Post-conflict Land Restitution and Deforestation in Colombia

Conférence Université de Namur

Marie Boltz (BETA, U. Strasbourg)

joint with Philippe Delacote (INRAE, BETA), Kenneth Houngbedji (U. Paris Dauphine, IRD), Julien Jacob (BETA, U. Strasbourg), and Laura Peralta (BETA, U. Strasbourg)

Context: forests in Colombia

▶ One of the most biodiverse country in the world - forest $= 1/2$ area of the country. (WWF, 2017)

▶ 59 million ha of forests (FAO,2020) $= 52\%$ of country's land cover (1/3 in France ; 58% Brazil);

▶ Forests facing big threats:

  ▶ Between 1990 and 2017: Colombia lost more than 6.7 million ha of natural forest (Cabreara et al. 2019)

  ▶ Despite growing support from international community (PES programs) and commitment of the government to cut deforestation by 30% ... by 2022

  ▶ ...Strong political/economic forces pushing toward increased deforestation: agriculture and cattle rearing, mining, coca production.

▶ Acceleration of deforestation in the wake of the end of the conflict

  ▶ Prem et al. 2020 shows that deforestation was higher after the ceasefire with FARC in municipalities historically with stronger FARC historical presence

Context: a half-century long civil conflict

▶ The civil conflict started in Colombia in the 60s fueled between rightwing government, far-left guerilla groups (ELN, FARC), far-right paramilitaries, crime syndicates

▶ It was mainly fueled by inequalities in access to land, and narco-traffic.

▶ Very unequal country: 14% of landowners owns 78% of agricultural land in 2010 (Ibanez et al., 2010)

▶ 7.7 million people were internally displaced

▶ UN estimates (2008): 12% of all civilian deaths caused by FARC and ELN guerrillas, 80% caused by right-wing paramilitaries, and the remaining 8% caused by Colombian security forces.

▶ In 2016: the FARC and the government signed a historic ceasefire deal.

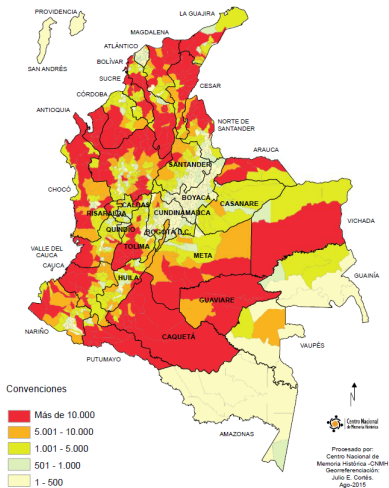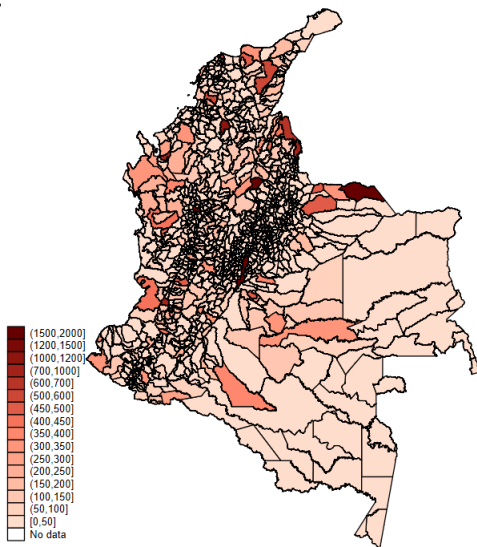# Colombian conflict: forced displacements

Figure: Forced displacement by municipality in 2015, in red municipalities with more forced displacement. Source: Centro Nacional de memoria histórica

Colombian conflict: violence - attacks before 2010

Violence

Context: the Land Restitution Law (LRL)

▶ History of the law

  ▶ In 2011, President Santos decreed the LRL

  ▶ Legal tool to recognize legal rights of victims over the land they were forcibly displaced from.

  ▶ Victims could benefit from the LRL if they were displaced after 1991.

  ▶ Victims can get back their land when it was stripped or abandoned due to the armed conflict.

Context: the Land Restitution Law (LRL) – 2

Process of the land restitution

▶ Creation of the *Unidad Administrativa Especial de Gestion de Restitucion de Tierras Despojadas* attached to the Ministry of Agriculture and Rural Development

▶ The government targeted areas where restitution could take place with official reasons being:
  ▶ Security situation
  ▶ Historical density of dispossession
  ▶ Existence of conditions for return

▶ **Macro-target** and **Micro-target** zones

Context: the Land Restitution Law (LRL) – 3

▶ To get a land restituted a victim needs to go through the following steps:

1. File a case: asking for a specific parcel, justifying why is requesting this parcel

2. **Administrative step**:
   ▶ The administration verifies the technical and legal feasibility of each application
   ▶ If approved: the case enters into the **registry** of dispossessed and abandoned land and the process of restitution can start

3. **Judicial step** The judge in charge of the cases has "officially" 4 months to provide with an answer:
   ▶ Restitution of the original land parcel
   ▶ Restitution of another parcel
   ▶ Monetary compensation
   ▶ Formalization of vacant lots
   ▶ Refusals

▶ What happens if the land requested is currently used/owned by another incomben user?

   → In the early period of the LRL: no compensation scheme for the incumbents.

▶ No restitution on protected forest: strict rule.

▶ After restitution, the ANRT will provide follow-up and resources to beneficiaries: 65% invest in cattle rearing activities.
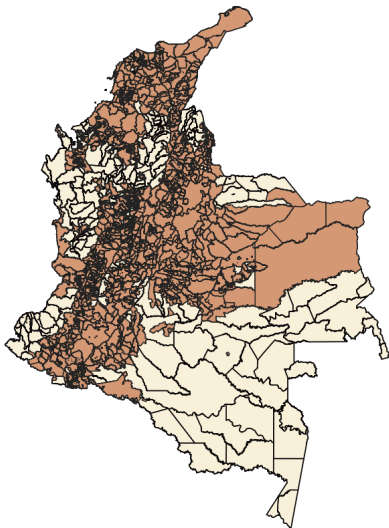
Land restitution law: eligible municipalities

Figure: Micro-target zones in brown. Source: made by the author with data from Unidad de restitución de tierras (2019)

Research question

▶ We aim at understanding the process of land restitution in the post-conflict Colombia and its impact on deforestation

  1. What are the trends of deforestation in the early implementation of the LRL?
     > what is the aggregate effect of the policy at the municipality level?

     > we aim to here isolate the LRL from the Peace agreement effects

  2. What can we learn from the underlying mechanisms explaining this trend?

     > are old agricultural parcels left abandonned to forest regrowth cleared?

     > or do incumbents deforest more to claim ownership while facing the threat of restitution/expropriation?

Literature review: agriculture the main driver of tropical deforestation

▶ Expansion of agricultural frontier is found to be boosted by population growth and migration that pressure forest (Kissinger et al., 2012).

▶ In a meta-analysis of 152 sub-national case studies of net losses of tropical forest: agriculture is the leading land-use change associated with nearly all deforestation cases. (Geist & Lambin, 2002).

▶ Evidence of the **prejudicial effect of insecure property rights on deforestation** (Araujo et al., 2009; Deacon, 1999; Mendelsohn, 1994). Agricultural yields tend to be low and deforestation rates rapid where ownership is insecure.

Literature review - Deforestation and conflict in Colombia

▶ In Colombia, deforestation trends are closely related to Colombian half-century-long internal conflict (Alvarez, 2007; Camacho & Rodriguez, 2013).

▶ With ambiguous effects:

  + Deforestation was higher at locations closest to coca plantations (Negret et al., 2019)

  + Paramilitary conflict activity significantly reduces the share of forest cover (Fergusson et al., 2014; Ferretti-Gallon Kalifi & Busch, 2014);

  − Conflict was associated with less deforestation because less easy to access in violent regions with a catch-up after the ceasefire (Prem et al., 2020).

▶ Importance of the State for policy enforcement: (Bonilla-Mejía & Higuera-Mendieta, 2019) find that protected zones fail to control deforestation in remote areas where the lack of State presence is more evident.

Timeline recap

▶ A few key dates:

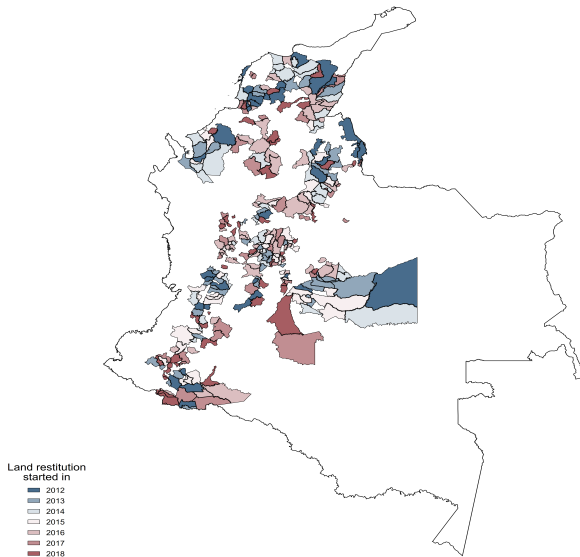|	
60s	Start of the armed conflict between guerilla groups and the government
1991	Starting period for displacements covered by the LRL
2010-2014	Election of President Santos: beginning of peace talks
2011	**Land Restitution Law** (LRL)
Dec 2014	**Ceasefire with FARCs**
2016	**Peace agreement between FARC group and government**
2021	Renovation of LRL policy (10 Years more)

Data

▶ We build a census of Colombian municipalities over the period of **1984**-**2023**

▶ Several data sources are used:
  ▶ **Deforestation**: Global Forest Change dataset from 2000 to 2015, Landsat satellite data, resolution 30m*30m

      Tree cover = vegetation taller than 5m
      Tree cover loss (deforestation) in year t = if a pixel in 2000 was considered as forest and in year t is not a forest anymore
      Data aggregated at municipality level

  ▶ **Other sources for deforestation**:
    ▶ MODIS Land Cover land use data (for robustness checks)
    ▶ ESA CCI Land Cover time series v2.0.7 (1992-2015) to detect forest land and crop land in 1992 (before displacements)
    ▶ Primary forest data (Vancutsem, C. et al., 2021)

  ▶ **Land restitution** : "open data judgment requests" from the Land Restitution Unit $\rightarrow$ Shows for each demand the judgment that was ruled

  ▶ **Panel CEDE** run by U. Los Andes, compiles information from national administrations at the municipality level from 1984 - 2019 (socio-economic variables): GDP, agriculture production, poverty index, past violence

LRL: demands for land restitutions since 2011:

Early vs late municipalities

Land restitution
started in
■ [2012, 2015[
■ [2015, 2018]
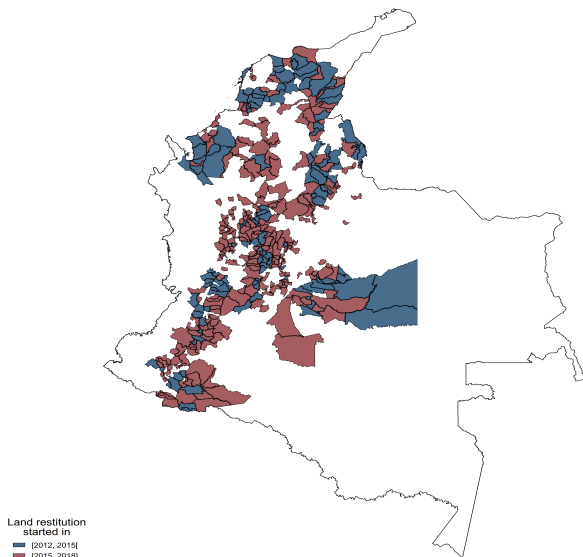
LRL: land restitution demands by year

Land restitution
started in

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
- 2018

Source: Authors' own elaboration.

Land restitution that already took place

▶ Among 1122 municipalities: 619 were eligible vs 503 not eligible

▶ Among the eligible : restitution took place in 158 municipalities, 461 eligible municipalities did not restitute yet

▶ Among the municipalities with restitution claims:

   ▶ Restitution claims before 2015: 119 municipalities

   ▶ First restitution claims after 2015: 311 municipalities

Empirical strategy: Early vs late restitutions

▶ We estimate the impact of the land restitution law on deforestation comparing:
  ▶ municipalities with early demands for restitution (2011-2014)
  ▶ with municipalities that started the process after 2015.

▶ We conduct a difference in difference model between early/late municipalities

▶ We compare their situation:
  ▶ between 2008 and 2011 — before the LRL –,
  ▶ and between 2011 and 2014 — after the LRL and before the Pease Accords –.

Two groups:
• Early
• Late

2008 **2011** **2014**

Approval of Land Restitution Law

Ceasefire with the FARC

▶ This allows us to study the (early) effects of the Land Restitution Law on a period prior to the ceasefire and peace agreement

Empirical strategy: Early vs late restitutions

We estimate the following TWFE specification:

$$LnDeforest_{mt} = \alpha + \beta D_{it} + \delta_t + v_m + u_{mt}$$

▶ $D_{it} = 1$ if the first demand for restitution in the municipality took place in year t with $t < 2015$

▶ v is the municipality fixed effect that captures any time-invariant municipal-level heterogeneity. δ_t is the year fixed effect.

▶ We hence make the **identification strategy** that early municipalities and late municipalities would have been on parallel trends in terms of deforestation in the absence of the LRL.

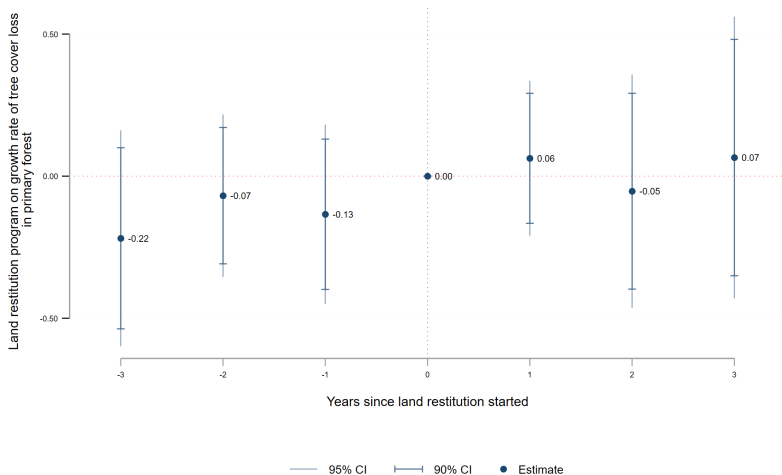▶ We use the Dechaisemartin and D'Hautloeille 2018 DiD estimator.

Results: increase in tree cover loss after 3 years
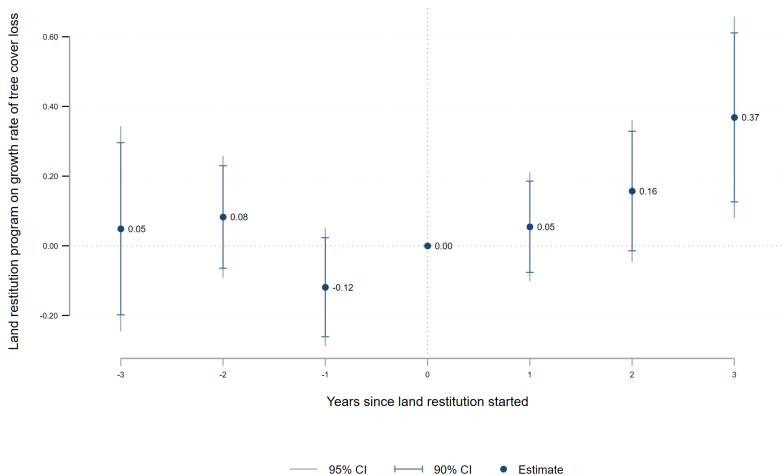
Source: Authors calculation.

Figure: Relative variation of tree-cover loss over time across municipalities with early and late land restitution.
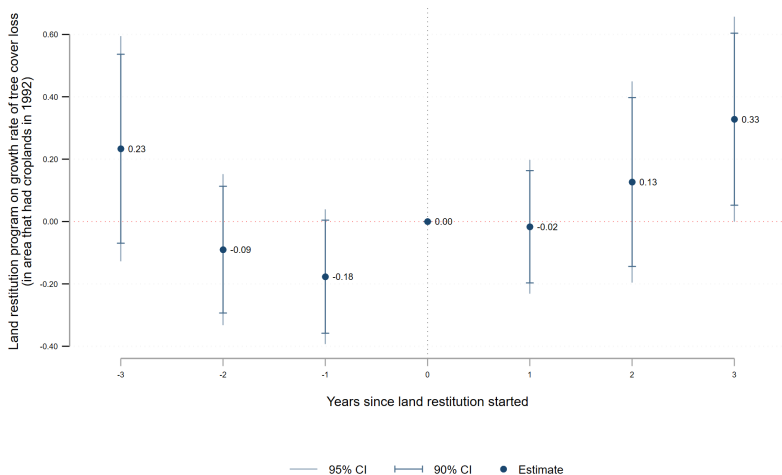
Results: no difference in tree cover loss in **primary forest**

Source: Authors calculation.

Figure: Relative variation of tree-cover loss of **primary forest** over time across municipalities with early and late land restitution.
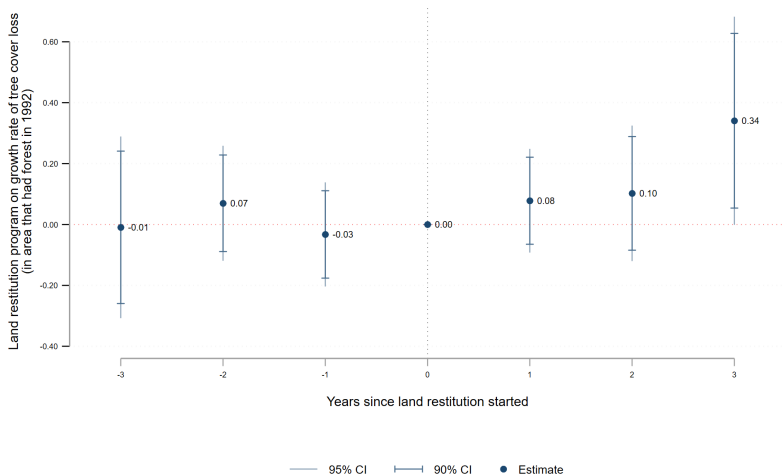
Deforestation in 1992 crop lands

Source: Authors calculation.

Figure: Relative variation of tree-cover loss over time **in ancient crops lands (1992)** across early and late municipalities.
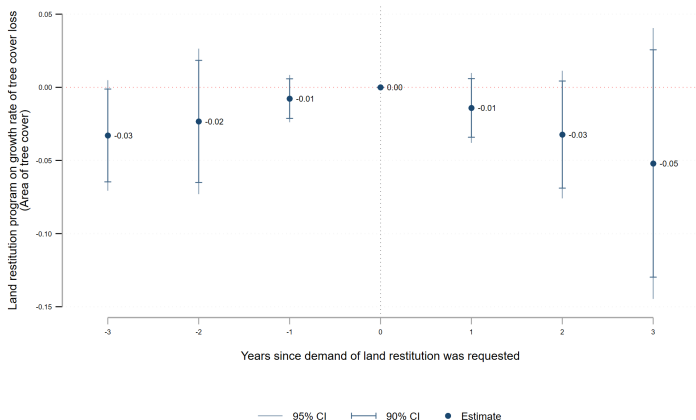
Deforestation in 1992 forest lands

Figure: Relative variation of tree-cover loss over time **in ancient forest lands (1992)** across early and late municipalities.

Are the results driven by the restituted **plots**?

▶ Are the results driven by the plots that are requested for restitution?

▶ The idea is to see whether the policy has a very local effect on plots that are subject to restitutions.

▶ To check for this, we redo the analysis by looking at the plot level, comparing early plot with later plots.

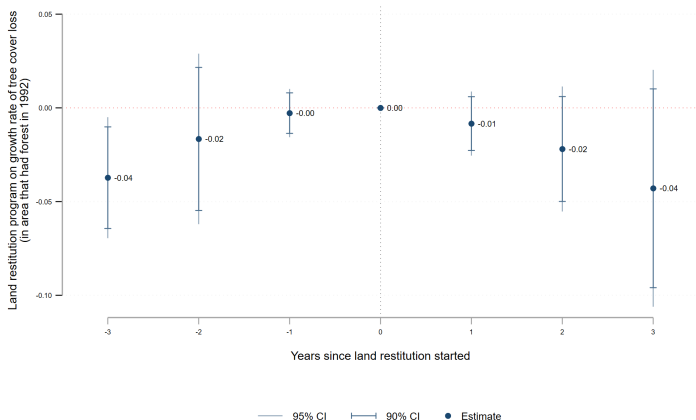▶ We find no effect, even conditioning on plots that were forest/crop lands in 1992.

Plot-level analysis: deforestation trend

Figure: Relative variation of tree-cover loss over time across restituted land **plots** with early and late land restitution.
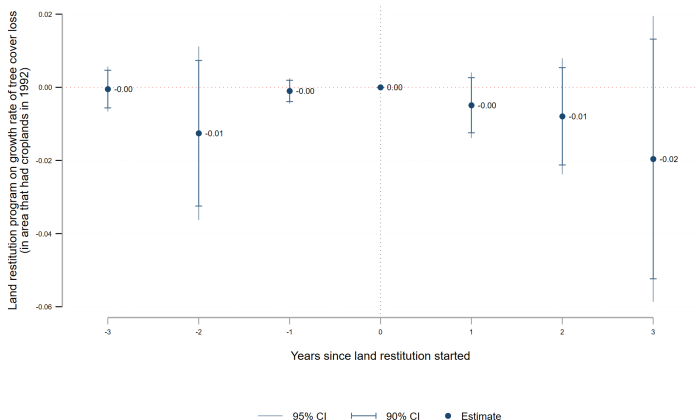
Plot-level analysis: deforestation trend in 1992 forest lands

Figure: Relative variation of tree-cover loss **in ancient forest lands (1992)** over time across restituted land **plots** with early and late land restitution.

Plot-level analysis: deforestation trend in 1992 crop lands

Figure: Relative variation of tree-cover loss **in ancient crop lands (1992)** over time across restituted land **plots** with early and late land restitution.

Conclusion

▶ We show that the Land Restitution Law had a positive impact on deforestation, meaning that municipalities with early claims for restitutions relative to municipalities with later claims show higher trends for deforestation in a period prior to the ceasefire.

▶ No effect on deforestation in primary forests.

▶ We tested whether deforestation took place more in areas that were already crop lands in 1992 and left to forest regrowth due to the displacement of their owners. > We found that there is indeed more deforestation.

▶ However, we found as well that forest land in 1992 are also more likely to be deforested in early vs late municipalities.

▶ We further tested whether deforestation was driven by parcels subject to claims for restitutions and did not find any effect.

Conclusion

▶ Potential mechanisms explaining the higher trend in deforestation in early municipalities is Early claims playing the role of

  ▶ a security signal driving potentially an increase in return migration

  ▶ a threat for incumbents pushing them to extend the agricultural frontiers due to potential claimants on their lands

▶ Next steps: go to the field to understand locally the mechanisms of the common pool resource management and the interactions between incumbent farmers and newly returned.

Total deforestation
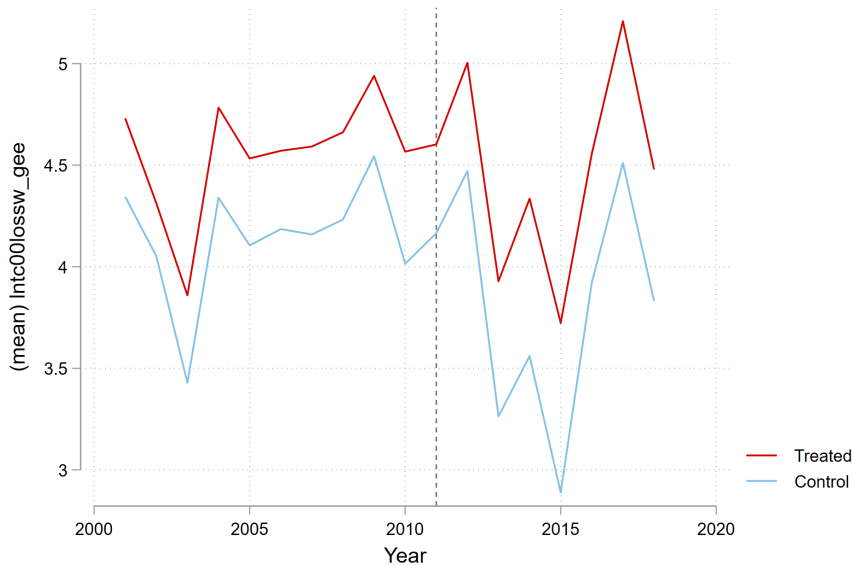
Total deforestation in primary forest
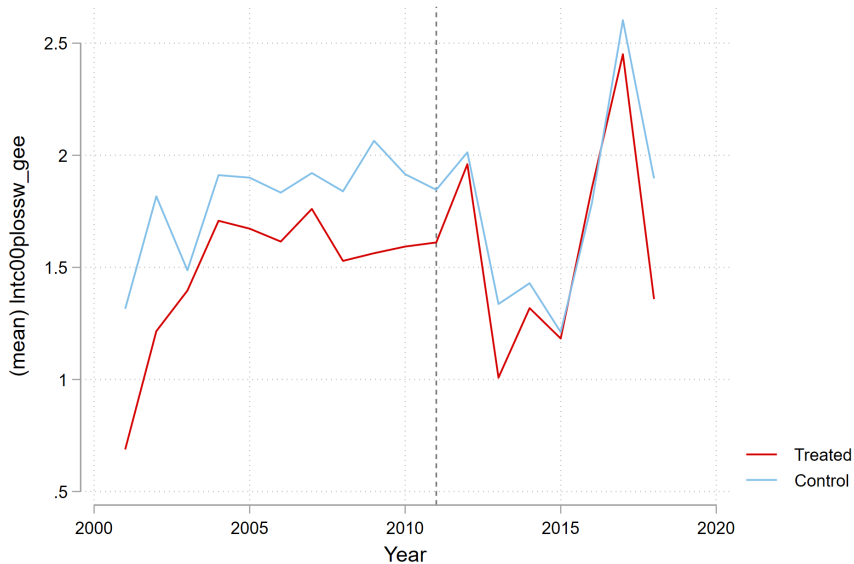
Determinants of restitution: Probit early vs late restitutions

	Early
Area of the municipality (GEE - ha)	-0.000
	(0.000)
Mean altitude (km)	-0.094**
	(0.037)
Average GDP from agriculture over 2000-09 (log US $)	0.066***
	(0.023)
Poverty Index in 2005	-0.006***
	(0.002)
Mean yearly tree cover loss (2001-10)	-0.240**
	(0.101)
Indigenous land	-0.051
	(0.049)
Spanish settlement	0.077
	(0.051)
Average number of refugees per year over 1993-10 (1000 people)	
- *leaving*	0.319***
	(0.078)
- *hosted*	-0.037
	(0.037)
Average number of attacks by FARC per year (1993-10)	-0.120*
	(0.066)
Number of municipalities	430
$\mathbb{P}(\mathbf{Early} = 1)$	0.28
LR Test	5.4e-08

Robust standard errors in parentheses. Significance levels are denoted as follows: * p<0.10, ** p<0.05, *** p<0.01.