INELASTICITY IN AGRICULTURE

AAE 320

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Agricultural & Applied Economics

Learning Goal

- Become aware that ag supply and food demand are relatively inelastic compared to many other types of supply and demand
- Understand the impacts of this inelasticity on ag prices, farm income and consumer spending on food
  - Means large price swings for small supply/demand quantity changes and small supply/demand quantity changes for large price swings
  - Means large swings in farm income and consumer spending on food

Elasticity

- Economists use the term “elasticity” to talk about the “responsiveness” between factors that are connected
- How responsive one factor is to changes in another factor
- Own price elasticity, income elasticity, cross price elasticity
- Own Price Elasticity:
  - How price responds to changes in quantity of supply (or demand)
  - Percentage change in quantity divided by percentage change in price
  - (Inverse of) how much price changes in % if have a sudden supply or demand “shock”
  - **Own Price Elasticity = %ΔQ / %ΔP**
- Like a slope, but normalized by using percentage changes so does not depend on units of measure used

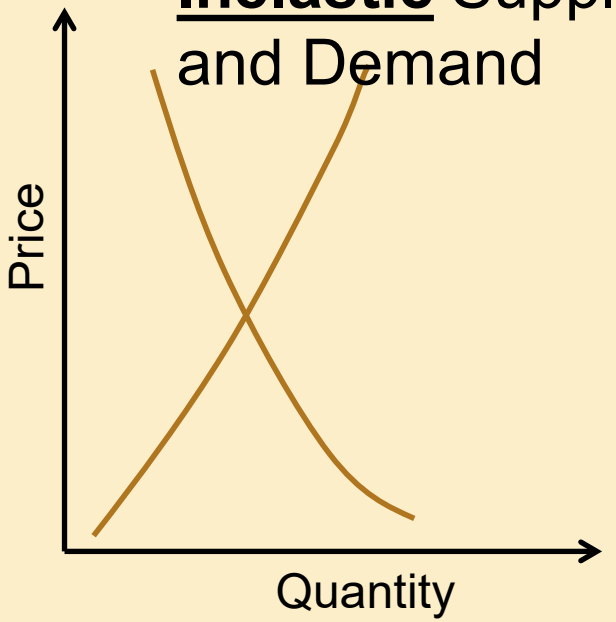
Why is food demand relatively inelastic?

- Biological: There are no substitutes for food, we have to eat, but we can only eat so much
- Social/Cultural: Many foods and diets are culturally set, slow to change, even with large price swings

Why is agricultural product supply relatively inelastic?

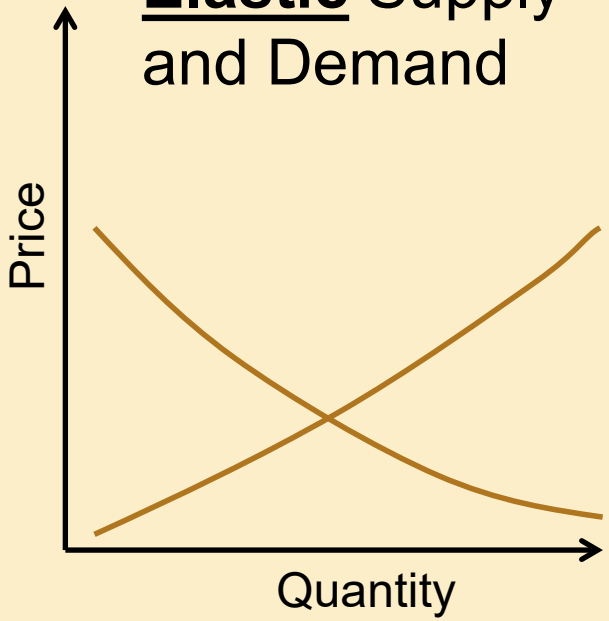
- Biological: Long crop and livestock life cycles: once the crop is planted or the cow is pregnant, supply “locked in” and can’t change quickly in response to price changes
- Social/Cultural: Few uses for land other than agriculture and farmers tied emotionally and institutionally to agriculture, national security

Inelastic Supply and Demand



Both curves are steep in quantity, flat in price

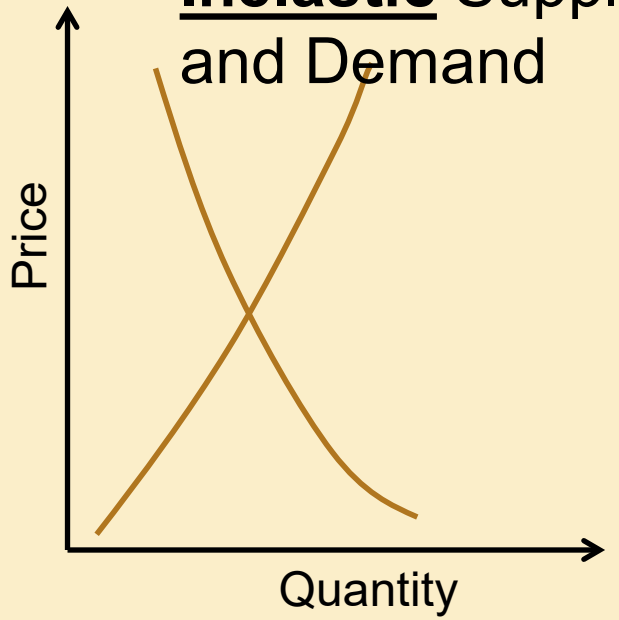
Elastic Supply and Demand



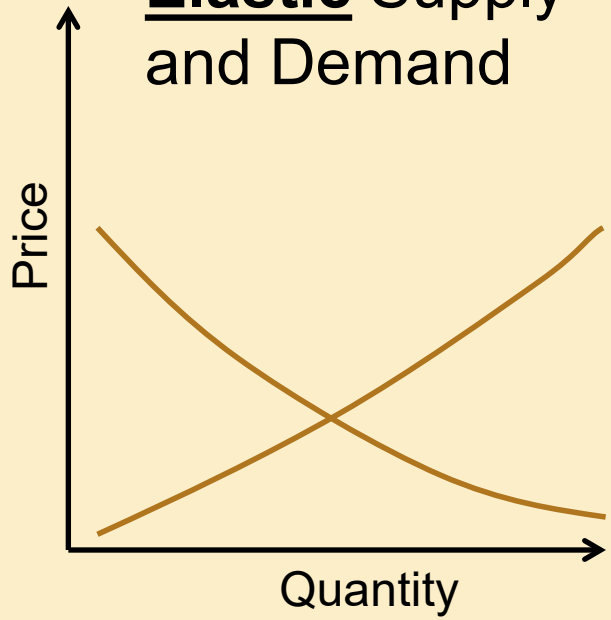
Both curves are flat in quantity steep in price

Agricultural supply and food demand curves are relatively inelastic in quantity, So What!

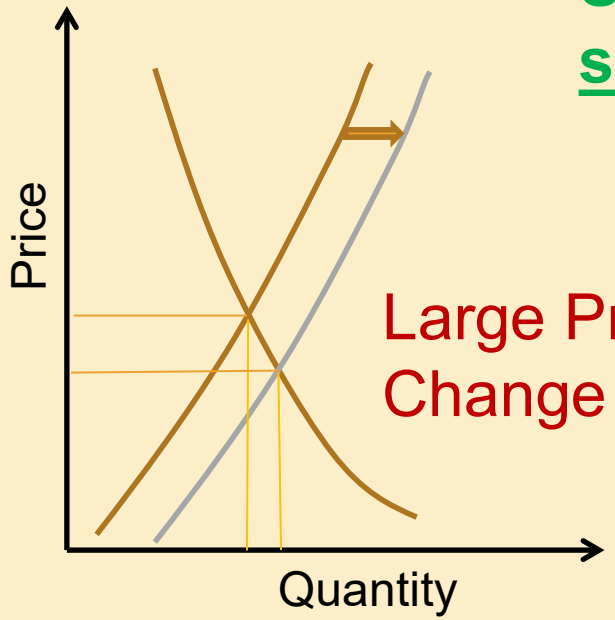
Inelastic Supply and Demand



Elastic Supply and Demand

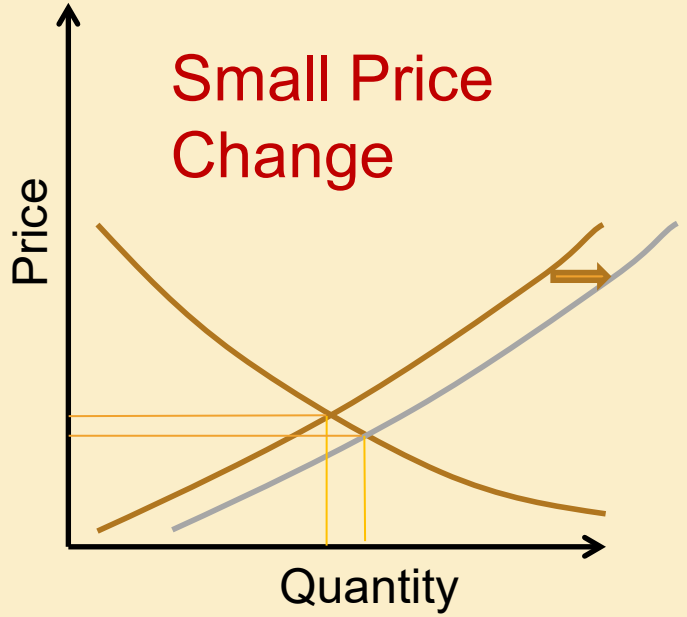


Same-sized supply shift

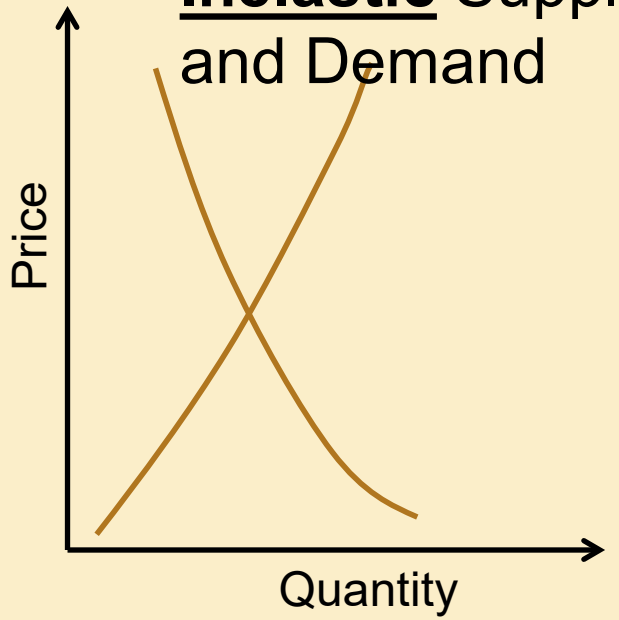


Large Price Change

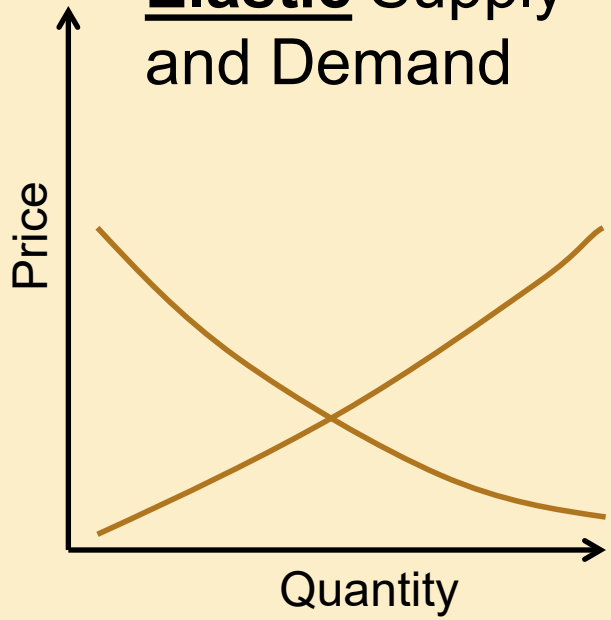
Small Price Change



Inelastic Supply and Demand



Elastic Supply and Demand



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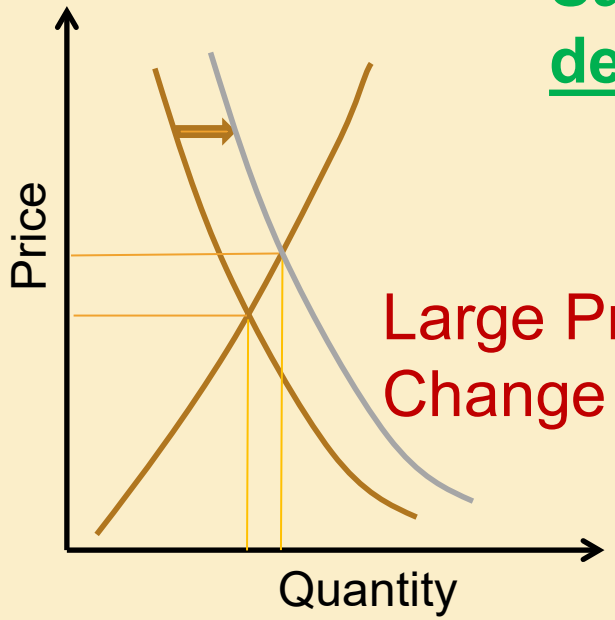
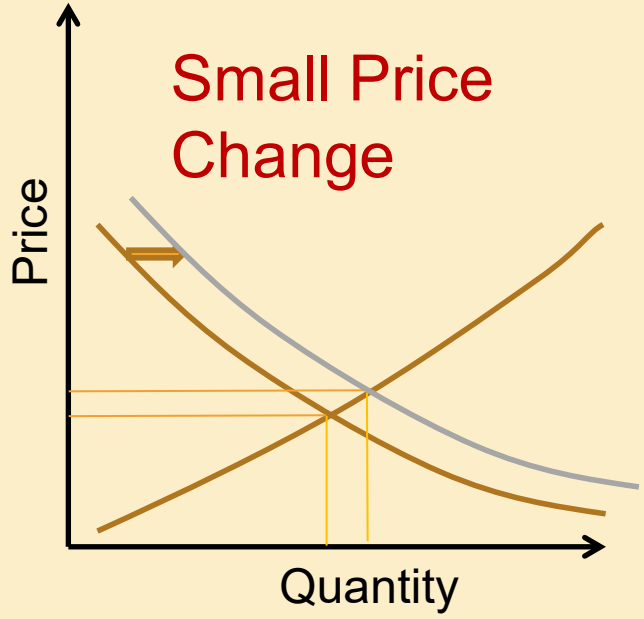


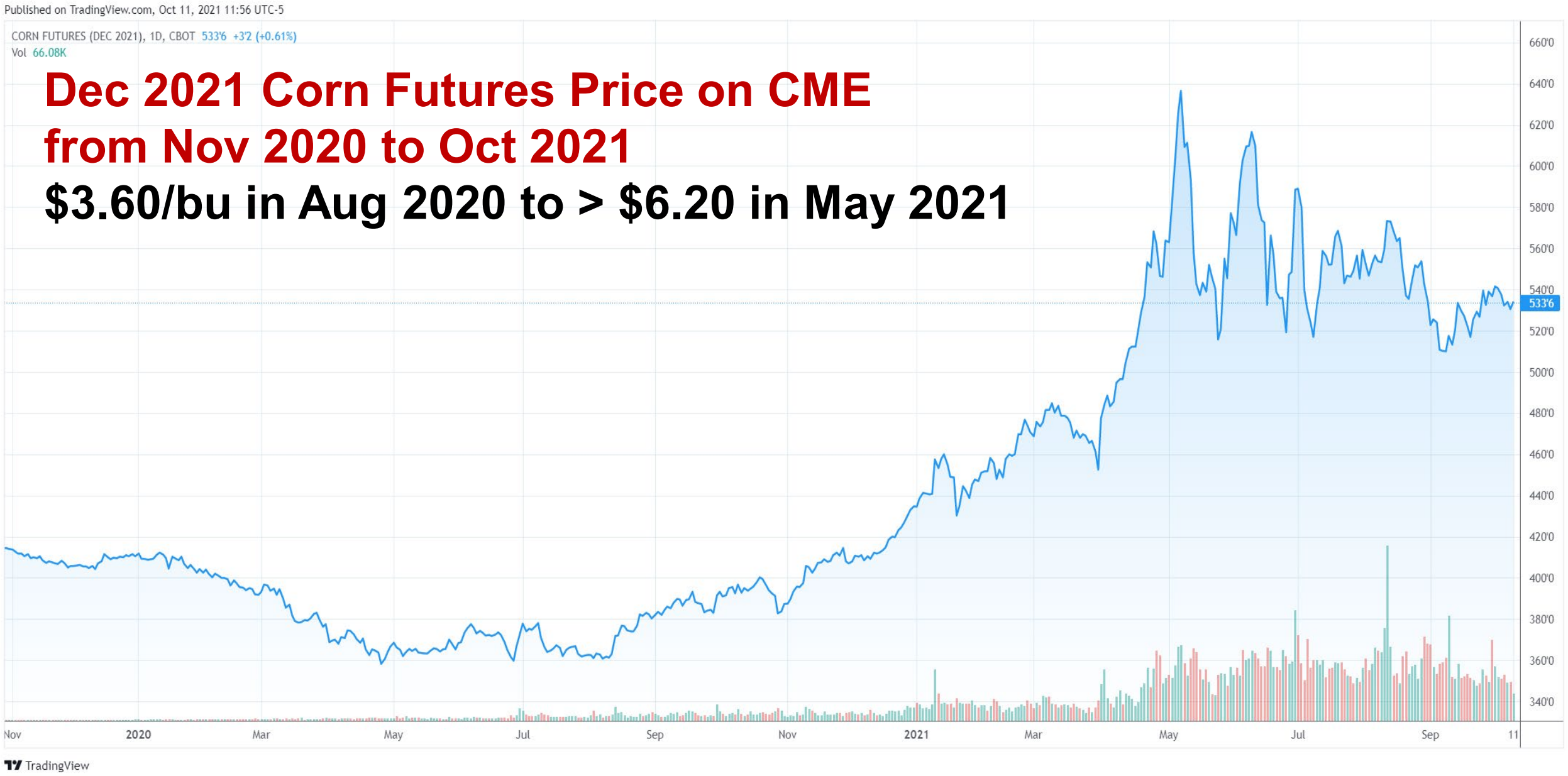
Large Price Change

Small Price Change



Implications of Inelastic Supply & Demand for Food/Ag Products

- Large price changes for small quantity changes
- Small quantity changes for large price changes
  - Tariffs cause milk prices to drop, but farmers still milk cows every day and don't start selling cows
  - Quinoa prices skyrocket as farmers race to keep up with demand, then prices drop fast once market supplied
  - Same thing for sweet cherries, peaches, new potatoes, … when they first come in
  - People keep buying milk in store even if prices go up
  - If beef prices plummet, people don't start eating beef for breakfast, lunch and dinner
- Ag/food supplies and demands often vary due to weather, disruptions, food fads/scares – **so prices vary greatly**


Published on TradingView.com, Oct 11, 2021 11:56 UTC-5
CORN FUTURES (DEC 2021), 1D, CBOT 533'6 +3'2 (+0.61%)
Vol 66.08K
Dec 2021 Corn Futures Price on CME
from Nov 2020 to Oct 2021
$3.60/bu in Aug 2020 to > $6.20 in May 2021
660'0
640'0
620'0
600'0
580'0
560'0
540'0
533'6
520'0
500'0
480'0
460'0
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420'0
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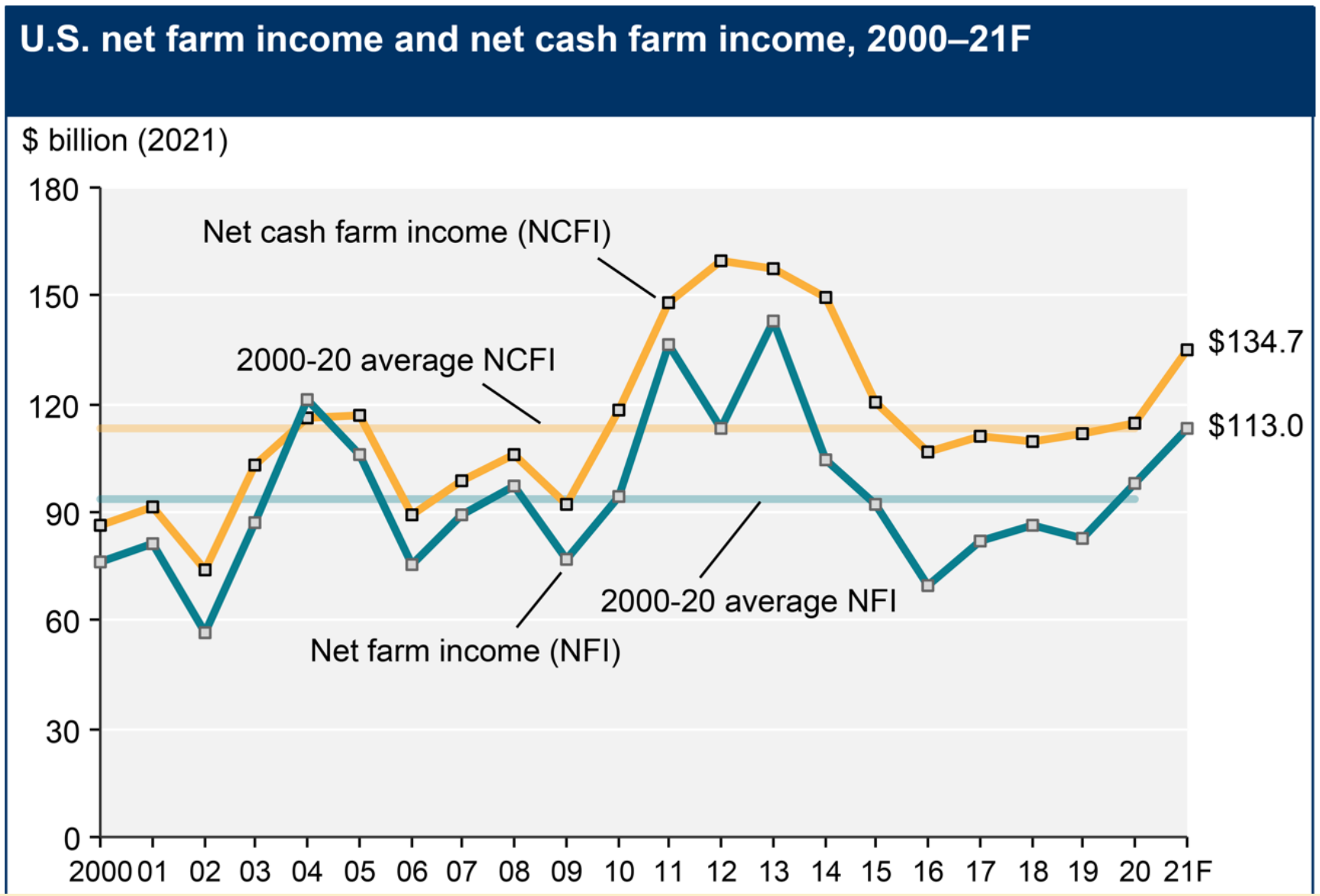

Source: USDA ERS Sep 2, 2021

Income effects of highly variable prices

- Farmers bear the costs of price variability because they are inelastic.
- Do not or cannot respond to crop and livestock price changes
- Lose money when prices are low and make money when prices are high

Summary

- Agricultural supply and food demand are relatively inelastic: Non-responsive to price changes
  - Biological and cultural reasons for these
- Large price swings for small supply/demand quantity changes
- Small supply/demand quantity changes for large price swings
- Large swings in farm income and consumer spending on food as weather, policy and other factors shock the system
- The effects of this inelasticity on farm income and consumer spending are important factors driving ag and food policy in many nations