UCDAVIS AGRICULTURAL & RESOURCE ECONOMICS

Access to Modern Markets and the Impacts of Rural Road Rehabilitation: Evidence from Nicaragua

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Fields

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Rural Infrastructure
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Abstract

Improving the quality of rural roads reduces the cost of arranging transactions between spatially separate locations and can significantly affect agricultural market prices, consumption expenditures, and poverty levels. My spatial arbitrage model takes advantage of the partial implementation of a rural road rehabilitation project in western Nicaragua to identify changes in market prices attributed to improving rural road quality and calculates the magnitude these price changes would represent of a typical rural household's basket of consumer goods.

Background

In 2005, the Millennium Challenge Corporation (MCC), a United States foreign aid agency, signed a $175 million compact with the Government of Nicaragua to help reduce transportation costs, improve access to markets, and raise incomes for farmers and rural businesses in western Nicaragua. After widespread irregularities during the November 2008 municipal elections, the MCC terminated a portion of the compact, reducing funding from $175 million to $113.5 million and cancelling the rehabilitation of rural roads that were not already under contract.

A substantial improvement in road quality resulted from the MCC's rehabilitation of a secondary rural route connecting the communities of Poneloya and Las Peñitas in the Pacific coast to the city of León (see Figure 1).

Meanwhile, the rehabilitation of the 8.3-mile road Santa Teresa-Las Brisas was cancelled and it remained in poor condition.

Data

Price and availability surveys regarding 53 goods were collected at grocery stores before and after the intervention both along the treated road, León-Poneloya-Las Peñitas, and the untreated road, Santa Teresa-Las Brisas (see Figure 2).

Methodology

A difference in difference in differences (DDD) estimation strategy measures the resulting changes in markups between León ($L=0$, $D=0$) and the stores located along the treated road ($L=1$, $D=1$), which can be attributed more certainly to the road improvement if this same effect cannot also be found along the untreated road ($L=1$, $D=0$):

$$P_{it} = \beta_0 + \beta_1 L_i + \beta_2 \lambda_t + \beta_3 L_i \lambda_t + \beta_4 D_i + \beta_5 D_i \lambda_t + u_{it}$$

P_{it} indicates price of one of the goods at store i in time t. The treatment effect β_5 is aggregated across goods according to the Nicaraguan government's definition of a six-member household's typical consumption basket (see Table 1).

Key Results

This rural road improvement narrowed the gap between urban and rural prices by lowering the prices of some manufactured goods (e.g. toothpaste) and raising the prices of locally produced goods (e.g. fresh fish caught in the coast):

- Price changes that result from a better connection to markets benefited poor households by lowering the average cost of a basic basket of consumer goods by -1.69%.
- Fishers, who are likely to be among the extremely poor households, benefited from the price of fresh fish caught in the coast rising by 31.9%.

Figure 1

The 12.2-mile road from León to Poneloya-Las Peñitas was paved but in a very poor condition before being substantially rehabilitated with $21 million funding from the Millennium Challenge Corporation

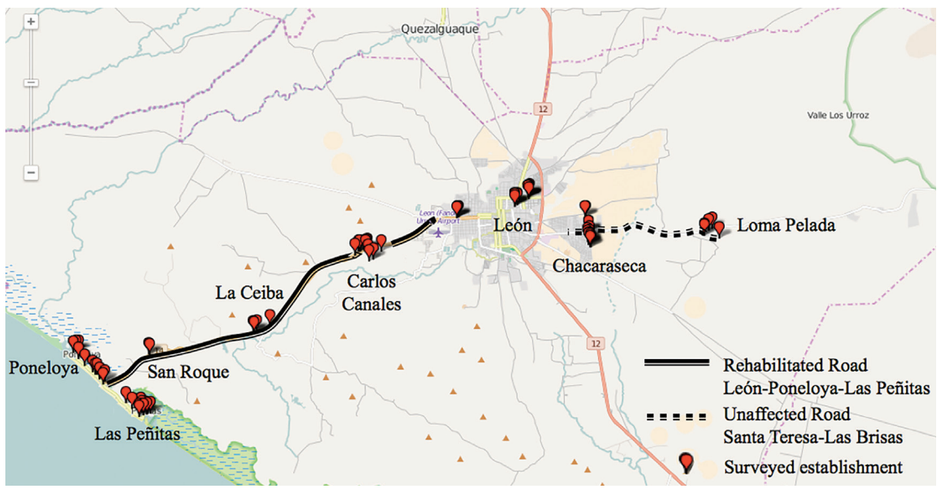

Figure 2

Price and availability surveys were collected at grocery stores located along the treated road, León-Poneloya-Las Peñitas, and the untreated road, Santa Teresa-Las Brisas

Table 1: Percentage Changes in Value of Monthly Consumption Basket

Category	Predicted (1) $\sum_g [\beta_{0g} + \beta_{1g} + \beta_{2g} + \beta_{3g} + \beta_{4g}] Q_g$	Change (2) $\sum_g \beta_{5g} Q_g$	(2) / (1)
Food	1,400.52	5.71	0.41 %
Meat	1,168.35	-43.88	-3.76 %
Produce	404.43	-43.69	-10.80 %
Household	641.68	5.02	0.78 %
Clothing	321.87	10.35	3.22 %
Total	3,936.85	-66.48	-1.69 %

Note: Q_g is defined by the Nicaraguan National Information and Development Institute (INIDE) as the monthly quantity of good g consumed by a typical family of six (four adults and two children)

Dissertation Summary