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# Can violence be rational?

## An empirical analysis of Colombia<sup>#</sup>

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### *ABSTRACT*

Colombia is neither waging war against external enemies, nor has a dictatorial government engaged in a large scale repression of insurrection. However, it is possibly the most violent country of the world. Despite a number of papers focusing on the effects of violence on democracy in Colombia, the existing literature fails to sufficiently address the opposite perspective, that is, the impact of democratic government on violence. Recourse to violence appears so widespread and permanent in Colombia and extols such a high cost on the country, that it suggests that large sectors of the Colombian population may have become addicted to violence. The aim of this paper is to assess whether violence in Colombia may be defined as a rational behaviour by using a pooled cross-section and time-series sample of 27 Colombian departments over the period 1990-1999. Findings do not support the addictive rational hypothesis; rather, violence appears to be a cyclical phenomenon in Colombia.

**JEL Classification:** C5, E6

**Keywords:** Colombia; violence; rational addiction; panel analysis.

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## 1. Introduction

Colombia is neither waging war against external enemies, nor has a dictatorial government engaged in a large scale repression of insurrection. However, it is possibly the most violent country of the world. Homicides are one of the harshest forms of violence. Unfortunately in Colombia they are accompanied by every kind of violence, such as massacres, kidnapping, forced relocation of villagers, crimes against property. Drugs traffickers, guerrillas, army and police forces members, paramilitary groups, rural rich and poor, young gangs and “self righteous” citizens are all involved in violence, in addition to common criminality.

In the last decade more than 280,000 homicides have been recorded. It is as if an entire midsized city had been swept away. The rate of homicides has receded very recently as a consequence of the policy started by President Uribe, which combines tough repression with amnesty to the paramilitary forces. It is too early, however, to assume that violence has subsided forever in Colombia, although one would greatly wish it.

Colombia stands out for its singularity among Latin American countries. Although most Latin American countries have a reputation of being violent, Colombia surpasses them by far. Its homicide rate more than quadrupled between the late 1980's and the early 1990's. During this latter period Colombia was surpassed only by two countries, Guatemala and El Salvador, both engaged in a bloody civil war. But the distance between Colombia and other traditionally violent countries, such as Brazil, Mexico and Peru, has never been so wide, as in the 1990's.

One would expect that this extreme incidence of violence would impact hugely on the economy and democratic institutions. This is not the case, however, at least in comparative terms, especially in Latin America. Colombia neither had in the recent decades a revolutionary period, nor a dictatorship, of any kind.<sup>1</sup> Its economy has done comparably well in the region and its income distribution, although highly skewed in favour of the rich segments of the population, is no more unequal than that of neighbouring and more peaceful countries.

The intensity of violence, combined with the persistence of democratic institutions and the reasonably good economic performance, has attracted a huge number of scholars from different disciplines – called *Violentologists* in Colombia – to study the factors originating violence and its impact on society.<sup>2</sup> Despite these studies, however, new useful insights might be provided by introducing dynamics in analysing violence as an individual behaviour. In fact, it seems natural to model the demand for violence using a model which allows linkages of consumption over time. To

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<sup>1</sup> More precisely, during the Nineteenth century

<sup>2</sup> Gaitan and Montenegro (2000) consider more than seventy studies. Among more recent studies by economists we have to quote Bourguignon et al. (2003), Brauer and Gómez-Sorzano (2004).

this aim, a number of studies have raised the possibility that the behaviour of agents who consume addictive goods could be considered rational, in the sense that it involves forward-looking maximization with stable preference (Becker and Murphy, 1988; Becker et al., 1991, 1994; Grossman and Chaloupka, 1998, among the others).

The purpose of this paper is to test whether violence consumption generates addiction in Colombian people and, if this is the case, to analyze whether such addiction can be explained in the context of rational addiction theory. To this aim, a pooled cross-section and time-series sample of 27 Colombian departments over the period 1990-1999 has been used.

The rest of the paper is organized as follows. Section 2 provides a brief overview of the main features of Colombian violence. Section 3 outlines the basic theoretical model. Descriptive statistics of the data are provided in Section 4. Section 5 describes the pooling, panel unit root and stationarity tests and the empirical specification. Section 6 outlines the empirical findings by discussing the regression results. Section 7 concludes the paper.

## **2. Main features of Colombian violence**

This section illustrates the multifaceted phenomenon of violence that challenges most of the explanations provided by the literature. These studies assign spread of violence to separated socio-economic features of the Colombian society. By contrast, our paper provides an alternative explanation based on modelling rational behaviour.

### **2.1. All inclusiveness and overlapping**

Colombia exhibits almost every possible kind of violence. Violence is associated with drug production and trafficking. It is produced by vast scale and country wide guerrilla. Colombia is afflicted by pervasive criminality and by violence inside families. Criminal, especially young people gangs wage violence in the urban areas. Economic violence is also widespread, particularly in the rural areas, where landowners and their private police fight with landless peasants. Oil producing areas have become a magnet of every kind of violence. Reaction to violence produces further violence. The most conspicuous example is the violence produced by paramilitary, or self defence, groups. These organizations started to protect peasants from guerrillas and drug traffickers and have ended up with conducting large scale massacres and extra-judicial killings. Some of these groups were started by big landowners and are still used for the protection of their estates. In the urban areas self-defence groups organized by citizens have proliferated and their activity has turned from defensive into offensive. Illegal chases of prostitutes, beggars, transvestites are organized by groups of citizens. As it has to be expected in such a situation, the presence of the police and of the army have been greatly expanded over the territory, but effective control has been lessened. Large areas are “controlled” during (part of) the day by the army and the police, but for the rest of the time they are left to illegal, violent control. The border between the defence of the legal order and outright illegal activity has become blurred. Even racial violence has surged up, although Colombia is one of the most ethnically homogenous countries of Latin America. Table 1 shows the number of homicides in Colombia by main categories from 1980 to 2000.

[TABLE 1]

According to statistics common criminality accounts for the largest share of murders (table 2), but there is hardly specialization in crime. Guerrillas are increasingly engaged in narco traffic and even in common criminality, especially in kidnapping. Initially and officially this was for covering the minimum cost of their activity, but there is a large consensus that revenue now extends beyond this cost. The same applies to paramilitary and self defence groups. Illegal activities, implying also

homicides, are performed by legal uniformed bodies, not to speak of citizens groups involved in moral cleansing of the urban areas.

## **2.2. Growing spatial spread of violence**

Although there is a concentration of violent activities in a few departments – four of them account for more than 55 % of national homicides and twelve of them account for 90 percent of the total - every area is exposed to violence. During the 1990's the national average rate of homicides per 100.000 inhabitants stayed always over 60. Even departments that are considered peaceful, such as Chocò and Narino, have a homicide rate well above all Latin American countries (with the exception only of Guatemala and Salvador during civil war). The geography of violence shows significant variations over the years. In general, the increase in the overall rate of violence has implied and extended geographical coverage of violence. Presently, no department is immune. Changes in the localization of narcotrafic, guerrillas and their main adversary, the paramilitaries, have set the trend. The drug cartel of Medellin moved to Cali after the death of its (in) famous boss Pablo Escobar. This was followed by a significant decrease of the homicide rate in the Department of Antioquia, (whose capital city is Medellin). However, the homicide rate continues to stay well above the national average, since the Department is now affected by guerrillas and self defence forces that fight to share the rent from coca leaves cultivation, that has replaced drug trafficking. Guerrillas and paramilitaries are concentrated in the North Western part of the country, but are moving rapidly towards the eastern regions. Coca and poppy cultivation are concentrated in the central areas of the country, but while in 1991 only four Departments had coca cultivations, their number has extended to twenty-five in the year 2003. Of these twenty five, eleven departments have an area of cultivation that extends over more than one thousand hectares (despite the massive efforts displayed for eradication). Furthermore, Colombia started in the meantime the cultivation of poppies for the production of heroin, of which Colombia has become on of the biggest suppliers to the US. At present there is little overlapping between coca leaves and poppies cultivations.

Violence is said to be an urban phenomenon: Colombian cities account for almost a half of total homicides. But this corresponds roughly to the ratio of urban to total population. Violence in Colombia is as rural as urban: between 1996 and 1998 there were three hundred and five municipalities (over a total of about one thousand) where the homicide rate was above the national average.

There used also to be specialization in crime. Political violence was mostly located in the rural areas, while common criminality and that related to narcotrafic took place mostly in the cities. These borders are getting blurred, as political violence tends to expand to the rural areas, while that

related to narco traffic is spreading to the rural areas, where cultivation of coca and poppies takes place.

Clearly, the Colombian state has completely lost control of large areas of the country and has surrendered part of its monopoly of coercion to the various criminal groups, even in those areas that remain under its nominal control. A violent competition for filling the void left by state institutions is taking place among the narcos, the guerrillas, the paramilitaries and the self-defence groups. While the important size of these rents – deriving basically from drugs production and trade and from control on natural resources, from extortions and offences to property - is feeding war among violent factions nobody seems to prevail. Large and increasing segments of the society are using violence to protect and or to advance their interests. Use of violence is spreading from the conflicts for the control of traditional illegal activities, to the illegal substitution of state institutions by groups of citizens. Even the army and police bodies are in same areas competing, on a private and illegal basis, with violent groups for a share of the rents.

### **2.3. Violence and democracy**

There is a wide perception among scholars that a high level of political violence is “a contributing cause to the breakdown (of democratic regimes), but the line between cause and effect is blurred” (Linz, 1978). However, the combination of record levels of violence with the maintenance of democratic institutions – political leaders at all levels of government are selected through popular and regular - is a peculiar feature of the Colombian society that surprises external observers. In the view of scholars and international agencies, Colombia oscillates between a democratic and semi democratic regime. According to the classification by Mainwaring et al. (2001), Colombia was democratic between 1974 and 1990, but fell into the semi democratic category thereafter.

Recent constitutional reform has tried to increase political participation with a view to reduce violence. However, although the positive outcomes of this reform in terms of political competition and voter participation, democracy requires that candidates to elections compete fearlessly safely and freely. Candidates, however, have become an increasingly frequent target of violence, especially since the beginning of this century. Guerrillas murder candidates to demonstrate their control of territory and the melting down of state institutions. Their victims are preferably candidates of right wing parties. The paramilitary and self defence groups are engaged in the physical elimination of left wing candidates, that are considered as actual or potential supporters of guerrilla. Kidnapping of candidates and intimidation is also widely used (Garcia and Hoskin, 2003).<sup>3</sup>

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<sup>3</sup> There are now detailed statistics on the number of political candidates and officials murdered and the numbers are really impressive: since the mid-1980's 4 presidential candidates, 200 judges and investigators, half of the Supreme Court's Justices, 1200 police officers, 151 journalists and more than 300,000 Colombians have been murdered (Posada-Carbó, 2004). However, caution has

Decentralization has also been used to foster democracy, through popular election of local and departmental councils and heads of their executives.

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to be used in the interpretation of these numbers, particularly concerning the trend that they could show. Before 1990 no local elections were held, and murderers targeted only candidates to national offices, such as the presidency and the congress. These “practices” has continued, for sure.



### 3. Theoretical framework

Recourse to violence appears so widespread and permanent in Colombia and extols such a high cost on the country, that it suggests that large sectors of the Colombian population may have become addicted to violence. In other words, observation of facts concerning violence suggests that economic models of addiction could be tested. To this aim, the Becker and Murphy (1988)'s rational addiction model has rapidly become one of the standard models in the economic literature in part due to its theoretical rigor and in part to its empirical success (Ferguson, 2000). Although a great deal of criticism has been recently brought against several assumptions underlying the rational addiction theory,<sup>4</sup> the Becker and Murphy's model is still popular among practitioners, because it leads to a simple linear specification with testable hypothesis.

Following Becker and Murphy's rational addiction model, consumers maximize a utility function which incorporates the addiction that is given by the dependence between the current utility and the past consumption of the addictive good. Moreover, since individuals are rational they maximize the utility obtained during all their life. To this aim, at any given moment in time, consumers' utility is assumed to be a function of the consumption of a non-addictive good,  $Y(t)$ , the consumption of the addictive good,  $C(t)$ , and the stock of what the authors call 'consumption capital',  $S(t)$ . The stock accumulation process is described by a simple investment function,  $\dot{S}(t) = C(t) - \delta S(t)$ , where  $\dot{S}(t)$  is the rate of change over time in  $S$ . Negative addiction is characterized by the fact that the consumption capital reduces future utility and earning potential.

The rational behaviour implies the maximization of the lifetime utility function, subject to the lifetime budget constraint and the simple investment function. Assuming a constant price of the non-addictive good, treated as numeraire, a concave and time-additive utility function, with a length of life equal to  $T$  and a constant rate of time preference,  $\sigma$ , the consumer's problem can be stated as,

$$\begin{aligned}
 U &= \int_0^T \beta^{\sigma t} U[Y(t), C(t), S(t)] dt \\
 s.t. & \\
 \int_0^T \beta^{-rt} U[Y(t) + P(t)C(t)] dt &\leq A_0 \\
 \dot{S}(t) &= C(t) - \delta S(t)
 \end{aligned} \tag{1}$$

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<sup>4</sup> A new class of addiction models has been proposed that includes various forms of irrationality, such as self-control problems (Akerlof, 1991; Elster and Skog, 1999), myopic behaviour (O'Donoghue and Rabin, 1999; Gruber and Köszegi, 2001); temptation (Gul and Pesendorfer, 2006); mistaken behaviour (Loewenstein, O'Donoghue and Rabin, 2003); and cue-triggered decision processes (Bernheim and Rangel, 2004).

where  $\beta = 1/(1-r)$  is the time discount factor;  $r$  is the real interest rate, which is assumed to equal the rate of time preference;  $P$  is the price of the addictive good; and  $A_0$  is the present value of wealth.

The rational addiction theory claims that addictive behaviour is characterized by two central characteristics, defined in terms of the capital stock: tolerance and reinforcement. Tolerance implies that the satisfaction from a given level of consumption is lower when past level is greater ( $U_S < 0$ ); reinforcement implies that an increase in past level of consumption increases the marginal utility for present consumption ( $U_{CS} > 0$ ). In summary, consumers inherit a certain degree of addiction  $S(0)$  at time 0. Individuals then make inter-temporal consumption choices with respect to addictive and non-addictive goods which account for forecast effects of usage on future utilities, via addiction dynamics, and their inter-temporal budget. Different life experiences, as summarised in the initial degree of addiction, drive different rates of addictive consumption even for people with the same wealth and preferences.

In order to empirically testing the rational addictive behaviour, a demand function founded in the underlying Becker and Murphy's model must be specified. A standard technique used in literature to derive a structural demand function for consumption of  $C$  is to approximate the instantaneous utility function in the neighbourhood of steady-state by a quadratic function in the arguments. By solving the first-order condition for  $Y(t)$  and  $C(t)$ , a linear difference equation can be derived,

$$C(t) = \theta_1 C(t-1) + \theta_2 C(t+1) + \theta_3 P(t) + \theta_4 e(t) + \theta_5 e(t+1), \quad (2)$$

where  $\theta_2 = \delta\theta_1$ . The current consumption of the addictive good depends on past consumption, on the actual value of future consumption of the addictive good, on current price of it, and on the unobservables  $e(t)$  and  $e(t+1)$  that incorporate the impact on utility of unobserved variables that have an influence on the life cycle.

On the basis of such a function, a test of the significance of the coefficient  $\theta_1$  in equation (2) can be used to discriminate between myopic and addictive models, as well as the signs of  $\theta_1$  and  $\theta_2$  can be used to check for the rational addiction hypothesis (Sisto and Zanola, 2006). Furthermore, solving equation (2) for  $C(t)$ , one can derive the short-run price elasticity,  $\eta_s$ , and the long-run price elasticity,  $\eta_l$ , as,

$$\eta_s = \frac{\theta_3}{\theta_1(1-\lambda_1)\lambda_2} \frac{p}{c}$$
$$\eta_l = \frac{\theta_3}{\theta_1(1-\lambda_1)(\lambda_2-1)} \frac{p}{c}$$
(3)

where  $\lambda_{1,2}$  are the characteristics roots.

#### 4. Sample Data

Data used in this study is obtained from a wide range of sources covering 27 Colombian departments over the period 1990-1999. The variables used in the empirical work are the following.<sup>5</sup>

Violence is represented by the rate of homicides per 100,000 inhabitants, *hom*. Past and future violence affect the present level of violence, as well as its price. Two different prices have been used: inequality and political participation. Concerning inequality, there has been - since the seminal paper by Becker (1968) - a lot of research on the determinants of crime and many empirical tests of various crime models. The basic idea behind is that criminal acts result from a rational decision based on the expected benefits, that are equal to the difference between the loot and the opportunity cost of crime. To this aim, there is an intuitively reasonable and generally accepted agreement in the literature about the notion that income inequality is a contributing factor to crime (Ehrlich, 1973). This is because the more inequality there is, as measured by the Gini coefficient, *gini*, the higher the number of poor people, who can expect to derive a net benefit from crime.

However, this variable alone does not take account of the full meaning of the opportunity cost of violence. In fact, in a somewhat wider interpretation of the Becker's paradigm, the cost of violence may be also interpreted in terms of political participation. It is likely that with more participation political institutions work better and deviant behaviour is more effectively sanctioned. Hence, we include voter turnout, *turn*, as a second explanatory variable defining the price of violence. It is represented by the share of actual voters on total population in Presidential elections. Due to the lack of annual observations, this variable has been estimated, for the years between elections, on the basis of a linear evolution.

To minimize the possible bias from omitted variables on the coefficient associated to our indicator of violence, we include a number of controls: the per capita income, *gdp*; the share of homicides of young people (less than 14 years old) over total homicides, *young*; the amount of extrajudiciary killings per 100,000 inhabitants, *extra*; the amount of property offences per 100,000 inhabitants; number of property offences, *prop*; and population, *pop*.

Table 2 presents the mean, standard deviation, and other indicators referred to the primary variables in the data set.

[TABLE 2]

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<sup>5</sup> Appendix provides definitions for the variables of the DANE database that have been used in the empirical implementation.

## 5. Estimation Techniques

### 5.1. Pooling

To test whether data can be pooled, F-tests are performed on the null hypothesis that the coefficients for each variable are the same for each year (Levaggi and Zanola, 2003). The results, reported in Table 3, show that the null hypothesis of equal coefficients cannot be always be rejected, implying that some caution is necessary in pooling data. In particular, Pesaran and Shin (1995) argue that a pooled estimator is potentially inconsistent when the model is dynamic and parameter heterogeneity is not taken into account. Hence, to make the model robust to this potential inconsistency we allow for some heterogeneity in the parameters, through department specific cluster.

[TABLE 3]

### 5.2. Unit root tests

We next step test for stationarity of the variables included in the model. To check for the stationarity of our data, we employ two panel unit tests, the Im et al. t-bar test (2003, henceforth IPS), and the test developed by Hadri (2000, henceforth HD). The IPS test is a weighted average of the standard Augmented Dickey-Fuller tests, calculated for the time series for each of the individual cross-sections. The IPS test assumes that all series are non-stationary under the null hypothesis against the alternative of stationarity. Hadri (2000) develops a residual-based Lagrange multiplier test for the null that the individual observed series are stationary against the alternative of unit root in panel data. Three versions of the Hadri test are allowed, respectively, for homoskedastic across the panel, heteroskedastic across units, and serially dependent disturbances using a Newey-West estimator of the long run variance. Results are shown in Table 4. The IPS results show that the null of unit root could not be rejected and hence the series are I(1) processes. On the basis of the HD test, almost all versions of the test reject the null of stationarity at 5% for variables.

[TABLE 4]

### 5.3. Model specification

For our empirical implementation we write a variant of equation (2),

$$\begin{aligned}
viol_{i,t} = & \alpha_0 + \alpha_1 viol_{i,t-1} + \alpha_2 viol_{i,t+1} + \alpha_3 gini_{i,t} + \alpha_4 turn_{i,t} + \alpha_5 gdp_{i,t} + \alpha_6 young_{i,t} + \alpha_7 extra_{i,t} \\
& + \alpha_8 prop_{i,t} + \alpha_9 pop_{i,t} + \varepsilon_{i,t},
\end{aligned} \tag{3}$$

where subscript  $i$  and  $t$  stand respectively for the department and the period considered and  $\varepsilon_{i,t}$  is the error term. The dynamic structure of the model makes the OLS estimator upwards biased and inconsistent because of the endogeneity of past and future violence consumption, and also because of the possibility of serial correlation of the residuals. Hence, once established that series are non-stationary, feasible generalized least squares for panel data with correction for AR(1) autocorrelation and for heteroskedasticity across panel is asymptotically equivalent to a regression in difference, and therefore addresses the possible issue of unit root (Hamilton, 1994). However, even this approach does not solve the problem since it fails to control for the endogeneity of lagged violence consumption.

Hence, to get consistent estimates an obvious choice is the first difference transformation of the model and the use of the past and future level of violence and prices in  $t-2$  as instruments for the first difference  $\Delta c_{i,t-1}$ . Due to over-identification, we adopt the generalized method of moments (GMM), which has been proved to be an appropriate method to get a consistent estimator when the number of instruments is higher than exogenous variables, as is the case here (Hamilton, 1995). The GMM estimator has the further advantage that it does not need the restrictive assumption of strictly exogeneity of the independent variables since they may be assumed to be predetermined or endogenous (Heinesen, 2004). The overall validity of the instruments is investigated through the Hansen J statistic test for over-identification of all instruments. The test fails to reject the null assumption of valid instruments: the Hansen J statistic is 1.561, Chi-sq(4) P-val = 0.81570.

## 6. Discussion

The results from the GMM analysis are reported in Table 6. As can be seen in the first column, all the coefficients associated to consumption and prices are individually significant at least at the 10% level of significance.

[TABLE 6]

The coefficient associated to past violence is negative and statistically significant, providing a dependence from the past level of violence such that past changes negatively impact on the present level. This may be interpreted as a slowing in the incidence of violence. Is this slowing high enough to guarantee a constant reduction of violence to the pass of time, even if no political strategy is followed? A way to answer to this question is to see the coefficient associated to future levels of violence. In our sample the coefficient for  $c_{t+1}$  is positive. This implies that consumer does not take into account the future consequences of current choice suggesting an addictive behaviour, whereas past consumption affects current violence negatively. On the basis of such a result, we cannot affirm that our estimates support the rational hypothesis. Rather, violence appears to be a cyclical phenomenon. These results suggest the need of an active political strategy to reduce violence. Otherwise, due to its cyclical nature violence would inevitably reappear after a temporary disappearance. However, the multifaceted origins and manifestations of violence require an equally articulated strategy. Our estimates suggest that reduction of inequality and increase of political participation are two necessary ingredients of this strategy.

Inequality and political participation, the prices of violence in our model, are statistically significant at all common level and show the expected signs. In particular, the price of violence in terms of inequality (*gini*) has a positive sign, showing that increases in inequality will increase the level of violence. The second measure of price (*turn*) displays the expected sign as an increase of democracy will reduce the number of homicides per 100,000 inhabitants. However, a word of caution is necessary due to the potential endogeneity of political participation. The direction of causation between violence and political participation is not, *a priori*, obvious (see also, for the case of Colombia, Hoyos and Ceballos, 2004). Political participation is clearly obstructed by violence, and intimidation of voters and murder of candidates is a daily feature of Colombian politics, as already mentioned. In their study of 2002 parliamentary election Garcia and Hoskin, (2003) show that in the municipalities controlled by the guerrillas, or the paramilitaries, the voter turnout is lower than elsewhere. However, their results also show that the same municipalities are characterized by higher poverty. It is thus difficult to ascribe lower turnout to violence. They also show that when municipalities are affected both by guerrillas and paramilitaries, the level of turnout is not lowered

and that in any case the number of voters living in the areas is small. Thus the impact of violence on political participation does not appear to be greatly significant. On the other hand, or better to be contrary, the fact that guerrillas, the paramilitaries and other criminal actors try to suppress political participation show that fear its impact on them. This adds an argument to the strategy of reducing violence though increased political participation is weakly statistically significant, perhaps due to the low number of observations.

As for the other variables, the amount of extrajudiciary killings per 100,000 inhabitants displays a positive sign, while the other variables are not statistically significant.

Based on the results in Table 5, we calculate the short- and long-run price elasticities for both prices (inequality and participation). The short run elasticity gives the response in period  $t$  to a change in the expected price, whereas the long-run elasticity pertains to the response to a change in the expected price across all periods (Farrell et al., 1999).

The short-run elasticities, measured in terms of sample means, are in the range  $-0.70\sim 0.86$  while the long-run elasticities are found between  $-0.66$  and  $0.80$ . Thus, the short-run elasticities exceed the long-run elasticities, meaning that in the short-run price changes influence violence much more than in the long-run. These results contrast with what predicted by Becker et al. (1991). However, smaller long-run price elasticities are typically found in similar studies on addictive goods (Bask, 2000; Baltagi and Griffin, 2002, Shen and Giles, 2006).



## 7. Conclusions

This paper has tested whether violence in Colombia can be explained in the context of rational addiction theory. While the previous literature has focused on socio-economic determinants of violence, we have suggested an alternative explanation based on modelling rational behaviour. According to empirical evidence shown in this paper, the rational addiction hypothesis would not be the best explanation for violence in Colombia. On the contrary, violence appears to be a cyclical phenomenon.

An important implication of the empirical evidence is that violence can be somewhat controlled by increasing the democratic content of Colombian political system, particularly by fostering political participation, and by reducing the huge inequality of income distribution. However, a word of caution is necessary due to the macro nature of data and further research is required to investigate behaviour based on micro information.

## References

- Akerlof, G. (1991), Procrastination and Obedience, *American Economic Review*, 81(2), 1-19.
- Arellano, M. and Bond, S.R., (1991), Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations, *Review of Economic Studies*, 58, 277-297.
- Baltagi, H.B., Griffin, J.M. (2002), Rational addiction to alcohol: panel data analysis of liquor consumption, *Health Economics*, 11, 485-491.
- Bask, M., Melkersson, M. (2003), Should one use smokeless tobacco in smoking cessation programs? *European Journal of Health Economics*, 4(4), 263-270.
- Becker, G. (1968), Crime and Punishment: An Economic Approach, *Journal of Political Economy*, 76, 169-217.
- Becker, G., Grossman, M., Murphy, K.M. (1991), Rational Addiction and the Effect of Price on Consumption, *American Economic Review*, 81(2), 237-241.
- Becker, G., Grossman, M., Murphy, K.M. (1994), An Empirical Analysis of Cigarette Addiction, *American Economic Review*, 84(3), 396-418.
- Becker, G., Murphy, K.M. (1988), A theory of rational addiction, *Journal of Political Economy*, 96, 675-700.
- Bernheim, D., Rangel, A. (2004), Addiction and Cue-Triggered Decision Processes, *American Economic Review*, 94(5), 1558-1590.
- Bourguignon, F., Nuñez, J., Sanchez, F. (2003), A Structural Model of Crime and Violence Inequality in Colombia, *Journal of European Economic Association*, 1(2-3), 440-449.
- Brauer, J., Gómez-Sorzano, A.G. (2004), Homicide Cycles in Colombia, *International Journal of Applied Econometrics and Quantitative Studies*, 1, 29-50.
- Chaloupka, F. (1991), Rational addictive behaviour and cigarette smoking, *Journal of Political Economy*, 99, 722-742.
- Ehrlich, I. (1973), Participation in Illegitimate Activities: A Theoretical and Empirical Investigation, *Journal of Political Economy*, 81(3), 521-565.
- Elster, J., Skog, O.J. (1999), *Getting Hooked: Rationality and Addiction*, Cambridge University Press, Cambridge.
- Farrell, L., Morgenroth, E., Walker, I. (1999), A time-series analysis of U.K. lottery sales: long and short run price elasticities, *Oxford Bulletin of Economics and Statistics*, 61(4), 513-526.
- Ferguson, B.S. (2000), Interpreting the Rational Addiction Model, *Health Economics*, 9(7), 587-598.

- Gaitan, F., Montenegro, S. (2000), Un análisis crítico de estudios sobre la violencia en Colombia, paper for the conference Crimen y Violencia: Causas y Políticas de Prevención, Bogotá. May.
- Garcia, M., Hoskin, G. (2003), Participación Política y Guerra en Colombia. Un Analysis de las Elecciones de 2002, in Hoskin, G., Masias, R., Garcia, M. (eds), Colombia 2002: *Elecciones, Comportamiento Electoral y Democracia*, Uniandes-Fundación Konrad Adenauer, Registraduría Nacional, Departamento Nacional de planeación, Bogotá.
- Grossman, M., Chaloupka, F.J. (1998), The Demand for Cocaine by Young Adults: a Rational Addiction Approach, *Journal of Health Economics*, 17, 427-474.
- Gruber, J., Köszegi, B. (2001), Is Addiction “Rational”? Theory and Evidence, *The Quarterly Journal of Economics*, 116, 1261-1303.
- Gul, F., Pesendorfer, W. (2006), Harmful Addiction, *Review of Economic Studies* (forthcoming).
- Hadri, K. (2000), Testing for stationarity in heterogeneous panel data, *Econometrics Journal*, 115, 53-74.
- Hamilton, J.D., (1994), *Time Series Analysis*, Princeton, New Jersey: Princeton University Press.
- Heinesen, E., (2004), Determinants of local public school expenditure: A dynamic panel data model, *Regional Science and Urban Economics*, 34(4), 429-453.
- Im, K.S., Pesaran, M.H., Shin, Y. (2003), Testing for Unit Roots in Heterogeneous Panels, *Journal of Econometrics*, 115, 53-74.
- Levaggi, R., Zanola, R. (2003) Flypaper Effect and Sluggishness: Evidence from Regional Health Expenditure in Italy, *International Tax and Public Finance*, 10, 535-547.
- Linz, J. (1978), *Crisis, Breakdown and Reequilibration*, The John Hopkins University Press, Maryland.
- Loewenstein, G. O’Donoghue, T., Rabin, M. (2003), Projection Bias in Predicting Future Utility, *Quarterly Journal of Economics*, 118(4), 1209-1248.
- Mainwaring, S., Brinks, D., Pérez-Liñán, A. (2001), Classifying Political Regimes in Latin America, 1945–1999, *Studies in Comparative International Development*, 36(1), 37–65.
- O’Donoghue, T., Rabin, M. (1999), Doing it now or later, *American Economic Review*, 89(1), 103-124.
- Pesaran, M.H., Shin, Y. (1995), *An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis*, Department of Applied Economics Working Paper 9514, University of Cambridge, Cambridge.
- Posada-Carbó, E. (2004), Colombia’s Resilient Democracy, *Current History: A Journal of Contemporary World Affairs*, 68-73.

Shen, K., Giles, D. (2006), Rational exuberance at the mall: addiction to carrying a credit card balance, *Applied Economics*, 38, 587-592.

Sisto, A., Zanola, R. (2006), Cinema and TV. An Empirical Investigation of Italian Consumers. *Advances in Austrian Economics* (forthcoming).

**Table 1. Homicides in Colombia, by main categories, 1988-2000**

<b>Year</b>	<b>Political homicides</b>	<b>Forced disappearances</b>	<b>Murders of social marginals</b>	<b>Massacres</b>	<b>Common Violence</b>
1988	2,738	210	273	1,083	16,796
1989	1,978	137	364	732	20,101
1990	2,027	217	267	1,229	21,600
1991	1,829	180	389	1,364	25,110
1992	2,178	191	505	1,602	25,125
1993	2,190	144	161	1,097	24,042
1994	1,668	147	277	1,009	23,543
1995	1,831	85	371	1,049	22,321
1996	1,783	183	218	1,131	23,350
1997	2,318	215	85	1,280	23,200
1998	n.a.	n.a.	n.a.	n.a.	23,096
1999	1,843	291	158	1,594	24,358
2000	2,285	440	272	2,276	26,264
<b>Tota</b>	<b>24,648</b>	<b>2,440</b>	<b>3,340</b>	<b>15,446</b>	<b>298,606</b>

**1**

Original Source: Pedro Valenzuela (2001). Original data derived from: Comisión Colombiana de Juristas (2000a, 2000b, 1999). For common homicide between 1988-2000, National Police (1999). \*With the exception of common homicide, it includes data from October 1998 to September 1999. \*\* With the exception of common homicide, it includes data from October 1999 to September 2000

**Table 2. Descriptive statistics**

<b>Variable</b>	<b>Mean</b>	<b>Std.Dev.</b>	<b>Min</b>	<b>Max</b>	<b>Source</b>
<i>viol</i>	60.56035	44.51898	11.65394	384.5655	DANE
<i>gini</i>	0.5026812	0.0547591	0.36	0.67	Estadísticas Vitales PNUD Diez años de desarrollo humano en Colombia
<i>turn</i>	0.1881315	0.0574337	0.093	0.359	
<i>gdp</i>	1,949.611	1117.643	755.6185	9001.725	DANE Cuentas Regionales
<i>young</i>	1.059866	0.8072939	0	4.505235	DANE
<i>extra</i>	21.85556	48.73147	0	439	Estadísticas Vitales Policía nacional, Revista de Criminalidad
<i>prop</i>	205.0748	155.0672	16	900.1	Policía nacional, Revista de Criminalidad
<i>pop</i>	1,402,856.00	1,324,795	155,154	6,276,429	DANE Estadísticas Vitales

**Table 3. F-tests for pooling data, 1990-1999**

<b>Variable</b>	<b>F-test</b>
Test for pooling <sup>1</sup> :	
<i>gini</i>	0.96 (0.4818)
<i>turn</i>	1.24 (0.2676)
<i>gdp</i>	2.10* (0.0263)
<i>young</i>	12.88* (0.0000)
<i>extra</i>	1.16 (0.3181)
<i>prop</i>	0.20 (0.8159)
<i>pop</i>	0.33 (0.9727)

**Notes:** P values in brackets.

An asterisk in the test for pooling signifies rejection of the null of equal coefficients across years at the 5% level of significance.

**Table 4. Test of the null of the presence of a unit root and of the null of stationarity, 1990-1999 (27 departments)**

Variable	IPS test	HD test (1)	HD test (2)	HD test (3)
<i>hom</i>	-1.551 (0.156)	2.634 (0.8960)	7.092* (0.0067)	3.696* (0.0000)
<i>gini</i>	-0.480 (1.000)	16.832* (0.0006)	12.908* (0.0001)	6.699* (0.0000)
<i>turn</i>	-1.355 (0.437)	18.023* (0.0000)	14.549* (0.0000)	6.423* (0.0000)
<i>gdp</i>	-0.599 (0.999)	21.945* (0.0000)	12.469* (0.0000)	8.653* (0.0000)
<i>young</i>	-1.166 (0.747)	3.625* (0.0250)	1.843 (0.1126)	3.240* (0.0000)
<i>extra</i>	-0.955 (0.944)	12.810* (0.0077)	3.672 (0.2199)	5.340* (0.0000)
<i>prop</i>	-3.359* (0.000)	12.065* (0.0000)	7.914* (0.0000)	5.690* (0.0000)
<i>pop</i>	0.677 (1.000)	25.822* (0.0000)	25.735* (0.0000)	10.146* (0.0000)

**Notes:** P values in brackets.

\*/\*\*/\*\*\*/ in the IPS test signifies rejection of the null of unit roots at 1, 5, 10 per cent level of significance, respectively.

\*/\*\*/\*\*\*/ in the Hndri tests signifies rejection of the null of stationarity at 1, 5, 10 per cent level of significance, respectively.



**Table 5. Results, 1990-1999 (27 departments)**

<b>Variable</b>	<b>Coef.</b>	<b>Robust Std. Err.</b>
<i>hom (t-1)</i>	-0.0746527*	0.0151453
<i>hom (t+1)</i>	0.287148**	0.1282451
<i>gini</i>	75.69895***	43.42548
<i>turn</i>	-166.2705***	99.40002
<i>gdp</i>	-0.026511	0.0038135
<i>young</i>	6.5434*	2.115458
<i>extra</i>	0.0155172	0.027067
<i>prop</i>	-0.0017792	0.019887
<i>pop</i>	-0.000022	0.000027
<i>cons</i>	-4.597867	5.553407
<i>N. obs.</i>	135	
<i>Centered R2</i>	0.1476	
<i>Hansen J stat.</i>	1.561	Chi – sq(4) P-val = 0.81570
$\eta_s^{gini}$	0.8560	
$\eta_l^{gini}$	0.7977	
$\eta_s^{turn}$	-0.7036	
$\eta_l^{turn}$	-0.6557	

**Note:** \*/\*\*/\*\* significance at 1%, 5%, 10%, respectively.

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