Food & Agricultural Policy Research Institute
University of Missouri

Challenges in projecting during crises

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Day 1: Agricultural Outlook Ukraine 2023-2030

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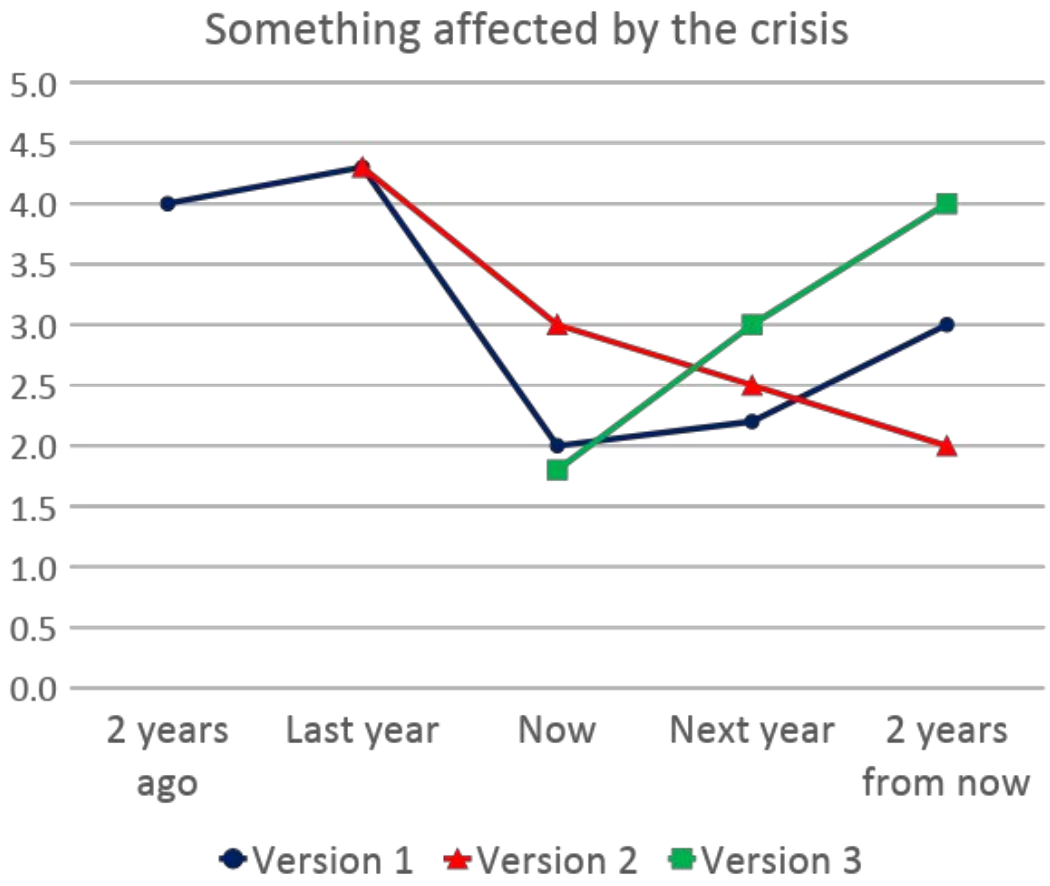
The take-away message and an agenda

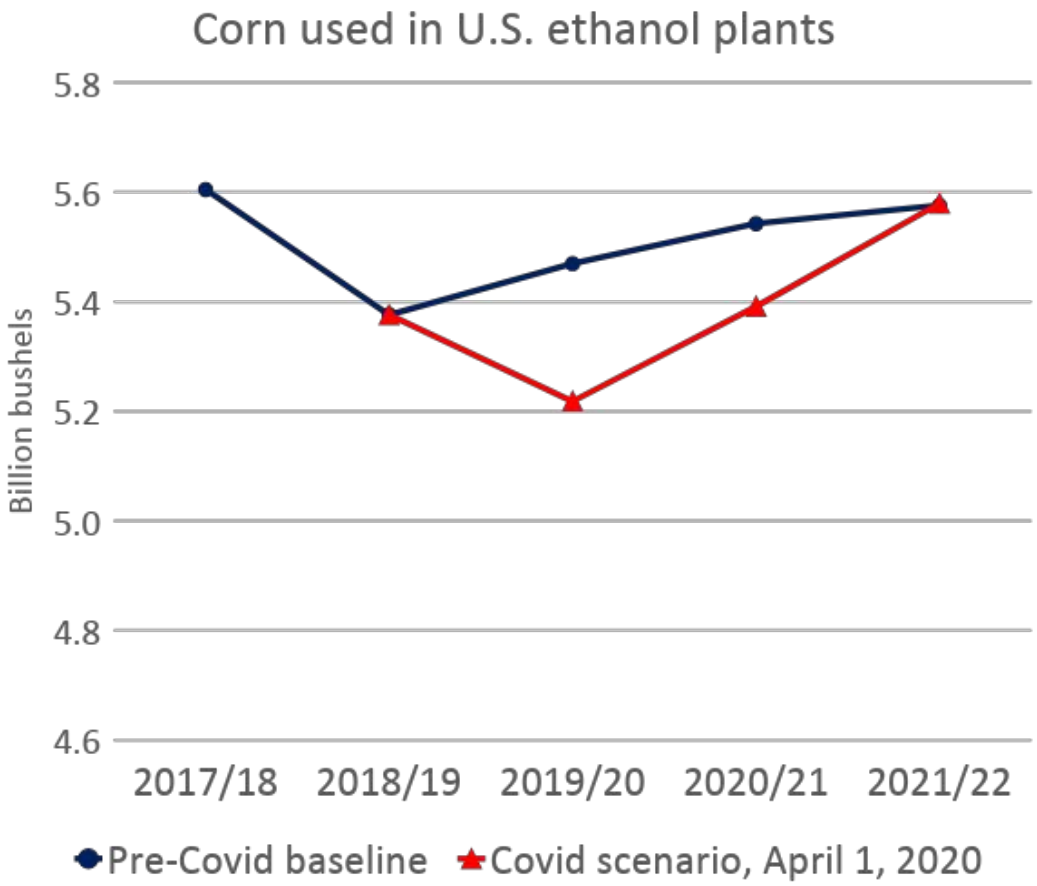
- Projecting during a crises is incredibly difficult and incredibly important

- Agenda
  - Lessons from early FAPRI analysis of COVID-19 impacts on markets
  - Implications for making projections related to agricultural markets in Ukraine
  - Some humble suggestions



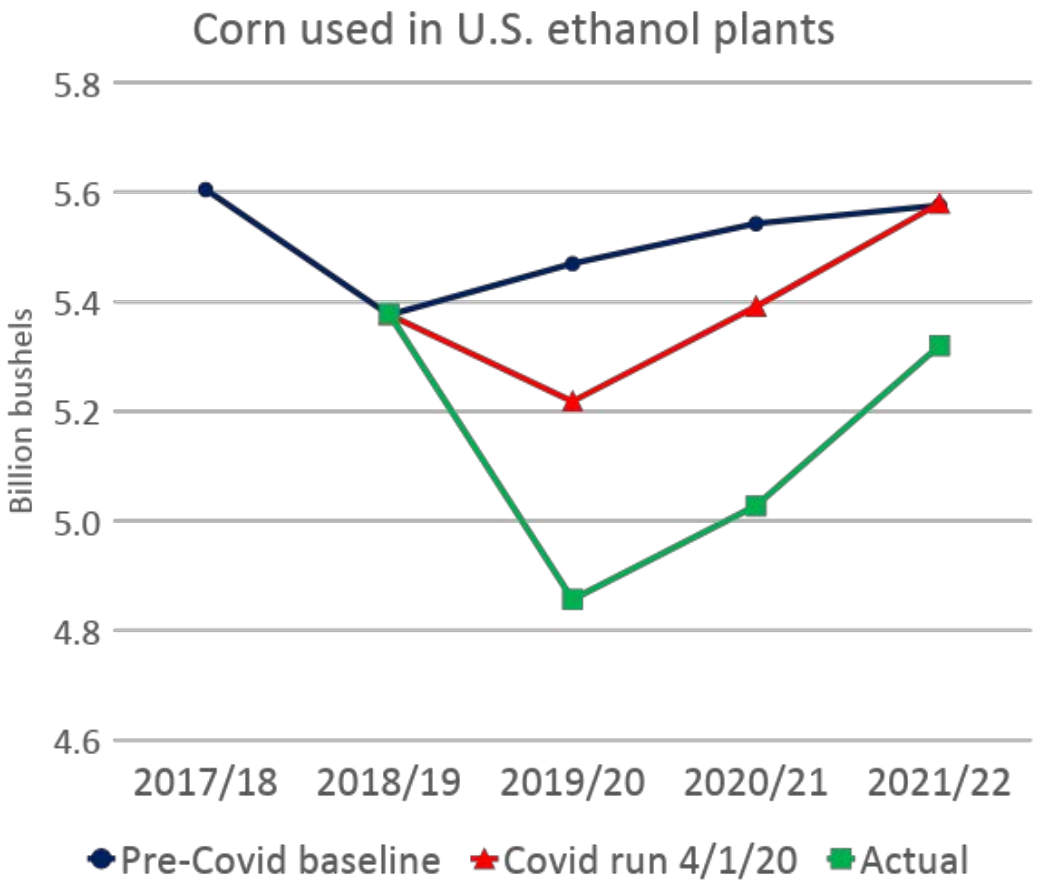
Covid impacts on corn used to make ethanol

- We knew by April 1, 2020 that Covid was keeping a lot of people at home
- That meant fewer miles driven, less demand for gasoline AND less demand for ethanol
- But how much? How long?



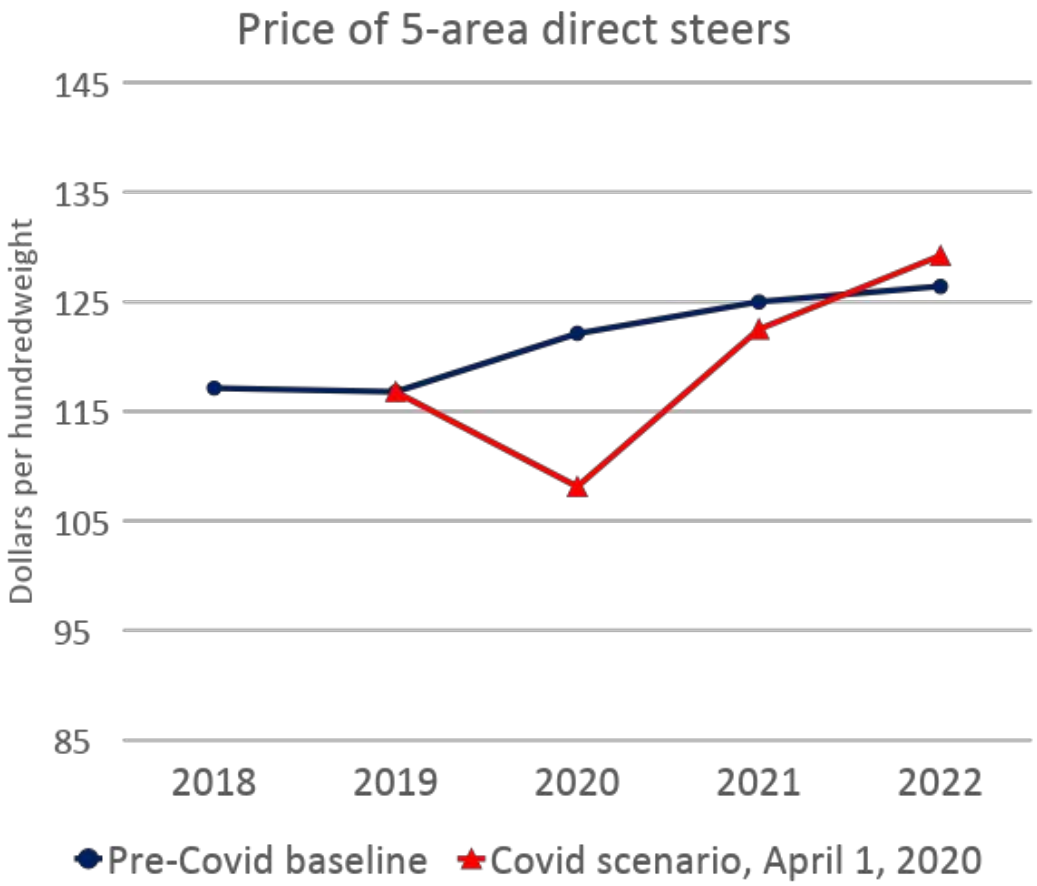
Covid impacts on corn used to make ethanol

- What happened?
- We had the right story
  - Gasoline and ethanol use did decline in early 2020 (2019/20 marketing year)
  - And it did recover the next 2 years
- But…
  - The dip in gasoline and ethanol use was far sharper than expected
  - And we still have not returned to the pre-Covid level, even today



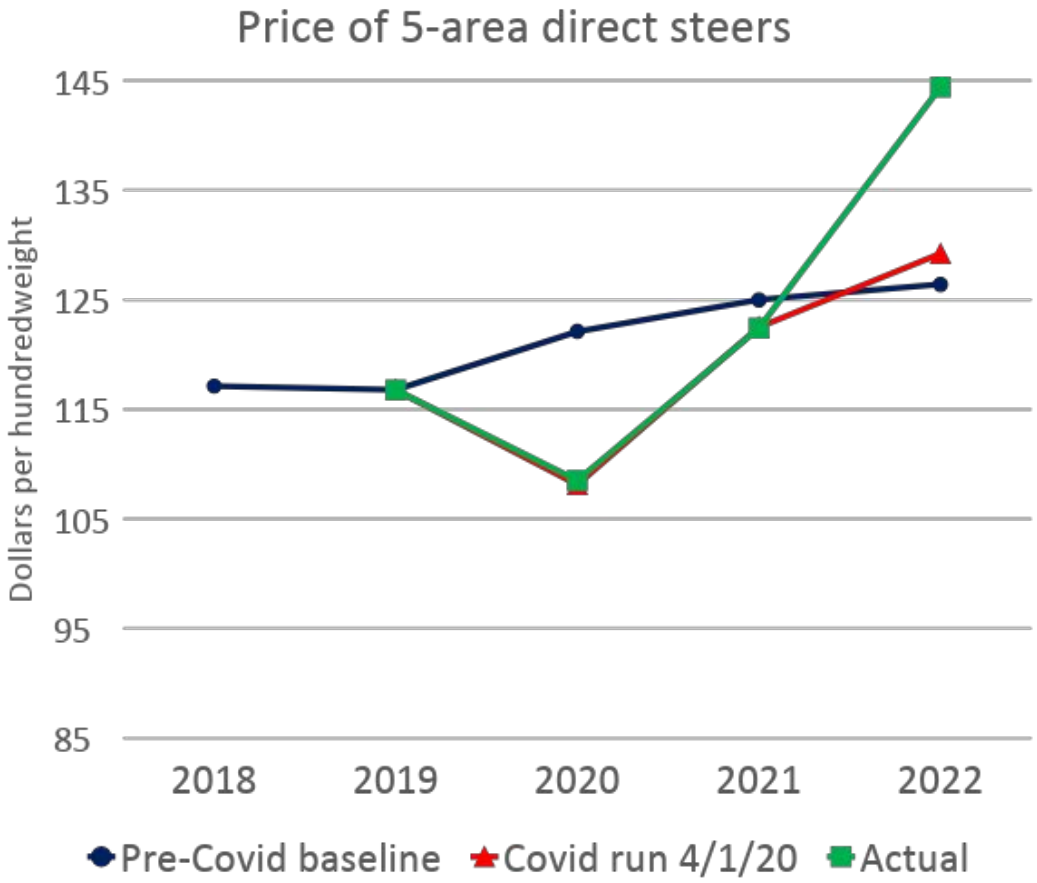
Covid impacts on U.S. cattle prices

- By April 1, 2020, the Covid recession had begun, so we expected consumers to have less disposable income
- We also built in a slight increase in wholesale-retail margins reflecting early stories about supply chain issues
- We expected these two factors to result in lower prices for cattle, but we expected markets to recover quickly post-Covid



Covid impacts on U.S. cattle prices

- What happened?
- Those early estimates got 2021 and 2022 cattle prices almost exactly right…but for the wrong reasons
- U.S. household disposable income increased in 2020 (because of payments) and meat demand was strong in the U.S.
- Problems at packing plants were severe, sharply increasing the gap between live cattle and retail beef prices



Why those early, not so great, projections were nevertheless very important

We got a lot wrong, in part because we had so little information

- How long would the pandemic last?
- How would producers and consumers respond?
- How severe would supply chain issues be? How long would they persist?

However, those early estimates (and similar estimates done at USDA and elsewhere) were very important, even if flawed

- The April 1, 2020 run estimated a negative impact on 2020 U.S. farm income of $20.3 billion
- The U.S. made $23.5 billion in Covid-related payments to U.S. farmers in 2020

What we did and what we learned from the experience

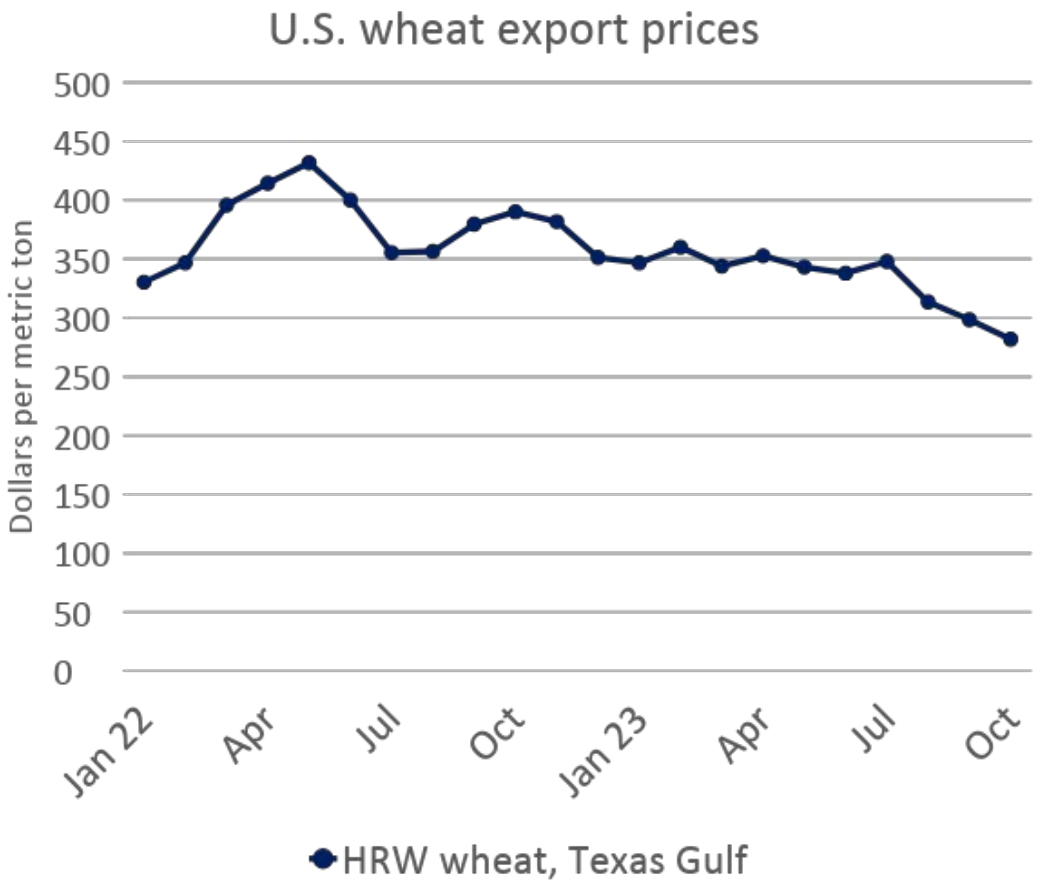
- We assessed which model relationships were still likely to hold and which ones might need to be re-examined
  - A lot of model equations “still worked” and did not require changes
  - But there were major exceptions
  - In meat demand equations, for example, we should have recognized that government payments would increase disposable income and that limitations on other types of consumer spending (travel, entertainment, eating out) would mean people could spend more of their income on food at home
  - And, of course, we should have made more model adjustments to reflect supply chain interruptions

What we did and what we learned from the experience

- We also tried to get as much information as possible
  - Scoured the news
  - Reached out to industry contacts
  - Had many, many Zoom discussions to try to see what others thought
- And we constantly revised our work to incorporate new information
  - The April 1, 2020 run was the fourth of seven runs we did in early months of the pandemic
  - And even now we're trying to untangle what happened

And what about Ukraine?

- In immediate aftermath of the Russian invasion, wheat and corn prices spiked higher
- Common view in spring 2022: war would stop most Ukraine exports and might slow Russian exports as well
- Yet, international wheat prices are lower now than in January 2022
- What happened? Black Sea Grain Initiative, impacts on Russian trade were minimal, and lots of other developments in world markets

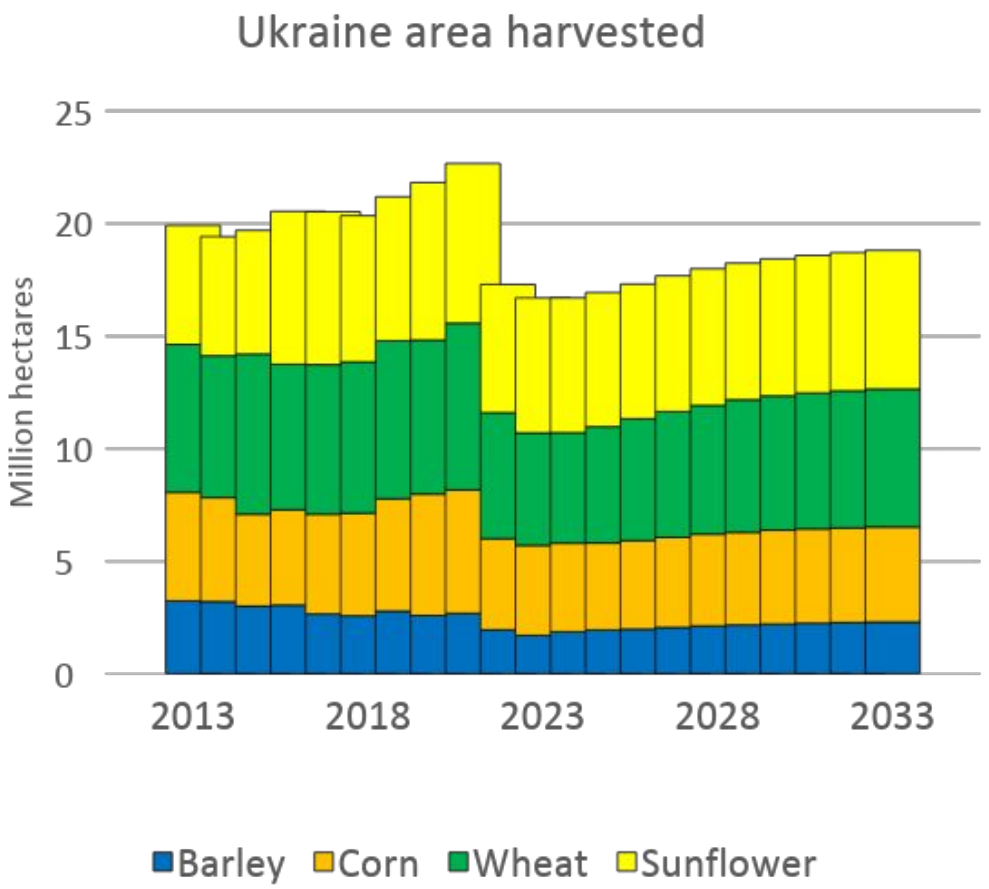


Source: USDA Economic Research Service

Where do we go from here?

- I don't pretend to know. My hat is off to those who are doing their best to develop reasonable projections

- Consider the area devoted to 4 major crops in Ukraine
  - How long will the war continue?
  - How long will it take to clear mines, etc.?
  - Will it be easy/hard/impossible for Ukraine to export?
  - What are implications for crop prices in Ukraine?
  - What about the price and availability of inputs?
  - Will farmers and others be able and willing to make investments?



Source: FAPRI preliminary baseline, Nov. 2023; estimates developed by Malieka Bordigioni at Univ. of Nevada, Reno

Approaches to the problem: 1) Scenario analysis

- One option is scenario analysis
- But with so many possible layers of uncertainty, which scenarios to consider?
  - What are the major causes of uncertainty?
  - What options are of greatest interest to policy makers or the public?
- Most audiences can’t absorb dozens of scenarios

Approaches to the problem: 2) Stochastic analysis

- Another option is stochastic analysis—but it may not be the best in this circumstance

- We use our models to generate 500 stochastic outcomes for 2000+ variables
  - Gives us the ability to talk about price distributions, other measures of risk and uncertainty
  - But it works best when considering “known unknowns,” such as likely variation in weather, where the underlying economic relationships do not change
  - Particularly important when considering U.S. policies that only make payments when prices or revenues are below normal levels

- Not as useful in situations like that in Ukraine where extremely rare (we hope) events cause fundamental shifts
  - For example, we struggle with the question of whether and how we should consider the possibility of another pandemic in our stochastic work

A few points for modelers

- If you start from a model built before the crisis, ask which equations still hold and which need to be re-examined
  - For example, the war fundamentally changes relationship between world and Ukraine prices
  - May even need to change the way the model solves if an effective export limit is binding
- Talk to people
  - See if anyone has information about what might be around the corner

A few points for modelers

- Be bold
  - In a crisis, you will never have all the information you'd like to have
  - But even analysis with a long list of caveats can help people make more-informed choices
- Be humble
  - You won't get it "right," no matter how hard you try
  - Don't try to fool people into thinking you know more than you do
  - People will forgive "bad" projections when they have not been oversold

Thanks!

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