Food and Agricultural Trade: Implications for Food Security

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WBI Course on Agricultural Trade and Export
Vienna, April 2010
Overview

• Definitions
• Stylized facts
  • Protection
  • Hunger
• Trade and Trade liberalization: Which implications for the food security objective?
  • Theories
  • Illustrations
• The role of regional integration
  • The EU experience
  • Challenges in MENA
Definitions

• Differences between Agricultural and Food Trade
  • Using a HS6 nomenclature;
  • **WTO**: about 700 products over 5200. Does not include Fisheries but includes all raw agricultural commodities (wheat, cotton, hides…) but also processed foods. Ethanol but not biodiesel.
  • **FAO**: covers agriculture and fisheries, but some processed food are not covered by FAO statistics;
  • In EU trade agreements: own definition of agricultural products based on the coverage of the Common Agricultural Policies
  • **Not official definition of Food.** Should it be Agriculture minus non edible agricultural products.
    • What about tobacco and alcohol products?
Definitions (2)

- Food security:
  - Millennium development goals
  - Reduce Hunger
  - Implies *Food Safety*, too.
- Does not imply *self sufficiency*
- Can be achieved through increased imports and/or domestic production
- Understanding two different contexts:
  - The *business as usual* case. Targets: increased quantity available at a low price with good quality
  - The *Crisis* situation. Domestic and/or International. Protecting domestic consumers against these extreme risks.
## Applied protection 2004

<table>
<thead>
<tr>
<th>Goods</th>
<th>World</th>
<th>HIC</th>
<th>MIC</th>
<th>LDC</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agricultural goods</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>primary and semi-processed</td>
<td>18.9</td>
<td>18.0</td>
<td>20.8</td>
<td>14.1</td>
</tr>
<tr>
<td>final</td>
<td>22.8</td>
<td>21.7</td>
<td>25.4</td>
<td>16.8</td>
</tr>
<tr>
<td><strong>Industrial goods</strong></td>
<td>4.4</td>
<td>2.7</td>
<td>8.9</td>
<td>11.7</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>primary and semi-processed</td>
<td>2.8</td>
<td>1.2</td>
<td>6.2</td>
<td>10.9</td>
</tr>
<tr>
<td>final</td>
<td>5.0</td>
<td>2.9</td>
<td>9.9</td>
<td>11.9</td>
</tr>
<tr>
<td><strong>Extraction and Energy</strong></td>
<td>1.9</td>
<td>0.6</td>
<td>5.6</td>
<td>12.7</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>primary and semi-processed</td>
<td>1.4</td>
<td>0.3</td>
<td>4.6</td>
<td>14.4</td>
</tr>
<tr>
<td>final</td>
<td>3.3</td>
<td>1.4</td>
<td>7.6</td>
<td>11.2</td>
</tr>
<tr>
<td><strong>All products</strong></td>
<td>5.1</td>
<td>3.3</td>
<td>9.6</td>
<td>12.2</td>
</tr>
<tr>
<td>of which:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>primary and semi-processed</td>
<td>3.3</td>
<td>1.8</td>
<td>6.8</td>
<td>11.4</td>
</tr>
<tr>
<td>final</td>
<td>6.0</td>
<td>3.9</td>
<td>11.0</td>
<td>12.4</td>
</tr>
</tbody>
</table>

Source: Laborde, 2008
Average protection faced and applied by developing countries on agricultural products.

<table>
<thead>
<tr>
<th>Partner</th>
<th>Protection faced by developing countries’ exports</th>
<th>Protection applied on developing countries’ imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>TRQ_MARG</td>
<td>PREF_MARG</td>
</tr>
<tr>
<td>World</td>
<td>19.84%</td>
<td>2.54%</td>
</tr>
<tr>
<td>HICs</td>
<td>17.98%</td>
<td>2.42%</td>
</tr>
<tr>
<td>MICs</td>
<td>23.02%</td>
<td>2.91%</td>
</tr>
<tr>
<td>LDCs</td>
<td>13.89%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Source: Bouet & Laborde, 2009a
Protection applied on agricultural imports

Source: Bouet & Laborde, 2009a
Protection faced on agricultural exports

Protection faced by agricultural exports - 2004 - MAcMap-HS6

Legend
(%)<br>&lt;4<br>4-8<br>8-12<br>12-16<br>16-20<br>20-30<br>30-40<br>&gt;40<br>no data

Source: Bouet & Laborde, 2009a
## Agricultural vs Food protection

- **World protection:** agriculture = 18.85%, non-Food = 13.21%, Food = 21.12%

<table>
<thead>
<tr>
<th>HS2 chapter</th>
<th>Sector description</th>
<th>World average¹</th>
<th>Simple Average²</th>
<th>&gt;20 percent (in percent)</th>
<th>&gt;40 percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Live animals</td>
<td>12.6</td>
<td>12.9</td>
<td>12.3</td>
<td>4.1</td>
</tr>
<tr>
<td>2</td>
<td>Meat and edible meat offal</td>
<td>38.5</td>
<td>27.7</td>
<td>41.8</td>
<td>13.7</td>
</tr>
<tr>
<td>3</td>
<td>Fish and crustaceans</td>
<td>6.7</td>
<td>15.8</td>
<td>30.8</td>
<td>4.8</td>
</tr>
<tr>
<td>4</td>
<td>Dairy, eggs, honey, &amp; ed. products</td>
<td>37.4</td>
<td>23.2</td>
<td>30.1</td>
<td>15.1</td>
</tr>
<tr>
<td>5</td>
<td>Products of animal origin nsp.</td>
<td>4.6</td>
<td>10.2</td>
<td>17.8</td>
<td>2.1</td>
</tr>
<tr>
<td>6</td>
<td>Live trees and other plants</td>
<td>7.7</td>
<td>20</td>
<td>16.4</td>
<td>6.2</td>
</tr>
<tr>
<td>7</td>
<td>Edible vegetables and certain roots and tubers</td>
<td>13.6</td>
<td>20.2</td>
<td>28.8</td>
<td>7.5</td>
</tr>
<tr>
<td>8</td>
<td>Edible fruits &amp; nuts, peel of citrus/melons</td>
<td>14.7</td>
<td>21</td>
<td>40.4</td>
<td>8.9</td>
</tr>
<tr>
<td>9</td>
<td>Coffee, tea, maté and spices</td>
<td>6.4</td>
<td>15.4</td>
<td>23.3</td>
<td>4.1</td>
</tr>
<tr>
<td>10</td>
<td>Cereals</td>
<td>25.4</td>
<td>13.9</td>
<td>15.1</td>
<td>6.8</td>
</tr>
<tr>
<td>11</td>
<td>Milling industry products</td>
<td>27.4</td>
<td>16.4</td>
<td>21.2</td>
<td>6.2</td>
</tr>
<tr>
<td>12</td>
<td>Oil seeds/misc. grains/med. plants/straw</td>
<td>5.6</td>
<td>7.5</td>
<td>8.2</td>
<td>1.4</td>
</tr>
</tbody>
</table>

Source: Bouet & Laborde, 2009a
## HS2 protection (2)

<table>
<thead>
<tr>
<th>HS2 chapter #</th>
<th>Sector description</th>
<th>World average¹</th>
<th>Simple Average²</th>
<th>&gt;20 percent</th>
<th>&gt;40 percent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(in percent)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Lac., gums, resins and other veg. saps and extracts</td>
<td>4.5</td>
<td>7.3</td>
<td>7.5</td>
<td>0.7</td>
</tr>
<tr>
<td>14</td>
<td>Vegetable plaiting materials</td>
<td>5.9</td>
<td>8.1</td>
<td>6.8</td>
<td>1.4</td>
</tr>
<tr>
<td>15</td>
<td>Animal or vegetable fats, oils &amp; waxes</td>
<td>19.3</td>
<td>16</td>
<td>25.3</td>
<td>6.2</td>
</tr>
<tr>
<td></td>
<td>Edible preparation of meat, fish, crustaceans, etc.</td>
<td>14.4</td>
<td>22.9</td>
<td>39.7</td>
<td>8.9</td>
</tr>
<tr>
<td>16</td>
<td>Sugars and sugar confectionery</td>
<td>47.8</td>
<td>22.9</td>
<td>43.8</td>
<td>10.3</td>
</tr>
<tr>
<td>17</td>
<td>Cocoa and cocoa preparations</td>
<td>6.4</td>
<td>17.1</td>
<td>29.5</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Preparations of cereals, flour, starch or milk</td>
<td>15.7</td>
<td>17.2</td>
<td>28.8</td>
<td>2.1</td>
</tr>
<tr>
<td>19</td>
<td>Preparations of vegetables, fruit, nuts etc.</td>
<td>16.5</td>
<td>22.9</td>
<td>41.8</td>
<td>8.9</td>
</tr>
<tr>
<td>20</td>
<td>Miscellaneous edible preparations</td>
<td>15</td>
<td>18.3</td>
<td>28.8</td>
<td>4.8</td>
</tr>
<tr>
<td>21</td>
<td>Beverages, spirits and vinegar</td>
<td>23.6</td>
<td>55.7</td>
<td>65.1</td>
<td>33.6</td>
</tr>
<tr>
<td></td>
<td>Residues from food industries, animal feed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Tobacco and manufactured tobacco substitutes</td>
<td>10.4</td>
<td>8.7</td>
<td>8.2</td>
<td>0.7</td>
</tr>
<tr>
<td>23</td>
<td></td>
<td>30.1</td>
<td>54.1</td>
<td>52.1</td>
<td>21.2</td>
</tr>
</tbody>
</table>

Source: Bouet & Laborde, 2009a
Net Trade Balance as a % of GDP

Source: Bouet & Laborde, 2009a
Protection and Trade Position

Average protection on food products vs. Net Trade Balance for food products as % of GDP for Middle Income Countries and Least Developed Countries.
Food Security Indicator

• The Global Hunger Indicator
• IFPRI
• Composite Index

**THE GLOBAL HUNGER INDEX IS CALCULATED AS FOLLOWS:**

\[
GHI = \frac{(PUN + CUW + CM)}{3}
\]

with
- **GHI**: Global Hunger Index
- **PUN**: proportion of the population that is undernourished (in %)
- **CUW**: prevalence of underweight in children under five (in %)
- **CM**: proportion of children dying before the age of five (in %)
Global Hunger Index (2009)
Global Hunger Index (changes 90’s → 00’s)

Source: GHI 2009, IFPRI
Changes in protection and hunger

![Graph showing the relationship between change in agriculture protection and change in Hunger Index. The graph displays a positive correlation, indicated by a trend line, with data points scattered across the chart.](image-url)
LINKS BETWEEN TRADE AND FOOD SECURITY
Achieving food security

- Domestic production
- Trade policies
- Imports

Domestic demand for food products
How to achieve food security through trade

• **Trade:**
  → Increased specialization
  → Increased production in some countries, decreased production in others
  → More interdependency

• **Agricultural trade liberalization:**
  → Tariff elimination = Boost Demand
  → Elimination of subsidies = Limit Supply
  → Increase world prices
  → Higher prices for producers in exporting countries
  → Stimulate supply and investments, Higher incomes for poor producers
  → Reduction of tariffs allows price reduction for consumers in importing countries (but reduced production in these countries)
Objectives for a food importing country:

• Availability of food products (quantity)
  • Trade allows to rely on world supply (large and stable)

• At a low price
  • By definition, for importing countries: world price $<$ domestic price
  • In “real” terms: increasing income of households $\rightarrow$ trade liberalization

• Of good quality
  • More or less constraints/technology on foreign producers?
  • Role of SPS, can boost or reduce trade.

• Constraints, in particular in terms of crisis (domestic or international)
  • Balance of payments for importing countries
  • Income constraints for household
Objectives for a food/agricultural exporting country:

- Trade increases income for domestic producers but will raise price for domestic consumers since domestic production is exported;
- If non food products are exported, the Food balance is not affected and can become positive;
- But due to supply constraint, careful analysis is needed:
  - Substitution for the producer between cash crops and food products: e.g. more tobacco $\rightarrow$ less corn.
  - Complementarity between agricultural production: e.g. more cotton $\rightarrow$ more maize.
    - Positive externalities: investment, fertilizers
Public intervention (small country)

<table>
<thead>
<tr>
<th>Policy Instrument</th>
<th>Domestic production</th>
<th>Domestic consumption (→ Hunger?)</th>
<th>Trade</th>
<th>Self Sufficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Import duties</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Import subsidy</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Production subsidy</td>
<td>+</td>
<td>0</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Consumption subsidy</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Export Tax</td>
<td>-</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Export Subsidy</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

- But… Global externalities. E.g. Export taxes by main exporters → Higher costs for importing countries
  → Role of global discipline
Trade and Volatility

• When do we need protection?
  • Role of Tariff rate quotas
  • Role of contingent protection: Safeguards mechanisms

• Supporting domestic production:
  • Gains in productivity → Private Investment in agriculture → Requires Price stability?
    • Achieved through public policy or without public policy

• Food security during crisis
  • World market less reliable than domestic producers?
    • Depends on the source of volatility:
      • Endogenous (behaviour), Can the government limit it?
      • Exogenous (rainfall), Risk analysis (as in finance theory)
  • Fixed cost to trade and trust relations

• As before, non cooperative trade policies → Increase in global instability
• The role of safety net
Input-Output relations in Agriculture

• Complex IO relations: few countries can be “self-sufficient” in everything:
  • Cereals and Cattle
  • Fertilizers and Crops

• What does it mean to be food secure in this situation?

• Role of regional integration
ILLUSTRATION: THE EFFECTS OF FULL TRADE LIBERALIZATION
A CGE assessment

Export volume – Changes %

Study design

- Bouet & Laborde, 2009a
- MIRAGE CGE model: multi sector, multi country, dynamic
- Full trade liberalization: all sectors

**Source:** Bouet & Laborde, 2009a
Agricultural and Agro food production by region

Source: Bouet & Laborde, 2009a
Real Income by region

Source: Bouet & Laborde, 2009a
Food consumption evolution
THE EFFECTS OF EXPORT TAXES
Experiment design

- Bouet & Laborde, 2009b
- Demand shock on the world market for one commodity. E.g. wheat
- How different countries can react?
  - Exporters $\rightarrow$ Export tax to neutralize effects on domestic prices
  - Importers $\rightarrow$ Reduction in tariffs and, import subsidies?
  - Interaction between exporters and importers policies
Results on average prices

<table>
<thead>
<tr>
<th>Wheat</th>
<th>Average production price</th>
<th>Average trade price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Exogenous demand increase</td>
<td>9.10%</td>
<td>10.8%</td>
</tr>
<tr>
<td>2 – 1 + Implementation/increase of export taxes to mitigate the shock on domestic prices</td>
<td>1.52%</td>
<td>16.76%</td>
</tr>
<tr>
<td>3 – 1+ Elimination/reduction of import duties to mitigate the shock on domestic prices</td>
<td>9.05%</td>
<td>12.62%</td>
</tr>
<tr>
<td>4 – 1+ Elimination/reduction of import duties and import subsidies to mitigate the shock on domestic prices</td>
<td>20.12%</td>
<td>27.31%</td>
</tr>
<tr>
<td>5 – 2 &amp; 4: Combined non cooperative policies allowing import subsidies</td>
<td>16.00%</td>
<td>41.10%</td>
</tr>
<tr>
<td>6 – 2 &amp; 3: Combined non cooperative policies without import subsidies</td>
<td>7.05%</td>
<td>20.58%</td>
</tr>
</tbody>
</table>
Results on real income (welfare, %)

1 – Exogenous demand increase

2 – 1 + Implementation/increase of export taxes to mitigate the shock on domestic prices

3 – 1+ Elimination/reduction of import duties to mitigate the shock on domestic prices

4 – 1+ Elimination/reduction of import duties and import subsidies to mitigate the shock on domestic prices

5 – 2 & 4: Combined non cooperative policies allowing import subsidies
THE EC EXAMPLE
The Common Agricultural Policy

• Treaty of Rome, 1957. The CAP (article 39):
  • to increase productivity, by promoting technical progress and ensuring the optimal use of factors of production, in particular labour;
  • to ensure a fair standard of living for the agricultural Community;
  • to stabilise markets;
  • to secure availability of supplies;
  • to provide consumers with food at reasonable prices.

• CAP and Agricultural Trade policies:
  • Subsidies, tariffs, tariff rate quotas and public intervention (target price)
  • Developing a regional market: “Fortress Europe”
  • The role of monetary integration
A clear success

Source: European Commission, 2009
But too successful and too costly → Reforms

- Cost for EU Tax payers
  - Subsidies
  - Storage
  - Half of the EU budget. EUR46 billions + envrnt (11 bios x 2/3).

- Cost for EU consumers
  - Final consumers
  - Intermediate consumers

- Cost for Trade partners
  - WTO led reform. Uruguay Round and the Blairhouse agreements

Source: European Commission, 2009
Evolution of CAP expenditures

Source: European Commission, 2009
INSIGHTS FOR MENA
• Configuration of trade liberalization:
  • Multilateral
  • Regional

• Defining a regional market:
  • Larger as possible to have a stable supply
  • But:
    • Need transportation capacity and effective integration
    • Difficulty to define regional policies with too many countries (transfers problem)

• Trade liberalization and:
  • Agricultural policies
  • Capital market integration and efficiency
  • Safety net