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Research methods

A system dynamics approach to the study of Colombian coca cultivation and the counter-intuitive consequence of law enforcement

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ABSTRACT

A large-scale expansion of the Colombian coca cultivation is one of the most revealing signs of a structural change in the illegal cocaine market in the Andean region. From being a modest and domestic production, in the space of five years Colombian coca cultivation supplied a competitive market, capable of substituting almost completely the foreign sources of supply. The purpose of this work is to explore the role and potential of system dynamics (SD) as a modeling methodology to better understand the consequences of drug policy. As a case study, this work tests the hypothesis that the outbreak of Colombian coca cultivations is a consequence of the take down of large cartels, leading to the surge of small drug-trafficking firms called "cartelitos." Using an SD model, and elements from the economic theory of the criminal firm, our work shows how the formation of these small firms might significantly contribute to the configuring of a more competitive domestic coca industry (and hence to a more efficient crime industry). We conclude that SD seems an appropriate dynamic modeling-based approach to address policy issues regarding drug markets. The methodology takes into account the dynamic nature of drug markets and their multi-dimensional responses to policy interventions.

Introduction

Illegal drug markets appear to be different than legal markets on a number of dimensions related to their complexity, dynamics, and response to policy interventions (Reuter, 2001). This suggests the need for methodologies that take into account these markets' characteristics and provide new opportunities for policy analysis and design. This work explores the role and potential of system dynamics (SD) (Forrester, 1994) as an approach for addressing and understanding the behavior of illegal markets. As an example, the work introduces a case study that analyses the outbreak of Colombian coca cultivations. The paper tests the suitability of the approach for addressing the causes of the problem, and suggests its future use when considering the consequences of law enforcement.

The case study

By the mid-1980s, cocaine was prevalent in most cities in the United States (US), where the Colombian drug dealers were the main suppliers (Chepesiuk, 2005). Although Colombian cartels were the main producers of cocaine, they were not the main farmers of coca (Thoumi, 2009). They also had to smuggle coca paste, obtained from Peruvian and Bolivian middlemen, conducting logistical operations that included clandestine runways and overnight flights (Chepesiuk, 2005; Krauthausen, 1998). In fact, by the middle of the 1980s Colombian coca crops was only 9% of the Andean cultivation, while the Peruvian and Bolivian cultivations amounted to 61% and 30% respectively (US State Department, 2011, 2010). A different scenario was seen fifteen years later, when the Colombian coca production peaked at 76% of total Andean cultivation (Fig. 1), while Peru and Bolivia were by then supplying only the remainder (UNODC, 2010, 2011).

This work tests the SD methodology for exploring the hypothesis that the expansion of coca cultivations in Colombia, in 1995, is related more to the take-down of the main Colombian drug cartels (Medellín and Cali), than to the traditional explanations for such expansions. Although this paper does not discard traditional explanations, it does challenge the effectiveness of the Peruvian Air Bridge Denial Program (ABDP).

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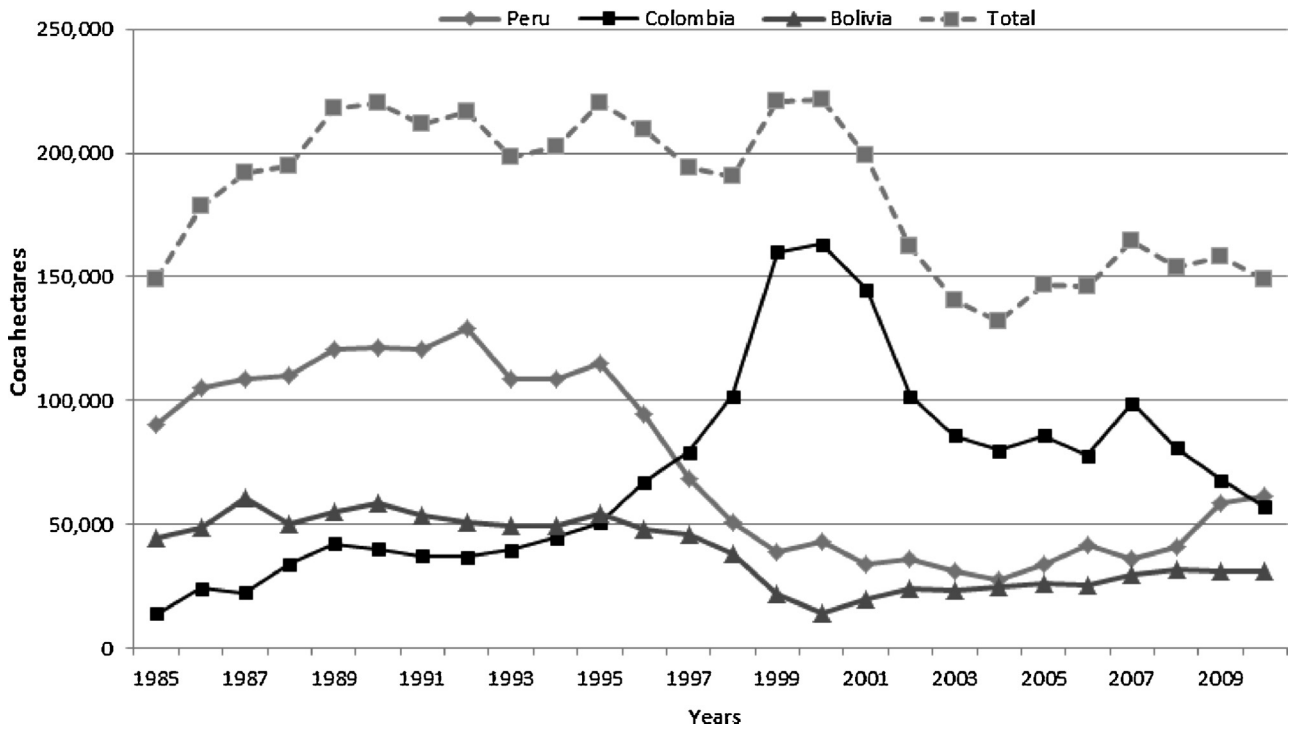

Fig. 1. Evolution of coca cultivations in the Andean region.
Source: United Nations (UNODC, 2010) and Rocha (1997).

Background

The history of law enforcement operations against the main Colombian cartels begins after their expansion during the 1980s and 1990s (Levitt & Rubio, 2000). The Government reacted by getting support from the US, focusing its efforts mainly on the Medellín cartel (Thoumi, 2001). This American cooperation was a preamble to "Plan Colombia" (1999–2005), which consisted of a comprehensive strategy whose main component was to strengthen the Colombian armed forces and national police (DNP, 2006). After all the coordinated efforts against the Medellín cartel, the Cali cartel became the largest single player in the cocaine industry, attracting the attention of Colombian law enforcement (Chepesiuk, 2005). Its defeat left a hole in the Colombian drug scene, where a multitude of trafficking organizations were in the contest to become primary suppliers (Mallory, 2007). This led to the formation of an estimated 160–360 of the so-called "cartelitos" or baby cartels (Garzon, 2008; Grossman, 2006; ICG, 2005; Mallory, 2007). These small firms were harder to penetrate, became more elusive, and collectively were just as successful in exporting cocaine as the large cartels had been (Corcoran, 2007; ICG, 2005).

The Peruvian eradication policies

Parallel to events in Colombia, Peruvian coca cultivation decreased by 27% between 1996 and 1997. Like Peru, Bolivia also registered substantial declines in coca cultivation during the late 1990s (Bagley, 2011). Peruvian Government documents suggest that much of the success of the US-backed coca eradication and alternative-development programs in Peru and Bolivia in the late 1990s is attributable to the disruption of the "air bridge," which allowed the transport of coca paste from these two Andean countries into Colombia (Bagley, 2011; Thoumi, 2003). The reduced availability of Peruvian and Bolivian coca paste explains a rapid expansion of coca cultivation into Colombia (Bagley, 2011). This theory has become one of the most accepted explanations for the migration of coca production. Several authors (Fukumi, 2008; Huskisson, 2005) had repeated what the early reports by Crane, Rivolo, and Comfort (1997) and Crane (1999) had found.

However, as Navarrete-Frias and Thoumi (2005) point out, this explanation has its problems because even though the ABDP that started during 1990 was intensified over four years, showing results in terms of the number of neutralized airplanes, coca prices in the Upper Huallaga (Peru) remained high and relatively stable and did not fall until late 1995. Although the decline in Peruvian and Bolivian cultivations during 1996–2000 coincided with a few airplane neutralizations, which provides some evidence for us to assume that these captures represented a mere fraction of the coca paste trade between Peru and Colombia that was transported by plane. The estimated number of clandestine flights between those countries had been 20 per month. The effectiveness in terms of plane captures thus represents little more than 10% effectiveness during the best year (Thoumi, 2003).

Ronken, Ledebur, and Kruse (1999) came close to estimates by Thoumi (2003), indicating that the ABDP had only 12% success—capturing one in eight of suspicious airplanes. Success of the program was claimed on the basis that there was a 47% reduction in the number of clandestine flights, assumed to be the result of a deterrence effect (Soberón, 1997). The authors also remark that there is no consensus about the number of intercepted airplanes. In 1995, the DEA (2003) confirmed the interception of 20 airplanes, while the National Narcotics Intelligence Consumers Committee (NNICC) declared a total of 39 (NNICC, 1996), but Peruvian authorities reported captures of as many as 70 airplanes in 1992, 67 in 1993, 36 in 1994, and, up to August of 1995, 21 planes (Soberón, 1997). Likewise, Rumrrill (1998) remarks that even though the ABDP affected a percentage of the transit of coca paste from Peru to Colombia, fluvial and terrestrial routes should not be underestimated. They suggest that the market rapidly adapted by incorporating new fluvial and terrestrial corridors that proved to be useful during the 1980–1983 period. The shift toward fluvial routes had begun in 1993, the most successful year in terms