CENTRE FOR BRAZILIAN STUDIES

UNIVERSITY OF OXFORD

Crime, police and urban space

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Working Paper Number
CBS-65-05

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Crime, police and urban space[1]

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Abstract

The Brazilian agenda of priorities in the area of public security in the last decade has focussed on the interconnections between three great subjects: (a) violent urban crime, with all the implications of disaggregation and social disorder; (b) urban space, with an emphasis on exclusion, marginality and disorganization; and (c) the police, protagonist of multiple crises and probably one of the most frequent actors in all areas of urban space. In this context, a crucial question is what has been the impact of the police in the control of the violence in Brazil's urban centres? Few public agencies have such deep participation in the diverse environments of the cities, such frequent interaction with their inhabitants, as the police. This paper will explore the interconnections between these three dimensions of public security, analysing the experience of Belo Horizonte, a Brazilian city of two million inhabitants. We will analyze the impact of a program of police management in which the use of maps was a central strategy. The project was carried out over twenty months, and the results of the evaluation using time series analysis indicate that it had a significant impact on violent crimes rates.

[1] The Minas Gerais State Military Police, represented by Colonel Severo Augusto da Silva Neto and his staff, embraced and carried out the project, providing a unique and brave opening to researchers from a civil institution. Renato M. Assunção suggested the initial idea of this article. We specially thank the whole Crisp team, who dedicated themselves to the project. Special thanks to Geraldo Majella Moreira Duarte, one of the more active team mentors.
The project on which this paper is based – "Result-oriented Police" – would not have been possible without the support of the Ford Foundation and the Welett Foundation. CNPq and the Center of Brazilian Studies - Oxford University have provided a unique opportunity for one of the authors to dedicate himself entirely to the organization of the main argument of this text.
[2] Researchers from CRISP – Study Center for Crime and Public Safety - Federal University of Minas Gerais (www.crisp.ufmg.br) Cláudio Beato was CNPq Visiting Fellow at the Centre for Brazilian Studies, January – March 2005

Resumo

A agenda de prioridades brasileira na segurança pública nos últimos tem circulado em torno da confluência de três grandes temas: (a) A criminalidade urbana violenta, em todas as implicações em termos de desagregação e desordem social; (b) o espaço urbano: em seus aspectos de exclusão, marginalidade e desorganização; (c) a polícia: protagonista de múltiplas crises e provavelmente um dos atores mais freqüentes em todos as áreas do espaço urbano. Neste contexto, uma questão crucial é qual o impacto da polícia no controle da violência nos centros urbanos brasileiros? Este artigo buscará explorar as interconexões entre fatores relacionados a estas três dimensões, analisando uma experiência realizada em uma cidade brasileira de dois milhões de habitantes. Para tal, será analisado o impacto de um programa de gestão policial no qual o uso intensivo de informações, incluindo o uso de mapas, é o eixo central. O projeto durou vinte meses, e os resultados da avaliação de séries temporais indicam que ele teve um impacto significativo nas taxas de crime violento.

Introduction

The Brazilian priority agenda on public safety during the last few years has revolved around three major issues: (a) violent urban criminality, in terms of social dis-aggregation and disorder; (b) the urban space, in terms of exclusion, marginality and disorganization; (c) the police, main character of several crises and probably one of the most frequent actors in all areas of the urban space.

The crime and violence numbers in large urban centers point toward the emergence of predatory crimes. Notwithstanding the phenomenon of “organized crime”, what seems to be occurring is the growth of disorganized crime, made manifest in multiple expressions of urban violence. This phenomenon is the background for the concentration of violent crime on the major Brazilian metropolitan areas. The São Paulo and Rio de Janeiro metropolitan areas alone concentrate 40% of homicides in Brazil, although they account for only 18% of the country’s total population. A constitutive aspect of this phenomenon is the urban context wherein the crimes occur, which is largely responsible for this growth. Around 20% of this type of offense occur in less than 2% of the geographical area of an urban center. Hence, the Brazilian urban problem has had to include violence as one of the most relevant obstacles to the planning and development of large urban centers.

Modern criminological literature stresses factors related to urban ecology as one of the elements in the distribution of certain types of offenses. Usually, their distribution in the urban space obeys the “Zip Law”, according to which a few areas concentrate the greatest number of offenses. In Belo Horizonte, for instance, around only 8 among the 2,500 census sectors which divide the city account for more than 10% of violent crime. What are these hotspots about? Which are the determinant factors for the occurrence of these criminality clusters? (Beato et al, 2005)

Finally, a consensus exists today that, whatever the social-economical and environmental determinants, the police has a central role to play in the prevention and control of these areas. Recurring demands for police reform which imply intervention in the constitutional order, as well as management modernization, have come to light during the last years. The main core of these discussions have two arguments. On the one hand, there is a matter of principles concerning the role of police in democratic societies, expressed in the following short formula: “there is no democracy without a democratic police”. The second argument is not expressed clearly, but it will be explored

in this paper: what is the impact of police on violence control in Brazilian urban centers? The police is a strategic actor in urban landscapes. Few other public agencies have such a regular penetration in the several environments of a city, keeping regular contact with their inhabitants from different social strata.

Democratic societies need accountable, controlled and efficient police organizations. In this sense, the literature has stressed the importance of adopting pro-active strategies for preventing and controlling crime in democratic societies (Goldstein, 1990). Information management which allows focused and pinpoint deployment seems to have a significant impact on crime rates (Sherman, 1989; 1995. Beato, 2004a).

We will seek to explore here the interconnections among the factors related to these three dimensions. The intertwining among police, crime and urban space will be the core of the discussion undertaken in this paper. The search for hypothesis on how these factors relate to each other, as well as the way they interact, seems crucial given the contemporary picture of public policies on safety in the major Brazilian urban centers.

Crime and violence in urban spaces

In its classic conception, the cities were created precisely for the sake of the safety of its inhabitants who found there a space for protection and liberty outside the feudal system. The development of citizenship, economic rationality, a universalistic legal system, and new forms of association among individuals occurred with the development of the cities (Weber, 1978. Durkheim, 1978). However, today the development of large urban centers has become associated with crime and fear, in several ways restricting the liberty of its inhabitants and eroding their sense of safety (Davis, 1998).

Some authors believe that the cities are not responsible for the crimes which occur in them, being only a stage for the social relations – and that these relations are responsible for violence (Freitag, 2002). This is an argument that neglects the multiple ways in which these relations happen in the urban context, as well as the environmental influences on the several forms of violence. The urban configuration is the central element of the social disorganization of communities and places (Shaw e McKay, 1942), of the structure of opportunities for offenses to occur (Cohen e Felson, 1979), and of the formal and informal housing market as an encouraging factor to several forms of violent crime, and in self-regulating capacity (Bottoms and Wiles, 1997).

Examining the aggregate crime rates in geographic areas has sought to explain the variation in violent crime rates among several cities, metropolitan areas, states or countries (Bailey, 1984; Blau and Blau, 1982; Land et al., 1990; Schuerman and Solomon, 1986. Fajnzylber, Lederman e Loayza. 1998). Results have shown that variables such as the rate of economic inequality, population structure, comprising total population, demographic density and unemployment rates, are significantly associated and correlated to homicides.

Contrasting with these highly aggregate approaches, understanding the facts related to urban space has been made possible by new spatial-analysis techniques and computer capacity to analyze large database, which now allow the pursuit of explanations in urban spaces in a level of detail not possible before. More recently, harking back to the Chicago School tradition, attempts have been made to understand the context dynamics of urban communities, in order to comprehend crime and violence. Hence, communities and social and time dynamics have become the focus of analysis (Sampson, 2002. Abott, 1997). Going back to this tradition owes much to the ecological concentration of socio-economic resources and to mechanisms of spatial segregation and crime concentration.

The crime-cause ecologic model seeks to grasp violence's multi-faceted nature and to identify factors influencing behavior and, thus, increasing the risk of someone committing a crime or being victim of violence. Ecologic analysis of crime distribution in urban centers raises theoretical and practical issues. In practical terms, there is the question why some neighborhoods and locations in a city have high crime rates. Many like to refer to a crime *explosion* in major urban centers. It might be more correct to speak of an *implosion*, because it occurs inside specific communities, where victims and aggressors come from and live in the same space. A time-honored interpretation of this phenomenon is to credit to drug trafficking (Zaluar, 1984; 1997. Beato et ali, 2001). Indeed, several forms of association between predatory crime and drugs have been studied in the literature. They are rather common topics, such as the affinity between drug use and a tendency to commit crime, ways of financing dependency, manners of solving extra-legal conflicts and the need for expensive weapons for such purposes (Johnson *et al.*, 1990).

Theoretically, the literature dealing with the hypothesis of social disorganization links this greater incidence to socio-economic characteristics of the communities, cities, boroughs and neighborhoods (Shaw and McKay, 1942. Park e Burgess, 1924. Bursik,

1986) or to “collective efficiency” in controlling the behavior of their inhabitants (Sampson, 1997). In fact, this causation mechanism is not direct but is due to the fact that areas with greater relative and absolute privation are conducive to more mobility and demographic heterogeneity, weakening traditional bonds of social control and, thus leading to more crimes. However, empirical evidence shows places in a city with high crime incidence due not only to the characteristics of their populations. There is something more, related to environmental characteristics, which can favor this incidence of criminal activities. The effect of boroughs and neighborhoods goes beyond traditional characteristics related to poverty concentration and concentrates on aspects such as institutional mechanisms and the interaction processes among persons. Social bonds, trust, institutional resources, disorder and routine activities are highlighted as dimensions which explain the concentration of violence and crime (Sampson et al, 2002).

As a result of this emphasis and as a counterpoint to approaches which deal only with individual or social-group characteristics, analysis strategies have been developed to deal with the spatial distribution of crimes and contexts of opportunities for criminal actions. These are the features of community and urban spaces where crimes occur which must be examined. Attention is called to the fact that some communities continue to be plagued with high crime rates, despite substantive changes in the social and cultural characteristics of their residents (Reiss, 1986). The importance of socio-economic background factors is not being denied as elements which can predispose individuals to crime. Yet, they are only one element defining the context of criminal activity. The others have to do with the availability of targets for criminal action, the absence of control and vigilance mechanisms as well as institutional and interactive mechanisms (Cohen and Felson, 1979). The dominant strategy has privileged socio-demographic analysis and the social characteristics of groups of individuals in the cities, with special attention to the concentration of poverty (Wilson, 1987). Comparing communities of different strata can supply leads and hints on mechanisms and resources to control geographic spaces and locations. Romantic exercises about “civic culture” or “social capital” are of little value, unless conditions are made explicit through which the social cohesion of communities is effectively translated into control of the place where their dwellers live (Sampson, 2002). Paradoxically, this cohesion is not always translated into control mechanisms and resource mobilization in favor of the community (Wilson, 1987). Poor communities can develop interaction mechanisms in the

neighborhood which do not necessarily translate into collective efficacy (Zilli, 2004. Silva, 2004).

In this article, we will deal with one of the institutional resources to regulate social relations: the police acting in urban spaces. The ways such action occurs is crucial to understand mechanisms which may help public policies to control violence in urban spaces deteriorated by violence. Even though crime control is not exclusive to the police, adopting pro-active and preventive police strategies and techniques can significantly impact urban criminality.

The police problem in Brazil

One of the omnipresent actors in the most varied urban spaces is the police. Its great capillarity and the nature of much of its activities earned the police the definition of "society's secret social service" (Muir, 1977) Despite ambiguous feelings about the police in poor communities, few public agencies have been in such demand by the population in these areas. The police has thus become a public service of first need. The deterioration caused by the implosion of violence in these places has brought to these communities a feeling of abandonment and helplessness which, associated to precarious other public services, breeds social disorganization.

Crucial questions for society are: What is the police impact on crime rates? Can the police function as an institutional resource, allowing urban communities to rescue their self-control capability? Can regions degraded by violence be rescued by social-control public agencies? The most conventional and frequent way adopted by Brazilian police organizations to evaluate their impact has been nearly unanimously rejected in all tests carried out: the number of policeman/policewoman per inhabitant or the police budget. For obvious reasons, the number of police personnel says nothing about what they are doing in the streets, just as budget increase does not mean that funds are adequately allocated (Blumstein et al, 1978).

In the USA, during the 70s and 80s, the concern was to evaluate specific police styles. One postulated hypothesis was that police departments which adopted more legalistic styles tended to develop more aggressive forms of policing and to have more impact on the crime rates (Wilson, 1968. Wilson and Boland, 1978). This would occur indirectly, with a probable increase in the number of arrests through blitzes as well as search-and apprehend operations. However, the most important consequence was the message sent by the police, changing the perception of the likelihood of arrests. This

form of direct communication minimized the perception of disorder and, hence, contributed to increase the social-control mechanisms, in anticipation of what would later be used in New York City. Indeed, later evaluations confirmed the efficiency of pro-active police work (Sampson e Cohen, 1988)

Anyhow, the U.S. experience showed how police activity management could be a major component in regulating social life and, consequently, in controlling crime (Wilson and Kelling, 1982). Later, this specific component of problem definition and solution was isolated and gave rise to a new paradigm in policing (Goldstein, 1990). In Brazil, only recently has the debate on the best ways to manage been incorporated into the agenda of possible police reforms (Beato, 2001).

In any case, the limits of this impact are not yet clear. On the one hand, some authors believe that the police does not have much to do in controlling crime, to the extent that some fundamental determining factors are outside its scope of action. According to some authors, using the police to solve the crime problem would be like using a “band aid to cure cancer” (Bayley, 1994). The most important determinants for prevention are the responsibility of other agencies and types of programs. On the other hand, the paradigm of the New York City police in relation to life-quality crimes imparted much importance to police-developed management strategies (Kelling, 1996. Bratton,). There is much room for activities to be developed by the police itself, provided that they are adequately supported by result-based information and management forms.

I would like to develop the hypothesis that in Latin America, despite the enormous magnitude of social problems, the police plays a central role in establishing preventive and pro-active policies to control predatory criminal activity in urban centers. A public safety policy must deal – in addition to strategies of local and focused socio-economic development – with mechanisms which improve police efficiency and control. I will call this sum total of actions in several fronts, for social development and police management, “community management of public safety problems”.

Community management of public safety problems

Despite the enormous public outcry for crime control through the police, its exact share in this matter is not very clear. A recent growing emphasis has been on approaches which seek to do institutional reengineering, in order to develop a Management by Results more consistent with police activity (Bratton, 1998). From this standpoint, knowledge and information acquire a central role in police activities which,

with strategies of community involvement and articulation with other public agencies, end up outlining a strategy which I will call "**community management of public safety problems**". Information is the basic input for this type of strategy and how the police produces, organizes, make available and use information will determine the nature and effectiveness of the activities which are developed. Modern systems of managing public safety activities are based on the intensive use of information for planning and developing strategies as well as monitoring and evaluating results. Involvement of other public and justice agencies plus parts of civil society is an integral part of this management form.

Understanding the process of transforming information held by the public and by various state agencies into data organized to be used and, lastly, into knowledge supporting decision making and the development of strategic actions is something complex which must be widely known (Manning, 1988. Manning 1992. Skolnick, 1966. Reiss and Bordua, 1967). This involves technological aspects to organize various facets of police and legal activity, with distinct concepts on data storage and management. Information technology for the sake of public safety is a wide-ranging field, multiplied by countless applications in investigation, scientific evidence or monitoring and vigilance for intelligence activities.

Furthermore, involvement of the community and of other stakeholders who deal with the public safety problem is an essential component in this type of management, given the need to work through networks and in partnership with other agencies (Goldstein, 1990). In times of legitimacy crises and rare interaction with the public at large, these partnerships demand some reengineering in forming and planning police activities. The reasons to develop this type of strategy will be discussed next, in further detailing.

Traditional policing strategies

This change in paradigm implies, in the Brazilian case, in two hurdles to be overcome. The first one has to do with the lack of a culture to plan and manage public safety problems. This makes the challenges in this area equivalent to controlling natural catastrophes in which little of human intervention makes any difference. The absence of a deeper planning culture has much to do with this belief, which is corroborated by scarcely any formation in social projects to control and prevent crime or in public policies for safety. From a strictly police standpoint, the belief is that it is

possible to manage human and material resources, but not the outcome of this process. Thus, old techniques and methods of organization are used, which would make possible to internally manage military barracks and police stations, but never results related to crime.

For many years in Brazil, public safety problems were the realm of legal experts and police officers. Even today, after successive governments of various ideological hues, whenever more serious emergency actions are needed, a team of lawyers and police officers is put together, to define what actions must be taken. The outcome of such police legal formalism is the phenomenon of violence, as shown in indicators which point to growing criminality in Brazil. The lack of success cases has led to rampant wide-ranging skepticism among operators, policy makers and those who study this area. Given the complexity of the violence phenomenon in the past few years, these traditional forms of action yield little or no result.

If the growing and legitimate demand of Brazilian society for more safety – which is amplified in the media – is added to the analysis, we have a context of perplexity and skepticism among the operators. The more common attitude is to kick responsibility upstairs, downstairs or sideways in the hierarchy. Thus, city governments blame state administrations because they cannot get better results from the police. In turn, state governments pass the buck to the federal government, placing the blame on macro-economic policies which would supposedly determine crime increase.

One of the translations of this managerial traditionalism in police organizations is widely known in literature as the approach by incidents. Professor Goldstein, 1990, believes that this is one of the obstacles to a result-centered approach in police work. Each event is treated in stand-alone isolation, and no attempt is made to understand it in a wider causal structure. Systems of information and systems to manage police patrol cars running police occurrences are not able to relate events which follow time and space patterns. Consequently, service is not articulated and there is little intelligence in terms of relating and identifying patterns. Lack of effort to understand patterns and analyze cases has certainly contributed to inefficacy and inertia in public safety organizations and, consequently, led to hopelessness among system operators. “Incident-based approach” basically means that the police is called by citizens, by government institutions and even by police personnel themselves (even if less frequently), through a 190 toll-free telephone system. The procedure adopted by the police officers in these cases is exactly the same: they write down the incident in a

"bulletin of occurrence", communicate with the Operations Central on what to do, find the competent channels, consider the incident ended and just go away. The inefficacy of this beat patrol style is due to the fact that it follows a police organization logic rather than the space-and-time dynamics of criminal offenses. Resources are allocated as reactions, responding to events which have already occurred in the police patrol areas. A more detailed analysis of crime incidence would show distinct dynamics for each type of occurrence, with standard characteristics which can be identified. They do not occur at random nor in diffused fashion throughout the city.

One of the consequences is that police activities are disconnected from the boroughs, neighborhoods and communities in which they take place. As officers are constantly running after isolated incidents, in addition to being centrally allocated by the Operations Central, they have little time to involve the persons wherever they act. This is eventually reflected in the ambiguous way that the population in general relates to the police. Part of this traditional way of acting has to do with the ambiguity of police actions dating back to its origins, and ends up reflected on the organizational objectives and environment, as well as in the culture of its members. Next, we will deal with this diffuse universe of actions occurring in public spaces, involving various types of strategy, and with their impact on violent urban crime.

Experience of a "Results Policy" and crime control in urban spaces.

The Minas Gerais State Military Police (**PMMG**) is a time-honored traditional organization, enjoying much prestige with its fellow police organizations in Brazil. Indeed, it is both a benchmark reference and a pioneer in institutionally relating, in its activities, to academic centers and civilian entities - dating back to the 80s. Such opening led to a generation of officers who have made it possible to introduce major police innovations and experiences in Brazil.

In the late 90s, a period of serious deterioration in public security conditions in the Brazilian state of Minas Gerais, preceded by an institutional crisis in police organizations (a first-ever strike), led the Military Police to start a deep process of introducing managerial innovations and relating to the population and to other civil entities. Partnerships with civil society and external institutions were part of a set of changes and innovations introduced to face the crisis context. One of these changes was signing convenia with universities, resulting in a unique partnership process in the operational scope of police activities. Collaboration started between police organizations and a

center for public policy research. Its objective was to develop technologies and analyses, and to increase aiding mechanisms, developing specific programs and evaluating police activities.

In order to implement the intended innovations, a chief component was to organize more quickly available data, for operational planning through statistics and mapping. One of the core projects was mapping out a "MAPA de Belo Horizonte", a partnership linking the Center for the Study of Crime and Public Security (Minas Gerais Federal University/**UFMG**) and the State Capital Police Command (**CPC**) of the Minas Gerais Military Police (**PMMG**). This was part of a wider CPC-implemented program: the "Results Police", a program which sought to introduce new managerial techniques into police activities, by decentralizing operational plan and by introducing result measurement and control mechanisms.

Strong emphasis has been placed on the police-community relation, with the creation of Community Councils in 25 city regions. These councils have become active police partners. To a greater or lesser extent, some of them were able to develop very successful partnerships in specific projects, others less successfully so[3].

The city of Belo Horizonte was divided into 25 police regions (Companies / '*Cias'*). Public security managers (captains of each police company) are responsible for these regions and for their results. Towards this end, they could adopt whatever measures they deemed necessary. Much-hailed police management techniques consecrated by the New York Police Department (**NYPD**) were adopted, regular meetings were held with the participation of officers in charge of each unit and eventual participation of some community leaders. An operational plan was requested, to be later assessed by some of the commanders. Thus, emphasis on MBR/MBO (management by results/objectives) is key to the changes, and can even lead to a change of area commander, if necessary.

A major component in this project has been the intensive use of PMMG information, for purposes of operational planning and crime control projects. Unlike the traditionally lukewarm bureaucratic reports at year's end, attempts were made to organize a Crime Analysis Center, in order to provide permanent information-and-analysis subsidies to the police commanders.

Organizing information involved a two-time deployment. First, databases were organized, to be used as geo-reference, in addition to training crime analysts. The

[3] For an evaluation of the community police program in Belo Horizonte, see Beato, 2004b.

second stage would expand the number of users of the statistics and geo-reference system, including police beat patrollers, through personnel training to carry out analyses for the police companies.

The following sources were used in organizing the geo-file database:

(a) Data from COPOM (Military Police Operating Center) for the city of Belo Horizonte. The objective was to translate its information into planning and analysis. The toll-free 190 telephone number was initially used and was updated by beat patrol personnel. The database software was developed by PRODEMGE, a data processing organ of the Minas Gerais state government. The softwares to translate such data into visualization and space analysis were initially developed at UFMG's Center for the Study of Crime and Public Security.

(b) Geo-processing data produced by PRODABEL (an organ of the Belo Horizonte city government) offered a geographic database with over five million items. These are graphic files ranging from the transportation grid to physical data (city hydrography, arborization etc.). For the project, data were initially used referring to city blocks, street axes, districts and neighborhoods, slums, green areas, police company and battalion areas, in addition to geo-referenced information on crime-luring targets such as banks, supermarkets, shops and stores, bakeries, lottery sites etc[4].

(c) Data from the 1991 census and a 1996 head count for socio-economic and demographic information related to censor sectors.

(d) data supplied by the communities through the Public Security Community Councils.

In order to implement and institutionalize the project, 23 policemen working in planning and operations at the level of battalions and the Capital Police Command (CPC) were trained in Crime Analysis[5]. Preliminary analyses were now done at CPC's Statistics Department which, in practice, functioned as a crime analysis unit. Every six months, the managers in each of the twenty-five police sub-areas received a statistical diagnosis of violent crime occurrence in their areas, showing the most common types

[4] More recently, a private company also started supplying databases of geo-referenced aerial photographs of the entire city of Belo Horizonte.

[5] This course totaled 60 class hours and comprised two modules: one on the use of MapInfo for geo-processing of criminal events, and the other on the use of some statistical tools describing criminal data. In another stage, the same course was taught to some 40 policemen from the patrol Companies more directly involved in leading-edge police activities. Two types of usage were developed: (a) Geo-processing of occurrences; and (b) Statistical analysis of transgressions.

and their spatial distribution in the territory. The statistical diagnosis showed the greater-incidence violations, their location concentration as well as hour, day of the week and month. Then, the more common occurrences in each area were represented in a map of the region, allowing identification of crime 'axes' and 'spots'[6]. This identification was initially visual, through a rather coarse ellipse technique. Later, the university (UFMG) began offering other possibilities to analyze and identify hot spots, which the police from then on named "hot crime zones" (**ZQC**).

Based on such information, the police captains in each Company detailed a plan of operational jobs in the next few months, establishing performance goals to be pursued in that period. In fact, the statistical and mapping data were only an initial tool to understand what was happening in those places. Qualitative data should be collected later with the investigation and intelligence services of the police, with complementary data on groups and persons involved with lawlessness in these areas. Furthermore, partnership solutions were considerably encouraged. If there were problems with hold-ups in buses or taxis, for instance, negotiations were held with union representatives and businessmen from bus and cab services, searching for joint solutions.

Another major component was the destination of information, which was now shared with the community council members, so that they could visualize their region more clearly. It was also possible to add information not reaching the police call system. This increased the organization's accountability, to the extent that officials had to supply and explain statistics to public opinion, through the media and in meetings and seminars held jointly with society. Assimilation of this information-sharing process was different in the various city councils. Some factors contributed to greater or lesser success in community police activities, specially as regards the use of information (Beato, 2004b). The quality of community leadership and of officers was an impact variable, derived specially from the need for formation of those involved in planning community police work.

Evaluation meetings known as EADO (*Encontros de Avaliação e Desempenho Operacional* / meetings for operational evaluation and performance) were held in a room prepared specially for this purpose, with multimedia devices for the presentation of maps and data. The format was clearly inspired in the *Compstat* developed by the New York police[7]. The model developed had to be adapted to local reality, with major differences.

[6] For an example of these reports, see Annex 1 hereto.
[7] Some PMMG policemen went to New York, to know this experience, sponsored by the Ford Foundation.

The initial objective of the meetings was rather more didactic, conveying a process of police activity management which was brand new for Latin American standards, not very used to result-based reporting and accountability. Changing little-productive commanders is not common in Brazilian military police either. They have traditional evaluation and performance mechanisms which have little to do with operational activities. Moreover, the true ritual of public humiliation which characterized New York's *Compstat* for a certain time would not have been well received by the organization.

Methodology

The study will analyze a monthly series of violent crimes from January 1995 to December 2003. Between January 2001 and October 2002, PMMG's State Capital Police Command, following a period of adaptations, started experimenting the previously described type of management. After October 2002, the aforementioned changes were abandoned due to changes in the organization's command and guidelines. This provided us with a unique opportunity to evaluate the results of a program introduced exclusively in the police realm, a type of semi-experiment that could be controlled from the behavior of crime levels in other cities which historically have had a high correlation with Belo Horizonte.

This paper analyzes temporal series, defining structural breaks in the time period when the program was operational. Methodological differences sharpen the debate on police effectiveness in crime control. There are distinct strategies to assess this type of intervention. They are longitudinal studies appraising the effect of an increasing or decreasing number of policemen per inhabitant on crime rates during a certain time period (Loftin and McDowal, 1982), or cross-section analyses comparing different regions, in terms of policemen per inhabitant and crime rates. The use of added indicators through cross-section analyses may give rise to distinct biases in result analyses. Working with added rates at a given moment in time hides the behavior of significant parts of the population (the young and the poor, for example). Another problem would be simultaneity, according to which when certain types of crime increase, more actions will be directed towards them, generating a false interpretation of a paradoxical positive correlation between police and crime (Jacob and Rich, 1980). This could be solved through temporal analyses. Wilson and Bolan, 1982, argued, in turn, that longitudinal studies are inappropriate due to constraints in isolating which effects

result from structural political changes. Police, on the other hand, tend to maintain a certain stability of actions in time.

This controversy bypasses the possibility of carrying out semi-experimental studies, in which an intervention period is clearly defined. This has been true of various other studies on the impact of specific forms of police work in Newark (Sherman, 1983) and in San Diego (Boydstun, 1975). Our analysis below follows this line, even though it is not a controlled experiment.

Data sources

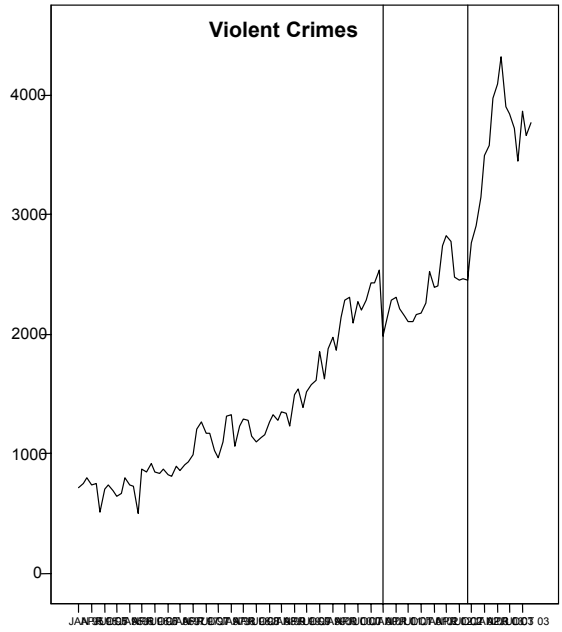
The data used are Minas Gerais Military Police records on violent crimes against persons and patrimony: homicide, thefts, hold-ups and sexual violence attempted and consumed. Altogether, 102 monthly observation items were collected from 1995 to 2003.

Moreover, observations were made of operational evaluation meetings held between the various levels of regional command in the city of Belo Horizonte. The Operational Employment Plans of the geographic units were also object of analyses. Other data sources were interviews and exchange of opinion with policemen from various command levels.

As regards specific aspects, such as those relating to community police work, a separate study was made to collect impact evaluation subsidies (Beato, 2004b). For such evaluation, field work comprised (a) interviews with policemen and leaders who participated in the process, (b) observations of participants in council meetings, (c) evaluation of the problems faced by them with the police, (d) use of secondary data and secondary sources, and analyses of crime statistics in the different regions of the city. Furthermore, (e) use was made of data from a survey with 1,200 policemen (officers and NCOs) in the city of Belo Horizonte. From August 2000 to August 2001, two coordinating researchers and five monitor researchers worked in the project. Six focus groups were held with company commanding officers from each Battalion, in order to follow strategic activities developed by the State Capital Police Command, meetings, events and the overall relation between PMMG and the city government.

Analysis techniques

The question raised in this section will be whether the changes in police work had significant impacts on violent crime statistics. The chart below shows the monthly evolution of violent crimes from 1995 to the end of 2003.



Vertical lines in the chart represent the intervention period. Our first issue is to know whether the fluctuation represented in the chart is statistically significant during the intervention period. The better-known statistical tests (*t* test, X^2 test or *F* test) are based on the assumption of model parameter constancy. In our case, we know the change points which intervened in the police command: Jan/2001 and Oct/2003. In order to test known change points, Chow,1960, proposed a test to ascertain the instability of coefficients in a regression model through an F test (formulated for changes in the parameters), known as the Chow test (see explanation in the Annex hereto). We have used the **Autoreg** procedure of the *SAS System* to carry out the Chow test in the series of violent crimes in Belo Horizonte. This test's outcomes are found in Table 01.

Table 1: Testing the Break Points via the Chow Test.

Test	Break Points	Degree of Freedom	Statistics F	Prob. > F
Chow	73	2	41.15	<0.0001
Chow	93	2	53.60	<0.0001

The Chow test confirms that the alterations in the form of police work were indeed statistically significant. Thus, the observations in the period studied were break points. Hence, the indicator variables will be defined from these break points. We have

used the **Reg** procedure in order to adjust to a multiple regression incorporating the changes.

Table 2: Multiple regression adjustment with structural break, R^2 Adjusted=0,9809.

Variable	Degrees of Freedom	Estimates	Standard Error	Statistics t	Prob. > |t|
Time	1	31.9	0.8	40.2	<0.0001
D_3	1	-3475.9	1543.5	-2.3	0.0264
D_2*Time	1	-3.4	1.1	-3.1	0.0023
D_3*Time	1	38.1	15.4	2.5	0.0148

$$\hat{Y}_i = 31,9X_i - 3475,9D_3 - 3,4D_2X_i + 38,1D_3X_i,\ i = 1,...,108.$$

$$onde \quad D_2 = \begin{cases} 1 & se \quad 73 \le i < 93 \\ 0 & se \quad i < 73 \ ou \ i \ge 93 \end{cases}$$

$$e$$

$$D_3 = \begin{cases} 1 & se \quad i \ge 93 \\ 0 & se \quad i < 93 \end{cases}$$

D_2 and D_3 are dummy variables;
X_i is the time variable.

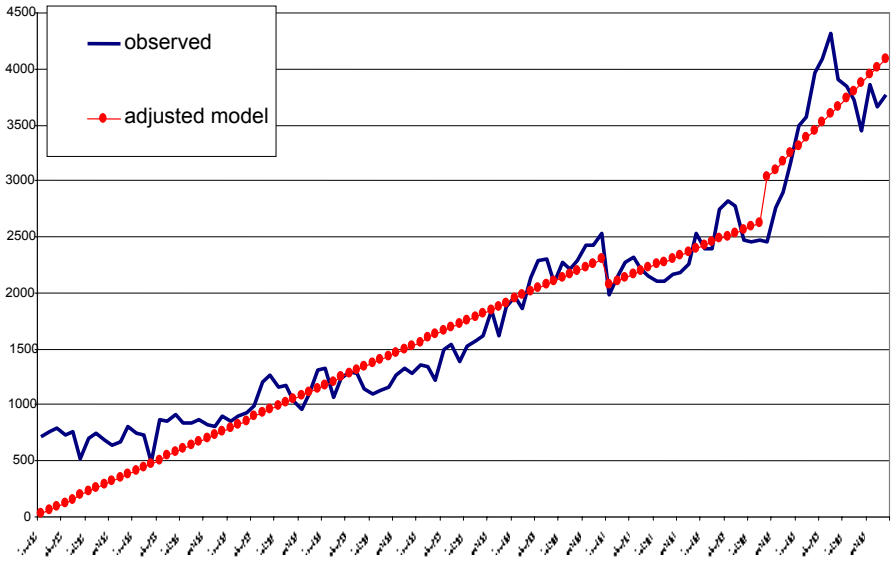
Obs.: Recall that $\hat{Y}$ makes no forecast for Y but for E(Y).

In the monthly violent crime occurrence in the city of Belo Horizonte, three distinct moments in time were considered: period 1 (Jan/95 to Dec/00, reference period), period 2 (Jan/01 to Sep/03, intervention period) and period 3 (Oct/02 to Dec/03, return to traditional police work executed in period 1). In observing a growing trend of quasi-linear occurrences, a choice was made to estimate a linear regression model with dummy variables in order to incorporate these distinct forms of police work in which the reference period has been set in period 1.

As can be seen, starting from equation I, the model has been significantly expressed as a function of time (X variable), of the period to resume traditional police work (D_3 variable), of the interaction between the intervention period and the time (D_2*X interaction) and by the interaction between the period to resume traditional police work and the time (D_3*X interaction). In this case, we sought to verify three possible situations:

(A) how the adjustment of the model in period 1 behaves, disregarding the subsequent moments (D_2 and D_3 equal to zero); (B) what was the program's impact on the immediately-previous period; and (C) what happened when the program was "abandoned" returning to the traditional form of police work.

After model adjustment, the resulting chart is as follows:

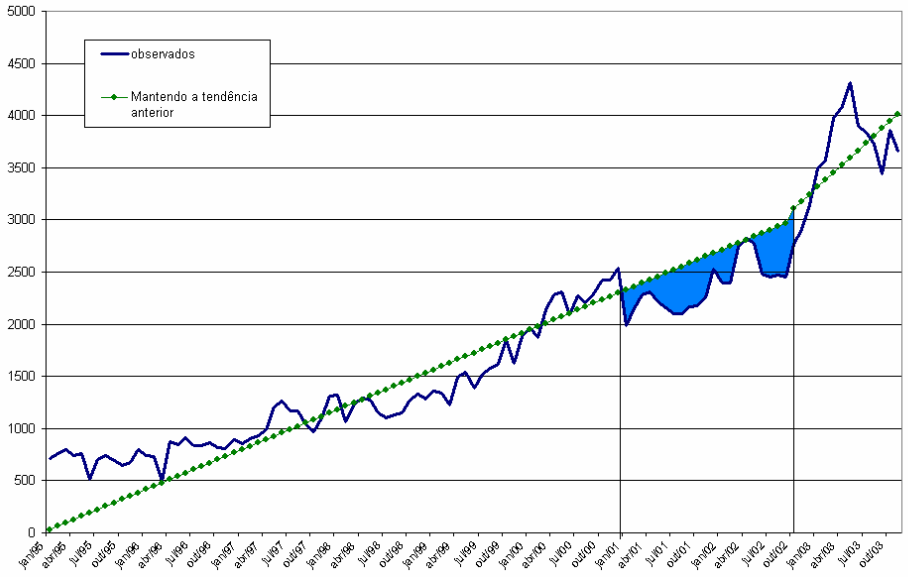


Depending on the significance of the model parameters in table 02, the following explanations can be inferred: in the first moment (period 1), there is an increase of roughly 32 violent crimes for each time unit. When the police-work form changes (period 2), the number of violent crimes tends to fall, on the average, by 3.4 crimes for each time unit. Upon returning to traditional police work (period 3), a 38-crime increase is expected, on the average, for each time unit, subtracted by a constant of 3476 crimes. In relation to the crime series as whole, this is tantamount to saying that the period when the police program was implemented was that when violent crimes were reduced in the city of Belo Horizonte. At the same time, abandoning the program (period 3) made the crime-increase trend accelerate if compared to the previous periods (periods 1 and 2).

How many crimes were avoided by the project?

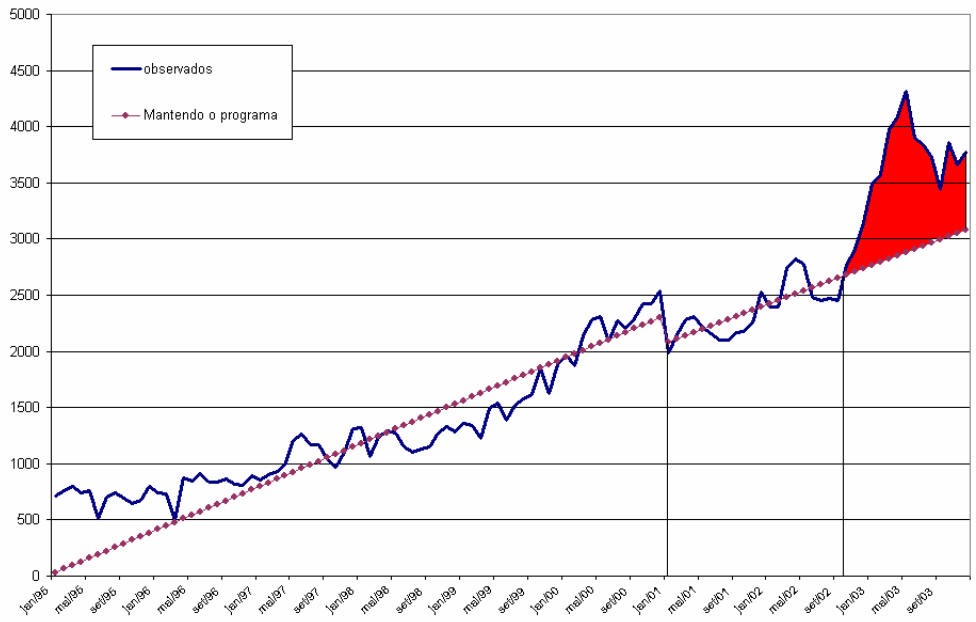
If the hypothesis above holds true, exact quantification can be made of the crime reduction caused by the program. Calculation is made of the number of foreseen crimes, if there were no intervention whatsoever, minus the number of actually-perpetrated

crimes. The difference between the values foreseen by the adjusted model projection in period 1 and the values observed in period 2 provides the exact dimension of the number of crimes avoided by introducing the project. We thus come to approximately 5675 violent crimes avoided, corresponding to the area highlighted in the graphic below.



How many crimes could have been avoided if the project had continued?

In the same way, if the same procedure is adopted, we can estimate the number of crimes which could have been avoided later, if the project had continued. If we project the trend and reduce the foreseen value by the actually-observed value, we will arrive at the amazingly impressive number of 11073 violent crimes which could have been avoided, if the program had continued under the same conditions in which it was implemented. This number is estimated from the dark area in the chart below.



However, the discussion of this number is not conclusive because it is not possible to isolate this result from the political context into which the project was abandoned. In the Brazilian case, this was a period of Presidential and specially Gubernatorial election campaigns (state governors are the political representatives of the police). The politization process of the Brazilian police in the last few years has undeniably led to the adoption of some positions. In 2003, with the new state governor in office, a power struggle pervaded the relations between the police command and the governor's new team. On the other hand, an incipient process of institutional insurrection in the police (sparked and fanned by corporate political leadership) ended in an attempt to strike the year before the period analyzed herein. This means that a latent process of conflict was under way, which could explain many of the abrupt and dramatic changes in the number of violent crimes after the project. The effect of election cycles on public security could go in the opposite direction compared to other countries (Levitt, 2002). In Brazil's case, given police politization, this could be a moment of de-structuring and des-aggregation of security and safety conditions, instead of a tighter control on crime.

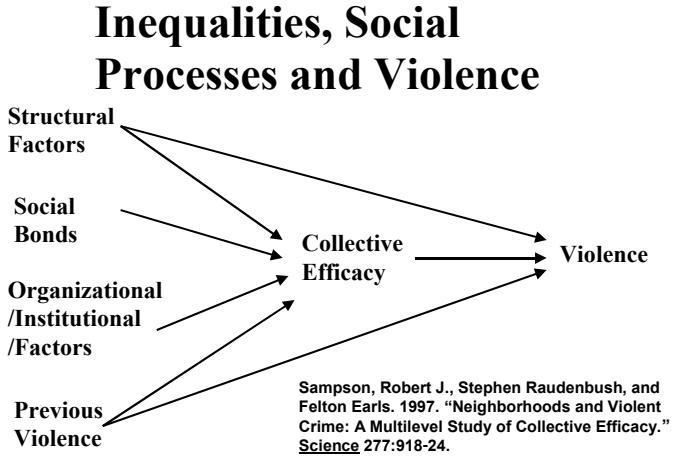
In any case, whatever this effect might be, our argument remains valid that the project had a significant impact on the previous period. However, it is an open question how many of the crimes which later occurred were due to the abandonment of the project and how many were due to some type of slow "turtle operation" adopted by the Military Police in order to stake out power space and get into a tug-of-war with the new government.

A hypothesis to be explored is through observation of the new slope of the new straight line of foreseen values, following the intervention period. Its sharper growth could be a temporary result of the political context. Another hypothesis would be that this is due to some kind of "bottled up" effect of crimes, suddenly exploding in the first few months after the intervention period. The first hypothesis seems more convincing to me. The second would unrealistically assume a group of guerrilla-like motivated offenders who, once the period of program-imposed restriction is over, let their anti-social feelings burst out in a predatory orgy.

Discussion of results

Development in the number of violent crimes in the city of Belo Horizonte can be broken down into three periods. The first period refers to a vegetative growth in the number of crimes from 1995 to December 2000. Several transformations were then started, organizing information and implementing intended modifications. The outcomes of this Management by Results (MBR) were already felt in early 2001, when the growth pace of violent crimes starts to decrease and stabilize. This stability lasts until the start of the third period, when traditional forms of police work are resumed. As a result, in a little over eight months, violent crimes increased up to 71%. Homicides went up over 50% in one year.

These are eloquent numbers worthy of a more careful analysis. Some hypotheses suggested in the literature to explain sudden increase in violent crime could be schematically represented as follows:



Structural factors have to do with the macro-economic context, increased unemployment, age-structure changes, inequality, industrialization etc. No significant change of such magnitude occurred during this period. No extraordinary burst of industrialization, no un-structuring of eventual community bonds, no abrupt age-structure change - none of this took place. Unemployment remained in the same levels. Nothing seems to indicate any significant increase in drug consumption or traffic. The other organizations in the system of justice continued to operate as slowly and inefficiently as they have always done. Prisons remained choke-full of people and with no further room at all - as always. Violent places were plagued by the same previous standards of violence; indeed, violence decreased in some of them.

The most significant changes which occurred were organizational and institutional. On the one hand, management techniques adopted until then were abandoned. On the other hand, reaction against institutional changes in the social-defense sphere led to the creation of a new state office specifically aimed at social defense.

In fact, this un-structuring has not been generalized. Some of the larger police units continue adopting previously-outlined strategies, the more so due to partnerships with several civilian and justice organs in major projects then being tested in the realm of crime prevention. Indeed, the existing network among these organs was able to rein in and contain the demobilization of one of the partner institutions[8] .

Conclusions

This paper has discussed some important, though inconclusive, preliminary results. This case illustrates how results-based management techniques, in which systematic use of information is a central element, are able to produce crime-control outcomes. For policy makers, the conclusions are obvious. Preventive police experiences must be strengthened, instead of the traditional repressive actions which have characterized police work in Brazil. Event that which is traditionally conceived as preventive strategy – known as ostensive police work – shows little efficacy and has nothing to do with pro-active police forms to deal with problem solving.

Two aspects will be later explored in further detail. The first one has to do with the impact on specific types of crime. A very preliminary analysis showed greater impact on crimes against assets and patrimony, in part because many of the specific strategies

[8] See “Fica Vivo” (*Be on your toes / Stay alive*) case in Beato, 2004c.

developed aimed at reducing crime opportunities. But one wonders whether something in this group was perhaps more sensitive to this type of management. Such preliminary verification led to the development of a program specifically aimed at the homicide problem. Known as “Fica Vivo” (a double-meaning pun: “*Be on your toes / Stay alive”*), it is discussed elsewhere (Beato, 2004c; 2003).

The second aspect to be explored has to do with the internal validity of the model adopted for impact evaluation. Historically, the city of Belo Horizonte has always had a high correlation of violent crimes as compared to other cities in its Greater Metropolitan Region and the other parts of the state of Minas Gerais. From 1986 to 1997, there was evidence of a strong correlation between the monthly number-based series of violent crimes in Belo Horizonte and such series in some neighboring cities (Beato et al, 1999). Evidence was also found of correlation between series in cities quite distant from Belo Horizonte (Governador Valadares, Uberlândia and others). The correlation between the series in metropolitan-area cities and in the state capital itself (Belo Horizonte) can be only partly explained by geographic proximity. After all, the relatively high correlation values for the Belo Horizonte and Governador Valadares series, for instance, suggest the presence of other characteristics in addition to the geographic factor. The next step would be to observe what took place in these cities during the structural-break periods.

In any case, in all likelihood this paper was the first systematic analysis in Latin America of police impact on crime rates in urban contexts. The ecological approach with the use of mapped crime information has allowed a detailed exam of such intervention’s conditions and impact on a major urban center. These are very promising possibilities for the development of public policies and for academic investigation.

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ANEXOS

Anexo 1

Relatório da SA 128 do 22º BPM para o ano de 1998

Vila Cafezal; Alto Vera Cruz; Vera Cruz; Saudade; Taquaril; Jonas Veigas; Jardim Castanheiras; Jardim dos Pirineus; São Lucas; Santa Efigênia; Pompéia; Paraíso; Esplanada; Nossa Senhora de Fátima.

(1) O que acontece?

*Apenas os delitos indicados por marcas coloridas serão analisados mais detalhadamente

Crimes registrados na AS 128 em 1998

Natureza Ocorrência		Frequencia	Percentual	Percentual Cumulativo
C09004	Assalto Ônibus	204	27,98	27,98
B04001	Tentativa Homicídio	177	24,28	52,26
C09027	Assalto Transeunte	149	20,44	72,70
C09020	Assalto Táxi	80	10,97	83,68
B04002	Homicídio	43	5,90	89,57
C09008	Assalto Padaria	27	3,70	93,28
C09009	Assalto SupermercadoMercearia	23	3,16	96,43
C09001	Assalto Residência	8	1,10	97,53
C09018	Assalto Veículo	6	0,82	98,35
C09031	Assalto Posto	4	0,55	98,90
C09005	Assalto Casa Lotérica	2	0,27	99,18
C13000	Latrocínio	2	0,27	99,45
C09006	Assalto Prédio	1	0,14	99,59
C09007	Assalto Drogaria	1	0,14	99,73
C09017	Assalto garagem ônibus	1	0,14	99,86
C09019	Assalto Passageiro ônibus	1	0,14	100,00
Total		729	100,00	100,00

Mais de 70% dos delitos violentos referem-se a três modalidades: assalto a ônibus, tentativa de homicídio e assalto a transeunte.

Os registros de assaltos a ônibus, conforme veremos nos mapas, se dão nos pontos finais, mas provavelmente ocorreram durante o percurso.

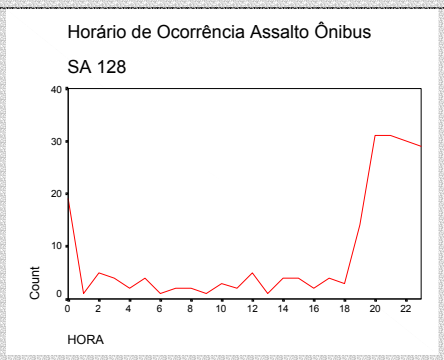
(2) Bairros de maior destaque na área

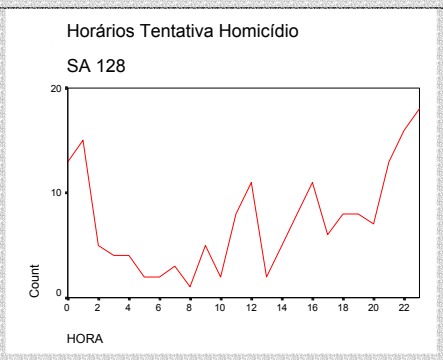
O bairro Vera Cruz destaca-se, concentrando quase 1/3 (29,6%) das ocorrências de crimes violentos na área. A seguir, temos o São Lucas, que concentra outros 17%, e o Castanheiras (Taquaril), com 8,09% . Na Santa Efigênia temos outros 7,54%, seguido pela Vila Cafezal com 6,17%. Este conjunto de bairros mencionado concentra quase 70% dos crimes nesta SA

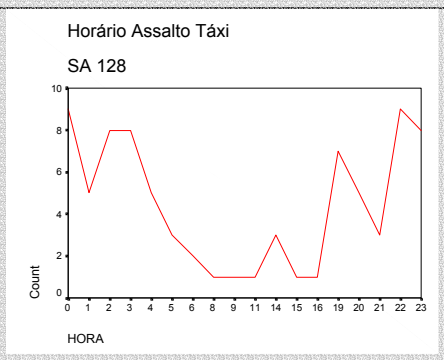
Crimes por Bairros na SA 128 em 1998

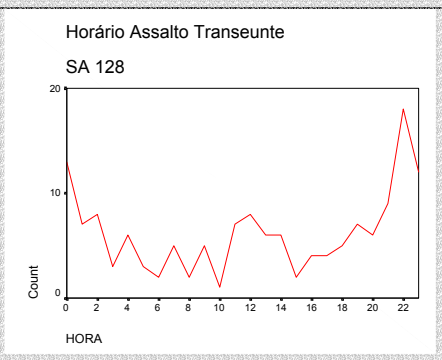
Natureza Ocorrência		Frequencia	Percentual	Percentual Cumulativo
560	VERA CRUZ	216	29,63	29,63
512	SAO LUCAS	128	17,56	47,19
88	CASTANHEIRAS (TAQUARIL)	59	8,09	55,28
468	SANTA EFIGENIA	55	7,54	62,83
570	VILA CAFEZAL	45	6,17	69,00
405	PARAISO	38	5,21	74,21
525	SERRA	34	4,66	78,88
540	TAQUARIL	34	4,66	83,54
523	SAUDADE	30	4,12	87,65
433	POMPEIA	27	3,70	91,36
203	FAZENDINHA	25	3,43	94,79
194	ESPLANADA	24	3,29	98,08
301	JONAS VEIGA	7	0,96	99,04
85	CASA BRANCA	2	0,27	99,31
231	GRANJA DE FREITAS	2	0,27	99,59
3	ABADIA	1	0,14	99,73
321	LISTAR	1	0,14	99,86
501	SAO GERALDO	1	0,14	100,00
Total		729	100,00	

(3) A que horas acontecem os principais delitos ? Existe algum padrão ?

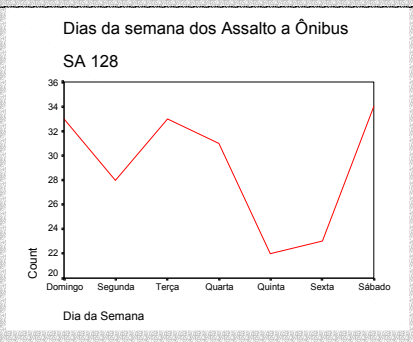


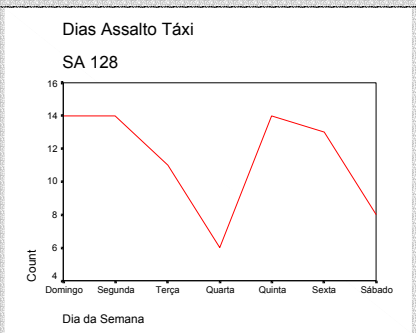


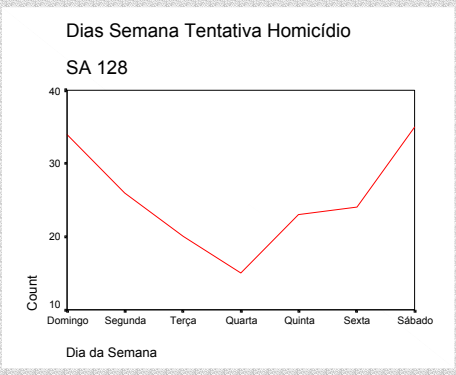


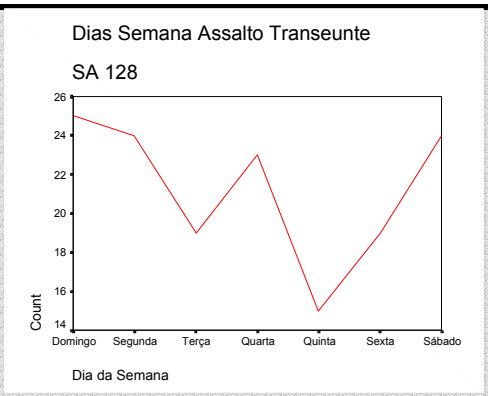


(4) Em que dia da semana acontecem os principais delitos ?

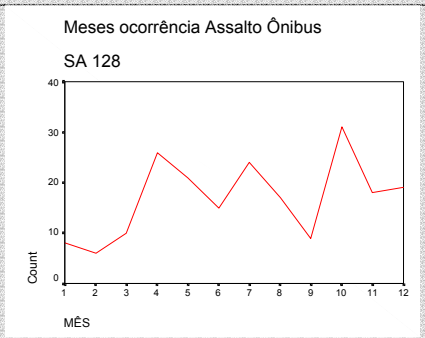


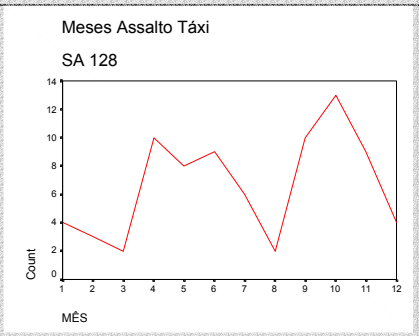


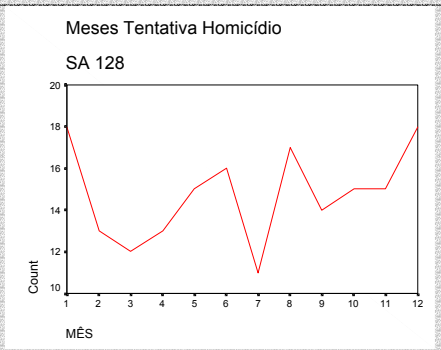


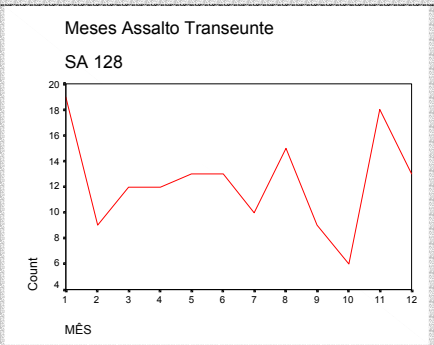


(5) Em que meses acontecem os principais delitos ?



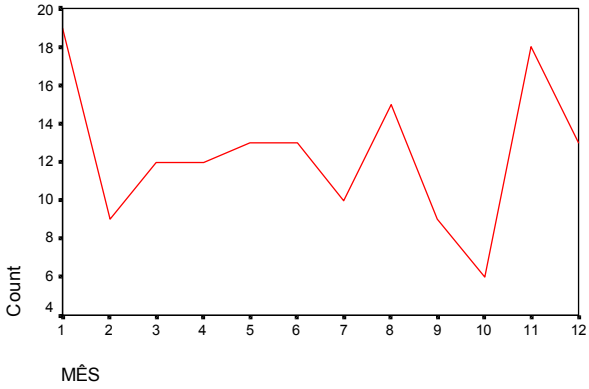




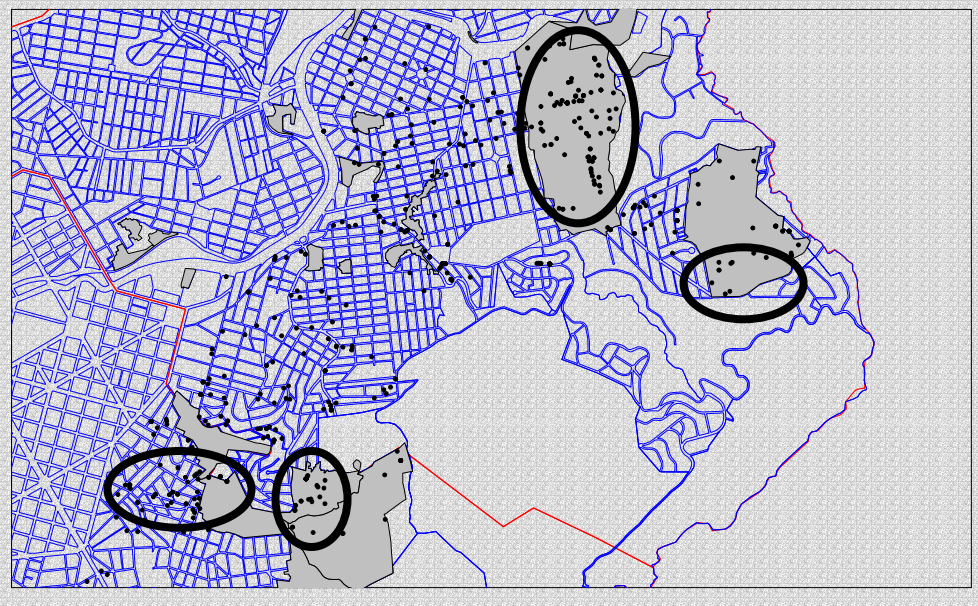


Meses Assalto Transeunte

SA 128



Mapa 8
Total Delitos da SA 128



- As regiões com maior concentração de crimes violentos são as favelas, na qual destaca-se o Alto do Vera Cruz (acima à direita), seguida pela Santana do Cafezal. As ruas em torno do Serra e São Lucas também concentram grande número de ponto.
- Vamos observar com mais detalhe o Alto do Vera Cruz. Conforme pode-se ver, a Rua Tebas, Rua Doutor Brochado e a Rua Desembargador Bráulio concentram grande número de chamadas de ocorrência das mais diversas naturezas.

Anexo 2

TESTE DE CHOW

Testando quebra estrutural em pontos conhecidos

Considere que a amostra seja dividida em duas sub-amostras, uma contendo as observações antes do ponto de mudança, e outra contendo o restante das observações após o ponto de mudança.

Suponha o modelo hipotético abaixo para explicarmos a idéia do teste:

$$Y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \varepsilon_i, \quad i = 1, ..., N.$$
$$\varepsilon_i : \ NI(0, \sigma_\varepsilon^2).$$

A hipótese nula do teste é que não existe mudança nos parâmetros do modelo e a alternativa é que ao menos um dos parâmetros mudou em algum instante do tempo.

H_0: Os parâmetros $(\beta_0, \beta_1, \beta_2)$ são constantes sobre toda a amostra.

H_1: Os parâmetros $(\beta_0, \beta_1, \beta_2)$ mudam em um instante de tempo (ponto de mudança) para $(\beta_0 + \delta_0, \beta_1 + \delta_1, \beta_2 + \delta_2)$, onde ao menos um $\delta_i \neq 0, i = 1, 2, 3.$, e permanece constante até o final da amostra.

Sob a hipótese nula de não existir quebra estrutural, a soma de quadrados residuais das duas sub-amostras $(SQE_{N_1} + SQE_{N_2})$ não deve diferir significativamente da soma de quadrados residuais total (SQE_N) obtida do modelo com a amostra completa.

Esta é a idéia por trás do teste para quebra estrutural proposto por Chow (1960):

$$F_{chow} = \frac{\left(SQE_N - \left(SQE_{N_1} + SQE_{N_2}\right)\right)/k}{\left(SQE_{N_1} + SQE_{N_2}\right)/\left(N - 2k\right)} : \ F_{(k, N-2k)}$$

A estatística do teste de Chow tem distribuição F com k graus de liberdade no

numerador e N-2k no denominador, onde k é o número de parâmetros do modelo.