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Who Wants Safer Streets?

Explaining Concern for Public Safety in Brazil

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Public action to prevent crime is often driven by concerns about public safety. But what generates those concerns? Is it crime, or something else? Using survey data for Brazil, we find that the desire for greater public safety has a positive own-income effect, but a negative neighborhood-income effect; living in a poor area increases concern for public safety at given own-income. The own-income effect is nonlinear, such that inequality attenuates the aggregate concern for greater safety. Education raises concern, and strongly so when neighbors are poorly educated. Controlling for these factors, we identify a significant causal effect of lack of public safety on the desire for greater safety.

JEL classification: D12, D60, H41

Key words: Perceived public safety, crime, inequality, Brazil

# 1.	Introduction

Crime prevention often stems from public concern. In various ways—calls for policing, counseling teenagers, being watchful neighbors, spending on security measures —personal concerns about public safety motivate actions and behaviors that help reduce crime. To the extent that those concerns are driven by crime, there will then be a <u>self-correcting mechanism</u> whereby higher crime rates stimulate preventive responses. It has been argued that such a mechanism exists and helps explain crime cycles over time (Philipson and Posner, 1996).

Repeated opinion polls have indicated that public safety is an important concern of people almost everywhere. But what motivates concerns for public safety? Do expressed needs for greater safety reveal differences in vulnerability to crime, or are other forces at work? Economic research on crime has largely ignored public opinion, and so can throw little empirical light on this seemingly important factor in mobilizing public action against crime. There have been a number of empirical studies of average crime rates, and public spending on crime prevention, across geographic areas (including Greenberg et al., 1979, Behrman and Craig, 1987, Gyimah-Brempong, 1989, and Witt et al., 1999). There has also been work on private spending on crime prevention and the substitutability with public spending (Clotfelter, 1977). But there has been no research to our knowledge on the determinants of concern about public safety.

The present paper tries to help fill this gap. We study survey responses to questions about perceived current levels of public safety, and the desire for improving public safety. Our approach addresses a number of questions about the determinants of concern for public safety. One question concerns the role of crime itself. If the self-correcting mechanism exists then we expect that survey respondents who currently feel unsafe will have a greater desire for improved safety. We test that hypothesis. In doing so, an obvious advantage of self-rated assessments of

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public safety is that they contain information about vulnerability to crime in one's immediate neighborhood—information that one cannot find in typically highly aggregated ex-post data on reported crime. Given the highly localized nature of crime incidence, this is a clear advantage of our approach. Against this advantage, we must allow for the likely endogeneity of self-reported data. We offer a strategy for identification.

We also look for other household and neighborhood factors that might influence expressed concern about public safety. One potential factor is income. We test for individual income effects on both perceived levels of public safety, and the desire for greater safety. Strong income effects on the latter might well explain any tendency for poorer areas to enjoy less public safety, in that less concern about public safety at the individual level makes it harder to mobilize public actions which make those areas safer.

A closely related question concerns the role of income inequality. There is evidence that areas with higher inequality tend to have higher crime rates (Ehrlich, 1973; Witt et al., 1999); Fajnzylber et al. (1998) also find evidence of such a relationship across countries. An influential paper by Ehrlich (1973) argues that inequality increases the potential gains from crime. Another possibility—which we have not seen discussed—is that the income gains may do more to raise concern for public safety amongst the poor than the rich (which is clearly possible even if it is the rich who care most about public safety). There is presumably only so much public safety one can possibly want, so diminishing income effects must eventually set in. The concern for public safety will then be concave in income, implying that aggregate concern is lower when inequality is higher. Our approach allows us to test that hypothesis.

Priors about how safe or unsafe one is will be formed in a world of incomplete information in which psychological factors come into play. There is evidence from psychology

that cognitive dissonance (arising, roughly speaking, from the displeasure attached to contemplating adverse events) often leads people to downplay their exposure to unsafe environments; for example, regulations are required to force people to wear safety hats in unsafe jobs. (Akerlof and Dickens, 1982, review the evidence and provide an economic model of this form of behavior.) One's knowledge about the true probability distribution will presumably matter to such effects. Thus it can be hypothesized that education will influence concern for public safety.

We also want to test for neighborhood effects on perceptions of the current level of public safety, and the desire for greater safety. As a stylized fact, crime tends to be spatially concentrated, and notably in poor areas. Past attempts to understand this stylized fact have typically focused on the behavior of criminals, as in the model of Freeman et al (1996) in which the probability of capture is a decreasing function of the number of crimes committed in an area. Strong geographic effects on crime incidence can arise from social interactions within neighborhoods, whereby one person's decision to commit a crime positively affects his neighbor's decision (Glaeser et al., 1996).

Here we examine whether perceptions of public safety, and the desire to improve it, also exhibit strong neighborhood effects. Depending on what we find, this might help understand the geographic concentration of criminal activity, to the extent that this is mediated by local actions motivated by a desire to improve public safety. It might also throw light on the extent to which public safety concerns encourage residential differentiation, such as the "flight to the suburbs" by nonpoor people concerned about their safety in inner city areas.

We shall also investigate the role of education, as an external (neighborhood) effect as well as an internal effect. If own-education matters to concern for public safety via its effects on

knowledge about the true probabilities of crime, then one's neighbors' education could well have the same effect, assuming that education fosters different knowledge sets in different people, but that this knowledge is shared amongst concerned neighbors. We also want to see if the effects of household attributes, such as income and education, interact with neighborhood characteristics; for example, does having well educated neighbors attenuate the impact on concern for public safety of differences in own education?

The following section takes a preliminary look at our data from Brazil, where crime and public safety have become serious concerns, as in other countries in Latin America and elsewhere. For example, homicide rates have been on the rise in Latin America since the mid-1980s, and the average rate is higher than in any of the other principal regions of the world (Fajnzylber et al., 1998). Section 3 then presents our strategy for identifying the causal effect of the level of public safety on the expressed desire for greater safety. Our results are presented in section 4, while section 5 offers some conclusions.

2.   An overview of our methods and data

There are various ways of studying demand for public safety. One way is to value the human and property losses from reported crime, though naturally this is unlikely to fully capture the welfare losses, including amongst those who do not actually experience crime, but live in fear of it. Crime under-reporting is also known to be common. Another approach is to estimate the impact on local property prices, treating public safety as a local public good and assuming that housing markets work well, including that there is free mobility (Thaler, 1978; Clark and Cosgrove, 1990). Alternatively one might assume that observed levels of local public spending are optimal for median voters in each local area (Borcherding and Deacon, 1972). Or one might

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use residential location choices as a means of identifying demand for local public services (Ravallion, 1982).

All these approaches rely on inferences from (more or less) objectively observed behavior including market behavior. A second broad category of approaches to valuing local public services relies on subjective questions, including both qualitative questions and willingness-to-pay questions; examples of the various approaches that have been used include Gibson (1980), Bergstrom et al., (1982), Bohm (1984), and Jacoby (1994). There is recent experimental evidence suggesting that subjective-qualitative questions are more reliable in valuing social programs than open-ended willingness to pay questions (Gregory, MacGregor and Lichstein, 1992).

Our approach is in the spirit of the subjective-qualitative approach. However, we use rather different survey questions than found in that literature. The key difference is that the questions we use allow us to measure the perceived current level of provisioning, as well as the desire for improvement. Past studies using subjective approaches to demand for public services have used the latter question, but not the former. Yet it seems plausible that subjective demand will depend heavily on the perceived current level of provisioning. Under certain assumptions, we are able to identify this effect empirically.

We use the Brazilian Living Standard Measurement Survey for 1996, managed and collected by the Brazilian Institute of Geography and Statistics. The sample frame covered the Northeast and Southeast of Brazil, representing about 75% of the population. (The regions excluded are the Amazon and the Center/West.) The sample size is 4922 households in 550 primary sampling units (PSU); the latter are Census Tracts, roughly identifiable as

"neighborhoods" (around 300 households in urban areas and 200 in rural areas). The survey followed well established practices for these surveys (Grosh and Munoz, 1996).

An unusual feature of the survey is that it asked for subjective information from the head of the household on self-rated welfare in terms of various categories of goods, including public safety. Specifically, the head of the household was asked:

(1) "How would you judge the living conditions of your household in relation to public safety?" The answer for each was given on a scale from one (very bad) to five (very good). We call the answers to this question, the Current Level of Public Safety (*CLPS*).

(2) "If you could improve conditions of members of this household what importance would you attach to public safety?" This time a number is given on a scale one (not important) to four (very important). We call this the Desire to Improve Public Safety (*DIPS*).

With respect to *CLPS*, 38 percent of the respondents assessed current public safety as "bad" or "very bad" (Table 1). For *DIPS*, 57% of respondents thought that improving public safety was "very important", and only 6.5% said it was not important. Table 1 does not provide much support for the idea of a self-correcting mechanism in response to low current levels of public safety. Yes, 60% of those who said that their current level of safety is "bad" or "very bad" also said it is "very important" to improve public safety. But then this is also true of 54% of those who think their current level is "good" or "very good". The Spearman rank correlation is -0.07. While this is significantly different from zero (at the 5% level), the low rank correlation clearly suggests that the assessed current level of public safety is not the only factor explaining the desire to improve public safety.

Income is one possible factor. Figures 1 and 2 tell us about the (unconditional) income effect on answers to the Current Level and Desire to Improve questions. We use total

expenditure on consumption (including imputed values of consumption from income in kind) per person as the "income" variable on the horizontal axis. The graphs are non-parametric regressions of *CLPS* and *DIPS* mapped to a scale from 1 to 5 (4 for *DIPS*) against expenditure per person. (We used Cleveland's, 1979, local regression method as programmed in STATA.) In addition, we give results for the same question asked about education, health, housing, leisure, food, clothing, work and transport. To help interpret these and other graphs in the paper, Figure 3 gives the cumulative distribution of consumption.

Figure 1 shows clear income effects on perceived current levels of all goods. However, this is less strong for public safety. This might be surprising, in that one expects that the objective level of public safety has a positive income effect, at least between neighborhoods. By this interpretation, richer people are better able to mobilize local public action to prevent crime or move to safer neighborhoods. This assumes that public safety has properties of a local public good (clearly, this could not happen if public safety is a pure public good nationally). However, the weak income effect in Figure 1 may well indicate the presence of other variables correlated with expenditure and influencing perceptions of safety at a given level of objective safety. The value that the household attaches to public safety will in general depend on household attributes, including income, as well as the actual level of public safety.

Very different effects are found for *DIPS* (Figure 2). The importance attached to improving public safety tends to increase noticeably as expenditure rises. The income effect on *DIPS* is stronger than for the private goods, for which the desire to improve does not vary as much by expenditure level, and starts to decrease for most categories at high consumption levels (the upper 10-15% of people ranked by consumption).

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How can we interpret the strong income effect on *DIPS* in Figure 2? If public safety is a normal public good then the rich will want more than the poor, but will be rationed in their consumption. Then we can expect a strong income effect on the household's desired level of public safety. However, this does not explain why the rich would have a much stronger desire to <u>improve</u> their public safety. That will presumably depend on how the marginal utility of public safety varies with income. If the cross-partial derivative of (indirect) utility between public safety and income is positive — also implying that greater public safety increases the marginal utility of income — then the desire to improve public safety will have a positive income slope. The curve shown in Figure 2 is consistent with this interpretation.

There is also a strong indication that the desire to improve public safety is a concave function of expenditure (Figure 2); the expenditure slope of *DIPS* falls as spending increases, and is noticeably lower for the richest half of the population than the poorest half (comparing Figures 2 and 3). By Jensen's inequality, concavity implies that any inequality-reducing redistribution of expenditures holding the mean constant will <u>increase</u> the aggregate concern for public safety. However, one should be cautious in drawing that conclusion since the concavity may well be an artifact of the fact that the *DIPS* question is bounded; one cannot answer more than "very important". This means that diminishing returns must eventually set in. Changing the scale may change the curvature. In the next section, we will test for concavity in an unbounded continuous variable consistent with answers to the Desire to Improve Question, assuming normal errors.

3.   An econometric model of concern for public safety

We want to identify the causal effect of lack of public safety on the desire to improve safety, as well as the effects of other observed covariates such as income and education. The

problem is that the perceived level of safety cannot be treated as exogenous to the desire for improved safety. Our identification strategy rests on three main assumptions:

Assumption 1: There is a latent objective level of public safety which is a pure local public good, in that it is constant within suitably defined geographic areas.

Assumption 2: Differences in *CLPS* between otherwise identical households living in different areas can be attributed to differences in their objective level of public safety, and similarly for the *DIPS*.

Assumption 3: *CLPS* is a strictly increasing function of the objective level of public safety at given household characteristics.

Assumption 1 is defensible given that our "areas" are the PSU level in the survey. Assumption 3 is unlikely to be contentious. But is Assumption 2 believable? While other local public goods could clearly influence concern for public safety, this need not violate Assumption 2 as long as those other local public goods matter via their effect on the objective level of public safety in a neighborhood. It is difficult to think of a local public good that is likely to alter concern for public safety for a given household at a given actual level of public safety.

These assumptions allow for geographic effects on the expressed desire for greater public safety, though these effects are assumed to operate via the latent objective level of public safety, which is a local public good, and hence affected by local area characteristics. Assumption 2 thus justifies the exclusion restriction that geographic variables do not alter *DIPS* at given household characteristics, and for a given objective level of public safety. This is the key to identification.

Under these assumptions we will be able to identify the direction of the effect of differences in the current objective level of public safety on household-level desire for improving public safety. We do not directly observe the current level of public safety, and cannot do so at

such a fine level of geographic disaggregation as the PSUs in our data. But we can use *CLPS* as an indicator. However, *CLPS* will also depend on (observed and unobserved) respondent characteristics. So we must treat *CLPS* as endogenous to *DIPS*. Assumptions 1 and 2 justify using geographic dummy variables as instruments for *CLPS* in a regression model of *DIPS*.

In addition to (log) expenditure per person and a geographic price index, we include other household characteristics, notably household size and demographic composition, stage of the life cycle (age and age squared of the household head), and the gender and education of the household head. These variables allow for possible heterogeneity in preferences and measurement error in other variables. The main concern in the latter respect is probably that spending per capita may not be the right "income" metric. One way this might happen is through credit constraints; then education could matter via its effect on expected future income. Another way is via a misspecification of the appropriate equivalence scale. For example, if we should not have normalized total spending by household size but (say) its square root (to allow for economies of scale in consumption) then household size will appear as a significant regressor, independently of consumption per person.

To outline our estimation method in more formal terms, let the qualitative answers to the questions on *CLPS* and *DIPS* correspond to latent continuous variables:

$$CLPS^* = \gamma_s s + \gamma_x x + \varepsilon_{CL} \tag{1}$$

$$DIPS^* = \beta_s s + \beta_x x + \varepsilon_{DI} \tag{2}$$

where s is the unobserved objective level of safety and the full set of household variables (including prices and total expenditures) is represented by the vector x and the ε's are white noise errors.

Since public safety is a pure local public good (Assumption 1), the value of s will depend on a vector of geographic variables, z:

$$s = \delta z + v \qquad (3)$$

where v is another white-noise error term. We will use two sets of variables for z, one in which we try to quantify the neighborhood effects by observed characteristics and another with a set of geographic dummy variables. In the first approach, the vector z comprises two sets of variables:

(i) Indicators of the area's attraction to criminals; for example, living in a high rent area will presumably increase vulnerability to property crime.

(ii) Indicators of community-level concern for public safety. The averages of the individual characteristics that influence household concern are obvious candidates. One also wants to allow for social effects. The extent of "social capital" in an area can be expected to increase public safety, by promoting forms of cooperative behavior. How long people have lived in the area may well matter. Education could also influence the ability of local residents to cooperate in crime prevention.

We can consistently estimate the coefficients on x in (1) and (2) by using (3) to solve out s. We cannot separate β_s from γ_s. We can however identify β_s / γ_s and thus use Assumption 3 to infer the sign of β_s. To see how, use (1) to eliminate s from (2), giving the conditional concern for public safety:

$$DIPS^* = \frac{\beta_s}{\gamma_s} CLPS^* + (\beta_x - \frac{\beta_s \gamma_x}{\gamma_s})x + \varepsilon_{DI} - \frac{\beta_s \varepsilon_{CL}}{\gamma_s} \qquad (4)$$

This cannot be estimated directly, given that $CLPS^*$ is correlated with the error term (via equation 1). However, under Assumptions 1 and 2, equation (3) justifies the use of the

geographic variables as instruments for $CLPS^*$ in (4). We will use a complete set of geographic dummy variables as the instruments for $CLPS^*$.

All models are estimated using ordered probit specifications, assuming normally distributed errors in (2) and (3). Equation (4) is estimated by inserting the predicted $CLPS^*$ from the first stage ordered probit. The reported standard errors are obtained by bootstrapping (using 200 replications).

4.   Results

Table 2 gives descriptive statistics for the explanatory variables. In addition to expenditure, we include the education of the household head, the age, gender and race of the head, household size and demographic composition. As an indicator of cooperation within the community we include the proportion of the population not born in the municipality. As an indicator of attractiveness to criminals we include the average rent of the dwellings in the neighborhood (actual rent paid, or imputed rent for owner occupiers). (This will presumably also be influenced by the extent of public safety in a neighborhood, via effects on housing demand. This is not of concern for the econometrics, however; if anything, it adds to the case for using average rent as an indicator of actual public safety.) External effects are also modeled by including mean consumption and education of the head in the area as explanatory variables. We also allow for interaction effects between the household and geographic variables; specifically, we shall include the interactions between "own value" and "area value" for both consumption expenditure and education.

The estimated coefficients are in Table 3. The first two columns are based on equations (1) and (2), in which equation (3) has been used to solve out s, so that area-specific variables are included. The ordered probit imposes an ordering on $CLPS$ and $DIPS$ ranging from low (very

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bad, not important) to high (very good, very important). The two columns that follow report the same model only with the area-specific variables replaced by area-specific dummies. The last column gives the estimates for equation (4).

We are interested in testing whether the concern for public safety is concave in expenditure on private goods. The negative coefficients on the cross terms with mean area consumption imparts convexity, but the effect is well outside applicable consumption levels. The functional form using log per capita consumption is not sufficiently flexible to allow both convexity and concavity (at different consumption levels). To relax this, we tried adding the reciprocal of consumption per capita to the *DIPS* regressions. This extra parameter is sufficient to assure that the functional form does not impose concavity. The term in the reciprocal of consumption was insignificant by a t-test (coefficients and standard errors are reported at the bottom of the table). So concavity is confirmed, even when we allow for an unbounded latent variable.

How much does inequality contribute to *DIPS*? A simple way to measure the quantitative importance of inequality to the concern for public safety is to simulate the effect of eliminating all inequality while holding mean consumption and all other variables in our model constant. It is readily verified that the increase in the expected value of *DIPS* is then the regression coefficient on log consumption times the Theil indices of inequality, given by the difference between the log of mean consumption and the mean of log consumption. From Table 2 we find that the Theil index is 0.457. From Table 3, the estimated regression coefficients on log consumption for linear models of *DIPS* range from 0.23 to 0.48. So even at the upper bound of this range the increase in the average value of *DIPS* is only 0.22. To compare, the absolute difference between the "little importance"/"important" and "important"/"very important"

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thresholds ranges from 1.4 to 2.2. While there is an effect of inequality in dampening the concern for public safety in Brazil, the magnitude of the effect is small.

We find significant effects of the geographic variables on both *CLPS* and *DIPS*. Even with geographic dummies, consumption has a positive and significant effect on *CLPS*, indicating that neighborhood effects cannot solely explain the differences in the perceived *CLPS*. Holding real per capita consumption constant, lower prices for private goods have a negative influence on *CLPS* and positive on *DIPS*. The negative effect on *CLPS* implies lower levels of public safety in low cost areas. The positive effect of *DIPS* implies that living in more costly areas increases the marginal utility of public safety. More immigrants in the area (people not born in the same municipality) reduces *CLPS* and increases *DIPS*. No significant effects of the local rents are found in the *CLPS*. The positive significant effect of local rents on *DIPS* indicates a higher willingness to pay for public safety when living in a high rent area. Living in an urban (rather than rural) area does not have a significant effect on either *CLPS* or *DIPS*, holding the other geographic variables constant.

To investigate external effects on the *DIPS* we have made Figures 4 and 5, which are based on the estimates reported in the 2nd column of Table 3. Figure 4 shows the predicted probability of the answers "very important" and "important" for the *DIPS* question as a function of per capita consumption for a poor and a rich area, holding all other explanatory variables constant at the mean levels. The predicted probabilities for the remaining answers are omitted since the predicted probabilities for "important" and "very important" add up to more than 0.9. The poor area is set at the 25th percentile while the rich is set at the 75th percentile of the consumption distribution. *DIPS* is higher in the poor area than in the rich area. As income rises, the probability that the *DIPS* is "very important" increases in both areas but more so in the poor

than in the rich. In rich areas, which are relatively safer, the income slope is lower. Families around the 20th to 30th percentiles living in areas with (on average) similarly poor neighbors tend to have greater desire for improved public safety than do rich families living in rich areas.

Notice that the difference in the expected *DIPS* between poor and rich areas (as illustrated in Figure 4) controls for (amongst other things) average dwelling rent in the area, which we interpret as an indicator of the area's attractiveness to potential thieves. The effect in Figure 4 we can interpret as arising from positive external effects of local concern for public safety on individual concern.

Figure 4 also gives the corresponding results when we delete average dwelling rent from the model. This can be given a reduced-form interpretation, treating average dwelling rent as a function of mean consumption in the area. The difference between the curves in poor and rich areas has narrowed, but we still find that concern for public safety is higher in poor areas, ceteris paribus.

Very different effects are found for education. As shown in Figure 5, there is no effect of own education for people living in an area in which the average education level is about 11 years (roughly one standard deviation above the mean). Even poorly educated people living in these areas have a high desire to improve public safety. In areas where average education is low, in contrast, the effect of own education on *DIPS* is strong.

Since both higher own education and higher education in the area of residence increase concern for public safety, it is natural to ask which is more important. From Table 3 (column 4) we find that the marginal effect of higher own education on *DIPS* is 0.044 minus 0.0039 times mean education in the area. The marginal effect of higher education in the area is 0.077 minus

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0.0039 times own education. Thus area education has the higher marginal impact if and only if own education does not exceed education in the area by more than 8.5 years.

However, it is clear that there are geographic effects that we have not been able to identify. This is indicated by the fact that including area dummies instead of geographic variables in the regression models improves the fit considerably. The adjusted R^2 for *CLPS* increases from 0.010 to 0.016. For *DIPS*, the adjusted R^2 goes from 0.057 to 0.104 (Table 3).

The results of the second stage ordered probit estimates are reported in the last column of Table 3. Assumption 2 justifies using the *CLPS* regression with geographic fixed effects (3[rd]column) as instruments (since, under that assumption, geographic variables do not matter independently of the objective level of public safety and individual characteristics, including budget constraints). The coefficient on *CLPS* is negative and significant in the final 2SLS regression for *DIPS* (last column). Given Assumption 3, this implies that $\beta_s < 0$ (recalling equation 9). Higher current public safety reduces the desire to improve public safety, consistent with diminishing returns.

So there is evidence of a <u>conditional</u> corrective mechanism, operating via concern for public safety. However, the size of the marginal effect of *CLPS* on *DIPS* is small. For example, an increase in the *CLPS* from the lower to the upper threshold of the "bad" answer (1.216) yields to a 0.156 drop in the *DIPS*. For comparison, the thresholds surrounding the "important" answer in the *DIPS* differ by 1.4.

5.   Conclusions

The desire for greater public safety in Brazil appears to be high for those who currently feel unsafe, but it is not much lower amongst those who say they are quite happy with their

current level of safety. There are other factors at work determining who wants more public safety.

Compared to private goods, we find strong income effects on the desire to improve public safety. There is a much lower, though still positive, income effect on the perceived current level of public safety. Roughly speaking, the poor in a given neighborhood feel no less safe than the non-poor, but the poor give higher priority to other needs.

The desire to improve public safety is an increasing concave function of income. Thus higher mean income, at given distribution, increases aggregate concern for public safety, while higher inequality reduces it. We also find that individual concern for public safety is higher for better-educated and larger households.

Strong neighborhood effects are indicated. Living in a poor area raises concern about public safety at given own income. Controlling for other factors, concern is greatest amongst rich people living in poor areas, which suggests a mechanism whereby poor areas tend to become more homogeneous, as the "rich" respond to their concerns by leaving. Poor families living in poor areas tend to have a similar or slightly greater desire to improve public safety than rich people in rich areas.

Education appears also has a strong spillover effect on concern for public safety within neighborhoods, suggesting knowledge sharing. Having well educated neighbors increases personal concern for public safety, and reduces the marginal effect of own education. Indeed, this effect is so strong that, when comparing neighborhoods with generally well-educated residents, there is little difference in the desire to improve public safety according to own education. The extent of this spillover offers partial support for the arguments made for geographically targeted crime awareness programs. Our finding that communities with more

stable population (in that more people were born in that municipality) are perceived to be safer is also suggestive of the importance of social interactions and trust within neighborhoods.

Controlling for these factors, we are able to identify a negative causal effect of greater current levels of public safety on expressed desire for improved safety. We cannot identify the quantitative effect of objective safety, but we can determine its sign. Our results confirm that a self-correcting mechanism in response to crime exists, mediated through public opinion. However, while the conditional effect in response to perceived lack of safety is statistically significant, it is quantitatively small. This suggests that, without changes in the other socio-economic determinants of concern for public safety, it would take large changes in perceived safety to achieve a noticeable shift in public opinion about the need for corrective action.

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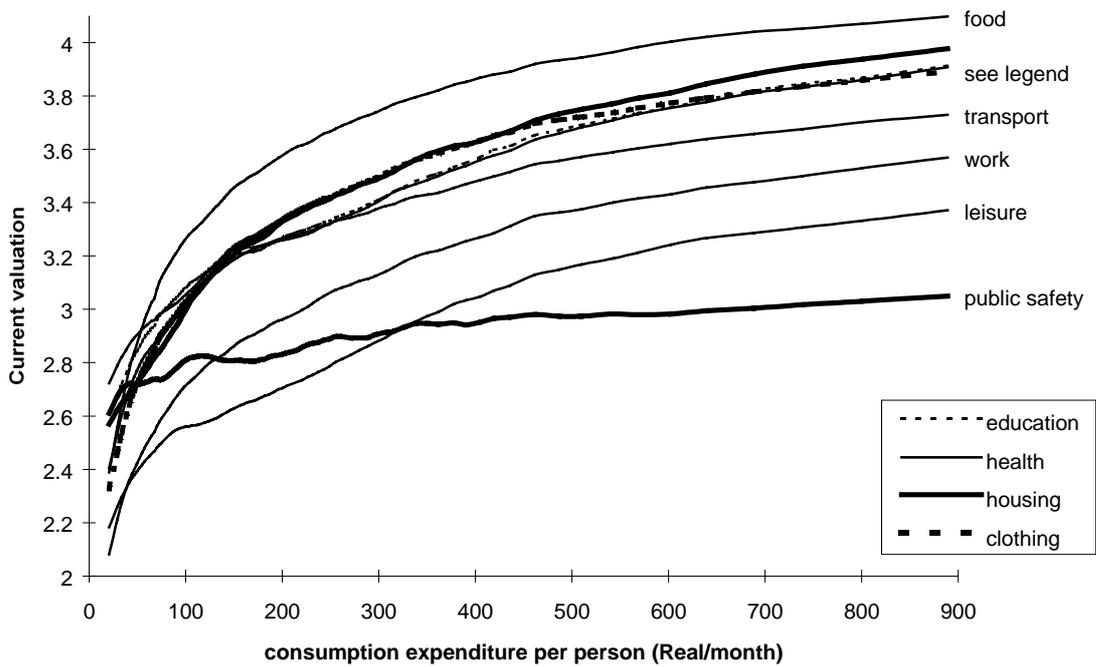**Figure 1: Current level as a function of consumption expenditure (1=very bad, 2=bad,3=regular,4=good,5=very good)**

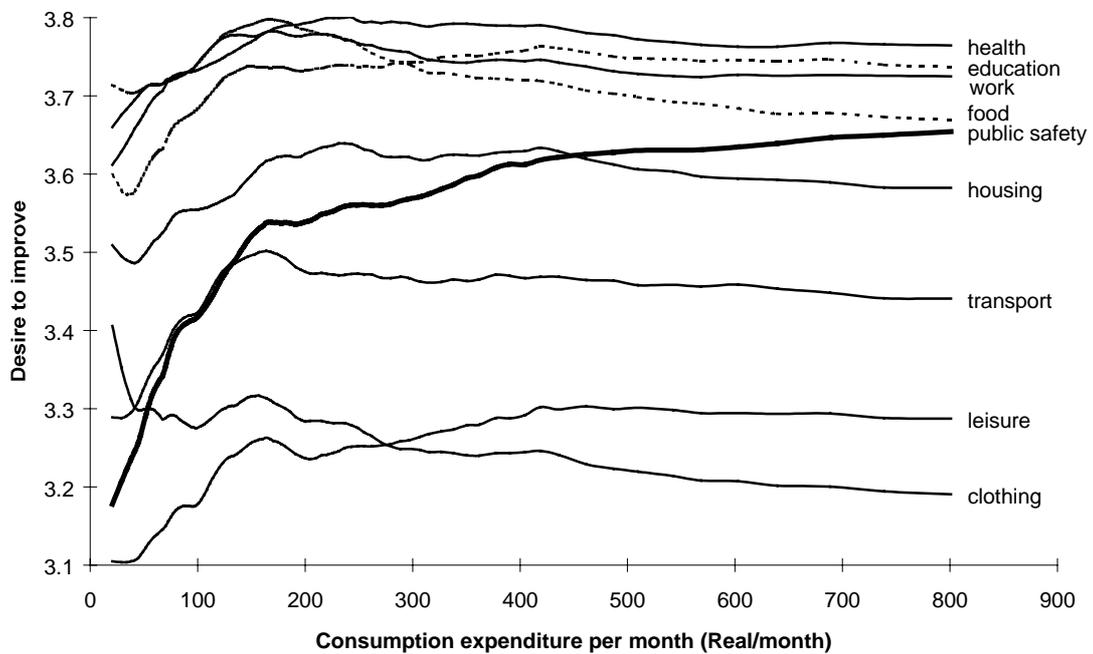**Figure 2: Desire to improve as a function of consumption expenditure (1=not important,2=little importance, 3=important, 4=very important)**
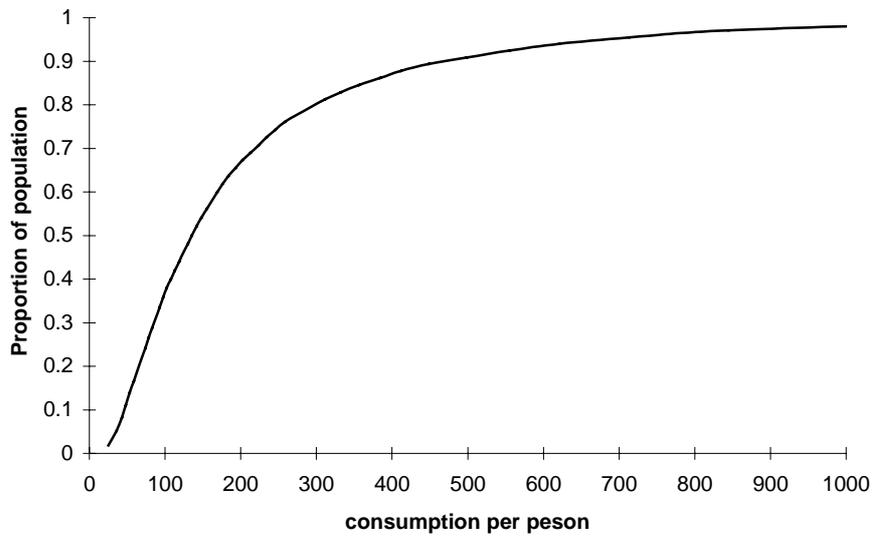
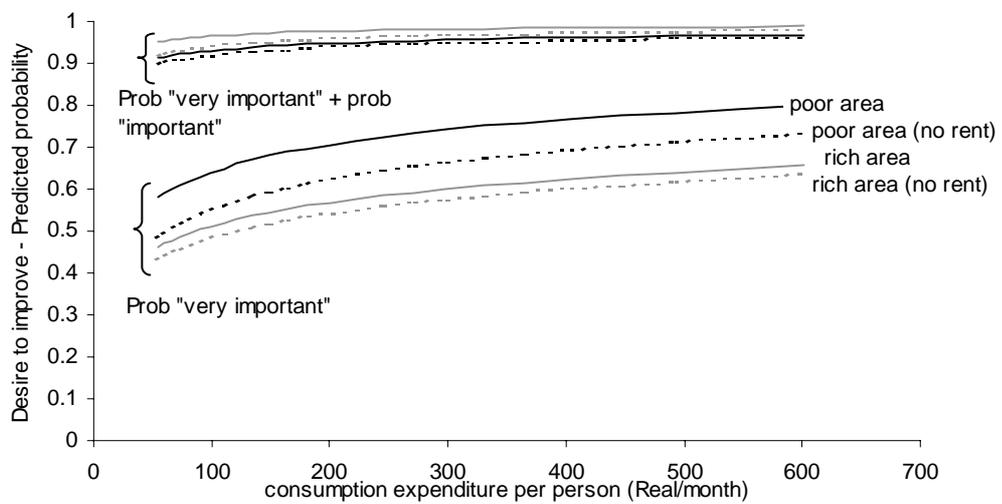**Figure 3: Empirical distribution function of consumption in Brazil**

Figure 4: Predicted desire to improve public safety as a function of consumption expenditure
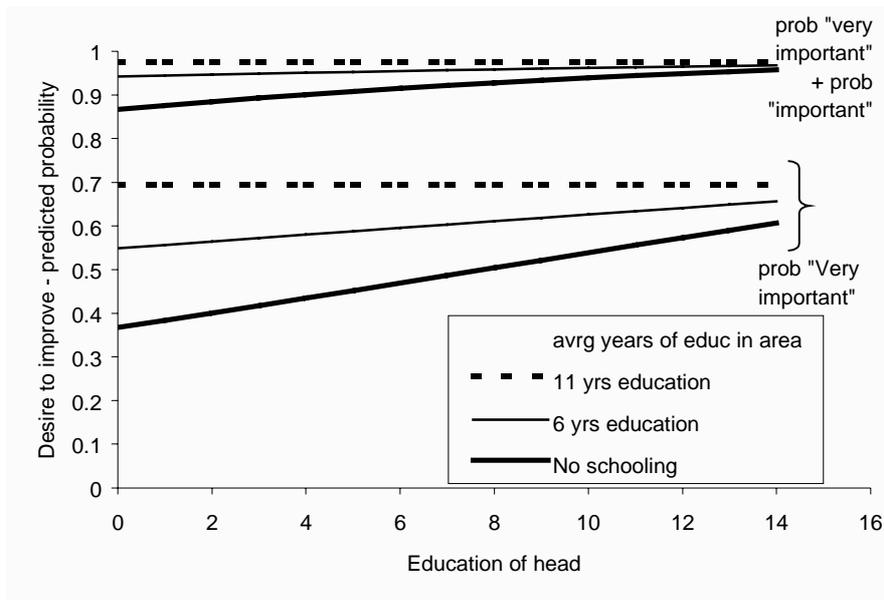
Figure 5: Predicted desire to improve public safety as a function of education

Table 1: Subjective assessments of public safety

	(%)	Very important	Important	Little importance	Not important	Total
	very good	2.07	0.43	0.16	0.08	2.74
	Good	14.7	11.08	2.17	0.49	28.43
Current	Regular	17.42	11.73	1.63	0.12	30.89
level	Bad	15.57	10.41	1.22	0.06	27.26
	very bad	7.36	2.78	0.43	0.1	10.67
	Total	57.11	36.42	5.61	0.85	100

(Column group header: Desire to improve)

Table 2: Descriptive statistics

	Mean	Standard deviation
Consumption per person per month /a	275	373
log consumption /a	5.160	0.912
Years of education of household head/b	6.494	4.471
Age head of household (/100)	0.463	0.154
Dummy head=female	0.229	0.420
Dummy head=white	0.485	0.500
Household size	3.929	2.010
log household size	1.230	0.555
Fraction boys 0-17	0.155	0.183
Fraction girls 0-17	0.150	0.181
Fraction females 18-60	0.299	0.213
Fraction old males 61+	0.052	0.159
Fraction old females 61+	0.069	0.189
Urban	0.767	0.423
log mean monthly dwelling rent /c	5.111	0.974
Percentage immigrants	0.418	0.192

/a Monthly, deflated to Sao Poalo prices in Brazilian Real.
/b Constructed variables based on the educational attainment
/c Includes imputed rent for home owners

Table 3: Determinants of current level and desire to improve public safety

Dependent variable	Ordered probit *CLPS*	Ordered probit *DIPS*	Ordered probit *CLPS*	Ordered probit *DIPS*	Two stage ordered probit *DIPS*
Area fixed effects?	No	No	Yes	Yes	No, used as instruments
CLPS	n.a.	n.a.	n.a.	n.a.	-0.128*
					(0.022)
log per capita consumption	-0.160	0.483*	0.104*	0.335*	0.230*
	(0.119)	(0.134)	(0.037)	(0.047)	(0.030)
years of education of head	0.016	0.044*	0.004	0.029*	0.042*
	(0.010)	(0.011)	(0.006)	(0.008)	(0.006)
age head (/100)	-0.814	-0.929	-0.008	-0.012	-0.010
	(0.622)	(0.701)	(0.007)	(0.009)	(0.007)
head's age squared (/10000)	1.164	0.958	0.095	0.117	0.097
	(0.649)	(0.729)	(0.072)	(0.090)	(0.071)
Dummy head=female	-0.073	-0.042	-0.024	-0.117	0.021
	(0.048)	(0.055)	(0.053)	(0.069)	(0.054)
Dummy head=white	0.049	0.031	0.061	0.061	-0.008
	(0.033)	(0.038)	(0.040)	(0.051)	(0.036)
log(household size)	0.028	0.144*	0.038	0.268*	0.197*
	(0.044)	(0.050)	(0.049)	(0.063)	(0.048)
Fraction boys 0-17	0.036	0.273*	0.089	0.405*	0.167
	(0.118)	(0.135)	(0.129)	(0.167)	(0.143)
Fraction girls 0-17	-0.064	0.313*	0.081	0.386*	0.193
	(0.119)	(0.136)	(0.132)	(0.169)	(0.130)
Fraction females 18-60	0.234*	0.097	0.156	0.295*	0.139
	(0.100)	(0.113)	(0.111)	(0.142)	(0.120)
Fraction old males 61-	-0.156	-0.078	-0.052	-0.077	-0.054
	(0.131)	(0.144)	(0.143)	(0.178)	(0.151)
Fraction old females 61+	0.216	-0.093	0.115	0.099	-0.037
	(0.128)	(0.143)	(0.140)	(0.177)	(0.146)

Continued on next page

Dependent variable	Ordered probit	Ordered probit	Ordered probit	Ordered probit	Two stage ordered probit
	CLPS	*DIPS*	*CLPS*	*DIPS*	*DIPS*
log (mean consumption in area)	-0.133	-0.051			
	(0.133)	(0.149)			
log(own consumption)*log(mean consumption in area)	0.041	-0.048*			
	(0.021)	(0.024)			
Mean years of education in area	0.007	0.077*			
	(0.015)	(0.017)			
years own education x mean years of education in area (/100)	-0.110	-0.393*			
	(0.125)	(0.143)			
Dummy urban=1	0.048	0.062			
	(0.053)	(0.060)			
Regional price deflator	-0.691*	0.684*			
	(0.238)	(0.278)			
log(average rent in area)	-0.027	0.158*			
	(0.045)	(0.050)			
Percentage not born in that municipality	-0.340*	0.228*			
	(0.083)	(0.096)			
Threshold 1	-2.485	0.589	-2.060	-1.372	-0.884
	(0.710)	(0.800)	(0.549)	(0.626)	(0.327)
Threshold 2	-1.539	1.541	-0.844	0.071	.0408
	(0.710)	(0.799)	(0.548)	(0.622)	(0.318)
Threshold 3	-0.727	2.991	0.215	2.276	1.458
	(0.710)	(0.800)	(0.548)	(0.623)	(0.323)
Threshold 4	0.732	n.a.	2.100	n.a.	n.a.
	(0.710)		(0.550)		
Pseudo R squared	0.010	0.057	0.172	0.371	
chi2(553)			1967	1412	
test for concavity : (coefficient on 1/consumption per person)		1.033		-2.639	
		(3.166)		(3.317)	