Title of the Presentation

Temporary Migration as a Strategy against Weather Shocks: Evidence from Rural India

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Temporary Migration as a Strategy against Weather Shocks: Evidence from Rural India

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Abstract

We focus our attention on the extent to which anomalies in precipitation and growing degree days prompt temporary migration, as well as the effectiveness of migration to bolster consumption in the face of such anomalies. To investigate the effectiveness of migration, we divide weather variables into three periods, harvest period of previous ag season, pre-harvest and harvest periods of current ag season. Our result identifies effects of weather anomalies on the number of temporary migrants are different by period, and effects of temporary migration on consumption are different by periods.

Background

Recently, some studies have turned their attention to temporary migration. While permanent migration has received substantial attention in the past, temporary migration in direct response to adverse growing season conditions has not, severely limiting our understanding of households' behavioral responses to weather shocks. If feasible, temporary migration seems well suited to cope with short term weather anomalies.

Recently, some studies have turned their attention to temporary migration. However, the effects of temporary migration as a coping strategy rarely studied because of limited data and complexity.

Objective

The objective is to assess effectiveness of temporary migration as a coping strategy to extreme weather events

Data

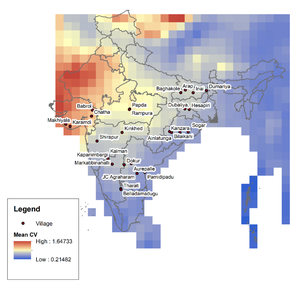
Micro household data

- Village Dynamics in South Asia (2015)
  - Data type : Monthly panel data
  - Time line : 2011.7 – 2015.6
  - 28 villages in India

Weather data

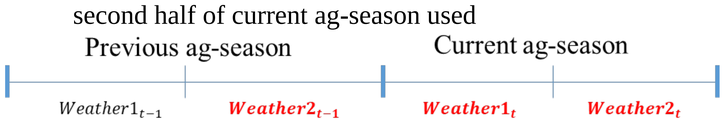
- NCEP Climate Forecast System Version 2
  - Time line : 2011 – 2015

Precipitation CV in Fall ag season



Weather variables

- Growing degree days and Statistical z-score of precipitation
  - Each ag season has divided by two periods
  - GDD and precipitation are aggregated to defined periods
  - Variables from the second half of last ag-season and first and second half of current ag-season used



Consumption model

$$C_{i,v,t} = X_{i,v,t}\alpha + \alpha_1 M_{i,v,t} + \sum_k \alpha_{k,2} Weather_{k_{v,t,p=2}} + \sum_k \sum_{j=1}^{2} \alpha_{k,2+j} Weather_{k_{v,t,p=j}}$$
$$+ \sum_k \alpha_{k,5} M_{i,v,t} Weather_{k_{v,t,p=2}} + \sum_k \sum_{j=1}^{2} \alpha_{k,5+j} M_{i,v,t} Weather_{k_{v,t,p=j}} + \varepsilon_{i,v,t}$$

where $C_{i,v,t}$ is consumption of household i in village v at year-agricultural season t, $X_{i,v,t}$ is control variables, $M_{i,v,t}$ is number of temporary migrants per month.

$Weather_k$ is k-th weather variable, including growing degree days, below and above average precipitation anomalies, and quadratic terms of below and above average precipitation anomalies. In weather variables, p=1 is pre-harvest period and p=2 is harvest period.

Migration, the interest variable, has two endogeneity sources, unobservable characteristics and bi-directional causality. For example, migration can increase household welfare, while increased welfare can stimulate migration further. To deal with the endogeneity issues, this study used instrumental variables with household and agricultural season fixed effects..

Instrumenting for migration

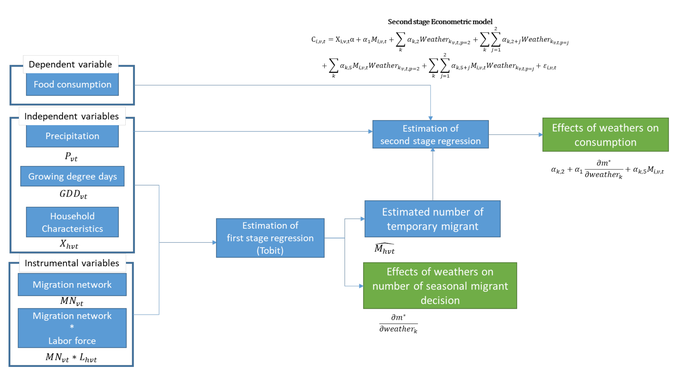
As instruments, we use proportion of migrants in village level (migration network) and its interaction with number of household members in labor force. The labor force is included in control variable. In addition, migration network satisfies conditions of instrumental variable. The first stage of regression is estimated by using Tobit model.

Average marginal effects

Derivative consumption model respect to weather variable provides three different effects by weather.

- Direct effects: consumption change by crop yield change
- Indirect effects by migration: consumption changes because of number of temporary migration
- Indirect effects by changing migration: consumption changes because of changing number of temporary migration by weather

Analysis process



Results

- Average marginal effects of weather on number of temporary migrants

Variable	Average marginal effects on number of temporary migrants
$PP_{v,t-1,p=2}$	0.047** (0.021)
$PP_{v,t,p=1}$	0.065* (0.037)
$PP_{v,t,p=2}$	0.011 (0.017)
$NP_{v,t-1,p=2}$	-0.004 (0.024)
$NP_{v,t,p=1}$	0.024 (0.029)
$NP_{v,t,p=2}$	-0.061** (-0.028)

- Average marginal effects of weather on consumption

Variable	Direct effects	Indirect effects 1 – Change of migration	Indirect effects 2 - Migration	Total average marginal effects
$PP_{v,t-1,p=2}$	-0.083*** (0.018)	0.078* (0.030)	0.105*** (0.016)	0.099** (0.030)
$PP_{v,t,p=1}$	-0.053** (0.018)	0.024 (0.090)	0.097*** (0.023)	0.067 (0.093)
$PP_{v,t,p=2}$	-0.128*** (0.012)	-0.032*** (0.003)	-0.029* (0.016)	-0.189*** (0.017)
$NP_{v,t-1,p=2}$	0.285** (0.084)	-0.038 (0.044)	0.230*** (0.041)	0.128 (0.090)
$NP_{v,t,p=1}$	0.053 (0.042)	-0.217 (0.158)	0.063* (0.035)	0.210 (0.276)
$NP_{v,t,p=2}$	-0.028 (0.029)	-0.162** (0.055)	0.050** (0.024)	0.009 (0.245)

- We saw that direct effects of above average abnormal precipitation have negative effects, regardless of periods. In the total effects, we can observe that negative direct effects of previous harvest period and current pre-harvest period are compensated by migration and migration number changes. Thus, we can say that migration is an effective way of coping above average abnormal precipitation for those two periods.

- Total effects of harvest period of current ag season show significant negative effects. Temporary migration is an effective coping strategy when migrants can work in the destination. However, as we discussed at indirect effects, temporary migrants may not get jobs in case of above average abnormal precipitation at current harvest period. In addition, National Rural Employment Guarantee Act, 2005 guarantees 100 days of wage employment to rural households. Thus, total effects may be negative.

- To reduce negative effects of changing temporary migration pattern, rural India needs policy to reduce temporary migration employment uncertainty.