13. World Supply and Demand for Food: An Historical Perspective and Future Prospects

Nathan Hendricks

Nathan Hendricks is an Assistant Professor in Agricultural Economics at Kansas State University. He holds B.S. and M.S. from KSU and a Ph.D. from University of California, Davis. His research analyzes agricultural supply response and the effect of agricultural and environmental policies. His previous research has investigated agricultural supply dynamics, the cost-effectiveness of alternative water conservation policies, and the production effects of agricultural domestic support programs. He teaches an undergraduate course on international and environmental issues in agriculture, a graduate course on agricultural policy, and a graduate team-taught course in quantitative methods.

Abstract/Summary

Global agricultural productivity growth is slowing while the world population is likely to increase from 7 billion to 9 billion by 2050. Meanwhile, meat demand will continue increasing due to rapid economic growth in China and India. In this session, we will examine some of these major trends in world supply and demand for food. We will also place these future prospects in perspective by looking at world supply and demand from 1960-2000, a period where world population doubled from 3 billion to 6 billion and yet supply actually increased faster than demand. An understanding of these global trends in agricultural markets is an important perspective for producers and agribusiness leaders as they make long-run decisions.
World Supply and Demand for Food: An Historical Perspective and Future Prospects

Nathan P. Hendricks
2013 Risk and Profit Conference

Motivation

• Why think about world supply and demand?

Soybean Trade Flows 2010

• What will be the price of agricultural commodities in 15-30 years?

Motivation

• Bad question: “Can we feed the world by 2050?”
• Better question: “What will be the price of food in 2050 and will everybody be able to afford it?”

HISTORICAL PERSPECTIVE

Thomas Malthus (1798)

• Predicted population growth would exceed ability of land to produce

Population

Food Production

Time

Time

Renewed Malthusian Fears

• Late 1960s early 1970s
• Proposals for population control
• Calls to not give food aid
• Predictions of massive famines
What happened?

Why were Malthusians wrong?

The Green Revolution

- High-yielding varieties of rice and wheat introduced in Asia and Latin America
- Ex. India

FUTURE PROSPECTS
Demand

Population

- 1960-2000: 3 billion to 6 billion
- 2011-2050: 7 billion to 9.5 billion
- Population growth is slowing, but still a large increase is expected

Incomes

- Incomes are converging
- Asia is increasing meat consumption -> substantial increase in demand for grain

Biofuels?

Primary uses of U.S. corn

Source: USDA, Economic Research Service

Source: World Bank and Penn World Table
Demand Expected to Increase 70% by 2050

Worrying Signs about Productivity

1. Growth of yields are slowing
2. Growth in R&D expenditures are slowing

Yield Growth is Slowing

Growth in R&D Expenditures is slowing

The “Yield Gap”
RECENTLY HIGH PRICES IN PERSPECTIVE

What was the main cause?

• Weather

No strong evidence to suggest these were major causes

• Consumption in China and India
• Index funds creating a bubble

Role of biofuels widely debated

Often Overlooked Factors

1. Lack of grain in storage
2. Changes in trade barriers

Storage

• Shock absorbers of the market
• Traders sell-off stocks if prices are high
• Stocks have been very low since 2007
**Ending Stocks to Use Ratio of Calories from the Major Grains**

Source: Wright (2011)

---

**Changes in Trade Barriers**

- In response to rising food prices
  - Food-exporting countries imposed export restrictions
  - Food-importing countries reduced import tariffs
- Primarily developing countries
  - India banned rice and wheat exports
  - Russia 40% export tax on wheat

Source: Anderson and Nelgen (2012)

---

**Conclusion**

- Strong demand growth to 2050
- Concerns that supply growth is slowing
- Lots of uncertainty
- Current market movements may not reflect long-run prospects

---

**Nathan P. Hendricks**

Email: nph@ksu.edu
Website: http://nphendricks.com/
Follow me on Twitter: @nphendricks