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**Impacts of export restrictions on the Ukrainian wheat market: a stochastic partial  
equilibrium approach**

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# Impacts of export restrictions on the Ukrainian wheat market: a stochastic partial equilibrium approach

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## Introduction

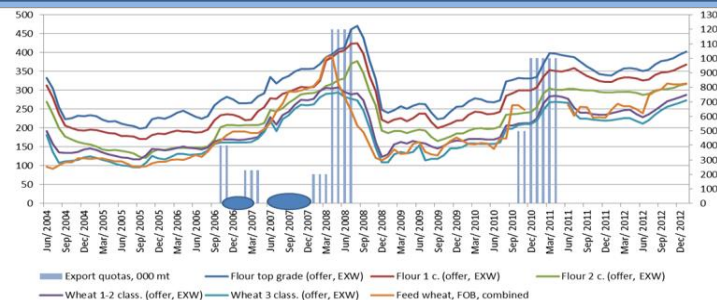
In the past ten years Ukraine has emerged from wheat net importer from one of the largest world exporters. In 2011-12, Ukraine exported an estimated 5.4 million tons of wheat, 15 million tons of corn, and 2 million tons of barley. These high levels of exports have yielded Ukraine the potential to alleviate global food insecurity. This is particularly true in light of the country's prospects for further increases in grain production..

However, during the recent commodity price booms on world markets (2007/2008 and 2010/2011), Ukraine heavily intervened into its wheat markets with a number of export quotas and tariffs.

These trade interventions aimed to stabilize prices on the domestic market by preventing the transmission of dramatically increasing and volatile world market prices.

This paper aims to analyze how the Ukrainian wheat market developed during these interventions, comparing to the periods with no government restrictions

## Ukrainian wheat and flour prices



## Chronology of government decisions on grain export restrictions and export quotas, starting from 2006 (1000 MT)

Period	Wheat	Barley	Corn
10/17/2006-12/31/2006	400	600	600
12/14/2006-06/30/2007	3	600	500
02/15/2007-06/30/2007	228	606	30
02/26/2007-06/07/2007	Quotas cancelled		Quotas cancelled
06/08/2007-06/30/2007	Quotas cancelled		
07/01/2007-10/31/2007	3	3	3
01/01/2008-03/31/2008	200	400	600
01/01/2008-07/01/2008	1,200	900	
05/21/2008	Quotas are cancelled		
08/2010	500	500	2,000
10/2010-12/2010	500	200	2,000
12/2010	1,000	200	3,000
03/2011	1,000	200	5,000
05/2011	Quotas are cancelled		
05/2011-01/2012	Tariffs are introduced		
10/2011	Tariffs cancelled, except for barley (01/01/2012)		

Source: UkrAgroConsult, FAO, 2009

## Methods

- The model consists of a system of single equations that follow major behavioral relationships in the Ukrainian wheat market.

### Supply block :

Area Harvested =  $f(\text{Area Harvested (t-1)}, \text{real wheat net returns (t)}, \text{competing commodities real net returns (t)}, \text{policy variables})$

Yield =  $f(\text{weather, trend})$

Production = Area Harvested \* Yield

### Demand block:

Feed Use =  $f(\text{real wheat price (t)}, \text{real prices of other competing feed crops (t)}, \text{grain feed demand index (t)}, \text{trend})$

Food Use =  $f(\text{real wheat price (t)}, \text{real price of substitutes (t)}, \text{real income per capita, trend})$

Ending Stocks =  $f(\text{wheat beginning stocks, real wheat price (t)}, \text{wheat production (t)}, \text{wheat production (t+1)})$

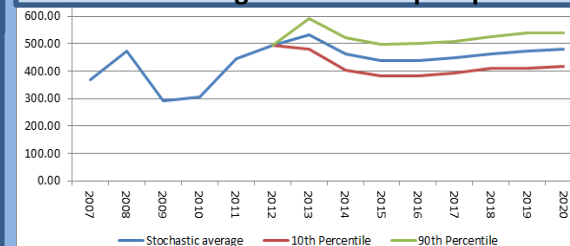
## Research Objectives

- to develop the structure and closure of an econometric regime-switching model of the Ukrainian wheat sector within a partial equilibrium framework
- to generate reliable estimates and projections of its endogenous variables (i.e. wheat production, consumption, price, etc.) under two different trade regimes. Under the first regime ("free trade" regime) all wheat surplus in a given year would be exported from Ukraine without any restrictions. Under the second regime ("restricted trade" regime), Ukrainian wheat exports would be limited due to policy interventions.
- To extend the deterministic baseline with a stochastic one

## Stochastic process

- The deterministic model cannot always adequately capture the inherent uncertainty associated with agricultural production and volatile price environment
- The model was extended with the stochastic model that is based on the approach originated at Food and Agricultural Policy Research Institute (FAPRI), USA.
- stochastic draws for two exogenous variables – soft wheat yields as well as soft wheat export price. – are generated.
- This is done by making 500 correlated draws from empirical distributions of these two exogenous variables and solving the model for each of the 500 sets of exogenous variables to generate 500 alternative outcomes for the endogenous variables in the model (Westhoff et al. 2006).
- For the yields, the statistical distributions are based on historic deviates in yield equations used in the deterministic models.
- For the export prices, the stochastic draws of the world prices were first generated by FAPRI and then incorporated into the model via the export wheat price equations.

## Stochastic range of wheat export prices



## References

Westhoff, P., Brown, S. and C. Hart. 2006. "When Point Estimates Miss the Point: Stochastic Modeling of WTO Restrictions." *Journal of International Agricultural Trade and Development*, vol. 2.