ABSTRACT

Unintended Consequences:
How Agricultural Subsidies are Fueling the Drug Trade

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The United States has historically subsidized its farmers directly and indirectly through a variety of different methods. In recent years, there has been evidence that OECD agricultural subsidies are leading farmers in certain nations to begin growing illegal plants that contain alkaloids for the production of narcotics. In this paper, I use narcotic seizure data from the United States Drug Enforcement Agency as a proxy for narcotics supply levels. Regression results strongly suggest a link between U.S. subsides and drug production, but no link between U.S. subsidies and methamphetamine or marijuana production.

Unintended Consequences:
How Agricultural Subsidies are Fueling the Drug Trade

by

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LIST OF ABBREVIATIONS

CGE	Computable General Equilibrium
DEA	Drug Enforcement Administration
FAIR	Federal Agriculture Improvement and Reform Act
FSRI	Farm Security and Rural Investment Act
GDP	Gross Domestic Product
GTAP	Global Trade Analysis Project
OECD	Organization for Economic Cooperation and Development
PFC	Production Flexibility Contract
STRIDE	System to Retrieve Information from Drug Evidence
UNDCP	United Nations Drug Control Program
US	United States
USDA	United States Department of Agriculture
WTO	World Trade Organization

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CHAPTER ONE

Introduction

In this paper, the primary question that I want to answer is whether American agricultural subsidies are increasing the production of narcotics and how that is affecting the supply of drugs in America. Answering this question is important because it affects everyone in this world in very significant ways. Domestically, subsidies could be flooding our country with narcotics, filling up our prison systems, and destroying thousands of lives. Abroad, these increased narcotics levels could be undermining the tax bases of many countries and potentially helping to destabilize entire governments like that of Mexico.

Literature on the effects of American transfers to agriculture is largely centered on estimates of their effects on international pricing and economic growth. This research largely finds that the effects of subsidies are beneficial to net-agricultural importers and harmful to net-agricultural exporters[1]. Other studies have tied the effects of agricultural pricing to things as far apart as child labor and immigration, but this was not connected to subsidies. There has been no research that has focused solely on empirical market responses to OECD subsidies on the international level, though there has been speculation by activists and political-economists for some time[2].

This paper compliments existing literature and finds that U.S. subsidies are having serious effects on global markets, and it provides evidence that supposedly "decoupled"

[1] Tokarick, Stephen. 2008. Dispelling some misconceptions about agricultural trade liberalization. *The Journal of Economic Perspectives* 22, no. 1: pp. 199-216

[2] Chomsky, Noam. 2007. Starving the poor. *Khaleej Times*, May 15, 2007. http://www.chomsky.info/articles/20070515.htm.

payments (payments that are not directly tied to production) are continuing to distort trade. This paper also serves as a bridge between the literature on agricultural subsidy distortions and that of drug policy, bringing to light new evidence that these two areas are in fact interrelated.

John Simpson, a World Affairs editor for the British Broadcasting Corporation (BBC), has spent a lot of time in Latin America over the years observing the changing dynamics of the region. Several years ago, he decided to visit a farming village in Peru that produced coca. In this community he found a group of poor and terrified farmers who were barely making a living. Simpson interviewed the farmers and questioned them on why they were not making legitimate crops. Simpson then describes being led into a marketplace where European and American produce could be had at extremely low prices. It was obvious that legitimate crops could not be economically farmed and sold when food could be obtained at these artificially low levels, which were lower even than what could then be found in America. Simpson's conclusion was that subsidies had been driving down the cost of US and European agricultural products, which were then being "dumped" on developing markets at a "fraction of their real value." The only agricultural product that could be grown in this village and then sold at a profit was coca, thus proving that at least in this one village, Simpson argued, subsidies appeared to be stimulating the drug trade[3].

As of the year 2000, the Colombia that Simpson witnessed had become the top producer of coca with 74% of the global market[4]. Ibanez and Carlsson (2010) conducted

[3] Simpson, John. Rethinking the war on drugs. British Broadcasting Company.http://news.bbc.co.uk/2/hi/south_asia/4282306.stm.

[4] United Nations Drug Control Program. World drug report. 2006.

a survey of Colombian farmers that found the best method to end coca cultivation would be an increased level of compensation for alternative crops. The present study effectively expands the possibility of Simpson's findings to the rest of the Colombian economy.

There is also evidence that low crop prices could be affecting narcotics production in other parts of the world. Since the West's invasion of Afghanistan, the Asian nation has surged to become the world's largest supplier of opiates with 90% of world production (Byrd et. al 2008, pg. iii). The UNODC currently estimates that there were 193,000 hectares of opium poppy under cultivation in Afghanistan during 2006-07, and this resulted in over 70 million labor days for the impoverished economy (Byrd et. Al 2008, pg. 5) The more remote the region is, the greater likelihood that the population will produce poppies, due to a lack of access to markets and what are essentially reduced opportunities[5].

In 2007, the UN found that there were two districts in Afghanistan where rising prices for alternative goods led to farmers abandoning poppy cultivation (Byrd et. Al 2008, pg. 9). One of those alternative goods was wheat, one of the most heavily subsidized crops in the US, which begs the question whether the lack of alternatives in the Afghani case was also rooted in the artificially low price level created by Western subsidies. Just as in Simpson's Colombian village, in the face of poverty Afghan farmers will likely grow those crops that will give them a living wage.

When exploring the effects that OECD subsidies have had on growth, most economists utilize a computable general equilibrium model. The most popular such model is currently the Global Trade Analysis Project (GTAP) model, which is based in

[5] Byrd, W., D. Mansfield, D. Oldham, and C. and Ward. 2008. *Afghanistan, economic incentives and development, initiatives to reduce opium production*. World Bank.

the department of Agricultural Economics at Purdue University. The GTAP model is a very comprehensive computable general equilibrium model, and the current data set takes into consideration 113 interactional regions and 57 different economic sectors[6]. Using this model in slight variations, economists regularly publish papers on how liberalization would affect economic growth. In a 2007 paper, Anderson and Valenzuela found that real farm incomes are still being harmed by agricultural subsidies in many parts of the world. They discovered considerable regional variation, but found that trade liberalization would lead to sectoral value added in primary agriculture equal to an increase of 11.5% in Latin America and 7.9% in East Asia & Pacific . The effects on individual countries in this study can vary widely from these averages, with Brazil's potential value added being able to hit 42.9% in the event of total global liberalization[7].

These distortions are powerful and in terms of affecting the third world, Edmonds and Pavcnik conducted a study for the National Bureau of Economic Research on Vietnam after the country ended an agricultural export tax. They found that higher rice prices were associated with significant reductions in child labor. In their research, a 30% increase in rice prices gave Vietnamese families enough resources to pull about 1 million children from the fields, mainly girls, and send them to school[8].

These examples show that the increased production of agriculture caused by subsidies is most certainly spilling onto the world stage and altering prices in the global economy that are detrimental to many parts of the developing world. The resulting effect

[6] Center for Global Trade and Analysis (GTAP). https://www.gtap.agecon.purdue.edu.

[7] Anderson, Kym and Ernesto Valenzuela. 2007. Do global trade distortions still harm developing country farmers? *Review of World Economics* 143, no. 1: pp. 108-139

[8] Edmonds, Eric and Nina Pavcnik. 2002. Does globalization increase child labor? Evidence from Vietnam. no. 8760, National Bureau of Economic Research. http://www.nber.org/papers/w8760.

has been significant over time, given that the developing world has a comparative advantage in labor intensive production and farming by definition[9]. Subsidies end up highly distorting the third-world's natural markets, and impeding their development as people are forced to shift into unaffected markets. These unaffected markets that have the lowest opportunity costs could ultimately involve illegal activities as Simpson claimed.

For those farmers that choose not to engage in the drug trade, the only other option would be to migrate to the city in search of alternative employment. In Mexico, increased migration to the cities has been observed after NAFTA when the country became full exposed to the American agricultural sector, with large cities seeing a rise in the male population by about 4.8% and the female population by about 4.4%. This has coincided with a drop in real wages amongst the poor[10]. This evidence of rural migration to the cities serves as an excellent example of the structural changes that are brought about through the competition of farmers in a developing country with those in America. In Mexico there has been a lot of growth in industry and subassembly due to NAFTA (Hanson 2003), which is able to soak up some of this excess labor that is being created by farming, but most other countries are not so fortunate.

The problem with proving that agricultural subsidies are leading farmers into producing illegal crops largely has to do with the fact that drug lords do not publicize their production levels, and this in turn leads to a rather serious lack of data. The United

[9] Stiglitz, Joseph E. 2000. Two principles for the next round or, how to bring developing countries in from the cold. *World Economy* 23, no. 4: 437-454.

[10] Hanson, Gordon H. 2003. *What has happened to wages in Mexico since NAFTA?* National Bureau of Economic Research.

Nations Drug Control Program (UNDCP) estimated that in the 1990s that the trade in illicit drugs accounted for about 400 billion dollars or 8% of global trade[11], but this number is very rough and it has been argued that the true numbers are substantially lower[12].Difficulties in gathering data on production in developing countries are further compounded by a large amount of domestic farming in relation to some illegal narcotics like *Cannabis sativa* (Marijuana). This leaves two principle plants that are largely grown in the developing world, but which are not grown at any real level in the United States: the poppy and coca plant (Greenfield 2001). The poppy is used for the creation of heroin, and the coca plant is used in the creation of cocaine. Together, these plants produce some of the most addictive and dangerous drugs sourced from agriculture.

In this paper, I approximate for the supply of narcotics in the United States by using the seizure rates of controlled substances by the DEA. Using the seizure rate as a proxy for supply is already done by many organizations including Europol[13].By controlling for economic factors and the DEA's influence, the seizure rate should function as an effective proxy. In support of this initial model, I run a second set of regressions that use DEA drug bust prices as the dependent variable. In both sets of regressions I discover that there is a statistically significant impact by agricultural subsidies on narcotics availability and pricing.

In this paper I also include the regression results for methamphetamine and marijuana. Methamphetamine as a chemically sourced compound should not be affected

[11] United Nations Drug Control Program. World drug report. 1997.

[12] Reuter, P., & Greenfield, V. 2001. Measuring global drug markets. *World Economics* 2, no. 4: 159-173.

[13] EMCDDA. Issue No. 2: Cocaine. European Monitoring Centre for Drugs and Drug Addiction, Lisbon. 2010.

by changes in agricultural subsidies. Marijuana should also not be affected by subsidies due to the large level of domestic farming mentioned earlier in the paper. Consistent with these assumptions, these two drugs were not found to have any relationship with subsidies providing yet another layer of evidence for the hypothesis.

At the very least this paper serves as evidence that agricultural subsidies are disrupting agricultural production to the extent that it is increasing the supply of drugs in the United States. In keeping with Simpson's observations, this increase in supply could also be interpreted as reflecting the current state of production for cocaine within Colombia given that this South American nation supplies 90% of America's consumption[14]. Even though Colombia produces 1-2% of the World's poppies, it is the principal supplier on the United States via Mexico[15]

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[14] United Nations Drug Control Program. World drug report. 2009.

[15] United Nations Drug Control Program. World drug report. 2011.

CHAPTER TWO

The Political Economy of Agricultural Subsidies in the United States

The United States currently employs a variety of different methods for making pecuniary transfers to farmers. These payments fall into one of two categories: market price support payments or producer support payments. Market price support payments are border measures such as import tariffs and export subsidies that are directly targeting the price of a good. Producer support payments are transfers that are directly or indirectly tied to output levels. Payments that are directly tied to production are referred to as being "coupled" whereas payments that are not directly tied to production, and ideally should not influence production, are referred to as being decoupled payments[1]. The current approach to agricultural subsidies has been around in some form since the mid-80s, but this is by no means the point at which America first started using agricultural subsidies.

Since the early days of the United States tariffs have been used to shield farmers. But it wasn't until the beginning of the twentieth century that Americans became amenable to the idea of subsidizing farmers. With Roosevelt's New Deal came new policies after the Great Depression. Starting with the Agricultural Adjustment Act of 1933, the U.S. government began a policy of supporting farmers with direct transfers.

[1] Goodwin, Barry K. and Ashok K. Mishra. 2005. Another look at decoupling: Additional evidence on the production effects of direct payments. *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1200-1210.

These early subsidies came mainly in the form of supply controls, price and income supports[2].

Slight modifications came to the AAA in 1938, but many further revisions came during the Agricultural Act of 1949. Together, these past three periods of legislation comprise the core or "permanent" farm legislation. Farm bills since this period have been largely temporary, and the expiration of a current farm bill without a replacement would lead to a reversion to the older permanent farm legislation (Sumner 2007).

Farm policy remained largely unchanged until the Food Security Act of 1985, which altered the direction of U.S. agricultural policy. The U.S. government began to pursue policies that were more concerned with increasing the export competitiveness of its agricultural goods. Slight revisions to this policy occurred in 1990 and 1995, but remained fundamentally unchanged during this period (Sumner 2007). In 1996, the Federal Agriculture Improvement and Reform (FAIR) Act was enacted by the U.S. Government. The FAIR Act was publicized as being an attempt to begin phasing out farm subsidy programs, but was actually an expansion of the existing farm agenda of increasing the competitiveness of American farmers. Due to low agricultural prices, government transfers to farmers exploded from $4.6 billion dollars in 1996 to $32.2 billion dollars in 2000 (Sumner 2007).

In 2002, a new farm bill called the Farm Security and Rural Investment (FSRI) Act was implemented. This act was fully consistent with FAIR Act policies, and made temporary provisions adopted after the 1996 farm bill permanent. Permanent additions included countercyclical program payments, which are tied to specific crop prices, and

[2] Sumner, D. A. 2007. *Farm subsidy tradition and modern agricultural realities.* The 2007 Farm Bill and Beyond: 29–33.

transfers tied to historical farm yields (Sumner 2007). The most recent Farm Bill from 2008 has some modifications made in response to WTO related issues, but continues to remain fairly consistent with policy from 1996, and the CBO estimates that it would cost $284 Billion dollars over 5 years[3]

Since the FAIR Act of 1996, the U.S. has been transitioning in the direction of making a great proportion of government transfers into decoupled payments[4]. In spite of this attempt, decoupled payments continue to be tied to production as recent empirical work has shown, although the effects of different kinds of subsidies are far from uniform. Economic theories for explaining how subsidies continue to be effectively coupled include how decoupled payments still hinder the production of nontraditional crops, how payments are still affected by historical production, and how acquired wealth affects borrowing costs and risk aversion (Sumner 2007). The current system of subsidies continues to be tied to the volume of production, with larger farms receiving greater amounts of subsidies. This situation can still easily lead to farmers utilizing their additional funds to further expand production in what could become a vicious cycle. Empirical research has confirmed that government commodity payments are increasing the share of large farms, while causing the share of small farms to decrease[5]. Key, Lubowski, and Roberts (2005) discovered that farms receiving subsidies produced 38-59

[3] Johnson, R. 2008. "What is the farm bill.". *Congressional Research Service Report* RS22131.

[4] Goodwin, Barry K. and Ashok K. Mishra. 2005. Another look at decoupling: Additional evidence on the production effects of direct payments. *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1200-1210.

[5] Ahearn, Mary Clare, Jet Yee, and Penni Korb. 2005. *Effects of Differing Farm Policies on Farm Structure and Dynamics.* American Journal of Agricultural Economics 87, no. 5, Proceedings Issue: pp. 1182-1189

percentage points more than farms that did not receive subsidies[6]. The empirical results of this paper also conclude that current subsidies are coupled; otherwise the current distortions would not be occurring in either model.

Resistance in OECD countries to the ending of agricultural subsidies is widespread, and ranges from the power of agricultural lobbying groups to romanticized notions amongst the public[7]. In many ways, the American system of agricultural subsidies acts as a regressive tax, redistributing income from the entire population (including the poor) to wealthy farmers. Food costs actually rise due to the combination of tariffs and export subsidies that lead to an additional cost of about $104 annually per household[8].

Additionally, the Kansas City Federal Reserve Bank concluded that agricultural subsidies do not effectively promote economic growth, based on analysis of 783 counties that were dependent on farming and had growth rates below the national average[9]. Fears that many OECD countries will lose their agricultural sectors after liberalization are completely unfounded. Anderson and Valenzuela found a fairly large drop in value added, but it is by no means the end of the industry. Based on the experiences of New Zealand, which moved to cut its subsidies out decades ago, trade liberalization proved to

[6] Key, Nigel, Ruben N. Lubowski, and Michael J. Roberts. 2005. Farm-level production effects from participation in government commodity programs: Did the 1996 federal agricultural improvement and reform act make a difference? *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1211-1219.

[7] Swinnen, Johan F. M. 2010. The political economy of agricultural and food policies: Recent contributions, new insights, and areas for further research. *Applied Economic Perspectives and Policy* 32, no. 1: 33-58,

[8] Organization for Economic Co-operation and Development. 2006. *Agricultural policies in OECD countries: At a glance.* Paris: OECD Publishing.

[9] Drabenstott, M. 2005. Do farm payments promote rural economic growth? *Main Street Economist*. March.

be very advantageous. Instead of losing out from competition, New Zealand specialized in certain types of crops that they could produce more efficiently after liberalization[10].

It is also important to emphasize that the costs to Americans do not end with farm bill expenditures. With respect to the destructive power of narcotics, the Office of National Drug Control Policy estimates that illegal narcotics cost the US economy $180.9 billion dollars in 2002 alone. These costs had been growing at a rate of about 5.3% annually since 1992, and have likely continued to have grown at a similar rate since. The vast majority of these costs are composed of lost productivity (~71%), healthcare (~9%), and "other" effects (~20%)[11]. While these numbers have not been itemized and do include nonagricultural drugs like methamphetamine, cocaine and heroin most certainly compose a substantial portion of the total. Given how many drug users are polysubstance misusers[12], disentangling the amount might prove to be impossible or entirely unnecessary. Other important costs to consider include interventionist measures to stem narcotics production like Plan Colombia that have cost the US $7 billion dollars since the year 2000[13].

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[10] Blandford, David and Joe Dewbre. 1994. Structural adjustment and learning to live without subsidies in OECD countries. *American Journal of Agricultural Economics* 76, no. 5, Proceedings Issue: pp. 1047-1052

[11] Harwood, H. J., E. Bouchery, and Lewin Group. 2004. *The economic costs of drug abuse in the United States, 1992-2002*Executive Office of the President, Office of National Drug Control Policy.

[12] Goudie, A. J., H. R. Sumnall, M. Field, H. Clayton, and J. C. Cole. 2007. The effects of price and perceived quality on the behavioural economics of alcohol, amphetamine, cannabis, cocaine, and ecstasy purchases. *Drug and Alcohol Dependence* 89, : 107-115.

[13] Romo, Rafael. Plan colombia revisted: Mixed results from US anti-drug initiative. http://articles.cnn.com/2011-01-17/world/colombia.us.drugs_1_balloon-effect-drug-traffickers-peru-and-colombia?_s=PM:WORLD.

In conclusion, previous research has discovered that fairly large distortions are being created across the developing world from border measures. Significant distortions exist in East Asia and Latin America, regions that produce a substantial portion of the world's coca and poppy crop. Ending OECD subsidies would help to improve the livelihood of people in this area, and erode the current set of incentives that are leading people to growing plants for the narcotics industry.

CHAPTER THREE

Econometric Model and Data Sources

My strategy to detect whether United States agricultural subsidies are boosting narcotics production is centered on using seizure data from the United States Drug Enforcement Agency. I worked with two different models to see if their predictions each correspond with the underlying intuition that accompanies standard international trade theory. In the seizure model, I use narcotic seizure levels as my dependent variable and the gross amount of government transfers to farmers along with a set of controls as my independent variable. The seizure model is a time-series regression from 1986 to 2010, and uses Ordinary Least Squares (OLS) regression methods. OLS was utilized because tests for autocorrelation came back negative.

For the seizure regression model, I tested directly for the relationship between subsidies and narcotic seizure levels. I controlled primarily for two things: changes in US domestic demand and factors that might affect the DEA's ability to discover narcotics. In terms of controlling for domestic demand, I used the log of the aggregate amount of United States' GDP and unemployment rate. To control for the DEA, I used the agency's man-power that is actively searching for drugs. It is important to note that there exists some degree of endogeneity with respect to the number of agents that are actively searching for drugs in a given year. Due to this problem, the variable representing the DEA's agents actively searching for narcotics has been instrumented using two-stage least-squares with the number of agents from the previous year. It is also important to

note that Europol has suggested that narcotics seizures continue to function as a control regardless of law enforcement activity[1].

While DEA budgetary data was available for use in these models, its inclusion was found to cause collinearity when running the regressions and later dropped. Experiments were also done using interaction terms between the budget and man-power variables, and this was found to result in a cost of R-Squared. For the most accurate results, using the number of Special Agents works consistently as the best control.

The subsidy variable was lagged twice due to the delayed effect that occurs from these subsidies; farmers spend a year growing legitimate crops and attempting to sell them before being able to replant, and the coca plant in particular takes one year to mature before it can be harvested[2]. The seizure model is as follows:

$$\ln(NARCSEIZ._t) = \beta_0 + \beta_1 \cdot \ln(SUBSIDIES_{t-2}) + \beta 2 \cdot \ln(SPEC\_AGENTS_t) + \beta_3 \cdot \ln(RGDP_t) + \varepsilon_t$$

Where $NARCSEIZ_t$ is the amount of narcotic seizures in kilograms during period t, $SUBSIDIES_t$ is the total dollar amount of transfers to farmers in period t, $SPEC\_AGENTS_t$ is the total number of DEA special agents that has been instrumented with the lag from the previous year, $RGDP_t$ is the chain weighted GDP for the United States, and $\varepsilon_{i,t}$ is the idiosyncratic error term.

In addition to the seizure model, I created a pricing model that is aimed at displaying the change in narcotics prices created by subsidies. The pricing model utilizes panel data, and runs from 1990-2006. The Drug Enforcement Administration records the

[1] EMCDDA. Issue No. 2: Cocaine. European Monitoring Centre for Drugs and Drug Addiction, Lisbon. 2010.

[2] Coca. Encyclopaedia Britannica Online. http://www.britannica.com/EBchicked/topic/123424/coca.

sale price for narcotics purchased during busts, and this serves as the dependent variable in the pricing regression. These prices are distributed by state and year. The regression has no controls, but uses fixed effects as a control for omitted variable biases. The second model is as follows:

$$\ln(NARCPRICES._{i,t}) = \beta_0 + \beta_1 \cdot \ln(SUBSIDIES_{i,t-2}) + u_i + v_t + \varepsilon_{i,t}$$

Where $NARCPRICES._{i,t}$ is the price of narcotics during period t, $SUBSIDIES_t$ is the total dollar amount of transfers to farmers in period t, u_i is the state fixed effect, v_t is the time period fixed.

CHAPTER FOUR

Results and Policy Implications

Most Data was sourced from the American Drug Enforcement Agency's website. The DEA variables include Cocaine Seizures, Heroin Seizures, Marijuana Seizures, Methamphetamine Seizures, Cocaine Prices, Heroin Prices, DEA Budget, and DEA Special Agents. The budget, as mentioned previously, was dropped due to collinearity. These DEA variables, except for the narcotic pricing variables, were obtained from the DEA website, and originated from a large dataset that can be requested via the Freedom of Information Act, known as "STRIDE," which stands for System to Retrieve Information from Drug Evidence[1]. Due to dramatic changes that occurred in agricultural policy during the mid-1980s, this paper only takes into consideration data from 1986 to 2010 that was sourced from the DEA's website. Also, the Cocaine and Heroin Pricing data goes from 1990 to 2006 and was leveraged from a separate project.

Data on United States transfers to farmers (subsidies) was sourced from the United States Department of Agriculture's Economic Research division[2]. This variable is a combined total of all direct transfers to US farmers according to the USDA. This information can be downloaded in an excel document from the USDA. Information on the United States' chain weighted GDP can be downloaded from the Federal Reserve Bank of St. Louis' website[3].

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[1] Stride data. Drug Enforcement Administration. http://www.justice.gov/dea/stride_data.html.

[2] United States Department of Agriculture, Economic Research Service. http://www.ers.usda.gov.

[3] FRED economic data. Federal Reserve Bank of St. Louis. http://research.stlouisfed.org/fred2/ .

Seizure Model Results

All data with respect to the seizure model is contained in Table 1 below. The first regression in the seizure model established that there is a connection between agricultural subsidies and cocaine seizures at beyond the .001 level. Based on this model a 1% increase in subsidies will increase the level of cocaine seizures by 0.68%. Additionally, the model predicts that an increase in special agents by 1% will lead to an increase in cocaine seizures by 3.82%. The relationship in the first coefficient is due to the fact that subsidies are increasing the production of cocaine, and this coefficient reflects the level of the increase. The second coefficient reflects that additional agents will be able to track down additional drugs, boosting the seizure rate. The third coefficient displays the relationship between purchasing power and the demand for the drug. In this regression, the impact of U.S. GDP is also significant at the 0.024 level, but negatively correlated with seizures. This seems to imply that cocaine might be regarded as an inferior good based on these results. Saffer and Chaloupka (1999) found that income had essentially insignificant effects with respect to cocaine consumption[4]. Goudie et. al (2007) found that high quality cocaine functioned as a luxury good, but all other forms were inferior goods[5].

The second regression in the seizure model established that there is a connection between agricultural subsidies and heroin seizures at beyond the .001 level. Based on this model a 1% increase in subsidies will increase the level of heroin seizures by 0.59%.

[4] Saffer, H. & Chaloupka, F. 1999. The demand for illicit drugs. *Economic Inquiry* 37, no. 3: 401-411.

[5] Goudie, A. J., H. R. Sumnall, M. Field, H. Clayton, and J. C. Cole. 2007. The effects of price and perceived quality on the behavioural economics of alcohol, amphetamine, cannabis, cocaine, and ecstasy purchases. *Drug and Alcohol Dependence* 89, : 107-115.

Additionally, the model predicts that an increase in special agents by 1% will lead to an increase in heroin seizures by 2.87%. The relationship in the first coefficient is due to the fact that subsidies are increasing the production of heroin, and this coefficient reflects the level of the increase. The second coefficient reflects that additional agents will be able to track down additional drugs, boosting the seizure rate. The third coefficient displays that heroin is an inferior good, and that a 1% increase in U.S. GDP will lead to a drop in heroin seizures by 2.91%. In Saffer and Chaloupka (1999) the authors found evidence that heroin was in fact an inferior good.

The third regression in the seizure model established that there is not a connection between agricultural subsidies and marijuana seizures with a p-value of 0.122. This reflects how marijuana is grown domestically in substantial quantities and how there should not be a relationship for this reason between production and subsidies. Interestingly the regression predicts that an increase in special agents by 1% will lead to a decrease in marijuana seizures by 8.39%. This relationship seems counterintuitive at first, but most assuredly reflects the diversion of resources towards tracking down harder drugs. Law enforcement organizations have the capacity to prioritize projects in any way that they deem fit[6]. In 1984, a law was passed that allowed local police organizations to confiscate resources during drug busts if the DEA was involved. This created an incentive for local organizations to focus their efforts on drug busts in spite of the high opportunity costs involved (Benson et. Al 1995)[7]. Inexpensive drugs like marijuana are

[6] Benson, Bruce L., David W. Rasmussen, and Iljoong Kim. 1998. Deterrence and public policy: Trade-offs in the allocation of police resources. *International Review of Law and Economics* 18, no. 1: 77-100

[7] Benson, Bruce L., David W. Rasmussen, and David L. Sollars. 1995. Police bureaucracies, their incentives, and the war on drugs. *Public Choice* 83, no. 1-2: 21-45

unlikely to provide as much revenue as more profitable harder drugs. Additionally, with respect to public opinion, a law enforcement organization will likely receive more respect for the bust of high dollar hard drugs over drugs like marijuana. The third coefficient, the impact of U.S. GDP, is significant with a p-value of 0.001 and positively correlated with marijuana seizures. Saffer and Chaloupka (1999) who found that income had essentially insignificant effects with respect to marijuana consumption. In contrast, this paper seems to imply that marijuana is in fact a normal good.

The fourth regression in the seizure model established that there is no relationship between methamphetamine and any of the independent variables. The lack of a relationship between the number of special agents and methamphetamine seizures probably reflects how the drug is a latecomer on the narcotics scene. The lack of a relationship with subsidies is in keeping with the paper's theory.

Table 1. Time-Series Regressions

Variables	Cocaine	Heroin	Marijuana	Meth
Subsidies	0.68***	0.59***	-0.35	-0.01
	(0.16)	(0.12)	(0.23)	(0.21)
DEA Agents	3.83**	2.87**	-8.39***	1.03
	(1.52)	(1.17)	(2.16)	(1.98)
US GDP	-3.64**	-2.91***	9.73***	2.01
	(1.61)	(1.25)	(2.3)	(2.11)
Adj R-Squared	0.5129	0.5363	0.38255	0.7651

Pricing Model Results

All data with respect to the pricing model is contained in Table 2 below. The first regression in the pricing model established that there is a connection between agricultural subsidies and cocaine prices with a p-value less than 0.001. Based on this model a 1% increase in subsidies will decrease cocaine prices by 0.24%. The second regression in the

pricing model established that there is also a connection between agricultural subsidies and heroin prices with a p-value less than 0.001. Based on this model a 1% increase in subsidies will decrease heroin prices by 0.74%. The third regression proved to be statistically insignificant with a p-value of 0.287. The insignificance of the methamphetamine regression is consistent with that of the seizure model, which is expected given that methamphetamine production is not dependent on agriculture.

Table 2. Panel Data Regressions

Prices	Cocaine	Heroin	Meth
Subsidies	-0.24***	-0.74***	-0.19
SE	(0.04)	(0.17)	(0.204)
R-Squared	0.6356	0.2407	0.2482

CHAPTER FIVE

Conclusion and Policy Implications

In conclusion, the results of this paper strongly suggest the existence of a link between US agricultural subsidies and narcotics production in Colombia. This connection is strongest for the coca crop, but the evidence demonstrates that it is also applicable to the poppy plant. In addition, intuitive reasoning suggests that this link between US agricultural subsidies and narcotics production is not limited to Colombia. In fact, all OECD countries subsidize their agricultural sector, and these distortions could be global in nature. Developing countries do not have the capacity to re-train their populations to work in other sectors for monetary reasons. From the standpoint of a farmer, growing narcotics has the lowest opportunity cost relative to other options. Ultimately this is why we are finding an increase in the availability of narcotics in the U.S. market.

Based on the observations of BBC employee John Simpson, these farmers produce illegal plants out of necessity. The econometric data in this paper indicates that elimination of all direct transfers to farmers would have the capacity to lower the supply of cocaine and possibly heroin in the United States by up to 60%. This number should be approached with a degree of caution. The current form of decentralized narcotics production in Colombia could change and farmers could find themselves compelled by force to continue growing coca and poppies by regional drug-lords. In the event that the United States did end its subsidies to farmers, the Colombian government must remain

vigilant in its fight against drug production and help local farmers make the transition to legal crops.

When congress begins negotiating the next Farm Bill, they should take into consideration the possibility that this distortion is occurring, especially since it could be creating substantial economic costs for the country. Elimination of the farm program would also help to offset the rapid fiscal expansion in America. Additionally, by stabilizing farm incomes in the nations south of the U.S., it would help stabilize the level of immigration to the country.

Policymakers involved in creating additional free trade agreements with developing countries that are significant producers of narcotics, namely Colombia, should be sensitive to the needs of foreign farmers. Provisions of protection for foreign farmers should be included in treaties, or a common agricultural policy consistent with that of the United States' should be extended over them. The potential problem with subsidizing foreign farmers is that it would create a vacuum, and the highly mobile production of drugs could simply transfer to other areas. An even more effective method might be to develop an alternative system for insuring farmers that is truly decoupled, or abandoning the program altogether.

APPENDICES

APPENDIX A

Time-Series Graphs

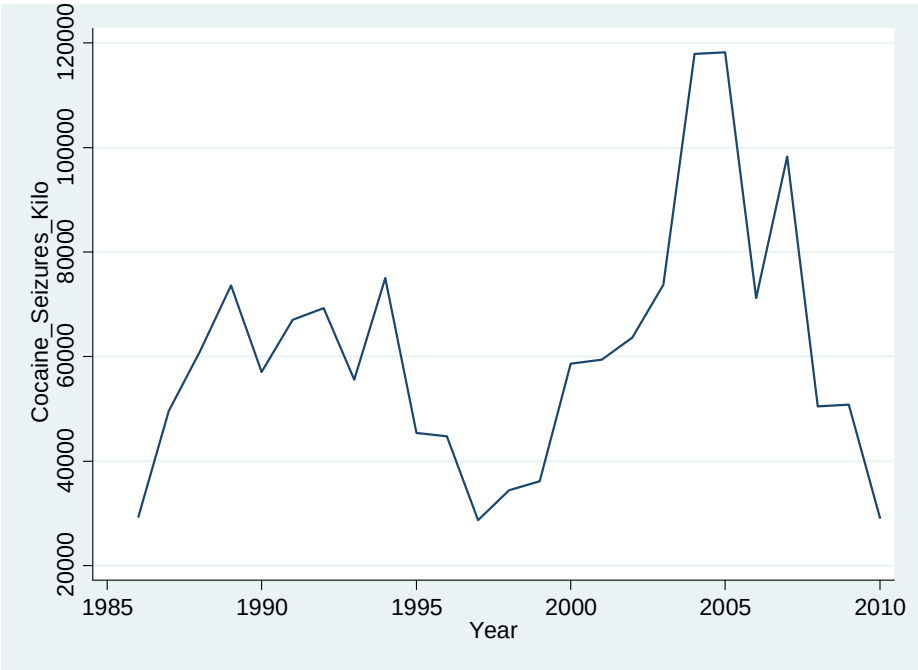

Figure A.1. Cocaine Seizure Graph

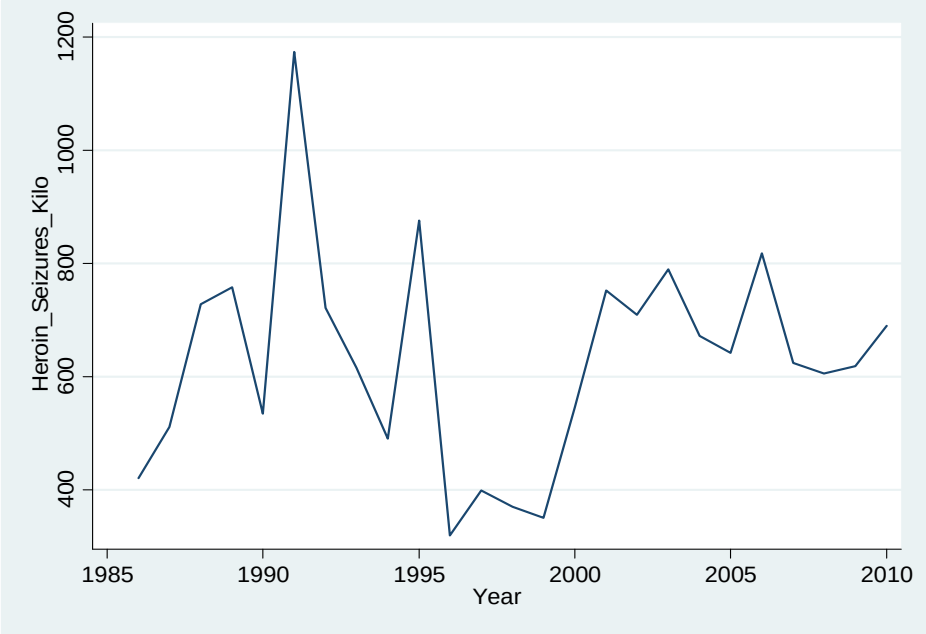

Figure A.2. Heroin Seizure Graph

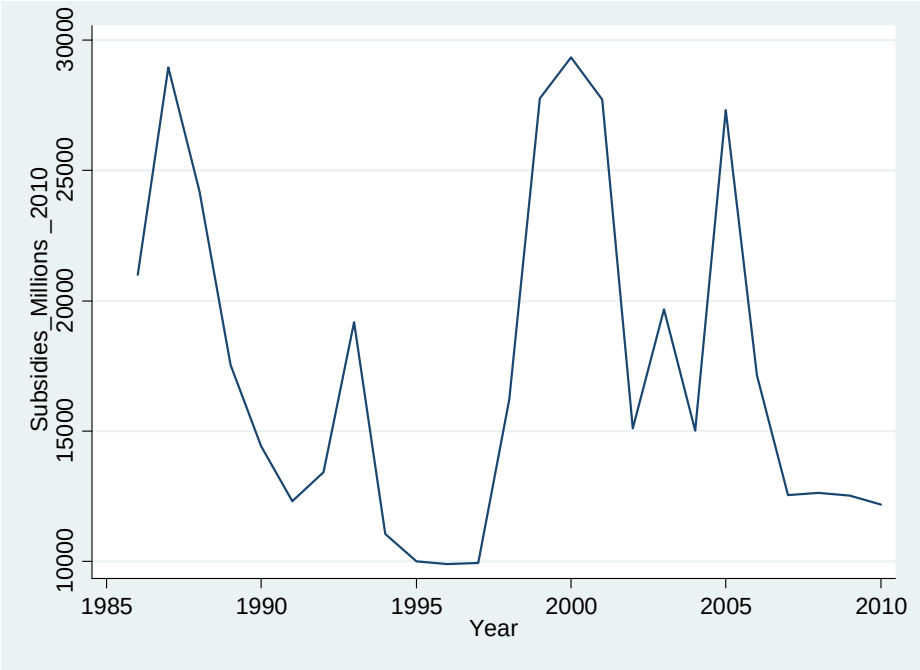

Figure A.3. Agricultural Subsidies Graph

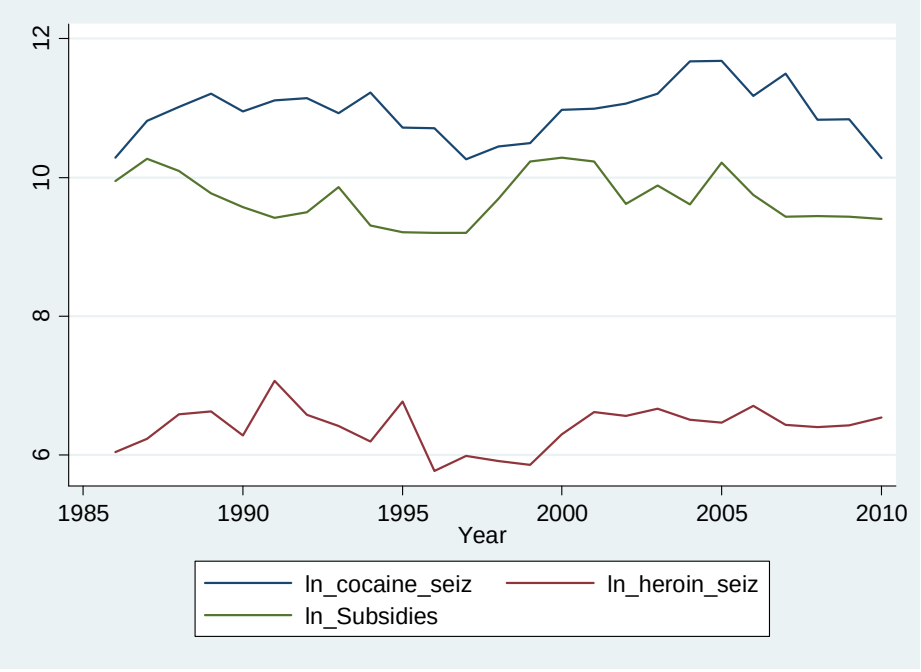

Figure A.4. Trend Comparison Graph

APPENDIX B

Econometric Data for Seizure Model

Cocaine:

```
. ivregress 2sls ln_cocaine_seiz l2.ln_Subsidies  ln_real_gdp_10 (ln_dea_special_
> agents = l. ln_dea_special_agents)

Instrumental variables (2SLS) regression              Number of obs =      25
                                                      Wald chi2(3)  =   23.44
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.5129
                                                      Root MSE      =  .26757

------------------------------------------------------------------------------
ln_cocaine~z |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ln_dea_spe~s |   3.827298   1.515511     2.53   0.012     .8569507    6.797645
             |
ln_Subsidies |
         L2. |   .6760327   .1589177     4.25   0.000     .3645598    .9875055
             |
ln_real_g~10 |  -3.638958   1.611028    -2.26   0.024    -6.796516   -.4814002
       _cons |   6.544041   3.398512     1.93   0.054    -.1169201      13.205
------------------------------------------------------------------------------
Instrumented:  ln_dea_special_agents
Instruments:   L2.ln_Subsidies ln_real_gdp_10 L.ln_dea_special_agents
```

Heroin:

```
. ivregress 2sls ln_heroin_seiz l2.ln_Subsidies  ln_real_gdp_10 (ln_dea_special_a
> gents = l. ln_dea_special_agents)

Instrumental variables (2SLS) regression              Number of obs =      25
                                                      Wald chi2(3)  =   25.48
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.5363
                                                      Root MSE      =  .20688

------------------------------------------------------------------------------
ln_heroin_~z |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ln_dea_spe~s |   2.871702   1.171754     2.45   0.014     .5751054    5.168298
             |
ln_Subsidies |
         L2. |   .5876996   .1228711     4.78   0.000     .3468768    .8285225
             |
ln_real_g~10 |  -2.913638   1.245606    -2.34   0.019    -5.354981   -.4722956
       _cons |   4.030429   2.627642     1.53   0.125    -1.119655    9.180514
------------------------------------------------------------------------------
Instrumented:  ln_dea_special_agents
Instruments:   L2.ln_Subsidies ln_real_gdp_10 L.ln_dea_special_agents
```

Marijuana:

```
. ivregress 2sls ln_marijuana_seiz l2.ln_Subsidies  ln_real_gdp_10 (ln_dea_specia
> l_agents = l. ln_dea_special_agents)

Instrumental variables (2SLS) regression              Number of obs =      25
                                                      Wald chi2(3)  =   21.61
                                                      Prob > chi2   =  0.0001
                                                      R-squared     =  0.4357
                                                      Root MSE      =  .38255

------------------------------------------------------------------------------
ln_marijua~z |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ln_dea_spe~s |  -8.391875    2.16675    -3.87   0.000    -12.63863   -4.145123
             |
ln_Subsidies |
         L2. |   -.351776   .2272071    -1.55   0.122    -.7970936    .0935417
             |
ln_real_g~10 |   9.729076   2.303313     4.22   0.000     5.214666    14.24349
       _cons |  -5.133005   4.858906    -1.06   0.291    -14.65629    4.390276
------------------------------------------------------------------------------
Instrumented:  ln_dea_special_agents
Instruments:   L2.ln_Subsidies ln_real_gdp_10 L.ln_dea_special_agents
```

Methamphetamine:

```
. ivregress 2sls ln_meth_seiz l2.ln_Subsidies  ln_real_gdp_10 (ln_dea_special_age
> nts = l. ln_dea_special_agents)

Instrumental variables (2SLS) regression              Number of obs =      25
                                                      Wald chi2(3)  =   83.12
                                                      Prob > chi2   =  0.0000
                                                      R-squared     =  0.7651
                                                      Root MSE      =  .35021

------------------------------------------------------------------------------
ln_meth_seiz |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ln_dea_spe~s |   1.026934   1.983581     0.52   0.605    -2.860812     4.91468
             |
ln_Subsidies |
         L2. |  -.0124753   .2079998    -0.06   0.952    -.4201473    .3951968
             |
ln_real_g~10 |   2.014937   2.108599     0.96   0.339    -2.117841    6.147714
       _cons |  -20.40326   4.448151    -4.59   0.000    -29.12148   -11.68505
------------------------------------------------------------------------------
Instrumented:  ln_dea_special_agents
Instruments:   L2.ln_Subsidies ln_real_gdp_10 L.ln_dea_special_agents
```

APPENDIX C

Econometric Data for Pricing Model

Cocaine:

```
. xtreg   ln_cocaine_price  l2.ln_subsidies i.year, fe
note: 2002.year omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       593
Group variable: areacode                        Number of groups   =        51

R-sq:  within  = 0.6356                         Obs per group: min =        11
       between = 0.0036                                        avg =      11.6
       overall = 0.1817                                        max =        13

                                                F(12,530)          =     77.03
corr(u_i, Xb)  = -0.0007                        Prob > F           =    0.0000
```

ln_cocaine~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_subsidies						
L2.	-.2408527	.0400218	-6.02	0.000	-.3194736	-.1622318
year						
1993	-.0810524	.0360201	-2.25	0.025	-.1518121	-.0102927
1994	.0492881	.0309387	1.59	0.112	-.0114894	.1100655
1995	.0059414	.0195101	0.30	0.761	-.0323852	.044268
1996	.081575	.0379711	2.15	0.032	.0069826	.1561674
1997	-.0818634	.0416878	-1.96	0.050	-.1637571	.0000303
1999	-.198154	.0419565	-4.72	0.000	-.2805755	-.1157324
2001	.011813	.0146874	0.80	0.422	-.0170395	.0406656
2002	(omitted)					
2003	.0551547	.0146774	3.76	0.000	.0263216	.0839878
2004	.0897852	.0268707	3.34	0.001	.0369991	.1425712
2005	.039895	.0188704	2.11	0.035	.0028251	.0769649
2006	.060212	.0270585	2.23	0.026	.007057	.1133671
_cons	6.692921	.1270284	52.69	0.000	6.44338	6.942462
sigma_u	.19225988					
sigma_e	.07634442					
rho	.86379639	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(50, 530) =    72.43                 Prob > F = 0.0000
```

Heroin:

```
. xtreg   ln_heroin_price  l2.ln_subsidies i.year, fe
note: 2002.year omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       553
Group variable: areacode                        Number of groups   =        50

R-sq:  within  = 0.2407                         Obs per group: min =         1
       between = 0.0200                                        avg =      11.1
       overall = 0.0621                                        max =        13

                                                F(12,491)          =     12.97
corr(u_i, Xb)  = -0.0494                        Prob > F           =    0.0000
```

ln_heroin_~e	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
ln_subsidies						
L2.	-.7448453	.1701837	-4.38	0.000	-1.079223	-.4104671
year						
1993	-.2769815	.152021	-1.82	0.069	-.5756734	.0217104
1994	-.2412492	.1322216	-1.82	0.069	-.5010391	.0185406
1995	.0439444	.0825341	0.53	0.595	-.1182192	.2061079
1996	-.4376392	.1618684	-2.70	0.007	-.7556795	-.119599
1997	-.5392738	.1777396	-3.03	0.003	-.8884978	-.1900498
1999	-.7877568	.1788122	-4.41	0.000	-1.139088	-.4364253
2001	-.0099082	.0604047	-0.16	0.870	-.1285917	.1087753
2002	(omitted)					
2003	-.0624836	.0603676	-1.04	0.301	-.1810942	.056127
2004	-.5430447	.1141844	-4.76	0.000	-.7673951	-.3186944
2005	-.2846156	.0800036	-3.56	0.000	-.4418073	-.1274239
2006	-.2226497	.11669	-1.91	0.057	-.4519229	.0066236
_cons	8.728546	.5411224	16.13	0.000	7.665345	9.791748
sigma_u	.48561933					
sigma_e	.30751973					
rho	.71377132	(fraction of variance due to u_i)				

```
F test that all u_i=0:     F(49, 491) =    26.09                 Prob > F = 0.0000
```

Methamphetamine:

```
. xtreg   ln_meth_price  l2.ln_subsidies i.year, fe
note: 2002.year omitted because of collinearity

Fixed-effects (within) regression               Number of obs      =       560
Group variable: areacode                        Number of groups   =        51

R-sq:  within  = 0.2482                         Obs per group: min =         5
       between = 0.0036                                        avg =      11.0
       overall = 0.1427                                        max =        13

                                                F(12,497)          =     13.67
corr(u_i, Xb)  = 0.0008                         Prob > F           =    0.0000

------------------------------------------------------------------------------
ln_meth_pr~e |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
-------------+----------------------------------------------------------------
ln_subsidies |
         L2. |  -.1853713   .2045208    -0.91   0.365    -.5872032    .2164606
             |
        year |
       1993  |  -.2396148   .1849638    -1.30   0.196    -.6030222    .1237926
       1994  |  -.2371198    .159601    -1.49   0.138    -.5506956    .0764559
       1995  |  -.0191666   .1005833    -0.19   0.849    -.2167874    .1784542
       1996  |   .0284802   .1954268     0.15   0.884    -.3554844    .4124447
       1997  |  -.3411184   .2142146    -1.59   0.112    -.7619963    .0797595
       1999  |   .1343758   .2151334     0.62   0.533    -.2883072    .5570588
       2001  |  -.0659187   .0713167    -0.92   0.356    -.2060381    .0742007
       2002  |  (omitted)
       2003  |  -.0143276   .0712753    -0.20   0.841    -.1543657    .1257106
       2004  |  -.2706076   .1371762    -1.97   0.049    -.5401242   -.0010909
       2005  |  -.5685619    .095354    -5.96   0.000    -.7559085   -.3812153
       2006  |   -.239651   .1384861    -1.73   0.084    -.5117414    .0324394
             |
       _cons |   7.065989   .6508629    10.86   0.000     5.787207    8.344771
-------------+----------------------------------------------------------------
     sigma_u |   .3501129
     sigma_e |   .37024418
         rho |   .47207555   (fraction of variance due to u_i)
------------------------------------------------------------------------------
F test that all u_i=0:     F(50, 497) =     9.85                 Prob > F = 0.0000

.
```

APPENDIX D

Economic Theory

Understanding why subsidies are having an effect on the production of narcotics requires a basic knowledge of international economics and trade theory. More specifically, an understanding of the Ricardian model and comparative advantage is key to perceiving this link. The insight behind this form of trade theory is that different countries have certain goods that they have a high degree of production efficiency relative to other products that they produce. The most important factor here is that each country needs to have (and does have) comparative advantage with certain goods. It does not matter if one country is better at making every good than another country, the two countries will still specialize towards those goods which they have comparative advantage in. The reasoning behind this is that what matters is not the relative efficiency between countries, but within them. Countries have a finite amount of resources that motivate this specialization, as it will maximize the total level of production between the two countries when they trade. The most obvious example of this kind of constraint is the makeup of labor.

When one country offers a subsidy to an industry it distorts the allocation of resources between the nations, especially when one country subsidizes an inefficient industry that a trading partner has comparative advantage in. This will lead to overproduction of the subsidized good and distortion of the market as the efficient producer moves away from it. The obvious end result from the model is a retreat of the outer-boundaries of the Trade Possibility Frontier.

Latin America has a high degree of comparative advantage in agriculture due to its large amount of low skilled labor and tradition of farming. The United States arguably has comparative advantage in things like services, software, and other high skilled industries. For reasons that are largely cultural, America has a much romanticized view of farming, and feels that it must protect the industry with an assortment of subsidies and government transfers.

The end result of this is that the United States produces a substantial amount of agricultural products that it wouldn't necessarily produce otherwise. The glut of this agricultural produce is then sent overseas and destabilizes international trade in the area of agriculture, in accordance with the theory mentioned earlier. Many Latin American farmers subsequently encounter suppression of international food prices, and must turn to alternative opportunities to survive. Retraining services are normally supplied in OECD countries, but developing countries cannot afford this luxury to smooth out the labor transition created by international trade. Given their specialty in the field of agriculture, it is easier for developing countries to substitute different crops as this option offers the lowest opportunity costs. Facing starvation and weak institutions, the relative penalties are minimal with respect to going to prison, thus leading some farmers to produce illegal plants instead of legitimate crops.

APPENDIX E

Time Series Data

Table E.1. Time Series Data

Year	Cocaine Seizures (Kg)	Heroin Seizures (Kg)	Marijuana Seizures (Kg)	Meth Seizures (Kg)	Subsidies (Millions)
1986	29389	421	491831	234.5	21,000.5
1987	49666	512	629839	198	28,961.5
1988	60951	728	347306	694	24,208.7
1989	73587	758	286371	896	17,539.0
1990	57031	535	127792	272	14,420.9
1991	67016	1174	98592	289	12,305.9
1992	69324	722	201483	352	13,417.3
1993	55529	616	143055	560	19,189.3
1994	75051	491	157181	768	11,049.1
1995	45326	876	219830	876	9,999.6
1996	44735	320	192059	751	9,894.1
1997	28670	399	215348	1147	9,928.2
1998	34447	370	262180	1203	16,215.8
1999	36165	351	338247	1489	27,769.7
2000	58674	546	331499	1771	29,338.7
2001	59417	753	272131	1634	27,713.1
2002	63613	710	238646	1352	15,095.2
2003	73725	790	254242	1680	19,666.9
2004	117865	672	266091	1656	15,011.3
2005	118258	642	283382	2161	27,323.4
2006	71211	818	328277	1766	17,124.7
2007	98299	625	360728	1113	12,541.6
2008	50474	606	662143	1519	12,625.2
2009	50825	619	671557	2010	12,529.1
2010	29179	690	722476	2067	12,176.40

BIBLIOGRAPHY

Coca. Encyclopaedia Britannica Online. http://www.britannica.com/EBchicked/topic/123424/coca (accessed 12/3, 2010).

Center for Global Trade and Analysis (GTAP). https://www.gtap.agecon.purdue.edu.

Ahearn, Mary Clare, Jet Yee, and Penni Korb. 2005. Effects of differing farm policies on farm structure and dynamics. *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1182-1189, http://www.jstor.org/stable/3697693.

Anania, Giovanni, Mary Bohman, and Colin A. Carter. 1992. United states export subsidies in wheat: Strategic trade policy or expensive beggar-thy-neighbor tactic? *American Journal of Agricultural Economics* 74, no. 3: pp. 534-545, http://www.jstor.org/stable/1242566.

Anderson, Kym and Ernesto Valenzuela. 2007. Do global trade distortions still harm developing country farmers? *Review of World Economics / Weltwirtschaftliches Archiv* 143, no. 1: pp. 108-139, http://www.jstor.org/stable/40441129.

Arkes, Jeremy, Rosalie Liccardo Pacula, Susan M. Paddock, Jonathan P. Caulkins, and Peter Reuter. 2008. *Why the DEA STRIDE data are still useful for understanding drug markets.* National Bureau of Economic Research. http://www.nber.org/papers/w14224.

Benson, Bruce L., David W. Rasmussen, and Iljoong Kim. 1998. Deterrence and public policy: Trade-offs in the allocation of police resources. *International Review of Law and Economics* 18, no. 1: 77-100, http://www.elsevier.com/wps/find/journaldescription.cws_home/525007/description#description.

Benson, Bruce L., David W. Rasmussen, and David L. Sollars. 1995. Police bureaucracies, their incentives, and the war on drugs. *Public Choice* 83, no. 1-2: 21-45, http://www.springerlink.com/link.asp?id=100332.

Blandford, David and Joe Dewbre. 1994. Structural adjustment and learning to live without subsidies in OECD countries. *American Journal of Agricultural Economics* 76, no. 5, Proceedings Issue: pp. 1047-1052, http://www.jstor.org/stable/1243389.

Byrd, W., D. Mansfield, D. Oldham, and C. and Ward. 2008. *Afghanistan, economic incentives and development, initiatives to reduce opium production*. World Bank.

Chau, Nancy H. and Harry de Gorter. 2005. Disentangling the consequences of direct payment schemes in agriculture on fixed costs, exit decisions, and output. *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1174-1181, http://www.jstor.org/stable/3697692.

Chomsky, Noam. 2007. Starving the poor. *Khaleej Times,* May 15, 2007. http://www.chomsky.info/articles/20070515.htm (accessed 09/12, 2010).

Drabenstott, M. 2005. Do farm payments promote rural economic growth? *Main Street Economist* no. March.

Drug Enforcement Administration. FY2012 performance budget congressional submission. http://www.justice.gov/jmd/2012justification/pdf/fy12-dea-justification.pdf (accessed 10/14, 2011).

Edmonds, Eric and Nina Pavcnik. 2002. Does globalization increase child labor? Evidence from Vietnam. no. 8760, National Bureau of Economic Research. http://www.nber.org/papers/w8760.

EMCDDA. Issue No. 2: Cocaine. European Monitoring Centre for Drugs and Drug Addiction, Lisbon. 2010.

FY 2012 performance budget congressional submission. Drug Enforcement Administration. http://www.justice.gov/jmd/2012justification/pdf/fy12-dea-justification.pdf (accessed 10/14, 2011).

FRED economic data. Federal Reserve Bank of St. Louis. http://research.stlouisfed.org/fred2/ (accessed 09/16, 2011).

Goodwin, Barry K. and Ashok K. Mishra. 2005. Another look at decoupling: Additional evidence on the production effects of direct payments. *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1200-1210, http://www.jstor.org/stable/3697696.

Goodwin, Barry K., Ashok K. Mishra, and François Ortalo-Magné. 2011. *The buck stops where? the distribution of agricultural subsidies.* National Bureau of Economic Research. http://www.nber.org/papers/w16693.

Goudie, A. J., H. R. Sumnall, M. Field, H. Clayton, and J. C. Cole. 2007. The effects of price and perceived quality on the behavioural economics of alcohol, amphetamine, cannabis, cocaine, and ecstasy purchases. *Drug and Alcohol Dependence* 89, : 107-115.

Hanson, Gordon H. 2003. *What has happened to wages in mexico since NAFTA?* National Bureau of Economic Research. http://www.nber.org/papers/w9563.

Harwood, H. J., E. Bouchery, and Lewin Group. 2004. *The economic costs of drug abuse in the united states, 1992-2002*Executive Office of the President, Office of National Drug Control Policy.

Ibanez, Marcela and Fredrik Carlsson. 2010. A survey-based choice experiment on coca cultivation. *Journal of Development Economics* 93, no. 2: 249-263, http://www.elsevier.com/wps/find/journaldescription.cws_home/505546/description#description.

Johnson, R. 2008. "What is the farm bill." *Congressional Research Service Report* RS22131, .

Key, Nigel, Ruben N. Lubowski, and Michael J. Roberts. 2005. Farm-level production effects from participation in government commodity programs: Did the 1996 federal agricultural improvement and reform act make a difference? *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1211-1219, http://www.jstor.org/stable/3697697.

Organisation for Economic Co-operation and Development. 2006. *Agricultural policies in OECD countries: At a glance*. Paris: OECD Publishing.

Reuter, P., & Greenfield, V. 2001. Measuring global drug markets. *World Economics* 2, no. 4: 159-173.

Romo, Rafael. Plan colombia revisted: Mixed results from US anti-drug initiative. http://articles.cnn.com/2011-01-17/world/colombia.us.drugs_1_balloon-effect-drug-traffickers-peru-and-colombia?_s=PM:WORLD (accessed 09/20, 2011).

Roy, Suryadipta. 2007. Are illegal drugs inferior goods in the US? *Atlantic Economic Journal* 35, no. 3: 303-314, http://www.springerlink.com/content/0197-4254.

Saffer, H. & Chaloupka, F. 1999. The demand for illicit drugs. *Economic Inquiry* 37, no. 3: 401-411.

Simpson, John. Rethinking the war on drugs. British Broadcasting Compa-ny.http://news.bbc.co.uk/2/hi/south_asia/4282306.stm (accessed 08/30, 2010).

Stats and facts. Drug Enforcement Agency. http://www.justice.gov/dea/statistics.html (accessed 10/14, 2010).

Stiglitz, Joseph E. 2000. Two principles for the next round or, how to bring developing countries in from the cold. *World Economy* 23, no. 4: 437-454, http://www.blackwellpublishing.com/journal.asp?ref=0378-5920.

Stride data. Drug Enforcement Administration. http://www.justice.gov/dea/stride_data.html (accessed 10/14, 2010).

Sumner, Daniel A. 2007. Farm subsidy tradition and modern agricultural realities. *The 2007 Farm Bill and Beyond*: 29–33.

Sumner, Daniel A. 2005. Production and trade effects of farm subsidies: Discussion. *American Journal of Agricultural Economics* 87, no. 5, Proceedings Issue: pp. 1229-1230, http://www.jstor.org/stable/3697699.

Swinnen, Johan F. M. 2010. The political economy of agricultural and food policies: Recent contributions, new insights, and areas for further research. *Applied Economic Perspectives and Policy* 32, no. 1: 33-58, http://aepp.oxfordjournals.org.

Tokarick, Stephen. 2008. Dispelling some misconceptions about agricultural trade liberalization. *The Journal of Economic Perspectives* 22, no. 1: pp. 199-216, http://www.jstor.org/stable/27648230.

United Nations Drug Control Program. World drug report. 1997.

United Nations Drug Control Program. World drug report. 2006.

United Nations Drug Control Program. World drug report. 2009.

United Nations Drug Control Program. World drug report. 2011.

United States Department of Agriculture, Economic Research Service. http://www.ers.usda.gov (accessed 10/14, 2010).

World Trade Organization, Statistics Database. http://stat.wto.org/Home/WSDBHome.aspx?Language=E.

World Bank Group, Data Catalog. http://data.worldbank.org/.