

# The Effects of Agricultural Income on IDPs: the Case of Colombia

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- ▶ “The Colombian conflict is a contest for political power of long duration and low intensity” (Restrepo, Spagat, Vargas 2004)
- ▶ Peace agreement signed in 2016 with largest guerrilla group (FARC), after more than 50 years of conflict
- ▶ 8 million IDPs (1997-2017): 15 % of total population
- ▶ Large cost for migrants (welfare loss) and for society (Victims Law, congestion, etc.)

- ▶ 92 % municipalities are affected, however most IDPs migrate from poor rural areas lacking a strong state presence
- ▶ Decision making process is influenced by pecuniary (expected income) and non-pecuniary factors (violence)
- ▶ Agricultural income has two opposing effects:
  - Increase opportunity cost of migrating (-)
  - Increase likelihood of victimization (+)

- ▶ ¿What are the effects of changes on agricultural income on the level of forced displacement?
- ▶ If IDPs migrate only in response to violence then changes in agricultural income should have a negligible effect on the number of IDPs
- ▶ Due to the possible endogeneity problem (reverse causality, omitted variable bias), we perform an IV estimation

- ▶ We use an instrumental variable and perform a 2SLS
- ▶ Second-stage regression:

$$\ln(IDP_{it}) = \alpha_{2i} + \gamma_2 \ln(\hat{Y}_{it}) + \beta_2 M_{it} + \epsilon_{it}$$

$IDP_{it}$ : number of IDPs expelled from municipality  $i$  at time  $t$

$Y_{it}$ : agricultural income of municipality  $i$  at time  $t$

$\gamma_2$ : elasticity of IDPs with respect to agricultural income

$M_{it}$ : set of control variables (coca cultivated area, conflict intensity, rural population)

$\epsilon_{it}$ : clustered standard errors

- ▶ First-stage regression:

$$\ln(Y_{it}) = \alpha_{1i} + \mu_1 R_{it} + \beta_1 M_{it} + \varepsilon_{it}$$

$Y_{it}$  : agricultural income of municipality  $i$  at time  $t$

$R_{it}$  : standardized deviation of rainfall from its mean

$\varepsilon_{it}$ : clustered standard errors

# IV-estimation First Stage

	IV (1)	IV (2)	IV (3)	IV (4)
<b>First State Dependent Variable: Log (Agric. Income)</b>				
Prec. Dev. Standarized	-0.044*** (0.007)	-0.044*** (0.007)	-0.044*** (0.007)	-0.044*** (0.007)
Conflict Intensity		0.001 (0.002)	0.001 (0.002)	0.001 (0.002)
Log (Coca cult. area)			-0.043** (0.021)	-0.043** (0.021)
Log (Rural population)				0.047 (0.211)
Cons	22.863*** (0.001)	22.862*** (0.002)	22.896*** (0.017)	22.478*** (1.892)
R-sq: within	0.009	0.009	0.011	0.011
R-sq: between	0.000	0.001	0.002	0.043
R-sq: overall	0.001	0.002	0.000	0.035



# IV-estimation Second Stage

	IV (1)	IV (2)	IV (3)	IV (4)
<b>IV Dependent Variable: Log ( IDP's)</b>				
Log (Agric. Income)	-1.313*** (0.266)	-1.318*** (0.266)	-1.311*** (0.270)	-1.234*** (0.261)
Conflict Intensity		0.018*** (0.005)	0.019*** (0.005)	0.018*** (0.005)
Log (Coca cult. area)			0.020 (0.031)	0.022 (0.029)
Log (Rural population)				2.175*** (0.331)
Cons	33.894*** (6.074)	33.985*** (6.081)	33.809*** (6.178)	12.570* (6.644)
R-sq: within	-	-	-	-
R-sq: between	0.153	0.147	0.139	0.062
R-sq: overall	0.101	0.097	0.091	0.068
Number of obs	7,933	7,933	7,933	7,933
Number of groups	799	799	799	799
Obs per group avg	9.9	9.9	9.9	9.9
F test	74.8	73.3	73.4	56.0
Mun. fixed effect	Yes	Yes	Yes	Yes
Robust Std. Err. in parentheses. * p<0.1, ** p<0.05, *** p<0.01				

- ▶ First stage:
  - An increase in the standardized deviation of rainfall reduces agricultural income
  - Larger coca cultivated areas are associated with a reduction in agricultural income
- ▶ Second stage:
  - Agricultural income has a negative and statistically significant impact on IDPs: a 1% reduction in agricultural income increases IDPs in 1.2%
  - There a possitive association between conflic intensity and IDPs

- ▶ There is a negative and statistically significant relation between agricultural income and IDPs
- ▶ Violence is also an important trigger of forced migration
- ▶ Improving the living conditions in violent areas can reduce the flow of IDPs
- ▶ Income generating programs and state presence are fundamental to reduce IDPs

*Thank you!*

- ▶ Alternative instruments: dummy variable for positive rainfall shocks, absolute deviation of precipitations from mean
- ▶ Alternative proxies for income: GDP, energy consumption, agricultural credits
- ▶ Estimations without 13 largest metropolitan areas