The Impact of a Rise in Expected Income on Child Labor:

Evidence from Coca Production in Colombia

Diego A. Martin

CID Research Fellow and Graduate Student

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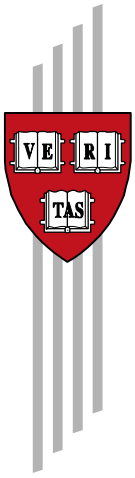

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The impact of a rise in expected income on child labor: Evidence from coca production in Colombia*

Diego A. Martin†

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Abstract

Can households' beliefs about future income shocks affect child labor? This paper examines whether the three-year gap between the announcement (in 2014) and the start (in 2017) of the Illicit Crop Substitution Program (ICSP) increased child labor in Colombia. The ICSP provides farmers with financial support for not planting and harvesting coca leaves – the key input of cocaine. My results from a difference-in-differences model using differences in historical coca production show that due to the ICSP announcement, children became four percentage points more likely to work in municipalities with historical coca production than in non–coca-growing areas. Although the likelihood of working increased in coca–growing areas, the hours worked per child declined modestly after the ICSP announcement. The expansion of the children working in coca fields but the decline in working hours per child produce null effects of the announcement on education outcomes. The rise in the expected income affects the time allocation decision within households in rural areas.

JEL codes: J13, J22, K42, O13

Key words: Child labor, Coca cultivation, Anticipated effects, Policy announcements

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†Purdue University, Economics Department, West Lafayette, IN 47907. E-mail: dmartinl@purdue.edu.

1 Introduction

In middle-income countries, one in four children who live in rural areas works (UNICEF 2019). Previous evidence shows that transitory or permanent income shocks increase child labor (Beegle et al. 2006, Kruger 2007, Bandara et al. 2015, Bai & Wang 2020). However, can households' beliefs about future income affect child labor? This paper addresses this question by exploiting the increase in *expected* earnings from coca cultivation caused by the announcement of the Illicit Crop Substitution Program (ICSP) in Colombian rural areas.[1] The ICSP provides cash transfers to farmers conditional on reducing the production of illicit crops such as coca bushes, the key input in cocaine production (UNODC 2020).[2]

Although the Colombian government announced the ICSP in 2014, for administrative and political reasons, the policy was implemented in 2017.[3] The three-year gap between the announcement and the implementation created a surge in coca production since farmers strategically harvested coca leaves to increase baseline production so that once the program started, they would receive more money from the government for substituting coca bushes for legal crops (Mejia et al. 2021).[4] The ICSP reduced coca production after its implementation, but the decline in coca cultivation did not compensate for the massive increase after the announcement (Ladino et al. 2021). The ICSP had a slow rollout since only 54 municipalities that concentrated 65% of the national coca cultivation had received aid from the program by 2021 (UNODC 2022).

In this paper, I test the hypothesis of whether an increase in expected income produced by ICSP announcement changes the households' incentives to send children to the labor

[1] ICSP in English or *Programa Nacional Integral de Sustitución de Cultivos Ilícitos* (PNIS) in Spanish.

[2] After 2017, the ICSP prioritized places with FARC-EP presence and large coca areas. Governmental officials negotiate the time for coca eradication with local social leaders. A farmer receives up to USD 7,200 in cash, in-kind assistance, and technical help for two years, conditional on eradicating coca cultivation in 60 days after joining the ICSP (Gobierno de Colombia 2017, Ladino et al. 2021).

[3] The administration of former president Juan Manuel Santos (2010–2018) announced the ICPS during the peace negotiation with the FARC-EP (*Fuerzas Armadas Revolucionarias de Colombia*) in 2014. However, the program started one year after the signing of the final peace agreement in 2017 (UNODC 2019*b*).

[4] The Colombian government accepted farmers to the ICSP program using coca cultivation as the baseline in late 2016, and early 2017 (Gobierno de Colombia 2017).

market. My hypothesis does not imply that children must only have worked picking coca leaves. Families could either use more hands to pick up more coca leaves or employ child labor to replace adult labor in other areas of the farm. Adults, for example, could produce coca paste (the intermediate ingredient between coca leaves and cocaine), while children could carry out other rural activities (e.g., feeding animals, trading products, etc.). The trade-off between the time children spend out or in the labor market depends on the expectations over future payments to substitute illicit for legal crops. By 2014, farmers only knew the benefits of producing a kilogram of coca paste but not how much the government would pay for the substitution. My hypothesis focuses on child labor since the literature has shown that working at an early age negatively affects long-run outcomes (e.g., Bau et al. (2020)). However, like child labor, adults decide how much time to allocate to coca growing depending on their beliefs about future income.

To address how the increase in expected earnings created by the three-year gap could impact child labor, I combine household surveys (GEIH for their name in Spanish) with information on coca production at the municipality level between 2009 and 2019. The data provides detailed information on children, parents, and other members of the household.[5] My empirical strategy consists of a difference-in-differences model exploiting time and cross-sectional variation. The time variation comes from the ICPS announcement in 2014. The cross-sectional variation corresponds to children's residence in areas with and without coca in 1994, the first year in which Colombian municipalities grew coca leaves for the drug industry. In the early 1990s, the harvest of Colombian coca leaves was negligible and not controlled by drug cartels. However, US-led antidrug operations shifted coca cultivation from Bolivia and Peru – the top producers at the time – to Colombia in 1995 (Zirnite 1998).

My results show that children were nearly four percentage points more likely to work after the ICSP announcement in municipalities with historical coca production than in those without coca cultivation.[6] This result is in line with the hypothesis that the three-year

[5]Departments are Colombian administrative units similar to states in the US, and municipalities are comparable to counties.

[6]My research design does not feature variation in the treatment time. The time variation is before

gap not only increased coca cultivation but also incentivized child labor. Several tests show that my results are robust. First, my findings hold when I measure coca prevalence at different times. Second, the results do not change after I excluded the observations in 2014, the year of the announcement. Third, I find no significant results when I shift the treatment timing in a placebo test (as expected).

As for mechanisms, I test whether child labor depends on gender, but the results show no differential effect between boys and girls after the ICSP announcement. Picking up coca leaves does not require particular physical skills to work in the fields (see Dest (2021) for more details). However, girls are more likely to work on unpaid activities (e.g., taking care of children) than boys after 2014. The expected earnings affect child labor equally regardless of gender, but the announcement changes time in home production.

Beyond the employment decision (extensive margin), I study children's weekly number of working hours (intensive margin). Although there was an increase in the probability of working after the ICSP announcement, the working time modestly declined by 5 hours per week when I compare municipalities with and without historical coca production. The results are statistically significant for girls but not for boys. My interpretation is that post-ICSP, total aggregate hours increased but that, given that more children joined the labor market, the hours per capita declined. The time when the ICSP would start was uncertain by 2014, as well as the financial support amount, the type of transfer (cash or in-kind assistance), and the program duration. To minimize the risk, families did not drastically modify household time allocation. Instead of using a child for three hours a day working in the field, they prefer to use three children for one hour each.

My findings regarding education outcomes reconcile the results from the extensive and intensive margins. After the ICSP announcement, comparing coca and noncoca areas, I find no significant effects on school attendance, on a standard over-age indicator that

and after 2014). My study does not use an intensity treatment. My individual variation is binary (whether a child lives in a municipality with historical coca production). Thus, the possible bias in the difference-in-differences model from different treatment timings as highlighted by Sun & Abraham (2020), Imai & Kim (2020), Goodman-Bacon (2021), Callaway & Sant'Anna (2021) does not arise in my analysis.

measures late entry and failure rates, or on educational attainment. These results align with the hypothesis that households use the time between the ICSP announcement and the implementation to increase the baseline coca production expecting to receive more government financial support. But families maximize children's time allocation considering the need for more information about the ICSP implementation. Instead of harming children's human capital accumulation, families allocate children's extra time to collect coca leaves or do other chores on farms. Overall, the results show that children were more likely to work post-2013, but on average, those who worked did not need to spend more time in the field, creating no harm to education outcomes.

The increase in the likelihood of working but not effect on educational outcomes does not mean that the ICSP announcement did not impact Colombian households. Beyond the ethical reasons that policy announcements should not incentives child labor since making children work can be inefficient in the long run (see Baland & Robinson (2000)), working in coca fields might be the first stone to a criminal path. Sviatschi (2022) shows that children who worked in illicit coca farming are 30% more likely to be incarcerated for violent and drug-related crimes as adults. Analyzing how the ICSP announcement affects child labor is also important from a policy design view. Coordination in promoting and implementing a program is essential to reduce the unintended negative effect and boost the program's objectives in developing countries (see Cabral et al. (2021) for another example of the negative impact of leaders' speeches on decision-making).

Many papers exploit exogenous shocks to understand how past income variations affect child labor in the present (e.g., Beegle et al. (2009), Colmer (2021)), but less is known about the effect of policy announcements about the future on current labor outcomes. My research expands the literature by exploring a new channel affecting child labor: changes in *expected* earnings. Families reallocate time in the present to maximize potential future returns. Indeed, my paper relates to that of Edmonds (2006), who shows that child labor declined when South African families were notified that they would receive income from a social pension.

This article also contributes to the study of the unintended effects of conditional cash transfer programs (CCTs) on child development. As a CCT, the ICSP directly provides farmers with financial support conditional on their reducing coca production. Most of the work in this area has focused on studying the direct effects of CCTs on labor outcomes (see De Janvry et al. (2006), Del Carpio et al. (2016), Cahyadi et al. (2020)) and human capital accumulation (see Baird et al. (2011), Glewwe & Kassouf (2012)). Some other studies have shown the negative externalities that CCTs can have on health, education, and welfare (see Nandi & Laxminarayan (2016), Masi (2018), Filmer et al. (2018), respectively). My contribution to this literature is to study unintended effects arising before the actual program is rolled out. In this regard, I study the effect of changes in expected earnings on child labor instead of the program's direct consequences for child development.

The closest research to my paper is the work by Angrist & Kugler (2008), who show that self-employment earnings and teenage boys' labor supply increased in Colombian coca-growing areas during the late 1990s. The main difference between their research and my analysis is the source of exogenous variation. Whereas these authors utilized the international price of cocaine, I use the increase in the expected earnings from harvesting coca leaves after the ICSP implementation.[7] I also analyze different mechanisms to understand how expected earnings from harvesting coca leaves could affect child labor.[8]

The remainder of the article is organized as follows: Section 2 describes the institutional framework. Section 3 describes the data. Section 4 shows the difference-in-differences strategy and the event study model. Section 5 shows the main results and robustness tests. Section 6 presents the potential mechanism behind the increase in child labor. Finally, section 7 highlights the implications of the findings for policymakers.

[7]Another difference is that Angrist & Kugler (2008) built regions by combining departments while I analyze data at the municipality level, an administrative unit smaller than departments. This disaggregation of the data allows me to compare individuals living in more similar places.

[8]Other related studies in the Peruvian context find that a rise in coca prices led to an eight percentage point increase in child labor in coca-growing areas (Sviatschi 2022). By contrast, Dammert (2008) finds that a decline in coca production from Peru increased child labor in coca-growing states.

2 Institutional Framework

This section describes the cross-sectional and time variation leveraged in my empirical strategy. The main variation at the individual level refers to whether a child lived in a municipality with coca production in 1994. The variation in the time dimension is dichotomous, referring to the periods before and after the ICSP announcement. The Colombian government and the FARC-EP guerilla group announced the creation of the ICSP in 2014. This announcement took place during the peace negotiation process between the Colombian government and the FARC's members. Illegal crops such as coca were on the negotiation agenda since cocaine trafficking is the principal financing source for the FARC-EP and other criminal groups (Felbab-Brown 2005).

2.1 Coca production and child labor

Since the 1990s, the valleys and upper jungles of the Andean region in Bolivia, Colombia, and Peru have accounted for more than 98% of the global area planted with coca leaves (UNODC 2006). Cocaine production starts with the collecting and drying of coca leaves from plants 1.5 to 2 meters tall to convert them into coca base through relatively simple chemical process that takes a few days (UNODC 2010). About 125 kilograms of coca leaves create one kilogram of coca base, the final product of coca growers, but not the final step in the production chain. Drug cartels buy coca base and refine it into cocaine in more sophisticated laboratories (UNODC 2010).

Farmers grow coca for several reasons. Coca bushes are more resistant than other crops to poor-quality terrain and weather conditions and better suited to locations with unsophisticated infrastructure. Farmers can collect coca leaves six months after planting the bushes, and coca growers can obtain three to six harvests per year (Dion & Russler 2008).[9] Coca growers live on plots of approximately 1.3 to 1.8 hectares, where at least one hectare is dedicated to coca leaves. On average, coca-growing families have five peo-

[9] In 2018, the internal price in Colombia for coca leaves was \$0.76 per kg (UNODC 2019*a*), while for coffee beans, Colombia's most exported legal crop, it was \$1.96 per kg (FNCC 2018). However, the average cocaine price in the streets from the US is \$84 per gram (UNODC 2010).

ple, and more than two-thirds of their income comes from the production of coca base (UNODC 2020).

Remote rural areas in Colombia have higher levels of child labor and more farmers harvesting coca leaves than nonrural areas (see Edmonds (2007), Ibanez & Carlsson (2010), respectively). Contrary to popular perceptions in high-income countries, most working children are employed by their parents rather than in businesses (Edmonds & Pavcnik 2005, Dion & Russler 2008).

2.2 The drug war in Colombia

Cultivation of coca leaves in Colombia was minimal until 1994. In the late 1980s and early 1990s, Colombia converted coca leaves from Bolivia and Peru into cocaine and exported this drug to the US and Europe (Mejia 2016). The US government sought to reduce the cocaine supply by blocking air transport of coca leaves from Bolivia and Peru to Colombia. However, import restrictions on coca leaves incentivized the harvest of coca in Colombian territory (Roncken et al. 1999). As a result of the blockage of coca production in Bolivia and Peru, Colombia became the top producer of coca leaves in 1998 (UNODC 2006). Figure 1 summarizes the changes in annual coca cultivation in Bolivia, Colombia, and Peru between 1990 to 2019.

Due to this increase in coca production, Colombia and the US government launched *Plan Colombia* in 2000 (Mejia 2016). This antidrug program consists of manual eradication campaigns, aerial spraying of herbicides, the launch of alternative development projects, and other strategies to reduce the cultivation of illegal drugs (Mejia & Restrepo 2016). In particular, the ICSP is among the development projects aiming to reduce coca production by providing financial support to coca growers who switch to cultivation of legal crops.[10] Since the beginning of the program, the US has provided Colombia with more than $10 billion (U.S. Government 2021).[11]

[10]The ICSP is not the first alternative livelihood program seeking to encourage harvesting of legal crops instead of coca (others include, e.g., the Macarena Integral Consolidation Plan (Mejía et al. 2011) and Forest-Guard Families program (Nilsson & Marín 2021)). The alternative programs for coca substitution are complemented by forced eradication (Moreno-Sanchez et al. 2003, Reyes 2014, Mejía et al. 2017).

[11]In 2020, the US spent $448 million in aid to Colombia, $30 million more than in 2019 (Norman

2.3 ICSP announcement

Between 2012 and 2016, the Colombian government negotiated with the left-wing guerrilla group FARC-EP to end an internal civil war that had lasted more than 50 years. The negotiation took place in Cuba, a neutral location that allowed tight control of the information shared to the public. In 2014, the parties to the negotiation announced the creation of the ICSP in a media conference. The announcement stated that the government would provide financial assistance to coca growers who substituted to other crops and did grow coca leaves again (Colombian government and FARC-EP 2016).[12] Qualitative and empirical evidence shows that the ICSP announcement was unexpected for communities in rural areas (see Garzón et al. (2019), Mejia et al. (2021), respectively).

Mejia et al. (2021) present compelling evidence that – contrary to the aim of reducing coca production – the ICSP announcement caused a massive increase in Colombian coca production. Farmers increased their coca cultivation expecting to receive more financial support once the ICSP was implemented by the government. Mejia et al. (2021) also show that neither the concomitant increase in coca prices and decline in cocaine supply from Bolivia and Peru nor other announcements related to the peace negotiation seem to be behind the extensive expansion in the Colombian coca cultivation area after 2014.

The first communities in the ICSP joined the program in late 2017 and early 2018 (Ortega Hernández et al. 2022). The program prioritized municipalities with FARC-EP presence, highly dense areas with many coca hectares, and national parks. After signing an agreement, a farmer receives about USD 400 (close to twice Colombian minimum wages) conditional on eradicating coca cultivation in the following 60 days and five additional transfers for the same value every two months. Farmers in the ICSP also receive in-kind transfers of approximately USD 4,160 for alternative development agriculture projects and USD 640 for technical assistance in alternative crops. Both values receive once during the time in the ICSP. Only one person per family can join the program, and

2019).

[12] See section A.1 in the online appendix for the complete press release announcing the ICSP. Figure A-2 summarizes the timeline of the ICSP announcement and implementation.

she must be a resident-owned land of the community (Ladino et al. 2021).[13]

3 Data description and summary statistics

This section describes the three principal databases used in my analysis. First, I calculate child labor from the Great Integrated Household Survey (GEIH, its acronym in Spanish), collected by the Colombian Statistics Bureau (*DANE*, its acronym in Spanish). This database also provides household characteristics and individual controls. Second, I use the number of hectares of coca production, collected by the United Nations Office on Drugs and Crime (UNODC). Third, I control for the geographic conditions of municipalities, transfers from the central government, and conflict exposure. These data come from the Center for the Study of Economic Development (CEDE, its acronym in Spanish) from Universidad de los Andes (Acevedo et al. 2014).

3.1 Household survey

The GEIH is a nationally representative cross-sectional survey containing demographic and labor information for individuals and households. The sampling covers the 24 department capital cities and their metropolitan areas, other urban areas, rural areas, populated centers, and dispersed rural areas. The final sampling unit is an area that contains an average of ten houses, where DANE interviews everybody in the area.

My definition of the incidence of child labor is the children between 10 and 17 years old who report using most of their time during the last week working. The principal question to measure child labor in the GEIH survey is "What activity did you spend most of your time on last week?" Option A is working.[14] Although individuals are legally adults from age 18 years in Colombia, the legal minimum working age is 15 years. Adolescents between the ages of 15 and 17 can legally work if they have a permit issued by the Ministry of Labor and they receive social benefits and labor protections (Otero-Cortés

[13]Once the government signs an agreement to participate in the ICSP with a local community, the government tries to guarantee the community's security conditions, and social leaders participate in the design and implementation of the program (Machuca 2021).

[14]The online appendix A.2 explains in detail the construction of the child labor variable.

2019).

My concept of child labor differs from the International Labour Organization's (ILO's) definition. According to the ILO, child labor does not simply refer to any work done by children. Rather, the type of work must limit the child's development or put the child at risk (Noguchi 2002). However, I cannot appropriately disentangle dangerous jobs for children from safe employment. My definition is broader because it eliminates the separation between harmful and benign. Child labor in my research includes any children who work at least one hour during the last week (similar to the literature in child labor such as Dammert (2008), Beegle et al. (2006), Edmonds (2006)).

Figure 2 shows the raw data for children working in urban and rural areas. On average, child labor in rural areas is nine percentage points greater than the rate in urban areas. Between 2009 and 2019, child labor fell by four percentage points in rural areas (from 17% to 14%) and urban areas (from 9% to 5%). The reduction in child labor corresponds to a decline in children reporting that they help with household expenses, pay for education, or are part of a family business (DANE 2021).

3.2 Coca cultivation

Coca crops are a satellite-based measure estimated annually since 1999 by the Integrated Monitoring System of Illicit Crops (SMICI, its acronym in Spanish) of the UNODC. First, SIMCI uses satellite images to georeference areas with coca production. Second, high-definition pictures from helicopter flights validate whether the areas previously classified as having coca by the satellite images have coca bushes. The estimation of coca crops represents the harvest up to December 31st of each year (UNODC 2007). For 2018, for example, 70% of the satellite images correspond to the period between mid-November of 2018 and late February of 2019. Among the remaining 30% of the satellite data, half of the images are from March and April and the other half from August and November (UNODC 2007).[15]

[15]See Mejia et al. (2021) and Abadie et al. (2014) for more details about how UNDOC measures coca production annually.

Figure 1 shows an increase in coca cultivation between 2013 and 2017 from 48,189 to 171,495 hectares. The latter number corresponds to the largest coca harvesting area observed during the last two decades. For reference, the area with coca cultivation in 2017 was more than double the area of Chicago (60,660 hectares), a city of 2.6 million people. Figure 3 Panel B shows the spacial distribution of the average coca production from 2009 to 2019.

The 1994 coca cultivation data come from the National Narcotics Directorate (DNE, its acronym in Spanish). This public entity oversaw the administration of drug dealers' assets captured by the Colombian government. Figure A-1 shows the number of municipalities with coca cultivation. Between 1994 and 2009, the number of municipalities with coca production increased from 59 to 207. By 2019, the coca cultivation area was concentrated in 176 municipalities.

3.3 Education outcomes

The GEIH contains self-reported schooling information for children and adults. Following the literature (e.g., Dammert (2008)), I use the school attendance rate, schooling years, and two measures of education lag to estimate the effect of the ICSP announcement on human capital accumulation. The most typical outcomes are a dummy variable equal to one for children who attend school and the number of schooling years.

The rise in expected earnings could incentives getting behind in the schooling years to spend time working. However, measuring educational lags is not trivial since the number of "correct" years depends on the age and the educational system of each country.[16] The Colombian education system consists of five years of primary school and six years of secondary education. A ten-year-old and a seventeen-year-old teenager should have a minimum of three and nine years of schooling, respectively (Arango & Rodríguez 2016). I create a variable equal to one when children do not meet the minimum years of education

[16]Two children with same years of education but one year difference in age do not translate in one of the children being behind the education year for his or her age. For example, an eleven-year-old child with five years of education could or not be one year lag compared with a ten-year-old with the same time in school. The second child could start primary school earlier for a household decision.

according to their age and the Colombian education system.[17]

The second educational lag variable is a standard over-age indicator that measures late entry and high failure rates. The variable is one when the ratio between years of education and age minus six is smaller than one. This variable, used by the literature, is comparable between countries with different education systems (e.g., Patrinos & Psacharopoulos (1997)).[18]

3.4 Other data

In the estimations, I include the suitability to farm coca index, which sorts municipalities from best to worst environmental conditions for growing coca (e.g., altitude, soil erosion, rainfall index, and an index of suitability for common crops based on soil nutrients, minerals, and topography).[19] I also control for transfers from the national government to departments and municipalities (local entities). These allocations are based on a fixed rule depending on the population lacking access to services (DNP 2001).[20] Finally, I include violence trends for municipalities. These data come from CEDE, which collects the information from different sources such as DANE and governmental agencies (Acevedo et al. 2014).

3.5 Final sample

After combining the household surveys and municipality-level annual coca cultivation data, the sample consists of about 20,669 households interviewed monthly in 437 out of 1103 municipalities in rural areas from 2009 to 2019. The regions in the final data are more urban, have fewer hectares, and lower multidimensional index poverty than areas not included in the GEIH. On average, GEIH municipalities have a rural index of 49%,

[17] The variable is equal to one when a 10 years old child has less of three years of education, 11 years old less than four, 12 years old less than five, etc.

[18] (1) I build the age–grade distortion as $SAGE = [\frac{yearsofeducation}{age-6}] * 100$. $SAGE$ equals 100 for children aged 6 and currently attending school. (2) I set the over-age indicator to one if $SAGE < 100$ and 0 otherwise.

[19] Section A.3 in the online appendix describes in detail the construction of the coca suitability variable based on Mejia & Restrepo (2015).

[20] Section A.4 in the online appendix summarizes the central government transfer system, called the General Participation System (*Sistema general de participation* or SGP).

an area of 799 square kilometers, and a poverty index of 66.47. Non-GEIH areas report a rural index of 59%, an area of 1,157 square kilometers, and a poverty index of 71.40. Figure 2 Panel A presents the spatial distribution of the municipalities in the sample.

The proportions of municipalities with coca production at the national level and in the GEIH sample are similar. Whereas 197 out of 1,103 (18%) municipalities produced coca in Colombia between 2009 and 2019, 82 out of 421 (19%) areas cultivated coca in the GEIH sample. Figure 4, Panel A shows the same production trends between national coca cultivation and production in GEIH locations. Panel B shows that the municipality area coverage with coca harvesting is not statistically different between the sample with all coca-producing municipalities and the places in the GEIH sample.

The final sample represents about 9 million people in 3 million households in Colombian rural communities (approximately 20% of the Colombian population). The child labor rate is 18%, the average weekly working time for children is 25 hours per week, and the median is 21 hours (see Table A-3 in the online appendix).[21] About 72% of children work in agriculture, 12% in local commerce, and 7% in manufacturing. For occupations, 68% of the children report that they are farmers, ranchers, agricultural workers in general, or agricultural laborers.[22] The working children also report field or rural areas (72%), followed by households (14%), as the principal place where they work.

On average, the children are 13 years old, 92% have access to the health system, and 82% live with their parents. The typical household head is male, not single, and has four years of education (primary school). On average, the households have five individuals, 36% have children younger than five, and 12% have adults older than 65. The average number of children per household is two. Household income per capita is approximately $50, per month.[23]

[21]Table A-1 in the online appendix presents the raw data of child labor by age and municipalities with historical coca cultivation. Table A-2 shows the raw data of adult labor. The adult labor rate is 66% and the average weekly working hours is 41.

[22]The economic activity variable contains ten sectors from the Classification of All Economic Activities (Division 2008). The occupation variable has 82 categories from the Standard Occupational Classification System (Elias et al. 2010).

[23]In the online appendix, Figure A-3 presents the distribution of the income per capita in Panel A, the household size in Panel B, and the distribution of children per household in Panel C.

As in the literature, I find that child labor increases with age in Colombia. On average, 13% of children who are 10 to 15 years old work, while 33% of the oldest children (16 to 17 years old) report spending most of their time working during the last month.

The household survey data have information on other activities. I focus on the question "In addition to the activities that you informed me of having performed last week, which of the following unpaid tasks did you do?" On average, 12% of the children report taking care of children. Only 15% of children working also report carrying out household chores. Indeed, the correlation between engaging in child labor and doing household chores is negative (-0.11).

For the educational outcomes, most students attend school (98%). According to the Colombian education system, the academic lag is 47% when using the age and schooling difference. The over-age index, a comparable measure across countries, says that 69% of Colombian students do not have regular progress (in terms of schooling years) relative to their current age. On average, the highest level attained is six years of education, which is analogous to the first year of mid-school in the US category (see Table A-3 on the online appendix).

4 Empirical strategy

The primary obstacle to identifying the impact of the ICSP announcement on the labor market is that coca production locations are not randomly distributed in rural Colombia. Coca production may be more likely to arise in disadvantaged areas where poverty is high and state presence is extremely low. Thus, a comparison of children living in municipalities with and without coca cultivation could be confounded by correlated municipality characteristics.

My identification strategy exploits the timing of the ICSP announcement and cross-sectional variation in municipalities with coca production in 1994. Formally, I estimate the impact of the ICSP announcement on child labor with the following equation:

$$childlabor_{i,h,m,y} = \beta_1(coca_{m,1994} * Post_{2014}) + \alpha_m + \eta_y + X_{i,m,y}\Theta_1' + X_{h,m,y}\Theta_2' + \sum_{c \in X_m} \gamma'(c * Post_{2014}) + \epsilon_{i,m,y} \quad (1)$$

Where $childlabor_{i,h,m,y}$ takes the value of one for an individual i between 10 and 17 years old who works in household h, municipality m and year y. $coca_{m,1994}$ is a dummy equal to one for municipalities with coca in 1994, and $Post_{2014}$ takes the value of one from 2014 to 2019 (i.e., since the ICSP announcement). $X_{i,m,y}$ is a set of individual controls such as age, gender, access to the health system, and residence with parents. $X_{h,m,y}$ are characteristics of the head of the household such as age, gender, years of education, and single status as well as dummies for children younger than five and adults older than 65. X_m are municipality characteristics before the ICSP announcement interacted with $Post_{2014}$ to control for differential changes pre- and post-ICSP. X_m includes the proportion of the rural population, suitability to farm coca, the logarithm of government expenditure in 2005, and the multidimensional poverty index in 2005. I also include homicides per 100,000 inhabitants from 1993 and 1999 and FARC attacks against civilians between 1993 and 2008.

Equation (1) also includes municipality fixed effects (α_d) and year fixed effects (η_y). These variables control for observable or unobservable shocks affecting municipalities and shocks that affect all the municipalities in a given year (e.g., inflation and changes in international coca prices, respectively). Finally, $\epsilon_{i,m,y}$ is the error term. Drawing on Bertrand et al. (2004), I cluster standard errors by municipality, allowing for correlation of errors over time within each 421-municipality code in the sample.

The main coefficient of interest is β, which captures the average differential change in child labor before and after the announcement in municipalities with historical coca production relative to non–coca-growing areas. Equation (1) includes any relevant municipality characteristics that do not vary over time and any differential trends in child labor that differ across municipalities.

My research design is not subject to the assumption needed to estimate unbiased pa-

rameters with two-way fixed effects under continuous or staggered treatment, when the estimator may be biased by violations of the linear additivity assumption or potentially negative weights from staggered treatment. Imai & Kim (2020) show that the ability of the two-way linear fixed effects regression to calculate an estimator that adjusts for unobserved unit-specific and time-specific confounders at the same time relies upon the assumption of linear additive effects. Goodman-Bacon (2021) decomposes the estimated parameter in the difference-in-differences model when units are treated at different times and shows the possibility of weights being negative in two-period DD estimators. Callaway & Sant'Anna (2021) calculate estimators for staggered difference-in-difference setups with variation in the treatment timing. Neither the time variation nor the individual treatment is staggered in my research design.

4.1 Identifying assumption

The assumption required to estimate an unbiased difference-in-differences model is that the trends in the outcomes of the treatment and comparison groups would be parallel in the absence of treatment.[24] In this case, the assumption is that in the absence of the announcement, child labor in municipalities with historical coca production would have followed a similar trajectory to that in areas not growing coca in 1994. To partially assess the assumption, I estimate the following nonparametric model:

$$childlabor_{i,h,m,y} = \sum_{i=-4}^{-1} \delta_i (coca_{m,1994} * Post_i) + \sum_{i=1}^{6} \delta_i (coca_{m,1994} * Post_i) + \eta_y + \epsilon_{i,m,y} \tag{2}$$

Instead of having one single point estimate showing the effect before and after 2013 (β_1 in Equation (1)), Equation (2) shows all the lags ($\sum_{i=-4}^{-1} \delta_i$) and leads ($\sum_{i=1}^{6} \delta_i$) of the parameters. The omitted variable is the interaction for 2013, the year before the ICSP announcement in 2014. The parameters δ_i show the effect of the announcement relative to the outcome in 2013, the year before the time variation. The parallel trends assumption

[24] Goldsmith-Pinkham et al. (2020) present a detailed explanation of the critique for *Bartik-type* instruments and the extension to parallel pre-trends. Having similar pretrends is the fundamental stone for the difference-in-differences model.

holds when the lags ($\sum_{i=-4}^{-1} \delta_i$) are not statistically significant, which means that the trends in child labor before the announcement in areas with and without coca leaves were not different.

5 Results

5.1 Addressing parallel trends

First, the raw data support the identifying assumption of parallel pretrends in this setting. Panel A in Figure 5 presents the child labor of municipalities with and without coca production in 1994. The solid line marks one year before the ICSP announcement in 2014, and the dashed line in 2017 indicates the policy implementation year. As evidence of parallel trends, the raw data show similar trends in child labor between coca and noncoca areas before 2014. Further analysis of the raw data suggests that rather than being affected by the ICSP announcement, the decline in the number of children working in areas without historical coca production followed the overall Colombian trend of declining child labor (see Figure 4).

Panel B in Figure 5 and Table 1 present the event study coefficients obtained by estimating Equation (2), where 2013 is the omitted category. In line with the parallel pretrends assumption, I find that child labor is not statistically different between areas with and without historical coca production. The coefficient measuring the difference between coca-growing and non–coca-growing municipalities becomes statistically significant in 2016 ($\delta_{2016} = 0.068$), one year before the ICSP implementation, and it remains statistically significant through 2019.

The incomplete implementation of the ICSP explained the sustainable growth in child labor after 2017 when the Colombian government implemented the ICSP. By 2021, the government has implemented about one-third of the program, and families report less income after receiving aid from the ICSP than before joining the program (Machuca 2021).[25]

[25] Although farmers substituted about 20% of the coca hectares in 2021, coca cultivation has continuously grown until 2022 (UNODC 2022).

5.2 Main findings

As previously established, the incidence of child labor refers to individuals between 10 and 17 years old who spent most of their time working during the last week. Table 2 reports the coefficient β_1 from estimating Equation (1). Although each column shows the estimates from different specifications, the four columns include year and municipality fixed effects. Column 1 includes only this set of fixed effects. Column 2 includes individual and household characteristics. Column 3 replaces these individual and household control variables with municipality characteristics interacted with the time dummy before and after the ICSP announcement ($Post_{2014}$). Finally, Column 4 includes the fixed effects and both sets of controls. The last column presents the baseline model since this specification captures observable and unobservable aggregated changes at the year and municipality level, individual and household characteristics including gender and age, household head age, education, and gender, and municipality conditions such as the poverty index and exposure to conflict. Table A-3 in the online appendix shows a detailed description of each control variable.

Across the specifications in Table 2, the results are similar in magnitude and significantly different from zero. The findings show that after the government announced the ICSP in 2014, children became nearly four percentage points (pp) more likely to work in municipalities with historical coca production than in non–coca-growing areas (Column 4, $\beta_1 = 0.036$). The policy announcement accounts for an increase of 18% (0.036/0.195) in the probability of a child working after 2014. The rise in in expected income from the ICSP announcement increases the likelihood of child labor.

5.3 Robustness

The first test is to vary the definition of treated municipalities. As a reference, Column 1 in Table 3 shows the parameter from the baseline model. Column 2 switches the criterion for designating municipalities as treated from their coca cultivation status in 1994 to their coca cultivation status in 1999 – one year before the launched of Colombia's largest antidrug strategy supported by the US government (*Plan Colombia*, which started in

2000).[26] Column 3 changes the criterion for designating municipalities as treated from their coca-growing status in 1994 to their coca-growing intensity in 2013 (above or below the national median coca production one year before the policy announcement). After I change the criterion for designating treated municipalities, the results are significantly different from zero and similar in magnitude to the parameter β_1 in the baseline model.

In Column 4, I return to the municipality-level variation based on coca production in 1994 but excludes the observations in 2014 since the announcement came in the middle of that year. In Column 5, I run a placebo test where the treatment timing is set to 2012, the year of the official beginning of the Colombian peace process.

The model that excludes the observations from 2014 predicts an effect of the ICSP on child labor 0.9 pp bigger than the baseline model ($\beta_{1,out2014} = 0.045$ vs. $\beta_{1,baseline} = 0.036$). The placebo test shows no differential effect on child labor between municipalities with and without coca production using 2012 as the time variation.

In Column 6, I replace child labor as the dependent variable with an indicator for labor force participation, defined as children working or seeking employment. As before, my findings show that children are more likely to join the labor force in municipalities with than without historical coca production after the ICSP announcement. The coefficient is positive and significantly different from zero ($\beta_1 = 0.038$).

The effect of the ICSP announcement on child labor is also robust to keeping only households that report that they have always lived in the same municipality for more than five years. Section A.5 in the online appendix shows that the results for nonmigrant families are somewhat higher in magnitude than the results for the full sample for which I have data for migration ($\beta_1 = 0.040$ or 20%).

In sum, my results comparing municipalities with and without coca cultivation in 1994 show that the ICSP announcement increased the probability of children working in the former municipalities.

[26]The coca production correlation between 1994 and 1999 is 0.46. Colombia had 18 coca-growing areas in 1994 and 39 in 1999. In both years, 13 municipalities had coca production, 26 in 1999 only, and five in 1994 only.

6 Mechanisms

The ICSP announcement incentivized child labor in rural areas. The results also document that child labor did not fall to preannouncement levels once the ICSP started operating. In this section, I explore how gender and unpaid activities change after 2014 as well as the intensive margin (working hours per week) for children and adults.

The literature shows that gender determine who joins the labor force within a household (e.g., Edmonds (2007)). To analyze the gender mechanisms, I estimate a triple difference-in-differences model following the equation:

$$\begin{aligned} childlabor_{i,h,m,y} = \beta_1(coca_{m,1994} * Post_{2014} * Male_i) + \beta_2(coca_{m,1994} * Post_{2014}) \\ + \beta_3(Post_{2014} * Male_i) + \alpha_m + \eta_y \\ + X_{i,m,y}\Theta_1' + X_{h,m,y}\Theta_2' + \sum_{c \in X_m} \gamma'(c * Post_{2014}) + \epsilon_{i,m,y} \end{aligned} \tag{3}$$

Table 4 shows the triple difference-in-differences models by gender using Equation (2). My findings comparing areas with and without coca production post-2014 reject the hypothesis that boys are more likely to work than girls.[27] The triple interaction is negative but it is not statistically significant from zero (Column 3, $\beta_1 = -0.004$).[28]

Income shocks or changes in expected future income affect not only the labor market – exogenous changes could also affect the time allocation to domestic tasks (e.g., Blundell et al. (2018)). The hypothesis states that households face a trade-off between sending children into the labor market or increasing the time spent on activities at home.

Figure A-4 in the online appendix shows the raw data and point estimates for a dummy variable equal to one for taking care of children. Both panels show that the parallel trends assumption for that type of domestic activity seems to hold in this setting. Table 5 presents the results of estimating Equation (1) for this new dependent variable. After

[27] Table 1 provides evidence supporting the parallel trends assumption for boys and girls.

[28] I run a similar specification in Equation (3) to study the effect of the ICSP announcement on child labor depending on age categories. Table A-5 in the online appendix shows no differential effect by age category (i.e., 10-11, 12-13, 14-15, and 16-17).

the ICSP announcement, girls became more likely to take care of children in coca-growing areas than in non–coca-growing areas ($\beta_1 = 0.043$). The coefficient is negative and not statistically different from zero for boys ($\beta_1 = -0.017$).[29] Indeed, the triple difference in Column 4 shows that boys are less likely to work compared with girls in unpaid activities after the ICSP announcement, and the difference is statistically significant from zero ($\beta_1 = -0.054$). This finding suggests that the increase in expected income affects the time allocation within households, but the effect depends on the children's gender.

6.1 Intensive margin

In this subsection, I study the effect of the ICSP announcement on the working hours in the last week (the intensive margin). Figure 6 show the raw data and point estimates for weekly working hours conditional and unconditional on working, respectively. The model of conditional on working excludes children who do not work from the estimation (i.e., the observations decline). In contrast, the unconditional working hours estimations give zero to children who do not work.[30] Both panels support the parallel trends assumption for weekly working hours. Before 2014, The raw data (Panel A and B) also show that working hours declined in places with and without coca production.

Column 3 in Table 6 shows the effect of the ICSP announcement on weekly working hours using Equation (1). On average, post-ICSP, children worked nearly three hours less per week in coca-growing areas than in non–coca-growing areas (a decrease of 12%). The result comes mainly from girls, who worked five hours less per week, and the coefficient is statistically different from zero (Column 1). Boys worked fewer hours per week in places with historical coca cultivation, but the result is not statistically significant (Column 2). However, the triple difference with a male dummy shows no effect of the ICSP announcement on the condition hours in the labor market. Since collecting coca leaves

[29] I do not find a coefficient statistically different from zero in six models using as dependent variables the following variables: raising animals, cleaning other homes, taking care of older people, making clothes for family members, self-constructing housing, and engaging in community or volunteer work (estimates not reported). Interpretation of these exercises should be done with caution because the parallel trends assumption might not hold in these six specifications.

[30] The division between conditional and unconditional hours is common in the analysis of child labor (see Edmonds & Pavcnik (2005) and Dillon et al. (2012) for details).

does not demand a specific skill depending on gender, the overall effect on working hours is marginal and comes mainly from girls, who might spend more time in unpaid activities after 2014 (as Table 5 shows).

In Table 6, Columns 5 to 8 present the effect of the ICSP announcement comparing unconditional working hours (i.e., zero hours for children who do not work) of children living in and out of municipalities with historical coca production. The coefficient is positive for girls, boys, and both but not statistically different from zero. These results have more observations (or power) than the estimators in Columns 1 to 4 since the model does not exclude children who do not work. The evidence supports that average children did not go from zero to a positive number of hours after the ICSP announcement.

Overall, both conditional and unconditional working hours show that more children worked in rural areas to increase coca cultivation but did not spend more time working per capita. The rise in expected income increase the number of hands working but not the average time each child needs to work. This evidence is consistent with the lack of information in the ICSP announcement. In 2014, when the Colombian government and FARC members announced the ICSP did not specify the exact amount farmers would receive for the substitution program or any further information to decide how much time to spend growing coca bushes. Families diversify the risk in the expected earnings by increasing the number of children who join the labor market and reducing the time per child. Since farmers did not know when and how much financial aid would come from the ICSP, households preferred only partially to disturb children's time allocation.

6.2 Education outcomes

The ICSP announcement changes children's time allocation in and out of the labor market (e.g., taking care of children). In this subsection, I analyze the effect of the announcement on self-reported education outcomes from children in rural areas. Figure 7 presents the raw data (Panels A to D) and the point estimates (Panels E to H) for the four variables: attendance, schooling lag, an over-age indicator, maximum years of education. The raw data show stable patterns for pre– and post–ICSP announcement educational outcomes.

The point estimates are around zero and not statistically different from zero. Both results show that the assumption of parallel trends hold for education outcomes. Table 7 uses Equation (1) to estimate the changes in education outcomes. Post-ICSP, I find that compared with those in noncoca areas, children in coca areas faced lower attendance rates and year attained, a higher probability of lagging in their grade for their age and over-age index. However, the differences between coca– and non–growing-ares in the four variables are not different from zero.

The null results for education outcomes relate to the evidence of a rise in the probability of working (extensive margin) and a reduction in the average number of hours worked (intensive margin). The increase in expected earnings created by the ICSP announcement pulled more children into the labor market, but it did not increase the need to work more hours. That is why the increase in the likelihood of working did not affect education outcomes. These results are in line with Prem et al. (2021), who show that the ceasefire during the peace negotiation between Colombian and FARC members improved children's academic outcomes, but the improvements are attenuated in coca-growing areas. My results show that, as the ceasefire, the ICSP announcement in the middle of the peace negotiation did not affect educational outcomes in areas with historical coca cultivation.[31]

6.3 Adult labor

In this subsection, I explore the effect of the ICSP announcement in the labor market among adults. The raw data and point estimates for adult labor in Figure A-4 show that the parallel trends assumption holds for adults (Panel C and H). As in the case of child labor, Table 8 shows the results for adult labor using Equation (1). , Column 1 includes only year and municipality fixed effects, Column 2 adds individual and household controls, Column 3 replaces the individual with municipality characteristics, and Column 4 includes all the controls.

The model with all the controls and fixed effects shows that after 2014, adults were nearly

[31] I run a version of Equation (1) using educational data from dropout, math and languages scores. The results show no effect of the ICSP announcement on these academic variables. However, I do not present these results since the parallel trends assumption does not hold for these outcomes.

three pp more likely to work in municipalities with historical coca production than in non–coca-growing areas, an increase of 4%. The effect on the probability of working is 16 pp smaller for adults than for children.

Table A-6 in the online appendix analyzes the effect of the ICSP announcement on adult labor by gender. Women are five pp more likely to work in areas with than without coca cultivation (12%). The coefficient is statistically significant from zero. However, the parameter for the sample of men is close to zero and not statistically significant.[32] This evidence confirms the idea that labor was provided by inactive groups such as children and women.

The findings present a change in the labor market where children and women, individuals with low employment rates, are more likely to work after 2014. In the control period (2009 to 2013), on average, 87% of men work, but only 39% of women and 19% of children work. Therefore, the ICSP announcement raises individuals' probability with time to work rather than employers already in the fields.

7 Conclusion

Households' decisions depend on current income and their *expected* earnings. When deciding who works or studies within homes, families include current and expected revenues to smooth consumption. Governments could affect decisions only by promising subsidies, aid, or assistance. Providing evidence of the possible side effects of announcing programs with unknown implementation time is essential to understand how families react to official messages. The standard political agenda includes constant communication that, without precautions, can harm citizens who receive the transmission. The three-year gap between the ICSP announcement and implementation is an example of how poor coordination in the government negatively affected the population.

[32]The effect of the intensive margin for adults is like the findings from children. After the ICSP announcement, conditional working hours of adults declined in coca–growing areas more than non–coca-growing areas. However, the announcement did not affect the unconditional hours (see Table A-7 in the online appendix).

The ICSP is a traditional illicit substitution program that provides financial support to farmers to reduce the cultivation of illegal crops. In essence, the ICSP is a conditional cash transfer type program where households receive cash and in-kind assistance from the government conditional on reducing the coca production. Beyond the failure of the illicit substitution programs to reduce coca production, the three-year gap provides families with time to increase the baseline of coca bushes expecting to receive more money from the government. Farmers understood from the announcement that the government would provide more financial support for having three hectares than one hectare. Promoting the ICSP raised the expected earnings of coca cultivation.

This paper shows how a gap between announcing and implementing rural policies can increase child labor. In the setting considered here, households adjusted children's time allocation depending on their expected earnings. In particular, to receive money from the ICSP for reducing their coca production, farmers needed to show that they produced coca in the first place. This incentive to grow coca increase children's likelihood of joining the labor market. The ICSP announcement needed more details about the money amount or when the program will start in Colombian rural areas. The message was unclear, and the expected income was highly uncertain. Farmers maximized the time allocation to collect coca leaves among all the household members despite the announcement's uncertainty. Thus, children and women with low employment rates increase the probability of joining the labor market, while men, who already worked in the fields, did not change their time at work.

The uncertainty of the messages explains why the findings show a modest decline in the average number of weekly working hours post-ICSP. The decline in hours came mainly from girls and women who spent time working in unpaid activities at home. The ICSP changed the time allocation in the labor market and home production. Farmers could face several challenges from the ICSP, such as receiving insufficient financial support or having a slow implementation of the program (as it happened). Instead of massively increasing the time of all children in the labor market, families minimized the risk by sending more children to work and reducing the time each child spends in coca fields.

This research sheds light on the unintended consequences of policies designed to target local equilibrium outcomes without considering the multiple effects of public policies. The results have policy implications regarding the time between announcing and implementing programs. The evidence implies that governments should hold announcements until programs are ready to implement in the field.

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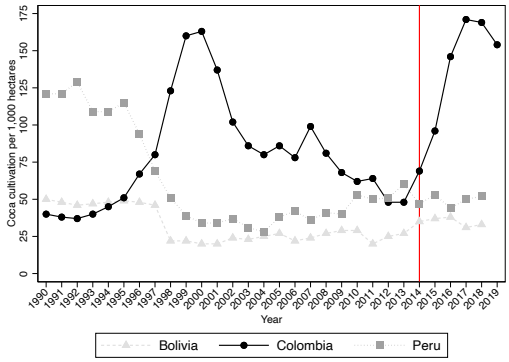
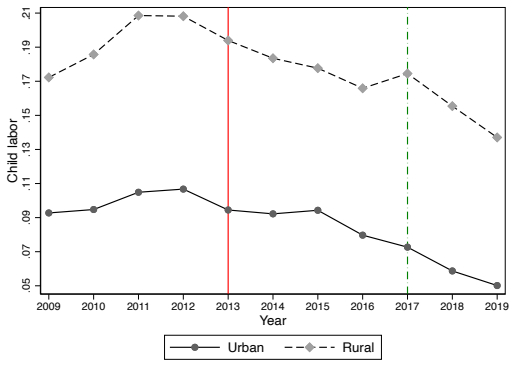
9 Figures

Figure 1: Coca production in Bolivia, Colombia and Peru



Notes: Own calculations based on UNODC (2020).

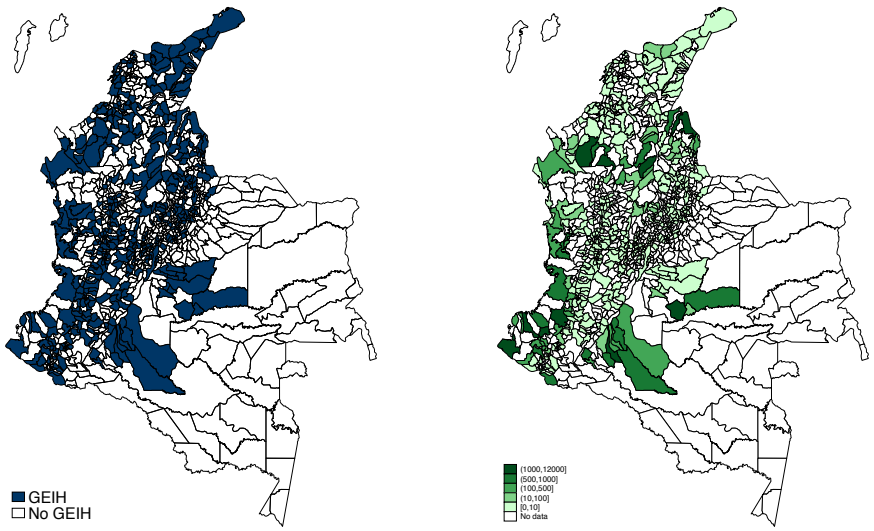
Figure 2: Colombian child labor in levels



Notes: Own calculations using Great Integrated Household Survey (GEIH). 2013 is one year before the Colombian government and FARC members announced in a press released the National Program for the Substitution of Crops for Illicit Use (ICSP). The Colombian government started the program in 2017.

Figure 3: Municipalities in household survey and coca production

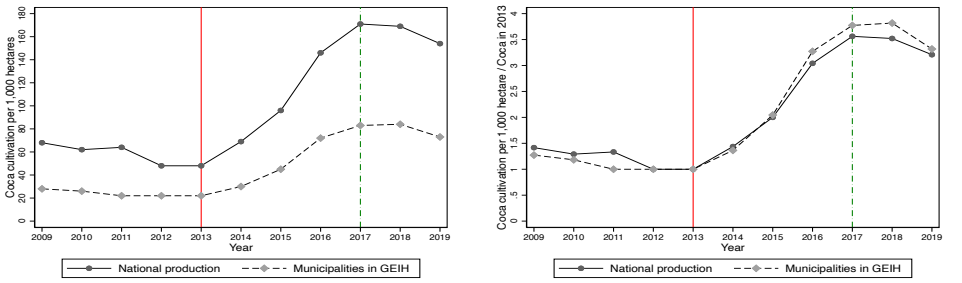
A. Municipalities in household survey **B.** Average coca production from 2009 to 2019



Notes: Panel A presents the panel data of 421 municipalities from 2009 to 2019. Panel B shows the average coca production in the same period in hectares.

Figure 4: Coca production in Colombia

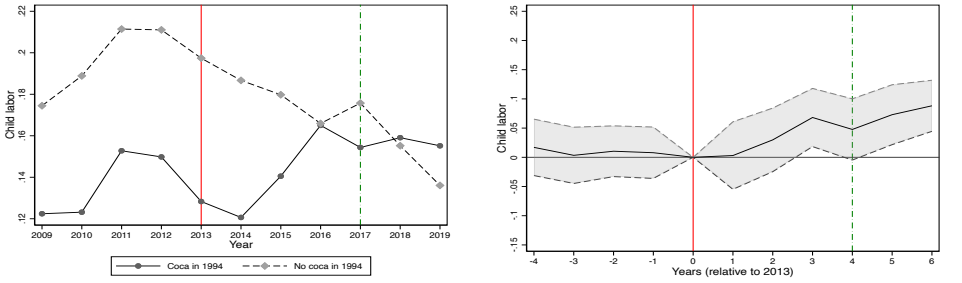
A. In levels **B.** Municipality area cover with coca cultivation



Notes: The solid line in 2013 shows a year before the Colombian government and FARC members' announced the Illicit Crop Substitution Program (ICSP). The government started the program in 2017. In Panel A, the two-sample Kolmogorov-Smirnov (KS) test rejects the null hypothesis (both distributions are equal) with a p-value of 0.021. In Panel B, the KS does not reject the null hypothesis with a p-value of 0.479.

Figure 5: Trends in child labor

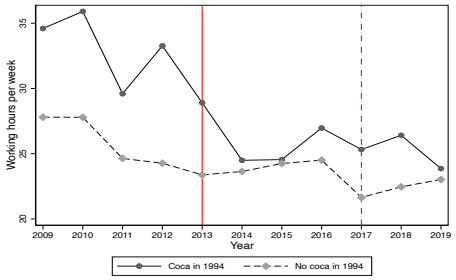
A. Raw data **B.** Points estimates



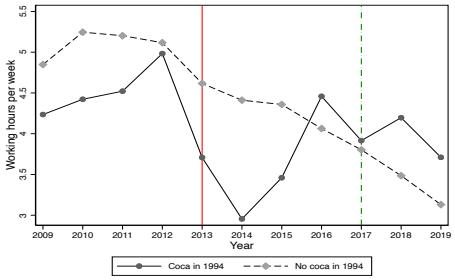
Notes: Panel A presents child labor using the Great Integrated Household Survey (GEIH). Panel B presents the estimated coefficients and 95% confidence intervals for the year interaction in Equation (2). The interaction in 2013 is the omitted category. The solid line in 2013 shows a year before the Colombian government and FARC members announced the Illicit Crop Substitution Program (ICSP). The government started the program in 2017.

Figure 6: Trends in weekly working hours for children

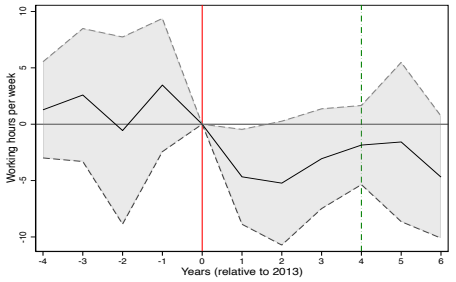
A. Raw data conditional on working hours



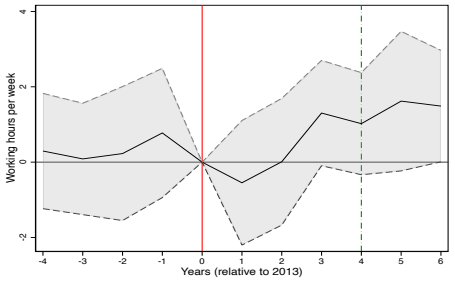
B. Raw data unconditional on working



C. Points estimates conditional on working hours



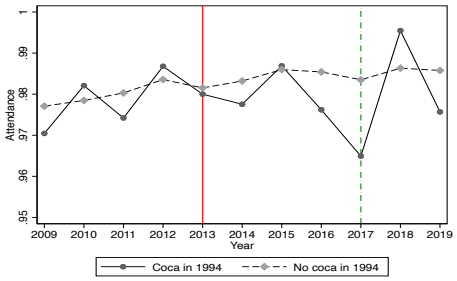
D. Points estimates unconditional working hours



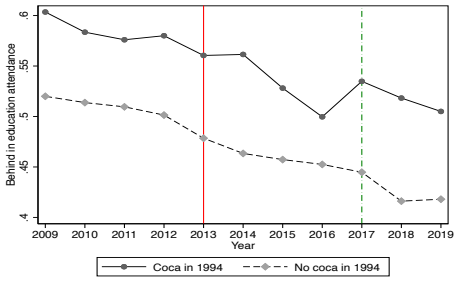
Notes: This figure presents the raw data for working hours conditional and unconditional on working, panels A and B, respectively. Panels C and D present the estimated coefficients and 95% confidence intervals from the dynamic specification in Equation (3).

Figure 7: Trends in education outcomes

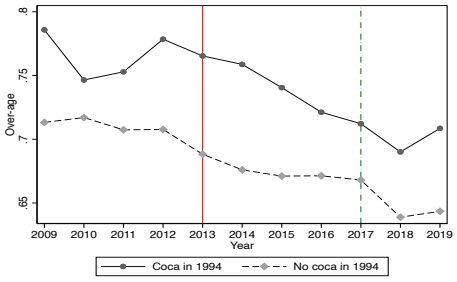
A. Raw data for attendance



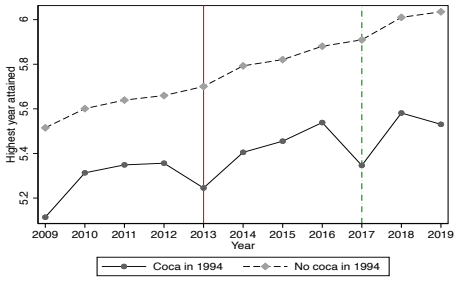
B. Raw data for behind in education attendance



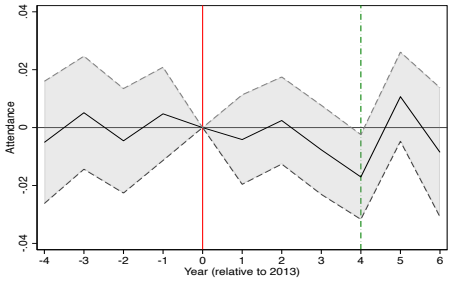
C. Raw data for over-age



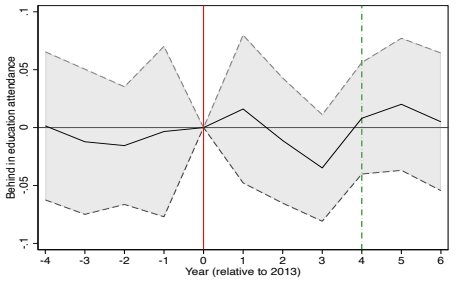
D. Raw data for highest year attained



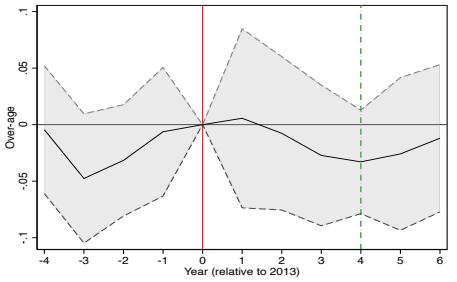
E. Point estimates for attendance



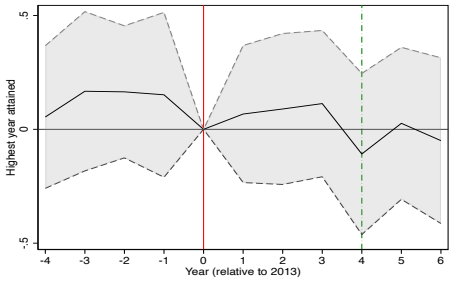
F. Point estimates for behind in education attendance



G. Point estimates for over-age



H. Point estimates for highest year attained



Notes: Panels A to D show the raw data for each education outcome per year. Panel F to H present the estimated coefficients and 95% confidence intervals from the dynamic specification in Equation (3) with each education outcome as dependent variables.

Tables

Table 1: Event study by sub-samples

Dep. Var. Being employed	Youth	Girls	Boys	Adults
	10 - 17 years old			18 and more
2013 is the reference year	(1)	(2)	(3)	(4)
2009 X coca in 1994	0.019	0.018	0.016	0.027
	(0.025)	(0.019)	(0.036)	(0.017)
2010 X coca in 1994	0.008	0.002	0.015	−0.008
	(0.024)	(0.019)	(0.034)	(0.013)
2011 X coca in 1994	0.014	0.009	0.014	0.015
	(0.022)	(0.025)	(0.030)	(0.015)
2012 X coca in 1994	0.008	0.044	−0.025	0.005
	(0.022)	(0.028)	(0.036)	(0.017)
2013 X coca in 1994	–	–	–	–
2014 X coca in 1994	0.003	0.019	−0.008	0.010
	(0.030)	(0.018)	(0.048)	(0.015)
2015 X coca in 1994	0.033	0.038*	0.025	0.026
	(0.028)	(0.021)	(0.042)	(0.016)
2016 X coca in 1994	0.068***	0.019	0.097**	0.043***
	(0.025)	(0.016)	(0.044)	(0.014)
2017 X coca in 1994	0.048*	0.060**	0.041	0.029**
	(0.027)	(0.028)	(0.044)	(0.014)
2018 X coca in 1994	0.074***	0.043**	0.097***	0.038**
	(0.026)	(0.020)	(0.037)	(0.018)
2019 X coca in 1994	0.088***	0.077***	0.104**	0.043***
	(0.022)	(0.025)	(0.043)	(0.015)
Observations	137,843	65,390	72,453	521,186
Dep. Var.				
Mean (2009 to 2013)	0.195	0.095	0.278	0.645
SD (2009 to 2013)	0.397	0.293	0.448	0.479

Notes. This tables presents the estimated coefficients and robust standard errors shown in parentheses clustered at the municipality level for the treatment-group year interaction variables in Equation (2). The interaction in 2013 is the omitted category. 2013 is one year before the Colombian government and FARC members' announced in a press released the National Program for the Substitution of Crops for Illicit Use (PNIS for its name in Spanish). The government started the program in 2017. *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table 2: Child labor

	Dep. Var. Being employed			
	(1)	(2)	(3)	(4)
Post 2013 X coca in 1994	0.041***	0.045***	0.036**	0.036***
	(0.015)	(0.014)	(0.015)	(0.014)
Observations	144, 495	144, 495	1144, 495	144, 495
Mean DV (2009 to 2013)	0.194	0.194	0.194	0.194
SD DV (2009 to 2013)	0.395	0.395	0.395	0.395
Controls:				
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Individual and household controls	No	Yes	No	Yes
Municipality controls x Post 2013	No	No	Yes	Yes

textitNotes. *Individual controls:* age, age cube, sex, having health insurance, living with the parent, know how to read and write. *Household controls:* sex of the head in the house, and her education, the number of people per house, kids younger than five years old, and adults older than 65. *Municipality controls:* the proportion of the rural population, suitability to farm coca, the logarithm of government expenditure in 2005, and the multidimensional poverty index in 2005. I also include homicides per 100,000 inhabitants from 1993 and 1999 and the FARC attacks against civilians between 1993 and 2008. Standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table 3: Robustness exercises for child labor

	Dep. Var. Being employed					
	Baseline	Coca in 1999	Median coca in 2013	Out 2014 observations	Time Placebo	+ Seek employment
	(1)	(2)	(3)	(4)	(5)	(6)
Post 2013 X coca in 1994	0.036***			0.045***		0.038***
	(0.014)			(0.014)		(0.013)
Post 2013 X coca in 1999		0.048***				
		(0.016)				
Post 2013 X coca in 2013			0.027**			
			(0.011)			
Post 2012 X coca in 1994					0.021	
					(0.016)	
Observations	144, 495	144, 495	144, 495	131, 192	144, 495	144, 495
Mean DV (2009 to 2013)	0.194	0.194	0.194	0.194	0.194	0.212
SD DV (2009 to 2013)	0.395	0.395	0.395	0.395	0.395	0.410

Notes. This table presents the results from the main specification in Equation (1). Each column includes the set of controls, municipality fixed effects, and year fixed effects. Standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table 4: Analysis by gender

Dep. Var.	Being employed		
	Girls	Boys	Both
	(1)	(2)	(3)
Post 2013 X coca in 1994	0.032**	0.046**	0.038**
	(0.015)	(0.020)	(0.018)
Male X Post 2013 X coca in 1994			−0.004
			(0.023)
Male			0.178***
			(0.006)
Observations	68,462	76,031	144,495
Mean DV (2009 to 2013)	0.094	0.275	0.194
SD DV (2009 to 2013)	0.292	0.446	0.395

Notes. This table presents the results from the main specification in Equation (1) in Column 1 and 2, and Equation (3) in Column 3. Each column includes the set of controls, municipality fixed effects, and year fixed effects. Standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table 5: Unpaid activities

Dep. Var.	Taking care of children			
	Girls	Boys	Both	
	(1)	(2)	(3)	(4)
Post 2013 X coca in 1994	0.043***	−0.017	0.011	0.040**
	(0.015)	(0.015)	(0.012)	(0.017)
Male X Post 2013 X coca in 1994				−0.054*
				(0.031)
Male			−0.108***	−0.108***
			(0.003)	(0.004)
Observations	144,495	144,495	144,495	144,495
Mean DV (2009 to 2013)	0.185	0.067	0.120	0.120
SD DV (2009 to 2013)	0.388	0.250	0.325	0.325

Notes. This table presents the results from the main specification in Equation (1) in Column 1, 2 and 3, and Equation (3) in Column 4. Each column includes the set of controls, municipality fixed effects, and year fixed effects. Standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table 6: Intensive margin model for children

Dep. Var.	Weekly working hours							
	Conditional on working				Unconditional on working			
	Girls	Boys	Full sample		Girls	Boys	Full sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post 2013 X coca in 1994	−5.043***	−2.638	−3.056**	−1.949	0.466	0.539	0.387	0.388
	(1.516)	(1.750)	(1.440)	(2.103)	(0.331)	(0.700)	(0.417)	(0.485)
Male X Post 2013 X coca in 1994				−1.448				−0.001
				(1.625)				(0.653)
Male				5.689***				5.593***
				(0.419)				(0.199)
Observations	6,195	18,492	24,711	24,711	68,462	76,031	144,495	144,495
Mean DV (2009 to 2013)	18,638	26,400	24,560	24,560	1,766	6,522	4,393	4,393
SD DV (2009 to 2013)	14.727	16.758	16.630	16.360	7.095	14.108	11.750	11.750

Notes. This table presents the results from the main specification in Equation (1) in Column 1, 2, 3, 5, 6, and 7, and Equation (3) in Column 4 and 8. Each column includes the set of controls, municipality fixed effects, and year fixed effects. Standard errors in parentheses are clustered at the municipality level. *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table 7: Education outcomes

Dep. Var.	Attendance rate	Educational lag	Over-age index	Highest level attained
	(1)	(2)	(3)	(4)
Post 2013 X coca in 1994	−0.003	0.013	0.004	−0.025
	(0.005)	(0.014)	(0.015)	(0.063)
Observations	137,835	137,835	137,834	137,835
Mean DV (2009 to 2013)	0.980	0.507	0.710	5.614
SD DV (2009 to 2013)	0.138	0.500	0.454	2.450

Notes. This table presents the results from the main specification in Equation (1). Each column includes the set of controls, municipality fixed effects, and year fixed effects. The dependent variable in column (1) is one for children attaining school. Column (2) is one when the number of education years is less or equal to three years. It is also one when a child who is 12-year-old (13-years-old) has four (five) or fewer years of education, and it is one when a child who is 14-year-old (15-years-old) has six (seven) or fewer years of education. Finally, it is one when a child who is 16-year-old (17-years-old) has eight (nine) or fewer years of education. The variable is zero otherwise. Column (3) is equal to one when $[SAGE = (\frac{yearsofeducation}{age-6}) * 100] * 100$, and 0 otherwise. Over-age equals one if $SAGE < 100$ and 0 otherwise. Column (4) is the number of education years attained. Robust standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table 8: Adult labor

	Dep. Var. Being employed			
	(1)	(2)	(3)	(4)
Post 2013 X coca in 1994	0.026**	0.024**	0.027**	0.026**
	(0.011)	(0.012)	(0.011)	(0.012)
Observations	546,031	546,031	546,031	546,031
Mean DV (2009 to 2013)	0.631	0.631	0.631	0.631
SD DV (2009 to 2013)	0.482	0.482	0.482	0.478
Controls:				
Year FE	Yes	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes	Yes
Individual and household	No	Yes	No	Yes
Municipality controls X Post 2013	No	No	Yes	Yes

Notes. This table presents the results from the main specification in Equation (1). Each column includes the set of controls, municipality fixed effects, and year fixed effects. Robust standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

A Online Appendix (not for publication)

A.1 ICSP announcement

The Colombian government and FARC's members announce the ICSP creation in the following press released:

"(...) Regarding the first sub-point, Programs for the substitution of crops for illicit use, we have agreed that the National Government will create and launch a new Comprehensive National Program for the Substitution of Crops for Illicit Use-ICSP, as part of the structural transformation of the field that it seeks the Comprehensive Rural Reform, and in order to generate material and immaterial conditions of well-being and good living for the populations affected by crops for illicit use, in particular for rural communities living in poverty that currently derive their subsistence from these crops , and thus also find a sustainable and definitive solution to the problem of illicit crops and all the problems associated with them in the territory (...)." Joint dispatch No. 36. Havana, May 16, 2014 consulted on May 31, 2021 in the following link (El Tiempo 2016).

A.2 Child labor definition

I classify a child between 10 to years old as an employee using four variables asked consecutively. First, "what activity did you spend most of your time in last week?" Multiple option question: a. Working. b. Seeking employment. c. Studying. d. Household duties. e. Permanently unable to work. f. Other activity. Second, "In addition to the question above (first question), did you do any paid activities last week for an hour or more?" 1 Yes 2 No. Third, "even though you did not work in the past week, for an hour or more on a paid basis, did you have a job or business that earned you income during that week?" 1 Yes 2 No. Fourth, did you work in a business last week for one hour or more without getting paid? 1 Yes 2 No. A child working either chooses A in the first question or Yes in at least one of the other three questions. I use the same four questions for adult labor.

In the sample, all the children choose an option in the first question. Only 7% of the children report information for the other three questions. Therefore, the first question is the principal component to calculate child labor.

On average, 7% of the children report that they work most of their time in the last week. From those children answering the second, third, and fourth questions, 7% of the final sample, 2% of them report doing pay activities in the last week for an hour or more. Less than 0.01% of children say that even though they do not work in the past week, they receive money from a business. Finally, 7.5% of the children report that they work in a firm last week for one hour or more without getting paid.

For the intensive margin, I use the following question: "How many hours a week do you usually work?" The answer is a numeric variable. Individuals have zero in the number of working hours when they do not work. On average, children work 26 hours per week.

A.3 Suitability of land for growing coca

The index of suitability to grow coca comes from Mejia & Restrepo (2015) in the following steps. First, the authors calculate the production per planted hectare for coca bushes from a representative sample of coca-growing farmers conducted by UNODC and illicit crop monitoring between 2005 and 2010. The farmers were in 64 out of 1,052 municipalities in Colombia. Second, the authors match the productivity from the sample of coca growing areas with geographical characteristics where coca fields were located. The characteristics are "altitude above sea level, soil erosion, aptitude (an index of suitability for common agricultural crops, based on soil nutrients, minerals and topography), and a precipitation

(rainfall) index". Thus, the authors estimate the determinants of the productivity of coca cultivation with the following model:

$$ln(productivity_{hm}) = \beta_0 + \beta_1 altitude_m + \beta_2 altitude_m^2 + \beta_3 othercrops_m + \beta_4 othercrops_m^2 + \beta_5 water_m + \beta_6 water_m^2 + \beta_7 erosion_m + \beta_8 erosion_m^2$$

Where $productivity_{hm}$ is the productivity of coca field h in municipality m from the representative sample. Using the estimated results, Mejia & Restrepo (2015) create a measure of expected productivity of coca bushes for 1,052 Colombian municipalities with geographical data following the equation:

$$suitability_m = exp\Big(\hat{\beta}_0 + \hat{\beta}_1 altitude_m + \hat{\beta}_2 altitude_m^2 + \hat{\beta}_3 othercrops_m + \hat{\beta}_4 othercrops_m^2 + \hat{\beta}_5 water_m + \hat{\beta}_6 water_m^2 + \hat{\beta}_7 erosion_m + \hat{\beta}_8 erosion_m^2\Big)$$

$suitability_m$ measure how productive (production per planted hectare) growing coca in an area depending on geographic characteristics. The index does not vary over time, but it varies varies across municipalities. Finally, Mejia & Restrepo (2015) normalize "the suitability index in terms of standard deviations from the mean to facilitate its interpretation".

A.4 General Participation System in Colombia

In 2001, the Colombian government created the General Participation System (*Sistema general de participacion - SGP*) for distributing resources from the central government to the territorial entities mainly for education, health services and basic sanitation (Article 4 of Law 715, 2001). From the pool of the national sources, for example, 58.5% goes to education (DNP 2001).

The percentage of the national sources to education has increased since 2001 (1.3%; in 2010, 1.6% during 2011 and 2016, an additional 1.8% in 2017). Education resources are mainly used to finance: i), teachers, teaching directors and administrative staff; ii) Hiring the provision of the educational service; iii) Activities to maintain, evaluate and promote educational quality. The amount for 2017 of the SGP is 5 million of US dollars (20.5 billion Colombian pesos).

The assignation from the national government to municipalities depends on a fixed rule. For education, the rule is based on population served and population to be served in conditions of efficiency and equity (DNP 2001).

A.5 Migrant families

The difference in migration patterns between municipalities with historical coca production and non-coca growing areas could lead to a bias effect of the ICSP announcement on child labor. The Colombian department of statistics (DANE) has included a migration module to the household survey since 2012. The module asks: "have you always live in this municipality?" 60% of the rural households report that they have always lived in the same area.

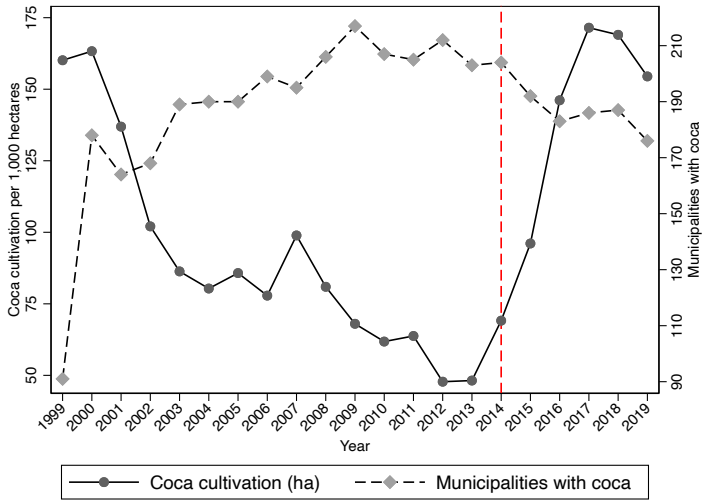
Table **??** presents the estimated parameters using Equation (1) from 2012 to 2019, eight years of sample. Unfortunately, the household survey does not provide data from 2009 to 2011, three pre-treatment years. Child labor is 20% for the sample of eight years, only one

ppt greater than the child labor rate in the full sample between 2009 and 2019. Column 1 shows that children are six ppt more likely to work in municipalities with historical coca production than in no-coca growing areas. The effect is just 0.8 ppt greater than the estimated parameter using the full sample. Column 2 keeps the families saying that they have always lived in the same municipality. The parameter β_1 in Equation (1) is positive and statistically significant from zero. The parameter is two ppt greater than the point estimate in the full sample. Importantly, the coefficient is in the same direction that the hypothesis. Child labor increases in areas with historical production after the ICSP announcement. Columns 3 has only the migrant families. Whereas child labor is 21% similar to columns 1 and 2, the coefficient is not statistically significant from zero.

The interpretation of the results using the migration module are might not causal because the available data only contains two pre-treatment years, 2012 and 2013, and testing for parallel trends is challenging. However, the evidence suggests that the results from omitting migrant families are somewhat larger than the results using the full sample.

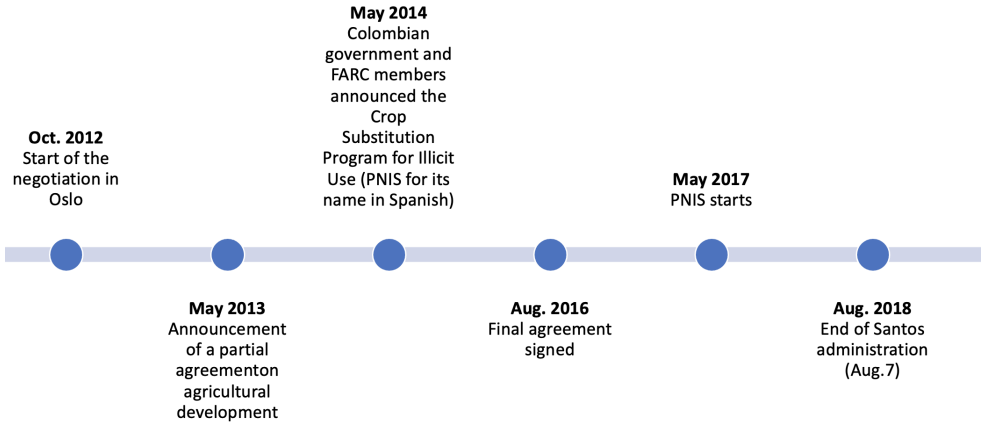
A.6 Online Figures

Figure A-1: Coca production by municipalities



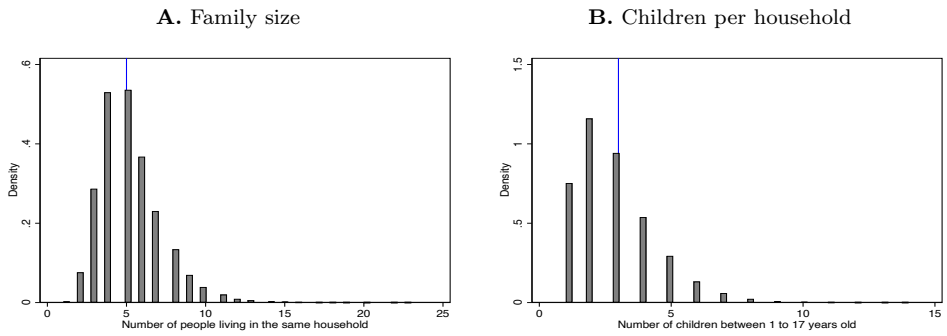
Notes: The line in 2013 shows a year before the Colombian government and FARC members announced the Illicit Crop Substitution Program (ICSP). The government started the program in 2017.

Figure A-2: Timeline for most relevant events



Notes: This figure summarizes the timeline of the ICSP announcement and implementation.

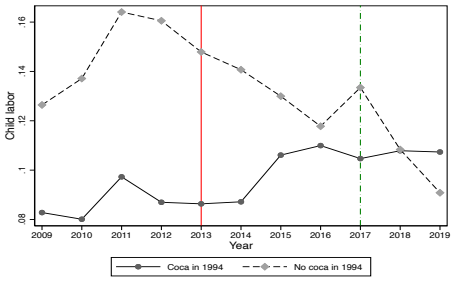
Figure A-3: Household size



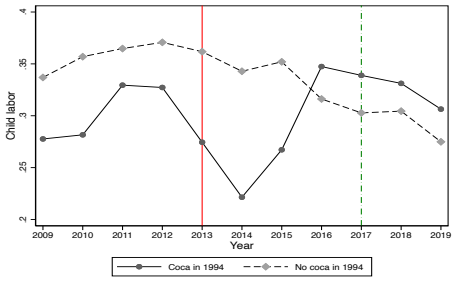
Notes: Panel A shows the distribution of the household. Panel B is the distribution of the number of children in one household.

Figure A-4: Trends in employment by ages

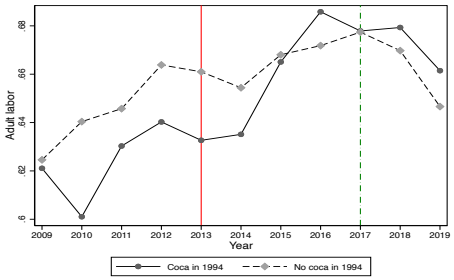
A. Raw data for 10 - 15 years old



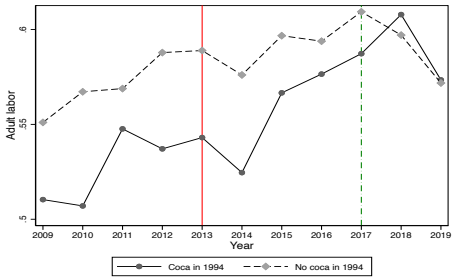
B. Raw data for 16 - 17 years old



C. Raw data for adults - all ages

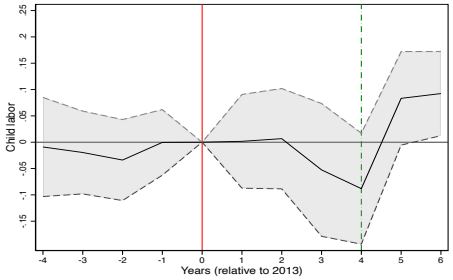


D. Raw data for 18 - 25 years old



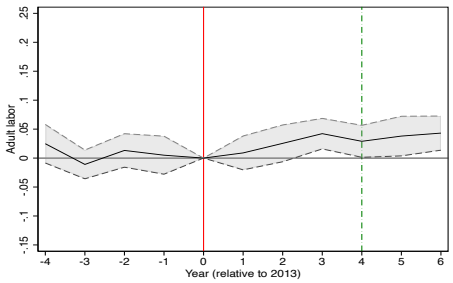
E. Raw data for 26 years old or more

F. Point estimates for 10 - 15 years old



G. Point estimates for 16 - 17 years old

H. Point estimates for adults - all ages



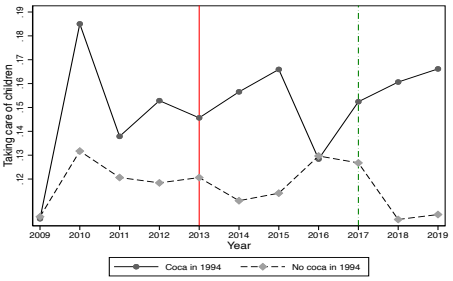
I. Point estimates for 18 - 25 years old

J. Point estimates for 26 years old or more

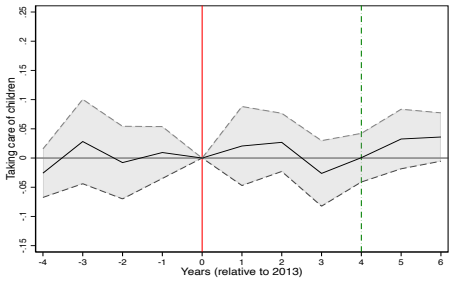
Notes: Panels A to E shows the raw data for the child labor per year. Panel F to J presents the estimated coefficients and 95% confidence intervals from the dynamic specification in Equation (3) with dependent variables is a dummy equal to one for employees and zero otherwise by the same age categories mentioned before.

Figure A-5: Treinds in taking care of children

A. Raw data



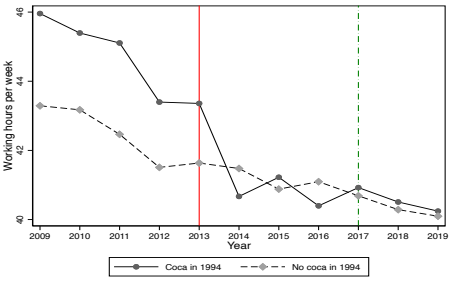
B. Points estimates



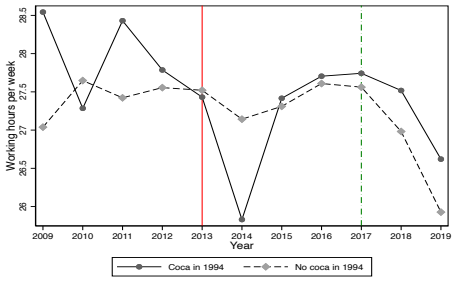
Notes: Panel A presents taking care of children using the Great Integrated Household Survey (GEIH). Panel B presents the estimated coefficients and 95% confidence intervals for the year interaction in Equation (3). The interaction in 2013 is the omitted category. The solid line in 2013 shows a year before the Colombian government and FARC members announced the Illicit Crop Substitution Program (ICSP). The government started the program in 2017.

Figure A-6: Trends in weekly working hours for adults

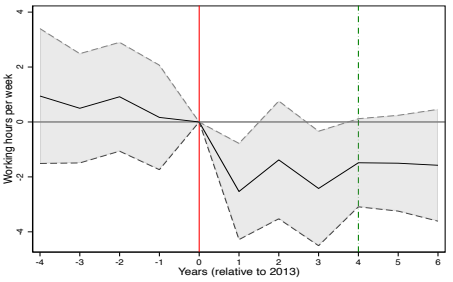
A. Raw data conditional on working hours



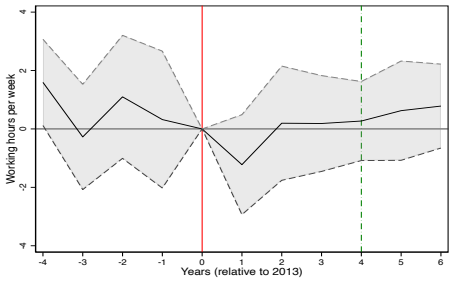
B. Raw data unconditional on working



C. Points estimates conditional on working hours



D. Points estimates unconditional working hours



Notes: This figure presents the raw data for working hours conditional and unconditional on working, panels A and B, respectively. Panels C and D present the estimated coefficients and 95% confidence intervals from the dynamic specification in Equation (3).

A.7 Online Tables

Table A-1: Employment status for children by age
Raw data

Panel A: municipalities without coca in 1994								
	Unemployed				Employed			
Year	10 to 15	Variation	16 to 17	Variation	10 to 15	Variation	16 to 17	Variation
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2009	1,223,415	.	274,257	.	177,060	.	139,362	.
2010	1,180,724	-4%	270,061	-2%	187,641	7%	149,922	8%
2011	1,126,553	-5%	262,361	-3%	221,099	15%	150,652	0%
2012	1,147,118	2%	270,268	3%	219,196	-1%	159,225	5%
2013	1,159,118	1%	261,987	-3%	201,045	-9%	148,496	-7%
2014	1,174,016	1%	263,694	1%	192,043	-5%	137,589	-8%
2015	1,156,901	-1%	248,774	-6%	172,656	-11%	135,221	-2%
2016	1,129,127	-3%	279,431	11%	150,527	-15%	135,137	-4%
2017	1,100,214	-3%	293,435	5%	169,334	11%	127,401	-2%
2018	1,106,214	1%	270,615	-8%	134,350	-26%	118,444	-7%
2019	1,120,442	1%	289,615	7%	111,732	-20%	109,775	-7%
Panel B: municipalities with coca in 1994								
	Unemployed				Employed			
Year	10 to 15	Variation	16 to 17	Variation	10 to 15	Variation	16 to 17	Variation
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2009	59,109	.	11,886	.	5,338	.	4,566	.
2010	64,434	8%	13,678	13%	5,609	5%	5,363	15%
2011	62,338	-3%	14,535	6%	6,718	17%	7,141	25%
2012	59,567	-5%	15,546	7%	5,680	-18%	7,559	6%
2013	66,403	10%	15,151	-3%	6,279	12%	5,727	-32%
2014	61,646	-8%	17,450	13%	5,886	-7%	4,962	-15%
2015	67,592	9%	15,309	-14%	8,022	27%	5,582	11%
2016	65,477	-3%	14,595	-5%	8,090	1%	7,771	28%
2017	71,162	8%	14,243	-2%	8,319	3%	7,298	-6%
2018	66,115	-8%	14,690	3%	7,992	-4%	7,275	0%
2019	59,549	-11%	14,761	0%	7,158	-12%	6,524	-12%

Notes. Employed is defined by children between 10 and 17 years old saying they occupy most of the time in the last week working. Unemployed is defined by children saying they occupy most of the time in the last week searching for work. Own. calculations using Great Integrated Household Survey (GEIH, acronym in Spanish)

Table A-2: Employment status for adults
Raw data

Panel A: municipalities without coca in 1994					
Year	Unemployed	Variation	Employed	Variation	Total
(1)	(2)	(3)	(4)	(5)	(6)
2009	2,187,528		3,639,431		5,826,959
2010	2,124,244	-3%	3,782,866	4%	5,907,110
2011	2,120,964	0%	3,866,203	2%	5,987,167
2012	2,019,030	-5%	3,987,224	3%	6,006,254
2013	2,060,166	2%	4,017,217	1%	6,077,383
2014	2,120,372	3%	4,015,221	0%	6,135,593
2015	2,066,097	-3%	4,158,040	3%	6,224,137
2016	2,065,795	0%	4,229,072	2%	6,294,867
2017	2,048,763	-1%	4,302,149	2%	6,350,912
2018	2,140,398	4%	4,340,835	1%	6,481,233
2019	2,306,655	7%	4,220,674	-3%	6,527,329
Panel B: municipalities with coca in 1994					
Year	Unemployed	Variation	Employed	Variation	Total
(1)	(2)	(3)	(4)	(5)	(6)
2009	100,092		164,076		264,168
2010	110,137	9%	165,921	1%	276,058
2011	104,773	-5%	178,570	7%	283,343
2012	103,896	-1%	184,915	3%	288,811
2013	103,852	0%	178,855	-3%	282,707
2014	104,108	0%	181,205	1%	285,313
2015	98,011	-6%	194,618	7%	292,629
2016	94,254	-4%	205,736	5%	299,990
2017	96,380	2%	202,838	-1%	299,218
2018	98,962	3%	209,651	3%	308,613
2019	103,929	5%	203,064	-3%	306,993

Notes. Employed is defined by adults who are 18 years old or older saying they occupy most of the time in the last week working. Unemployed is defined by adults saying they occupy most of the time in the last week searching for work. Own. calculations using Great Integrated Household Survey (GEIH, acronym in Spanish)

Table A-3: Descriptive Statistics

Dependet variables:	Mean	Std. Dev.
Child labor	0.178	0.383
Weekly working hours		
Conditional on working^{+}	24.560	16.631
Unconditional on working	4.393	11.750
Unpaid activities		
Taking care of children	0.119	0.323
Education outcomes		
Attendance rate	0.982	0.131
Educational lag	0.475	0.499
Over-age index	0.685	0.464
Highest level attained	5.753	2.449
Adult labor	0.657	0.475
Weekly working hours^{+}		
Conditional on working^{+}	41.495	16.994
Unconditional on working	27.249	24.039
Individual controls		
Age	13.433	2.264
Female	0.552	0.497
Access to health	0.916	0.277
Living with parents	0.815	0.389
Know how to read and write	0.976	0.154
Dummy for working in agriculture sector^{+}	0.718	0.450
Dummy for occupation as farmers or agricultural workers^{+}	0.676	0.467
Household controls		
Household head is female	0.230	0.421
Household head is single	0.187	0.390
Years of education of household head	4.425	3.599
Age of household head	45.590	12.143
Number of people living in the same household	5.373	2.002
Dummy of younger than 5 years old	0.361	0.480
Dummy of adults older than 65 years old	0.122	0.329
Municipality controls		
Multidimensional poverty index	67.457	18.365
Suitability to farm coca	-0.015	0.884
Rural pop. / Urban pop.	0.469	0.264
Log (government expenditure in 2005)	22.607	1.109
FARC attacks (from 1993 to 2008)	8.056	12.522
Number of homicides (from 1993 to 1999)	3.625	1.308

Notes. Sample for children between 10 and 17 years old. The children sample is $144,945$. $^{+}$ shows the sample $24,711$ for children working.

Table A-4: Households always living in the same area

Dep. Var.	Being employed	
	(1)	(2)
Post 2013 X coca in 1994	0.046***	0.020
	(0.016)	(0.022)
Post 2013 X coca in 1994 X (=1 for HHs always living in the same municipality; = 0 for HHs not always living in the same municipality)		0.040*
		(0.022)
Observations	100,908	100,908
Mean DV (2012 to 2013)	0.201	0.201
SD DV (2012 to 2013)	0.400	0.400

Notes. Each column includes all the sets of controls. The GEIH collects migration information since 2012. The pretreatment period does not contain 2009 to 2011 data. This table presents the results from the main specification in Equation (1) in Column 1 and Equation (2) in Column 2. On average, 57% of the households (HHs) have always lived in the same municipality. Each column includes the set of controls, department fixed effects, and year fixed effects. Robust standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table A-5: Analysis by age

	Dep. Var. Being employed				
	(1)	(2)	(3)	(4)	(5)
Post 2013 X coca in 1994	0.036**	0.037***	0.036**	0.035***	0.038***
	(0.016)	(0.014)	(0.014)	(0.014)	(0.014)
10-11 years old X Post 2013 X coca in 1994	-0.001				
	(0.013)				
12-13 years old X Post 2013 X coca in 1994		-0.004			
		(0.010)			
14-15 years old X Post 2013 X coca in 1994			0.002		
			(0.013)		
16-17 years old X Post 2013 X coca in 1994				0.003	
				(0.026)	
Age of legal work (15-17 years old) X Post 2013 X coca in 1994					−0.006
					(0.019)
Observations	144,495	144,495	144,495	131,192	144,495
Mean DV (2009 to 2013)	0.194	0.194	0.194	0.194	0.194
SD DV (2009 to 2013)	0.395	0.395	0.395	0.395	0.395

Notes. This table presents the results from the main specification in Equation (1). Each column includes the set of controls, municipality fixed effects, and year fixed effects. Standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table A-6: Analysis by gender for adults

Dep. Var.	Being employed		
	Women	Men	Both
	(1)	(2)	(3)
Post 2013 X coca in 1994	0.049***	0.005	0.046
	(0.018)	(0.008)	(0.037)
Male X Post 2013 X coca in 1994			0.002
			(0.027)
Male			0.490***
			(0.008)
Observations	266,345	279,686	546,031
Mean DV (2009 to 2013)	0.393	0.873	0.631
SD DV (2009 to 2013)	0.488	0.333	0.482

Notes. This table presents the results from the main specification in Equation (1) in Column 1 and 2, and Equation (3) in Column 3. Each column includes the set of controls, municipality fixed effects, and year fixed effects. Standard errors shown in parentheses are clustered at the municipality level *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.

Table A-7: Intensive margin model for adults

Dep. Var.	Weekly working hours							
	Conditional on working				Unconditional on working			
	Women	Men	Full sample		Women	Men	Full sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post 2013 X coca in 1994	−2.088**	−1.308	−1.492**	−0.195	1.060	−0.978	−0.043	−0.411
	(0.839)	(0.922)	(0.758)	(1.114)	(0.651)	(0.871)	(0.648)	(1.292)
Male X Post 2013 X coca in 1994				−1.850*				0.677
				(1.053)				(1.700)
Male				14.031***				28.248***
				(0.282)				(0.369)
Observations	107,568	242,622	350,190	350,190	266,345	279,686	546,686	546,686
Mean DV (2009 to 2013)	31.827	45.640	41.495	41.495	13.238	39.858	27.249	27.249
SD DV (2009 to 2013)	18.439	14.479	16.699	16.699	19.685	20.335	24.039	24.039

Notes. This table presents the results from the main specification in Equation (1) in Column 1, 2, 3, 5, 6, and 7, and Equation (3) in Column 4 and 8. Each column includes the set of controls, municipality fixed effects, and year fixed effects. Standard errors in parentheses are clustered at the municipality level. *** is significant at the 1% level, ** is significant at the 5% level, * is significant at the 10% level.