

# The Impact of Ethiopia's Road Investment Program on Economic Development and Land Use: Evidence from Satellite Data

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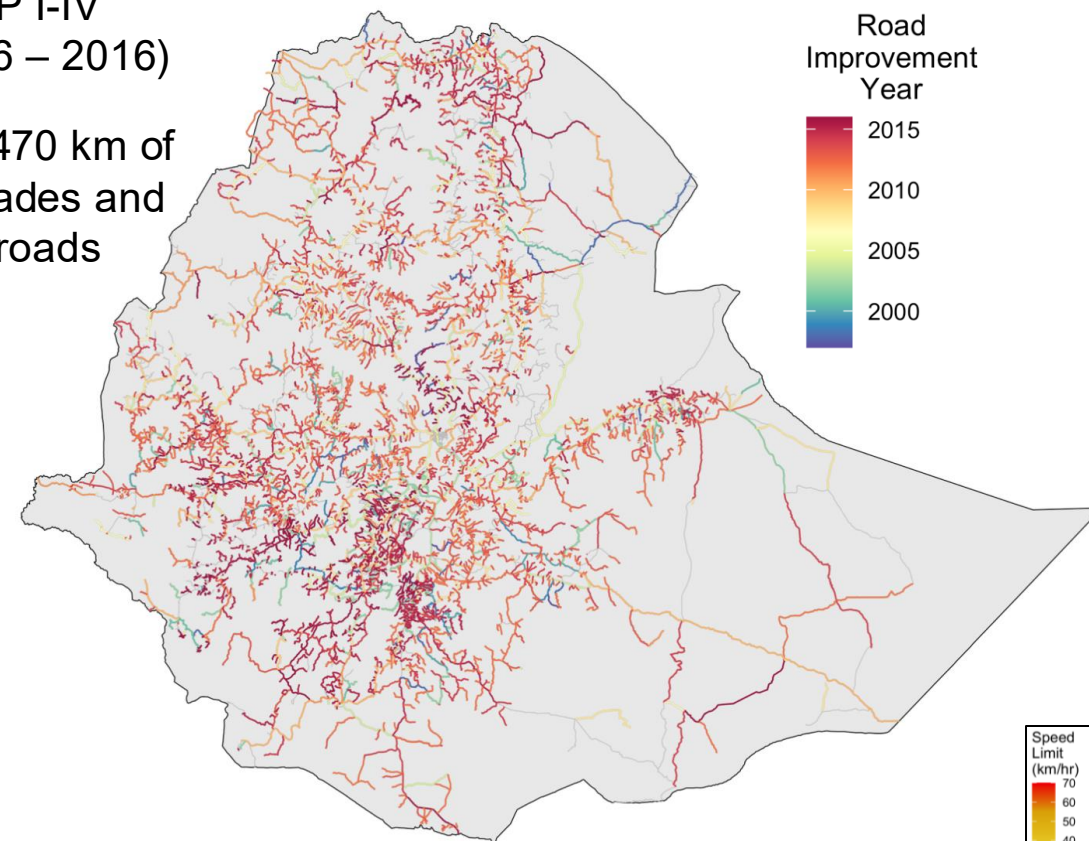
## Motivation

- Roads upgrades and constructions to promote integration, economic development, and facilitate trade.
  - Between 1995 - 2015, World Bank-supported ~161 billion USD in projects
  - Economic impact of investments in large-scale road infrastructure is debated.
- ➔ **Study the impact of the large-scale Road Sector Development Program in Ethiopia (1996-2016)**

## Road Sector Development Program

RSDP I-IV  
(1996 – 2016)

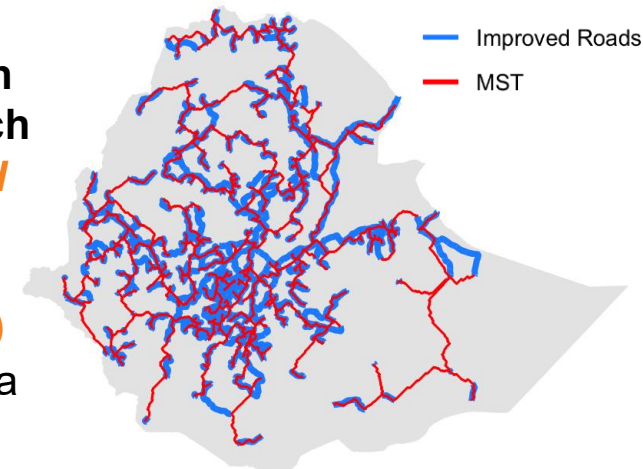
128,470 km of upgrades and new roads



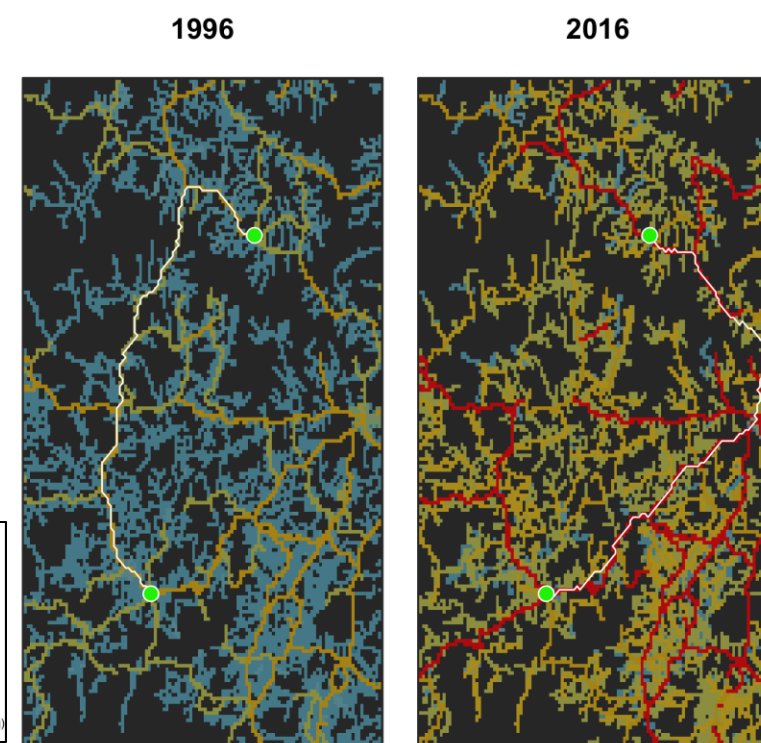
## Three Methods Approaches

**1. Event study for year-to-year change**, Callaway & Sant'Anna (2020), compares areas near improved roads to areas not-yet-treated.

**2. Impacts from start to 2016 with an instrumental variable approach** comparing *incidentally connected* areas to areas far from improved roads. The RSDP are instrumented by *minimum spanning tree (MST)* that connects targeted locations in a least-cost way.



**3. Impact of changes in market access from start to 2016.** Market access for an area captures how quickly population centers can be reached.



*Fastest route between two example cities in 1996 and 2016. Fastest route determined between all city pairs to calculate market access*

## Data



Annual **road improvement** data from the Ethiopian Roads Authority



Intercalibrated **nighttime lights** data from DMSP-OLS (1992 to 2013) and VIIRS (2012 – present)



Annual **land cover data** from the European Space Agency landcover dataset (1992 – 2018)

**Aggregate all variables to the Kebele level, Ethiopia's 4<sup>th</sup> administrative division (N = 15,714)**

## Results

- RSDP contributed to an **increase** in nighttime lights and urban land and **reduction** in cropland.
- Larger impacts in areas with higher nighttime lights at baseline & among higher speed limit roads

