The economics of the war on illegal drug production and trafficking[☆]

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A B S T R A C T

We model the war on drugs in source countries as a conflict over scarce inputs in successive levels of the production and trafficking chain, and study how policies aimed at different stages affect prices and quantities in upstream and downstream markets. We use the model to study Plan Colombia, a large intervention aimed at reducing the downstream supply of cocaine by targeting illicit crops and blocking the transport of cocaine outside this source country. The model fits the main patterns found in the data, including the displacement of the drug trade to other source countries, the increase in coca crops' productivity as a response to eradication, and the lack of apparent effects in consumer markets. We use a reasonable parametrization of our model to evaluate the cost-effectiveness of different policies implemented under Plan Colombia. We find that the marginal cost to the U.S. of reducing cocaine transacted in retail markets by one kilogram is $940,000, if it subsidizes eradication efforts; and $175,000, if it subsidizes interdiction efforts in Colombia.

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1. Introduction

Ever since Richard Nixon formally declared a war on drugs in 1971, different policies have been implemented in producer, transit and consumer countries with the goal of reducing illegal-drugs' consumption. Source and transit countries, such as Colombia (where about 70% of the cocaine consumed worldwide is produced), Afghanistan and Mexico, have played a mayor role, and in alliance with the U.S. and other developed countries, implemented several anti-drug strategies ranging from the eradication of illicit crops, the detection and destruction of processing labs and the interdiction of drug shipments en route to consumer markets.

In September 1999, the Colombian government announced Plan Colombia, a strategy which had two main objectives. The first was to reduce the production of illegal drugs (primarily cocaine) by 50% within six years; the second was to improve

security conditions in Colombia by reclaiming control over large areas of the country held by illegal armed groups (see the U.S. Government Accountability Office—GAO, 2008). Since 2000, Plan Colombia has provided the institutional framework for a military alliance between the U.S. and Colombia in the war against drug production, trafficking and the organized criminal groups associated with these activities.

According to official figures from the Colombian government (see DNP, 2006), between 2000 and 2008, the U.S. disbursed about $4.3 billion for the military component of Plan Colombia; while the Colombian government spent about $7.3 billion on several anti-narcotic programs. Joint expenditures reached, on average, $1.3 billion per year, which corresponds to about 1.2% of Colombia's GDP, making Plan Colombia on of the largest interventions in a drug producing country. Despite the financial efforts, the results have been mixed. While the number of hectares of coca crops cultivated in Colombia decreased by about half (from 161,700 ha in 1999 and 2000 to 86,000 ha on average from 2005 to 2008), potential cocaine production only decreased by about 24% (from 690 metric tons per year from 1998 to 2000, to 550 around 2008). This paradoxical outcome can be explained by a significant increase in yields per hectare, from roughly 4.3 kg of cocaine per hectare per year prior to 2000, to about 6.6 kg of cocaine per hectare per year in 2008. Furthermore, the wholesale price of cocaine in consumer countries remained relatively stable during this period.[1]

In this paper, we construct a model of the war on drugs in source countries to study the effects of such interventions in downstream and domestic markets. Our model helps us understand the mixed results of Plan Colombia and underscores the economic forces explaining the mixed results. The structure in our model allows us to surpass the inherent data limitations related to the study of illegal markets, and provides tractable expressions to calculate the cost effectiveness of different supply-side interventions. These are informative numbers in this context, given that the lack of good natural experiments and the general equilibrium effects of such large interventions, limit our ability to grasp the magnitude of such costs from traditional program evaluation analysis.[2]

We model the drug market as a vertical production chain composed of several stages (or nested production functions), starting with production in the source country and followed by trafficking to transit countries. Drugs are then transported and distributed in downstream markets, until reaching final consumers. Source country interventions take place in two fronts. First, the eradication front, where policies are aimed at reducing the cultivation of illicit crops (coca or opium poppy) required to produce hard drugs (cocaine or heroin, respectively). Second, in the interdiction front, where policies are aimed at blocking the routes required to transport the drugs from the source country to transit markets and interdicting drug shipments. Both policies affect downstream markets by curbing the net supply of drugs from the source country.

Our model incorporates several economic forces usually absent from formal analysis of illegal drug markets or policy discussions. First, we allow producers to combine land and complementary factors to produce cocaine, which creates the potential for substitution in response to eradication efforts. This force creates an endogenous increase in land productivity as a response to eradication campaigns, thus rendering these policies less effective at curbing drug production. Likewise, we allow traffickers to compensate for interdiction losses by demanding more cocaine. Second, our model allows other source countries to supply downstream markets when the price of Colombian cocaine increases. This renders supply reduction efforts in Colombia less effective in reducing downstream consumption and creates the possibility of displacement effects: Large shifts in cocaine production among different source or transit countries depending on the extent and effectiveness of different anti-drug strategies implemented in each of these countries. Finally, our model takes into account that, at each stage, Colombian cocaine only represents a fraction of producers' costs, while a large chunk of the price is determined by other inputs, including labor used in distribution networks, bribes for government officials, airplanes or drug submarines, construction of drug-tunnels, etc. Since supply-reduction policies in Colombia do not directly affect the price or supply of these inputs, increases in the price of Colombian cocaine do not translate into equal changes in consumer prices, rendering source country interventions less cost effective.

Essentially, our model allows drug markets to adjust to reductions in coca crops and routes in a source country through margins other than an increase in consumer prices. The adjustment may occur through investments aimed at raising land productivity, displacement of production to other countries, or a more intensive use of trafficking and distribution networks abroad. Our model disciplines these margins of adjustment by providing an explicit micro-foundation, and permits us to quantify them using reasonable parameter values.

Besides the above market structure, we follow the conflict literature (see Grossman and Mejía, 2008) and model supply-reduction policies in source countries as a conflict between the (Colombian) government and producers or traffickers. For instance, we model eradication as a conflict between the government and producers over the effective control of land suitable for coca cultivation. Likewise, we model interdiction as a conflict between the government and drug traffickers over the effective control of transportation routes. This modeling strategy incorporates another margin of adjustment; namely, investments by market participants to avoid eradication and interdiction efforts. As a result, the cost of eradication

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[1] See Mejía and Posada (2008) for a thorough description of the main stylized facts related to cocaine markets, both in producer and consumer countries. Despite Plan Colombia, market prices at the wholesale and retail levels remained relatively stable from 2000 to 2008—the period in which we base our study. Recent data indicates an increase in wholesale prices since 2008, when Colombia redirected its efforts toward interdiction.

[2] Some recent exceptions include the papers by Mejía et al. (2014) and Rozo (2014), described in the related literature section. However, both papers only estimate partial equilibrium effects, and their general equilibrium implications require filtering the results through a model like the one we propose in this paper.