The Determinants of Criminal Victimization in São Paulo State[¥]

Fábio Augusto Reis Gomes

Escola de Pós-Graduação em Economia – Fundação Getúlio Vargas – RJ (EPGE/FGV)

Centro de Pesquisa em Economia Internacional (CEPE)

Correspondência:

Fábio Augusto Reis Gomes

Praça José de Alencar nº 8 /905

Bairro Flamengo, Rio de Janeiro – RJ

Cep: 22.230-020

freis@fgvmail.br

Lourenço Senne Paz

University of Maryland, Department of Economics

ÁREA 6

Economia do Trabalho, Economia Social e Demografia

[¥] We are grateful to Luiz Renato Lima for his comments. The usual disclaims apply.

ÁREA 6: Economia do Trabalho, Economia Social e Demografia

The determinants of criminal victimization in São Paulo state

Abstract

In this paper an exploratory research of the determinants of criminal victimization in São Paulo state is conducted using the life-style and opportunity models with Seade's 1998 Pesquisa de Condição de Vida (Life Condition Survey). São Paulo is the most populous Brazilian state with 37 million inhabitants, responding for more than one third of the Brazilian GDP. Our results indicate that the life-style and opportunity models had a good fitting to the data. As expected, the likelihood of being a burglary/larceny victim is increasing in income and if the person is male, and it decreases if the person is married and has few years of schooling. In relation to assault, the victimization likelihood increases considerably if the person is asian, single or divorced, and foreigner, on the other hand, it is decreasing in income and years of schooling, and it is smaller for black or multi-racial background people.

Keywords: Victimization; burglary/larceny; assault; São Paulo state, Brazil.

JEL classification: K40, K42, O17.

Resumo

Este artigo é uma pesquisa exploratória sobre os determinantes da vitimização pela violência no estado de São Paulo, Brasil, a partir dos modelos de estilo de vida e oportunidade, utilizando dados da Pesquisa de Condição de Vida do Seade de 1998. São Paulo é o estado mais populoso com cerca de 37 milhões de habitantes, respondendo por mais de um terço do PIB brasileiro. Os resultados obtidos indicam que os modelos de estilo de vida e oportunidade desempenharam um papel bastante razoável. Como esperado, a probabilidade de um indivíduo ser vítima de roubou ou furto é crescente na renda e se for homem, e se reduz quando o indivíduo é casado e tem baixa escolaridade. Em relação à agressão física, a probabilidade de vitimização aumenta consideravelmente se o indivíduo for asiático, separado ou solteiro, e estrangeiro. Ela é decrescente na escolaridade e renda, e é menor para negro ou mestiço.

Keywords: Vitimização; roubo/furto; agressão; Estado de São Paulo; Brasil.

Classificação JEL: K40, K42, O17.

Introduction

Since Becker (1968) crime has become a topic of increasing relevance among economists. In order to understand the crime decision process, Becker (1968) introduced the idea that criminals are rational, self-interested agents whose behavior can be best understood as an optimal response to incentives. More recently, Ehrlich (1996) extended this work, developing a model in which the level of crime is jointly determined by the supply of offenses and the demand for private and public protection from crime. In addition, Sah (1991) studied the patterns of crime, considering that criminals make crime more appealing to nearby residents by jamming the law enforcement system and, therefore, lowering the probability of punishment. Although, these articles try to establish when crime is an optimal decision, they offer few clues as to which individuals are most likely to be victims of crime, an important topic, especially in violent countries like the Latin American ones.

Recently, Gaviria and Páges (2002) analysed the determinants of crime victimization in Latin American cities, focusing mainly on how the socioeconomic status of individual, the population size of her city of residence and the recent population growth of the city affects the probability of being a victim of crime. Also, they present a model to explain when wealthy individuals are more likely to be victim of property crime, based on investment in private protection. They concluded that the typical victim of crime in Latin America come from rich and middle class households and tend to live in larger cities.

Our purpose in this paper is to assess the determinants of the individual risks of being a victim of violence in the most populous Brazilian state, São Paulo. Besides having about 37 million inhabitants, it also produces more than one third of the Brazilian GDP. Our theoretical approach is based on life-style and opportunity models (Hindelang, et al., 1978 e Cohen et al., 1981), implicitly used by Gaviria and Pages (2002), since they also focuses on socioeconomic variables. These models try to identify what individuals are more likely to be crime victim, based on their life-style.

Our data is from Seade's 1998 Pesquisa de Condição de Vida (Life Condition Survey), hereafter PCV. While many victimization surveys are either unavailable or incomplete our data contains information about burglary/larceny and assault and also, contain detail information about individual's characteristics. It provide an estimate that in São Paulo state about 6% of its population, 1,650,000 inhabitants, were victim of burglary/larceny in the survey's twelve preceding months, and around 1.6% of its population were victim of assault in the same period. The figures turn out to be more dramatic with we consider family unit instead of individuals, because around 18% of São Paulo state families had at least one member that was victim of burglary/larceny and about 5% in case of assault.

This high crime rate in São Paulo state, which has a significant impact on the economy, stresses the importance of this paper. In fact, the only paper that deals, specifically, with victimization in Brazil is Fajnzylber and Araujo (2001), however, those authors did not explore PCV database, and this fact reinforces the innovative feature of our paper. Also, if some Latina American countries have the same crime patterns, the understanding of the Brazilian case could be important to shed some light on the other countries patterns. Last but not least, it is worth noting that while Gaviria and Pagés (2002) have all information at household level and don't have information on the type of victimization, we have information at individual level and about burglary/larceny and assault.

The obtained results indicate that the life-style and opportunity models had a good fitness to the data. As expected the likelihood of being a burglary/larceny victim is increasing in income and if the person is male, and it decreases if the person is married and has few years of schooling. In relation to assault, the victimization likelihood increases considerably if the person is Asian, single or divorced, and foreign, on the other hand, it is decreasing in income and years of schooling, being smaller for black or multi-racial background people.

This paper is organized as follows. Section 2 addresses the models and the determinants of the victimization. The data set, the estimations and the results are presented in section 3. Finally, the conclusions are drawn in section 4.

2. The Determinants of the victimization

The exploratory research that will be conducted here about the determinants of the victimization by violence is based on two well-known studies: Hindelang *et al*. (1978) e Cohen *et al*. (1981) that developed the life-style and opportunity models. The theoretical framework developed by them consists in organizing the factors that affect the likelihood of an individual being a victim of a crime. The five main factors are: *i) exposure*, the physical visibility and accessibility of persons or objects to potential offenders at any time or place; *ii) proximity*, the physical distance between areas where potential crime targets reside and areas where relatively large populations of potential offenders are found; *iii) guardianship*, the effectiveness of persons private security guards, law enforcement, objects such as alarms, in preventing violations from occurring; *iv) target attractiveness*, the material or symbolic desirability of persons or property targets to potential offenders; *v) definitional properties of specific crimes*, the features of specific crime that act to contain strictly instrumental actions by potential offenders.

The five main factors crucially depend upon the life-style of the individual. For example, persons that spend more time in public places will present a higher degree of social interaction; as a consequence they will be more exposed. Crime exposure also depends on the socio-economic characteristics of the individual, this is so because the smaller the distance between the places frequently visited by the potential victim and by the agents that presents the typical features of criminal the larger will be the likelihood of occurring a crime.

In terms of guardianship level by the potential victims, depending on their preferences, or even their occupation, the individuals may frequent places with different levels of security. The target attractiveness is related to its defense ability and to the possible offender's utility gain, generally proxied by the victim's purchase power.

The guardianship ability may be influenced by age and gender, and the former to the victim's economic situation. The crime intrinsic features may or may not reinforce the other factors. Crimes that involve high sums of money will be probably better planned, which includes a cautiousness choice of victim. So factors like exposure and guardianship besides target attractiveness are clearly reinforced.

2.1 Theoretical model

To provide an analytical treatment of the life-style and opportunity models main insights we developed an analytical model in which citizens and criminals make rational

decisions. Citizens (potential targets) decide how much to invest in private protection, a proxy for *guardianship*. Criminals decide to commit or not an offense, based on citizen wealthy, a proxy for *attractiveness*. We also consider the effects of *exposure* and *proximity* in our model discussing how criminals meet citizens.

In fact, our theoretical model is an extension of Gaviria and Pagés (2002) model. Their model analyses property crimes, considering the following structure. There are many citizens, each one has an exogenous wealth. Thus the wealth could be viewed as an individual type. There is only one type of criminal. In the first stage citizens decide how much to invest in private protection, having knowledge of the criminals characteristics. In the second stage, citizens are matched with criminals, who in turn decide whether or not to commit a crime, taking as known the victim wealth. We modified both stages. In the first we considered a continuum of criminal types. Thus agents decide how much to spend in private protection considering the distribution function of criminal types. In this sense, our model is a stochastic version of Gaviria and Páges (2002) model.[1] In the second stage, we discuss more accurately the matching process between citizens and criminals. For example, we suppose that this process depends on citizen type, that is, her level of wealth.

Thus, we suppose that the target *(i)* attractiveness is proxied by her income, w_i, and she can invest e_i in her self-security. The offender's (*j*) benefit of a crime is given by $\delta_j w_i$, where $\delta_j \sim [\delta_L; \delta_H]$ is an offender (*j*) specific parameter. This parameter may reflect the ofender's ability, or her preference for certain types of crime.

The offender has a $1-p(e_i)$ likelihood of having a successful offense against victim (*i*), which is decreasing in e_i . In case of failure, she will face a punishment, F_j, where $F_j=F(\delta_j)$ with $F'(\delta_j)>0$. So, $F_j \sim [F_L; F_H]$ with $F_L = F(\delta_L)$ and $F_H=F(\delta_H)$. The offender will attack when the expected benefit surpasses the expected punishment:[2]

$$[1-p(e_i)]\delta_j w_i > p(e_i)F_j \qquad (1)$$

$$p(e_i) < \frac{\delta_j w_i}{F_j + \delta_j w_i} \qquad (2)$$

It is assumed that the offender is able to observe e_i, it is easy to know if the target has electrified fence or watchdog in her property or if she is accompanied by bodyguards. The investment e_i is endogenous and it is chosen by the potential victim taking into account distribution function δ_j and F_j .

$$\Delta_\delta \equiv E_i(\delta_j) = \frac{\delta_H + \delta_L}{2} \qquad (3)$$

$$\Delta_F \equiv E_i(F_j) = \frac{F_H + F_L}{2} = \frac{F(\delta_H) + F(\delta_L)}{2} \qquad (4)$$

Therefore the chosen e_i level will be, on average, the one that makes the offender indifferent about committing or not the crime and it is given by:

$$[1-p(e_i^*)]\Delta_\delta w_i = p(e_i^*)\Delta_F \qquad (5)$$

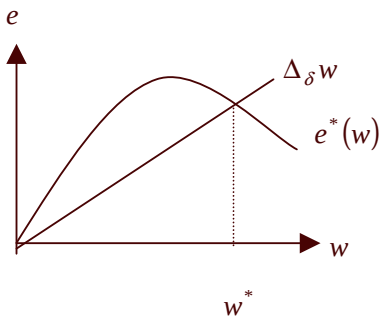
$$p(e_i^*) = \frac{\Delta_\delta w_i}{\Delta_F + \Delta_\delta w_i} \qquad (6)$$

[1] We keep the assumption that criminals know about the type of the victim.
[2] Like, Gaviria and Páges (2002) agents are supposed to be risk neutral.

$$e_i^* = p^{(-1)}\left[\frac{\Delta_\delta w_i}{\Delta_F + \Delta_\delta w_i}\right] \qquad (7)$$

Notice that $e_i^* = e_i^*(w_i)$ which is a function of w_i. Thus, it worths invest in security (guardianship) as long as such investment does not exceed the crime expected loss, i. e., $e_i^*(w_i) \leq \Delta_\delta w_i$. There are two possible cases according to $e_i^*(w_i)$ concavity.

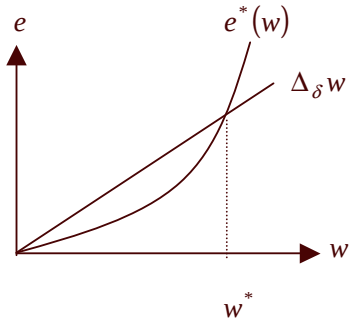
Case 1) $e_i^*(w_i)$ is concave, i. e., the security investment cost is decreasing.



Graph(1)

As a result, the agents that have $w_i < w_i^*$ will not invest in security. The opposite happens if $w_i > w_i^*$.

Case 2) $e_i^*(w_i)$ is convex, the security investment cost is increasing.



Graph(2)

Hence, the agents whose $w_i > w_i^*$ will not invest in security (guardianship). The opposite happens if $w_i < w_i^*$.

According to these two cases, the agent chooses either $e_i^* = 0$ or $e_i^* = p^{(-1)}\left[\frac{\Delta_\delta w_i}{\Delta_F + \Delta_\delta w_i}\right] > 0$.

Now, the interaction among victims and criminals will be described. It is assumed that criminals and potential targets are spread and meet each other with a chance of π_{ij}. This probability depends on the distance between offender and victim and on the target's exposure. Both will be considered exogenous in this model. In fact, it is not obvious that these variables are endogenous, because people may not be able to implement their choices; for example, it is not easy to change jobs because one has to cross a dangerous area to go to work. However, because the wealthy individuals frequent more secured places, we assume that π_{ij} is a

decreasing function of income, w_i, and it is also an increasing function of the proportion of offenders in society, i.e., $\pi_{ij} = \pi_{ij}(w_i, \Theta_j)$, where $\Theta_j = \sum_{n=1}^{N} I_n / N$, $I_n = 1$ if *n* is a criminal and N is the population size.

The offender *(j)* faces a certain number of potential targets per period and evaluates if committing the crime is an optimal choice. Assume that $E_i(\delta_j) = E_i(\delta_j \mid w_i, \Theta_j)$ and $E_i(F_j) = E_i(F_j \mid w_i, \Theta_j)$ the agent's private security investment decision, as done above, does not change; as a result the likelihood of an agent *(i)* being attacked by a criminal *(j)* is given by

$$V_{ij} = \pi_{ij}(w_i, \Theta_j) \times \Pr\left[p(e_i^*) < \frac{\delta_j w_i}{F_j + \delta_j w_i} \right] \qquad (8)$$

It was seen that $e_i^* = 0$ or $e_i^* = p^{(-1)}\left[\frac{\Delta_\delta w_i}{\Delta_F + \Delta_\delta w_i} \right] > 0$, so

$$V_{ij} = \pi_{ij}(w_i, \Theta_j) \times \left\{ \begin{array}{c} \Pr\left[\frac{\Delta_\delta w_i}{\Delta_F + \Delta_\delta w_i} < \frac{\delta_j w_i}{F_j + \delta_j w_i} \right] \\ \Pr\left[p(0) < \frac{\delta_j w_i}{F_j + \delta_j w_i} \right] \end{array} \right\} \qquad (9)$$

After some algebraic manipulation, it is possible to prove that,

$$\Pr\left[\frac{\Delta_\delta w_i}{\Delta_F + \Delta_\delta w_i} < \frac{\delta_j w_i}{F_j + \delta_j w_i} \right] = \Pr\left[kF(\delta_j) < \delta_j \right] < \Pr\left[p(0) < \frac{\delta_j w_i}{F_j + \delta_j w_i} \right] = \Pr\left[gF(\delta_j) < \delta_j \right] \quad (10)$$

where $k = (\delta_H + \delta_L)/(F_H + F_L)$ and $g = p(0)/[1 - p(0)]w_i$. The inequality comes from the fact that $p'(\bullet) > 0$ and it implies that by investing in self-security it is possible to reduce the chance of being a victim, as predicted by the above models. Assume that $kF(\delta_L) > \delta_L$ and $kF(\delta_H) < \delta_H$,[3] then

$$\Pr\left[kF(\delta_j) < \delta_j \right] = \int_{kF(\delta_j)}^{\delta_H} \frac{1}{\delta_H - \delta_L} d\delta_j = \frac{1}{\delta_H - \delta_L} \left[\delta_H - \left(\frac{\delta_H + \delta_L}{F_H + F_L} \right) F(\delta_j) \right] \qquad (11)$$

This probability would be zero only if $kF(\delta_L) > \delta_H$, but this inequality implies that $\delta_L F(\delta_L) > \delta_H F(\delta_H)$, which is impossible to hold because $F'(\bullet) > 0$. Even investing in private security, there is always a chance of being a victim, in other words, there is at least one δ_J that makes (11) larger than zero.

Notice that $\Pr\left[kF(\delta_j) < \delta_j \right]$ is not of function of income. It happens because the investment in security is exactly the one that makes the attractiveness generated by income go to zero. In the case of a zero investment in security, because $p(0)$ is not a function of income and $\delta_j w_i / (F_j + \delta_j w_i)$ is an increasing function of income, the larger the income the larger will be $\Pr\left[p(0) < \delta_j w_i / (F_j + \delta_j w_i) \right]$. In fact, assuming that $gF(\delta_L) > \delta_L$ and $gF(\delta_H) < \delta_H$,[4] we see that

[3] These conditions occur when $F_H / F_L < \delta_H / \delta_L$.

[4] These conditions imply that $\delta_H / \delta_L < (F_H + \delta_H w_i)/(F_L + \delta_L w_i)$.

$$\Pr\left[\, p(0) < \frac{\delta_j w_i}{F_j + \delta_j w_i} \,\right] = \Pr\left[gF(\delta_j) < \delta_j \right] = \int_{gF(\delta_j)}^{\delta_H} \frac{1}{\delta_H - \delta_L} d\delta_j = \frac{1}{\delta_H - \delta_L} \left[\delta_H - gF(\delta_j) \right] \quad (12)$$

Thus, as long as g is decreasing in income, the above probability (12) increases in income. Hence it follows that attractiveness, proxied by income, increases the chance of being a victim of the individuals that do not invest in self-security (increase in guardianship). Going back to those two cases of e_i concavity:

Case 1) $e_i^*(w_i)$ is concave. The optimal investment in security, as a function of income, is decreasing and only the agents that have $w_i > w_i^*$ will invest in security. Once the criminal meets the potential target, the chance of being a victim is decreasing if the potential target has invested in private security. Moreover, as $\pi_{ij} = \pi_{ij}(w_i, \Theta_j)$ is decreasing in w_i, the model clearly implies that the wealthier agents will have a smaller chance of victimization, which agrees with the life-style and opportunity models.

Case 2) $e_i^*(w_i)$ is convex. The optimal investment in security, as a function of income, is increasing and only the agents that have $w_i < w_i^*$ will invest in security. As we've seen, once the criminal faces the potential target, the likelihood of committing a crime will decrease if the target invests in private security, but as $\pi_{ij} = \pi_{ij}(w_i, \Theta_j)$ is decreasing in w_i, the model does not show a clear implication about the probability of victimization of a wealthy individual. The wealthy individuals have a smaller chance of meeting criminals, but once it happens the chance of being a victim is larger than the poor individuals' one. This result can also be found in the life-style and opportunity models.

3. Data, Regressions and Results

The PCV has a considerable range of information about the families and the individuals interviewed. So much so, it enable us to have a satisfactory assessment about the individual life-style and to know if the individual were a victim of burglary/larceny or assault in the twelve preceding months without collecting data from other sources.

The PCV is a household sampling survey that allows the identification of the household and its people, in individual and family level, and making possible the investigation about housing, employment, income, health service use and exposure to violence.

The PCV data were collected between June and November of 1998 the seven regions of the São Paulo state: the Great São Paulo and six other regions covering the remaining area of the state. Fifteen thousand domiciles were visited, being 4,700 of them in the Great São Paulo region. The survey employed two dimensions for data collection: domicile and individual. The violence exposure data were collected at the individual level. The violence exposure data were collected at the individual level.

An important feature of these data about victimization is that it was not obtained from police reports, but the individual itself provided this information by answering the survey. In fact, a critical sample selection bias is avoided.

Following Carneiro and Fajnzylber (2001) and Ramirez et al. (2001) we included the following types of variables in our regressions: *i)* gender, in general men are more exposed and women have less self-defense; *ii)* age, we allow non-linear and discontinuous effects, since the effect could be concave and we expect that each range has a distinct life-style; *iii)*

race; *iv)* marital status, because it is an important determinant of an individual's life-style; *v)* schooling, because it affects social interactions, as in age case we allow non-linear and discontinuous effects; *vi)* income, we allow non-linear effects introducing the logarithm of income, besides the level income[5]; *vii)* housing, because each region has differences in public safety, etc.

In this paper we use the logit model with the following specification to study the patterns of burglary/larceny and assault victimization in São Paulo state.

$$Y_i = c + X_i\beta + Z_h + \gamma_r + \varepsilon_i \qquad (13)$$

where Y_i is a dummy variable indicating if the individual i who lives in region r was a burglary/larceny or assault victim, X_i is a vector of the individual characteristics (age, race, schooling), is a vector of the domicile characteristics (number of dwellers, public illumination), γ_r is a São Paulo state region effect and (i is an individual error term.

3.1 Burglary and Larceny victimization

We started with the burglary/larceny case. In the PCV survey burglaries and larceny were considered equivalent, even though they are distinct social interactions. Burglary is a crime without physical violence, that in general is not reported to the police unless the stolen property is expensive or it is insured. Larceny involves physical violence threat and therefore is considered more serious.

Initially we estimated model (1) that included variables related to gender, age, schooling, income, and marital status. Table (1) reports the results. As expected by the life-style model, the likelihood is larger for men and increasing in income and schooling, it is smaller for non-widows, elderly people (from 45 to 59 years) and low schooling individuals (low exposure, low attractiveness).

In model (2) were included variables related to the socioeconomic situation of the individuals. We find that the fact of not having public illumination on the home street (low security) increased the chance of being a victim. On the other hand, the fact of having health insurance reduced the likelihood and the larger the number of persons living in the same home, the smaller is the likelihood of being a victim (lower attractiveness, because it is a lower income proxy). Finally, model (3) has controls for the place of birth and how long have she been living in current home of the individual and if she is a foreigner or born in São Paulo state. In addition to the results of model (2) it can be added that home street public iluminating service availability is no more significant and the longer the individual is living in the same home the smaller is the likelihood of being a victim. We stress that the estimated coefficients showed a great robustness to the inclusion of other controls in model as shown by models (2) and (3).

3.2 Assault victimization

In terms of assault, it is necessary to consider that this type of crime involves moral and cultural values. Thus a subset of the surveyed individuals may not consider crime the injuries that resulted from fights, domestic violence, and in some cases it can be considered not to

[5] In this case discontinuous effects were not significative.

serious to be reported to the police, and the recognition of being a victim can reveal family conflicts.

For assault crime the procedure employed was the same, and the results are presented in table (2). In model (1) the fact of being asian, and divorced or single increased the likelihood of being a victim, however, income and years of schooling are inversely related to the likelihood of being a victim. In model (2) we noticed that the black or multiracial background dummy variable became statistically significant with a negative sign. The individuals that have health insurance presented a smaller likelihood of being victims of assault. Moreover, the larger the number of dwellers of a home, the smaller will be the likelihood of victimization. We stressed that in model (3) the black dummy variable continued to be statistically significant with the same sign and magnitude of model (2). In addition, the fact of being a foreigner drastically increases the chance of being assaulted. Notice that it is not possible to distinguish if these foreigners are legal or illegal immigrants, being the latter a growing phenomenon lately. Again, the estimated coefficients were robust to the inclusion of other control variables.

4. Conclusions

This paper analyses the determinants of the individual risks of being a victim of violence in São Paulo state by using the life-style and opportunity models. From the regressions output we concluded that the likelihood of being a victim of burglary/larceny is increasing in income and years of schooling, if the individual is male, and it is drastically diminished if the individual is not a widow and has few years of schooling. In respect of assault victimization the likelihood increases if the individual is single or divorced, asians and foreigners. On the other hand, it is decreasing in income and schooling.

References

Becker, Gery, (1968). “Crime and punishment: an economic approach.” Journal of Political Economy 76, 169-217.

Ehrlich, I. (1996). “Crime, punishment, and the market for offenses.” Journal of Economic Perspective 10 (1), 43-67.

Carneiro and Fajnzylber, (2001) “La Criminalidad em Regiones Metropolitanas de Rio de Janeiro y São Paulo: factores determinantes de la victmización y política pública” in **Crimen y Violencia en América Latina**, edited by Fajnzylber, Pablo; Lederman, Daniel and Loayza, Norman. World Bank. Ed. Alfaomega.

Cohen, L. E., Kluegel, J. R., & Land, K. C. (1981). “Social inequality and predatory criminal victimization: An exposition and test of a formal theory”. American Sociological Review, 46, 505-524.

Fajnzylber and Araujo, Jr. (2001) “Violência e Criminalidade” in **Microeconomia e Sociedade no Brasil**, edited by Marcos Lisboa and Naércio Menezes-Filho, FGV-EPGE, Rio de Janeiro: Editora Contracapa.

Gaviria, A. (2000) “Increasing returns and the evolution of violent crime: the case of Colômbia”, Journal of Development Economics Vol 61, 1-25.

Gaviria, A. and Pagés, C. (2002) “Patterns of crime victimization in Latin America cities”, Journal of Development Economics Vol 67, 181-203.

Hindelang, M. J., Gottfredson, M. R., & Garofalo, J. (1978) **Victims of personal crime: An empirical foundation for a theory of personal victimization.** Cambridge, MA: Ballinger.

Jensen, G. & D. Brownfield. (1986). “Gender, Lifestyles and Victimization: Beyond Routine Activities.” **Violence and Victims** 1: 85-99.

Ramírez, Teresita; Zurita, Beatriz; Villoro, Renata; Messmacher, Miguel; López, Blanca and Leon, Cintli. (2001) “Tendências y Causas del Delito Violento en el Distrito Federal de México” in **Crimen y Violencia en América Latina**, edited by Fajnzylber, Pablo; Lederman, Daniel and Loayza, Norman. World Bank. Ed. Alfaomega.

Sah, R. (1991). “Social osmosis and patterns of crime” Journal of Political Economy 99 (6), 169-217.

Sampson, R. J. & Lauritsen, J. L.(1990) “Deviant lifestyles, proximity to crime and the offender-victim link in personal violence” **Journal of Research in Crime and Delinquency**, 27, 110-139.

Table 1 – Burglary/Larceny Victimization Logit Estimations Output

Independent Variables		Burglary/Larceny victim		
		(1)	(2)	(3)
Gender	Male	0.5092*	0.5087*	0.5105*
Age (years)		0.1062*	0.0819*	0.0844*
Squared age (years)		-0.0011*	-0.0009*	-0.0009*
Age ranges (years)	Up to 15	0.1685	-0.0318	-0.387
	From 16 to 24	0.2467	0.0432	0.0270
	From 25 to 34	0.0149	-0.0939	-0.1029
	From 35 to 44	-0.2483	-0.2631	-0.2643
	From 45 to 59	-0.3550**	-0.3025**	-0.3230*
Race	Black\multi-racial	-0.1689*	-0.1719*	-0.1699*
	Asian	-0.0951*	-0.1073*	-0.1154*
Schooling (years)		0.1040*	0.0743*	0.0868*
Squared schooling (years)		-0.0058*	-0.0041*	-0.0045*
Schooling ranges (years)	Up to 4	-0.6970*	-0.6687*	-0.6097*
	From 5 to 8	-0.4887*	-0.4665*	-0.4306*
	From 9 to 12	-0.3017*	-0.2437*	-0.2267*
Marital status	Married	-0.8529*	-0.7952*	-0.7968*
	Divorced	-0.1483*	-0.1454*	-0.1463*
	Single	-0.6608*	-0.6253*	-0.6211*
Per capita family income		-2.34e-08*	-1.93e-08*	-1.88e-08*
Log of per capita family income		0.1816*	0.1486*	0.1453*
Health insurance			-0.0558*	-0.0527*
Employment status	Employed		0.0109	0.0094
	Unemployed		0.0087	0.0061
Home street public illuminating service			0.0851**	0.0880
Number of dwellers living at home			-0.0817*	-0.0809*
Born in São Paulo state				0.0243
Migrant				-0.0067
Foreigner				-0.0111
Number of years living in current home				-0.0035*
Number of observations		37573	34499	34134

Notes: *(**) indicates statistical significance in a two tail test at 5% (10%).

[a]Marriage or living together; [b]Divorced; [c]Unemployed.

All models include region fixed effects, and clustering by region.

Table 2 – Assault Victimization Logit Estimations Output

Independent Variables		Assault victim		
		(1)	(2)	(3)
Gender	Male	0.1906	0.1435	0.1427
Age (years)		-0.0223	-0.0727	-0.0725
Squared age (years)		0.0000	0.0004	0.0004
Age ranges (years)	Up to 15	-0.6289	-1.224	-1.235
	From 16 to 24	0.0615	-0.5086	-0.5066
	From 25 to 34	-0.0591	-0.3323	-0.3244
	From 35 to 44	0.0769	-0.0042	-0.0097
	From 45 to 59	-0.1546	-0.0780	-0.0647
Race	Black\multi-racial	-0.0823	-0.1612*	-0.1579*
	Asian	0.1598**	0.2686*	0.1820*
Schooling (years)		-0.0503	-0.0918**	-0.1087*
Squared schooling (years)		-0.0049*	-0.0016	-0.0011
Schooling ranges (years)	Up to 4	-1.1836*	-1.101*	-1.1253*
	From 5 to 8	-0.5640*	-0.5011*	-0.5116*
	From 9 to 12	-0.6236*	-0.4982*	-0.5041*
Marital status	Married	0.078	0.0861	0.0805
	Divorced	1.0061*	0.9486*	0.9589*
	Single	0.3936*	0.4391*	0.4285**
Per capita family income		2.11e-08*	1.34e-08*	1.27e-08*
Log per capita family income		-0.1572*	-0.0958*	-0.0912*
Health insurance			-0.3817*	-0.3946*
Employment status	Employed		-0.0155	-0.0130
	Unemployed		0.1666	0.1672
Home street public illuminating service			-0.2086*	-0.2188*
Number of dwellers living at home			-0.0567*	-0.0605*
Born in São Paulo state				0.0801
Migrant				0.0437
Foreigner				0.8563*
Number of years living in current home				0.0048
Number of observations		37573	34499	34134

Notes: *(**) indicates statistical significance in a two tail test at 5% (10%).

[a]Marriage or living together; [b]Divorced; [c]Unemployed.

All models include region fixed effects, and clustering by region.