Factors contributing to the sharp rise, and then fall, in food commodity prices: 2002-2009

Ron Trostle
Economic Research Service
U.S. Department of Agriculture
Factors contributing to the sharp rise, and then fall, in food commodity prices: 2002-2009

Ron Trostle
Economic Research Service
U.S. Department of Agriculture

February 26, 2009
Factors contributing to the sharp rise, and then fall, in food commodity prices: 2002-2009

Ron Trostle
Economic Research Service
U.S. Department of Agriculture

February 26, 2009
Food commodity prices since January 2002: Up 130%, then down 1/3

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

Source: International Monetary Fund: International Financial Statistics
Nominal price increases since January 2002 and declines since the peak

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Up</th>
<th>Down(^1)</th>
<th>Since peak in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>337 %</td>
<td>62 %</td>
<td>Mid March, 2008</td>
</tr>
<tr>
<td>Corn</td>
<td>268 %</td>
<td>62 %</td>
<td>End of June, 2008</td>
</tr>
<tr>
<td>Soybeans</td>
<td>295 %</td>
<td>53 %</td>
<td>Early July, 2008</td>
</tr>
<tr>
<td>Rice</td>
<td>&gt; 400 %</td>
<td>36 %</td>
<td>Late Sept, 2008</td>
</tr>
<tr>
<td>Index of food</td>
<td>130 %</td>
<td>34 %</td>
<td>June, 2008</td>
</tr>
<tr>
<td>commodities</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^1\)Lowest price since peak, as of February 23, 2009.

Kansas City for wheat; Central Illinois for corn and soybeans. CBOT for rice

Source: USDA/ERS
Daily Prices for Wheat, Corn, & Soybeans
January 2002 – February 2009: Three periods of price changes

Index: January 2002 = 100

Source: USDA/ERS
Daily Prices for Wheat, Corn, & Soybeans


Index: January 2002 = 100

- Consumption generally exceeds production
  - Stock/Use drops in 7 of 8 years after 1999.
- Dollar begins to lose value
  - Crude oil price begins to rise more rapidly

Growth in world biofuels production

Ag production costs rise

Bad weather

Worse weather

Source: USDA/ERS
World grain & oilseeds
Total production and use

Million metric tons

1,500
2,000
2,500
3,000


Source: USDA PS&D Database
Total world grain & oilseeds
Stocks and stocks-to-use ratio

Source: USDA PS&D Database
Daily Prices for Wheat, Corn, & Soybeans

Index: January 2002 = 100

Consumption generally exceeds production
Stock/Use drops in 7 of 8 years after 1999.

Dollar begins to lose value
Crude oil price begins to rise more rapidly

Growth in world biofuels production

Ag production costs rise

Bad weather
Worse weather

Source: USDA/ERS
Value of U.S. dollar declines after 2002 1/

Index values, 2000=100

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

Source: USDA / ERS
Daily Prices for Wheat, Corn, & Soybeans

Index: January 2002 = 100

Consumption generally exceeds production
Stock/Use drops in 7 of 8 years after 1999.

- Dollar begins to lose value
- Crude oil price begins to rise more rapidly

Growth in world biofuels production

Ag production costs rise

Bad weather
Worse weather

Source: USDA/ERS
Daily Prices for Wheat, Corn, & Soybeans

July 2007 – March 2008

Index: January 2002 = 100

Ag production costs continue to rise

Worse weather

Aggressive buying by importers

Exporter & importer policies

Source: USDA/ERS
Foreign Exchange Reserves

Emerging Asia: Foreign exchange reserves

$bn

Emerging Asia ex China

China

Japan

OPEC

Russia

Source: Oxford Economics / Haver Analytics
Daily Prices for Wheat, Corn, & Soybeans

July 2007 – March 2008

Index: January 2002 = 100

- Ag production costs continue to rise
- Worse weather
- Aggressive buying by importers
- Exporter & importer policies

Source: USDA/ERS
### Policy responses to rising prices by selected countries - Exporters

<table>
<thead>
<tr>
<th>Country</th>
<th>Raised export taxes</th>
<th>Export volume restrictions</th>
<th>Export bans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Cambodia</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Egypt</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Russia</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ukraine</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Vietnam</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>China</td>
<td>x</td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>India</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Indonesia</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serbia</td>
<td></td>
<td></td>
<td>x</td>
</tr>
</tbody>
</table>
Policy responses to rising prices by selected countries – **Importers** 1/

<table>
<thead>
<tr>
<th>Country</th>
<th>Reduced import tariffs</th>
<th>Increased consumer subsidies</th>
<th>Imposed price caps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>EU</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mexico</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morocco</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mongolia</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>China</strong></td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>India</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Indonesia</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Malaysia</td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Serbia</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1/ Countries in red font employed both import and export policies.
Daily Prices for Wheat, Corn, & Soybeans
July 2007 – March 2008

Index: January 2002 = 100

- Ag production costs continue to rise
- Worse weather
- Aggressive buying by importers
- Exporter & importer policies

Source: USDA/ERS
Daily Prices for Wheat, Corn, & Soybeans
March 2008 – February 2008

Index: January 2002 = 100

Source: USDA/ERS

Wheat: down 62%
Corn: down 62%
Soybeans: down 53%
Rice: down 36%
Daily Prices for Wheat, Corn, & Soybeans
March 2008 – February 2009

Index: January 2002 = 100

Reports of large crop production

Prospects of big wheat crop

Dollar bottoms

Crude oil peak

Dollar began appreciating

Global economic slow down

Reversal of exporter & importer policies

Futures markets liquidation
Total open interest down 47%
Non-commercial longs down 67%

Source: USDA/ERS
Total Open Interest: U.S. Futures Markets for Wheat, Corn, Soybeans, and Rice

Million contracts, by week

Wheat on CBOT, KCBOT, & MGE; Corn, Soybeans, & Rice on CBOT

47% decline since peak

Note: non-commercial long positions fell 67%.

Source: U.S. Commodity Futures Trading Commission
Spikes in food commodity prices: Will this time be any different?

Index: January 2002 = 100

Source: International Monetary Fund: International Financial Statistics
Factors contributing to changes in food commodity prices

<table>
<thead>
<tr>
<th>Temporary factors:</th>
<th>Continuing upward pressure on prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>➢ Adverse weather</td>
<td>Demand factors:</td>
</tr>
<tr>
<td>➢ Trade policies by exporters and importers</td>
<td>➢ Economic growth in many developing countries</td>
</tr>
<tr>
<td>➢ Aggressive buying by importers</td>
<td>➢ Population growth in developing countries</td>
</tr>
<tr>
<td></td>
<td>➢ Increasing per capita meat consumption</td>
</tr>
<tr>
<td></td>
<td>➢ Continued biofuels production</td>
</tr>
<tr>
<td></td>
<td>Supply factors:</td>
</tr>
<tr>
<td></td>
<td>➢ Relatively high energy prices</td>
</tr>
<tr>
<td></td>
<td>➢ Ag production costs</td>
</tr>
<tr>
<td></td>
<td>➢ Slowing growth in total crop production</td>
</tr>
</tbody>
</table>

**Supply factors**

**Demand factors**
U.S. commodity prices: soybeans, wheat, corn & rice
History, current year, & projections

$ per bushel (per cwt for rice)

Global Agricultural Supply and Demand: Factors Contributing to the Recent Increase in Food Commodity Prices

A report available at:


Ronald Trostle
Economic Research Service
U.S. Department of Agriculture
rtrostle@ers.usda.gov
202-694-5280
End of slides used in presentation

The following slides provide more detail on various aspect of the story.
Prices of many commodities rose even more

Index: January 2002 = 100

- Crude oil
- Average of all commodities
- 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

Source of data for nominal prices and weights: International Monetary Fund
Total world grain & oilseeds
Production, yield, & area harvested

Index: 1970 = 100

Trend growth rates:

<table>
<thead>
<tr>
<th></th>
<th>1975-90</th>
<th>90-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prod</td>
<td>2.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Area</td>
<td>0.15</td>
<td>0.17</td>
</tr>
<tr>
<td>Yields</td>
<td>2.0</td>
<td>1.1</td>
</tr>
</tbody>
</table>

1 Total oilseeds = soybeans + rapeseed + sunflowers

Source: USDA Agricultural Projections to 2017
Biofuels production: Largest producers

Million Gallons

Source: USDA Agricultural Projections to 2017
Adverse weather reduced production:

- **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
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>90-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>2.2</td>
<td>1.3</td>
</tr>
<tr>
<td>Yields</td>
<td>2.0</td>
<td>1.1</td>
</tr>
<tr>
<td>Area</td>
<td>0.15</td>
<td>0.14</td>
</tr>
<tr>
<td>Population</td>
<td>1.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Per capita production</td>
<td>0.56</td>
<td>0.11</td>
</tr>
</tbody>
</table>

Index: 1970 = 100

Source: Compiled from USDA’s PS&D Database

1 Total oilseeds = soybeans + rapeseed + sunflowers
Population growth rates decline
(Percent by period)

Source: USDA Agricultural Baseline Projections to 2017.
Strong economic growth
Average Real GDP growth rates

Source: USDA Agricultural Baseline Projections to 2017.
Global meat
Production, per capita consumption, and population

Exponential trend growth rates:

<table>
<thead>
<tr>
<th></th>
<th>1975-90</th>
<th>90-07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>3.1</td>
<td>2.5</td>
</tr>
<tr>
<td>Population</td>
<td>1.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Per capita consumption</td>
<td>1.4</td>
<td>1.1</td>
</tr>
</tbody>
</table>

Index: 1971 = 100

1 Total meat = beef + pork + chickens & turkeys.

Food commodity prices:
Indices for selected crops and total food

Index: January 2002 = 100

Source: International Monetary Fund: International Financial Statistics
Total Open Interest: U.S. Futures Markets for Wheat, Corn, Soybeans, and Rice

Million contracts, by week

Wheat on CBOT, KCBOT, & MGE; Corn, Soybeans, & Rice on CBOT

47% decline since peak

Source: U.S. Commodity Futures Trading Commission
Nominal price increases since January 2002 and declines since the peak

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Up</th>
<th>Down&lt;sup&gt;1&lt;/sup&gt;</th>
<th>Since peak in 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheat</td>
<td>337 %</td>
<td>62 %</td>
<td>Mid March</td>
</tr>
<tr>
<td>Corn</td>
<td>268 %</td>
<td>62 %</td>
<td>End of June</td>
</tr>
<tr>
<td>Soybeans</td>
<td>295 %</td>
<td>53 %</td>
<td>Early July</td>
</tr>
<tr>
<td>Rice</td>
<td>&gt; 400 %</td>
<td>36 %</td>
<td>Late September</td>
</tr>
<tr>
<td>4-crop average</td>
<td>247 %</td>
<td>40 %</td>
<td>April</td>
</tr>
<tr>
<td>Index of food</td>
<td>130 %</td>
<td>34 %</td>
<td>June</td>
</tr>
<tr>
<td>commodities</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup>Lowest price since peak, as of January 29, 2009. Kansas City for wheat; Central Illinois for corn and soybeans.
Nominal Crop Price Index

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

Index: January 2002 = 100

Source of data for nominal prices and weights: International Monetary Fund

ERS - ECONOMIC RESEARCH SERVICE
Conditions in the summer of 2007:

- Dollar was weak
- Oil price was record high
- Production costs were high
- Biofuels production had been expanding rapidly
- World consumption growing faster than production
- Low stock/use ratio

Also

- Foreign exchange reserves were large and growing
- Involvement of funds were increasing
Factors contributing to higher food commodity prices

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strong growth in demand, based on:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Increasing population + Strong economic growth + Rising per capita meat consumption</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slowing growth in agricultural production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Declining demand for stocks of food commodities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Escalating crude oil price</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapid expansion of biofuels production</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dollar devaluation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rising farm production costs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adverse weather</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Large foreign exchange reserves</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aggressive purchases by importers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exporter policies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importer policies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Demand factors in yellow
Supply factors in green