The labor market effects of drug-related violence in a transit country*

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Abstract

We estimate the effects of drug-related violence on individual labor market outcomes in a transit country. Transit countries do not have enough market power to determine the global supply or demand of drugs yet must deal with the consequences from drug trafficking activities. We implement a Bartik-type instrumental variables strategy which assumes that violence in Honduran municipalities located along drug transport routes changes when coca production in Colombia grows or contracts. Our results show that drug-related violence has negative effects on extensive and intensive margin labor market outcomes for transit country workers and has greater effects on women than men.

Keywords: drug markets, violence, labor market outcomes, gender inequality, instrumental variables.
JEL Classification: C26, O17, J01, J16, J40.

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I Introduction

Violence affects many dimensions of life. It leads to behavioral changes that decelerate economic activity (Becker and Rubinstein, 2011; Metcalfe et al., 2011; Ahern, 2018), hampers the accumulation of human capital (Barrera and Ibáñez, 2004; Brown and Velásquez, 2017; Monteiro and Rocha, 2017), and shapes individual choices in labor markets. The effects of violence on labor force participation are unclear, since feelings of insecurity may preclude individuals from supplying labor but could also motivate them to work more in order to accumulate savings (Fernández et al., 2014). There is also evidence that a violent context may lead to adjustments in employment choices at the extensive and intensive margins (Basu and Pearlman, 2019), such as changing occupational choices and industrial composition (Cramer, 2008). Moreover, these effects may vary by gender (BenYishay and Pearlman, 2013). Part of the uncertainty about the effects of violence on labor markets is due to differences in the sources of violence leveraged in previous research.

This paper studies the effects of drug-related violence on labor market outcomes in a transit country. According to the latest report by the United Nations Office on Drugs and Crime, the biggest consumer of illegal drugs is the United States and the largest producers are located in South America (UNODC, 2021). Geographically, this implies that Mexico, Central America, and Caribbean countries located between consuming and producing nations are transit countries. The international drug trade has fueled a rise in violence in transit countries (Demombynes, 2011), which seems to concentrate on sub-national areas linked with drug trafficking (Shirk and Wallman, 2015). However, the extent of cartel power in Mexico makes them a pivotal actor with market power that influences global drug markets by affecting the available quantity of illegal drugs (Rosen, 2021), but Central American and Caribbean countries behave like small firms in a perfectly competitive industry since they are unable to affect either the global supply or demand of drugs.

Identifying the causal effects of drug-related violence on individual outcomes is empirically challenging (Brown and Velásquez, 2017). Previous work in this direction has leveraged the sharp increase in violence in Mexico to study the labor market effects of rising homicides in that country

(Velásquez, 2020). However, almost no studies have concentrated on estimating the consequences of drug-related violence in Central American or Caribbean countries. Our work focuses on the first region, studying the case of Honduras, one of the most violent countries in Central America. We propose a Bartik-type instrumental variables strategy that leverages temporal variation from coca production in South America and baseline spatial variation from municipal-level homicides in Honduras. Our identifying assumption is that municipalities located along trafficking routes report different levels of violence when drug production grows or contracts. This suggests using two instruments: one that increases the quantity of drugs to be transported and another that reduces them. These candidate instruments are, respectively, the amount of coca plantations (in hectares) and eradicated coca plantations (in hectares) in Colombia, the world's largest reported coca producer. We argue that both instruments fulfill the required conditions for causal identification and allow us to identify the effects of drug-related violence on labor market outcomes in Honduras.

Results show that increases and decreases in drug-related violence has statistically significant effects on transit country labor markets. For all workers, we find a statistically significant reduction in labor supply and a significant increase in the share of informal employment in municipalities where violence increases with drug production. Compared to the average over the period, labor force participation falls by 7.03% and informality rates increase by 6.84% with respect to the mean when drug-related violence increases by one standard deviation. We also find an increase in the amount of hours worked per week, which rise by 9.44% on average as drug-related violence increases Moreover, our results indicate that drug-related violence has greater effects for women but not men, especially at the extensive margin. We also find that increases in drug-related violence have greater effects on labor market outcomes than corresponding decreases in violence.

We conduct two placebo tests to ensure that these estimated effects are due to exogenous variation in South American drug production and that the main mechanism by which this instrument operates is through violence. First, we use commodity prices as excluded instruments and estimate how internationally set prices affect municipal-level homicides. While there is a relevant first-stage between these two variables, we find no conclusive evidence that the variation in violence gener-

ated by price changes has an effect on labor market outcomes for all workers, men, or women. Second, we use drug production as the excluded instrument, but change the instrumented variable from homicides to non-violent deaths. Our findings indicate no relationship between drug production in South America and non-violent fatalities in Honduras. Both placebo tests suggest that the variation from drug-related instruments only affects labor market outcomes through its relationship with municipal-level homicides, lending further support that our identification strategy is adequately capturing the consequences of drug trafficking in a transit country labor market.

This paper contributes to various debates in the literature on violence and labor markets. While the effect of violence on labor markets is a broad-reaching topic, few studies have concentrated on the effects of drug-related violence in countries besides the United States or Mexico. Approximately 32 transit countries lie between the drug producing nations in South America and primary consumers mostly located in the United States. To our knowledge, this is one of the first studies that documents the consequences of drug-related violence in one of those transit countries. We hope that this contribution generates further interest in analyzing the effects of drug trafficking on other outcomes, in other transit countries, and perhaps motivates a cross-country analysis to determine whether the consequences of drug trafficking are heterogeneous across different locations.

Additionally, the results also provide new evidence on barriers to gender equality. Besides the many documented obstacles faced by women in Latin American labor markets (Bando, 2019; Bando et al., 2019), our findings suggest that externalities from the international drug trade also contribute to perpetuate labor market inequalities among men and women in a transit country. Gender-based labor policies should consider that external factors out of the control of governments may be hindering some of the efforts directed at reducing inequalities between women and men.

The remainder of this paper is organized as follows. Section II describes the international drug market in Latin America. Section III describes the data we use to implement our instrumental variables identification strategy detailed in Section IV. Section V presents our estimates of the effects of drug-related violence on labor market outcomes, robustness tests, and additional empirical exercises. Section VI concludes.

II Drug trafficking in Latin America and the Caribbean

According to the United Nations Office on Drugs and Crime (UNODC), Latin America and the Caribbean is a hotspot for the global drug trade. North America has the largest number of opioid and cocaine consumers, South America concentrates the largest producers of cocaine, and Central America and the Caribbean is one of the largest drug trafficking routes worldwide (UNODC, 2021).

Interpreted in terms of production theory, this suggests that North and South American countries have market power, since they are able to determine the equilibrium quantities and prices of illegal drugs. Transit countries in Central America and the Caribbean are therefore akin to small firms under this view: price takers that are unable to influence the demand or supply of drugs. While drug consumption has risen in many countries in Central America and the Caribbean since the 1980s, the amount of users remains comparatively small relative to North American users and almost no countries in trafficking areas have become large producers of drugs (Bergman, 2018).

Despite their lack of market power, transit countries bear the costs from illicit drug trafficking. Given the increase in drug consumption over time, there are growing health concerns for users (Gómez, 1998; Bergman, 2018). There is also distress about organized crime's threats to democracy and the capture of politicians by cartels to facilitate drug transportation across these territories (Bagley, 2015; Dell, 2015). However, the violent costs from drug trafficking are the most visible. Areas exposed to intense drug trade suffer from higher homicide rates (Demombynes, 2011; Velde, 2012; Rivera, 2016). Data from the 2018 World Development Indicators shows that seven of the top ten most violent nations were transit countries in Central America and the Caribbean[1].

The broad literature that focuses on quantifying the effects of violence on individual outcomes agrees that the source of violence is relevant to its impact (White, 2014). Therefore, drug-related violence may have different consequences than say, sexual (Sabia et al., 2013), gang-related (Watkins, 2017), and generalized violence (Bindler and Ketel, 2021). While greater attention in

[1]These are in order (homicide rate in parentheses): El Salvador (52), Jamaica (43.0), Honduras (38.9), Mexico (29.1), Guatemala (22.5), St. Lucia (21.4), and Puerto Rico (21.1). The other Latin American countries not in Central America or the Caribbean are: Venezuela in fourth place (36.7), Brazil in sixth place (27.4), and Colombia in seventh (25.3).

previous work has been placed on studying the impact of the opioid crisis on consumers in the United States (Maclean et al., 2020) and the effects of drug-related violence in Mexico (BenYishay and Pearlman, 2013; Osorio, 2015; Brown and Velásquez, 2017; Basu and Pearlman, 2019; Velásquez, 2020), less research has focused on estimating the consequences of drug-related violence for individuals in transit countries other than Mexico, which is a unique case because it is a transit country with market power, unlike countries located in Central America and the Caribbean. Moreover, the population in the latter region is over five times larger than in Mexico.

This paper focuses on estimating the labor market consequences of drug-related violence in Honduras, one of the most violent transit countries through which an estimated 15% of United States-bound cocaine flows (UNODC, 2013, 2019). Violence is one of the problems consistently identified as detrimental by the Honduran population (Dammert and Tobar, 2017), and while the high levels of violence are due to multiple causes, drug-related homicides have been documented as one of its primary sources (Berg and Carranza, 2018; Landa-Blanco et al., 2020). Additionally, there is both historic and recent evidence of collaboration between drug cartels and authorities.[2]

The benefit of studying a transit country with no market power in drug markets is that we can leverage plausibly exogenous changes in production and other drug-related events as instruments for sub-national homicide rates to identify the causal effects of changes in drug-related violence on individual labor market outcomes. We first describe the data that will be used to carry out the analysis and then present in detail our identification assumptions and proposed empirical strategy.

III Data

The main source of data we use in this paper are household surveys from 2013-2019, the *Encuesta Permanente de Hogares de Propósitos Múltiples* or EPHPM (for its acronym in Spanish), which are further augmented with yearly information on municipal-level violence, drug production, and other

[2]See Rosenberg (1988) for historic evidence on collaboration between cartels and politicians in Honduras. Recent research shows that such associations may have grown over time, reaching the upper echelons of power (Bosworth, 2010; Blume, 2022). In fact, on February 15, 2022, outgoing president Juan Orlando Hernández was detained by police for extradition to the United States, which was authorized on April 21, 2022 where he awaits trial, https://www.nytimes.com/2022/04/21/nyregion/honduras-juan-orlando-hernandez-extradition.html.

relevant variables. The EPHPM is a nationally representative labor force survey collected annually by the Honduran National Statistics Institute (INE, for its acronym in Spanish). These surveys gather information from a sample of about 7,200 dwellings, collecting individual-level data on demographics, education, labor market outcomes, and socioeconomic conditions representative of the total population. While the EPHPM surveys are not longitudinal, their repeated cross-section nature allows exploring patterns and trends in labor market outcomes over time. Given our interest on labor market outcomes, we focus on the sample of respondents aged 15-59 years old.[3]

Table 1. Descriptive statistics from household surveys

	Full sample		Men		Women	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
A. Outcomes						
Labor force participation	0.669	(0.471)	0.861	(0.346)	0.502	(0.500)
Employed	0.624	(0.484)	0.819	(0.385)	0.454	(0.498)
Hours worked per week	40.1	(21.4)	41.5	(19.4)	37.7	(24.1)
Informality	0.804	(0.397)	0.822	(0.382)	0.775	(0.418)
Real hourly wages	50.19	(84.13)	46.96	(82.62)	55.31	(86.24)
B. Characteristics						
Fraction male	0.465	(0.499)				
Age	31.9	(12.6)	31.4	(12.6)	32.4	(12.6)
Married	0.504	(0.500)	0.506	(0.500)	0.503	(0.500)
Born in a different municipality	0.474	(0.499)	0.437	(0.496)	0.507	(0.500)
Years of education	8.00	(3.88)	7.74	(3.79)	8.23	(3.95)
Years of education missing	0.079	(0.270)	0.083	(0.276)	0.076	(0.265)
Lives in Central District	0.140	(0.347)	0.133	(0.339)	0.145	(0.353)
Lives in San Pedro Sula	0.082	(0.274)	0.079	(0.270)	0.084	(0.278)
Lives in other urban area	0.331	(0.471)	0.317	(0.465)	0.343	(0.475)
Lives in rural area	0.447	(0.497)	0.471	(0.499)	0.427	(0.495)
Observations	107,108		50,023		57,085	

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: These statistics show averages from 2013-2019 for Hondurans aged 15-59 years old. All statistics are weighted using survey-provided weights.

Table 1 shows descriptive statistics for the selected sample over the study period. On average, two out of every three Hondurans are active in the labor market. The mean employment rate over the period is 62.4%, and employed individuals work about 40 hours per week. Labor informality

[3]We define this upper bound because the legal retirement age in Honduras is 60 for women and 65 for men.

is high, with 80% of workers not contributing to any form of social security. Real hourly wages are 50.19 Lempiras (about 2.09 USD per hour using an exchange rate of 24 Lempiras per 1 USD). The sample has an average age of 32 years, 8 years of schooling, and just over half reside in urban areas. About 50% currently live in a different municipality than their birthplace, suggesting the importance of internal migration. The table also highlights gender differences. Labor force participation and employment rates are higher for men than women, as well as hours worked and labor informality. However, average wages are higher for women, which is due in part to the fact that women who work have higher educational attainment and are more likely to reside in cities.

The EPHPM surveys do not collect data for all 298 Honduran municipalities due to accessibility constraints in some areas of the country (INE, 2019). The surveys cover 16 of the 18 departments, which comprise 288 municipalities, 96.6% of all districts. The two departments not included are the Bay Islands and Gracias a Dios (See Figure A.1 in the Online Appendix for their locations). These departments account for 1.85% of the total population (0.75% in the Bay Islands and 1.09% in Gracias a Dios according to the most recent census in 2013, (INE, 2013)). Given the high coverage rates of the surveys and their ability to measure changes over time for most Hondurans, they are suitable to study how labor market outcomes are affected by violence.

Municipal-level violence data are obtained from the Honduran National Police, which hosts the *Sistema Estadístico Policial en Línea* (SEPOL, for its acronym in Spanish). SEPOL provides publicly accessible counts for 22 different violent events across all 298 municipalities on its website. We scraped this website to obtain these statistics and constructed a municipal-level panel of monthly violent events from January 2013 to December 2019. Table A.1 in the Appendix presents annual statistics for the 22 violent incidents included in SEPOL records for this period.

All variables in the EPHPM are identically defined to ensure comparability across surveys, although few changes have been made to the sampling frame or questionnaire in recent years. Selecting this period allows providing up-to-date information on labor market outcomes before the pandemic. Since surveys are collected during a particular month in the year, we use the sum of violent incidents in the months preceding survey fieldwork. For instance, in 2013, the survey

was collected in May. Therefore, we sum SEPOL incidents from January to April to measure pre-survey violence. From 2014-2019, the survey was collected in July, so we use the sum of violent incidents from January to June. We merge these sums to the current municipality of residence for survey respondents in each year.

Additionally, we merge other relevant data to these augmented household surveys. First, we use statistics from the Global Illicit Crop Monitoring Programme collected by UNODC, which measures drug-related indicators in South America. We compile the yearly sum of coca production and eradication (in hectares) from 2013-2019 for the largest producer of coca: Colombia.[4] Second, we add annual information on deportations of Honduran citizens from the United States Immigration and Customs Enforcement (ICE) reports. Evidence has shown that deportations increase criminal capital in Central America (Sviatschi, 2019), especially with regards to organized crime and the drug trade. The data include aggregate counts of total, criminal, and non-criminal removals of Hondurans from the United States. Last, we also gather information on commodity prices for goods exported by Honduras, including coffee, bananas, and palm oil; in order to conduct robustness exercises described in the next section. Table A.2 in the Online Appendix shows descriptive statistics for drug production, deportations, and commodity prices over the period of study.

We believe that together, these data are suitable to estimate the effects of drug-related violence on labor market outcomes in a transit country, which will provide new and relevant evidence to better understand the consequences of illicit activities on individual labor market outcomes. In order to appropriately isolate the causal effect of drug-related violence on labor market outcomes in Honduras, we propose using a Bartik-type instrumental variables identification strategy.

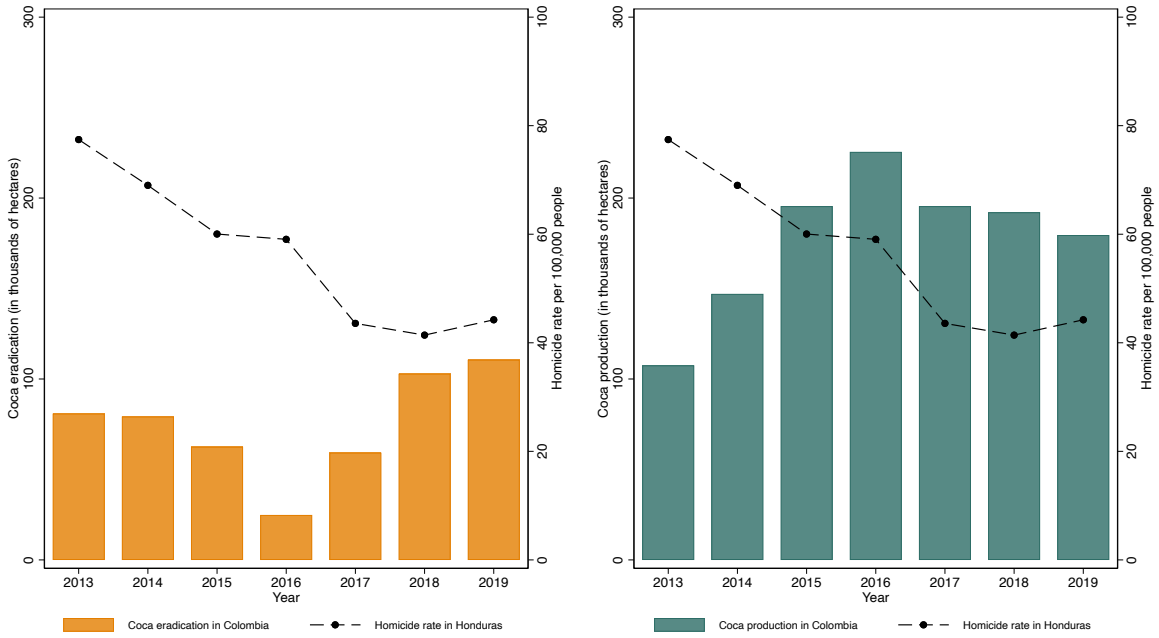
[4]The next largest coca producers in South America are Bolivia and Peru. We estimate all our results including Bolivian production but omit them due to space restrictions since they are qualitatively similar. Unfortunately, there are no available estimates of production for 2018 and 2019 for Peru, so we omitted this country from our calculations due to data availability concerns.

IV Identification and empirical strategy

A Identification

Estimating the causal effect of violence on labor market outcomes is plagued with endogeneity issues, which creates a challenge for empirical researchers. We propose overcoming this challenge by means of an instrumental variables strategy. Our identification assumption is that increases and decreases in coca production in Colombia affect municipal-level violence in Honduras differentially, depending on whether the district is located along a drug trafficking route. The resulting variation over space and time allows isolating the causal effect of drug-related violence.

Figure 1. Yearly trends in drug production and violence in Honduras

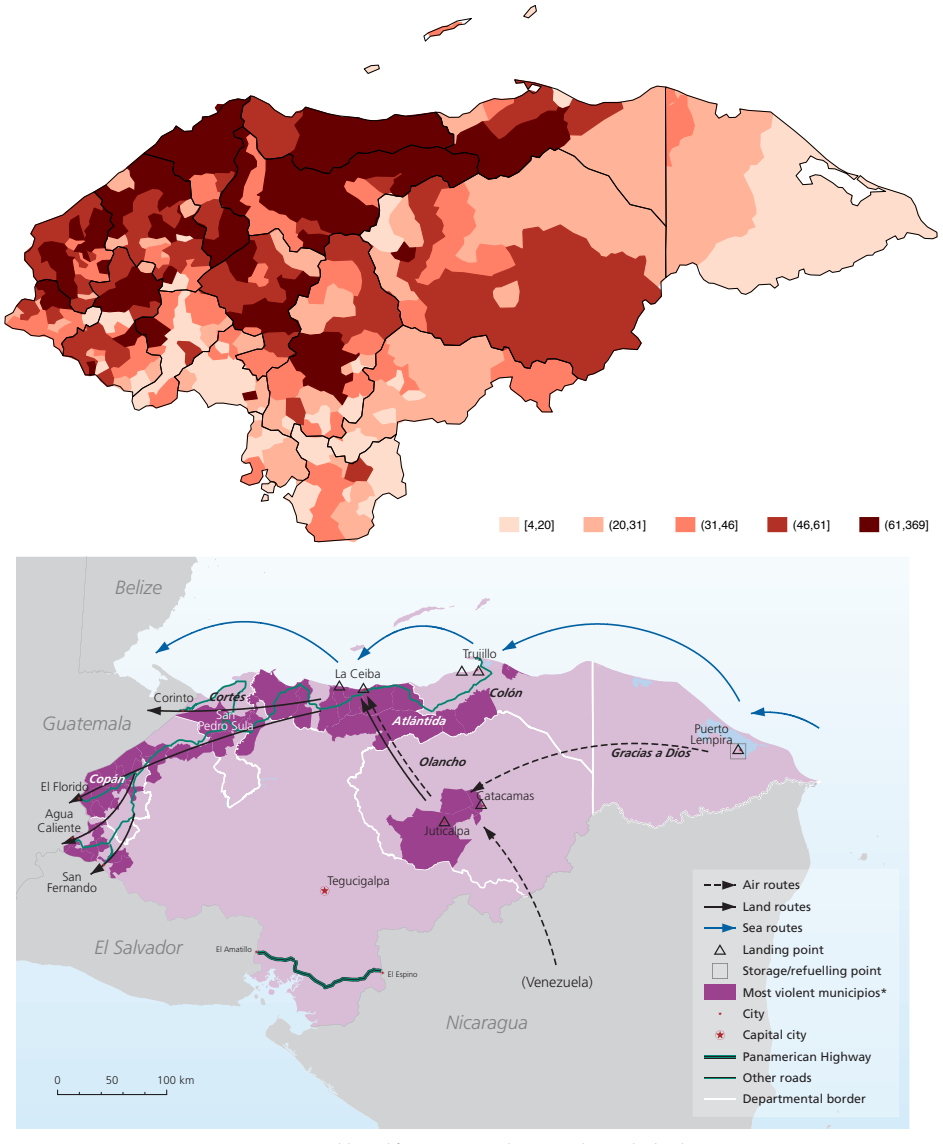


Source: Authors' elaboration from UNODC and SEPOL data from 2013-2019.

Figure 1 plots yearly trends for coca production (in hectares) in Colombia and violence in Honduras as measured by the homicide rate. We observe that while coca production in Colombia increased over this period, the homicide rate has fallen in Honduras. This is contrary to the case studied by Velásquez (2020), in which the author leverages an increase in homicides to estimate

the labor market effects of drug-related violence in Mexico. However, while drug production and violence diverge when observing national trends, our assumption in this paper is that homicides at the district-level are affected by drug-related events in different ways, with municipalities along trafficking routes having a greater probability of being affected by changes in drug production. This requires that we move past aggregate behavior and focus instead on sub-national patterns.

Figure 2. Municipal-level violence and documented trafficking routes



Source: Authors' elaboration from SEPOL data in Panel A and reproduction from UNODC (2013) in Panel B.

To explore sub-national differences in the relationship between drug production and violence, we show average homicide rates from 2013-2019 by municipality together with the map of known drug trafficking routes collected by UNODC in Figure 2. There seems to be some visible correlation between district-level violence and drug transit routes. However, we can estimate this relationship more precisely by constructing a municipal-level panel of violence and drug production.

In order to determine the relationship between changes in coca production and municipal-level homicide rates over time, we first regress observed homicide rates on municipality fixed-effects and secular time trends to remove these effects from the variation in violence. Then, we predict the residuals from that regression. Finally, we regress these residuals on our candidate instruments.

We have two candidate instruments. The first is the amount of eradicated coca plantations in Colombia interacted with the baseline level of homicides in each municipality. This instrument is an exogenous shock to the illegal drug supply. It lowers the available quantity of drugs, which increases prices on drugs currently being transported to consumers. Since these scarcer drugs are now more valuable, we should expect greater violence along transit routes (Castillo et al., 2020). The regression of this instrument on the predicted residuals once removing municipal and time fixed effects is significant, providing a suitable F-statistic of 34.76. As such, it fulfills the first required conditions for an instrumental variable. Before discussing the other requirement, we describe our second instrument.

The second instrument is the the amount of coca plantations in Colombia interacted with the baseline level of homicides in 2013 for each Honduran municipality. This is the opposite case of the previous instrument, since it increases the available quantity of drugs in the market, therefore lowering prices for product currently en route to consumers. Since there are more drugs, we should expect less violence along trafficking routes. Our results show a significant relationship, which suggests that once we eliminate time-invariant attributes and secular trends, local violence changes when drug production rises. This regression provides a first-stage F-statistic of 46.93.

This initial evidence suggests that both increases and decreases in Colombian drug production have a statistically significant relationship with municipal-level violence in Honduras, which we in-

terpret as evidence that drug production affects violence in municipalities along trafficking routes. Therefore, the interaction between municipal-level homicides and coca production and eradication are candidate instruments because they fulfills the first-stage condition of relevance. However, we also need to consider whether it satisfies the exclusion restriction, which requires that the effects of drug production only affect labor market outcomes through its relationship with violence.

We believe that our proposed instruments plausibly satisfy this exclusion restriction for a number of reasons. First, as stated in Section II, Honduras is a transit country that does not determine the global demand or supply of illicit drugs. While there is no national system for measuring drug use among the population, other sources suggest that drug consumption in Honduras is relatively low in comparison to other countries. UNODC (2021) estimates that 3.12% of the population consumes drugs in Central America, compared to 14% in North America[5]. In terms of users, Central America counts for 0.5% of consumption, with Honduras representing a fraction of that number. Therefore, while changes in drug production in South America may affect Honduran consumers and their outcomes directly, we can expect these to be a small percentage of the overall population.

Central American countries have not usually been producers of illicit drugs. However, there are recent reports of incipient production activities in the Northern Triangle: Guatemala, El Salvador, and Honduras (UNODC, 2021). Coca leaf plantations and processing laboratories have been found in Northern Honduras since 2017, with plantations of at least 40 hectares[6]. Compared to Colombia, the largest producer in South America, Honduran coca plantations represent only 0.028% of that country's total production. Even though the amount of coca plantations found in Honduras is non-zero and may be underestimated, its production activities represent a small fraction of overall cocaine production in the Americas. These statistics suggest that while Honduras is not a "pure" transit country because it consumes and produces some illegal drugs, its market share is likely too small so that any changes in production can have any influence over international drug prices.

We also conduct placebo exercises to validate the indirect causal chain we assume in this pa-

[5]These statistics apply to the consumption of cannabis. Unfortunately, there are no available estimates of amphetamine, cocaine, and opioid use in Central America or Honduras specifically (UNODC, 2021).
[6]See https://insightcrime.org/news/brief/coca-crops-flourish-honduras/ and https://latinoamerica21.com/en/central-america-joins-cocaine-production/.

per. First, we change the excluded instrument from variation in coca production to commodity price changes. Internationally set commodity prices may affect violence depending on whether they are labor intensive or not (Dube and Vargas, 2013). Price increases for labor intensive goods are expected to be negatively related to violence, while commodities that use less labor will likely increase violence. Therefore, such estimates would provide the effects of commodity price changes on labor market outcomes through its effect on municipal-level homicides. Depending on the good under consideration, these effects could be positive or negative, but will be unrelated to drug trafficking. Second, we employ the excluded instruments for coca production and eradication but instrument non-violent fatalities instead of homicides. We expect that drug-related events should have no effects on labor market outcomes because they should be unrelated to the amount of deaths from natural causes or traffic accidents. If this expectation is confirmed empirically, then we can conclude that any effects from changes in drug-related events operate only through violent deaths.

While the exclusion restriction from our identification strategy is untestable, we believe that the status of Honduras as a transit country with no market power in international drug markets, the use of multiple drug-related instruments for robustness, and the proposed placebo exercises to ascertain the validity of the assumed causal chain will provide support that our empirical strategy is indeed isolating how the relationship between drug trafficking and violence affects labor market choices. We present our empirical strategy below, and the results in the following section.

B Empirical strategy

Given our identification assumptions, we estimate the effects of drug-related violence on labor market outcomes using the following system of equations:

$$y_{imt} = \alpha + \beta \hat{H}_{mt} + \gamma X_{imt} + \lambda_m + \delta_t + u_{imt} \tag{1}$$

$$\hat{H}_{mt} = \pi_0 + \pi_1(\bar{H}_0 \times coca_t^j) + \gamma X_{imt} + \lambda_m + \delta_t + \varepsilon_{imt} \tag{2}$$

where the first equation is the reduced form and the second equation defines our first stage. y_{imt} are labor market outcomes for person i who lives in municipality m at time t, including labor force participation, employment status, hours worked per week, informality, and the logarithm of real hourly wages. H_{mt} is the homicide rate in municipality m at time t. X_{imt} is a matrix of characteristics that includes the attributes in Table 1: gender, age and its square, whether the person is married, born in a different municipality (as a proxy for internal migration), years of schooling, an indicator identifying whether years of schooling is missing, and regional dummies. We include municipality fixed-effects in λ_m that account for time-invariant factors at the district level and secular time trends in δ_t.

The first-stage equation formalizes the relationship we estimated in the previous sub-section. We instrument the homicide rate in municipality m at time t using the interaction between yearly coca eradication ($j = 1$) and production ($j = 2$) and baseline violence in each district for 2013: $\bar{H}_0 \times coca_t^j$. The included instruments, in both equations, are individual attributes, municipality fixed-effects, and secular time trends. This procedure extracts the variation in homicide rates within municipalities over time that is explained by temporal changes in Colombian drug production.

We estimate this system of equations by two-stage least squares (2SLS) using a Generalized Method of Moments (GMM) approach that provides fully robust variance estimation (Baum et al., 2007). The dependent variables we study include extensive and intensive margin labor market outcomes: labor force participation, employment rates, hours worked per week, labor informality, and the logarithm of real hourly wages. We also estimate OLS regressions to compare with our instrumented results. We cluster standard errors by municipality in all specifications since the variation we use to identify our effects occurs at the district-level (Cameron and Miller, 2015; Abadie et al., 2017). Since we estimate effects on multiple outcomes using the same source of variation, we adjust our p-values using false discovery rate adjusted q-values (Benjamini and Hochberg, 1995).

V Results

Table 2 shows results from OLS regressions of standardized municipality-level homicide rates on labor market outcomes in the first column and IV results using coca eradication and production interacted with baseline district-level homicide rates in the second and third columns for all workers, men, and women. The coefficients estimate how a one standard deviation change in violence affects the corresponding outcomes: labor force participation, employment rate, hours worked per week, labor informality, and log real hourly wages. The table also shows means for each outcome over the period of study, q-values that adjust for multiple hypothesis testing, and first-stage F-statistics for both IV specifications.

The OLS results suggest that there is almost no significant relationships between violence and labor market outcomes, with the exception of a marginally significant positive correlation between hours worked and violence for men, which does not survive multiple hypothesis adjustments. Given the lack of exogenous variation in municipal-level homicides, these OLS estimates cannot be interpreted causally. For this purpose, we apply the instrumental variable procedure described beforehand. As expected from the results in Section IV, there is a strong first stage relationship between the instruments (coca eradication and production in Colombia over time) and the endogenous variable (standardized municipal-level homicide rates over time). The F-statistics for all outcomes and samples are above the conventional levels suggested for instrument relevance.[7]

Our IV estimates indicate a significant relationship between drug-related violence and labor market outcomes, which varies according to the selected instrument. Let us begin by looking at the results that use the amount of coca eradication. As mentioned beforehand, this instrument reduces the supply of illegal drugs and therefore raises its price. Given the scarcity of available product, it makes existing stock more valuable, which may lead to an increase in violence during transportation (Castillo et al., 2020). Therefore, these results capture the effects of rising drug-related violence on labor market outcomes in transit countries.

[7]First-stage results are shown in Appendix Tables A.3, A.4, and A.5 for the all workers, men, and women, respectively.

Table 2. The effects of increases and decreases in drug-related violence on labor market outcomes

	All workers			Men			Women		
	OLS	IV: Eradication	IV: Production	OLS	IV: Eradication	IV: Production	OLS	IV: Eradication	IV: Production
Labor force participation	-0.004	-0.047	0.007	-0.001	-0.027	-0.012	-0.007	-0.069	0.024
	(0.003)	(0.016)***	(0.006)	(0.003)	(0.015)*	(0.011)	(0.005)	(0.022)***	(0.010)**
q-value	0.277	0.029	0.370	0.758	0.213	0.387	0.277	0.021	0.066
Mean	0.669	0.669	0.669	0.861	0.861	0.861	0.502	0.502	0.502
F-statistic		43.9	32.4		41.3	31.7		46.1	32.8
Observations	107,108	107,108	107,108	50,023	50,023	50,023	57,085	57,085	57,085
Employment rate	-0.004	-0.028	0.003	-0.001	-0.016	-0.014	-0.007	-0.041	0.017
	(0.003)	(0.016)*	(0.006)	(0.004)	(0.020)	(0.008)*	(0.005)	(0.021)*	(0.011)
q-value	0.277	0.213	0.680	0.834	0.529	0.225	0.277	0.169	0.243
Mean	0.624	0.624	0.624	0.819	0.819	0.819	0.454	0.454	0.454
F-statistic		43.9	32.4		41.3	31.7		46.1	32.8
Observations	107,108	107,108	107,108	50,023	50,023	50,023	57,085	57,085	57,085
Hours worked per week	0.366	3.782	0.872	0.534	3.179	1.356	-0.082	4.880	-0.297
	(0.320)	(1.178)***	(0.480)*	(0.304)*	(1.313)**	(0.500)***	(0.433)	(1.671)***	(0.697)
q-value	0.370	0.021	0.211	0.213	0.066	0.040	0.866	0.029	0.758
Mean	40.06	40.06	40.06	41.54	41.54	41.54	37.74	37.74	37.74
F-statistic		42.6	31.7		34.3	28.7		58.3	37.1
Observations	66,262	66,262	66,262	40,670	40,670	40,670	25,592	25,592	25,592
Informality	0.003	0.055	-0.019	0.003	0.068	-0.023	0.003	0.043	-0.010
	(0.003)	(0.020)***	(0.005)***	(0.003)	(0.030)**	(0.006)***	(0.003)	(0.017)**	(0.006)
q-value	0.370	0.036	0.002	0.327	0.086	0.002	0.526	0.066	0.242
Mean	0.804	0.804	0.804	0.822	0.822	0.822	0.775	0.775	0.775
F-statistic		40.6	31.8		32.8	28.5		56.0	37.6
Observations	66,140	66,140	66,140	40,595	40,595	40,595	25,545	25,545	25,545
Log Real Hourly Wage	-0.009	-0.028	0.005	-0.005	-0.124	0.054	-0.017	0.097	-0.083
	(0.011)	(0.073)	(0.032)	(0.014)	(0.109)	(0.054)	(0.013)	(0.076)	(0.036)**
q-value	0.529	0.758	0.866	0.758	0.370	0.413	0.327	0.327	0.086
Mean	3.392	3.392	3.392	3.316	3.316	3.316	3.512	3.512	3.512
F-statistic		46.5	32.0		40.8	30.7		56.5	35.5
Observations	55,957	55,957	55,957	34,467	34,467	34,467	21,488	21,488	21,488

Source: Authors' elaboration from augmented EPHPM survey microdata from 2013-2019.

Notes: Each row and column presents reduced form results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports estimates for the effects of standardized municipal-level homicide rates (mean zero and standard deviation one) on labor market outcomes for all workers, men, and women. Column (1) reports OLS estimates, column (2) instruments violence using the interaction between standardized municipal-level homicide rates and coca eradication in Colombia, and column (3) instruments violence using the interaction between standardized municipal-level homicide rates and coca production in Colombia. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors. Given that we estimate coefficients for multiple outcomes using the same source of exogenous variation, we present q-values that adjust for all hypothesis tested in the table, calculated using the method by Benjamini and Hochberg (1995) that controls for the false discovery rate (FDR) described in Anderson (2008). The first-stage results for each regression may be found in Tables A.3, A.4, and A.5, for all workers, men, and women, respectively.

Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.10$.

Columns (2), (5), and (8) of Table 2 show that a rise in drug-related violence has effects on extensive and intensive margin labor market outcomes. For all workers, we find a statistically significant reduction in labor supply and a significant increase in the share of informal employment in municipalities where violence increases with drug production. Compared to the average over the period, labor force participation falls by 7.03% and informality rates increase by 6.84% with respect to the mean when drug-related violence increases by one standard deviation. We also find an increase in the amount of hours worked per week, which rise by 9.44% on average as drug-related violence increases. These effects are robust to multiple hypothesis adjustments.

Results by gender suggest different effects of drug-related violence for men and women. The extensive margin effects we find for all workers are mainly due to discouragement effects on labor force participation for women, while drug-related violence affects men at the intensive margin. Labor force participation in more violent districts is significantly lower for women by 13.8%, but there is no significant effect on male participation after multiple hypothesis adjustments. Employment rates are unaffected upon examining the resulting q-values. We find significant increases in hours worked per week for men and women, 7.7% and 12.9%, respectively. Thus, those who are currently employed seem to work longer hours, which suggests that when violence increases, currently employed workers try to accumulate savings (Fernández et al., 2014). The increase in labor informality is statistically significant for men and women, 8.3% for the former and 5.6% for the latter. We find no statistically significant effects of violence on wages using the eradication IV.

The results for coca production should affect labor market outcomes in the opposite direction than eradication. That is, this instrument increases the supply of illegal drugs and therefore lowers its price. Given the greater availability of product, it makes existing stock less valuable, which may lead to an reduction in violence during transportation. Therefore, the results for the production IV capture the effects of less drug-related violence on labor market outcomes in transit countries.

Overall, we find lower effects of decreases in drug-related violence on labor market outcomes compared to increases. Labor informality falls when there are lower levels of local-level violence, working in the opposite direction than estimates using the eradication IV. Results by gender show

that less violence does not affect participation, employment, or wages for men, but does increase hours worked by 3.3% and lowers labor informality by 2.8%. Women do significantly increase their labor force participation when violence decreases, increasing their labor supply by 4.8%. This increased participation seems to reduce wages by 2.4%. We note that the opposing effects are asymmetric, suggesting that increases and decreases in drug-related violence differ in their impact.

To further analyze whether these small but statistically significant effects on female labor market outcomes are attributable to drug-related violence, we conduct two placebo exercises. First, we use changes in internationally set commodity prices for goods produced in Honduras as the excluded instrument, including coffee, bananas, and palm oil. Second, we change the instrumented variable from homicides to district-level fatalities assumed to be unrelated to drug markets: non-violent and traffic accident deaths. Together, these exercises aim to validate that our identification strategy is indeed capturing the causal effects of increases and decreases in drug-related violence on labor market outcomes.

Table 3 shows estimates that instrument violence using the interaction between baseline municipal homicide rates and commodity prices ($Price_t^j$, where $j = \{\text{Coffee, Bananas, Palm Oil}\}$ and $t = \{2013, ..., 2019\}$), instead of using coca eradication in Colombia over time. We observe that commodity prices are related with increases in violence given the relevant F-statistics (see Tables A.6-A.10 for the first-stage results). Following Dube and Vargas (2013), we conclude that coffee and palm oil are labor intensive in Honduras (there is a negative relationship between prices and violence), while bananas are less labor intensive (we estimate a positive relationship between prices and violence).[8] However, we find few conclusive effects on labor market outcomes. Most of the effects of violence from changes in commodity prices affects male outcomes, significantly reducing employment rates by about 2%. Men also work more hours as commodity prices rise. However, we find no significant effects on other outcomes, and interestingly, no impact on any female outcomes. We interpret these findings as suggestive evidence that while changes in commodity prices are related to municipal-level violence, they have small effects on labor market outcomes.

[8]See Figure A.2 for a visual depiction of the first-stage relationships between commodity prices and violence.

Table 3. The effects of commodity price changes on labor market outcomes

	Full sample			Men			Women		
	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil
Labor force participation	-0.003	-0.002	-0.003	-0.014	-0.015	-0.012	0.006	0.008	0.003
	(0.005)	(0.005)	(0.005)	(0.007)**	(0.007)**	(0.008)	(0.007)	(0.006)	(0.009)
q-value	0.763	0.814	0.744	0.162	0.112	0.346	0.633	0.390	0.814
Mean	0.669	0.669	0.669	0.861	0.861	0.861	0.502	0.502	0.502
F-statistic	71.0	55.6	54.7	69.4	52.6	56.4	72.6	58.6	53.4
Observations	107,108	107,108	107,108	50,023	50,023	50,023	57,085	57,085	57,085
Employment rate	-0.002	-0.001	-0.004	-0.019	-0.017	-0.015	0.012	0.011	0.003
	(0.005)	(0.004)	(0.006)	(0.006)***	(0.005)***	(0.007)**	(0.007)*	(0.006)*	(0.010)
q-value	0.814	0.814	0.744	0.008	0.010	0.125	0.301	0.270	0.814
Mean	0.624	0.624	0.624	0.819	0.819	0.819	0.454	0.454	0.454
F-statistic	71.0	55.6	54.7	69.4	52.6	56.4	72.6	58.6	53.4
Observations	107,108	107,108	107,108	50,023	50,023	50,023	57,085	57,085	57,085
Hours worked per week	1.548	1.466	1.500	1.850	1.713	1.899	0.825	0.836	0.503
	(0.380)***	(0.349)***	(0.442)***	(0.443)***	(0.382)***	(0.446)***	(0.589)	(0.519)	(0.642)
q-value	0.001	0.001	0.006	0.001	0.001	0.001	0.366	0.304	0.723
Mean	40.06	40.06	40.06	41.54	41.54	41.54	37.74	37.74	37.74
F-statistic	60.8	49.1	50.6	51.5	42.3	44.7	84.2	65.9	63.6
Observations	66,262	66,262	66,262	40,670	40,670	40,670	25,592	25,592	25,592
Informality	-0.003	-0.002	-0.008	-0.002	-0.002	-0.006	-0.002	0.001	-0.007
	(0.004)	(0.004)	(0.005)*	(0.006)	(0.005)	(0.006)	(0.008)	(0.005)	(0.007)
q-value	0.736	0.744	0.301	0.814	0.814	0.576	0.814	0.851	0.584
Mean	0.804	0.804	0.804	0.822	0.822	0.822	0.775	0.775	0.775
F-statistic	61.8	49.5	51.2	51.0	41.9	44.6	88.4	67.7	65.2
Observations	66,140	66,140	66,140	40,595	40,595	40,595	25,545	25,545	25,545
Log Real Hourly Wage	-0.032	-0.019	-0.006	-0.047	-0.018	0.008	-0.010	-0.025	-0.044
	(0.023)	(0.018)	(0.019)	(0.028)	(0.024)	(0.025)	(0.025)	(0.023)	(0.030)
q-value	0.366	0.570	0.814	0.301	0.732	0.814	0.814	0.561	0.360
Mean	3.39	3.39	3.39	3.32	3.32	3.32	3.51	3.51	3.51
F-statistic	62.3	48.5	50.1	55.6	44.1	47.6	79.5	60.9	60.1
Observations	55,957	55,957	55,957	34,467	34,467	34,467	21,488	21,488	21,488

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.

Notes: Each row and column presents reduced form results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports estimates for the effects of standardized municipal-level homicide rates (mean zero and standard deviation one) on labor market outcomes for all workers, men, and women. Column (1) reports IV estimates using as excluded instruments homicide rates × coffee prices, Column (2) reports IV estimates using as excluded instruments homicide rates × banana prices, Column (3) reports IV estimates using homicide rates × palm oil prices. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors. Given that we estimate coefficients for multiple outcomes using the same source of exogenous variation, we present q-values that adjust for all hypothesis tested in the table, calculated using the method by Benjamini and Hochberg (1995) that controls for the false discovery rate (FDR) described in Anderson (2008).The complete first-stage results for each reduced form regression by outcome are shown in Tables A.6-A.10.

Significance levels: ***$p < 0.01$; **$p < 0.05$; ***$p < 0.1$.

Additionally, we also change the instrumented variable from municipal-level homicides to non-violent fatalities. This placebo test aims to determine whether changes in drug-related events operate through other channels besides homicides. In particular, we consider non-violent deaths[9] and fatalities from traffic accidents in each municipality over time (NV_{mt}^{j}). We estimate Equations (1) and (2) changing the instrumented variable, for both the eradication (increases in drug-related violence) and production (decreases in drug-related violence) instrumental variables.

Results for this placebo test are shown in Table 4. While drug production is related to non-violent fatalities, as evidenced by the relevant F-statistics in the table[10], we find no conclusive evidence that drug production has an indirect effect on labor market outcomes through the amount of non-violent deaths in each municipality. The findings are similar when using the production IV (see Table A.16 in the Appendix). These results suggest that the temporal variation from drug eradication and production affects labor market outcomes through its relationship with municipal-level homicides and not other non-violent deaths. Therefore, we interpret our results in Table 2 as capturing the effect of increases and decreases in drug-related violence that are due to changes in drug production in countries with market power. As such, and to the best of our knowledge, they represent one of the first estimates of the externalities from drug trafficking in transit countries.

[9]Non-violent deaths is the sum of deaths by natural causes, accidents, and unclassified causes by the Honduran Police.
[10]See Tables A.11-A.15 in the Appendix for the full first-stage estimates by outcome variable.

Table 4. Placebo effects of drug-related violence on labor market outcomes (IV: Eradication)

	Full sample		Men		Women	
	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths
Labor force participation	0.225	0.064	0.097	0.036	0.359	0.102
	(0.223)	(0.073)	(0.102)	(0.041)	(0.389)	(0.125)
q-value	0.562	0.562	0.562	0.562	0.562	0.562
Mean	0.669	0.669	0.861	0.861	0.502	0.502
F-statistic	1.0	1.8	1.1	2.5	0.8	1.4
Observations	107,108	107,108	50,023	50,023	57,085	57,085
Employment rate	0.225	0.072	0.158	0.073	0.296	0.073
	(0.236)	(0.073)	(0.180)	(0.059)	(0.331)	(0.105)
q-value	0.562	0.562	0.562	0.562	0.562	0.562
Mean	0.624	0.624	0.819	0.819	0.454	0.454
F-statistic	1.0	1.8	1.1	2.5	0.8	1.4
Observations	107,108	107,108	50,023	50,023	57,085	57,085
Hours worked per week	-7.639	-2.908	-7.848	-3.826	-7.302	-1.239
	(10.309)	(3.604)	(9.833)	(3.064)	(12.094)	(5.985)
q-value	0.562	0.562	0.562	0.562	0.608	0.837
Mean	40.06	40.06	41.54	41.54	37.74	37.74
F-statistic	1.3	2.1	1.5	2.5	0.9	1.4
Observations	66,262	66,262	40,670	40,670	25,592	25,592
Informality	-0.069	-0.080	-0.066	-0.071	-0.128	-0.112
	(0.091)	(0.075)	(0.088)	(0.067)	(0.181)	(0.127)
q-value	0.562	0.562	0.562	0.562	0.562	0.562
Mean	0.804	0.804	0.822	0.822	0.775	0.775
F-statistic	1.1	2.1	1.4	2.7	0.7	1.4
Observations	66,140	66,140	40,595	40,595	25,545	25,545
Log Real Hourly Wage	0.075	0.276	0.294	0.458	-0.369	-0.187
	(0.280)	(0.238)	(0.359)	(0.344)	(0.663)	(0.269)
q-value	0.817	0.562	0.562	0.562	0.620	0.562
Mean	3.39	3.39	3.32	3.32	3.51	3.51
F-statistic	1.0	1.6	1.2	1.7	0.5	1.5
Observations	55,957	55,957	34,467	34,467	21,488	21,488

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.

Notes: Each row and column presents reduced form results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports estimates for the effects of standardized municipal-level homicide rates (mean zero and standard deviation one) on labor market outcomes for all workers, men, and women. Column (1) reports IV estimates using the interaction between standardized municipal-level non-violent deaths and coca production in South America and Column (2) reports IV estimates using the interaction between standardized municipal-level traffic accident deaths and coca production. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors. Given that we estimate coefficients for multiple outcomes using the same source of exogenous variation, we present q-values that adjust for all hypothesis tested in the table, calculated using the method by Benjamini and Hochberg (1995) that controls for the false discovery rate (FDR) described in Anderson (2008).The complete first-stage results for each reduced form regression are shown in Tables A.11-A.15.

Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

VI Conclusion

This paper estimates the effects of drug-related violence on labor market outcomes in a transit country that does not determine the supply or demand of drugs using instrumental variables. We assume that coca eradication and production in Colombia affect sub-national violence in Honduras and the resulting variation may subsequently impact labor market outcomes. Using household survey data for Honduras, we find statistically significant effects of increases and decreases in drug-related violence. Moreover, our results indicate that drug-related violence has greater effects for women but not men. We also find that increases in drug-related violence have greater effects on labor market outcomes than corresponding decreases in violence. Our results are robust to several additional tests, which lends support that our findings are indeed driven by the causal relationship between drug trafficking and sub-national violence in a transit country labor market.

These results suggest that the negative externalities of drug trafficking in transit countries are non-zero. Moreover, they seem to worsen when the price of illegal drugs increases, leading to lower labor force participation, especially for women. Additionally, there is strong evidence that individuals who are currently employed work longer hours, perhaps in order to accumulate savings, and that work tends to be informal in high violence districts. These results reveal two important findings. First, that drug trafficking constitutes a source of gender inequality in transit country labor markets that traditional equal opportunity policies do not address. Second, that increases and decreases in violence do have opposing effects, but that the former are greater than the latter. Further exploration on the mechanisms that drive these results is warranted in future research to better understand the broad implications of the international drug trade on transit country populations.

There is a possibility to extend the results in this paper by exploring heterogeneous effects within workers and by gender. It is possible to employ the same identification strategy to test whether these effects are more prominent or not depending on age groups, urban and rural areas, and skill level. Additionally, further exploration on the driving forces for these results will complement the preliminary results in a future draft.

We hope that this evidence generates greater interest in quantifying and understanding the consequences of drug trafficking in transit countries not only in Central America and the Caribbean, but across the world. UNODC (2021) reports that the drug trade increased during the Covid-19 pandemic, which may lead to greater economic and social costs in countries that have no market power to determine global demand or supply. Documenting the consequences of drug trafficking in other domains of life for individuals in transit countries is one direction for future research. Additionally, not all transit countries may face the same costs as Honduras. Future research can also estimate the heterogeneous effects of drug-related violence across countries to determine whether the consequences of the drug trade are worse in some nations more than others. Greater evidence would contribute to more effective policies to better deal with illegal drug markets than the current 'War on Drugs' (Saadatmand et al., 2012; Mejia and Restrepo, 2016; Ibanez and Klasen, 2017).

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Online Appendix (Not for publication)

Table A.1. Descriptive statistics for SEPOL data (Rates per 100,000 people)

Event	2013	2014	2015	2016	2017	2018	2019
Homicides	19.49	25.21	23.90	21.68	18.23	16.85	18.77
Traffic accidents	4.76	9.84	11.48	10.61	12.00	12.25	14.12
Traffic accident deaths	3.38	4.24	6.36	6.31	6.97	7.40	8.30
Accidental deaths	1.92	2.69	3.42	5.03	4.68	4.74	4.45
Unclassified deaths	1.45	1.56	1.74	3.42	2.43	3.03	2.92
Natural deaths	0.19	0.47	1.16	1.21	1.67	1.92	2.36
Submersion deaths	0.78	1.11	1.57	2.24	1.51	1.78	1.42
Suspension deaths	0.53	0.59	1.28	0.66	1.27	1.06	1.27
Suicides	1.22	1.42	2.57	1.41	3.16	2.41	3.07
Abortions	0.05	0.18	0.06	0.12	0.07	0.09	0.04
Police office deaths	0.17	0.27	0.24	0.14	0.08	0.17	0.43
Police office injuries	0.58	1.36	0.89	0.59	0.45	0.84	1.27
Firearm injuries	4.60	4.37	3.79	3.13	3.29	2.46	2.85
Knife injuries	1.56	1.68	1.64	2.15	1.42	1.67	1.87
Traffic accident injuries	5.57	11.44	13.51	10.11	9.32	8.43	10.64
Blunt weapon injuries	0.08	0.08	0.12	0.24	0.22	0.10	0.45
Peaceful protests	0.34	0.42	0.89	2.06	2.17	3.18	7.92
Violent protests	0.02	0.04	0.01	0.05	0.02	0.10	0.74
Abductions	0.11	0.12	0.03	0.06	0.02	0.04	0.03
Kidnappings	0.18	0.41	0.23	0.13	0.10	0.08	0.09
Rape	0.11	0.30	0.08	0.03	0.00	0.01	0.00
Rape attempts	0.11	0.01	0.00	0.01	0.02	0.00	0.00

Source: Authors' elaboration from SEPOL data from 2013-2019.
Notes: These statistics show yearly rates per 100,000 people.

Table A.2. Descriptive statistics for drug production, deportations, and commodity prices

	2013	2014	2015	2016	2017	2018	2019
A. Coca (in hectares)							
Production	107,500	147,000	195,500	225,500	195,500	192,100	179,500
Eradication	80,841	79,193	62,486	24,804	59,237	102,873	110,576
B. Removals							
Total	36,592	40,560	20,298	22,015	22,163	28,451	40,751
Criminal	16,625	13,980	8,556	8,592	9,282	12,734	17,941
Non-criminal	19,967	26,580	11,742	13,423	12,881	15,717	22,810
C. Commodity prices							
Coffee	101.8	118.9	111.0	93.2	90.8	84.0	72.4
Bananas	926.4	931.9	958.7	1,002.4	1,074.2	1,147.7	1,142.5
Palm Oil	764.2	739.4	565.1	639.8	647.8	559.9	524.0

Source: Authors' elaboration from UNODC, ICE, and the Federal Reserve.

Table A.3. First-stage regressions for Table 2, Full sample

	Labor force participation		Employment rate		Hours worked per week		Informality		Log Real Hourly Wage	
	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production
$\bar{H}_0 \times Coca_t^j$	-0.156	-0.766	-0.156	-0.766	-0.158	-0.765	-0.156	-0.766	-0.153	-0.774
	(0.023)***	(0.135)***	(0.023)***	(0.135)***	(0.024)***	(0.136)***	(0.024)***	(0.136)***	(0.022)***	(0.137)***
Male	-0.003	-0.001	-0.003	-0.001	0.001	0.005	0.001	0.004	0.005	0.006
	(0.002)	(0.002)	(0.002)	(0.002)	(0.005)	(0.004)	(0.005)	(0.004)	(0.005)	(0.005)
Age	0.000	-0.000	0.000	-0.000	0.000	0.000	0.000	-0.000	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	-0.000	0.000	-0.000	0.000	-0.000	0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.007	0.003	0.007	0.003	-0.001	-0.005	-0.002	-0.006	0.000	-0.004
	(0.004)*	(0.005)	(0.004)*	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Migrant	0.000	-0.001	0.000	-0.001	-0.005	-0.006	-0.005	-0.007	-0.007	-0.009
	(0.006)	(0.005)	(0.006)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
Years of education	-0.000	0.001	-0.000	0.001	-0.001	-0.000	-0.001	-0.000	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	-0.007	-0.070	-0.007	-0.070	0.078	0.027	0.070	0.027	0.045	0.015
	(0.075)	(0.080)	(0.075)	(0.080)	(0.084)	(0.082)	(0.086)	(0.084)	(0.079)	(0.077)
Region: San Pedro Sula	-0.055	-0.109	-0.055	-0.109	-0.081	-0.114	-0.083	-0.119	-0.079	-0.124
	(0.014)***	(0.016)***	(0.014)***	(0.016)***	(0.015)***	(0.016)***	(0.016)***	(0.017)***	(0.015)***	(0.018)***
Region: Other urban areas	-0.062	-0.059	-0.062	-0.059	-0.056	-0.053	-0.056	-0.054	-0.056	-0.056
	(0.015)***	(0.012)***	(0.015)***	(0.012)***	(0.014)***	(0.012)***	(0.014)***	(0.012)***	(0.014)***	(0.012)***
Region: Rural	-0.016	-0.016	-0.016	-0.016	-0.014	-0.013	-0.014	-0.014	-0.014	-0.014
	(0.008)**	(0.012)	(0.008)**	(0.012)	(0.008)*	(0.010)	(0.008)*	(0.011)	(0.007)*	(0.011)
F-statistic	43.9	32.4	43.9	32.4	42.6	31.7	40.6	31.8	46.5	32.0
Observations	107,108	107,108	107,108	107,108	66,262	66,262	66,140	66,140	55,957	55,957

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.

Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for all workers reported in Table 2. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.

Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.4. First-stage regressions for Table 2, Men

	Labor force participation		Employment rate		Hours worked per week		Informality		Log Real Hourly Wage	
	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production
$\bar{H}_0 \times Coca_t^j$	-0.153	-0.756	-0.153	-0.756	-0.153	-0.740	-0.151	-0.740	-0.150	-0.757
	(0.024)***	(0.134)***	(0.024)***	(0.134)***	(0.026)***	(0.138)***	(0.026)***	(0.139)***	(0.024)***	(0.137)***
Age	0.000	-0.001	0.000	-0.001	0.001	0.001	0.001	0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)
Age squared	-0.000	0.000	-0.000	0.000	-0.000	-0.000	-0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.009	0.004	0.009	0.004	0.006	-0.000	0.004	-0.002	0.008	0.000
	(0.007)	(0.006)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Migrant	0.001	-0.001	0.001	-0.001	-0.007	-0.007	-0.007	-0.007	-0.010	-0.010
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)	(0.008)	(0.007)
Years of education	0.000	0.000	0.000	0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	-0.018	-0.050	-0.018	-0.050	0.042	0.017	0.028	0.013	0.001	-0.003
	(0.100)	(0.100)	(0.100)	(0.100)	(0.104)	(0.101)	(0.108)	(0.105)	(0.100)	(0.097)
Region: San Pedro Sula	-0.063	-0.109	-0.063	-0.109	-0.087	-0.111	-0.090	-0.119	-0.079	-0.114
	(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.018)***	(0.019)***	(0.018)***	(0.019)***
Region: Other urban areas	-0.073	-0.070	-0.073	-0.070	-0.069	-0.067	-0.069	-0.068	-0.069	-0.070
	(0.016)***	(0.013)***	(0.016)***	(0.013)***	(0.015)***	(0.013)***	(0.015)***	(0.013)***	(0.015)***	(0.013)***
Region: Rural	-0.021	-0.021	-0.021	-0.021	-0.022	-0.023	-0.022	-0.023	-0.022	-0.023
	(0.012)*	(0.015)	(0.012)*	(0.015)	(0.012)*	(0.014)	(0.012)*	(0.014)	(0.012)*	(0.015)
F-statistic	41.3	31.7	41.3	31.7	34.3	28.7	32.8	28.5	40.8	30.7
Observations	50,023	50,023	50,023	50,023	40,670	40,670	40,595	40,595	34,467	34,467

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for men reported in Table 2. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: ***$p < 0.01$; **$p < 0.05$; ***$p < 0.1$.

Table A.5. First-stage regressions for Table 2, Women

	Labor force participation		Employment rate		Hours worked per week		Informality		Log Real Hourly Wage	
	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production	IV: Eradication	IV: Production
$\bar{H}_0 \times Coca_t^j$	-0.158	-0.774	-0.158	-0.774	-0.166	-0.808	-0.164	-0.810	-0.161	-0.808
	(0.023)***	(0.135)***	(0.023)***	(0.135)***	(0.022)***	(0.133)***	(0.022)***	(0.132)***	(0.021)***	(0.136)***
Age	-0.000	-0.000	-0.000	-0.000	-0.003	-0.002	-0.003	-0.002	-0.002	-0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.007	0.004	0.007	0.004	-0.007	-0.008	-0.006	-0.009	-0.007	-0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
Migrant	-0.001	-0.001	-0.001	-0.001	-0.000	-0.004	-0.001	-0.004	-0.001	-0.005
	(0.007)	(0.006)	(0.007)	(0.006)	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
Years of education	-0.000	0.001	-0.000	0.001	-0.001	-0.000	-0.001	-0.000	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	0.001	-0.086	0.001	-0.086	0.110	0.032	0.115	0.042	0.072	0.020
	(0.071)	(0.079)	(0.071)	(0.079)	(0.095)	(0.092)	(0.097)	(0.093)	(0.099)	(0.097)
Region: San Pedro Sula	-0.047	-0.109	-0.047	-0.109	-0.072	-0.119	-0.074	-0.120	-0.084	-0.143
	(0.011)***	(0.013)***	(0.011)***	(0.013)***	(0.010)***	(0.013)***	(0.011)***	(0.014)***	(0.012)***	(0.016)***
Region: Other urban areas	-0.052	-0.051	-0.052	-0.051	-0.038	-0.034	-0.039	-0.034	-0.038	-0.035
	(0.015)***	(0.012)***	(0.015)***	(0.012)***	(0.018)**	(0.014)**	(0.017)**	(0.013)***	(0.018)**	(0.014)**
Region: Rural	-0.012	-0.012	-0.012	-0.012	-0.003	-0.001	-0.004	-0.003	-0.003	-0.001
	(0.005)***	(0.009)	(0.005)***	(0.009)	(0.005)	(0.004)	(0.004)	(0.005)	(0.006)	(0.005)
F-statistic	46.1	32.8	46.1	32.8	58.3	37.1	56.0	37.6	56.5	35.5
Observations	57,085	57,085	57,085	57,085	25,592	25,592	25,545	25,545	21,488	21,488

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for women reported in Table 2. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.6. First-stage regressions for Table 3, Labor force participation

	Full sample			Men			Women		
	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil
Price of coffee	1.805			1.788			1.822		
	(0.214)***			(0.215)***			(0.214)***		
Price of bananas		-3.628			-3.581			-3.671	
		(0.486)***			(0.494)***			(0.480)***	
Price of palm oil			1.879			1.872			1.886
			(0.254)***			(0.249)***			(0.258)***
Male	-0.002	-0.001	-0.002						
	(0.002)	(0.002)	(0.002)						
Age	-0.000	-0.000	-0.000	0.001	0.000	0.000	-0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.006	0.005	0.003	0.005	0.003	0.002	0.007	0.007	0.005
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)	(0.004)	(0.004)	(0.005)
Migrant	-0.003	-0.004	-0.003	-0.005	-0.006	-0.002	-0.001	-0.002	-0.003
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.005)	(0.006)
Years of education	-0.000	-0.000	0.000	-0.000	-0.000	0.000	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	0.001	0.017	-0.044	0.007	0.019	-0.036	-0.006	0.013	-0.049
	(0.067)	(0.069)	(0.072)	(0.095)	(0.091)	(0.093)	(0.065)	(0.067)	(0.072)
Region: San Pedro Sula	-0.031	-0.041	-0.104	-0.037	-0.045	-0.112	-0.026	-0.036	-0.098
	(0.013)**	(0.013)***	(0.013)***	(0.015)**	(0.014)***	(0.015)***	(0.011)**	(0.012)***	(0.011)***
Region: Other urban areas	-0.045	-0.040	-0.050	-0.053	-0.048	-0.058	-0.038	-0.033	-0.043
	(0.011)***	(0.011)***	(0.012)***	(0.013)***	(0.013)***	(0.013)***	(0.011)***	(0.011)***	(0.012)***
Region: Rural	-0.015	-0.016	-0.014	-0.017	-0.017	-0.018	-0.012	-0.014	-0.011
	(0.006)***	(0.006)***	(0.008)*	(0.008)**	(0.008)**	(0.010)*	(0.004)***	(0.005)***	(0.005)**
F-statistic	71.0	55.6	54.7	69.4	52.6	56.4	72.6	58.6	53.4
Observations	107,108	107,108	107,108	50,023	50,023	50,023	57,085	57,085	57,085

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for labor force participation reported in Table 3. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.7. First-stage regressions for Table 3, Employment rate

	Full sample			Men			Women		
	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil
Price of coffee	1.805			1.788			1.822		
	(0.214)***			(0.215)***			(0.214)***		
Price of bananas		-3.628			-3.581			-3.671	
		(0.486)***			(0.494)***			(0.480)***	
Price of palm oil			1.879			1.872			1.886
			(0.254)***			(0.249)***			(0.258)***
Male	-0.002	-0.001	-0.002						
	(0.002)	(0.002)	(0.002)						
Age	-0.000	-0.000	-0.000	0.001	0.000	0.000	-0.001	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Age squared	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.006	0.005	0.003	0.005	0.003	0.002	0.007	0.007	0.005
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)	(0.004)	(0.004)	(0.005)
Migrant	-0.003	-0.004	-0.003	-0.005	-0.006	-0.002	-0.001	-0.002	-0.003
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.007)	(0.006)	(0.005)	(0.006)
Years of education	-0.000	-0.000	0.000	-0.000	-0.000	0.000	-0.000	-0.000	0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	0.001	0.017	-0.044	0.007	0.019	-0.036	-0.006	0.013	-0.049
	(0.067)	(0.069)	(0.072)	(0.095)	(0.091)	(0.093)	(0.065)	(0.067)	(0.072)
Region: San Pedro Sula	-0.031	-0.041	-0.104	-0.037	-0.045	-0.112	-0.026	-0.036	-0.098
	(0.013)**	(0.013)***	(0.013)***	(0.015)**	(0.014)***	(0.015)***	(0.011)**	(0.012)***	(0.011)***
Region: Other urban areas	-0.045	-0.040	-0.050	-0.053	-0.048	-0.058	-0.038	-0.033	-0.043
	(0.011)***	(0.011)***	(0.012)***	(0.013)***	(0.013)***	(0.013)***	(0.011)***	(0.011)***	(0.012)***
Region: Rural	-0.015	-0.016	-0.014	-0.017	-0.017	-0.018	-0.012	-0.014	-0.011
	(0.006)***	(0.006)***	(0.008)*	(0.008)**	(0.008)**	(0.010)*	(0.004)***	(0.005)***	(0.005)**
F-statistic	71.0	55.6	54.7	69.4	52.6	56.4	72.6	58.6	53.4
Observations	107,108	107,108	107,108	50,023	50,023	50,023	57,085	57,085	57,085

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for employment rates reported in Table 3. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.8. First-stage regressions for Table 3, Hours worked per week

	Full sample			Men			Women		
	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil
Price of coffee	1.771			1.724			1.854		
	(0.227)***			(0.240)***			(0.202)***		
Price of bananas		-3.561			-3.459			-3.736	
		(0.508)***			(0.532)***			(0.460)***	
Price of palm oil			1.852			1.821			1.913
			(0.260)***			(0.272)***			(0.240)***
Male	0.006	0.007	0.004						
	(0.004)	(0.004)*	(0.004)						
Age	-0.000	-0.001	-0.000	0.001	0.000	0.001	-0.003	-0.003	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)*	(0.002)*
Age squared	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)*	(0.000)*
Married	-0.004	-0.004	-0.004	0.002	0.000	-0.002	-0.010	-0.009	-0.007
	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)*	(0.006)	(0.006)
Migrant	-0.008	-0.009	-0.008	-0.012	-0.012	-0.009	0.000	-0.002	-0.005
	(0.006)	(0.006)	(0.006)	(0.007)*	(0.007)*	(0.007)	(0.007)	(0.007)	(0.008)
Years of education	-0.001	-0.001	-0.000	-0.001	-0.001	-0.000	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	0.063	0.078	0.040	0.048	0.059	0.024	0.068	0.089	0.061
	(0.074)	(0.077)	(0.076)	(0.096)	(0.095)	(0.096)	(0.087)	(0.090)	(0.086)
Region: San Pedro Sula	-0.037	-0.045	-0.118	-0.045	-0.052	-0.125	-0.021	-0.030	-0.109
	(0.015)**	(0.015)***	(0.014)***	(0.016)***	(0.016)***	(0.015)***	(0.012)*	(0.014)**	(0.010)***
Region: Other urban areas	-0.040	-0.035	-0.044	-0.049	-0.044	-0.056	-0.025	-0.020	-0.028
	(0.011)***	(0.012)***	(0.012)***	(0.013)***	(0.013)***	(0.012)***	(0.012)**	(0.012)*	(0.016)*
Region: Rural	-0.012	-0.013	-0.011	-0.017	-0.018	-0.019	-0.002	-0.004	-0.002
	(0.005)**	(0.006)**	(0.007)*	(0.008)**	(0.008)**	(0.010)*	(0.003)	(0.004)	(0.005)
F-statistic	60.8	49.1	50.6	51.5	42.3	44.7	84.2	65.9	63.6
Observations	66,262	66,262	66,262	40,670	40,670	40,670	25,592	25,592	25,592

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for hours worked per week reported in Table 3. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.9. First-stage regressions for Table 3, Informality

	Full sample			Men			Women		
	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil
Price of coffee	1.777			1.724			1.865		
	(0.226)***			(0.241)***			(0.198)***		
Price of bananas		-3.567			-3.457			-3.750	
		(0.507)***			(0.534)***			(0.456)***	
Price of palm oil			1.851			1.815			1.914
			(0.259)***			(0.272)***			(0.237)***
Male	0.005	0.007	0.004						
	(0.004)	(0.004)*	(0.004)						
Age	-0.000	-0.001	-0.000	0.001	0.001	0.001	-0.003	-0.004	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)*	(0.002)*
Age squared	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)*	(0.000)*
Married	-0.005	-0.006	-0.005	0.000	-0.002	-0.004	-0.011	-0.010	-0.007
	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)*	(0.006)*	(0.006)
Migrant	-0.008	-0.009	-0.008	-0.012	-0.012	-0.009	0.000	-0.002	-0.006
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)*	(0.007)	(0.008)	(0.007)	(0.008)
Years of education	-0.001	-0.001	-0.000	-0.000	-0.001	-0.000	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	0.056	0.072	0.034	0.033	0.046	0.011	0.073	0.094	0.066
	(0.075)	(0.078)	(0.077)	(0.098)	(0.098)	(0.100)	(0.089)	(0.092)	(0.088)
Region: San Pedro Sula	-0.039	-0.047	-0.120	-0.047	-0.054	-0.127	-0.022	-0.032	-0.111
	(0.016)**	(0.016)***	(0.015)***	(0.017)***	(0.017)***	(0.016)***	(0.013)*	(0.014)**	(0.011)***
Region: Other urban areas	-0.042	-0.037	-0.045	-0.051	-0.046	-0.057	-0.026	-0.020	-0.028
	(0.011)***	(0.012)***	(0.012)***	(0.013)***	(0.013)***	(0.013)***	(0.012)**	(0.012)*	(0.015)*
Region: Rural	-0.012	-0.013	-0.012	-0.017	-0.018	-0.020	-0.004	-0.005	-0.003
	(0.006)**	(0.006)**	(0.007)*	(0.008)**	(0.008)**	(0.011)*	(0.004)	(0.004)	(0.004)
F-statistic	61.8	49.5	51.2	51.0	41.9	44.6	88.4	67.7	65.2
Observations	66,140	66,140	66,140	40,595	40,595	40,595	25,545	25,545	25,545

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for labor informality reported in Table 3. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.10. First-stage regressions for Table 3, Log Real Hourly Wage

	Full sample			Men			Women		
	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil	Coffee	Bananas	Palm oil
Price of coffee	1.796			1.761			1.863		
	(0.228)***			(0.236)***			(0.209)***		
Price of bananas		-3.609			-3.531			-3.758	
		(0.518)***			(0.532)***			(0.481)***	
Price of palm oil			1.872			1.849			1.932
			(0.264)***			(0.268)***			(0.249)***
Male	0.009	0.009	0.007						
	(0.004)**	(0.004)**	(0.005)						
Age	-0.001	-0.001	-0.001	-0.001	-0.001	-0.000	-0.002	-0.002	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
Age squared	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.003	-0.003	-0.003	0.005	0.003	-0.000	-0.012	-0.010	-0.007
	(0.004)	(0.004)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)*	(0.006)*	(0.006)
Migrant	-0.008	-0.009	-0.010	-0.013	-0.012	-0.011	-0.000	-0.002	-0.006
	(0.006)	(0.006)	(0.006)*	(0.007)*	(0.007)*	(0.007)	(0.008)	(0.008)	(0.009)
Years of education	-0.001	-0.001	-0.000	-0.000	-0.001	-0.000	-0.000	-0.001	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	0.044	0.071	0.023	0.026	0.046	0.001	0.042	0.078	0.039
	(0.071)	(0.073)	(0.072)	(0.095)	(0.094)	(0.095)	(0.092)	(0.094)	(0.092)
Region: San Pedro Sula	-0.035	-0.044	-0.133	-0.044	-0.052	-0.128	-0.019	-0.029	-0.146
	(0.015)**	(0.015)***	(0.014)***	(0.015)***	(0.015)***	(0.016)***	(0.014)	(0.016)*	(0.014)***
Region: Other urban areas	-0.042	-0.039	-0.047	-0.053	-0.050	-0.059	-0.025	-0.021	-0.028
	(0.011)***	(0.011)***	(0.012)***	(0.012)***	(0.012)***	(0.012)***	(0.013)**	(0.013)	(0.015)*
Region: Rural	-0.013	-0.014	-0.012	-0.018	-0.019	-0.019	-0.003	-0.005	-0.003
	(0.005)**	(0.006)**	(0.007)*	(0.008)**	(0.008)**	(0.010)*	(0.004)	(0.004)	(0.005)
F-statistic	62.3	48.5	50.1	55.6	44.1	47.6	79.5	60.9	60.1
Observations	55,957	55,957	55,957	34,467	34,467	34,467	21,488	21,488	21,488

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for log real hourly wages reported in Table 3. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.11. First-stage regressions for Table 4, Labor force participation

	Full sample		Men		Women	
	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths
$NV^j_{mt} \times Coca_t$	0.044	0.120	0.045	0.140	0.040	0.104
	(0.045)	(0.088)	(0.044)	(0.089)	(0.045)	(0.087)
Male	0.009	0.005				
	(0.005)*	(0.004)				
Age	0.001	-0.000	-0.000	0.001	0.002	-0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Age squared	-0.000	0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.003	-0.010	-0.008	-0.030	0.000	0.004
	(0.008)	(0.009)	(0.010)	(0.015)*	(0.009)	(0.009)
Migrant	0.014	0.009	0.018	0.011	0.011	0.008
	(0.010)	(0.009)	(0.012)	(0.012)	(0.011)	(0.009)
Years of education	0.002	-0.001	0.002	-0.001	0.002	-0.001
	(0.001)*	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	-0.181	0.073	-0.190	0.047	-0.175	0.103
	(0.110)*	(0.096)	(0.129)	(0.115)	(0.118)	(0.110)
Region: San Pedro Sula	-0.003	0.004	0.015	-0.008	-0.019	0.014
	(0.017)	(0.010)	(0.014)	(0.011)	(0.019)	(0.010)
Region: Other urban areas	-0.015	-0.033	0.005	-0.047	-0.033	-0.020
	(0.020)	(0.026)	(0.022)	(0.029)	(0.019)*	(0.025)
Region: Rural	-0.002	-0.027	0.013	-0.035	-0.015	-0.020
	(0.008)	(0.008)***	(0.008)	(0.010)***	(0.010)	(0.007)***
F-statistic	1.0	1.8	1.1	2.5	0.8	1.4
Observations	107,108	107,108	50,023	50,023	57,085	57,085

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for labor force participation reported in Table 4. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.12. First-stage regressions for Table 4, Employment rate

	Full sample		Men		Women	
	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths
$NV^j_{mt} \times Coca_t$	0.044	0.120	0.045	0.140	0.040	0.104
	(0.045)	(0.088)	(0.044)	(0.089)	(0.045)	(0.087)
Male	0.009	0.005				
	(0.005)*	(0.004)				
Age	0.001	-0.000	-0.000	0.001	0.002	-0.001
	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
Age squared	-0.000	0.000	0.000	-0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.003	-0.010	-0.008	-0.030	0.000	0.004
	(0.008)	(0.009)	(0.010)	(0.015)*	(0.009)	(0.009)
Migrant	0.014	0.009	0.018	0.011	0.011	0.008
	(0.010)	(0.009)	(0.012)	(0.012)	(0.011)	(0.009)
Years of education	0.002	-0.001	0.002	-0.001	0.002	-0.001
	(0.001)*	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of education missing	-0.181	0.073	-0.190	0.047	-0.175	0.103
	(0.110)*	(0.096)	(0.129)	(0.115)	(0.118)	(0.110)
Region: San Pedro Sula	-0.003	0.004	0.015	-0.008	-0.019	0.014
	(0.017)	(0.010)	(0.014)	(0.011)	(0.019)	(0.010)
Region: Other urban areas	-0.015	-0.033	0.005	-0.047	-0.033	-0.020
	(0.020)	(0.026)	(0.022)	(0.029)	(0.019)*	(0.025)
Region: Rural	-0.002	-0.027	0.013	-0.035	-0.015	-0.020
	(0.008)	(0.008)***	(0.008)	(0.010)***	(0.010)	(0.007)***
F-statistic	1.0	1.8	1.1	2.5	0.8	1.4
Observations	107,108	107,108	50,023	50,023	57,085	57,085

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for employment rates reported in Table 4. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.13. First-stage regressions for Table 4, Hours worked per week

	Full sample		Men		Women	
	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths
$NV^{j}_{mt} \times Coca_t$	0.050	0.128	0.057	0.144	0.042	0.106
	(0.044)	(0.089)	(0.046)	(0.090)	(0.045)	(0.088)
Male	0.010	0.006				
	(0.008)	(0.007)				
Age	0.002	-0.001	0.000	0.001	0.005	-0.003
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)*	(0.003)
Age squared	-0.000	0.000	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.004	-0.010	-0.012	-0.029	0.007	0.011
	(0.008)	(0.009)	(0.011)	(0.016)*	(0.012)	(0.012)
Migrant	0.018	0.013	0.015	0.017	0.025	0.010
	(0.011)*	(0.012)	(0.011)	(0.014)	(0.015)	(0.013)
Years of education	0.001	-0.002	0.002	-0.001	0.001	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)*
Years of education missing	-0.129	0.124	-0.166	0.042	-0.024	0.259
	(0.114)	(0.106)	(0.144)	(0.117)	(0.157)	(0.145)*
Region: San Pedro Sula	0.010	0.006	0.011	-0.013	0.003	0.032
	(0.012)	(0.009)	(0.012)	(0.011)	(0.013)	(0.010)***
Region: Other urban areas	0.006	-0.033	0.017	-0.054	-0.016	-0.004
	(0.021)	(0.024)	(0.023)	(0.029)*	(0.022)	(0.024)
Region: Rural	0.011	-0.026	0.014	-0.038	0.003	-0.010
	(0.007)*	(0.008)***	(0.008)*	(0.010)***	(0.009)	(0.007)
F-statistic	1.3	2.1	1.5	2.5	0.9	1.4
Observations	66,262	66,262	40,670	40,670	25,592	25,592

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for hours worked per week reported in Table 4. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.14. First-stage regressions for Table 4, Informality

	Full sample		Men		Women	
	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths
$NV^{j}_{mt} \times Coca_t$	0.047	0.130	0.055	0.148	0.038	0.105
	(0.045)	(0.089)	(0.047)	(0.090)	(0.045)	(0.089)
Male	0.010	0.005				
	(0.008)	(0.007)				
Age	0.002	-0.001	0.000	0.001	0.005	-0.003
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)*	(0.003)
Age squared	-0.000	0.000	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	-0.003	-0.009	-0.009	-0.028	0.006	0.011
	(0.008)	(0.009)	(0.011)	(0.016)*	(0.012)	(0.012)
Migrant	0.018	0.012	0.016	0.015	0.024	0.008
	(0.011)*	(0.012)	(0.011)	(0.014)	(0.015)	(0.013)
Years of education	0.001	-0.001	0.002	-0.001	0.001	-0.003
	(0.001)	(0.001)	(0.002)	(0.001)	(0.002)	(0.002)*
Years of education missing	-0.132	0.122	-0.167	0.050	-0.030	0.247
	(0.115)	(0.108)	(0.147)	(0.118)	(0.157)	(0.148)*
Region: San Pedro Sula	0.011	0.006	0.006	-0.011	0.012	0.029
	(0.012)	(0.010)	(0.013)	(0.011)	(0.012)	(0.010)***
Region: Other urban areas	0.008	-0.033	0.012	-0.053	-0.004	-0.004
	(0.021)	(0.025)	(0.023)	(0.030)*	(0.022)	(0.024)
Region: Rural	0.012	-0.026	0.008	-0.036	0.011	-0.014
	(0.007)*	(0.008)***	(0.008)	(0.010)***	(0.008)	(0.007)*
F-statistic	1.1	2.1	1.4	2.7	0.7	1.4
Observations	66,140	66,140	40,595	40,595	25,545	25,545

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for labor informality reported in Table 4. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.15. First-stage regressions for Table 4, Log Real Hourly Wage

	Full sample		Men		Women	
	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths
$NV^j_{mt} \times Coca_t$	0.042	0.117	0.050	0.129	0.029	0.104
	(0.043)	(0.093)	(0.045)	(0.100)	(0.042)	(0.084)
Male	0.006	0.004				
	(0.007)	(0.008)				
Age	0.003	-0.000	0.000	-0.000	0.008	-0.000
	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)**	(0.003)
Age squared	-0.000	0.000	-0.000	0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)**	(0.000)
Married	-0.002	-0.007	-0.013	-0.030	0.012	0.014
	(0.008)	(0.010)	(0.011)	(0.016)*	(0.012)	(0.012)
Migrant	0.015	0.016	0.012	0.021	0.022	0.012
	(0.011)	(0.011)	(0.011)	(0.013)	(0.017)	(0.012)
Years of education	0.001	-0.001	0.002	-0.000	-0.000	-0.003
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)*
Years of education missing	-0.104	0.099	-0.205	0.018	0.068	0.254
	(0.118)	(0.104)	(0.135)	(0.112)	(0.161)	(0.157)
Region: San Pedro Sula	-0.003	0.009	-0.000	-0.014	-0.009	0.041
	(0.017)	(0.011)	(0.014)	(0.011)	(0.024)	(0.011)***
Region: Other urban areas	-0.014	-0.033	-0.005	-0.056	-0.033	-0.002
	(0.021)	(0.024)	(0.022)	(0.029)*	(0.022)	(0.024)
Region: Rural	-0.001	-0.026	0.006	-0.042	-0.015	-0.008
	(0.008)	(0.008)***	(0.008)	(0.011)***	(0.012)	(0.008)
F-statistic	1.0	1.6	1.2	1.7	0.5	1.5
Observations	55,957	55,957	34,467	34,467	21,488	21,488

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.
Notes: Each column presents results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports first-stage estimates for the reduced form regressions for log real hourly wages reported in Table 4. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Table A.16. Placebo effects of drug-related violence on labor market outcomes (IV: Production)

	Full sample		Men		Women	
	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths	Non-violent deaths	Traffic accident deaths
Labor force participation	-0.004	-0.008	0.037	-0.019	-0.036	0.007
	(0.012)	(0.017)	(0.033)	(0.015)	(0.034)	(0.026)
q-value	0.819	0.819	0.819	0.819	0.819	0.836
Mean	0.669	0.669	0.861	0.861	0.502	0.502
F-statistic	0.9	14.9	0.7	15.2	1.0	14.6
Observations	107,108	107,108	50,023	50,023	57,085	57,085
Employment rate	-0.008	-0.008	0.023	-0.005	-0.030	-0.009
	(0.015)	(0.015)	(0.022)	(0.013)	(0.030)	(0.026)
q-value	0.819	0.819	0.819	0.819	0.819	0.819
Mean	0.624	0.624	0.819	0.819	0.454	0.454
F-statistic	0.9	14.9	0.7	15.2	1.0	14.6
Observations	107,108	107,108	50,023	50,023	57,085	57,085
Hours worked per week	-1.356	1.217	-1.767	1.037	-0.397	0.227
	(2.028)	(1.195)	(3.670)	(1.136)	(1.087)	(1.794)
q-value	0.819	0.819	0.819	0.819	0.819	0.900
Mean	40.06	40.06	41.54	41.54	37.74	37.74
F-statistic	0.6	13.9	0.3	13.0	1.4	15.9
Observations	66,262	66,262	40,670	40,670	25,592	25,592
Informality	0.024	0.003	0.028	0.014	0.018	-0.006
	(0.031)	(0.018)	(0.060)	(0.025)	(0.015)	(0.016)
q-value	0.819	0.877	0.819	0.819	0.819	0.819
Mean	0.804	0.804	0.822	0.822	0.775	0.775
F-statistic	0.6	13.9	0.3	13.0	1.4	15.9
Observations	66,140	66,140	40,595	40,595	25,545	25,545
Log Real Hourly Wage	0.021	0.131	-0.044	0.248	0.094	-0.082
	(0.056)	(0.085)	(0.103)	(0.125)**	(0.085)	(0.078)
q-value	0.819	0.819	0.819	0.819	0.819	0.819
Mean	3.39	3.39	3.32	3.32	3.51	3.51
F-statistic	0.9	11.9	0.6	9.2	1.9	19.0
Observations	55,957	55,957	34,467	34,467	21,488	21,488

Source: Authors' elaboration from EPHPM survey microdata from 2013-2019.

Notes: Each row and column presents reduced form results from a separate regression. Clustered standard errors by municipality are shown in parentheses. The table reports estimates for the effects of standardized municipal-level homicide rates (mean zero and standard deviation one) on labor market outcomes for all workers, men, and women. Column (1) reports IV estimates using the interaction between standardized municipal-level non-violent deaths and coca production in South America and Column (2) reports IV estimates using the interaction between standardized municipal-level traffic accident deaths and coca production. All estimates include the controls specified in Section IV and are weighted using survey-provided expansion factors.

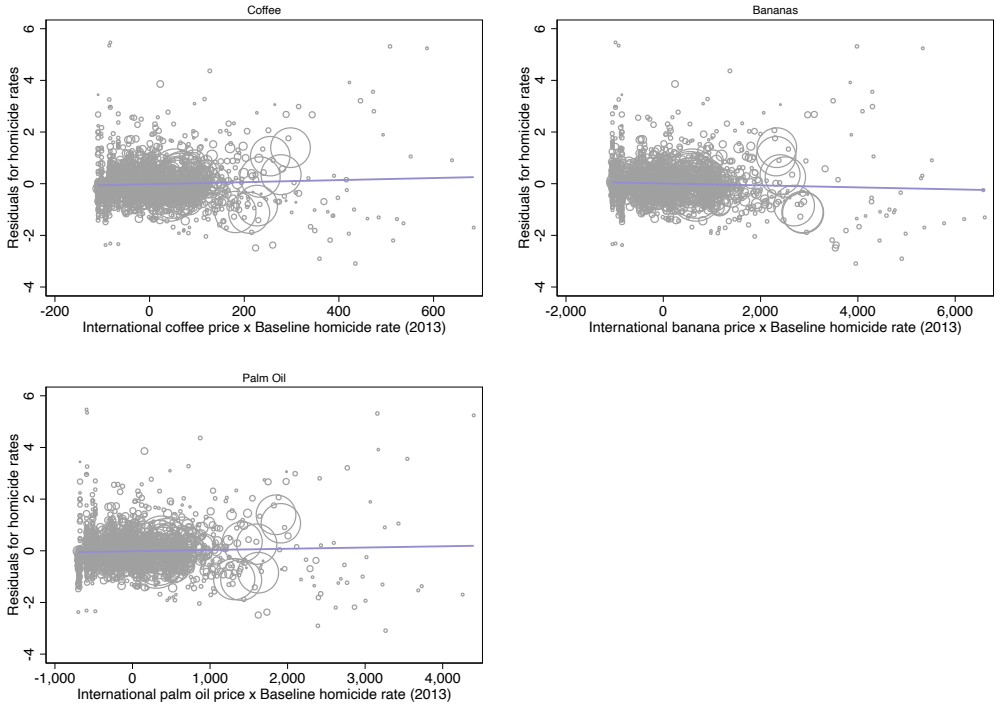
Significance levels: $^{***}p < 0.01$; $^{**}p < 0.05$; $^{***}p < 0.1$.

Figure A.1. Surveyed and Unsurveyed Departments by the EPHPM household surveys



Source: Authors' elaboration from EPHPM survey documentation.

Figure A.2. First-stage relationship between sub-national violence and commodity prices



Source: Authors' elaboration from International Coffee Organization, Federal Reserve Bank of St. Louis, and SEPOL data.
Notes: The predicted residuals are net of municipal fixed-effects and yearly secular time trends.