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Impacts of Russia's Invasion of Ukraine on U.S. Agriculture

Patrick Westhoff, Jarrett Whistance, Joseph Cooper, and Seth Meyer

Selected presentation for the International Agricultural Trade Research Consortium's (IATRC's) 2022 Annual Meeting: Transforming Global Value Chains, December 11-13, 2022, Clearwater Beach, FL.

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Food & Agricultural
Policy Research Institute
University of Missouri

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IATRC Annual Meeting - 2022

12 December 2022

Background

- Russian invasion of Ukraine occurred late February 2022 – roughly the midpoint of 2021/22 marketing year
- Disruptions to Ukrainian ports and sanctions imposed on Russia led to declines in exports of ag and ag-related inputs from that region
- We want to know “What were the expected impacts given what we knew at the time?” not “What’s the current situation?”

Key assumptions

- Starting point is 2022 Baseline Outlook (FAPRI-MU, 2022) updated in early summer to account for non-war related developments
- 2021/22 imposed U.S. export demand shifts based on June WASDE stock changes in Russia & Ukraine
- 2022/23 shifts based in part on June WASDE changes in Ukraine exports vs. 2019-2020 avg.
 - Modified to recognize that higher prices “should” result in more exports and that soy oil is imperfect substitute for sun oil
 - Imposed shifts on U.S. export demand: 16.3 mmt for wheat, 22.9 mmt for corn and 1.4 mmt for soybean oil

Table 1. Ukraine and Russia exports and stocks, million metric ton

	Wheat	Corn	Sun oil
Exports, 2019/20 - 2020/21 avg.	million metric tons		
Ukraine	18.9	26.4	6.0
Russia	36.8	4.0	3.5
Ending stocks, 2019/20 - 2020/21 avg.			
Ukraine	1.5	1.2	0.2
Russia	9.3	0.8	0.2
Ending stocks, 2021/22			
Ukraine	5.6	6.8	0.2
Russia	12.1	0.9	0.6
Stocks, 2021/22 vs. 2019/20-2020/21 avg.			
Ukraine	4.1	5.6	0.0
Russia	2.8	0.1	0.4
Exports, 2022/23			
Ukraine	10.0	9.0	3.6
Russia	40.0	4.3	3.6
Exports, 2022/23 vs. 2019/20-2020/21 avg.			
Ukraine	-8.9	-17.4	-2.4
Russia	3.2	0.3	0.1

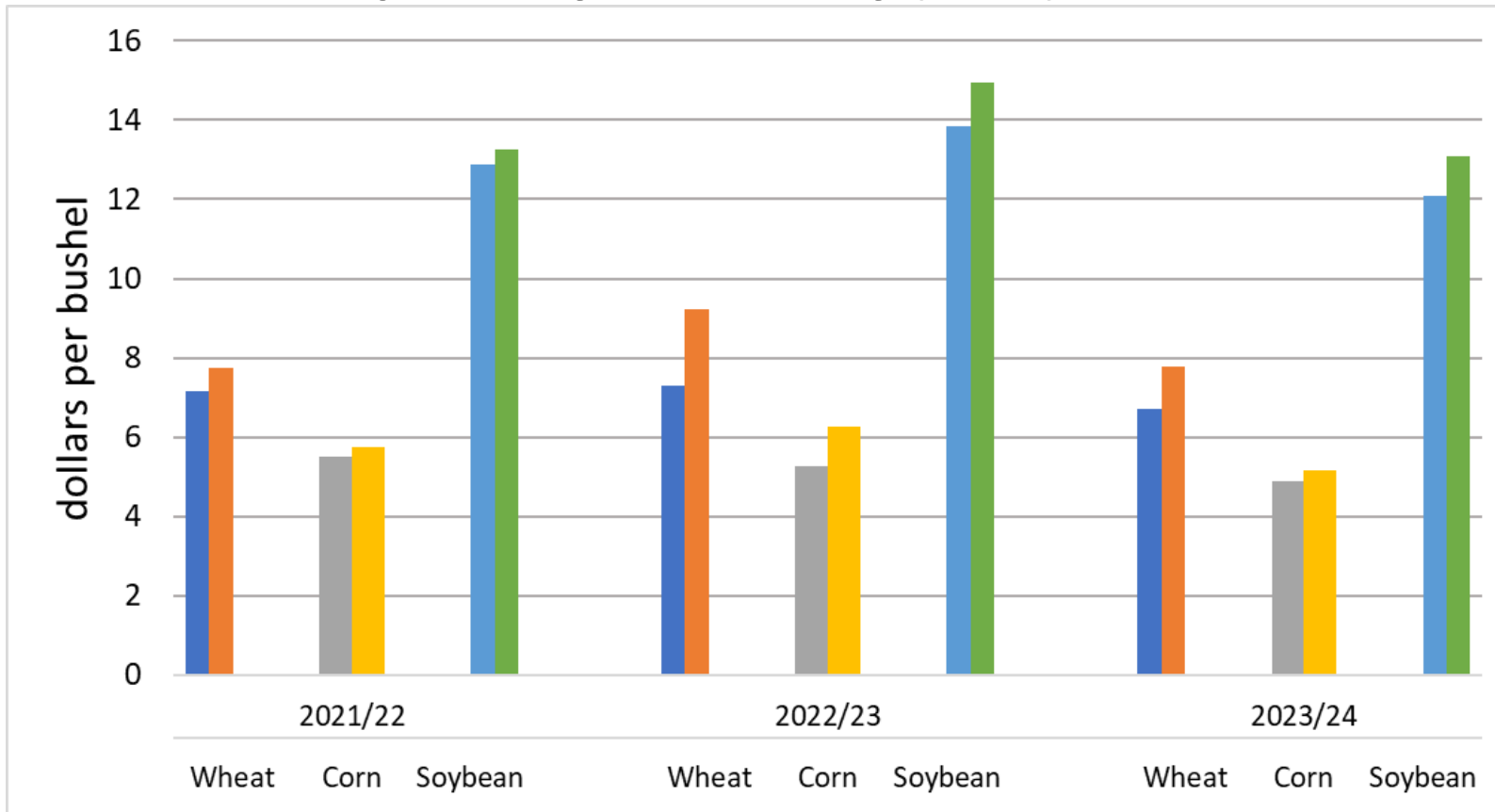
Source: author calculations based on USDA data from PSD Online, June 2022.

Table 2. U.S. farm production expenses, billion dollars			
Calendar year	2021	2022	2023
No war scenario			
Fertilizer	28.5	36.4	34.9
Fuel and electricity	22.0	23.6	23.3
Feed	65.3	71.4	67.7
All other	276.1	290.3	300.5
Total	391.9	421.7	426.4
Ukraine war scenario			
Fertilizer		43.2	42.2
Fuel and electricity		26.9	25.7
Feed		75.0	73.9
All other		292.0	304.6
Total		437.2	446.4
Difference			
Fertilizer		6.8	7.3
Fuel and electricity		3.3	2.4
Feed		3.7	6.2
All other		1.7	4.2
Total		15.5	20.1

- In addition to trade effects, scenarios accounted for changes in production expenses
- Largest impacts on fertilizer, fuel, and feed costs
- Keep in mind, assumptions were based on information at the time
- For comparison, USDA now estimates 2022 expenses of \$442 billion, within 1.1% of figures here
 - It's better to be lucky than good)

Commodity market impacts

U.S. farm prices by commodity (MYA)



- Higher U.S. exports in the “war” scenario lead to higher projected prices through 2023/24
- Impacts are modest in the 2021/22 but much larger in 2022/23
 - 27% for wheat,
 - 19% for corn,
 - 8% for soybeans
- Assumed return toward (not to) normality means smaller 2023/24 impacts

An aside: Is the estimated 27% impact on 2022/23 wheat prices reasonable?

Why it might be too small

- The initial market response to the invasion was much greater
- For example, Dec. CME wheat 2022 futures increased from \$7.88/bu. on Feb. 16 to \$12.79/bu. on May 17 (+62%)
- Short-run grain demand may be more inelastic than in our and other models

Why it might be too large

- Other models generally found smaller impacts
- The run-up in futures prices proved temporary (Dec. futures were at \$7.27/bu. on Dec. 7)
- We assumed Russian exports might be constrained, but not much evidence of that
 - USDA says they could set a new record this year (42 mmt)

Farm income impacts

Calendar year	2021	2022	2023
Crop receipts			
No war scenario	236.6	253.6	249.9
War scenario		270.3	270.1
Difference		16.6	20.2
Livestock receipts			
No war scenario	195.9	219.2	212.3
War scenario		218.9	213.7
Difference		-0.3	1.5
Government payments			
No war scenario	27.1	10.7	5.7
War scenario		10.7	5.5
Difference		0.0	-0.2
Production expenses			
No war scenario	391.5	421.7	426.4
War scenario		437.2	446.4
Difference		15.5	20.1
Other net farm income			
No war scenario	50.9	56.2	66.8
War scenario		56.2	70.8
Difference		0.1	4.0
Net farm income			
No war scenario	119.1	118.0	108.4
War scenario		118.9	113.7
Difference		0.9	5.3

- In calendar year 2022, the increase in crop receipts slightly outpaces increase in production costs
 - Net farm income exceeds baseline by \$0.9 billion
- In calendar 2023, receipts and expenses remain well above no-war baseline
 - Sales of 2022 (and 2023) crops
 - Livestock prices adjust
 - “Other income” adjusts for various reasons (inc. crop insurance)
 - Net farm income exceeds baseline by \$5.3 billion

Other impacts

- Consumer food prices are 1.5% higher in the war scenario in 2022
- U.S. consumer food expenditures are \$31 billion (2022) and \$38 billion (2023) above no-war levels
- Higher prices from 2021/22-2023/24 have farm program impacts
 - ARC benchmarks and PLC effective reference prices increase, as both depend on 5-year Olympic average prices
 - As a result, potential outlays in later years actually increase
 - Higher crop values in 2022/23 and 2023/24 increase cost of crop insurance programs (higher value of crops means higher premium subsidies, net indemnities)

Takeaways

- Despite higher production expenses as a result of the war, crop producers could end up being net beneficiaries as cash receipts projected to increase even more
- Effects on aggregate net farm income are projected to be rather modest, though impacts on food prices could be felt by consumers
- As always, the results are dependent on assumptions made at the time of the analysis—we resisted temptation to update

Thanks!

- To contact authors:

- Pat Westhoff

- Westhoffp@missouri.edu

- Jarrett Whistance:

- Whistancejl@missouri.edu

- Joseph Cooper

- Joseph.cooper@usda.gov

- Seth Meyer

- Seth.meyer@usda.gov

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