INTERNATIONAL TRADE AND FREIGHT BY 2050

by

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International trade and freight by 2050

Jari Kauppila, Senior Economist
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Intergovernmental Organisation

- 57 member countries (23 non-OECD) focusing on transport
- A strategic think tank for global transport policy issues
- An annual summit of Ministers
Underlying network model

Source: ITF International Freight model, OpenStreetMap, OpenFlights, Sea Project, UCL
What drives future trade?

- **Scale and distance**
  - Size of the economies
  - Distance (restrictions to trade, transportation technology, etc.)

- **Production factors**
  - Physical and human capital (natural resources, arable land, skills)
  - Changes in productivity

- **Transport policies**

- **Changes in global value chains**

- **Geopolitical forces**
Global trade elasticities have changed

Own calculations based on World Bank and OECD
Emerging economies still drive growth

GDP growth

% average annual rate

Emerging economies

World

Advanced economies
A growing share of trade between emerging economies

2012

- Within OECD: 47%
- OECD with non-OECD: 38%
- Within non-OECD: 15%

2050

- Within OECD: 25%
- OECD with non-OECD: 42%
- Within non-OECD: 33%
Emerging economies move to higher value-added activities – changing trade composition

Value-added shares by sector

<table>
<thead>
<tr>
<th>Services</th>
<th>China 2010</th>
<th>China 2060</th>
<th>India 2010</th>
<th>India 2060</th>
<th>Euro Area 2010</th>
<th>Euro Area 2060</th>
<th>Japan 2010</th>
<th>Japan 2060</th>
<th>USA 2010</th>
<th>USA 2060</th>
</tr>
</thead>
<tbody>
<tr>
<td>High-skilled manufacturing</td>
<td>43%</td>
<td>49%</td>
<td>51%</td>
<td>58%</td>
<td>72%</td>
<td>69%</td>
<td>75%</td>
<td>71%</td>
<td>78%</td>
<td>71%</td>
</tr>
<tr>
<td>Other sectors (agriculture, energy and other manufacturing)</td>
<td>16%</td>
<td>21%</td>
<td>7%</td>
<td>7%</td>
<td>8%</td>
<td>9%</td>
<td>10%</td>
<td>12%</td>
<td>6%</td>
<td>8%</td>
</tr>
</tbody>
</table>

| High-skilled manufacturing             | 13%        | 9%         | 20%        | 22%        | 10%            | 12%            | 15%        | 17%        | 16%      | 21%      |
| Other sectors (agriculture, energy and other manufacturing) | 41%        | 31%        | 41%        | 29%        | 8%             | 9%             | 20%        | 22%        | 6%       | 8%       |

1. Value-added shares by sector.

2. The diagram shows the percentage of value-added activities in different sectors for China, India, the Euro Area, Japan, and the USA.

3. The sectors include services, high-skilled manufacturing, and other sectors (agriculture, energy, and other manufacturing).

4. The data is presented for the years 2010 and 2060.
## CO₂ Emissions from Fuel Combustion

Total 31.734 Mt

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>International</td>
<td>23%</td>
</tr>
<tr>
<td>Freight</td>
<td>8%</td>
</tr>
<tr>
<td>International</td>
<td>6%</td>
</tr>
<tr>
<td>Freight</td>
<td>8%</td>
</tr>
<tr>
<td>Total</td>
<td>23%</td>
</tr>
</tbody>
</table>

Source: IEA
Implications for future global freight

Global freight will more than quadruple by 2050
(by a factor of 4.3)
(trade value by a factor of 4.2)

Increasing capacity constraints can hamper economic growth

Strong growth of CO₂ emission (+290%) undermines climate change goals

An unprecedented challenge

Average hauling distance +17%
International trade related CO₂ emissions

2010
- Sea: 37%
- Road: 53%
- Air: 7%
- Rail: 3%

2050
- Sea: 32%
- Road: 56%
- Air: 9%
- Rail: 3%
Global freight volumes and CO₂ emissions by corridor

- Intra-North America route
  - Freight volume: +344% in 2010, +263% in 2050
  - CO₂ Emissions: +270% in 2010, +191% in 2050

- North Atlantic route
  - Freight volume: +280% in 2010, +195% in 2050
  - CO₂ Emissions: +280% in 2010, +195% in 2050

- Mediterranean and Caspian Sea route
  - Freight volume: +715% in 2010, +689% in 2050
  - CO₂ Emissions: +406% in 2010, +315% in 2050

- Intra-Asia route
  - Freight volume: +403% in 2010, +332% in 2050
  - CO₂ Emissions: +374% in 2010, +273% in 2050

- South Atlantic route
  - Freight volume: +344% in 2010, +263% in 2050
  - CO₂ Emissions: +270% in 2010, +191% in 2050

- Intra-South America route
  - Freight volume: +280% in 2010, +195% in 2050
  - CO₂ Emissions: +280% in 2010, +195% in 2050

- Intra-Africa route
  - Freight volume: +715% in 2010, +689% in 2050
  - CO₂ Emissions: +406% in 2010, +315% in 2050

- Indian Ocean route
  - Freight volume: +403% in 2010, +332% in 2050
  - CO₂ Emissions: +374% in 2010, +273% in 2050
Domestic share of global freight

10% of international trade takes place within domestic borders
Domestic share of trade-related CO$_2$ emissions

- 10% of international trade takes place within domestic borders
- 30% of total trade-related CO$_2$ is emitted here
Increased trade will put infrastructure under pressure

**Investment**
- Adapt infrastructure to more and bigger vessels
- Also at port-hinterland links
- Alternative and multi-modal connections to increase efficiency

**Management**
- Focus on managing supply chains – not only nodes

**Efficiency**
- Many freight facilities are underutilised or managed at low efficiency level
- Improve load factors and reduce idle times across supply chains
### Aligning policies for sustainable freight

<table>
<thead>
<tr>
<th>International</th>
<th>National</th>
<th>Industry</th>
<th>Non-profit organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multilateral agreements</td>
<td>Economic measures</td>
<td>Vehicle design and utilisation</td>
<td>Global methodologies &amp; tools</td>
</tr>
<tr>
<td>International Maritime Organization (IMO)</td>
<td>Regulation</td>
<td>Alternative fuels</td>
<td>Data reporting platforms</td>
</tr>
<tr>
<td>International Civil Aviation Organization (ICAO)</td>
<td>Infrastructure and land-use planning</td>
<td>Optimising supply chains</td>
<td>Knowledge platforms</td>
</tr>
<tr>
<td>Etc.</td>
<td>Etc.</td>
<td>Shared loading</td>
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