Pharmaceuticals market overview

More insights, better decisions…
Introduction Seabury Group

With over 200 professionals, Seabury is the largest global advisory practice in aviation and aerospace, and a leading advisor in the transport and logistics industry

- Founded in 1995, Seabury provides management consulting, investment banking and corporate reorganization advisory services
- Seabury Cargo Advisory has an unparalleled range of expertise in:
  - Strategy consulting and business planning
  - Operational improvement (e.g. cost reduction, revenue boosting, contract negotiations and outsourcing)
  - Network and alliance optimization; fleet selection, acquisition and financing
  - Business intelligence, market research and forecasting
- The practice is led by a combination of former cargo experts and consultants from leading cargo consulting firms
- Seabury’s proprietary suite of software tools are considered the industry’s best with a depth of analytics necessary to support rapid decision making
Key customers of Seabury Cargo Advisory
Seabury Cargo Advisory team has worked with a vast array of first-class customers across all segments of the cargo industry.
Global Demand & Supply Databases

Seabury provides the industry's most comprehensive set of data with extensive historical time series and forecasts.

**Global Trade**
- Trade by air and surface between 200 countries
- Covers ~99% of worldwide international trade by air
- True origin-destination flows
- Data to/from US and China data per city
- Breakdown into 2000 commodities per trade lane
- Data per month from 1994 onwards, with monthly updates

**Ocean**
- Extensive and historical yearly data available from 2000
- Global trade by ocean split in dry bulk, liquid and containerized
- Number of TEUs transported for containerized goods
- Covers ~95% of worldwide international trade by ocean
- Data per month from 2000 onwards, with monthly updates

**Air Express**
- Global trade by air split in express and standard air cargo
- Breakdown into 75 commodities
- Split in large and small shipments
- Additional measures such as density and number of shipments
- Estimates for Low Value Shipments included
- Data from 2000 onwards, with yearly updates

**Capacity**
- Airport-to-airport scheduled air cargo capacity per airline
- Data available in tons, AT ks and number of flights per week per route
- Breakdown into aircraft type, model and configuration (e.g. 747-200F)
- High coverage of belly and freighter aircraft with monthly updates

**Forecast**
- 5-year air and sea trade forecasts per trade lane for 70 major industries
- Updated each 6 months
- 5-year ocean trade forecasts per trade lane for 70 major industries
- Updated each 6 months
- 5-year express and standard cargo forecast per trade lane, industry
- Updated each 12 months
Agenda

Pharmaceutical market dynamics

Developments and regional trends
Global trade in pharmaceuticals
Global tonnage has grown steadily since 2009, with the majority of goods travelling by sea.

Tonnage of worldwide pharmaceuticals market
Tons (x million) per year

Source: Seabury Global Trade Database
Global trade in pharmaceuticals

The more valuable goods travel by air, with air freight accounting for the majority of total value shipped.

**Value of worldwide pharmaceuticals market**

Value (USD B) per year

<table>
<thead>
<tr>
<th>Year</th>
<th>Air Value (USD B)</th>
<th>Air %</th>
<th>Ocean Value (USD B)</th>
<th>Ocean %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>146</td>
<td></td>
<td>32</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>171</td>
<td>8%</td>
<td>39</td>
<td>12%</td>
</tr>
<tr>
<td>2009</td>
<td>182</td>
<td></td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>199</td>
<td></td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>211</td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>213</td>
<td>8%</td>
<td>56</td>
<td>12%</td>
</tr>
</tbody>
</table>

Source: Seabury Global Trade Database
Pharmaceuticals within global trade

Pharmaceutical growth in ocean freight moves with the overall market, while pharmaceutical tonnage by air has seen more stable growth than the overall air cargo market.

Ocean trade growth rate
% YOY growth - tonnage

Air trade growth rate
% YOY growth - tonnage

Source: Seabury Global Trade Database
Pharmaceutical transport modes
Raw materials and Medicaments are the two largest pharmaceutical commodity types, with raw materials being almost exclusively transported by ocean.

Tonnage of global pharmaceutical trade
Tons (x million) per year

<table>
<thead>
<tr>
<th>Commodity Type</th>
<th>Ocean</th>
<th>Air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raw Materials</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Medicaments</td>
<td>1.3</td>
<td></td>
</tr>
<tr>
<td>Non-Medicament Pharma</td>
<td>0.5</td>
<td></td>
</tr>
<tr>
<td>Laboratory Chemicals</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Medicinal Supplies</td>
<td>0.3</td>
<td></td>
</tr>
</tbody>
</table>

Value density, USD / Kg

The more valuable the commodity, the more likely it is to fly by air

Note: commodity list excludes waste chemicals, which have low volumes and are primarily transported by surface (truck/rail), as well as chemically pure sugars which are also very low in volume.

Source: Seabury Global Trade Database
Pharmaceutical air cargo market key flows

Europe is a major exporter of pharmaceuticals via air freight, while Asia primarily imports

Source: Seabury Global Trade Database
Pharmaceutical ocean cargo market key flows

Ocean transport of pharmaceuticals is focused in Asia, with significant intra-Asia volumes and Asian exports, while Europe is primarily an import market.

Ocean trade 2012
Tonnage

Source: Seabury Global Trade Database
Key flows for temperature sensitive pharmaceuticals
North America is a major exporter of temperature-sensitive pharmaceuticals, while Asia-Pacific and Latin America are major importers.

Top air freight trade lanes for non-medicament pharmaceuticals 2012

Notes: “non-medicament pharmaceuticals” includes blood fractions, hormones, vaccines, cell cultures, etc.
Source: Seabury Global Trade Database
Pharmaceuticals is driven by passive temperature control

While active temperature control solutions demand a yield premium due to complex requirements, passive solutions drive volume and are less costly to implement.

**Temperature control share of pharma**

<table>
<thead>
<tr>
<th>% of total business</th>
</tr>
</thead>
<tbody>
<tr>
<td>General cargo</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
</tr>
<tr>
<td>Temp control</td>
</tr>
</tbody>
</table>

**Insights**

- Most pharmaceuticals shipments are shipped as general cargo, primarily those commodities in the 15-25 degree segment.
- While ~20% of shipments require temperature control, greater than 75% of these require only passive cooling solutions.
- Forwarders estimated that just 5% of all pharmaceutical shipments require active cooling solutions.
  - Several forwarders suggested laws may change to require active cooling for a greater number of pharmaceuticals.
- Forwarders new to the segment are moving towards temperature control, while established players see active cooling share decreasing.

Active cooling solutions are approximated to be just 5% of all pharma shipments.

Source: Seabury interviews with forwarders
Pharmaceutical market dynamics

Developments and regional trends

- Mode shift
- Regional trends
Ocean trade has outpaced air trade growth

Ocean trade growth has been much higher; all commodities experienced higher containerized trade growth compared to air trade growth.

Commodities growth for 2000-2012

Air weight growth (%)

- Higher air growth
- Higher ocean growth
- Weighted Average ocean growth: 7.7%
- Weighted Average air growth: 2.7%

Source: Seabury World Trade Forecast
Impact of mode shift on global pharmaceutical freight flows

Although global mode shift growth has seen only a small decrease over from 2008-2011, fluctuations exist in regional trade flows from air to ocean shift and vice versa.

Pharmaceutical mode shift growth 2008-2011

%¹

¹ CAGR 2008-2011 Mode shift in terms of weight, with around 3% of the volumes estimated;
Note: A negative mode shift number denotes a shift from air to ocean and vice versa
Source: Seabury mode shift database (February 19, 2013)
Pharmaceutical top lane mode shift from air to ocean

From 2008 to 2011, a number of pharmaceutical trade lanes saw a significant mode shift to ocean; India has played a major role in this trend.

Many of the top trade lanes involve the US as both importer and exporter; India and Israel exports to USA have shown significant shift to ocean.

Note: Mode shift data for countries with at least 1,000 tonnes of air trade for a given year
Source: Seabury mode shift database (February 19, 2013)
Pharmaceutical mode shift by value

The majority of value loss to ocean has occurred in 2009 and 2011; medicaments alone lost $1.5B in value

Pharmaceutical value mode shift since 2001

US$ (B)

Source: Seabury mode shift database (February 19, 2013)
Pharmaceutical top lane mode shift from ocean to air

Some pharmaceuticals saw a mode shift from ocean to air between 2008 and 2011; top trade lanes included origins or destinations in Western Europe.

Note: Mode shift data for countries with at least 1,000 tonnes of air trade for 2011
Source: Seabury mode shift database (February 22, 2013)
Pharmaceutical market dynamics

Developments and regional trends

- Mode shift

- Regional trends
Pharmaceutical air trade

Pharmaceutical air trade is dominated by Western Europe and the United States, although emerging economies in Asia have increased market share.

Total pharmaceutical air volumes
Tons (000’s)

[Diagram showing percentage changes and volumes from 2007 to 2012 for various regions, including Western Europe, USA, India, China, Israel, and Other.]
Growth rates within Western Europe

Certain countries, like Belgium and Germany, have experienced particularly fast growth while Italy and the UK have lagged behind.

Indexed growth in pharmaceutical air exports
Growth in air weight indexed to 100

Source: Seabury Global Ocean Database
Europe top export lanes
European pharmaceutical exports have seen a strong shift towards Asia Pacific and away from North America

Europe top 10 pharmaceutical air export trade lanes
Tons (000’s)

Source: Seabury Global Ocean Database
India air trade in pharmaceuticals

India exports significant quantities of low value medicaments, while importing more limited quantities of high value lab chemicals and other pharmaceuticals.

**Total air trade volume**

<table>
<thead>
<tr>
<th>Years</th>
<th>Exports</th>
<th>Imports</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2008</td>
<td>20</td>
<td>25</td>
</tr>
<tr>
<td>2009</td>
<td>30</td>
<td>35</td>
</tr>
<tr>
<td>2010</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>2011</td>
<td>50</td>
<td>55</td>
</tr>
<tr>
<td>2012</td>
<td>60</td>
<td>65</td>
</tr>
</tbody>
</table>

**Pharmaceutical commodity mix**

<table>
<thead>
<tr>
<th>Year</th>
<th>Medicaments</th>
<th>Raw Materials</th>
<th>Laboratory Chemicals</th>
<th>Non-Medicament Pharma</th>
<th>Value density ($ / kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>92</td>
<td>11</td>
<td>10</td>
<td>70</td>
<td>0</td>
</tr>
</tbody>
</table>

Notes: “Other” commodities include medicinal supplies, pure sugars, and waste chemicals.

Source: Seabury trade database
India export regions
North America, Europe and Africa are the primary destinations of Indian pharmaceutical exports, most of which originate in the Mumbai region.

India air freight export partner regions
Tons (000’s) per year

<table>
<thead>
<tr>
<th>Year</th>
<th>North America</th>
<th>Europe</th>
<th>Africa</th>
<th>Asia Pacific</th>
<th>Latin America</th>
<th>Middle East &amp; South Asia</th>
<th>Latin America</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>29%</td>
<td>21%</td>
<td>26%</td>
<td>26%</td>
<td>7%</td>
<td>5%</td>
<td>67.3</td>
</tr>
<tr>
<td>2010</td>
<td>26%</td>
<td>13%</td>
<td>26%</td>
<td>26%</td>
<td>7%</td>
<td>5%</td>
<td>81.7</td>
</tr>
<tr>
<td>2011</td>
<td>27%</td>
<td>19%</td>
<td>30%</td>
<td>30%</td>
<td>6%</td>
<td>6%</td>
<td>85.8</td>
</tr>
<tr>
<td>2012</td>
<td>28%</td>
<td>18%</td>
<td>28%</td>
<td>28%</td>
<td>6%</td>
<td>4%</td>
<td>91.6</td>
</tr>
</tbody>
</table>

Source: Seabury Global Trade Database
China export partners

China primarily exports to Asia Pacific countries, with less focus over time on European exports.

China air freight export partner regions
Tons (000’s) per year

Source: Seabury trade database
Key pharmaceutical export regions

The key pharmaceutical production regions are along the coast, with most air exports being channeled through Beijing or Shanghai.

China top export regions - 2012
Air weight in tons (000's)

Pharmaceuticals destined for export are typically manufactured close to their export gateway

Note: these regions represent the 7 largest pharmaceutical exporters by air freight tonnage, and also represent some of the greatest imbalances between production and gateway volumes.

Source: Seabury trade database
Israeli growth faltering
After ten years of strong growth, pharmaceutical air exports have shrunk dramatically

Israel’s exports are very exposed to the North American and European markets

Source: Seabury Global Trade Database
Competition for European and North American markets

North American and European pharmaceutical imports have seen moderate increases over the past two years, while Israeli imports have lost market share.

**North America pharmaceutical import share**
Air weight, tons (000's)

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>16%</td>
<td>16%</td>
</tr>
<tr>
<td>China</td>
<td>2%</td>
<td>3%</td>
</tr>
<tr>
<td>Israel</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td>India</td>
<td>19%</td>
<td>23%</td>
</tr>
<tr>
<td>Western Europe</td>
<td>52%</td>
<td>52%</td>
</tr>
</tbody>
</table>

**European pharmaceutical import share**
Air weight, tons (000's)

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>Others</td>
<td>30%</td>
<td>30%</td>
</tr>
<tr>
<td>China</td>
<td>7%</td>
<td>6%</td>
</tr>
<tr>
<td>Israel</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>India</td>
<td>17%</td>
<td>20%</td>
</tr>
<tr>
<td>USA</td>
<td>40%</td>
<td>41%</td>
</tr>
</tbody>
</table>

Source: Seabury Global Trade Database
Key findings

1. Over the past decade, pharmaceutical tonnage has grown in both air and ocean modes, and at similar rates.

2. Most pharmaceutical shipments do not require cooling, and an even smaller minority require active cooling.

3. European trade lanes have in recent years seen a mode shift towards air, while many North American trade lanes, especially with India, have seen a shift towards ocean.

4. European pharmaceutical air exports are showing strong growth with Asia, and slow or negative growth with North America.

5. India and China have gradually increased their share of pharmaceutical air volumes, while Israel has lost share after a decade of growth.
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