

Migration Responses to Household Income Shocks: Evidence from Kyrgyzstan

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Research Question

How do income shocks influence employment decisions of individual women and men?

- What are their impacts on migration and whether individuals work?
- How do they influence household composition?
- Do they influence the acquisition of human capital?

Specific Focus: Households in Kyrgyzstan Earning Income from Agriculture

During 2004-2014, how have Kyrgyz households earning income from agricultural production (crops and/or livestock) responded to reductions in total household income?

Preview of the Results

- Negative shocks significantly increase migration
 - Migration impacts on women are smaller than for men
 - Women are more likely to lose their jobs than are men following shocks
- Shocks decrease the number of adult males in the household, increase the dependency ratio, and decrease the prevalence of a male head
- Shocks do not affect whether young women or young men pursue non-compulsory education

Motivation

- Negative income shocks can substantially negatively affect the welfare of the poor
 - For example, they increase child labor and reduce the likelihood of investment in relatively capital-intensive HH enterprises (Yang 2008)
- Households—especially poor ones—tend to under-insure against such shocks (Dercon 2002; Townsend 1994; Jalan and Ravallion 1999)
- The effect of negative income shocks on migration is ambiguous:
 - They increase liquidity constraints (making it harder to finance migration and thus reducing it)
 - They increase the need for family members to stay home to help cope with the shock (reducing migration) (Halliday 2006)
 - They increase wage gaps between the origin and potential destinations (increasing migration) (Kennan and Walker 2011; Kleemans 2015)
- Limited empirical evidence on how movements in HH income affect migration and employment or how women are differentially affected

Background: The Economy of Kyrgyzstan

- Small (200,000 sq. km), land-locked, low-income country in Central Asia
- 2004 GDP per capita: \$757 (in constant 2010 USD); still a modest \$1,004 per capita by 2014
- In 2014, 30.6% of people were living below the national poverty line
- 65% of the population, 75% of the poor, and 80% of the extreme poor live in rural areas (FAO 2016)

Background: The Agricultural Sector

- Only 7 percent of the country's land is arable (44 percent of land is used as pastures for livestock)
- Agriculture's share in GDP was 33 percent in 2004, though that declined to 17 percent in 2014
- 39% of employment in 2004 and 32% in 2014 was in agriculture
- Livestock accounted for over 57% of overall net production value of agriculture in 2011
- Vast majority of agricultural production is concentrated in small individual farms (FAO 2016)

Background: Migration in Kyrgyzstan

- Many Kyrgyz have emigrated—largely to Russia and to a lesser extent Kazakhstan—in search of improved economic opportunities
- An estimated 650,000–1,000,000 Kyrgyz, about 40 percent female and 60 percent male, currently work abroad (OSCE 2016)
- In 2014, migrants sent home over \$2 billion in remittances—equivalent to over 27 percent of GDP
- This has contributed to making migration a major policy issue for the country

Data

- Data source: The Kyrgyzstan Integrated Household Survey (KIHS), 2004–2014 (11 years of data)
 - Rolling panel dataset; median household is in the sample for 3 years
 - Measures collected quarterly aggregated to be annual data
 - Household identifiers unique and consistent across years; individual identifiers constructed using household identifier and exact birth date (year, month, date)
- Sample: all households earning at least some income from agriculture (65.5 percent of households)
 - 9,562 households in total
 - 41 percent are urban
 - 41 percent of all income these households earn comes from agriculture

Outcomes

Migration:

- Defined as exiting the household roster (and thus ceasing to be considered a household member) (used, e.g., by Mueller et al. 2014)

Employment:

- Defined as having worked for a paid job and/or for a family farm or enterprise during the last week (or being temporarily away)

Pursuing Education:

- Is the individual currently a student?

Table 1: Summary statistics

	N	Mean	SD
Dummy—individual left roster since the previous round	62,282	0.103	0.304
Dummy—main place of work is outside the country	71,719	0.087	0.282
Dummy—main place of work is outside the oblast or country	71,719	0.124	0.330
Dummy—had a paid job and/or work on a family farm or enterprise	103,321	0.694	0.461
Dummy—worked multiple jobs in last week	71,719	0.151	0.358
Dummy—would like to work more, if it provided additional income	71,719	0.284	0.451
Dummy—employed under verbal contract	36,616	0.401	0.490
Dummy—student (universe: 15-24 years)	35,596	0.570	0.495
Dummy—student (universe: 15-20 years)	25,159	0.738	0.440
Assistance per capita from family and friends (2010 Som)	33,209	2,052	6,113
Healthy HH dietary diversity score	28,660	1.956	.647
Household dietary diversity score	28,660	9.214	1.088
Total household income (2010 Som)	9,551	128,773	118,259
Dummy—household produces an ag good in the majority of traded value basket	9,562	0.735	0.441
Head of household age	9,367	51.7	14.0
Household size	9,369	4.38	1.93
Land size (1000 m ²)	9,550	9.15	14.6
Dummy—head of household general secondary degree or higher	9,367	0.851	0.356
Dummy—head of household is married	9,367	0.729	0.445
Dummy—head of household is male	9,367	0.726	0.446

Source: Authors' calculations based on KIHS 2004–2014.

Notes: Household characteristics are summarized for the first (initial) year that the household is in the sample.

Econometric Specification

- We estimate:

$$E_{ijkt} = \beta_0 + \beta_1 H_{jkt} + \beta_2 \mathbf{X}_{jkt} + \beta_3 \mathbf{Y}_{ijkt} + \alpha_{kt} + \gamma_t + \mathbf{t}_{jk} + \epsilon_{ijkt} \quad (1)$$

where

- i indexes individuals, j indexes households, k indexes the oblast (i.e. region) – area type (rural or urban), and t indexes years
- E_{ijkt} is a migration or employment-related outcome
- H_{jkt} is total household income
- \mathbf{X}_{jkt} is a vector of household-level controls
- \mathbf{Y}_{ijkt} is a vector of individual-level controls including a male dummy, age, and age²
- α_{kt} are year \times oblast \times urban area dummy fixed effects
- γ_t are year fixed effects
- \mathbf{t}_{jk} is a vector of the quantities the HH grew in its first year in the sample of 6 most traded ag products, each interacted with a time trend

Identification: Simulated Instrumental Variables Strategy

- Problem: Omitted variable bias and reverse causality
- Solution: Instrument for HH income with simulated (i.e. predicted) HH income from a basket of the six most traded (by value) ag products (kidney beans, cow's milk, sheep, cows, bulls/ oxen, and potatoes):

$$S_{jkt} = \sum_{c=1}^6 (q_{c,t=0} \times p_{c,t})$$

- $q_{c,t=0}$ is quantity HH produced in its first year in the sample
 - $p_{c,t}$ is Kyrgyzstan-wide median price in the *current year*
 - Note: About 74% of sample households produced at least one of these products in their first year in the sample.
- Exploits that part of HH income due to exogenous shifts in prices of heavily-traded commodities

Basket prices

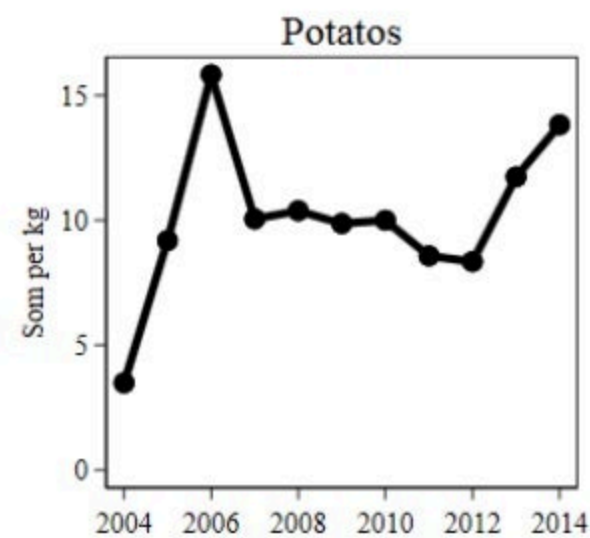
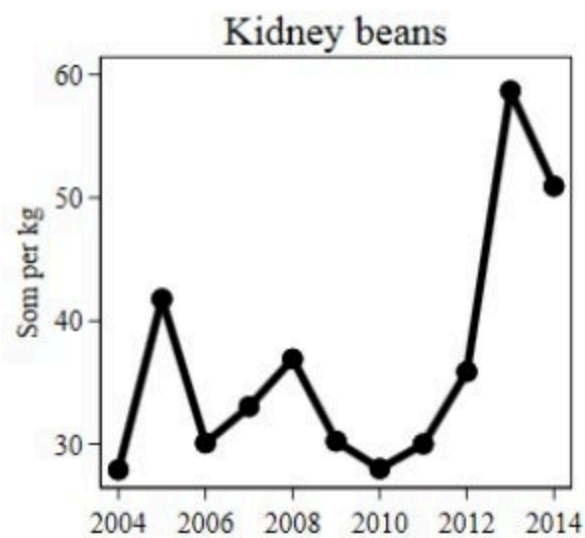
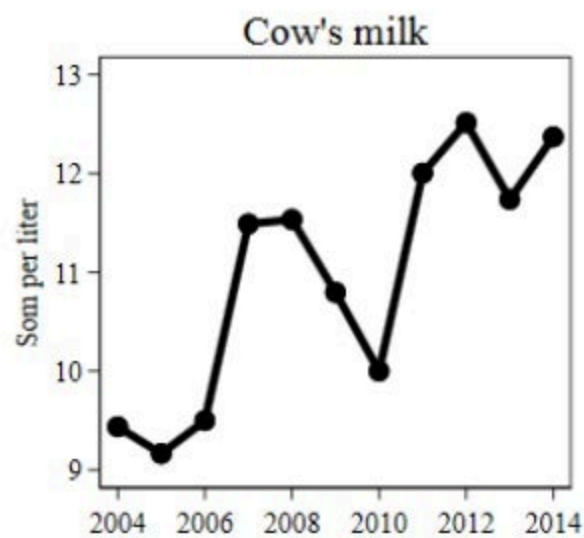
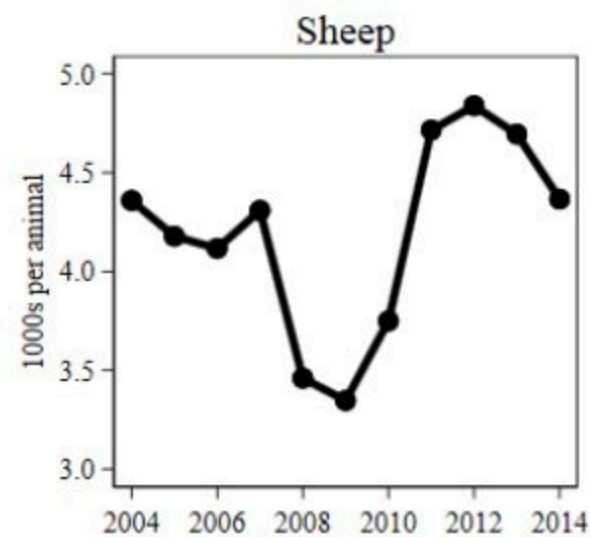
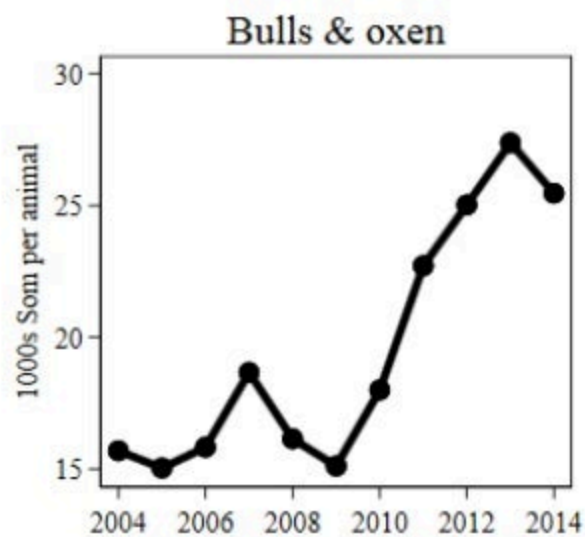
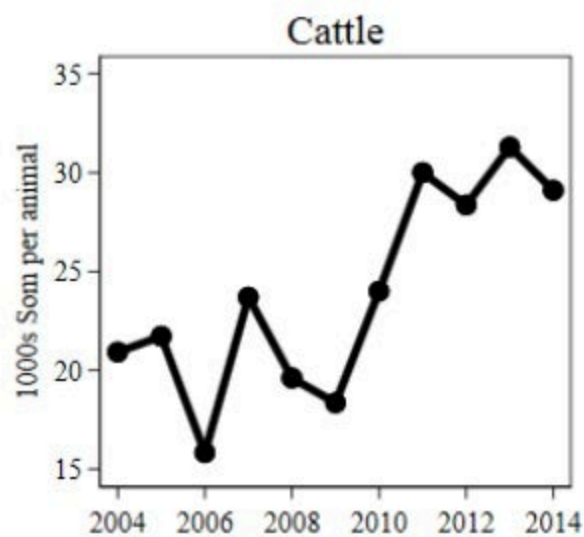


Table 2: First stage results

	(1)	(2)	(3)	(4)	(5)
<i>Controls added iteratively</i>					
Year FE	Yes	Yes	Yes	Yes	Yes
Year×urban×oblast FE		Yes	Yes	Yes	Yes
Household-level controls			Yes	Yes	Yes
Individual's age, age ² , and sex				Yes	Yes
Other individual-level controls					Yes
<i>Panel A: current income</i>					
Simulated income	1.177*** (0.104)	1.132*** (0.102)	1.143*** (0.100)	1.145*** (0.100)	1.141*** (0.100)
R ²	0.377	0.442	0.463	0.464	0.466
First stage F-stat	127.1	124.1	129.8	130.6	130.0
N	62240	62240	61401	61401	61401
<i>Panel B: lagged income</i>					
Simulated income	0.934*** (0.114)	0.936*** (0.116)	0.951*** (0.119)	0.951*** (0.119)	0.947*** (0.119)
R ²	0.527	0.576	0.592	0.592	0.594
First stage F-stat	66.7	65.6	64.1	64.1	63.8
N	60695	60695	59858	59858	59858

Source: Authors' calculations based on KIHS 2004–2014.

Notes: Standard errors are in parentheses and clustered at the household level. *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0.10$.

Table 3: Heterogeneous effects of income shocks on migration (IV)

	Dummy—left household		
	(1)	(2)	(3)
<i>Panel A: current year income</i>			
Income	-0.034*** (0.012)	-0.025** (0.012)	-0.041*** (0.013)
Income×male		-0.017*** (0.004)	
Income×male head			0.008 (0.008)
R^2	0.100	0.100	0.100
First stage F-stat	130.0	65.3	66.1
N	61401	61401	61401
<i>Panel B: lagged income</i>			
Income	-0.020 (0.013)	-0.012 (0.013)	-0.027** (0.014)
Income×male		-0.015*** (0.004)	
Income×male head			0.007 (0.006)
R^2	0.103	0.103	0.103
First stage F-stat	63.8	32.0	31.5
N	59858	59858	59858

Notes: *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0.10$.

Table 4: Effects of income shocks on employment

	Dummy—had a paid job and/or work on a family farm or enterprise	
	(1)	(2)
Income	0.037*** (0.014)	0.051*** (0.014)
Income×male		-0.026*** (0.005)
R^2	0.294	0.292
First stage F-stat	117.0	58.6
N	101433	101433

Source: Authors' calculations based on KIHS 2004–2014.

Notes: Income is measured in 100,000s of 2010 Som. Standard errors are in parentheses and clustered at the household level. *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0.10$.

Table 5: Impacts on household composition

	(1)	(2)	(3)	(4)	(5)
	# HH members - male	# HH members - female	# HH members, age 15-64	dependency ratio	dummy - male head
<i>Panel A: current income</i>					
Simulated income	0.079** (0.039)	0.017 (0.031)	0.131** (0.061)	-0.054* (0.033)	0.042*** (0.150)
R^2	0.343	0.284	0.453	0.266	0.015
First stage F-stat	156.7	156.7	156.7	150.5	156.8
N	34128	34128	34128	32232	34102
<i>Panel B: lagged income</i>					
Simulated income	0.107** (0.049)	0.030 (0.040)	0.206** (0.082)	-0.071 (0.047)	0.060*** (0.022)
R^2	0.298	0.233	0.405	0.251	0.620
First stage F-stat	81.08	81.08	81.08	78.02	81.01
N	24798	24798	24798	23393	24772

Source: Authors' calculations based on KIHS 2004–2014.

Notes: *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0.10$.

Table 6: Effects of income shocks on studying

	Dummy—student...			
	(universe: 15–24 years) (1)	(2)	(universe: 15–20 years) (3)	(4)
Income	0.000 (0.020)	-0.001 (0.021)	-0.011 (0.023)	-0.010 (0.024)
Income×male		0.002 (0.008)		-0.001 (0.008)
R^2	0.480	0.480	0.351	0.351
First stage F-stat	79.3	39.9	57.3	29.0
N	34,931	34,931	24,702	24,702

Source: Authors' calculations based on KIHS 2004–2014.

Notes: The student outcomes are constructed from the self-reported response to "Please specify which of the following definitions is the best description of your current status?" Income is measured in 100,000s of 2010 Som. Standard errors are in parentheses and clustered at the household level. *** indicates $p < 0.01$; ** indicates $p < 0.05$; and * indicates $p < 0.10$.

Conclusions

- Negative shocks significantly increase migration
 - Migration impacts on women are smaller than for men
 - Women are more likely to lose their jobs than are men following shocks
- Shocks decrease the number of adult males in the household, increase the dependency ratio, and decrease the prevalence of a male head
- Shocks do not affect whether young women or young men pursue non-compulsory education