Impact Assessment of Greek Shipping on the Economy and Society

October 2013
Greece is on the downturn; due to its size, Greek Shipping could become a key growth driver of the Greek economy.

Greek economy under protracted recession since 2008

Real GDP change (%)

-5
-4.9 %
-4.2 %
0
-3.1 %
-3.0 %
5
2007 2008 2009 2010 2011 2012¹ 2013¹

How can Shipping further support the recovery of the Greek economy?

1. Forecast
Source: Eurostat

The Boston Consulting Group
The study covers the classic impact as well as the broader impact of shipping cluster in Greek economy and society.

**Classic impact assessment:** Economic impact of the shipping cluster itself

**Broader impact:** Economic and social impact of funds from shipping activities

Quantitative study on economic impact of shipping activities
- Contribution to the Greek economy (in €-terms)
- Employment effects

Based on standard econometric model (multipliers derived from Input / Output tables)

Furthermore, the perspective of shipping activities in Greece are part of the study.

**Core Shipping**
- Ocean-going/passenger ship companies + ports
- Shipyards
- Lawyers
- Insurers
- Brokers
- Ship repairs

**Supporting companies**
- Investors
- Wider economy

**Wider economy**
- Investments (other industries, real estate)
- Funds earned by shipowners
- Philanthropy (individual donations, foundations)
- Investments in Greece
- Donations
- Returns

Explorative study of impact generated from funds that have been originally earned from shipping activities
- Investments into other industries
- Philanthropy
Impact assessment study based on a comprehensive approach incl. databases, interviews with experts and desk research

Database built based on four different types of sources

<table>
<thead>
<tr>
<th>30+ interviews</th>
<th>BCG internal database</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Shipping companies</td>
<td>• Benchmarks for ocean-going ships’ operating expenses</td>
</tr>
<tr>
<td>• Supporting companies</td>
<td>• BCG experts’ input</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>a. Interviews</th>
<th>b. Internal benchmarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>40+ sources</td>
<td>Global best practices</td>
</tr>
<tr>
<td>• Databases</td>
<td>• State Authorities</td>
</tr>
<tr>
<td>• Similar studies in other countries</td>
<td>• Comparative studies</td>
</tr>
<tr>
<td>• Other reports</td>
<td>• BCG experts</td>
</tr>
</tbody>
</table>

The outcome of the impact assessment study includes 2 elements

1. Assessment of the economic and social impact of Greek Shipping cluster
   - Core Shipping companies (ocean-going, passenger, ports)
   - Supporting companies
   - Wider economy and society

2. Recommendations for further developing Greek Shipping cluster in order to enhance its direct impact on the Greek economy
Greek Shipping cluster contributes ~€13.5B to the Greek economy and generates ~165,000 jobs

Out of ~€13.5B total impact, €6.5B directly from ocean-going shipping

<table>
<thead>
<tr>
<th>Economic impact (€B)</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>6.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ocean going shipping</td>
<td>7.6</td>
<td>1.7</td>
<td>3.0</td>
<td>11.2</td>
</tr>
</tbody>
</table>

Wages & salaries with only induced effects

% GDP 2010: 3.5%

Given the overall GDP contraction over the last years total impact exceeds 7% of economy in 2013

Out of ~165,000 total jobs, ~140,000 people employed by the Greek ocean-going shipping

<table>
<thead>
<tr>
<th>Employment (’000 employees)</th>
<th>Direct</th>
<th>Indirect</th>
<th>Induced</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other</td>
<td>31</td>
<td>71</td>
<td>41</td>
<td>163</td>
</tr>
<tr>
<td>Ocean going shipping</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

High indirect effects due to high multiplier of Services sector

% total employment 2010: 3.5%

Previous studies of the sector have estimated more than 200,000 people employed by shipping

Source: Company Annual Reports 2010, analyst reports, Industry experts' interviews, BCG analysis
Ocean-going shipping with the highest contribution on the direct impact of the cluster

Direct economic impact per type of company and type of Operating Expense

- Ocean-going: €6.5 billion
- Passenger: €1.0 billion
- Ports: €0.2 billion
- Total direct impact: €7.6 billion
- Wages & Salaries: €3.8 billion
- Fuel / Lubricants: €2.0 billion
- Repair / Maintenance: €0.2 billion
- Other: €1.6 billion

1. Including Admin expenses, insurance fees, consumables, 3rd party fees, depreciation etc.

Source: Company Annual Reports 2010, analyst reports, Industry experts’ interviews, BCG analysis
Ocean-going ship companies drive 85% of direct employment
Almost same allocation of direct employment between on shore and sea

Direct employment\(^1\) of Greek Shipping per
type of company and type of employees

<table>
<thead>
<tr>
<th>Type of company</th>
<th># of employees ('000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ocean-going</td>
<td>31.3</td>
</tr>
<tr>
<td>Passenger</td>
<td>4.1</td>
</tr>
<tr>
<td>Ports</td>
<td>1.9</td>
</tr>
<tr>
<td>Total direct impact</td>
<td>37.3</td>
</tr>
<tr>
<td>Seafarers</td>
<td>19.5</td>
</tr>
<tr>
<td>Employees in Head-Quarters</td>
<td>17.8</td>
</tr>
</tbody>
</table>

\(1\) Employees that are based or live in Greece
\(2\) Ships under Greek flag or other ships that are affiliated with NAT (Seamen’s Pension Fund) – Alpha Bank Economic Bulletin 2009

Source: Company Annual Reports 2010, analyst reports, Industry experts’ interviews, BCG analysis
Sea transport sector largest contributor to Greek Services Balance inflows

Sea transport inflows from Greek Shipping companies' services ...

€12-15B annual receipts from sea transport services that are provided to foreigners

- Mainly from revenue generated by Greek shipping companies for transferring cargo across the world on behalf of third parties

€140B cumulative during 2002-2012

... represent the biggest component of Services Balance (2012)

€B inflows (receipts) of Services Balance 2012

<table>
<thead>
<tr>
<th>Category</th>
<th>Inflows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea transport</td>
<td>11.8</td>
</tr>
<tr>
<td>Travel</td>
<td>10.0</td>
</tr>
<tr>
<td>Communication</td>
<td>1.5</td>
</tr>
<tr>
<td>Other(^1)</td>
<td>3.8</td>
</tr>
<tr>
<td>Total</td>
<td>27.1</td>
</tr>
</tbody>
</table>

No investment required in Greece to drive sea transport inflows to Greece

\(^1\) Including Constructions, Insurance, Financial Services, Computer & information etc.

Source: Bank of Greece, BCG analysis
Greek shipowners invest beyond shipping in key sectors of the Greek economy

**Investment rationale**

- Investment in Shipping-related sectors
- Participation in biggest sectors of Greek economy
- Asset management

**Main sectors**

- Energy, Transportation, Construction
- Financial services
- Tourism
- Technology
- Retail
- Real Estate

Shipowners' investments in other sectors could also support the recovery of the Greek economy

Source: Press search, Interviews
Greek shipowners contribute further to the society through three different channels of philanthropic activity

Channels of philanthropic activity

- Foundations
- Union of Greek Shipowners
- Individual donations

Source: press search
Concrete recommendations for enhancing the direct impact coming from Greek Shipping on the country's economy

Recommendations

1. Integration of shipping in the long-term national development strategy
2. Increase enrollment in maritime schools in order to increase employment of Greeks in the shipping cluster
3. Upgrade educational quality and establish private maritime schools
4. Simplify requirements and processes for start-ups and reduce bureaucracy
5. Stable institutional framework to maintain attractiveness in an increasingly competitive international ship registration environment and to attract further shipping activities

1. In February 2013, Greek State gave the green light for the establishment of private maritime schools
Source: Press search, Interviews with industry experts, BCG analysis
Summary of the study

Greek-owned fleet is leading the World Cargo Shipping, being first in total capacity. Furthermore, Greek-owned ships under EU flags are also ranked in the first position with 42.72%\(^1\).

Greek Shipping is a key growth driver and could support Greek economy's liquidity, employment, GDP and investments

- It contributes to the Greek economy €13.4B (2010 figures), more than 6.0% of Greek GDP, and 3.5% of country's total employment annually
- The direct contribution of Greek ocean going shipping to country's economy is estimated at €6.5B
- ~165,000 people are employed in the whole Greek Shipping cluster
- At least €12-15B annual contribution to the Services Balance – €140B contribution over the past decade
- Beyond Shipping, Greek ship-owners are investing shipping funds traditionally in other sectors of the Greek economy, further boosting the country's economic development, and contribute to the society through their philanthropic activities

5 concrete recommendations could increase the direct contributions of Greek Shipping to country's economy

- 1. Long-term national development strategy
- 2. Increase enrollment in maritime schools in order to increase employment of Greeks in the shipping cluster
- 3. Upgrade educational quality and establish private maritime schools
- 4. Simplify requirements and processes for start-ups and reduce bureaucracy
- 5. Stable and competitive institutional framework

\(^{1}\) In terms of dwt. Source: Jan 2013, IHS Fairplay World Shipping Encyclopaedia
Appendix
Introduction to Greek Shipping and detailed methodology used in the study
Appendix

Introduction to Greek Shipping

Methodology
# Greece, a country with a long tradition in Shipping

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Key Events</th>
</tr>
</thead>
</table>
| Ancient Greece       | - Initially Greeks were trading in the Aegean Sea, and gradually in Mediterranean and Black Sea
|                      | - Civilizations with big sea tradition e.g., Minoan etc.                   |
| Roman Empire         | - Big part of sea trade done by Greeks                                      |
| Byzantine Empire     | - Catalytic role in the defense against Arabs and in the commercial and cultural exchanges with the West World for over 1,000 years |
| Ottoman Empire       | - 16th century: The Greek Sea trade is spreading due to the increasing European needs for cereals
|                      | - 18th century: The British-French wars created shortage in supply, which was covered by the Greek shipping business
|                      | - Most recognized Greek shipping areas:                                    |
|                      |  - In Aegean Sea: Hydra, Syros, Andros, Chios, Kasos, Psara, Spetses       |
|                      |  - In Ionian Sea (due to trade with Italy): Galaxidi, Arta, Preveza, Corfu |
|                      | - Greek fleet contributes to the War of Independence                       |
| 19th century         | - During the Enlightenment, Greek Ship-owners establish Greek schools and libraries |
|                      | - The dispersion of families coming from Chios island led to the spread of Greek shipping in Europe during the Napoleonic wars |
| 20th century         | - After World War II, increasing use of Greek flag                         |
|                      | - From 1970 onwards, once the institutional framework became competitive and the necessary infrastructure was developed, Greek shipping companies rapidly moved their headquarters and their activities to Greece, |
|                      | - Greek flag was also developing in a fast pace, reaching its peak in 1979, right before the big shipping crisis |
| Today                | - Greek Shipping: a global leader, in terms of capacity, with 16% of global fleet's capacity |
|                      | - Over 3,700 ships                                                         |

Source: press search

---

© The Boston Consulting Group, Inc. All rights reserved.
Ocean-going shipping represents ~95% of Greek fleet

Greek fleet, March 2013

### Capacity (Mn DWT):

- Ore & Bulk: 1,636 (44%)
- Oil Tankers: 591 (16%)
- Chemical & Products: 571 (16%)
- Cargo: 241 (7%)
- Pure Containers: 320 (9%)
- Liquid Gas: 140 (4%)
- Passenger: 105 (3%)
- Άλλα: 73 (2%)
- Σύνολο: 3,677

Note: Ships over 1,000 GRT in service and currently on order
1. Data as of March 2013
Source: Greek Shipping Co-operating Committee March 2013
Average age of Greek-owned fleet reduced by 9 years during the past decade driven by newbuilding investments

Average age\(^1\) of Greek-owned fleet

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>20</td>
</tr>
<tr>
<td>3/1/13</td>
<td>10</td>
</tr>
</tbody>
</table>

Average age reduced by 49%.

Ship scrapping and investments on new ships during 2011

<table>
<thead>
<tr>
<th># of ships retired in 2011</th>
<th># of ships built in 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>222</td>
<td>282</td>
</tr>
</tbody>
</table>

Net change: +60 ships

Continuous investments even during crisis for World ocean-going shipping

Note: Left Hand Side graph: data from Lloyd's Register of Shipping – Fairplay - Greek Shipping Co-operating Committee March 2013 were used
Source: Hellenic Chamber of Shipping, Lloyd's Register of Shipping – Fairplay March 2013, Greek Shipping Publications online database 2012, Marine Information Services

1. In terms of number of ships and not capacity
Greek-owned fleet is leading World ocean-going shipping against strong competitors

Greek-owned fleet with the highest global capacity, lower though vs. 2000 levels

<table>
<thead>
<tr>
<th>Country</th>
<th>Capacity dwt (Mn)</th>
<th>% of total capacity (DWT) 2000</th>
<th>% of total capacity (DWT) 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greece</td>
<td>73 (28%)</td>
<td>18.1</td>
<td>16.2</td>
</tr>
<tr>
<td>Japan</td>
<td>12.7</td>
<td>16.2</td>
<td>15.8</td>
</tr>
<tr>
<td>Germany</td>
<td>15.8</td>
<td>15.8</td>
<td>9.2</td>
</tr>
<tr>
<td>China</td>
<td>12.7</td>
<td>9.2</td>
<td>8.6</td>
</tr>
<tr>
<td>Korea</td>
<td>12.7</td>
<td>8.6</td>
<td>7.6</td>
</tr>
<tr>
<td>Norway</td>
<td>12.7</td>
<td>7.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Denmark</td>
<td>12.7</td>
<td>3.4</td>
<td>2.2</td>
</tr>
<tr>
<td>Italy</td>
<td>12.7</td>
<td>2.2</td>
<td>1.9</td>
</tr>
</tbody>
</table>

On a European level, Greek-owned fleet is bigger than the sum of the next 3 largest European fleet markets (Germany, Norway, Denmark)

Greek flag is important, but Greek shipowners prefer mostly foreign flags

Common practice among shipowners on a global level

<table>
<thead>
<tr>
<th>Flag</th>
<th>Capacity dwt (Mn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greek flag</td>
<td>265</td>
</tr>
<tr>
<td>Liberia</td>
<td>73 (28%)</td>
</tr>
<tr>
<td>Malta</td>
<td>192 (72%)</td>
</tr>
</tbody>
</table>
| Marshall Islands | 73 (28%) |}

Note: Right Hand Side graph: Due to lack of data for other countries from Lloyd's Register of Shipping – Fairplay, UNCTAD database was used as common source of data


1. Data as of Jan 1st of the respective year
2. Gross Domestic Product

% global GDP (2011): Greece 0.4, Japan 8.5, Germany 5.2, China 10.0, Korea 1.6, Norway 0.7, Denmark 0.5, Italy 3.2

Copyright © 2013 by The Boston Consulting Group, Inc. All rights reserved.
Greek flag among most preferred flags globally

Top preferred flags for global fleet based on capacity, Jan 2013

Note: Ships over 1,000 GT
Source: IHS Fairplay/ World Shipping Encyclopaedia, Jan 2013; Clarkson Research Services March 2013
Due to the global economic crisis, shipping is on the downturn

Crisis with a negative impact on global demand

Increased fleet led to reduction in productivity

Dry transfers with the highest hit

Note: Baltic Dry Index Closing Daily Price
Source: Naftemporiki, UNCTAD

Low charter market indexes due to not only the reduction in global demand but also due to the increase supply, which was driven by high number of deliveries for orderings made in the rising period 2007-2008
Appendix

Introduction to Greek Shipping

Methodology
The study was based on more than 70 interviews and sources

40+ sources

- BCG Tanker Benchmarking Initiative
- BCG Container Benchmarking Initiative
- Marine information Services
- Lloyd's
- Clarkson's
- EIU (Economist Intelligence Unit)
- Hellenic Statistical Authority
- Eurostat
- Company Annual reports 2010
- International Maritime Association
- Bank of Greece
- Analyst reports (Alpha Bank)
- Hellenic Chamber of Shipping
- Greek Shipping Publications database
- UNCTAD, Review of Maritime Transport
- The World Bank - Doing business 2012 report
- Financial Times
- Policy Research Corporation
- Hill Dickinson – International Ship Registration Requirements
- Ernst & Young Shipping Industry Almanac 2011
- Druid Entrepreneurship and innovation - organizations, institutions, Systems and regions
- Harvard Business School
- The Steel And Shipbuilding Industries Of South Korea: Rising East Asia And Globalization Kyoung-ho Shin Paul S. Ciccantell
- A study of Korea's shipbuilders strategy for sustainable growth, Duck Hee Won
- SingaporeSetup.com
- Shipping Strategy by P.Lorange, Cambridge University Press
- SunStar Manila newspaper
- Input-Output Methodology Guide, Scottish Government
- Center of Maritime Economics & Logistics Erasmus University Rotterdam
- The Economic Significance of Maritime Clusters – July 2010, Danish Shipowners' Association
- The economic impact of the UK Shipping Industry - Oxford Economics
- The Greek Shipping Register, a proposal for the Foundation of an International/second Greek Shipping register, Andreas Merikas, Sofia Gialoutsi, Nikitas Kanellopoulos
- Foundations websites

30+ interviews

- Interviews with Greek Shipowners
- Greek law firm
- UK law firm
- P&I club
- Shipyards
- Greek Ship brokerage
- Foreign Ship brokerage
- Biggest Greek Banks

1. Eugenides, Laskaridis, Latsis, Lemos, Niarchos, Onassis, Pateras, Tsakos...
Unique methodology for quantitative assessment

Euros spent and employees based in Greece and their impact on the economy quantified in 3 effects

- **Direct impact**
  - Direct economic contribution of companies in the core shipping cluster (ocean-going shipping, passenger shipping, ports)
    - Expenses of the core shipping cluster spent in Greece
    - Number of jobs based in Greece from the core shipping cluster

- **Indirect impact**
  - Effect from core shipping activities on direct suppliers, their suppliers, and so on (assuming constant household income)
    - GDP contribution in Greece in €
    - Number of jobs dependent on core shipping

- **Induced impact**
  - Effect of core shipping activities on the wider economy including additional consumption by households from increased income
    - GDP contribution in Greece in €
    - Number of jobs dependent on core shipping

Total impact of shipping on Greek economy
Methodology based on unique set of sources

Sources used to estimate expenses & employees based in Greece
- Comprehensive BCG benchmarking database on ocean-going shipping (covering > 20 international shipping companies)
- Greek shipping directory covering > 3 500 ships
- Annual reports of > 10 companies and many analyst reports
- > 20 expert interviews

Direct impact
+ Comprehensive BCG benchmarking database on ocean-going shipping (covering > 20 international shipping companies)
+ Greek shipping directory covering > 3 500 ships
+ Annual reports of > 10 companies and many analyst reports
+ > 20 expert interviews

Indirect impact
+ Unique econometric model to estimate so-called multipliers that assess core shipping's impact on the wider economy based on
  - Input / Output tables from Eurostat
  - Employment data from Hellenic Statistical Authority

Induced impact
+ Unique econometric model to estimate so-called multipliers that assess core shipping's impact on the wider economy based on
  - Input / Output tables from Eurostat
  - Employment data from Hellenic Statistical Authority

Total impact of shipping on Greek economy