

Trade and Poverty: Evidence from Kyrgyz Households

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Motivation

- It is generally accepted that **trade** is beneficial for the overall **growth** of countries' economies.
- No consensus as to the effect of trade at the **individual level**, and as to who the potential *winners* and *losers* are.

Objective

to study the effect of trade on poverty in Kyrgyzstan at the household level, using the standard Rajan-Zingales (R. G. Rajan & Zingales, 1998) identification strategy.

- Focus on *farm households*;
- **Production** and **consumption** channels are explored.

Contribution to literature

- Most studies look at the reduced-form relation and fail to explain the specific channels behind;
 - I study the production and consumption channels of the effect of trade on poverty.
- Most of the work is based on cross-country regressions;
 - I use a micro approach and focus on a single country.
- Central Asia and Kyrgyzstan in particular have been largely overlooked by scholarly work on trade and poverty;
 - I focus on Kyrgyzstan using "Life in Kyrgyzstan" data, UN Comtrade database, and Google maps.

Review of the Literature: Theoretical Background

Trade and Poverty: Channels:

- Market of Goods and Services: Production and Consumption;
- Labor Market: Employment and Wages;
- Public Sector: Tax Revenues and Public Spending;
- Trade Promotes Growth of the Economy. Growth Reduces Poverty.

Review of the Literature: Theoretical Background

Market of Goods and Services: Production and Consumption:

- **Farm household** is the unit of analysis;
- Poverty is defined over this farm household.

Mechanism: Trade integration $\uparrow \Rightarrow$ Foreign demand for the commodities produced by the country $\uparrow \Rightarrow$ Price of the goods produced \uparrow :

- As **producers** of these commodities, farm households' wellbeing \uparrow as their income \uparrow ;
- As **consumers** of these commodities, farm households' wellbeing \downarrow as their consumption capacity \downarrow .

\Rightarrow The overall effect on the household depends on whether it is a **net producer** or a **net consumer** of the goods.

Review of the Literature: Theoretical Background

Market of Goods and Services: Production and Consumption:

Assumptions:

- 1 Following trade liberalization countries are able to adjust their output immediately in response to increased foreign demand;
 - May not be possible;
 - Takes time;
 - Production capacity may not be high enough.
 - Access to credits, inputs, markets and infrastructure.
- 2 Prices following trade liberalization may not transmit quickly enough from the borders to the local units where the farmers reside;
 - Transport costs and other costs of distribution; the extent of competition between traders; domestic taxes and regulations, etc.
- 3 The country is small enough, so is a price taker in the world market.

Kyrgyzstan: Key Facts

Trade Profile:

- One of the most open economies in the world;
 - Trade to GDP ratio ranging from 73.7% to 146.1% during 2000-2019.
- The first among former Soviet Union republics to enter the WTO on 20 December 1998;
- Major transit route for goods from China to other Central Asian countries and Russia;
- Trade largely characterized by trade deficit;
- Number of people employed in wholesale and retail trade and auto service in 2018 was 373,900 out of 2,382,500 of working population (15.7%);
 - Second industry that employs the most number of people after agriculture (20.3%).

Kyrgyzstan: Key Facts

Trade Profile:

- "Food products and live animals" in the top 3 categories of exports;
- 482,700 people employed in agriculture, hunting, forestry, and fishing in 2018;
 - The first most important sector in terms of employment;
- Net importer of "food products and live animals";
 - High vulnerability of Kyrgyz households to external price shocks.

Kyrgyzstan: Key Facts

Poverty Profile:

- Lower middle income economy;
- GDP growth rates ranged from 3.8% to 4.7% in the past 5 years;
 - However, due to Covid-19, negative growth in 2020.
- Poverty headcount ratio at national poverty line is 20.1% for 2019;
 - Rural: 23.2% in 2019;
 - Urban: 14.7% in 2019.
- Almost half of the population is malnourished.

Empirical Analysis: Model Specification

Why focus on **production** and **consumption** channels?

- Farm household is the unit of analysis;
- Agriculture is the crucial sector for Kyrgyzstan's economy and the leading sector in terms of the number of people it employs;
- "Food products and live animals" are among the leading categories both for Kyrgyz exports and imports;
- Stolper-Samuelson theorem: the low skilled labor benefits the most from trade;
 - This makes agriculture especially important:
"For this sector one can be reasonably confident that very-low-skilled workers in rural areas - the majority group among the poor - will benefit through the production responses" (Winter, 2002, p.1350).
- ⇒ The impact of trade is the biggest for farm households.

Empirical Analysis: Model Specification

$$Cons_{h,t} = \beta_0 + \beta_1 Shock_{h,t} + \beta_2 Shock_{h,t} * Remoteness_h + \sum \gamma' X_{h,t} + \eta_t + \mu_h + \epsilon_{h,t}$$

where:

- $Cons_{h,t}$ = total (or individual) consumption of bought food and non-food items of the household (h) at time (t);
- $Shock_{h,t}$ = the world demand for the goods produced and sold by household (h) at time (t);
- $Remoteness_h$ = the inverse measure of trade openness of the household (h);
- $X_{h,t}$ = vector of variables of control;
- η_t = time fixed effects;
- μ_h = household fixed effects;
- $\epsilon_{h,t}$ = error term.

Empirical Analysis: Model Specification

Dependent variable:

$Cons_{h,t}$:

- total consumption of bought food and non-food items of the household (h) at time (t) (in KGS per year);
- total consumption of bought food and non-food items of the household (h) per person at time (t) (in KGS per year);
 - Consumption of food items from own production is excluded;

Empirical Analysis: Model Specification

Variables of interest:

$$Shock_{h,t} = \sum \alpha_{p,h} * Exp_{p,t}^W$$

where:

- $\alpha_{p,h}$:
 - share of agricultural product (p) in the household (h)'s sold production (in terms of quantities sold);
 - *"If your household sold any part of the product, report quantities sold to each of the following..."*
 - share of agricultural product (p) in the household (h)'s sold production (in terms of amounts sold in USD);
 - *"If your household sold any part of the product, report quantities sold to each of the following..."*.
 - To calculate amounts in USD, I use unit values for each commodity from the UN Comtrade database;
 - 19 items were used (major crops and livestock).

Empirical Analysis: Model Specification

Variables of interest:

$$Shock_{h,t} = \sum \alpha_{p,h} * Exp_{p,t}^W$$

where:

- $Exp_{p,t}^W$:
 - imports of product (p) in year (t) by countries of the World from Kyrgyzstan in USD per year (from the UN Comtrade database).

Empirical Analysis: Model Specification

Variables of interest:

Remoteness_h:

- travel distance (in km) from population point where the household (h) resides to oblast center (by car);
- travel distance (in km) from population point where the household (h) resides to the cities of Bishkek or Osh (whichever is closer) (by car).
 - geo-codes (comprising of longitude and latitude coordinates) for the population point and the oblast center, Bishkek city and Osh city were used to calculate the distance.

Empirical Analysis: Model Specification

Variables of control:

- Household characteristics:
 - Number of household members with primary, secondary and university education;
 - Household size;
 - Number of males over age 15;
 - Number of children under age 5;
 - Gender of the household head;
 - Marital status of the household head;
- Time fixed effects:
 - Macroeconomic shocks across years;
- Household fixed effects:
 - Any time-invariant household characteristics that may affect the outcome variable.

Empirical Analysis: Model Specification

Predictions:

All	Consumption channel	Production channel
Shock	-	+
Shock \times Remoteness	+	-

- The positive sign of the coefficient for *Shock* would suggest the dominance of the **production channel**;
- The negative sign of the coefficient for *Shock* would suggest the dominance of the **consumption channel**;
- The sign for *Shock \times Remoteness* should be opposite of the coefficient of *Shock* as it undermines the effects for more remote and thus, less integrated households.

Identification Assumptions:

- 1 Variables of interest are exogenous;
- 2 As long as there are no time-varying omitted variables, which are correlated with our variables of interest and at the same time affect our outcome variable, OLS estimation on the within-transformation of the variables should provide *unbiased* and *consistent* results.

Empirical Analysis: Results

Table 4. Total Consumption of Bought Items of the Household and the Demand for Agricultural Commodities

Shock 1:

$\alpha_{p,h}$: share of agricultural product in the household's sold production
(in terms of quantities sold)

	Remoteness 1: Travel Distance from Population Point to Oblast Center		Remoteness 2: Travel Distance from Population Point to Bishkek or Osh						
	No variables of control	With variables of control	No variables of control	With variables of control					
Shock1	0.709 (0.490)	0.650 (0.459)	0.472 (0.421)	0.493 (0.399)					
Shock1 x Remoteness1	-0.017** (0.008)	-0.015** (0.007)				(8,896)		(9,125)	
Shock1 x Remoteness2			-0.007*** (0.002)	-0.007** (0.002)	Children under 5	-4,465 (5,232)		-5,967 (5,632)	
Hh members (primary)		8,454 (5,151)		8,261 (5,185)	Household head male	5,964 (27,653)		6,824 (28,661)	
Hh members (secondary)		1,347 (4,191)		1,839 (4,178)	Household head married	-11,459 (16,885)		-13,138 (17,536)	
Hh members (university)		-3,559 (2,360)		-3,437 (2,385)	Constant	-13,900,000 (10,600,000)	-29,600,000** (12,700,000)	-16,000,000 (10,700,000)	-30,700,000 (12,400,000)
Household head age		-468 (374)		-610 (400)	R ² within	0.038	0.075	0.031	0.072
Household size		6,772** (3,199)		8,194** (3,351)	Observations	2,230	2,228	2,185	2,183
Males older than 16		-3,545		-4,095	Number of households	1,352	1,351	1,327	1,326
					Household FE	YES	YES	YES	YES
					Year FE	YES	YES	YES	YES

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Empirical Analysis: Results

- 1 If the household lives 0 km away from the oblast center (10th percentile of distance):
 - \uparrow in the foreign demand for goods by 12,143,660 USD (90th percentile of the shock)
 - $\Rightarrow \uparrow$ in the total consumption by 7,893 (5,987) KGS per year, ceteris paribus.
- 2 If the household lives in a remote area, i.e. lives 196 km (350 km) away from the oblast center (from Bishkek or Osh) (90th percentile of distance):
 - \uparrow in the foreign demand for goods by 12,143,660 USD (90th percentile of the shock)
 - $\Rightarrow \downarrow$ in the total consumption by 27,809 (23,765) KGS per year, ceteris paribus.

Empirical Analysis: Results

Table 5. Total Consumption of Bought Items of the Household and the Demand for Agricultural Commodities

Shock 2: $\alpha_{p,h}$: share of agricultural product in the household's sold production (in terms of amount sold in USD)									
	Remoteness 1: Travel Distance from Population Point to Oblast Center		Remoteness 2: Travel Distance from Population Point to Bishkek or Osh						
	No variables of control	With variables of control	No variables of control	With variables of control					
					Household head age	-466 (369)			-607 (400)
					Household size	6,600** (3,200)			8,280** (3,380)
					Males older than 16	-3,403 (8,777)			-4,618 (9,090)
					Children under 5	-4,521 (5,197)			-5,993 (5,655)
Shock2	0.976* (0.492)	0.890** (0.447)	0.555 (0.492)	0.541 (0.456)	Household head male	5,515 (27,679)			6,064 (28,963)
Shock2 x Remoteness1	-0.019*** (0.007)	-0.018*** (0.006)			Household head married	-11,596 (16,872)			-13,110 (17,921)
Shock2 x Remoteness2			-0.006** (0.003)	-0.006** (0.003)	Constant	-12,700,000 (10,100,000)	-27,400,000** (12,700,000)	-15,400,000 (10,600,000)	-29,400,000 (12,500,000)
Hh members (primary)		7,936 (5,081)		8,092 (5,170)	R ² within	0.048	0.082	0.030	0.070
Hh members (secondary)		1,538 (4,112)		1,842 (4,181)	Observations	2,230	2,228	2,185	2,183
Hh members (university)		-3,326 (2,338)		-3,266 (2,399)	Number of households	1,352	1,351	1,327	1,326
					Household FE	YES	YES	YES	YES
					Year FE	YES	YES	YES	YES

Robust clustered standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Empirical Analysis: Results

- 1 If the household lives 0 km away from the oblast center (10th percentile of distance):
 - \uparrow in the foreign demand for goods by 11,835,780 USD (90th percentile of the shock)
 - $\Rightarrow \uparrow$ in the total consumption by 10,534 (6,403) KGS per year, ceteris paribus.
- 2 If the household lives in a remote area, i.e. lives 196 km (350 km) away from the oblast center (from Bishkek or Osh) (90th percentile of distance):
 - \uparrow in the foreign demand for goods by 11,835,780 USD (90th percentile of the shock)
 - $\Rightarrow \downarrow$ in the total consumption by 31,223 (18,452) KGS per year, ceteris paribus.

Empirical Analysis: Results

Table 6. Total Consumption of Bought Items of the Household per Person and the Demand for Agricultural Commodities

Shock 1:

α_{ph} : share of agricultural product in the household's sold production
(in terms of quantities sold)

	Remoteness 1: Travel Distance from Population Point to Oblast Center		Remoteness 2: Travel Distance from Population Point to Bishkek or Osh						
	No variables of control	With variables of control	No variables of control	With variables of control					
Shock1	0.130 (0.080)	0.121 (0.077)	0.088 (0.064)	0.081 (0.062)					
Shock1 x Remoteness1	-0.003** (0.001)	-0.003** (0.001)				(1,780)		(1,817)	
Shock1 x Remoteness2			-0.001* (0.001)	-0.001** (0.001)	Children under 5	154 (807)		50 (892)	
Hh members (primary)		903 (637)		953 (652)	Household head male	1,658 (5,504)		1,786 (5,684)	
Hh members (secondary)		193 (513)		218 (500)	Household head married	-927 (4,127)		-1,172 (4,123)	
Hh members (university)		-420 (326)		-386 (327)	Constant	-1,990,719 (1,867,727)	-4,513,932* (2,477,416)	-2,392,143 (1,903,255)	-4,690,965* (2,468,389)
Household head age		-137* (80)		-155* (88)	R ² within	0.025	0.060	0.019	0.052
Household size		-2,230*** (593)		-2,185*** (657)	Observations	2,228	2,228	2,183	2,183
					Number of households	1,351	1,351	1,326	1,326
					Household FE	YES	YES	YES	YES
					Year FE	YES	YES	YES	YES
Males older than 16		192		267					

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Empirical Analysis: Results

- 1 If the household lives 0 km away from the oblast center (10th percentile of distance):
 - ↑ in the foreign demand for goods by 12,143,660 USD (90th percentile of the shock)
 - ⇒ ↑ in the individual consumption by 1,469 (984) KGS per year, ceteris paribus.
- 2 If the household lives in a remote area, i.e. lives 196 km (350 km) away from the oblast center (from Bishkek or Osh) (90th percentile of distance):
 - ↑ in the foreign demand for goods by 12,143,660 USD (90th percentile of the shock)
 - ⇒ ↓ in the individual consumption by 5,671 (3,267) KGS per year, ceteris paribus.

Empirical Analysis: Results

Table 7. Total Consumption of Bought Items of the Household per Person and the Demand for Agricultural Commodities

Shock 2:

α_{ph} : share of agricultural product in the household's sold production

(in terms of amount sold in USD)

	Remoteness 1: Travel Distance from Population Point to Oblast Center		Remoteness 2: Travel Distance from Population Point to Bishkek or Osh						
	No variables of control	With variables of control	No variables of control	With variables of control					
Shock2	0.149** (0.075)	0.152** (0.074)	0.085 (0.067)	0.084 (0.067)					
Shock2 x Remoteness1	-0.003** (0.001)	-0.003** (0.001)					(1,772)		(1,819)
Shock2 x Remoteness2			-0.001* (0.001)	-0.001* (0.000)	Children under 5	144 (807)			51 (902)
Hh members (primary)		822 (622)		925 (648)	Household head male	1,602 (5,504)			1,676 (5,727)
Hh members (secondary)		221 (499)		219 (495)	Household head married	-952 (4,127)			-1,171 (4,180)
Hh members (university)		-383 (325)		-361 (332)	Constant	-1,774,064 (1,773,832)	-4,122,793* (2,452,776)	-2,243,115 (1,848,692)	-4,457,376* (2,459,575)
Household head age		-136* (79)		-154* (88)	R ² within	0.030	0.066	0.019	0.051
Household size		-2,262*** (597)		-2,174*** (664)	Observations	2,228	2,228	2,183	2,183
					Number of households	1,351	1,351	1,326	1,326
					Household FE	YES	YES	YES	YES
					Year FE	YES	YES	YES	YES
Males older than 16		220		191					

Robust clustered standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Empirical Analysis: Results

- 1 If the household lives 0 km away from the oblast center (10th percentile of distance):
 - \uparrow in the foreign demand for goods by 11,835,780 USD (90th percentile of the shock)
 - $\Rightarrow \uparrow$ in the individual consumption by 1,799 (994) KGS per year, ceteris paribus.
- 2 If the household lives in a remote area, i.e. lives 196 km (350 km) away from the oblast center (from Bishkek or Osh) (90th percentile of distance):
 - \uparrow in the foreign demand for goods by 11,835,780 USD (90th percentile of the shock)
 - $\Rightarrow \downarrow$ in the individual consumption by 5,160 (3,148) KGS per year, ceteris paribus.

Implications:

- Dominance of the **production channel** of the effect of trade on consumption;
 - The coefficient for *Shock* variable is always positive and the coefficient for the interaction term *Shock * Remoteness* is always negative, regardless of the remoteness variable used, shock variable used and whether the variables of control are included.
- The bigger the shock the higher the impact on total consumption of bought food and non-food items of the household;
- The closer the household to the oblast center or to the cities of Bishkek or Osh (the more integrated the household is) the more likely it is to benefit from a positive foreign demand shock;
- The farther the household to the oblast center or to the cities of Bishkek or Osh (the less integrated the household is) the more likely it is to suffer from a positive foreign demand shock

Conclusion

- The present research looks at the effect of trade on poverty on the example of Kyrgyz households employing "Life in Kyrgyzstan" data for 2012 and 2013; UN Comtrade data and Google Maps;
- Focus on production and consumption channels;
- Standard Rajan-Zingales identification strategy with fixed effects is employed;
- A measure of the world demand shock for the agricultural commodities produced and sold by the households is constructed and this shock is interacted with the measure of natural trade openness;
 - More open households integrated to trade are more susceptible to the demand shocks;
 - Those who live in the remote areas are likely to be influenced less by trade.

Conclusion

- Trade has a huge impact on the welfare of Kyrgyz households;
- The magnitude of the foreign demand shock that hits a household matters for its welfare;
- The degree of remoteness that reflects the integration of the household to the agricultural markets also matters for the family's welfare;
- Economic policies to improve farmers' integration to agricultural markets should be implemented.

Conclusion

"...although trade liberalization may not be the most powerful or direct mechanism for addressing poverty in a country, it is one of the easiest to change. While many pro-poor policies are administratively complex and expensive to implement, the most important bits of trade reform... are easy to do and will frequently save resources. Thus trade reform may be one of the most cost effective anti-poverty policies available to governments" (Winters et al., 2004, p.108).