AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Zentrum für internationale Entwicklungs- und Umweltforschung der Justus-Liebig-Universität Gießen

Proceedings of the International Conference and Young Researchers' Forum

"Natural resource use in Central Asia:
Institutional challenges and the contribution of capacity building"

held in Giessen, 1st October 2013

MIRZA NOMMAN AHMED, IRA PAWLOWSKI (EDS.)*

No. 64

Giessen, October 2013

Keywords: natural resources, water, agriculture, climate change, Central Asia

* Dr. Mirza Nomman Ahmed and Dr. Ira Pawlowski are research assistants at the ZEU and coordinators of the postgraduate programmes "Climate Change Network for Central Asia (CliNCA)" and "Land use, ecosystem services and human welfare in Central Asia (LUCA)". This conference has been organized in the framework of both these projects.In respect thereof, particular thanks goes to the German Department of Foreign Affairs and DAAD for facilitating CliNCA) and the VolkswagenStiftung for funding LUCA.

Contact: clinca.ahmed@zeu.uni-giessen.de
ira.pawlowski@zeu.uni-giessen.de

ELIZA ZHUNUSOVA

POLICY-INDUCED DISTORTIONS TO FARMER INCENTIVES AND THEIR IMPACT ON AGRICULTURAL LAND USE IN THE KYRGYZ REPUBLIC

Institute for Agricultural Policy and Market Research, Giessen University ; zhunusova.eliza@yahoo.com

1 STUDY BACKGROUND

22 years have passed since the Kyrgyz Republic (KR) became independent and since it started the transformation of its economy from a centrally-planned system into a market-oriented one. As one of the poorest countries within the former Soviet Union, Kyrgyzstan was hit the most by the cut of net transfers from other soviet republics and the loss of long supply chains producing machinery and equipment (Christensen & Pomfret, 2007). The Kyrgyz experience of transition comprised fairly rapid reforms including privatization of land, real estate and government-owned enterprises, as well as the liberalization of prices and elimination of producer subsidies, all of these undertaken within the first 10 years of transition. Further on, 262 large-scale state and 190 collective agricultural enterprises inherited from the Soviet times (the so called "sovkhozes" and "kolkhozes") were reorganized into smallholder farms with the land size of 0,1-1 ha per household (Akramov & Omuraliev, 2009). During the harsh times of transition when hyperinflation and unemployment were widespread, urban-rural migration was prevalent as people were returning to their home villages to undertake subsistence farming to make the ends meet (Pomfret, 2006, p.73). Agricultural output dropped substantially within the first years of the transformation period (1990 - 1995), but started to recover from 1996 as a response to price liberalization and privatized agricultural land (National Statistical Comittee, 2011). Although the share of agriculture in total GDP has decreased (from 50% in 1996 to 25% in 2011) as other industries, such as gold mining and manufacturing were evolving, it is still one of the key economic sectors in Kyrgyzstan that contributes to about one quarter of the GDP and employs over 30 percent of the country's economically active population (National Statistical Comittee, 2011). The livelihoods of around half of the total population in Kyrgyzstan directly or indirectly depend on agriculture (Christensen & Pomfret, 2007).

2 PROBLEM STATEMENT AND STUDY OBJECTIVES

Agricultural sector has all the potentials to become the driver of economic growth in KR, and not just serve the role of a "safety net", but a number of critical issues has to be addressed in order to achieve this. Light (2007) suggests that government's agricultural policies in Kyrgyzstan should cover three areas: (1) free markets and property rights; (2) productivity and investment, and (3) efficient markets and institutions. While the establishment of free markets and property rights seems to have gone well, the other two conditions critical for sustainable growth of agricultural sector and the economy overall, are not appropriately provided yet. Strategic aims of the Kyrgyz government in the agricultural sector consist of four main pillars: food provision, stability of agricultural markets, achieving competitiveness and improving trade, and environmental preservation and food safety (The World Bank, 2011). However it is unclear whether the implemented policies have been

designed taking into consideration all the possible effects of these polices on rural incomes or relative incentives between the sectors. The evidence from other developing countries showed that most of the times their commercial policies were inconsistent, have sought only immediate effects and did not consider the long-run effects of the polices on different sectors of the economy. Taking into account that the poorest part of the country's population lives in rural areas and farming is the major source of their income, the effect of policies affecting farmer incentives should be studied rigorously. It is of crucial importance to understand if and to what extent do the policies affect agricultural prices. And if they do, how strong do the farmers respond to changing prices/market conditions? The main objective of the current study is thus to investigate the impact of distortions to farmer incentives induced by government's policies on the use of agricultural land. Specific objectives of the study include: (1) to identify whether and, if yes, how much the government protects or discriminates individual branches of the agricultural sector; (2) to investigate whether there is a significant difference between the governmental assistance provided to the producers of food crops and cash crops; (3) to assess the production response of Kyrgyz farmers to changing prices of own and competitive crops (price elasticities) in the short- and long-run; (4) to analyze estimated protection rates in line with estimated price elasticities to assess the effect of price distortions on agricultural land use.

3 METHODOLOGY

Nominal Rates of Assistance (NRAs) as the indicators of direct distortions to agricultural price incentives were estimated for 7 major agricultural commodities for the period of 2001 to 2011 following the methodology described in Anderson (2009). Formula below is used for calculating NRAs for each agricultural commodity:

$$NRA = \frac{P_{FG} - (P_W * E - C_T - C_H - C_M)}{P_{FG}} * 100\% \quad (1)$$

where P_{FG} is the farm-gate price of a commodity in Kyrgyz Soms (KGS); P_W is the world price or the reference prices for the commodity in USD; E is the nominal exchange rate of KGS-USD; C_T, C_H, and C_M stand for transport, handling/processing and marketing costs respectively, associated with the delivery of a product from the farm-gate point to the border. When accounting for transport costs, the study incorporates information on production quantity, distance between the major production areas for each crop to the border, average trucking fees per ton/km/m3 in US dollars and exchange rates to create time series of transport costs for each crop. Marketing and handling costs are assumed to be 15 percent of the producer price for wool, cotton and tobacco, as these products need some processing before they can be exported 1. Due to the absence of adequate information, it was not possible to adjust prices for quality and variety differences, but they are not likely to be as large as to influence the sign of distortion estimates.

[1] Assumptions on marketing and handling costs are based on findings of Christensen and Pomfret (2007) and The World Bank (2007)

NRAs thus show the share of price distortion as the share of the domestic price. Positive NRA indicates assistance from the government provided to the producers of a certain crop, and accordingly negative NRA implies that the sector is being taxed through government policies.

Information on agricultural and macroeconomic performance, trade and policies for the period studied has been compiled and analyzed with regard to estimated protection rates for individual commodities. At the second step of the analysis, regression techniques are employed to obtain price elasticities for major crops. Nerlovian approach of modeling supply response is utilized, where the area allocated for each crop is modeled as a function of expected prices and other exogenous shifters.

In this study the desired area devoted for each crop q_t^d in period *t* is assumed to be a function of expected relative prices (own price and the price for competing crops), p_{it}^e; where i stands for four major crops included in the model: wheat, cotton, potato and maize. The structural form of the model is:

$$q_t^d = \alpha_1 + \sum_{i=1}^{4} \alpha_{2i} p_{it}^e + u_t \quad (2)$$

where α_1 and α_2 are the parameters to be estimated, and u_t stands for unobserved random factors.

As a farmer cannot fully adjust the allocation of his land in the short run, the actual area adjustment is just a fraction ∂ of the desired adjustment (Sadoulet & De Janvry, 1995):

$$q_t - q_{t-1} = \partial\left(q_t^d - q_{t-1}\right) + v_t \quad with\ 0 \ll \partial \ll 1 \quad (3)$$

where q_{t-1} is the area allocated for the crop in the previous period, ∂ is the so-called *partial adjustment coefficient*, v_t is a random term.

Prices that prevail at the harvesting period cannot be observed, unless the prices are administered by the government and are announced during the planting period (Sadoulet & De Janvry, 1995). This is why farmers price expectations are assumed to be based on the mistake they made in the previous period:

$$p_t^e = \gamma p_{t-1} + (1-\gamma) p_{t-1}^e + w_t \quad with\ 0 \ll \gamma \ll 1 \quad (4)$$

where γ is the fraction of the magnitude of that mistake, or the *adaptive expectations coefficient*; p_{t-1}^e is the price expected in the previous year, and w_t is a random error term.

Since q_t^d and p_t^e are not observable, the reduced form of the model is obtained by substituting (4) and (2) into (3):

$$q_t = \pi_1 + \sum_{i=1}^{4} \pi_{2i} p_{i,t-1} + \pi_3 q_{t-1} + \pi_4 q_{t-2} + e_t \quad (5)$$

where π_1, π_2, π_3, π_4 are the parameters to be estimated, π_2 is the short run coefficient of supply response; e_t are the residuals.

Formula in (5) presents the final model estimated in this study. α_1 and α_2 are then obtained using the estimates of π_1, π_2, π_3, π_4. However, in this particular specification of the Nerlovian model, where no exogenous shifters are included, partial adjustment coefficient ∂ and adaptive expectations coefficient γ are not estimable. Our parameters of interest are α_2 and π_2, the long run and short run coefficients of supply response respectively. The structure of the residuals in the

reduced form of the model display serial correlation, and Cochrane-Orcutt method is used to correct for it (Braulke, 1982).

4 DATA

The data used in this study is the secondary data on agricultural production, prices and trade compiled from the United Nations Commodity Trade Statistics Database (UN Comtrade), Food and Agricultural Organization of the UN (FAO), National Statistical Committee of the Kyrgyz Republic (NSC) and Ministry of Agriculture of the Kyrgyz Republic (MA).

Products considered in this study cover altogether around 50% of the total agricultural output in Kyrgyzstan. Based on the share of exports and imports in domestic production and consumption respectively, the products are classified into three groups: exportable, import-competing and home goods. Reference prices for traded goods are derived from the amount and value traded of that good in terms of export and import unit values. When appropriate reference prices are not available, as in the case of home goods, reference prices are derived from the agricultural trade data for Kazakhstan for it is the major trading partner of the KR and policy environment is considered to be liberal and close to one in Kyrgyzstan.

5 RESULTS

Kyrgyzstan's trade policy has been liberal with negligible tariffs on imports and no support to exports ever since the country has accessed the World Trade Organization (WTO) and even before when the producer subsidies were sharply cut in the early 1990-s. According to the Law on Customs Tariff as of 29 March 2006, the import tariffs on considered products were: 15% for milk, potato and tomato, 10% for onions, and none for others. The average customs tariff on imports was 5,04%. The tariff is applied only to imports from countries with which the Kyrgyz Republic does not have trade agreements, and hence does not trade much with. With this information in hand, one would not expect any major distortions to agricultural incentives caused by direct government intervention, because the latter does not seem to be significant.

The estimates of Nominal Rates of Assistance obtained for 7 agricultural commodities for the period of 2001 to 2011 are presented in Table 1. One should treat these results with caution because of the quality of available data on domestic and reference prices, as well as the impossibility to account for all the potential domestic trade costs from the production area to the border and vice versa.

Table 1 Estimates of Nominal Rates of Assistance for major agricultural commodities

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
wheat	56	63	52	34	52	43	31	35	27	8	29
potato	72	63	-8	12	12	52	55	37	52	62	51
tobacco	-38	-71	-54	-109	-107	-89	-105	-134	-199	-227	-180
milk	18	10	4	-39	-63	-34	-14	-15	-45	-69	-71
wool	35	0	-44	-42	-69	-3	32	21	26	-34	84
cotton	-17	-10	-4	34	22	38	33	31	29	24	52
maize	41	16	36	18	21	41	52	18	-13	-5	27

Source: Author's estimations

The estimates show that the Nominal Rates of Assistance for some products are substantially large indicating a strong intervention from the government on both directions, as the estimates are negative for some sectors and positive for others. The products considered can be divided into three groups: cash crops (cotton and tobacco as the major crops produced for export), food crops (wheat, potato, maize), and livestock products (milk and wool). As it can be seen from Table 1, food crops generally have positive NRAs which indicate that their producers enjoy assistance from the government, apparently targeting self-sufficiency in staple food. Positive NRAs for cotton starting from 2004 could obviously be attributed to improved integration of the domestic market for cotton into the world market (Christensen & Pomfret, 2007). Estimates of NRA for tobacco are remarkably negative. The main reason is suggested to be the poor access of farmers to the information on world prices for tobacco. The market for this crop is relatively small; there has been a dramatic decrease in the production of this crop in Kyrgyz Republic from about 54 thousand tons in 1990 to 10 thousand tons in 2011. The estimates of NRA for wheat, cotton and maize presented in Table 1 are generally consistent with the findings of Christensen and Pomfret (2007) for the period between 2001 and 2004.

Results of the regression analysis are presented in Table 2.

Table 2 Estimates of the Restricted Nerlovian Model of Supply Response (dependent variable: area allocated for each crop in year *t*, for the period of 2002-2011)

	Wheat		Cotton	
	Short run	Long run	Short run	Long run
Price_wheat/cotton in t-1	2225,7** (775,8)	6584,9		
Price_cotton/wheat in t-1			63,04 (28,41)**	124,09
Price_potato/cotton in t-1	-2114,9** (635,4)	6257,1	-127,18 (137,05)	-250,35
Price_maize/wheat in t-1	2023,5 (1171,3)	5986,7	-100,84 (253,33)	-198,5
Area in t-1	0,662** (0,218)		0,492 (0,133)**	
Constant	-61085,1 (191828,5)		16959,01	
Adaptive Expectations Coefficient, γ	0,338		0,508	
Adjusted R sq.	0,73		0,95	

Source: Author's estimations. Note: *, **, *** represent p-values at 0,1; 0,05; and 0,001% confidence levels. Standard errors are in parentheses. *a* the respective variables is omitted.

Results in Table 2 indicate strong supply response to changing wheat prices of producers of wheat, both in the short and in the long run. Both for the case of wheat and cotton, the long run coefficients of supply response are higher than the short run response as expected, because farmers can better adjust the allocation of their land in a longer period. Data insufficiency related to incorporation of other explanatory variables, including exogenous factors, as well as related to the period observed in this study, has justified the use of the Restricted Nerlovian Model, as relatively less data-demanding.

The findings of the study indicate that agricultural prices in the Kyrgyz Republic are distorted from world prices. Nominal Rates of Assistance are generally positive for important food crops, such as wheat and potato, over the entire period considered; and protection rates for cotton have been positive since 2004. Negative estimates of NRAs for tobacco are suggested to be due to poor domestic market integration and farmers' access to information on world prices. For remaining crops NRA estimates are rather erratic, and could be the result of not a specific policy goal, but rather indicate the significant quality and variety differences that could not be taken into account in this study. The findings of the study indicate that agricultural and food policies have an impact on price incentives of farmers. Moreover, farmers' response to the increase of crop prices is significant positive, which leads to the conclusion that policy-induced distortions to price (farmer) incentives influence use of agricultural land in the Kyrgyz Republic. Further investigation is needed, possibly with a more comprehensive dataset that covers additional factors influencing supply response.

REFERENCES

Akramov, K. T., & Omuraliev, N. (2009). Institutional Change , Rural Services , and Agricultural Performance in Kyrgyzstan. IFPRI Discussion Paper.

Anderson, K. (Ed.). (2009). Distortions to agricultural incentives: a global perspective (1955 - 2007) (Washington.). The World Bank. Retrieved from http://siteresources.worldbank.org/INTTRADERESEARCH/Resources/544824-1272467194981/DAI_Global_Perspective.pdf

Braulke, M. (1982). A Note on the Nerlove Model of Agricultural Supply Response. International Economic Review, 23(1), 241–244.

Christensen, G., & Pomfret, R. (2007). Distortions to Agricultural Incentives in the Kyrgyz Republic. The World Bank. Washington DC.

Light, M. K. (2007). Agriculture in Kyrgyzstan: Growth Engine or Safety Net?

National Statistical Comittee. (2011). Statistical Yearbook of the Kyrgyz Republic, 2006-2010. Bishkek.

Pomfret, R. (2006). The Central Asian Economies Since Independence. Princeton: Princeton University Press.

Sadoulet, E., & De Janvry, A. (1995). Quantitative Development Policy Analysis. Baltimore, Maryland, USA: The John Hopkins University Press.

The World Bank. (2007). Trade Audit Report of the Kyrgyz Republic. Washington, DC.

The World Bank. (2011). Kyrgyz Republic: Agricultural Policy Update, Volume 2. Main Report. Retrieved from https://openknowledge.worldbank.org/handle/10986/12863