Agricultural Commodity Markets and Trade: Price Spikes or Trends?

Alexander Sarris
Director, Trade and Markets Division
Food and Agriculture Organization of the United Nations

Presentation at the Conference on “The Food Crisis” of 2008: Lessons for the Future”
held at Imperial College, Wye Campus, London,
October 28, 2008
Plan of Presentation

• Recent agricultural price developments in perspective and volatility trends
• Overview of factors underlying recent commodity price hikes
• Factors affecting price volatility
• The global financial crisis and food commodity prices
• Medium term projections and outlook for basic foods
Almost all basic food commodities have seen their international prices rise significantly over the past two years
(Commodity price indices: 1998-2000=100)
But prices for tropical export crops have lagged behind
Recently basic food prices have declined but still remain much above their 2005-6 levels.
The recent food price declines have been largest in cereals, oils and fats and dairy but not so for sugar and meat
Rice export prices have declined dramatically after their peaks in early 2008.
Real prices of bulk food commodities have tended to decrease but since mid 1980s tendency seems to have stopped.
Real prices of vegetable oils have tended to decrease but since mid 1980s tendency seems to have stopped.
Real prices of livestock commodities have tended to decrease albeit at slowing pace since mid 1980s
Real prices of sugar and beverages have tended to decrease but since mid 1980s tendency seems to have stopped.
Causes of recent high commodity prices

• Strong growth in demand
  – sustained historically high economic growth world wide
  – bio-fuel feedstock demand,
    • particularly for maize and vegetable oils
  – stronger currencies/ weak USD
• Constrained supply
  – high energy related input costs... crude oil up since 2000
  – repeated yield shortfalls in key areas – climate change?
• Low commodity stocks
  – increased speculation/ demand to rebuild
• Increased activity on commodity exchange
  – higher volatility
• Policies and policy changes
  – tariff liberalization by importers
  – decoupling of subsidies, reduction in export subsidies, lower public stocks
  – increased use of export taxes/ bans
  – biofuel subsidies/tariffs/tax credits etc, changing mandates etc
Historic volatilities of international prices seem to increase with price spikes for grains.

**Wheat**

**Maize**
Historic volatilities of international prices seem to increase with price spikes for rice and soybeans.

**Rice**

- Volatility
- Nominal prices

**Soybeans**

- Volatility
- Nominal prices
Historic volatilities of international prices seem not to follow price trends for meats.

**Pig Meat**

**Poultry**

**Beef**
Historic volatilities of international prices seem to increase with price spikes for tropical beverages and sugar.
Historic volatilities of spot prices in organized markets (CBOT) seem to be increasing over time.
Similarly implied volatilities estimated from options in organized markets (CBOT) seem to be growing.
Factors affecting current and future price volatility

– Production variability and trends
– Stocks
– Financial speculation
– Exchange rates
– Oil prices and biofuel production
– Trade policies and price transmission
– Other factors
Production does not seem to have become more variable for wheat and maize.
Production does not seem to have become more variable for rice and soybeans.
Food cereals stock levels seem to be very low by historical standards

Correlation coefficients:
Price with global stock-to-use ratio : $r = -0.65$
Price with global stock-to-use ratio exc China : $r = -0.49$
Price with exporters’ stock-to-disappearance ratio: $r = -0.47$

Index 1989/90=100

Legend:
- Red: Global stocks-to-use ratio
- Yellow: Global stocks-to-use ratio exc China
- Green: Stocks-to-disappearance ratio for major exporters
- Blue: FAO Cereals Price Index (July/June)
Maize Ending Stocks and Stocks-to-Use Ratio 1979/80-2007/08

[Graph showing Ending Stocks and Stocks-to-Use Ratio for Maize from 1979/80 to 2007/08 with data points for each year represented by bars and a line indicating stocks as a percentage of utilization.]
Rice Ending Stocks and Stocks-to-Use Ratio 1999/00-2008/09
Financial speculation seems to have increased in organized exchanges. Share of commercial and non-commercial traders in total open interests in selected futures markets - February 2005 vs. February 2008

- **Corn**: 2005 - Commercial 62, Non-commercial 17; 2008 - Commercial 46, Non-commercial 43
- **Wheat**: 2005 - Commercial 55, Non-commercial 28; 2008 - Commercial 49, Non-commercial 42
- **Soybean**: 2005 - Commercial 60, Non-commercial 20; 2008 - Commercial 43, Non-commercial 46
- **Sugar**: 2005 - Commercial 44, Non-commercial 35; 2008 - Commercial 56, Non-commercial 34
Recent USD exchange rates have been quite variable
Impact on commodity prices of a 1 % USD depreciation against all currencies

Cheese SMP  WMP  Butter  Beef  Poultry  Pork  Veg. oil  Oilmeal  Oilseeds  Wheat  Rice  Maize
Price effects of biofuel demand for feedstocks

<table>
<thead>
<tr>
<th>Corresponding energy [biofuels]</th>
<th>Sugar</th>
<th>Maize</th>
<th>Sugar and Maize</th>
<th>Soybeans and Maize</th>
<th>Sugar, Maize and Soybeans</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.195 EJ</td>
<td>0.087 EJ</td>
<td>0.282 EJ</td>
<td>0.167 EJ</td>
<td>0.349 EJ</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Sugar</th>
<th>Maize</th>
<th>Sugar and Maize</th>
<th>Soybeans and Maize</th>
<th>Sugar, Maize and Soybeans</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sugar</td>
<td>+9.8</td>
<td>+1.1</td>
<td>+11.3</td>
<td>+2.3</td>
<td>+13.8</td>
</tr>
<tr>
<td>Maize</td>
<td>+0.4</td>
<td>+2.8</td>
<td>+3.4</td>
<td>+4.0</td>
<td>+4.2</td>
</tr>
<tr>
<td>Vegetable oils</td>
<td>+0.3</td>
<td>+0.2</td>
<td>+0.2</td>
<td>+7.6</td>
<td>+7.8</td>
</tr>
<tr>
<td>Protein</td>
<td>+0.4</td>
<td>-1.2</td>
<td>-1.2</td>
<td>-8.1</td>
<td>-7.6</td>
</tr>
<tr>
<td>Wheat</td>
<td>+0.4</td>
<td>+0.6</td>
<td>+0.9</td>
<td>+1.8</td>
<td>+2.0</td>
</tr>
<tr>
<td>Rice</td>
<td>+0.5</td>
<td>+1.0</td>
<td>+1.2</td>
<td>+1.1</td>
<td>+1.4</td>
</tr>
<tr>
<td>Beef</td>
<td>+0.0</td>
<td>+0.2</td>
<td>+0.2</td>
<td>+0.4</td>
<td>+0.4</td>
</tr>
<tr>
<td>Poultry</td>
<td>+0.0</td>
<td>-0.4</td>
<td>-0.4</td>
<td>-2.1</td>
<td>-2.0</td>
</tr>
</tbody>
</table>

Source: FAO AT2030 simulation results (2005)
<table>
<thead>
<tr>
<th>Country</th>
<th>Avg. 2005/07</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>0.2%</td>
<td>2.5%</td>
</tr>
<tr>
<td>Canada</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>EU (27)</td>
<td>3.3%</td>
<td>56.6%</td>
</tr>
<tr>
<td>Australia</td>
<td>1.7%</td>
<td>1.7%</td>
</tr>
<tr>
<td>South Africa</td>
<td>32.3%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Tanzania</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.0%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Columbia</td>
<td>0.3%</td>
<td>4.9%</td>
</tr>
<tr>
<td>China</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>India</td>
<td>1.7%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Thailand</td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

Share of ethanol in gasoline (energy basis)
Short term policy reactions have contributed to market instability

Policy actions to address high food prices
(by region, in sample of 77 countries)

<table>
<thead>
<tr>
<th>Geographical region</th>
<th>Reduce taxes on foodgrains</th>
<th>Increase supply using foodgrain stocks</th>
<th>Export restrictions</th>
<th>Price controls / consumer subsidies</th>
<th>None</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>44%</td>
<td>22%</td>
<td>19%</td>
<td>33%</td>
<td>22%</td>
</tr>
<tr>
<td>East Asia</td>
<td>80%</td>
<td>80%</td>
<td>40%</td>
<td>80%</td>
<td>0%</td>
</tr>
<tr>
<td>Europe and Central Asia</td>
<td>33%</td>
<td>0%</td>
<td>33%</td>
<td>67%</td>
<td>0%</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>44%</td>
<td>0%</td>
<td>19%</td>
<td>50%</td>
<td>31%</td>
</tr>
<tr>
<td>Middle East and North Africa</td>
<td>60%</td>
<td>60%</td>
<td>20%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>South Asia</td>
<td>78%</td>
<td>56%</td>
<td>44%</td>
<td>67%</td>
<td>11%</td>
</tr>
</tbody>
</table>

Geographical region
Limited price transmission has also contributed to world price instability. Percentage change in real rice prices in Asia, Q4 2003 to Q4 2007

<table>
<thead>
<tr>
<th>RICE</th>
<th>PW (US$)</th>
<th>PW (LC)</th>
<th>PD (LC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bangladesh</td>
<td>56</td>
<td>55</td>
<td>25</td>
</tr>
<tr>
<td>India</td>
<td>56</td>
<td>25</td>
<td>5</td>
</tr>
<tr>
<td>Indonesia</td>
<td>56</td>
<td>36</td>
<td></td>
</tr>
<tr>
<td>Philippines</td>
<td>56</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Thailand</td>
<td>56</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>China</td>
<td>48</td>
<td>34</td>
<td>30</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>39</td>
<td>25</td>
<td>3</td>
</tr>
</tbody>
</table>

Prices US yellow maize in USA and white maize in the Republic of South Africa (real Republic of South Africa rand)
Chile domestic wholesale and world wheat prices, inflation adjusted, 2003 to 2007
What next?

Given the depth of the shortages:

it will take some time for food stocks to be replenished,
especially if unusual weather events continue to occur
over the next few seasons

biofuel demand is likely to be important for some time, if

petroleum prices continue increase and policies supporting
biofuels sector are maintained

more energy efficient new generation biofuels that do not
compete with land resources for food production do not
become widely available commercially for many more years
The impact of future crude oil prices is critical to commodity prices...

...impact of 10% increase in crude oil prices
Nominal commodity prices have risen to record highs and will likely stay high.
Global stock to use ratios have fallen to historic lows and may stay low.
Conclusions: Main factors that will affect future agricultural commodity price volatility

- Stock replenishment rates
- Petroleum prices
- Biofuel policies and technology prospects
- Developments in USD exchange rates
- Developments in financial markets and speculative fund positions
- New investments in agricultural production
- Overall: considerable uncertainty and likely volatility
The global financial crisis and commodity markets: Demand factors

i) Slower rates of GDP growth in OECD economies, but sustained rates of growth in East Asia economies. Likely downward pressure on prices

ii) Reduced oil prices will lower agricultural production costs and may dampen demands for biofuel feedstocks

iii) Portfolio reallocations of international commodity funds and other financial funds, away from commodities, may put downward pressure on prices in the short run

iv) Exchange rate volatility

v) Return to market fundamentals?
The global financial crisis and commodity markets: Supply factors

• With commodity prices declining production incentives will be dampened and supply response will be smaller
• Freight rates have declined and this may lower import costs
• Falling prices may present an opportunity to replenish stocks, but since stockholding is (among others) a function of future price anticipations will this happen?
Impact of high prices and global volatility on developing countries

• Increase in world agricultural commodity prices may “double squeeze” low-income importers of food and oil, but may benefit agricultural exporters

• How do recent price developments affect poor agriculture based economies in the aggregate and at the household levels?

• Developing countries have structural features quite different from those of developed economies. How do these affect the impact of world price developments?

• What is the role of trade and other structural policies in adjusting to global price developments?

• Is domestic risk likely to increase in developing countries?
Medium term outlook. Population growth rates are decreasing.
GDP Growth expected to be high in Asia
World demand growth for food commodities slows: income sensitive products grow most.
Growth in food demand in 2008-17 much higher in developing countries
Supply: Moderate rate of growth

- Real prices firmness continue over medium term
  - Moderate level of technical progress (crop yield growth continues, livestock revolution)
  - Further trade liberalization unlikely to reverse the price trend

- Competition in export-supply is increasing
  - Low cost, low policy support countries increase supply most
  - South America, especially Brazil has great potential

- Uncertain: energy prices, demand for biofuel
Real international prices: expected to decline (2005-07 average=1)
Global food trade: growing faster than production

• Growing interdependence in food supplies

• Greater concentration of exporters by product.
  – Newly emerging exporters

• Developing countries, and LDCs in particular, are increasingly dependent on basic food imports

• OECD policies are changing, affecting their supplies on world markets
In the next ten years trade will continue to grow faster than production...
Protection in agricultural products is high in both developed and developing countries (ad valorem tariff equivalent of country in column for agricultural products imported from country in row in 2001)

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>BRAZIL</th>
<th>EU25</th>
<th>CHI-IND</th>
<th>ROECD</th>
<th>LDCs</th>
<th>ODCs</th>
<th>ROW</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>0.0</td>
<td>5.9</td>
<td>5.1</td>
<td>62.2</td>
<td>36.3</td>
<td>7.3</td>
<td>8.9</td>
<td>11.1</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>5.6</td>
<td>0.0</td>
<td>3.5</td>
<td>95.8</td>
<td>99.3</td>
<td>8.5</td>
<td>9.8</td>
<td>29.7</td>
</tr>
<tr>
<td>EU25</td>
<td>1.8</td>
<td>7.3</td>
<td>0.9</td>
<td>22.1</td>
<td>16.3</td>
<td>9.5</td>
<td>12.8</td>
<td>16.3</td>
</tr>
<tr>
<td>CHI-IND</td>
<td>1.1</td>
<td>8.7</td>
<td>12.7</td>
<td>20.0</td>
<td>86.8</td>
<td>11.8</td>
<td>6.8</td>
<td>7.9</td>
</tr>
<tr>
<td>ROECD</td>
<td>0.2</td>
<td>5.5</td>
<td>3.2</td>
<td>20.3</td>
<td>32.1</td>
<td>8.2</td>
<td>5.5</td>
<td>11.2</td>
</tr>
<tr>
<td>LDCs</td>
<td>2.5</td>
<td>10.1</td>
<td>3.0</td>
<td>26.7</td>
<td>32.3</td>
<td>8.7</td>
<td>6.3</td>
<td>5.9</td>
</tr>
<tr>
<td>ODCs</td>
<td>1.4</td>
<td>1.5</td>
<td>12.3</td>
<td>53.4</td>
<td>20.1</td>
<td>10.3</td>
<td>9.1</td>
<td>16.7</td>
</tr>
<tr>
<td>ROW</td>
<td>6.3</td>
<td>10.3</td>
<td>2.9</td>
<td>14.6</td>
<td>10.0</td>
<td>3.0</td>
<td>16.3</td>
<td>4.5</td>
</tr>
</tbody>
</table>
Protection in processed food products is high in both developed and developing countries (ad-valorem tariff equivalent of country in column for processed food products imported from country in row in 2001)

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>BRAZIL</th>
<th>EU25</th>
<th>CHI-IND</th>
<th>ROECD</th>
<th>LDCs</th>
<th>ODCs</th>
<th>ROW</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>0.0</td>
<td>14.7</td>
<td>16.4</td>
<td>22.2</td>
<td>23.7</td>
<td>19.6</td>
<td>20.4</td>
<td>21.8</td>
</tr>
<tr>
<td>BRAZIL</td>
<td>8.9</td>
<td>0.0</td>
<td>34.4</td>
<td>37.2</td>
<td>21.3</td>
<td>19.1</td>
<td>9.1</td>
<td>25.5</td>
</tr>
<tr>
<td>EU25</td>
<td>3.8</td>
<td>16.4</td>
<td>1.3</td>
<td>30.7</td>
<td>27.6</td>
<td>25.6</td>
<td>16.5</td>
<td>19.7</td>
</tr>
<tr>
<td>CHI-IND</td>
<td>2.6</td>
<td>12.2</td>
<td>19.9</td>
<td>18.3</td>
<td>23.7</td>
<td>23.3</td>
<td>10.3</td>
<td>19.1</td>
</tr>
<tr>
<td>ROECD</td>
<td>2.3</td>
<td>16.5</td>
<td>14.2</td>
<td>20.4</td>
<td>35.2</td>
<td>20.3</td>
<td>14.0</td>
<td>21.9</td>
</tr>
<tr>
<td>LDCs</td>
<td>2.4</td>
<td>9.5</td>
<td>13.4</td>
<td>20.8</td>
<td>5.2</td>
<td>13.6</td>
<td>12.7</td>
<td>7.8</td>
</tr>
<tr>
<td>ODCs</td>
<td>3.9</td>
<td>3.1</td>
<td>18.6</td>
<td>44.8</td>
<td>18.7</td>
<td>26.6</td>
<td>12.8</td>
<td>26.2</td>
</tr>
<tr>
<td>ROW</td>
<td>2.5</td>
<td>5.8</td>
<td>9.8</td>
<td>17.0</td>
<td>9.0</td>
<td>15.2</td>
<td>21.6</td>
<td>6.3</td>
</tr>
</tbody>
</table>
Conclusions. Recent agricultural commodity high prices: Price spikes or trends?

Trend factors.
- Strong growth in demand (economic growth and biofuel induced). Slowing down due to financial crisis
- Constrained supply (high energy related input costs to continue)
- Low commodity stocks (will rebuild slowly)
- Trade policies (decoupling of subsidies, biofuel subsidies, lower public stocks, WTO Doha Round liberalization?)

Spike factors
- Activity on commodity exchanges (likely to diminish with financial crisis)
- Repeated yield shortfalls in key areas – climate change? (likely to continue)
- Variable trade measures (export taxes and bans, import tariff changes, efforts to build up stocks)

Overall Assessment
- Much uncertainty and volatility in near and medium term
THANK YOU