

# Research Article

## EXAMINING POLICE STRATEGIC RESOURCE ALLOCATION IN A TIME OF AUSTERITY

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The increasing importance of proactive policing has highlighted the need to ensure that the police utilise their resources both efficiently and effectively. Traditionally, police agencies have allocated resources in response to their operational demands or requirements, with the majority of resources being distributed in response to political demands and public calls for service. In recent years there has been a greater emphasis by police to deliver services proactively, and to direct resources to specific geographic areas of high crime or to specific crimes, and to apply intelligence led targeted policing initiatives. The changing operating environment to a public service ethos of accountability and ‘do more with less’ means that historical methods of allocating police officers may not meet an agency's strategic goals. This paper examines if an economic approach to allocating police strategic resources is an appropriate and equitable method in a time of austerity. This greater emphasis on proactive, rather than reactive policing, which also represents a shift from centralised control, underlines the need to ensure the efficient and effective use of resources.

**Keywords:** Strategy, new public management, police reform, resource allocation

### INTRODUCTION

In the 1860s, General Ulysses Grant defined strategy “[as] the deployment of one's resources in such a manner which is most likely to defeat the enemy” (quoted in Mintzberg, 1996, p. 14). In a modern policing context, such an idea is no different, not to defeat the enemy *per se*, but for the police to be able to provide core services by responding to public calls for assistance. In recent years, police have placed a greater emphasis on delivering services proactively and directing resources to specific high crime areas or specific crimes, and applying intelligence-led resources to targeted policing initiatives. The use and allocation of resources forms part of an organisation's strategic direction and was

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identified by Hamel and Prahalad (1998), that “allocating resources across businesses and geographies is an important part of top management's strategic role” (p. 39).

After unprecedented increases in the number of reported offences in the late 1980s and the early 1990s, crime reduction became a primary concern of the police, the government and the community. The challenge facing police agencies across the world was to balance resources and service delivery levels with a decreasing level of funding and increasing expectations of the community. According to Stockdale, Whitehead and Gresham (1999), in the United Kingdom, where public demand for police service is rising and increasing the level of expenditure on resources is not feasible, managing and allocating resources has become essential.

The principle parameter that inhibits the effectiveness of police agencies is that they are geographically positioned as city, municipality, state, federal or national structures. In a democracy, the mandated control of crime is principally a government responsibility and a public good, and, as a result, there are major difficulties in allocating resources efficiently for protecting persons and property. For example, the delivery of police services in New Zealand is different from that of many other countries, in that there is one police organisation that is responsible for all policing at the local and the national level. A national police structure imposes a number of organisational problems when allocating police staff at the city and local level as there are difficulties in allocating the number of police officers required to meet the social outcomes identified by government.

This paper examines the issue of police strategic resource allocation in a time of austerity, and whether an economic approach and econometric modelling is an appropriate and equitable method in allocating police staff. The examination of strategic resource allocation is undertaken within the context of the 1990s New Public Management (NPM) organisational effectiveness movement. The paper will consider whether the NPM core principles provide a framework to enable police decision makers to identify a resource allocation method that increases the effectiveness of organisational service delivery.

While we now have some literature available pertaining to the implementation of some crime strategies, such as targeting hotspots, and whether or not these strategies had an effect on the level of crime, there is no modern, or post 1990, literature that evaluates or analyses police resource allocation

methods or that examines management structures. As a result, this article discusses the findings from research undertaken in the 1970s and 1980s which is still valid today.

There is strong evidence to support the notion that important facets of crime have become amenable to economic and econometric analysis and solution. Eck and Maguire (2000) noted that most economists would argue that the problem of crime and its solution hinge in a very fundamental way on how society allocates its resources at the local and national levels. However, Dimma (1985, p. 25, as cited in Mintzberg, 1994) advises “[b]e skeptical, though not cynical about all forecasts...Distrust econometric models and elaborate simulations...” (p. 230). This paper also examines the economic literature pertaining to resource allocation and New Public Management (NPM) and presents the view that an econometric approach is justified when precautions are included in the construction of any proposed model and when interpreting the subsequent analysis.

#### REVIEW OF LITERATURE

Where public demand for police services is rising and increased expenditure on resources is not feasible, the issue of managing and allocating resources becomes crucial (Stockdale, et. al., 1999). One approach to identifying the methods used by police allocate to resources is to examine their organisational strategies. According to Quinn (1996), “a strategy is the pattern or plan that integrates an organisation's major goals, policies, and action sequences into a cohesive whole” (p. 3). A comprehensive approach such as this ensures that an organisation commits their resources to achieving its strategic goals and government outcomes. Goals provide a dynamic track against which progress can be measured. The strategic decisions made by an organisation will “dictate both the resources the enterprise will have accessible for its tasks and the principal patterns in which these resources will be allocated” (Quinn, 1996, p. 4).

Is the level of crime in a particular location affected by the number of police officers in that location (Bayley, 1998)? Many politicians and members of the community believe that this is so. According to Hamel and Prahalad (1998), the use of resources, whether financial or non-financial, may be maximised through leverage. Leverage can be achieved principally by concentrating resources more effectively on key strategic goals and through effectiveness or by the complementing of one type of resource with another to

create higher order value (Hamel & Prahalad, 1998). However, the primary resource or mechanism for achieving the goals and objectives of a police agency are its personnel, and it is for this reason that “more [police officers] are thought to be better, fewer are thought to be worse” (Bayley, 1998, p. 6).

Managers of police organisations and their Ministers frequently adjust the number of police officers allocated or deployed to a geographical area, seeking the optimal ratio of police to population in order to make the smallest investment of resources to produce the greatest public satisfaction. In the past, the number of police officers allocated to a geographical area was based on formulas, institutional traditions, tacit understandings, and contract rules, all of which have little or no association with the reduction of crime. Goldstein (1990), notes that police resources are not used rationally to achieve public safety.

Except for targeted hotspot policing and short-term large enforcement crackdown operations (Braga & Weisburd, 2010), previous studies of police resource allocation have been inconclusive as to whether or not an increase in the number of police officers in an area decreases or increases crime. Debate continues as to which social variables are associated with police staffing levels and which are associated with the level of crime. Table 1 summarises the results of previous United Kingdom and United States studies.

Table 1: Results of Previous Studies of Police Resource Allocation

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- Many aspects of the economic theory of crime are supported by empirical data;
  - The level of crime can be decreased by either increasing the probability of capture, conviction or punishment or by increasing the severity of punishment; and
  - Increasing the number of police in an area can have a mixed result on the crime rate.
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Phillips & Votey, 1972; Carr-Hill & Stern, 1973; 1979; Chamlin & Langworthy, 1996; Maguire, 2003; den Heyer 2009

The mixed findings of previous research are largely attributable to matters such as the variation in how police strength is defined across different studies, the variation in the unit of analysis across studies, and the poor and/or inconsistent model specification and complexities involved in interpreting mutual effect

variables, such as the relationship that the level of crime and the number of police have on each other. Moreover, the literature has not clarified whether increasing the number of police officers will produce a greater level of public safety or whether it will reduce the level of crime. Not only has previous research found little connection between crime rates and the number of police officers, but increasing the number of police officers may increase crime rates, at least in the short term due to increased observation by officers or officers on patrol and hence, an increase in reported crime (Carr-Hill and Stern, 1979).

There is little consensus amongst academics as to which social factors are related to criminal activity, how to model criminal activity or police resources appropriately, and which public policies serve to lessen criminal activity (Carr-Hill & Stern, 1973, 1979; Avio & Clark, 1978; Benson & Rasmussen, 1991; Benson, Kim, Rasmussen & Zuehlke, 1992; Becsi, 1999; Weisburd & Eck, 2004; Police Foundation, 2011). In a symposium on the economics of crime, DiIulio (1996) argued that economists have not focused adequate attention on the modelling crime or on police resource allocation by using the sophisticated quantitative and modelling skills that are part of the economists' toolkit. DiIulio laments the fact that much of the research in this area has remained the domain of sociologists and criminologists who tend to use less sophisticated empirical analyses.

#### THE CHANGING OPERATIONAL ENVIRONMENT AND THE IMPACT OF NEW PUBLIC MANAGEMENT ON POLICING

Since the 1980s, police organisations in advanced liberal democracies have undergone a series of strategic and managerial reforms that were designed to improve their core service delivery and operational transparency (den Heyer, 2009). These reforms included a number of innovative policing programs to change from a reactive to a proactive method of service delivery, such as Community Oriented Police, Intelligence-led and neighbourhood style policing. However, Owing to the fiscal environment following the economic recession in late 2007, police agencies have found it increasingly difficult to maintain service delivery levels, effective operational and administrative levels of staffing, and the delivery of special programs, such as community policing (Wilson and Grammich, 2001). In response to these challenges, police managers are reviewing the allocation of their resources, and are examining new and alternative methods to maintain service delivery levels and maintain public confidence.

Police salaries and associated personnel costs can account for the majority of the total expenditure of a police agency. Given this, and that increased expenditure on police resources is not feasible, the issue of managing and allocating resources effectively becomes crucial. Managing and allocating resources effectively is the foundation of contemporary public service management. The new public service management environment raises the issues of fiscal and management accountability with the measurement of police performance moving to the forefront of the political agenda (Cope, Leishman, & Starie, 1997; Gillespie, 2006). These evolving government requirements have an impact on police as funding police consumes a large component of any government budget. In addition, the demand by the community for government services is ever increasing while fiscal policy constraints make it difficult or impossible for governments to fully meet these demands.

Historically, police agencies allocated resources in line with a perceived, rather than an empirically validated need, although this has changed in more progressive agencies, mainly as a result of the introduction of the NPM philosophies of the mid-1980s and early 1990s. The NPM philosophies included the application of the theories of Keynesianism and monetary economics to national, federal, state and local governments (Leishman, Cope, & Starie, 1995; Gorringer, 2001). The implementation of these economic elements was based on the theory of agency and of choice, changing the relationship between ministers or city council members and chiefs of police or commissioner, and increasing management discretion within agencies (Boston, 1991, 1999; Gorringer, 2001).

The basic thrust of the NPM reforms was to improve the incentives for efficiency within the government sector (Boston, 1991, 1999; Gorringer, 2001, Gillespie, 2006). The distinction between the service outputs that an agency produces and the outcomes that a government seeks to achieve, was central to these reforms (Gorringer, 2001). NPM arose from thinking about what is meant by the terms performance and accountability. The performance of government agencies may be judged on whether they produce the agreed service outputs, and whether they do so effectively (Boston, 1999).

The rise of NPM cannot be attributed to a single factor, but its adoption reflected the pressure placed on government departments and governments at the time (Leishman, et. al., 1995). The introduction of NPM has been successful in enhancing public sector organisational effectiveness and efficiency in the United Kingdom and in New Zealand. In other western nations, the introduction of

NPM has not been as successful due to the varying level of managerial acceptance. This has been due to the divergent capabilities of the managers concerned and “the levels of efficiency prior to the reforms” (Bale & Dale, 1998, p. 111).

As a result of the operating environment, police need to make transparent resource allocation decisions, be able to evaluate outputs and outcomes, and be able to demonstrate that resources are being used to generate the best returns for communities and society (den Heyer, 2009).

#### THE ALLOCATION OF RESOURCES BY POLICE ORGANISATIONS

With increasing police organisational decentralisation, the manner in which police resources are allocated between geographical areas for different services is of increasing importance both politically and, more, importantly, for those who receive the service. Whilst, previously, these allocations were often decided through negotiation or based on historical precedent, with increasing pressure for police accountability there is a need for police agencies to use justifiable methods to allocate resources. However, there is a limited amount of information available on the methods used by police agencies in allocating resources. Most United States law enforcement agencies allocate resources based on the number of calls for service (Chaiken, 1975), and the United Kingdom and Scottish Forces usually allocate resources based on a combination of central and local government funding regimes (Loveday, 2000).

The steady increase in the number of police officers and the increase of police expenditure in Western democracies over the last few decades has been a concern for governments, policy makers and researchers (Brandl, Chamlin & Frank, 1995; Craig, 1987; Grabosky, 1988; Chamlin & Langworthy, 1996; Stockdale et al., 1999). While the increase in police numbers and budgets has ceased since 2007, there is concern as to how police can deliver core services more efficiently and effectively. Allocating police officers to ensure that an efficient and effective service is delivered requires an analysis of the variables that impact on organisational performance. However, there is little information available or agreement of the specific social or economic forces that affect the growth in police officer numbers or how police officers should be allocated to specific geographical areas. Brandl et al. (1995) noted that to meet strategic objectives, the number of police officers is highly related to previous police numbers.

## THE BASIS OF AN ECONOMETRIC MODELLING APPROACH TO ALLOCATING POLICE RESOURCES

In developing police resource allocation policy, using an econometric approach, Hsiao (1986) and Benson and Rasmussen (2000) recommended the use of either time series or panel data as the foundation for a regression analysis model. Although official crime statistics, that is, those reported and recorded by police, do not reflect accurately the actual number of crimes committed, both cross sectional and time series analytical studies use this information as their basis. Inaccuracy however, can stem from the definition of crime, its interpretation and the administrative processes devised to record it (Weisburd & Eck, 2004).

Any proposed econometric model would be based on one dependent variable: the number of police officers, as a function of a number of different socio-economic and socio-demographic variables believed to be relevant to allocating resources. Developing an explanatory model through the construction of a regression equation will facilitate a better understanding of the situation under study and will allow experimentation with different combinations of inputs to examine and analyse their effects on the dependent variable. In this way, the identified explanatory model can, by its basic formulation, be geared toward intervention, therefore, influencing any future resource allocation through the identification of influencing variables.

### THEORETICAL MODEL RELATIONSHIP

The economic analysis of crime is concerned with the effect of incentives on criminal behaviour and the evaluation of alternative theoretical and operational strategies to reduce crime. At an individual level, this approach postulates that welfare maximising behaviour optimally allocates resources according to perceived or relative returns, and links socio-economic conditions to an individual's relative returns from legal and illegal activity (Becker, 1968; Stigler, 1970). This approach to the study of crime is entirely different to the sociological theories of learning and social control. These sociological theories link socio-economic conditions to society's failure to control criminal tendencies and to the personal processes by which an individual learns criminal behaviour (Hughes & Carter, 1981), whereas the economic literature typically focuses on the theoretical supply of offences in which per capita crimes are related to the probability and the severity of punishment for the type of crime, the expected

income from criminal activity, returns from alternative legal activities, and other socio-economic factors.

The literature does not identify a set empirical approach to the subject of econometric modelling of crime. Each researcher identifies which of the dependent variables they intend to model and then, based on relevant aspects of criminological, economic and econometric theory, present evidence to justify the position taken. However, a number of researchers have identified that the basic economic crime model will include, in addition to deterrence, likelihood of detection and severity of punishment, and other social and socio-economic variables such as opportunity, employment, income distribution, ethnicity, gender, poverty and percentage of youth in a population (Carr-Hill & Stern, 1973, 1979; Trumbull, 1989; Maguire, 2003).

The typical econometric model constructed at the local level to identify the variables associated with crime, the number of police officers and the resolution rate, employs data on reported crime and a simultaneous equation system in which police deterrence efforts are measured by the number of arrests or the number of crimes resolved. These analyses are aimed at establishing which police and socio-economic variables individually or together are related to crime or a specific offence. The crime equation is generally the first equation within a two or three equation multi-system, while deterrence is the second. Deterrence is usually identified by the police clearance or resolution rate. The third equation attempts to identify which of the variables are related to the number of police officers in an agency. Table 2 illustrates a typical three-equation system found in the literature.

Table 2: Typical Econometric Three Equation Crime Model

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Crime/offence =  $f$ (penalties imposed, likelihood of detection, police per capita, expenditure per police officer)

Resolution Rate =  $f$ (unemployed, youths 15–24 years, % under average income, police per capita)

Number of Police =  $f$ (number of offences, population, expenditure per officer).

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Adapted from Carr-Hill & Stern, 1979

This form of econometric model, using single or simultaneous equations, assumes that the rate of illegal activity will drop if there is a higher probability or severity of punishment (Ehrlich, 1981).

#### THE RELATIONSHIP BETWEEN POLICING, CRIME AND SOCIO-ECONOMIC VARIABLES

Previous aggregate studies of police resource allocation have used a number of different approaches, the most common method of which is to relate arrest rates with levels of crime (Phillips & Votey, 1972; Sjoquist, 1973; Tittle & Rowe, 1974; Logan, 1975; Loveday, 2000). These studies all relied on official police statistics and found lower levels of recorded crime in areas where police arrest rates were high. However, Wilson and Boland (1978) attempted to overcome the known weaknesses of police statistics by examining the data obtained from victimisation surveys and by finding a significant negative correlation between arrest rates and levels of crime.

Stockdale et al. (1999) used criminological theory in conjunction with economic techniques to assess the relative efficiency of police services. They concluded that as police services expand above a specific size, they typically encounter either diseconomies of scale, reduced technical efficiency, or a combination of the two. This was an extremely significant finding in terms of police organisational structure and resource allocation, and suggests that there is an optimum size of a police organisation, and this occurs at a relatively low minimum efficient scale or at a low number of police officers.

The Carr-Hill and Stern (1979) study produced three principal findings in regard to the number of police officers deployed in a geographical area:

1. The higher the clearance rate the lower the crime rate;
2. The larger the number of police in an area the higher the recorded offence rate; and
3. The larger the number of police in an area the lower the rate at which offences were cleared.

Carr-Hill and Stern (1979) attributed these results to the possibility that more police officers translate to more offences being recorded, either because they discover more offences themselves, or because they record more of the offences reported to them by the public. Their third conclusion states that having more police leads to lower clearance rates. Carr-Hill and Stern explain their findings

by noting that the recording effect outweighs any deterrent effect and they avoid suggesting that the police are ineffective, or do not have an effect in deterring criminals.

Difficulties in interpreting the research and the inconsistencies between the studies make it difficult to evaluate the aggregate approach in studying police effectiveness. While all the studies find a strong inverse relationship between the crime rate and the clearance rate, it is quite unclear what implications are to be drawn from these results. On the one hand, such findings may be seen as providing evidence for the effectiveness of police activity; while on the other, it could be argued that the studies demonstrate a workload effect, and that the resolution rates are high because crime rates of an area are low. Chaiken (1975), however, suggested, that in an area where workload levels are moderate, the association between workload and arrests per crime is weak, while areas where workload is either very low, or very high; its association with arrests is stronger. Wilson and Boland (1978) did not support this interpretation. In a study using a cross sectional sample of robbery, burglary and car crime in 35 large American cities, they did not find any workload effects on the arrest rate of individual police officers.

If police performance, measured by resolution rates, is associated with lower rates of crime, it can be anticipated that increases in police resources would be accompanied by lower crime rates. However, much of the previous research does not support this theory, and as such, the relationship between police numbers and crime rates could be an artefact of the statistical data upon which the analysis is based. This could also explain the inconsistent results and the interpretation of the research. The use of the crime rate, for example, as a measure of the outcome of police activity, can be criticised on the grounds that it reflects only a small proportion of crime which actually takes place in a community (Mosher, Miethe & Phillips, 2002). Many studies have indicated (Coleman & Bottomley, 1976; McCabe & Sutcliffe, 1978; Weisburd & Eck, 2004; Braga & Weisburd, 2010) that recorded crime statistics are influenced by police discretion and their recording practices.

The principal weakness in using aggregate data to analyse police effectiveness arises from the need to rely on gross data that is supplied by police and the difficulty of being able to draw an indication from the data how high clearance rates are achieved. A number of researchers have noted that the correlation between the number of officers allocated to a police agency and the

number appearing on patrol is usually not significant (Wilson, 1975). In a subsequent publication (Wilson & Boland, 1978), the authors identified that the crime rate may be less affected by the number of police officers on the streets than on how they are deployed and what tactics they use when on patrol. This view is supported by Forst, Lucianoric and Cox (1977), who highlighted that in Washington DC, fewer than 10 percent of the officers made over half of the arrests, and nine accounted for more arrests than 450 of their colleagues. Wilson and Boland (1978) went on to argue that patrol tactics depend on organisational and political decisions and probably not on the socio-economic and socio-demographic variables in a geographical area.

The Kansas City Patrol Experiment identified that after a point the effectiveness of an increase in the number of police diminishes and that saturating areas with police does not reduce crime or increase resolution rates through arrest (Kelling, Pate, Diekman & Brown, 1974). However, the number of available police must be large enough to control unpredictable events, such as riots. For this and other reasons, the exact point where an additional police officer will no longer be cost effective cannot be known with confidence. This may be termed an officer's 'marginal utility'. If the marginal utility of an additional police officer is reduced after a point, relationships between some determinants and the number of police personnel may diminish as these explanatory variables approach their highest values.

To date, the use of aggregate data to study police effectiveness has yielded little useful information. If this method of study is to be of value, the assumptions implicit in the approach require both modification and development. For these improvements to be achieved, it will be necessary, for example, to take account of factors influencing the reporting of crime, the resolution rate and the allocation of police resources.

## CONCLUSION

One of the features of the economic theory of crime is that it can be used to investigate both criminal behaviour and law enforcement activity (den Heyer, 2009). The most influential theories developed by Becker (1986) and Ehrlich (1981), assume that in any model of crime, the level of crime and the number of police officers are simultaneously determined, so that it is not possible to analyse one without taking the other into account. A strategic approach to allocating police officers to geographical areas will help police agencies to understand what

they want to achieve and how they will achieve it (British Prime Minister's Strategy Unit, 2004). As Wintringham (2000) identifies, "capability is about purpose. It is the ability to marshal the right resources, at the right time, for the right objective" (p. 4).

This paper has identified that although econometrics may be an appropriate method of allocating police resources, previous research on police resource allocation has not advanced significantly, although some methodological advancement has been made, especially in the statistical construction of proposed models. It is clear from previous research that if police agencies are to be able to contribute to government outcomes, simplistic analyses of the variables related to police resource allocation and effectiveness are no longer useful.

The question of the optimal level and allocation of police services in a geographical area is clearly a subject of complexity that has received relatively little empirical attention and as such will require police agencies to ensure that any resource allocation methodology adopted is firmly based on theory and empirical-based practice. An economic based model, developed from the geographical area's social, demographic and strategic information is one equitable process to provide information for police to allocate their resources.

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