile results in an increase of 3 sworn officers per 100,000 residents. In addition, the measure of mobility has a significant and negative effect on the police strength variable. An increase of 1 percent of individuals living in the same house results in a decrease of 4.12 officers per 100,000 residents.

Overall, the R-squared for the equation is extremely high at .98. This indicates that about 98 percent of the variance in the dependent variable, police strength, is explained by the model. An advantage of using fixed-effects panel analysis is that the relationship between the dependent and independent variables are estimated both within the groups (change in one city over time) and between groups (change among cities over time). It is essential to note that the independent and control variables explained slightly more than half of the variance in the dependent variable (R-squared 68 percent). The rest of the 30 percent was contributed by the nine year dummy variables and the 84 city specific dummy variables. Standardized coefficients were obtained to better assess the relative importance of per capita income, percentage of Black population, city expenditure per resident, and demographic variables (see Appendix B).

Discussion & Conclusion

The purpose of this article was to assess the relative impact of three competing theories on police employment in the last decade of the twentieth century. The results suggest that the 1990s proved to be a very unique decade for analyzing and discussing law enforcement trends in the United States. More specifically, four observations warrant discussion. First, despite the fact

that the 1990s represented the first decade in forty years characterized by a precipitous drop in crime, the variable measuring the percentage of Black population remained one of the strongest predictors of police strength. This finding supports the notion that decisions about police strength are based more on the perception of danger (i.e. percentage of Black population) than on objective measures of danger (i.e. crime rates). Garland (2001, p. 102), for example, reaches a similar conclusion with his assertion that law enforcement has become more "racialized" in its attempts to control populations that are perceived to be dangerous (see also Blalock, 1967). Sharp (2006) expanded by arguing that this trend seems to be static across many diverse cities, regardless of whether they are southern or northern or traditionally liberal or conservative. Given that the 85 large cities in this analysis represented many different geographies and political ideologies, this research further bolsters the underlying tenants of racial conflict theory.

The current analysis also demonstrates that the percentage of Black residents is the most important minority population to consider. In Appendix C, variables measuring the percentage of Hispanic residents along with the percentage of all other minority residents were included in the analysis along with the percentage of Black residents. The results indicate that the percentage of Black residents is the only measure of minority population that has a positive and significant effect on police strength. These findings are similar to Sever's (2001) conclusion that the percentage of Black residents has the most consistent effects on measures of police strength among all indicators of the minority population. Given the visible and often cantankerous immigration debate that is taking place in the United States, it will be interesting to see if future research detects a stronger positive association between the percentage of Hispanic population and police strength, especially considering the current economic downturn that plagues the United States.

Our second observation concerns the application of resource dependency theory in police research. The findings suggest that the change in police organizations largely depends on the availability of resources, which is similar to Lindbloom's (1959) long ago observation that the nature of organizational change is incremental. It is speculated that the increase in police strength was partially due to the role of the COPS Office in the 1990s with the infusion of $8.8 billion to fund law enforcement agencies through enhancement of their community policing capabilities. From the point of time when the Crime Act was passed in September of 1994 to August 10, 2001, the COPS Office estimates that over 83,000 new officers were on the street, which accounted for over 11 percent of law enforcement employment in the country (Zhao et al., 2002, p. 11). During a roughly similar time period from September of 1994 to 2002, more than $7 billion of the initially allocated $8.8 billion was awarded to law enforcement agencies (Zhao et al., 2002, p. 9).

As Donaldson (1995) pointed out, organizational innovations are closely associated with the availability of external resources. In the 1990s, a situation existed in which the Crime Act and the COPS Office facilitated funding for law enforcement agencies throughout the country. This was especially true for cities in this sample as the COPS Office funded every city with a population of over 150,000 residents. This level of funding could help to catalyze organizational innovation and change, in the form of new police officers; thus, a strong association existed in the 1990s between police expenditures, backed by grants from the COPS Office, and police strength, as measured through the ratio of officers to residents. There is a precedent for the association between federal subsidies and change in law enforcement agencies. In the 1970s, the Law Enforcement Assistance Administration (LEAA) subsidized a great deal of research on the police, which included the Kansas City Preventive Patrol Experiment. Ultimately, this research

had a significant effect on police reform efforts, including the shift to community and problem-oriented policing.

On the other side, the results did not lend support for the rational public choice perspective. Violent crime did not have a significant relationship with police strength in the 85 cities during the 1990s. Although this result may initially seem counter-intuitive, it may simply be a by-product of the fact that while the average ratio of officers to citizens increased during the 1990s, the crime rate fell precipitously after 1993. As pointed out earlier, the crime drop was the first after more than three decades of continuous increases in the nation's crime rate (1960s to 1992). The current study thus concludes that increases in police strength during the 1990s have little to do with changes in all measures of the crime rate after controlling for other demographic factors.

The third observation is related to the significant contribution of variables that measure the social disorganization perspective, including population density, single-parent households, and people living at the same residence for at least five years. Garland (2000) initially argued that demands for order in a community may be a result of social disorganization. Kent and Jacobs (2005) expounded on this point by arguing that although certain threatening acts that are caused by social disorganization may not be captured by official crime rates, they still may be powerful enough to cause residents to clamor for more police protection. For example, this analysis found that population density has a positive and significant effect on police strength. An increasingly dense population may exacerbate conflict between individuals living in closer proximity. Although these disputes may not be criminal in nature, they certainly have the potential to increase perceptions that more order is needed in an increasingly dense city or neighborhood. Just as Garland (2000) argued, social disorganization, in this case in the form of

population density, may increase demands for more law and order in the form of more police officers. Additionally, this reality may not be captured through traditional crime rates.

The final observation concerns the advantage of making use of panel data analysis. Particularly, the importance of year dummy and city dummy variables is the ability to capture additional variance that cross-sectional methods cannot achieve. Panel data models have long been considered one of the best designs for the study of causation next to a purely random experiment. Lempert (1966, p. 130), for example, stated that panel designs are research designs "par excellence." In addition, the two-factor fixed-effects approach is superior to the random-effects approach because it is able to capture unobserved systematic variance in an equation (Hsiao, 2003).

In conclusion, some of the limitations of this study need to be acknowledged. First, the current study only focuses on large cities with over 150,000 residents. Consequently, the results of this study are not generalizable to all cities or law enforcement agencies in the United States. Second, as Sever (2001) argued, quantitative studies of police strength are limited because many important variables cannot be included in the models. Variables capturing the fear of crime felt by the residents, the presence of interest groups, and the race of police bureaucrats are difficult to gather when using a sample of multiple cities (Sever, 2001). Third, the crime drop that was so apparent in 1990s has extended into the first part of the current century as well. It might be interesting to determine whether the same relationships found in the current study of the 1990s alone extend and apply to the 2000s. The symmetry in results from the 1990s to the early 2000s may be complicated by the fact that COPS funding has steadily eroded since 2000. This reality may convolute the influence of resources on police strength and present interesting questions for further research on this subject. Finally, this topic seems to be conducive to studies using

qualitative methods and data. Interviews with city or governmental officials about why they made certain decisions about police staffing issues would provide an excellent supplement to the many quantitative studies of police strength. Content analyses of newspapers or local news broadcasts could also elucidate how the environment in certain cities dictates decisions about the law enforcement presence.

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Notes

1. Kent and Jacobs (2005) also utilized the segregation rate to measure the economic conflict theory. This variable had a positive effect on police strength in three of the six models tested.

2. Chamlin (1990, p. 490) acknowledged that the national unemployment rate is a weak measure of conflict in the city of Chicago.

3. It is conceivable that public perceptions of crime could affect demand for additional police officers. It is also conceivable that the public may perceive more or less crime than the actual amount reported to the police. Unfortunately, there is not a uniform measure of public perceptions of crime, or the fear of crime, at the city-level of analysis.

4. The Hausman specification test compares the fixed versus random-effects under the null hypothesis that the individual effects are uncorrelated with the other regressors in the model (Hausman, 1978). The Hausman test was carried out and the significant statistical results indicated rejection of the null hypothesis; in other words, the random-effects model was a misspecification. Therefore, the fixed-effects panel model was preferred in this study.

5. Autocorrelation is the correlation of a variable with itself over successive time intervals. The most common situation in which this occurs is in time series regression in which the observation consists of a single individual or unit at multiple points in time (Berry & Feldman, 1985). The commonly used Durbin-Watson statistic is not adequate for panel data regression. Wooldridge (2002, pp. 282-283) derives a test for autocorrelation in panel data models. Drukker (2003) provides simulation results showing that the test has good size and power properties in reasonable sized samples. STATA offers the commands to perform Wooldridge test for autocorrelation. We ran the test and the non-significant test statistics indicated the absence of autocorrelation.

To detect whether the heteroskedasticity exists or not, graphical examinations of residuals has been conducted. A set of scatterplots were generated plotting the residuals against each of the independent variables and the predicted values. No specific patterns materialized; hence we are confident that heteroskedasticity was not a problem in this study (Cohen, Cohen, West, & Aiken, 2003).

To test for multicollinearity, variance inflation factors (VIF) were computed for each independent variable in the model. The VIF were well below a score of 4, indicating that multicollinearity was not present (Fisher & Mason, 1981; Judge, Hill, Griffiths, Lutkepohl, & Lee, 1988).

6. Additional models were run using the property crime rate and the total crime rate as indicators of the rational public choice perspective. Interestingly, a significant and negative relationship was found between the property crime rate and police strength, suggesting that an increase of one thousand property crime incidents will lead to a decrease of 3 officers per 100,000 residents. This finding is consistent with Stucky (2005). The same strategy was

extended to the total crime rates. The total crime rate also had a significant and negative effect on police strength. These models are available upon request.

7. The authors also explored the specific impact of the population of other minority groups on police strength. The percentage of Hispanic residents had a significant and negative effect on police strength while the percentage of individuals in the "Other" racial category did not significantly affect police strength. Please refer to Appendix C for results. Our findings were consistent with Sever (2001).

A final model was analyzed, in which the total minority population was included as an independent variable. The total minority population variable, which represented the sum of percentage of Black, percentage of Hispanic, percentage of Asian and Pacific Islander, percentage of American Indian and Alaska Native, was not a significant predictor of police strength. Those results are also available upon request.