Transportation Development and Child Nutrition in Nepal

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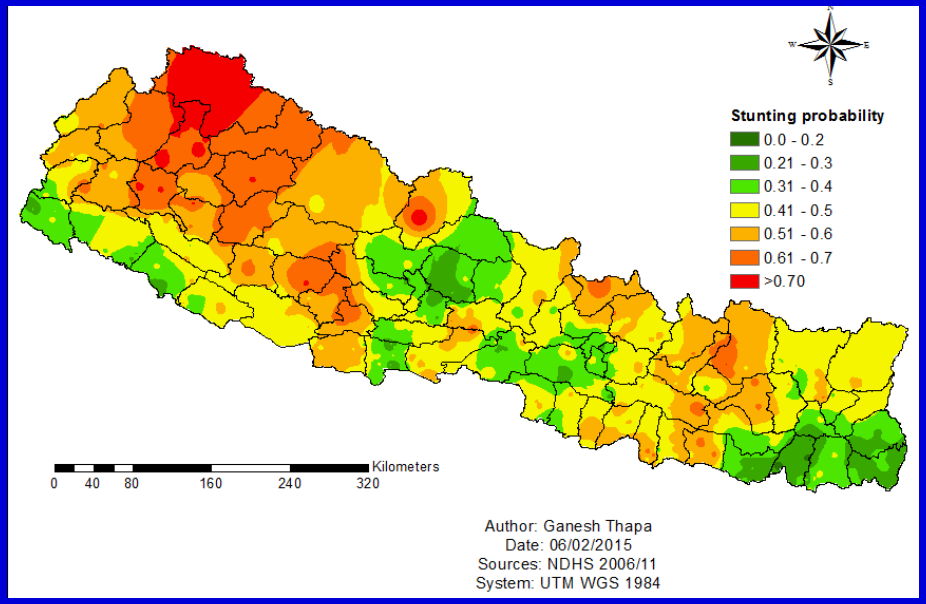
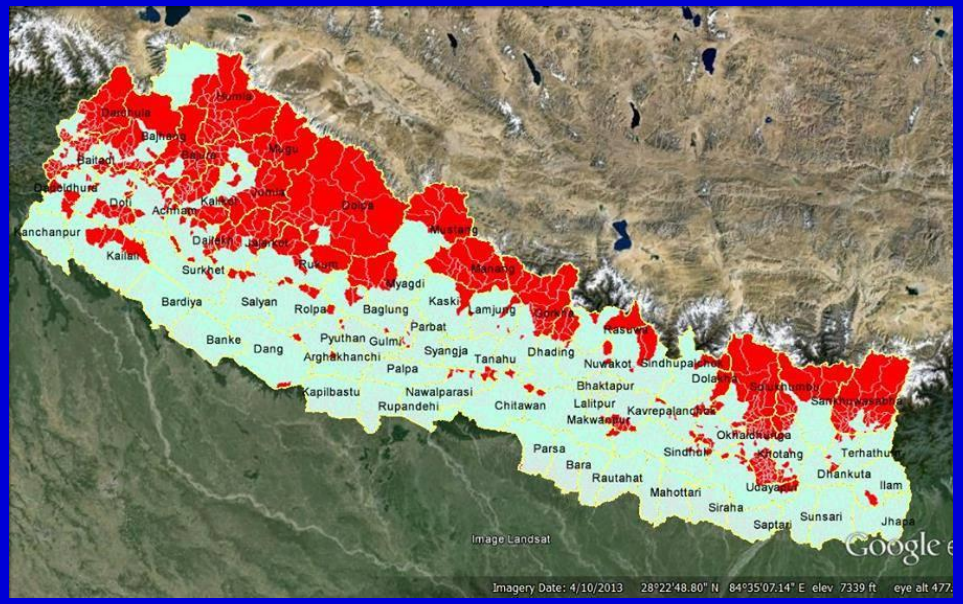
Research Motivation

High Prevalence of Child Malnutrition in Nepal

Only 43% of population has access to all-weather roads (WB 2011)



Nationwide probability
of stunting among U5s



Red patches are VDCs
without all-weather roads

Research question: *do roads improve nutrition?*

Research Motivation

Numerous connections between transportation and nutrition:

- agricultural prices (Bell & van Dillen, 2014)
- access to agricultural inputs and output markets (Olsson, 2009)
- access to employment, education and health facilities
- lower overall poverty (Warr, 2008)

Few studies for Nepal that measure the economic impacts of roads (UNDP, 2011; Dillon et al., 2011; Jacoby, 2010; Charlerly et al., 2016).

No previous attempt to link roads to child nutrition, despite a recognition that infrastructure is a basic determinant of economic development.

Objectives:

1. Measure the causal effect of roads on child nutrition (HAZ and WHZ) using a dose response function;

2. Test for spatial externalities associated with roads.

Main findings

Broad and beneficial nutrition payoffs from roads:

- on average, each additional 100km/km^2 increase in sealed-road-equivalent density is associated with a 0.22-0.28 point higher average HAZ and 0.04-0.09 point higher district-average WHZ
- These treatment effects differ by age group
- Some evidence of positive spatial spillovers of roads across districts

Policy implications:

- investments in infrastructure support nutrition & health interventions
- construction and upgrading of roads (and bridges) will translate over time into improved child nutrition outcomes.

Empirical Approach

Analysis conducted at the district level

Data

- NDHS Survey - Child nutrition data
  (average district-level HAZ and WHZ in 2006 and 2011)
- DOR, Nepal- Strategic roads
  (total length of sealed, gravel and earthen roads in district)
- Other data from NCBS, NMOAD, NMOPH, Dept. of Hydrology

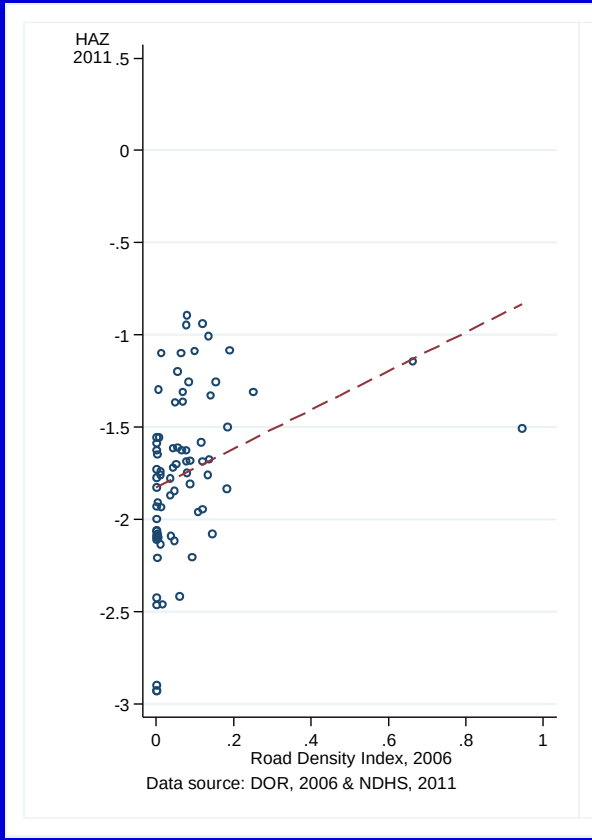
Methods

- IV and Generalized Propensity Score (GPS) approach
  - road density = continuous treatment
- Spatial Externality
  - adjustments to account for spatial spillover benefits from roads
- Separate analyses for children below five; age 3-5, and < 3

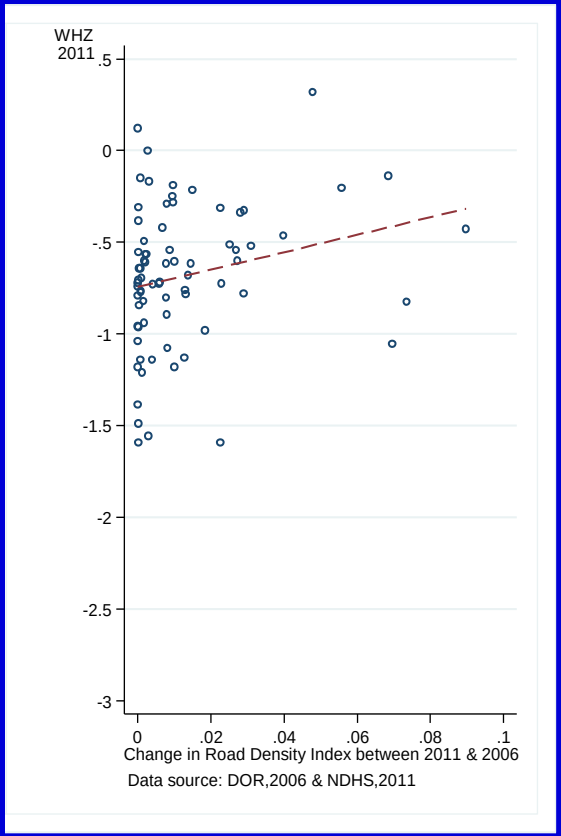
Methods

Weighted Road Index to account for length, quality (travel time) and density:

Index = 1.00 × sealed road + 0.20 × gravel road + 0.02 × earthen road



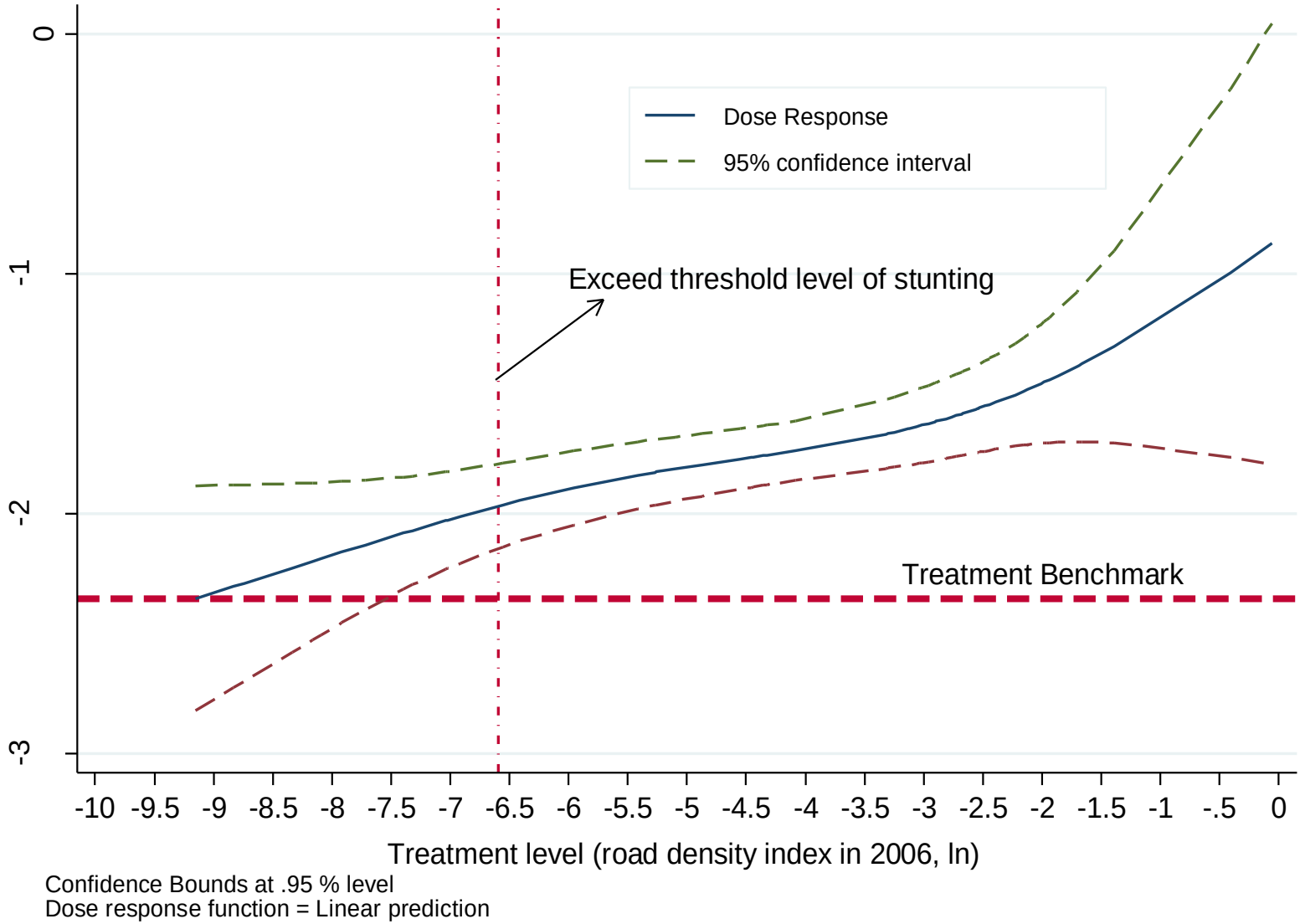
Outcome: HAZ 2011
Treatment: Index 2006



Outcome: WHZ 2011
Treatment: $\Delta_{06\text{-}11}$

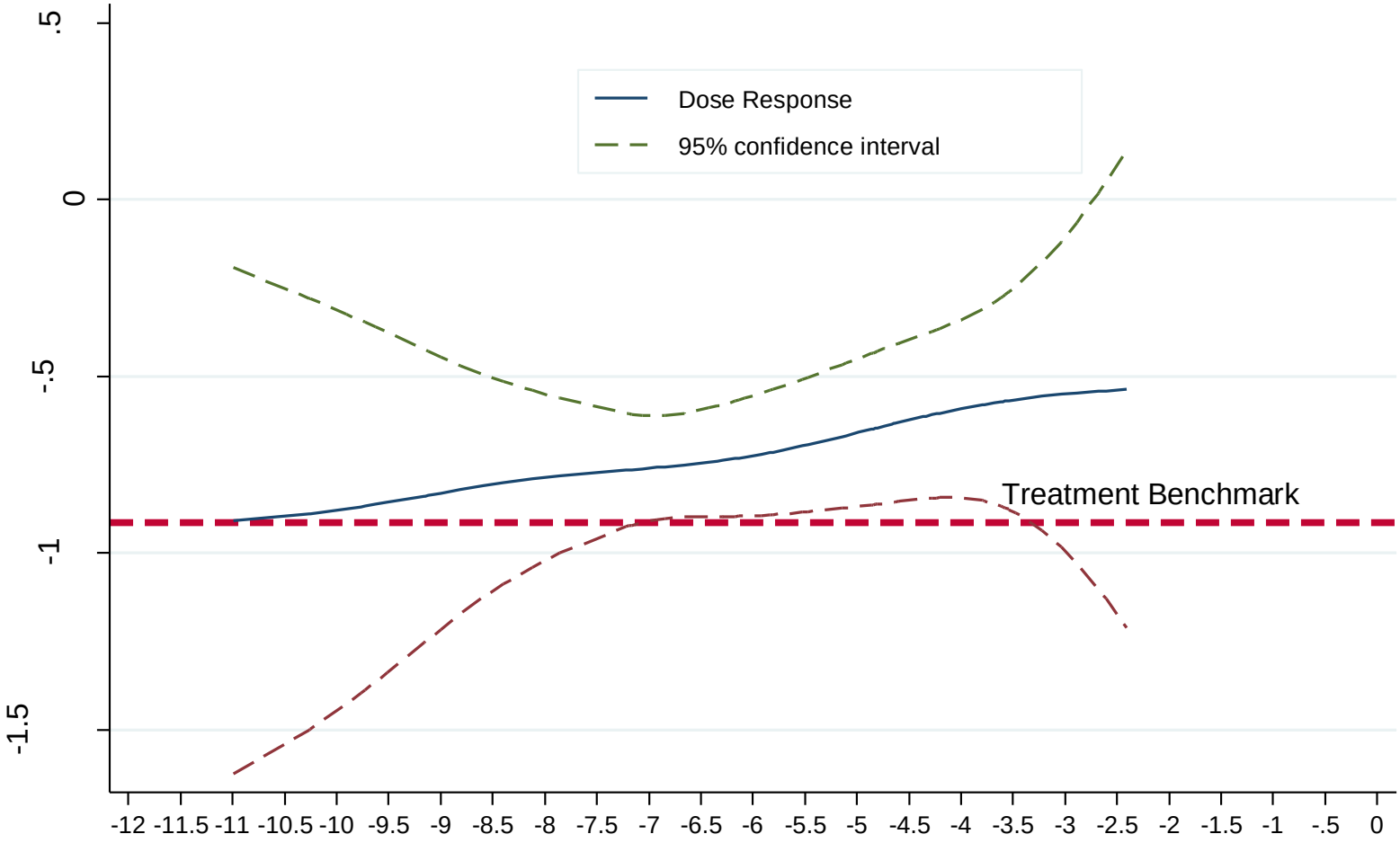
Results

HAZ response function (children < 5 years)



Results

WHZ response function (children < 5 years)



Summary of Results

- Treatment effects differ across age cohorts
  - HAZ: marginal effects of roads are highest for children 3-5 yrs
  - WHZ: marginal effects of roads are highest for children < 3 years
- Local changes in road networks are associated with improvements in HAZ (≈ 1 s.d.) and WHZ (≈ 1/2 s.d.)
- Roads have positive spatial spillovers on HAZ, especially for children below age 3

Conclusion

- Broad and beneficial health and nutrition payoffs from transportation development
- Policy implication: construction and upgrades of roads will translate over time into better child nutrition outcomes

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