Natural shocks and migration: the case of Kyrgyzstan

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Motivation

- Considerable part of international migration observed between Russia and other CIS countries is temporary and circular
- It is important to understand how sensitive are migrant streams to various shocks and understand migration decision
- Natural shocks represent an important source of exogenous variation to households' incentives that may vary migration behavior
- Natural shocks are becoming more common due to climate change

Motivation - 2

- Households in developing countries experience multiple shocks and develop various coping strategies

[Fafchamps, Udry, Czukas 1998; Kazianga, Udry 2004; Fafchamps, Lund 2003]

- Migration is mostly viewed as an ex-ante coping strategy, while it seems to be understudied as an ex-post coping strategy

[Stark, Bloom 1985; Yang, Choi 2007; Yang 2008]

- As a coping strategy, migration is quite costly and is not always feasible

- Households develop "safety nets" to help each other to overcome shocks consequences. Can migration financing be used as a mean of such help?

How natural shocks affect migration

- Natural shocks indefinitely affect household migration decision
- Most of the times effect is positive:

Evidence for internal migration: Gray, Mueller 2012a; Badiani, Safir 2010; Beine, Parsons 2015

Evidence for international migration: Kugler, Yuksel 2008; Hanson, McIntosh 2010

- But sometimes effect may be negative:

Evidence for internal migration: Gray, Mueller 2012b; Tse 2011

Evidence for international migration: Halliday 2006, 2008, 2012; Yang 2008

Mechanisms behind the effects

Positive effect:

- Need for funds to restore damaged assets
- Deteriorating productivity in home production as a result of destroyed capital or inefficient technology
- Falling wages or increased unemployment at local labour market

Negative effect:

- Budget constraint makes migration a non-feasible strategy:
  - destroyed assets or lost income may not allow to finance costs of migration
  - aggregate shock may disrupt mechanisms of communal mutual support [Yang 2008]
- Preference to retain labor at home
  - Rising relative productivity in home production [Halliday 2010]
  - Need for extra labor investment in subsistence farming [Halliday 2012]

Questions

- What is the effect of natural shocks on migration decision?

- What is a mechanism behind the observed effect?

- Does migration financing is used as a way to support affected households?

The context of Kyrgyzstan

- Mainly a mountainous Central Asian country with significant variation of natural and socio-demographic conditions between the regions
- Territory is subject to various natural disasters (earthquakes, landslides) and significant interannual temperature variation
- 30% of labour force employed in agriculture
- 37-41% rural poverty rate
- 90% of agricultural lands in private ownership
- Migrant remittances in 2013 – 31% GDP

Data

- "Life in Kyrgyzstan" panel survey data on 3000 households over years 2010 to 2013

- Representative nationally and at the regional level (East, West, North, South)

- We use subsample of **rural households**: 1500-1700 households yearly

Natural shocks

"During the last 12 months, has your household been affected by the following shocks?"

	2010	2011	2012	2013	No migrants	With migrants
Drought	4.52%	40.77%	33.99%	15.44%	23.54%	24.00%
Too much rain or flood	19.73%	21.89%	15.80%	16.01%	**17.85%**	**21.29%**
Very cold winter	22.47%	22.06%	56.91%	27.66%	32.33%	31.43%
Earthquake	6.92%	43.95%	2.93%	11.59%	**16.02%**	**18.30%**
Landslides	9.78%	8.14%	8.56%	4.41%	7.38%	9.87%

Migration participation

year	2010	2011	2012	2013
Household has international migrants	13.8%	14.2%	18.1%	20.1%
Household has international migrants financed from own funds	6.7%	9.1%	11.6%	13.5%
Household has international migrants financed with the help from friends or relatives	6.9%	5.7%	8.2%	7.1%
Household has international migrants financed by other method	0.9%	0.9%	0.4%	1.0%

Over 90% of migrant families have 1 or 2 migrants

Migrant vs non-migrant households

- Migrant households are larger, with higher share of working age members, more of them are Kyrgyz and Uzbek and less other ethnicities
- Migrant households more frequently own land and livestock and cultivate land but own and cultivate smaller parcels; they also have lower share of income from home production and local labour market
- Migrant households live in larger settlements in the South

Empirical strategy

$$y^*_{it} = \beta X_{it-1} + \gamma_k shock_{itk} + D_t + \varepsilon_{it} + u_i, \quad i=1\ldots K, \; t=1\ldots T$$

where y^*_{it} – utility from household participation in migration

      $shock_{itk}$ – natural shock experienced by household, $k=1..K$;

      X_{it-1} – household pre-shock characteristics;

      D_t – period dummy, $t = 1\ldots T$;

      u_i – individual effect;

      ε_{it} – random error such that $E[\varepsilon_{it} \mid u_i, x_{1i},\ldots x_{1T}] = 0$, ε_{it} ~ Type I extreme value distributions

List of controlled household characteristics

- Socio-demographic
  - HH size, hh age and sex composition, head age, head education, head ethnicity

- Wealth & economic activities
  - Asset index, owned land, cultivated land, livestock ownership (self-estimated value), share of income from home production, from local labour market activities and from private transfers

- Time&place characteristics
  - Month and year of interview, region (oblast), community population size

Shocks effects on migration participation

Shock	International migration participation		
	RE	RE	FE
drought	-0.36***	-0.34**	-0.33**
too much rain or flood	-0.32*	-0.23	-0.35
very cold winter	-0.09	-0.14	-0.03
earthquake	-0.08	-0.03	0.17
landslides	-0.17	-0.18	-0.41
Assets&economic activities	NO	YES	YES
Demographic controls	YES	YES	YES
Date&region controls	YES	YES	YES
N of obs	4,823	4,689	1,115
N hhid	1,717	1,692	383

Mechanisms: hypotheses

Positive effect

Mechanism: Deteriorating productivity in home production as a result of destroyed capital or inefficient technology

Test: The higher is **engagement in home production** the more migration increases (or less decreases) in response to shock

Mechanism: Falling wages or increased unemployment at local labour market

Test: The higher is **engagement in local labour market** the more migration increases (or less decreases) in response to shock

Negative effect

Mechanism: Destroyed assets or lost income may not allow to finance costs of migration

Test: - The lower is household **wealth** the more migration decreases (or less increases) in response to shock

    - Negative effect goes through **self-funding**

Mechanism: Aggregate shock may disrupt mechanisms of communal mutual support

Test: The lower is household **wealth** the more migration decreases (or less increases) in response to shock

    - Negative effect goes through **help-funding**

    - The higher **is shock-prevalence rate** in the community the more migration decreases (or less increases) in response to shock

Mechanism: Preference to retain labor at home for home production purposes

Test: - The higher is **engagement in home production** the less migration increases (or more decreases) in response to shock

Testing mechanisms

$$y^*_{it} = \beta X_{it-1} + \gamma_k shock_{itk} + \delta shock_{itk} * X_{it-1} + D_t + \varepsilon_{it} + u_i, \qquad i=1...K, \; t=1...T$$

- δ sign and significance is a matter of interest for:
  - Wealth (asset index, land ownership)
  - Engagement in agriculture and other home production (cultivated land, livestock ownership, share of income from home production)
  - Engagement in labour market (share of income from payed work)
  - Share of hh in community experiencing shock
- Look at shocks' effects on migration participation by source of funding

Shocks effects on migration participation by source of funding

Shock	International migration			International migration – self-funding			International migration – funding using help		
	RE	RE	FE	RE	RE	FE	RE	RE	FE
drought	-0.36***	-0.34**	-0.33**	-0.41***	-0.40***	-0.47**	0.01	0.05	0.17
too much rain or flood	-0.32*	-0.23	-0.35	-0.47**	-0.40**	-0.35	0.01	0.14	-0.18
very cold winter	-0.09	-0.14	-0.03	-0.11	-0.16	-0.28	-0.01	-0.07	0.10
earthquake	-0.08	-0.03	0.17	0.30	0.30	0.58**	-0.61***	-0.59***	-0.54*
landslides	-0.17	-0.18	-0.41	-0.14	-0.15	-0.37	-0.13	-0.11	-0.46
Assets&economic activities	NO	YES	YES	NO	YES	YES	NO	YES	YES
Demographic controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Date&region controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
N of obs	4,823	4,689	1,115	4,823	4,689	960	4,823	4,689	727
N hhid	1,717	1,692	383	1,717	1,692	333	1,717	1,692	250

Hypotheses testing: Drought

VARIABLES	Total migration	Total migration	Self-financed migration	Self-financed migration	Help-financed migration
drought	-0.65***	-2.39***	-0.68***	-2.29***	0.13
drought*asset index					0.15**
drought*size of cultivated land	0.08**		0.08*		
drought*size of owned land		0.24***		0.23***	
Controls	YES	YES	YES	YES	`YES
Observations	4,689	4,689	4,600	4,600	4,600
Number of hhid	1,692	1,692	1,688	1,688	1,688

Positive effect

Mechanism: Deteriorating productivity in home production as a result of destroyed capital or inefficient technology

Test: - More migration with higher **engagement in home production**

More total and self-funded migration with more cultivated land

Negative effect

Mechanism: Destroyed assets or lost income may not allow to finance costs of migration

Test: - Less migration the **poorer** is household

Less total and self-funded migration with less land owned

- **Self-funding** goes down

Hypotheses testing: Rain/flood

	Total migration
too much rain or flood	-0.14
too much rain or flood*asset index	0.15**
Controls	YES
Observations	4,689
Number of hhid	1,692

Negative effect

Mechanism: Destroyed assets or lost income may not allow to finance costs of migration

Test: - Less migration the **poorer** is household

    Less total migration with lower asset index

     - **Self-funding** goes down

Hypotheses testing: Cold winter

	Total migration	Total migration
very cold winter	-0.09	-0.61**
very cold winter*asset_ind	0.12**	
very cold winter* livestock		0.04*
Controls	YES	YES
Observations	4,689	4,689
Number of hhid	1,692	1,692

Positive effect

Mechanism: Deteriorating productivity in home production as a result of destroyed capital or inefficient technology

Test: - More migration with higher **engagement in home production**

More total migration with higher livestock ownership

Negative effect

Mechanism: Destroyed assets or lost income may not allow to finance costs of migration

Test: - Less migration the **poorer** is household

Less total migration with lower asset index

Hypotheses testing: Earthquake

	Help-financed migration	Self-financed migration	Self-financed migration	Help-financed migration
earthquake	-0.59***	0.10	-1.70*	0.31
earthquake*share of wages income		0.85*		
earthquake* size of owned land			0.23**	
(earthquake = 0)* share of affected households				0.95
(earthquake = 1)* share of affected households				-0.99*
Controls		YES	YES	YES
Observations		4,600	4,600	4,600
Number of hhid		1,688	1,688	1,688

Positive effect
Mechanism: Falling wages or increased unemployment at local labour market
Test: More migration with higher **engagement in local labour market**
   More self-funded migration with higher share of labour market income

Negative effect
Mechanism: Destroyed assets or lost income may not allow to finance costs of migration
Test: - Less migration the **poorer** is household
   Less self-funded migration with less land-ownership
Mechanism: Aggregate shock may disrupt mechanisms of communal mutual support
Test: - **Help-funding** goes down
   - Less migration the higher **is shock-prevalence rate** in the community
   Less help-funded migration with the higher shock-prevalence rate in the community

Hypotheses testing: Landslides

	Total migration	Total migration	Help-financed migration
landslides	-1.02*	0.62	0.63
landslides*livestock ownership	0.07*		
(landslides=0)*share effected households		0.12	0.66
(landslides=1)*share effected households		-1.49**	-1.34*
Observations	4,689	4,689	4,600
Number of hhid	1,692	1,692	1,688

Positive effect

Mechanism: Deteriorating productivity in home production as a result of destroyed capital or inefficient technology

Test: - More migration with higher **engagement in home production**

More migration for higher livestock ownership

Negative effect

Mechanism: Aggregate shock may disrupt mechanisms of communal mutual support

Test: - Less migration the higher **is shock-prevalence rate** in the community

Less total and help-funded migration with higher shock-prevalence rate in the community

Summary of results

- On average, natural shocks have little impact on migration behavior of Kyrgyz households: the only strong significant effect is for droughts
- For most of the shocks oppositely directed mechanisms neutralize each other
- **All** natural shocks (except landslides) vary with households' wealth such that poor households have less migration - a sign of possible liquidity constraint
  - Still need a better control for welfare (consumption)
- We see practically no considerable rise in friends and relatives help for migration funding as a response to shocks
- On the contrary, for earthquakes and landslides there is evidence for creating credit constraint through undermining the mechanism of communal mutual support