LUMS

Rural Connectivity and Health Outcomes

Hadia Majid

Department of Economics
Lahore University of Management Sciences

Outline

- Research Focus
- Motivation
- Literature Review
- Data
- Empirical Method
- Results
- Conclusion

Research Focus

- The effect of increased rural connectivity on health outcomes
  - Child immunization
  - Female prenatal care

- Rural connectivity
  - Accessibility to healthcare
  - Increased awareness

- Primary hypothesis: as villages become less remote and the access of residents to (health) information as well as goods and services improves, the rural population's health outcomes also improve

Motivation - The State of Healthcare

- A wide gap between the population's needs and the existing supply of infrastructure and trained medical personnel
  - 1,183 individuals per licensed/registered doctor
  - 1,592 persons per hospital bed

The State of Healthcare

- Several health intervention programs and strategies to raise the nutritional and health status of the population

BUT

- Public expenditure on health remains low
  - Pakistan public health expenditure as percent of GDP was 0.86 in 2009 (Source: World Bank data)
  - Public expenditure on health was 38.5% of total health expenditure in 2010 (Source: World Bank data)

The State of Healthcare

- Maternal Mortality Ratio is among the highest in South-Asia
  - 260 per 100,000 births in 2010 (CIA World Fact-book)

- 87 per 1000 live births in Pakistan die before turning 5 years old
  - One-third of these child deaths due to vaccine preventable diseases (UNICEF, 2009)
  - 20 percent of the disease burden of children under 5 is related to poor maternal health and nutrition (UNICEF figures)

- Immunization coverage surveys suggest
  - 1 in every 5 children is not immunized (USAID figures)
  - In many rural areas 2 of every 3 children are not immunized (USAID figures)

What Needs to be Done?

- Make policy interventions more effective
  - It's not just a matter of inadequate spending

- Identify the factors that matter
  - Demand and supply side factors
  - Constraints and limitations
  - Infrastructure issues

Literature

- The literature on health outcomes has looked at both demand and supply-side issues

Demand Side

- Alderman and Gertler's (1997) model: parental preferences biased towards the son
- Cooper and Ensor (2004) do an extensive study of barriers influencing obstetric choices in Bangladesh: knowledge regarding the (health) issues, mobility checks and monetary considerations

Literature

Supply Side

- Haddad and Hoddinott (1994): distance to health facilities has a negative effect on health outcomes for both boys and girls in Côte d'Ivoire
- Holmes (2006): community prices along with infrastructure such as availability of piped water, distance to nearest shops and public health clinics, as well as the quality of the closest health facilities play a significant role in reducing gender gaps in health outcomes in rural Pakistan

Contribution

- Considerable work has been done on the effect of community and health infrastructure variables on health outcomes
  - Most have focused on either factors related to distance, or the quality of public health clinics (where supply of doctors/nurses and pharmaceuticals is also considered)

- Specifically, I examine the effects of rural connectivity on health outcomes

Data

- IFPRI-PIDE dataset

- The International Food Policy Research Institute (IFPRI) conducted 12 rounds of the Pakistan Panel Survey (PPS) between July 1986 and September1991
  - 900 rural household level for districts of 3 provinces – Sind, Punjab and Khyber-Pakhtunkhwa

Data

- Starting in 2001 the Pakistan Institute of Development Economics (PIDE) resumed the IFPRI panel with the Pakistan Rural Household Survey (PRHS). The PRHS has a 60 percent of the original IFPRI sample and is conducted in Sind and Punjab
  - 2000 households

- Using the PPS and the PRHS, I am able to trace the evolution of rural connectivity and health outcomes for specific villages in Sind and Punjab over a 15 year period

Measures of Rural Connectivity

- Using the dataset I can map
  - The electrification status of a village in 1986-91 versus 2001
    - Exogenous?
  - Presence of in-village health facilities in 1986-91 versus 2001

- Electrification affects accessibility to information and awareness levels
  - Positive correlation between electrification of home and
    (1) Receipt of medical advice on child immunization
    (2) Home visits by medically trained personnel

Summary Statistics

Table 1

Variable	1986-91 Round	2001-02 Round
	Village Statistics	
% with electricity	53.5	83
% with any health facility	5.9	23
Mean distance b/w village & any health facility	5.16 km	3.5 km
	Household Characteristics	
% of children ever vaccinated	47	71
Male	48	69
% of women receiving prenatal care	10.7	50

Empirical Method – Basic Estimation Model

- Run two *probit* regressions

(1) $$h_{i,j} = \alpha_0 + \Psi E + \Theta F + \Phi X_{ij} + \lambda_j + \mu_i + \varepsilon_{ij}$$

- $h_{i,j}$ represents health outcomes of individual *i* in family *j* in 2001
  - Whether child is immunized: where child is at most 15 years old
  - Whether mother received pre-natal care
- E is a vector categorizing electrification
- F is a vector measuring the presence of health facilities
- X_{ij} is a vector of family characteristics including age, family size and highest education level completed

Empirical Method – Wealth Index

- Household wealth status is represented through a wealth index which uses productive assets such as agricultural assets along with information on ownership of cattle and livestock as well as household durables

- I use principal components analysis (PCA) to determine the weights of the wealth index.

- The first principal component, expressed in terms of the original (M) variables is therefore an index for each household.

(2) $$A_{1h} = f_{11} \times \frac{v_{1,h} - \overline{v_1}}{sd_1} + \cdots + f_{1M} \times \frac{v_{M,h} - \overline{v_M}}{sd_M}$$

- The procedure first standardizes the variables using their mean ($\bar{v}$) and standard deviation (sd), then the 'scoring factors (f)' are calculated

Empirical Method – Wealth Index

- For each household, the variable values are multiplied by the scores and summed for the wealth index

- I sort all households by the index and establish cut-off values for percentiles of the population
  - Households are assigned to groups based on their value on the index
  - I use similar cutoffs as those in Filmer and Pritchett (2001), and Vyas and Kumaranayake (2006): the bottom 40% is referred to as 'poor', the next 40% as 'middle' and the top 20% as 'rich'

Results: Rural Connectivity

	Immun_01	Pre-Natal_01
Electri: ’01 not ’86	0.767	0.187
	(0.456)***	(0.087)***
Electri: Both	0.877	0.498
	(0.436)***	(0.110)***
In-village facility: never		-0.995
		(0.204)***
In-village facility: ’01 not ’86	0.125	-0.986
	(0.060)***	(0.203)***
In-village facility: Both	0.137	
	(0.059)***	

Notes: ***p<0.01;** p<0.05; * p<0.1; Excluded category for electricity is Electricity: Never

Results: Rural Connectivity

- Relative to no electrification in ’86 and ’01, electrification improves probability of immunization and of receiving pre-natal care
- Similarly, access to in-village health facilities improves health outcomes
- Difference between the effect of electrification and in-village health facilities is significant
- Difference between coefficients on different levels of electrification (and in-village health facilities) is also significant for both regressions

Results: Household Variables

	Immun_01	Pre-Natal_01
Middle	0.136	0.252
	(0.053)***	(0.032)***
Rich	0.058	0.235
	(0.043)***	(0.033)***
Total Family Size	-0.009	-0.002
	(0.005)***	(0.002)**
Gender	0.019	0.085
	(0.039)***	(0.026)***
HHH-Wife Education	0.010	0.026
	(0.006)***	(0.004)***
HHH-Education	-0.006	-0.018
	(0.005)***	(0.004)***
HHH-Wife Age	-0.001	-0.001
	(0.001)***	(0.000)***

Notes: ***p<0.01;** p<0.05; * p<0.1; Excluded category for wealth is 'poor'

Results: Household Variables

- Relative to poor households, middle income and rich households are likely to see better health outcomes
  - Difference between middle and rich is significant only in the case of immunization

- Boys are likely to see better healthcare provision

- Health outcomes decrease in family size, age of wife of household head and education level of household head

- Health outcomes improve in education of wife of household head

Concluding Remarks

- Electrification and health facilities improve health outcomes as measured by immunization and pre-natal care
  - Effect of electrification on immunization is significantly larger than the effect of in-village health facilities
  - Electrification of all villages is an expensive policy option!

- In case of a male child, healthcare is better
  - But poor healthcare for girls will imply worse outcomes related to pregnancies

Thank you