

Background

- War in Ukraine and associated sanctions imposed on Russia have been causing a large disruption to direct trade with major grain-exporting countries in the Black Sea region.
- Wheat is a major commodity currently affected by this shock.
- Although this shock could disproportionately affect major wheat-importing countries, the effect can be felt around the world including Canada.
- The study at hand aims at examining the potential impact of war in Ukraine and associated disruptions in supply chain on wheat supply, disappearance, and export in Canada.

Materials and Methods

- The econometric model consists of seven equations, one of which is identity. The six equations explain production, inventory, per capita disappearance, export, vertical price transmission, and horizontal price transmission between Canada and rest of world.
- The model is estimated as a single system by three-stage least squares (3SLS) using annual data for the period 1991-2020.
- As Russia and Ukraine are two major wheat exporters, the simulation is carried out assuming 18% and 32% decrease in ROW export due to war.

Figure 1: Share of wheat export in 2020

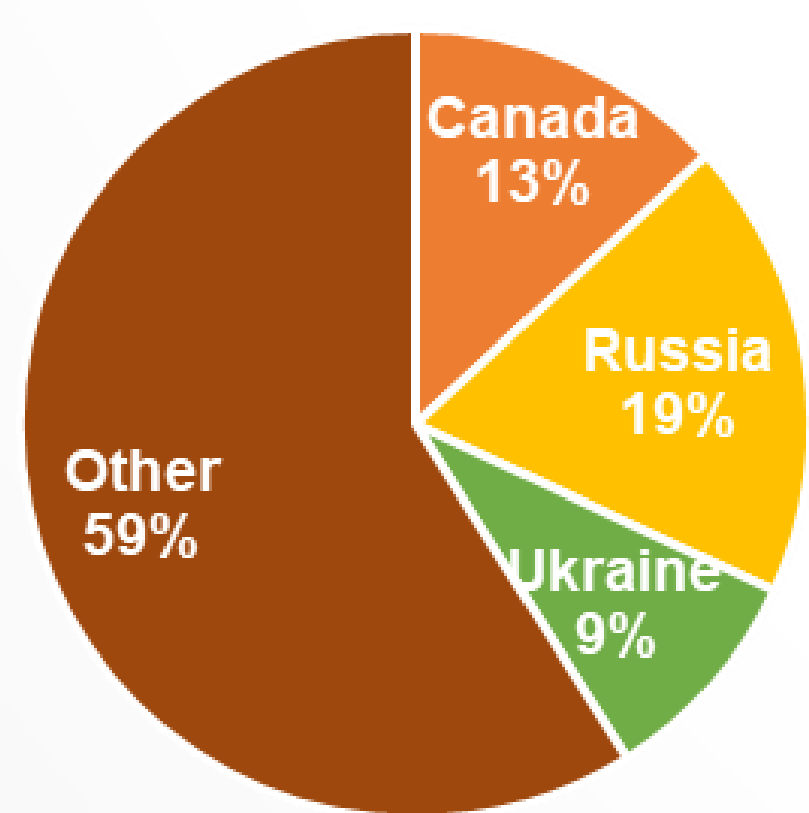


Table 1: Distribution of variables of interest and data sources

Variables	Mean	Source
Total production (000 tonnes)	27,107	CANSIM
Import (000 tonnes)	71.44	CANSIM
Stock (000 tonnes)	7,318	CANSIM
Disappearance (000 tonnes)	8,170	CANSIM
Export (000 tonnes)	19,153	CANSIM
Rest of world export (000 tons.)	118,567	FAO
Average producer price (\$/ton)	179.6	FAO
Average wholesale price (\$/ton)	199.9	CANSIM
Precipitation (mm)	547.6	WB
Real income per capita (\$)	42,368	WB
Exchange rate (CAD/USD)	1.268	BofC
Average fertilizer price (\$)	329.5	FAO

Results: selected regression results

Supply:

$$Q_t = -9639.59 + 0.495Q_{t-1} + 2738.13P_{t-1}^f - 456.788w_t + 25.04Prct_t - 1082.04Tem_t + 108.902t$$

Se (31422.4) (0.162) (1614.50) (527.288) (56.910) (887.538) (138.731)

Elasticity [0.491] [1.83] [-0.058] [0.505] [-0.162]

Export:

$$EX_t = -18713.0 + 0.094EX_{t-1} + 26.28P_t^w - 0.052EX_t^{ROW} + 5170.34ER_t + 0.673Q_t + 1.102S_{t-1} + 251.34t$$

Se (4212.36) (0.076) (8.734) (0.031) (1671.64) (0.079) (0.165) (106.514)

Elasticity [0.092] [0.274] [-0.321] [0.342] [0.952] [0.429]

Vertical price transmission equation:

$$P_t^w = 53.527 + 0.901P_t^f - 0.948t$$

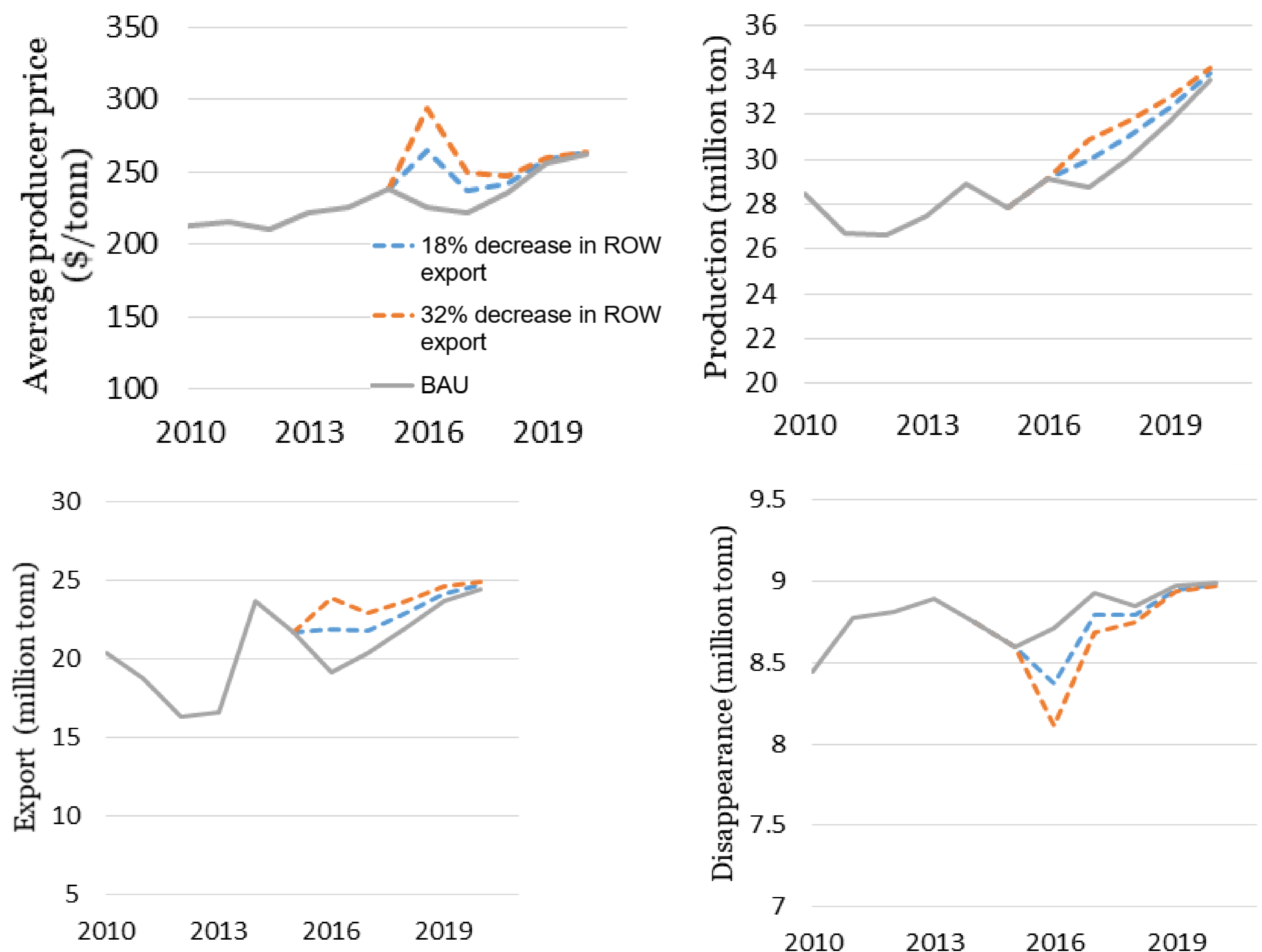
Se (9.706) (0.087) (0.596)

Elasticity [0.809]

Where Q_t is wheat supply, P_{t-1}^f is lag value of average producer price deflated by farm inputs PI, w_t is deflated average fertilizer price, $Prct_t$ refers to precipitation, and Tem_t is change in mean temperature. EX_t is wheat export, P_t^w refers to deflated wholesale price, EX_t^{ROW} is export in rest of world, ER_t is nominal exchange rate, and S_{t-1} is beginning stock.

Results: simulation

The simulation results represent what would have happened if the shock had occurred in 2016.



Conclusion

- As expected the simulation results indicate that Canadian wheat producers are less responsive to current price change compared to other economic agents.
- Overall, the result suggests that the rapid ramp-up in the price of wheat due to shock may benefit Canadian wheat producers and exporters through high producer and export prices, respectively, providing a large increase in profits, while Canadian households are struggling with inflation, *ceteris paribus*.
- On the policy side, the government should take action to protect households impacted by a hikes in food prices.

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