

The landscape and challenges of nationally representative forecasting

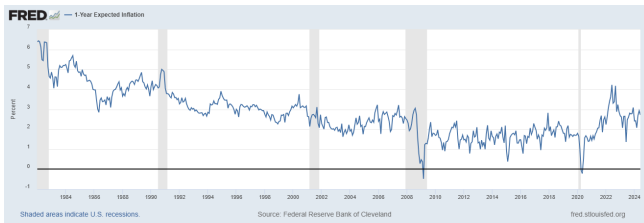
Matthew MacLachlan

Cornell University

AAEA post-conference workshop, July 31st, 2024

Vast and diverse Federal forecasts during rapid change

- Hundreds of publicly available forecasts
 - Produced by federal agencies, NGOs, academics, and others
 - Increased scrutiny and requirements accompany Federal forecasts
 - Many more internal forecasts
- The audience, purpose, reporting, and underlying methodologies vary
- Technological advancement and increased transparency
- George Washington University Center for Economic Research coordinates the Federal Forecasters Consortium and their annual conference.



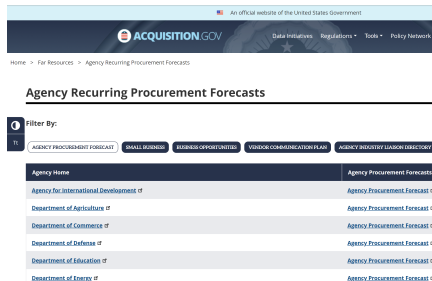
Forecasts provide value to different stakeholders

Introduction

USDA
forecasts

Going forward

- Internal: aid planning and budgeting
- External: reduce information asymmetries
 - Signal upcoming procurement needs—acquisition.gov
 - Can aid decentralized planning and budgeting: consumers and small producers may lack the expertise or resources to develop forecasts.
- Non-governmental forecasts often serve similar functions.



An official website of the United States Government

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Data Initiatives Regulations Tools Policy Network

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Agency Recurring Procurement Forecasts

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Agency Name	Agency Procurement Forecasts
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Department of Agriculture	Agency Procurement Forecast
Department of Commerce	Agency Procurement Forecast
Department of Defense	Agency Procurement Forecast
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Department of Energy	Agency Procurement Forecast

What do agencies need for their forecasts?

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- Current data: with slow collection or reporting, agencies can only report recent descriptions or “nowcasts.”
- Policy neutrality: avoids political influence over forecasts, projections, and their interpretations.
- Portability among staff: aids development, validation, and succession
- Clarity to stakeholders, supervisors, and colleagues

USDA forecasts economic conditions of rural America, primary production, and the food supply chain

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Going forward

- Examples of public forecasts from USDA (sub) agencies
 - Foreign Ag. Service: quarterly ag. trade
 - Forest Service with collaborators: fire danger
 - National Agricultural Statistics Survey: crop production
 - National Resource Conservation Service: water supply
- Difficult to observe and report all activity across vast, varied, and often rapidly changing food production systems and rural landscapes.
- Agricultural Outlook Forum brings forecasters, producers, policymakers, and others together to develop expectations of the future of agricultural and food production.

Rural and Resources Economics Division

Introduction

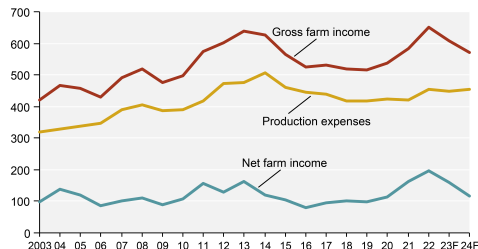
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Going forward

- Farm Sector Income Forecast
 - Multiple forecasts about the farm economy.
- Research and development
 - Methodology and evaluation and update completed in 2020; review published in 2023.
 - Evaluation of fertilizer forecasts.

U.S. gross farm income, production expenses, and net farm income, 2003–2024F

Billion 2024 dollars



Note: F = forecast. Values are adjusted for inflation using the U.S. Department of Commerce, Bureau of Economic Analysis, Gross Domestic Product Price Index (BEA API series code: A191RG) rebased to 2024 by USDA, Economic Research Service. Source: USDA, Economic Research Service, Farm Income and Wealth Statistics. Data as of February 7, 2024.

Kassel (2024)

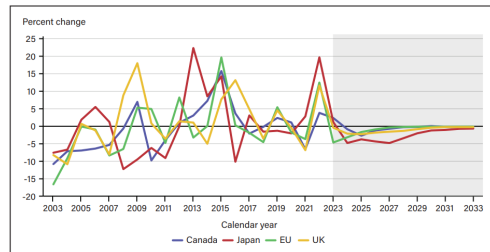
Markets and Trade Economics Division with the Office of the Chief Economist

- Baseline Projections and World Agricultural Supply and Demand (WASDE) Estimates
- Individual commodities Outlooks
 - Cotton and Wool
 - Feed
 - Livestock, Dairy, and Poultry
 - Oil Crops
 - Rice
 - Sugars and Sweeteners
 - Wheat
 - Fruit and Tree Nuts
 - Vegetables and Pulses

- US Agricultural Trade

Matthew MacLachlan

Select high-income countries, annual percent change in nominal exchange rates with the United States, 2003-2033



Zeng, Johnson, and Davis (2024)

Food Economics Division

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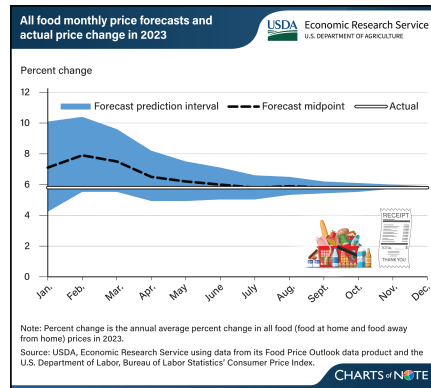
Going forward

● Food Price Outlook

- Forecasts 22 food and 13 agricultural commodity price series

● Research

- Model evaluation and updated in 2022, implemented in 2023
- Large grant evaluating further improvements to unusual but important series



Sweitzer (2024)

Challenges for USDA forecasters

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- Policy neutrality and collaborations with neighboring agencies
- Tight security requirements
 - Newest tools may not yet fulfill NIST requirements
 - Third-party is not often used
- Systematic review and clearance
- Sensitivity to stakeholders' needs
 - Continuity
 - Must be readily understandable

Commonalities and differences in the challenges USDA and external forecasts face

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- Most forecasts have been developed using a few statistical programs, including R, Python, and Stata.
- Computing power becomes increasingly important as software places
 - Cloud computing for scale and efficiency
 - Parallelization
- Code sharing has hastened the development, dissemination, and adoption of new approaches. Each group no longer needs to develop similar functions independently.

How to incorporate rapid advancements

● Process

- Prioritize stakeholders' needs and wants.
- Document an optimal adaptive process rather than repeated studies.
- Have a plan for when a better adaptive process comes along—it will.
- Equip staff with the newest tools.
 - ★ Many are open-source
 - ★ Improves staff's performance
 - ★ Facilitates communication with other researchers

● Regular practices

- Conduct and welcome regular forecast evaluation
- Use learning models that can adapt to changing data
- Streamline and automate data collection, estimation, and reporting.
 - ★ Reduces errors
 - ★ Leaves more time for R&D

Thank you and on to our panelists

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