Prospects for Food Commodity Prices
by
Sally Thompson
(with assistance from Ron Trostle)

Power Point Presentation for the
International Agricultural Trade Research Consortium
Analytic Symposium
“Confronting Food Price Inflation:
Implications for Agricultural Trade and Policies”

June 22-23, 2009
Seattle, Washington
Prospects for Food Commodity Prices

Sally Thompson
(with much assistance from Ron Trostle)
Economic Research Service
U.S. Department of Agriculture

International Agricultural Trade Research Consortium
June 22, 2009
Spikes in food commodity prices: Will this time be any different?

Index: January 2002 = 100

Source: International Monetary Fund: International Financial Statistics
Food commodity prices since January 2002: Up 130 %, then down 1/3

Index: January 2002 = 100

Source: International Monetary Fund: International Financial Statistics
Nominal Crop Price Index
Weighted average of 4 crops (wheat, soybeans, corn & rice) 1/

Index: January 2002 = 100

1/ IMF monthly prices weighted by world exports.

Source of data for nominal prices and weights: International Monetary Fund
Prices of many commodities rose even more

Index: January 2002 = 100

Crude oil
Average of all commodities
Food commodity index

+ 585 %
+ 330 %
+ 130 %

Source: International Monetary Fund: International Financial Statistics
Food commodity prices:
Indices for selected crops and total food

Index: January 2002 = 100

- Corn
- Soybeans
- Wheat
- Rice
- Food commodity index

Source: International Monetary Fund: International Financial Statistics
Crop price increases: real vs. nominal

Weighted average of 4 crops (wheat, soybeans, corn & rice) 1/

Index: January 2002 = 100

Nominal prices

Real prices

1/ IMF monthly prices weighted by world exports.

Source of data for nominal prices and weights: International Monetary Fund
Crop and meat prices (nominal)

Index: January 2002 = 100

Weighted average of 4 crops (wheat, soybeans, corn & rice) 1/
Simple average of 3 meats (beef, pork & chicken)

1/ IMF monthly prices weighted by world exports.

Source of data for nominal prices and weights: International Monetary Fund
Factors contributing to higher food commodity prices

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<thead>
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</thead>
<tbody>
<tr>
<td><strong>Strong growth in demand, based on:</strong></td>
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<tr>
<td>Increasing population + Strong economic growth + Rising per capita meat consumption</td>
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</tr>
</tbody>
</table>

- Slowing growth in agricultural production
- Declining demand for stocks of food commodities
- Escalating crude oil price
- Rapid expansion of biofuels production
- Dollar devaluation
- Rising farm production costs
- Adverse weather
- Large foreign exchange reserves
- Aggressive purchases by importers
- Exporter policies
- Importer policies

Demand factors in yellow
Supply factors in green
Factors that may influence future ag prices

• Nearer Term
  – Economic slow down, & recovery
  – Cost of energy (& other non ag prices)
  – Costs of ag production
  – Stock levels (Supply & demand balances; stocking policies; self-sufficiency policies)
  – Policy changes by exporters & by importers
  – Exchange rates (Esp. for commodities denominated in dollars)
  – Weather
  – Import demand: Who will be the importers? (Role of foreign exchange reserves)

• Intermediate Term
  – Biofuels production (Role of policies and profitability)
  – Consumption patterns (Continued increase in per capita meat consumption?)

• Longer Term
  – Technology advancements
  – Natural resource constraints
    • Land: Ability to expand cultivated area; productive capacity of new land
    • Water: Fertilizer (ability to continue rate of growth in irrigated areas)
  – Climate change and related legislation—e.g. Waxman-Markey
    • Impact of temperature, precip, and growing season changes on cropping patterns & productivity.
  – Potential revisions to projected population growth
## Factors contributing to changes in food commodity prices

**Temporary factors:**
- Adverse weather
- Trade policies by exporters and importers
- Aggressive buying by importers

**Continuing upward pressure on prices**

**Demand factors:**
- Economic growth in many developing countries
- Population growth in developing countries
- Increasing per capita meat consumption
- Continued biofuels production

**Supply factors:**
- Energy prices
- Ag production costs
- Slowing growth in total crop production

**Uncertain future impact:**
- Value of dollar
- Role of large foreign exchange reserves
USDA Baseline

- 10-year projection of major commodities
  - Supply, demand, trade, and prices.
  - Based on November 2008 market conditions. Released Feb 2009
- Assumes continuation of current U.S. law and
  - continuation of existing international trade agreements
  - normal weather
- Applications of long run agricultural projections
  - Budget estimates (FSA), Baseline reports (ERS), Special requests, research
- Linked Country Model ("Linker")
  - Annual model - dynamic partial equilibrium, 40 countries/regions,
  Linked with FAPSIM as U.S. model, 24 commodity markets
  Solves for prices and trade that clear world and country commodity markets
  Equilibrates: (Supply = Demand) and (Imports = Exports)
U.S. commodity prices: soybeans, wheat, corn & rice
History, current year, & projections

$ per bushel (per cwt for rice)

Livestock Prices

$ per metric ton, Nominal, U.S. markets

- Beef cattle: Choice steers, Nebraska
- Broilers: 12-city market price
- Hogs: National base

Source: USDA Agricultural Projections to 2018, February 2009
GDP growth slows in 2008 & 2009 ¹/

Percent


-6 -3 0 3 6 9

Africa
Developing Asia
World
Latin America
OECD Countries
Former Soviet Union

1/ Projections based on assumptions made in October, 2008

GDP growth down in 2008-10\(^1\)/

Source: ERS International Macroeconomic Data Set, 2009.
1/ Data for 2008 is preliminary while data for 2009 are estimates based on partial year.
GDP growth slows even in China and India

Source: ERS International Macroeconomic Data Set, 2009.
Population growth continues to slow


U.S. crude oil prices

Oil price expectations have jumped considerably.

Real 2000 $ per barrel. Refiner acquisition cost of imports

Source: USDA Agricultural Projections to 2018, February 2009; and previous reports
Percent change in value of ag trade during economic slowdown

<table>
<thead>
<tr>
<th>Country/Region</th>
<th>Latest month of available data</th>
<th>Agricultural Trade Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fourth Quarter (Oct-Dec) 2007-2008</td>
</tr>
<tr>
<td>Value of Exports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>March, 2009</td>
<td>-0.4 %</td>
</tr>
<tr>
<td>Japan</td>
<td>February, 2009</td>
<td>-15.6 %</td>
</tr>
<tr>
<td>USA</td>
<td>February, 2009</td>
<td>-5.5 %</td>
</tr>
<tr>
<td>EU</td>
<td>January, 2009</td>
<td>-10.0 %</td>
</tr>
<tr>
<td>Value of Imports</td>
<td></td>
<td></td>
</tr>
<tr>
<td>South Korea</td>
<td>March, 2009</td>
<td>-3.3 %</td>
</tr>
<tr>
<td>Mexico</td>
<td>January, 2009</td>
<td>-2.7 %</td>
</tr>
<tr>
<td>USA</td>
<td>February, 2009</td>
<td>6.1 %</td>
</tr>
<tr>
<td>EU</td>
<td>January, 2009</td>
<td>-11.8 %</td>
</tr>
</tbody>
</table>

The Monthly Value of World Imports Rebounds in March After Plummeting in Response to the Global Financial Crisis

Source: Global Trade Atlas
Monthly Value of Imports in Relation to Stock Market Value

Source: Global Trade Atlas and World Federation of Exchanges
World grain & oilseeds
Total production and use

Million metric tons

Source: USDA PS&D Database
Total world grain & oilseeds

Production, yield, area harvested, population & percap production

Exponential trend growth rates:

<table>
<thead>
<tr>
<th></th>
<th>1970-90</th>
<th>90-08</th>
<th>2009-18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>2.4</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Yields</td>
<td>1.9</td>
<td>1.2</td>
<td>0.8</td>
</tr>
<tr>
<td>Area</td>
<td>0.50</td>
<td>0.29</td>
<td>0.49</td>
</tr>
<tr>
<td>Population</td>
<td>1.7</td>
<td>1.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Per capita production</td>
<td>0.61</td>
<td>0.22</td>
<td>0.19</td>
</tr>
</tbody>
</table>

Index: 1970 = 100

1 Total oilseeds = soybeans + rapeseed + sunflowers

Source: Compiled from USDA’s PS&D Database & Baseline Projections
Total world grain & oilseeds
Stocks and stocks-to-use ratio

Million metric tons

Stocks / Use (%)

Source: USDA PS&D Database
Biofuels production: Largest producers

Million Gallons

Source: USDA Agricultural Projections to 2017
U.S. corn use

Billion bushels


Ethanol

FSI less ethanol 1/

Exports

Feed & residual

1/ Food, seed, and industrial less ethanol.

Source: USDA Agricultural Projections to 2018.
### Growth in world wheat and coarse grains use: 1980/81 - 2002/03 vs. 2002/03 - 2007/08

<table>
<thead>
<tr>
<th>Use</th>
<th>1980/81 to 2002/03</th>
<th>2002/03 to 2007/08</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MMT</td>
<td>%</td>
</tr>
<tr>
<td>Food</td>
<td>160</td>
<td>49</td>
</tr>
<tr>
<td>Feed*</td>
<td>144</td>
<td>44</td>
</tr>
<tr>
<td>U.S. corn for ethanol</td>
<td>27</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>328</td>
<td>100</td>
</tr>
</tbody>
</table>

*Feed includes wheat and coarse grains*
U.S. corn used for ethanol

Million metric tons

History and projections from sequential baselines: 2003 - 2009

Source: USDA Agricultural Baseline Projections, various reports.
Uncertainties

• Energy prices (oil & natural gas)
• Responsiveness to price changes
  – demand for biofuels vs. petroleum prices
  – supply of feed stocks vs. biofuels prices
  – costs of feedstock production vs. feedstock prices
    • Fertilizer (& natural gas), irrigation, farmland
• Additional crop land
• Water availability
  – manufacturing process
  – Increased irrigation
• New technological developments in biofuels industry
  – manufacturing process
  – new crop varieties: (higher yields; more suitable for biofuels)
  – new byproducts (with high value?)
• Biofuels policies & funding
Meat: Sum of all reporting countries\textsuperscript{1,2}

Production and per capita consumption

Exponential trend growth rates

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<td>3.1</td>
<td>2.8</td>
<td>1.6</td>
</tr>
<tr>
<td>Population</td>
<td>1.7</td>
<td>1.3</td>
<td>1.1</td>
</tr>
<tr>
<td>Per capita consumption</td>
<td>1.4</td>
<td>1.5</td>
<td>0.5</td>
</tr>
</tbody>
</table>

Source: USDA PS&D data and Agricultural Projections

\textsuperscript{1} Total meat = beef + pork + chickens & turkeys.

\textsuperscript{2} Data are not reported in USDA’s PS&D database for many small countries, therefore data are not a global total.
Per Capita Meat Consumption, Reporting Countries

Kilograms per capita


1 Data is not reported in USDA’s PS&D database for many small countries, therefore data are not global averages.

Source: USDA Agricultural Projections to 2018, February 2009
Value of U.S. dollar declines after 2002; projected to stabilize \(^1\)/

1/ Real U.S. agricultural trade-weighted dollar exchange rate, using U.S. agricultural export weights, based on 192 countries.

Weather in the future ??

Weather played a major role in recent past

- *In 2006*
  - Australia
  - Ukraine & Russia
- *and 2007*
  - Europe: dry spring; harvest floods
  - SE Europe: drought
  - Ukraine & Russia: drought (2nd year)
  - USA: late spring freeze
  - Canada: hot and dry
  - Australia: 2nd year of severe drought
  - NW Africa: drought
  - Turkey: dry
Who will be the importers?

Near term:
- Countries with large or growing foreign exchange reserves?

Longer term:
- Food deficit countries with faster population growth?
### Policy responses to rising prices by selected countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Exports</th>
<th>Imports</th>
<th>Domestic policies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Raised export export taxes</td>
<td>Export volume restrictions</td>
<td>Reduced import tariffs</td>
</tr>
<tr>
<td><strong>Export policies:</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Argentina</td>
<td>x</td>
<td>x</td>
<td></td>
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<tr>
<td>Cambodia</td>
<td></td>
<td></td>
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<tr>
<td>Egypt</td>
<td></td>
<td></td>
<td>x</td>
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<tr>
<td>Kazakhstan</td>
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<td></td>
<td>x</td>
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<tr>
<td>Russia</td>
<td></td>
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<tr>
<td>Ukraine</td>
<td>x</td>
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<td></td>
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<tr>
<td>Vietnam</td>
<td>x</td>
<td></td>
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<tr>
<td><strong>Import policies:</strong></td>
<td>x</td>
<td>x</td>
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<tr>
<td>Bangladesh</td>
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<td>EU</td>
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<tr>
<td>Mexico</td>
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<td>Morocco</td>
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<td>Mongolia</td>
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<td>Philippines</td>
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<tr>
<td>Thailand</td>
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</tbody>
</table>
### Policy responses to rising prices by selected countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Exports</th>
<th>Imports</th>
<th>Domestic policies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Raised</td>
<td>Reduced</td>
<td>Increased</td>
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<tr>
<td></td>
<td>Export</td>
<td>import</td>
<td>Imposed</td>
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<td></td>
<td>Export</td>
<td>tariffs</td>
<td>price</td>
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<td></td>
<td>Export</td>
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<td></td>
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<td></td>
<td>bans</td>
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<td></td>
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<tr>
<td></td>
<td>taxes</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>restrictions</td>
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</table>

**Exports**

<table>
<thead>
<tr>
<th>Country</th>
<th>Export volume</th>
<th>Export bans</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>India</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Indonesia</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Malaysia</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Serbia</td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>

**Imports**

<table>
<thead>
<tr>
<th>Country</th>
<th>Reduced import</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>x</td>
</tr>
<tr>
<td>India</td>
<td>x</td>
</tr>
<tr>
<td>Indonesia</td>
<td>x</td>
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<tr>
<td>Malaysia</td>
<td></td>
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<tr>
<td>Serbia</td>
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</tbody>
</table>

**Domestic policies**

<table>
<thead>
<tr>
<th>Country</th>
<th>Increased consumer</th>
<th>Imposed price</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>India</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>x</td>
<td></td>
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<tr>
<td>Malaysia</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Serbia</td>
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</tbody>
</table>

**Both export and import policies:**

- China: x for Export volume, x for Export bans, x for Reduced import, x for Increased consumer, x for Imposed price
- India: x for Export volume, x for Export bans, x for Reduced import, x for Increased consumer, x for Imposed price
- Indonesia: x for Export volume, x for Export bans, x for Reduced import, x for Increased consumer, x for Imposed price
- Malaysia: x for Export volume, x for Export bans
- Serbia: x for Export volume, x for Export bans
Foreign Exchange Reserves

Emerging Asia: Foreign exchange reserves

Source: Oxford Economics / Haver Analytics

Emerging Asia ex China

China

Japan

OPEC

Russia

Source: Oxford Economics / Haver Analytics
Thanks very much and I’m looking forward to your comments!