Crisis in Colombian prisons: Cause or Consequence of a flawed judicial system?

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Abstract

This paper examines the crisis that has been recently detected in Colombian prisons, by investigating the interactions between the judicial system and crime. We develop a simulation model, based on the economic theory of crime, in order to explain system behavior and to analyze alternative policies that may contribute to resolve some of the problems affecting Colombian prisons.

Among the most important variables included in the model are the profitability of crime, re-socialization of criminals, and effectiveness of justice. Simulations show that the cause of the penitential crisis is not the overcrowding problem, but the effect of flowed policies and the structure of the judicial system. We found that in spite of its higher short-term costs, longer sentences reduce crime. Conversely, as short sentences make crime more profitable, simulations show that reduction of sentences will increase the congestion of the judicial system in the long run.

1. The Colombian penitential system

The increasing number of crimes in Colombia demands both high capacity and organization of prisons. The severe pressure that, at present time, is suffering the penitential system might be the result of failures related to the administration of sentences, insufficient re-socialization programs, and poor management and security. In addition, the criteria applied during the present crisis has not contributed to solve the problem, as improvisation and the lack of a long-term view to policy making have been dominant.

During the last four years, the convicted population has fluctuated between 38000 and 46000 inmates. By March 1999, overcrowding of prisons reached 38.4% - 45498 inmates with capacity for 32868. As can be observed in table 1, overcrowding is persistent, although with high volatility.

Table 1. INPEC(2000)

YEAR	CAPACITY	INMATES	OVERCROWDING%
1990	28.380	32.387	14.1
1991	28.303	29.356	3.7
1992	28.252	26.962	-4.6
1993	27.560	28.550	3.6
1994	26.709	29.431	10.2
1995	27.822	31.960	14.9
1996	28.332	38.062	34.3
1997	29.313	41.404	41.2
1998	32.995	42.831	29.8
1999	32.868	45.498	38.4
AVERAGE	28.661	33.570	17.1

During this period of time, the national penitential institution (INPEC) has increased expenditure by an average of 27.98% annually, as can be appreciated in table 2. Operation costs, which represent approximately 82.12% of total, have had an increment of 27.67%, being personnel expenses the most significant item with an annual increase of 32.88%. On average, investment expenses represent 17.88% of the total, with an annual increase of 36.91%.

Table 2. Budget evolution, INPEC(2000)

Year	Operation	Change %	Investment	Change %	Total
1996	118.618,2		21.539,6		140.158
1997	148.843,2	25,48	29.856,3	38,6	178.700
1998	184.342,8	23,85	56.727,0	90,0	241.070
1999	246.443,3	33,69	46.589,3	(17,6)	293.033

Between 1996 and 1998, INPEC invested US$54 million for housing 2128 cells and for improving 35 penitentiaries. In 1999 investment was US$23.2 million; 57% less than in the previous year, in spite of the fact that the convicted population had increased. These figures show that the distribution of resources is unbalanced, and that the effort to increase investment has not been enough to solve the overcrowding problem.

On top of the overcrowding problem, re-socialization programs, such as employment and training programs, have had low attention. Only 41.3% of convicts have had access to employment programs and 24.9% to training programs. Nearly 34% of the convicted population does not redeem sentences. In addition, most of the penitential centers are very old: only 14% have been built over the last 20 years. Security in these centers is low; there is one security guard for 7.3 inmates, on average, which represents a deficit of 10000 guards.

According to studies carried out by the Commission on the Rationalization of Public Expenses (1996), the administration of justice faces many problems. High degree of congestion, inefficiency, ineffectiveness and an impunity rate of 97%, are the result of a

variety of factors and complex relations among a large number of variables that have an important effect on the Colombian society. The Civil Society and its Agenda for Colombia (1998) has identified problems related to the schooling and training of the justice workers. The absence of appropriate academic formation, ethical values and philosophical principles gives way to corruption.

The situation of the Colombian penitential system is not very different from those in other Latin-American countries. A Human Rights Watch report, *Prison project of New York* (1998), shows the large demand for prisons in Latin America and the Caribbean. Countries like Honduras and Venezuela exhibit overcrowding rates of 50 and 32% respectively. Table 3 compares the convicted population per 100000 inhabitants for some chosen countries within and outside Latin America. As can be appreciated, Colombia is one of the countries with highest number of prisoners per 100000 inhabitants.

Table 3 Human Rights Watch, Prison Project of New York (1998)

Country (Outside LA)	Prisoners as % of 100000 inhabitants	Country (Latin American)	Prisoners as % of 100000 inhabitants
India	34	El Salvador	105
Japan	42	Mexico	100
Ireland	44	Dominican Rep.	119
Albania	55	Colombia	121
Denmark	71	Costa Rica	138
Australia	79	Jamaica	153
South Africa	311	Venezuela	153
USA	455	Chile	192
Canada	111	Bolivia	50
China	111		

Maintenance cost per inmate reaches US$92 per day in the United States, whereas in Colombia this cost is about US$10, and in other Latin American countries, such as Venezuela, is about US$2.

The Justice Department of the United States has established that the average term served in prison for violent crimes is three years and seven months; this term is equivalent to 48% of the original sentence. For murder, average prison term is five years and eleven months, near 71% of the original sentence. Statistics indicate that 46% of re-offenses would be avoided if sentences had been completed. For the Colombian case, the average term served in prison is two and a half years.

It has been established that with longer prison sentences, the criminality rate diminishes (Levitt, 1996). Levitt found that, on average, imprisonment of an offender prevents the commission of 15 crimes. If increasing prison sentences by 15% there would be a reduction of 10% in the criminality rate of the United States. Marvell and Moody (1996) estimated that 21 crimes would be avoided by imprisonment policies. Spelman (1994) calculated that between 16 and 20 crimes would be prevented by keeping a criminal in jail,

while Cohen (1987) found that this number would be 12. Based on research conducted by inmates, Dilulio (1995) established that an average of 15 crimes may be prevented by imprisonment.

In Colombia there has not been similar research and the available data is limited. Based on the accessible information, it could be deduced that an increment of 10% of the population of inmates leads to an average decrease of 4.7% in the number of offenses. However, further evidence and research is required to support this assertion and other issues related with the application of justice, in particular with respect to the delay effects that must be taken into account when administrating justice.

2. Theoretical background

Our research is based on the economic theory of crime and it is supported by system dynamics as will be discussed ahead. The fundament of this paper is the work by Becker (1968), which assumes that criminals maximize their utility functions - by estimating the costs and benefits of carrying out an illegal activity.

The theoretical scheme provided in Becker (1968) may benefits from a system dynamics perspective when trying to understand a particular complex systems. Specifically, we include elements, which lie outside the theory, and that explain particular behavior with the help of delays and feedback relations (Sterman, 2000; Forrester, 1961).

In Becker's model, the four key elements are: 1) damages and offenses, 2) cost of apprehension and conviction, 3) the supply of offenses, and 4) punishment. In the following sections we briefly describe these elements and provide some of the most important relations (Becker, 1968):

Damages and offences
Becker establishes that the harm inflicted by criminals to society, H(O), is a function of the offences, O (O – offenses), and that H′>0 (is decreasing). The net cost or damage to society, D(O), is the difference between harm, H(O), and the society gain, G(O):

$$D(O) = H(O)-G(O).$$

It is possible that offenders receive diminishing marginal gains, G(O)"<0, and cause increasing marginal harm, H(O)">0, and that

$$D" = H"-G" >0.$$

Since H(O)′ and G(O)′>0, society will seek to move along the interval where:

$$D(O)′>0$$

Cost of apprehension and conviction
The criminal activity (A) depends on: the probability of conviction (p), the number of offenses (O), and the arrests (a),

$$A = h(p,O,a)$$

In Becker's model, the cost of clearing convictions is obtained as a function of the criminal activity:

$$C = C(A)$$

Offenses
The offense is established as a function of the probability of conviction, *p*, the punishment, *f*, and a variable *u*, which corresponds to other factors such as the entry into illegal activities and the ability to commit a crime.

$$O = O(p,f,u)$$

Punishment
According to this approach, punishment can be converted into costs, which can be either monetary or related to employment possibilities. The cost of punishment, *f*, for individuals is inferior to that assumed by society, *f'*, and is estimated as follows:

$$f' \equiv bf$$
$$b > 1$$

Where *b* is the coefficient that transforms *f* into *f'*. In case of fines, b is approximately 0. Punishment cost affects not only individuals, but also society, and f' is the social cost.

According to the economy of welfare and the relations described above, one can estimate the social loss caused by crimes as:

$$L = L(D,C,bf,O)$$

The design of policies for penitential systems seek for a balance between costs and social benefits. From this perspective, Becker proposes that the factors affecting the costs and benefits of the criminal actions should be incorporated in the design of justice policies. Phillips (1973) and Rubi (1978) identify four types of policies: punishing of the offender; disabling, so that the offender can not further commit crimes; rehabilitation; and deterrence for both potential offenders, and those already condemned.

3. The model

When taking a systems view to the problem, which incorporates not only the causes of crime but also some possible remedies, as well as other important issues related to the administration of justice, a complement to Becker's model might naturally emerge. Figure 1 shows the main relations exhibited in Becker's model. It also includes the elements that

contribute to the commission of crimes, adding policy elements that may contribute to the reduction of the burden that has to bear the penitentiary system.

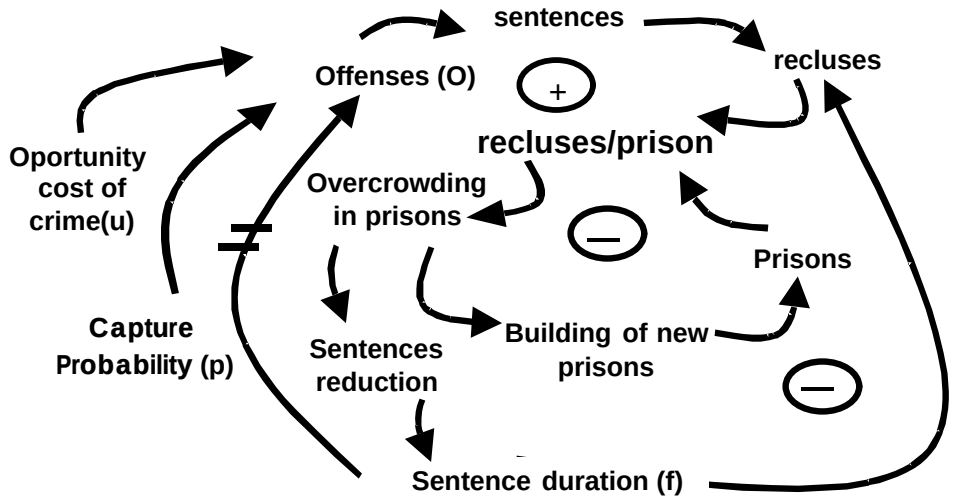


Figure 1. Dynamics of crime in the model of Becker.

Figure 1 shows how the offenses committed by criminals increases overcrowding of prisons, imposing pressure on the system, driving administrators to consider policies such as:

- Reduction of sentences through relaxed regulation. In this way, inmates will achieve freedom before completion of prison terms.
- Increase of budget in items such as investment in infrastructure and training programs for inmates.

As Figure 1 indicates, both types of policies represent high costs. The economic theory of crime establishes additional relations between the floating population of law offenders, who commit crimes, and private and public expenditures needed to control criminality. These relations are shown in Figure 2.

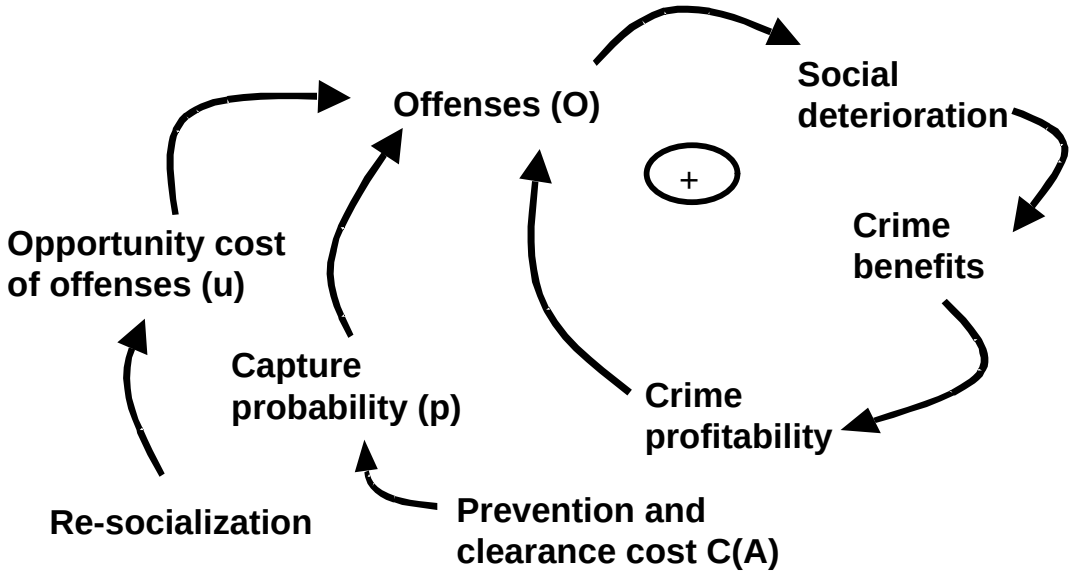


Figure 2. Economic rationality of crime

By linking system dynamics with the economic theory of crime, we take a systems perspective to understand the effects of the main interaction within the criminal sector (e.g. prisons, judges, offending population and police). By incorporating feedback and delays, system dynamics facilitates the assessment of the interactions within the system, and helps to explain its dynamics. In the case of the judiciary system it may help understanding the causes and effects of the penitential crisis and to analyze the impact of policies on the system.

Figure 3 shows simulation results that allows comparisons between what could happen under the present policy (line 1) and what could occur under alternative policies (2 and 3), considering reductions or increases in sentences by 25% (lines 2 and 3 respectively).

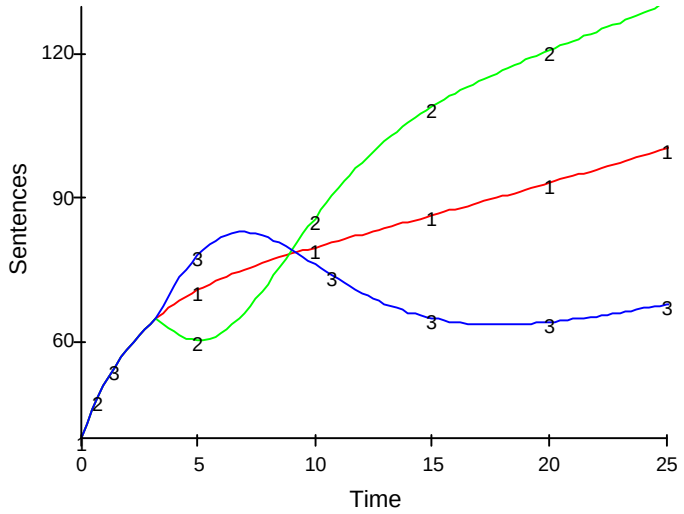


Figure 3. Simulation of the effects of penalty policies over the number of sentences.

As previous analysis indicates, the reduction of penalties that, in the short term, alleviates the crowding of prisons would, in the long term, have counterproductive effects in the judiciary system. Although the proposed reductions of effective penalties, ranging from 25 to 40%, would temporarily reduce the number of prisoners by 15%, this would increase criminality in the long run.

Alternatively, a deterrence project currently discussed in the Colombian congress for increasing prison terms to an average of 4 years seems a more positive policy, as can be appreciated in Figure 4 (line 3). Although inmate population does not decreases drastically, the expected behavior in the long run is an alleviation of almost 35% of prisons crowding. This behavior is more valuable that the reduction of effective sentences or adoption of no policy at all, as can be observed in Figure 4 (lines 2 and 1 respectively).

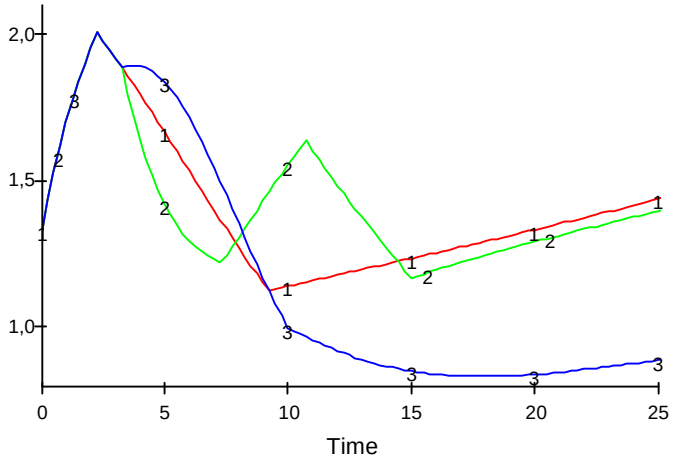


Figure 4. Simulation of jails crowding under different penalty policies

The policy of increasing penalties has effects on offenses similar to those of overcrowding. With longer sentences, offenses drop considerably below the average of other policies. This behavior is the result of a lower profitability of crime.

The cost of punishment varies according to the policies implemented. With deterrence policies and more effective capture and judgment of criminals, social benefits can be achieved, with a reduction of criminality and of prison costs, as shown in Figure 5 (line 3).

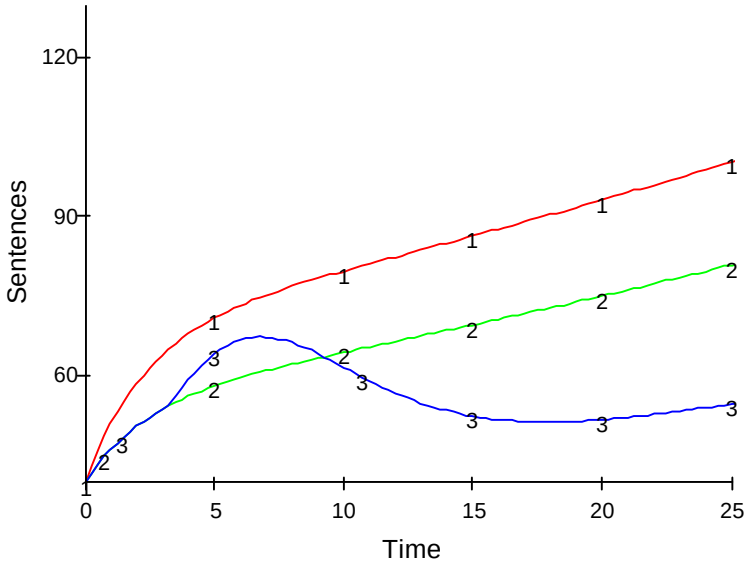


Figure 5. Simulated effects of an increased efficiency in judicial system

We now turn to the evaluation of the model proposed in this paper in order to assess the validity of the policies being investigated. This has to be acknowledged as preliminary results of on-going research.

4. Model validation

Sterman (2000), Shereckengost (1997), and Roberts (1993), propose that validation must focus on the usefulness of the model rather than on other issues. According to these authors, a model is valid when it can be used with confidence and security. These authors have propose tests of model structure and behavior, which we partly present ahead.

Tests of model structure

The first step consists on determining if the structure of the model is that of the system being modeled. The model that has been presented was developed considering the mental models of the staff of national penitential institution, INPEC. We also considered conceptual models described by law and other theoretical sources.

The second step is parameter estimation. Parameters were calculated based on historical behavior, from available information. Certain parameters of the model, in particular those related to profitability of crimes, are difficult to calculate, due to the absence of data and relevant studies. In these cases, international data was used, with adaptations to country-specific conditions.

The need of research is stressed by the deficiency of judicial statistics, as Fundación Presencia (1997) establishes in its study of justice. In spite of these difficulties, the model broadly reflects the behavior of the judicial system, when comparing simulated results of historical conditions with historical information, showing a good approximation between

both results, as can be appreciated ahead, which may provide some confidence in the use of the model.

Tests of model behavior

We evaluated the model with respect to historical information (1987-1999). The results obtained show that the model approximates well the actual behavior of the system. As shown in Figure 6, the levels of overcrowding in prison centers and of inmates are similar to those described in the first sections of this paper. The average size of the offending population and the number of offenses committed per year are very close to the estimations of national police (1997) and the commission on rationalization of public expenditures (1996).

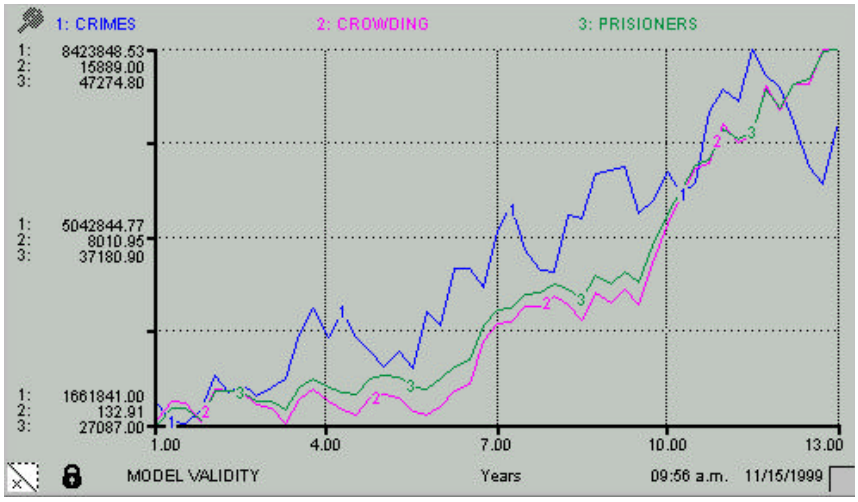


Figure 6. Simulating history (1987-99) under model conditions. Elements for validation.

Finally, the model describes correctly the increasing costs of criminality. Since the new 1991 constitution, the judiciary system has required a larger amount of resources to cope with increases in offenses and consequently making demands for more judges, policing and prisons, putting pressure on the justice system as a whole. Expenditure only began to grow in 1995 when the penitential system was alarmed for the growth observed in prisoners and the overcrowding of prisons.

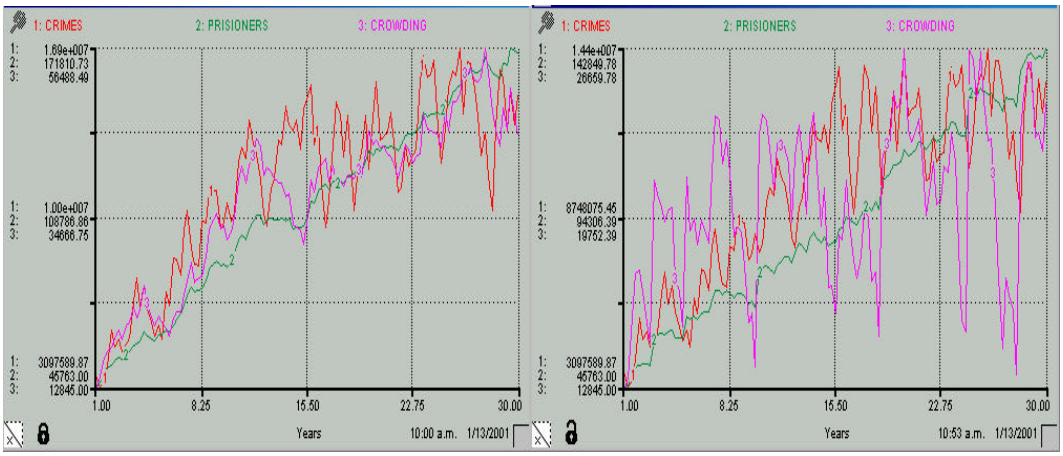
5. Policy analysis

In the absence of policies, inmates will increase three times as much during the next 20 years, to a number between 165000 and 180000 prisoners, as can be observed in Figure 7a. This figure shows simulation results, considering the present and historical rates of attention in the judicial system, the apprehension activities of police, and the growth in Colombian population.

Non-convicted offenders would increase their participation. Although the rate of recurrence would remain high, its growth would slow down slightly and this rate of

recurrence would increase 10% from its present value of 70%. Success in re-socialization programs would then be very low, as can be observed in Figure 7a. If the opportunity cost of legal activities for offenders does not improve, the situation would largely deteriorate, because of the lack of legal opportunities, making crime more profitable, which contributes to the commitment of offenses.

Figure 7b shows the reduction of criminality and overcrowding with penalties 25% higher and more efficiency of police, expressed in the increment of the probability of capturing a criminal from 0.5 to 0.65.



a b

Figure 7. The dynamics of crime, prison crowding and prisoners as result of hardened policies

Figure 8 indicates that the expansion of the penitential system would demand greater expenditures, characterized by a deficit of resources for re-socialization programs, and the redemption of penalties. A great part of judicial resources would be assigned to the operation of prisons and maintenance of prisoners, while little investment would be available for infrastructure.

With respect to social costs, it was found that increases in criminality induces non-linear increases in costs. Using Rubio's (1994) estimates and our own ones, which maybe undervalued, the present social costs of crime – currently around US$900 million – may quadruple to about US$3.5 billion, which shows that crime may become more profitable.

Social benefits depend on the accomplishment of the penitential system. It means that by disabling criminals, the current savings which reach to about US$1.5 billion may double to about US$3 billion. Following the ideas of Hayward (1996), a policy that combines deterrence and investment in the prison system, although not a definite solution, turns to be a valuable policy in terms of the balance that must be achieved between social costs and benefits.

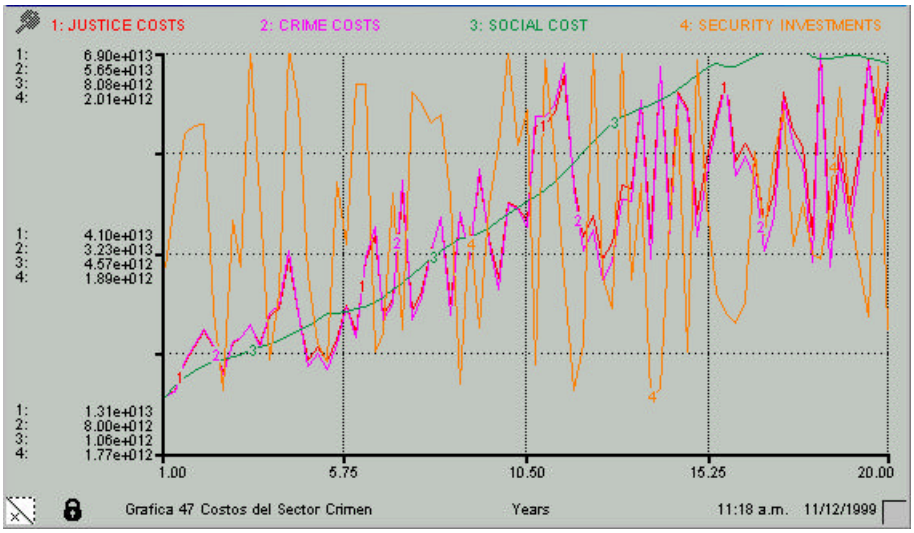


Figure 8. Costs and expenditures of judicial system

In our research, we also analyzed alternative policies, not discussed in this paper for space constrains, including:

- Increasing investment in penitential infrastructure as well as in opportunities to redeem penalties. This policy not only reduces effective penalty time, but also rises the opportunity costs of the legal activities for inmates when they complete their sentences, deterring them from offending again.
- Strengthening measures to secure offenders, other than preventive detention. For minor offences, we considered penalties such as conditional liberty, warnings, home detention and fines. This policy would reduce preventive detention by at least 20%. Overcrowding would be reduced on average by 25% and would reduce the growth of new prisoners by 10-15%.

6. Conclusions

A number of conclusions which, in general, coincide with those that have been found by Levitt and Rubio (2000) and Alesina (2001) are reported next:

- Overcrowding is not the fundamental cause of the prisons' crisis. The crisis is the result of policies, originated exogenously and endogenously to the judiciary system, that have had an effect on the profitability of crime.
- Imprisonment reduces crime, although not completely. It is an expensive strategy to combat crime in the short-term. However, is a profitable policy to Colombia because its application would allow savings in the long run.
- Even with high levels of overcrowding in prisons, and with a penitential system in crisis, not enough criminals are locked-up for a sufficiently long period of time to reduce criminality in Colombia. Therefore, it is necessary to apply a policy that

combines disabling, investment in infrastructure, and hardening of sentences. This combination offers the best results in terms of social welfare and crime reduction.

- It does not seem convenient to apply normative measures to free inmates before the expiration of their sentences. A policy of this kind harms the cost of punishment, increases the profitability of offenses, affects the rationalization process, and harms the deterring power of the State, and consequently increases crime.
- In order to alleviate conditions of the sentenced population, other alternatives, different than preventive detention, may be considered. Those policies include fines, total indemnification of victims, and reduction of social costs.

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