CRIMINAL CYCLES IN THE ILLEGAL DRUG INDUSTRY: A SYSTEM DYNAMICS APPROACH APPLIED TO COLOMBIA

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ABSTRACT

The coca farming dynamics seem to partially follow the patterns of a long war against organized crime in Colombian. Since the early 80s, the cocaine market in the US and the rest of the world has been mainly supplied by Colombian cartels. Consequently, these illegal organizations have been targeted by Colombian and American law enforcement agencies. Our work argues that such policy has had a counter-intuitive effect which has contributed to increases in coca farming and reductions in cocaine prices. This paper hypothesizes that such situation was the consequence of the way that drug cartels were dismantled – thus the Colombian paradox. The consequences of the war against cartels may be assessed with the support of a dynamic theoretical framework and SD. This research assesses alternative policy for dismantling drug cartels.

1 INTRODUCTION

The history of the world cocaine market, especially in American, has been tightly associated with the most renowned Colombian cartels during the last two decades. In the most recent years this association has been mainly with the guerrillas and paramilitary forces.

Most scholars in the field have focused their research almost exclusively on business costs, some on the associated business risk, and a small number on industry structure. Abundant literature addresses the American and Sicilian mafia cases (e.g., Rossemberg 1973, Reuter 1983, Fiorentini and Peltzman 1997, and Fiorentini 1999) but the literature on the Latin American organized crime and specifically on Colombia is still limited.

Up until 1993, Peru and Bolivia were the main coca-leaf providers worldwide while Colombia was just a marginal producer (Vargas 2004). The Colombian cocaine boom started during the early 90s and “developed complex organizations which, in many cases, operated autonomously” (Thoumi 2006). It has been acknowledged that the Colombian drug trafficking activity “coincided with an accelerated demand-rise in the US, which started an unusual process of accumulation of enormous amounts of money in the hands of the few involved in this activity” (López-Restrepo y Camacho-Guizado 2003). Two big cartels were formed (Medellin and Cali) and many other small ones initiated operation across Colombian, Central America and Mexico (Thoumi 2006).

The growth and expansion of these criminal groups coincide with increases in homicide rates in Colombia. Continuous increases in violence and a terrorist threat shocked Colombians who become aware of their long complicity with the fast enrichment of illegal actors. Society and government reacted and got support from the US in terms of military training and technology (Sauloy and Bonniec 1994).

In 1992-93 most outstanding members of the Medellin cartel were in jail or dead. The Colombian government then went ahead to fight the Cali cartel. In the mid 90s the two main members of the Cali cartel were taken to prison but immediately “the Norte del Valle cartel incorporated the Cali cartel’s routes and social networks” (Vice-presidencia 2006).

The Cali cartel played an important role as mediator between guerrillas and paramilitaries (Duncan 2006). Once this cartel was dismantled, small traffickers were co-opted by paramilitary groups who by 1996 had already controlled many remote and central regions of Colombia. The association that was established between traffickers and paramilitaries increase their possibilities for bribing and buying firearms but created frictions among themselves for market control. The guerrilla forces got also involved in the cocaine business. Given the rural nature of these groups, it is not an oddity that the new cartels focused on coca-leaf production, gaining considerably knowledge to improve both crops and profits.

The war against cocaine has been complex problem given the multi-dimensional characteristics that this involves. Some triumphs have soon turned loose battles, co-
operation has not always been consistent and policy has been erratic at times. There have been unexpected consequences in this war. These emerge as a consequence of the complexities involved, given the non-linear interactions between the main issues of concern. We thus developed a model for better understanding this criminal activity, specifically aiming to assess alternative policy for dismantling cartels.

The paper is organized as follows: section two shows the evolution of coca crops and it argues that growth might be partially explained by the policy of dismantling big cartels, the cocaine supply chain and the role played by organized crime. Section three shows the model that has been build to evaluate the dismantling policy that was applied as well as alternative dismantling strategies and their consequences. Section four discusses validation issues and conclusions.

2 BACKGROUND

2.1 The Evolution of Coca Farming

Colombia has experienced two outbreaks of coca farming during the last twenty years. Figure 1, depicts the series of coca-leaf farming by the State Secretary (INCSR). The first outbreak starts in the early 80s were followed by heavy increases of coca production during almost ten years. After five years of apparent stagnation (1991-1995), in the mid 90s, coca farming reached high levels until eradication policies reverted this tendency in 2000.

The stagnation period does not seem to be explained by any special eradication policy during those years as indicated in Figure 1. An event that coincides with the stagnation period, perhaps the only one directly linked to illicit drug trade, is the dismantling of the Medellin and Cali cartels.

What happened during the period that the Medellin and Cali cartels were being dismantled (1991-1995)? As expected: stagnation, moderate fall, and initial slow recovery in coca farming. But following the dismantling of the Cali cartel (soon after the disappearance of the Medellin Cartel) something that seemed unexpected happened: a new outbreak occurred.

An important number of Colombian scholars in the field (e.g. Lopez-Restrepo and Camacho-Guizado 2003; Vargas 2004, Thoumi 2006; Duncan 2006) argue that the cartel dismantling policy gave way to a new generation of criminals. They indicate that the fall of the cartels gave way to the surge of many small gangs, which were poor compared with the big cartels, vulnerable to police forces and other traffickers and atomized. What Colombian and foreign scholars do not acknowledge is that such break into bits is the consequence of a cartel dismantling policy and the way that such cartels were dismantled. In other words, the fight against big criminal structures have contributed to split these into a number of smaller units, bringing more people into this illegal industry given that such policy have destroyed the costly entry barriers to this unlawful business.

Figure 1: Coca bush hectares in Colombia. Source: INCSR (US 2008) and Rocha 1997.

Almost all Colombian scholars in the field (e.g. Lopez-Restrepo and Camacho-Guizado 2003; Vargas 2004, Thoumi 2006; Duncan 2006) describe the cartel dismantling policy as a starting point for a new criminal generation. They indicate that the fall of the cartels gave way to the surge of many small gangs, which were poor compared with the big cartels, vulnerable to police forces and other traffickers and atomized. What Colombian and foreign scholars do not acknowledge is that such break into bits is the consequence of a cartel dismantling policy and the way that such cartels were dismantled. In other words, the fight against big criminal structures have contributed to split these into a number of smaller units, bringing more people into this illegal industry given that such policy have destroyed the costly entry barriers to this unlawful business. It is not obvious to establish the causality between fewer cartels or a concentrate industry and more coca crops. However, would be a theory that might light the possibility of such causality.

Figure 2, depicts the Buchanan’s Defense of organized crime theory. The horizontal axis represents the resources devoted to law enforcement while the vertical axis the resources used by criminal activity. C curve, draws the criminal response. Z, is the initial equilibrium. Under a criminal monopoly, Cm represents the supply curve (criminal response) and Zm a new equilibrium. Buchanan 1973, states:

“Monopoly in the sale of ordinary goods and services is socially inefficient because it restricts output or supply. The monopolist uses restriction as the means to increase market price which, in turn, provides a possible source of monopoly profit. This elementary argument provides the foundation
for collective or governmental efforts to enforce competition. If monopoly in the supply of “goods” is socially undesirable, monopoly in the supply of “bads” should be socially desirable, precisely because of the output restriction.”

2.2 A Concentrated Industry

During the early days (about 1980s) the Colombian cocaine industry was characterized by its high degree of concentration and integration (Krauthausen 1998, Thoumi 2006). Coca base was imported from Bolivia or Peru, processed in remote laboratories and exported mainly to the US. Those activities were very expensive as there was a need to supplying remote laboratories with the coca leaves and then transport the cocaine powder by fast boats and airplanes to clandestine and legal airstrips and docks in the US. During the period (80-95), the main power position in the market became the route owner, a trafficker which controlled the logistic route to export cocaine from an isolated laboratory to the market place. The cocaine market was and still is a free market with relative low barriers to enter. Many illegal businessmen might buy coca base in Bolivia or Peru and resell it in Colombia. Many others could process coca into cocaine powder as outsourcing business; nevertheless, very few of them carry it from Colombia to US defying the huge risk associated to such venture (Krauthausen 1998). The real vocation of the infamous big Colombian traffickers until 1995 was having, controlling and managing their routes. The route owner is on a main position: He coordinates the network and decides who his partners are - he is the main money winner (Krauthausen 1998). There was a natural network monopoly where the route owner has the privilege to decide who go with him into the illegal business. Routes are fiercely owned and collected by traffickers who have power to do it. A market with several route owners would guarantee the presence of negative externalities whether any neighbor were under law enforcement push. In addition no many traffickers can manage risk associated to smuggling cocaine across several countries. The best route is the safest one. There exist indeed several economic barriers in order to become a big route owner. During the 80s and 90s coca prices declined: “It is difficult to account for the continued sharp decline until 1989 and the more modest declines in the 1990s” (Reuter 2001). Figure 4, depicts high wholesale prices during the late 80s and early 90s, the blossom years of cartels, compared with slightly lower average prices during the mid and late 90s, when cartels were being dismantled.
As cartels were broken into many small operational units along the production-distribution chain, the new units incorporate agents coming from the former cartels as well as newcomers into the business. Thus, it is possible to infer that the dismantling policy brought about an interesting dynamic to the industry. This issue is discussed ahead and it is incorporated into our model structure.

3 MODEL

3.1 Criminal Firm’s Basic Structure

The head of an illegal firm has under his command several functional areas and a large number of members. There is a well defined barrier between members and heads. The Heads of the firm establish monopolistic and economic barriers (identified as the variable promotion barriers in the causal-loop diagram, Figure 5) which obstruct members to easily reach the Heads level. The monopolistic barrier works by force. Economic barriers influence the Capacity to hire, which establishes a well defined hierarchical structure.

Cartel resources come from the initial Heads’ contribution; but as any firm, the very dynamic of reinforcing sources must come from the business itself. The model assumes that the rate by which cartel resources increase (Fraction profit) depends on the firm size (Figure 6).

Figure 7, indicates that illegal firms outsource some services (i.e. coca production, drug supply to end-customer and information services). As previously discussed monopolies (cartels) have no incentives for growing very big given the risks of information filtering or the possibility of loosing operational control (Krauthausen 1998). Our model suggests that the criminal firm incorporates basic structures to conduct illegal actions. Competition between small firms (those that render outsourcing services) brings criminal price down, benefiting cartels.

3.2 Simulation base-case scenario

The simulation of the base-case scenario shows the evolution of the firm’s initial configuration. Figure 8, draws a situation in which the Firm’s heads start raising (i), hiring enough members (ii). When the firm reaches a determined size, it increases the use of outsource services (iii). Small suppliers grow as they are still profitable with low entry barriers. Firm’s operations profitability (iv) continuously grow at diminishing returns, given the firm position in the market. As Outsourcing Services increases coca crops farming increases as well (v). In general, growth is initially accelerated and then only increases at diminishing return rates, as is the case with monopolies.
3.3 Policy against Medellin cartel

The Medellin cartel was the first big Colombian criminal organization to be dismantled. A bloody and long war against such group lasted almost ten years (1984-93) until the Colombian and American law enforcement agencies killed or imprisoned an important number of the cartel members. Our model replicates this policy using a probability of capture which triggers exit flows for both criminal categories: Heads and Members. The model assumes total impunity until the dismantling policy is implemented (this operates as a switch function in period 15). To model such policy, law enforcement initially succeeds by eroding the firm’s members and later striking bosses after some delay.

Figure 9, shows two trajectories: Number one (1) indicates the base-case scenario and number two (2) indicates the dismantling policy. There are reductions in members and heads of cartels. Cartel resources fall as well as firm lacks its operative capacity. However, many of the low level criminal services (outsource services) take charge at lower costs, due to competition. As law enforcement persists members and heads disappear as well as profitability (iv).

A very interesting issue is that as outsourcing increases (iii) new entrants emerge due to the dismantling policy and hiring requirements. As the dismantling policy prevails, avoiding recruitment, workforce migrates to smaller gangs that act as outsourcing firms of criminal services.

3.3 Policy against the Cali cartel

The new small firms fiercely rival among themselves to gain power as observed after the disappearance of the Medellin and Cali cartels. The attack on the Cali cartel was apparently successful as by 1995 their main head members
were imprisoned (Duncan 2006; Thoumi 2001). This was not a long and bloody war against this criminal group, simply the heads of the cartel disappeared (only heads) as they were taken to prison. Figure 10, illustrates the policy’s impact: (i) heads fall, and (ii) members fall (had to look elsewhere for jobs). Members thus migrate away or establish their own firms. Such outbreak of new small firms renders criminal services at a very low cost.

Figure 10: Cartel dismantling policy against Cali cartel

Thoumi 2001, describes the members’ migration from big cartels (the most integrated) to small firms - small cartels or “cartelitos” (Duncan 2006). Simulations show similar migration patterns (Figure 10 (iii)).

3.4 Alternative policies against cartels

We now simulate an alternative policy to the one that was actually implemented. This consists on dismantling members (leaving the heads in place) – this opposes the strategy implemented against the Cali cartel which mainly dismantled the heads of the organization. Figure 11, shows three main trajectories. The first one is the simulation of base-case scenario. In the second one, law enforcement is applied against firm’s members and heads, and the third one, consists on an exploratory policy of law enforcement on members only.

Simulation results (until period 30) seem to reveal a promising behavior: Firm members decrease, Outsourcing Services level register lower numbers that the base-case and firm’s profit shows a sharp fall. However after period 30, Heads increase at an important rate, now supported on outsource services, obtaining limited profits but increasing coca-leaf plantation (Figure 11).

Figure 11: Alternative policy against a cartel

Next section discusses initial model evaluation and validation.

4 CONSIDERATIONS AND CONCLUSIONS

The purpose of the model has been to explore the dynamics of criminal organizations and to assess alternative policy, aiming to reduce their impact on society. As observed, the model largely reproduces the developed theoretical framework. However, is there a statistical evidence for this?

Figures 12 and 13, show simulation results and reported coca plantations (hectares) during two important periods of the war against cartels. Both model results and real data show similar patterns: constant increase at the beginning followed by a period of stagnation. Discrepancies still exist.

Analysing the model during the war against the Cali cartel, we observe some basic coincidences (Figure 13). Both model and real data have some similar patterns: constant increase at the beginning and few periods of stagnation followed by several years of accelerated increases.

Although there is not enough validation evidence the model seems promising. Our preliminary prototype provides useful insights for a more elaborated model. How-
ever we will first assess if more model detail provides sufficient gains in learning about policy and its effect on the system.

Figure 12: Simulated and actual coca farming hectares during the war against the Medellin cartel.

Figure 13: Simulated and actual farming hectares during the war against the Cali cartel.

Previous simulation results help us assessing Buchanan’s theory with respect to the impact that a cartel dismantling policy has on cocaine trafficking. Simulations show that a cartel dismantling policy may bring about counter intuitive results as it may induce higher levels of criminal activity at a lower cost.

Simulations show that a policy that focuses on parts of the criminal production-distribution chain usually induces side effects (higher levels of criminality in the long run). Although a criminal antitrust strategy shows unexpected and undesired consequences, policy against heads seems to be the most harmful strategy to confront the criminal monopoly. Nonetheless, simulations reveal that it is more beneficial, at least in the short run, to focus on member heads. Such policy reveals to be the most expensive one. This however might be improved if complemented by declaring a war against low-key members of cartels as soon as heads are either in jail or dead.

This research confirms theoretical issues and learns from alternative policy in the war against cartels. There is still much work ahead. As this is on going research, we will next consider side effects and reinforcing issues regarding homicide and inmate increases and their effects on communities.

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