



MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Comparing Evaluations of Road Improvements: The MCC Experience

Ariel BenYishay and Rebecca Tunstall



Introduction

- MCC has committed \$2.3 billion to improve roads in 14 countries (33% of total funding)
- 7 of the 14 have impact evaluations designed at this point
- Remaining 7 planned to have final evaluations



MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

MCC contributions to body of evidence

- One of the first sets of evaluations of highway and secondary road improvements in developing countries
- Opportunity to compare differences in designs
 - How did they arise?
 - What are the implications and lessons?
- Answer multiple questions:
 - Impact of improvements funded by MCC
 - Impact of improvements funded by any source



MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

MCC Road Projects with Impact Evaluations

Country	Project	Budget Allocation	Number of Kilometers to be Improved	Percent Complete	Evaluation Designer
Armenia	Rural road rehabilitation	\$67 million	24 km	100%	Mathematica
El Salvador	Secondary road openings and upgrades	\$233 million	290 km	32%	Social Impact with IFPRI
Georgia	Main road rehabilitation	\$204 million	120 km	48%	NORC
Ghana	Feeder road rehabilitation	\$70 million	357 km	12%	NORC
Honduras	Secondary and tertiary roads Highway	\$21 million \$119 million	750 km 109 km	43%	NORC
Nicaragua	Main and secondary roads	\$58 million	74 km	99%	Millennium Challenge Corporation
Tanzania	Trunk roads and rural roads	\$369 million	465 km	0%	Economic Development Initiatives, Ltd



Road Selection

- Selection of roads includes:
 - Public consultation
 - Government selection
 - Benefit-cost analysis and an ERR hurdle rate
- Designs therefore must take the selection criteria into account



Evaluation Designs

- Randomize?
- Difference-in-differences, plus...
- Propensity score matching
- Continuous treatment
- Regression discontinuity
 - ERR hurdle rate
 - Timing of construction



Evaluation Designs

- Many evaluations use multiple methodologies

Combination of Methodologies

Evaluations

PSM-DD

Nicaragua, Tanzania

PSM-DD + Continuous Treatment

Georgia, Ghana, Honduras

PSM-DD + Continuous Treatment + RD (based on timing of construction)

El Salvador

PSM-DD + RD (based on ERR hurdle)

Armenia



MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Continuous Treatment

- Like a “dose-response” study
 - No formal control group
 - (Nearly) each observation serves as a comparison for others receiving more intense treatment
- Being used in El Salvador, Georgia, Ghana and Honduras
- Impact of reductions in travel costs (both time & direct costs)
 - To nearest market, town, or weighted composite of destinations
 - Use GIS data plus reported transport/travel unit costs along similar routes



Geographic Information Systems

- Measurement of treatment intensity
- Matching based on baseline accessibility
- Estimate the network effect of road improvements, if GIS data is updated



Regression Discontinuity

- Look for a break in treatment that is exogenous and noticeable
- Compare groups of obs on each side of the break
- El Salvador:
 - Timing of improvement of road segments varies; compare populations near juncture of segments

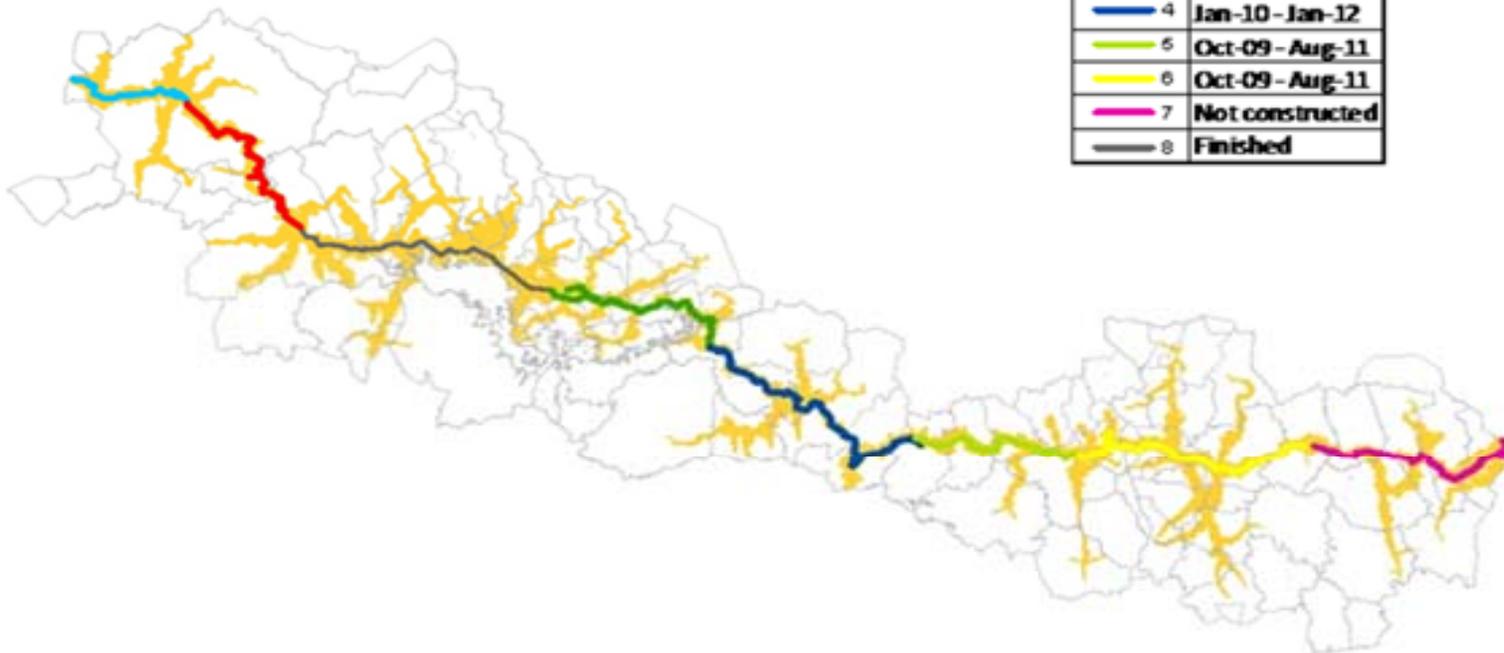


MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Discontinuity in timing

30 minute influence area to Longitudinal

segment	date
1	Not constructed
2	May-09 - Oct-10
3	Dec-09 - Oct-09
4	Jan-10 - Jan-12
5	Oct-09 - Aug-11
6	Oct-09 - Aug-11
7	Not constructed
8	Finished





MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Outcomes Studied

Country	Household Income / Consump.	Local Market Prices of Inputs/ Outputs	Business Income / Growth	Agric. Productivity	Transport access, time, costs	Access to health and education services	Land values
Armenia	Y			Y	Y		
El Salvador	Y			Y	Y	Y	Y
Georgia	Y		Y		Y		
Ghana		Y			Y		
Honduras	Y	Y	Y		Y		Y
Nicaragua		Y			Y		
Tanzania	Y	Y			Y	Y	



MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Surveys

Country	Data Sources	Data Collector	Survey Sample
Armenia	Integrated Living Conditions Survey	National Statistical Service of Armenia	Households selected by chance into main sample, plus an additional sample of 1,700 households (panel of road sections)
El Salvador	Connectivity Household Survey and Community Survey	El Salvador Office of Statistics and Census	Panel of 5,388 households
Georgia	Integrated Household Survey and Village Infrastructure Census	Department of Statistics of Georgia	Over-sample of national household survey of 3,382 households (panel of communities)
Ghana	Ghana Market Survey	National Opinion Research Center and Pentax (private firms)	Panel of 308 communities
Honduras	Household Survey, Business Survey and Price and Product Survey	National Institute of Statistics of Honduras	2,000 households Panel of 200 enterprises Panel of 100 communities
Nicaragua	Price Survey	Fideg (private firm)	Panel of 435 observations in 33 communities
Tanzania	Household and community surveys	Economic Development Initiatives, Ltd (private firm)	3,000 households and panel of 200 communities for trunk roads 1,200 households for rural roads on Zanzibar



MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Implementation Challenges

1. Project scope changes because of cost overruns and/or poor policy performance
2. Delays in construction
3. Changes to the roll-out and/or contracting strategy



MILLENNIUM
CHALLENGE CORPORATION
UNITED STATES OF AMERICA

Conclusions

- Empirical evidence on the impacts of improvements in highways and major secondary roads in developing countries
- Overlap of evaluation methodologies will allow for comparison of these methods
- Evaluators should build multiple methods into designs to remain robust to project implementation changes
- Explore opportunities for randomization