Diminishing economies of scale from megaships?

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Diminishing economies of scale from megaships?

Liner economics and the cycle

- Liner shipping is a cyclical industry; cycles driven by cash balances and utilisation
- Liner economics are fundamentally challenging and promote earnings erosion
- Liner shipping still remains fragmented
- Growth has been rapid but volatile: very hard to match capacity growth to demand growth
- Profitability has been poor and very volatile
- Safety in numbers; prolonged carriers losses have forced lines to pool resources in search for economies of scale and cost savings

- Carriers play ‘follow the leader’ in ordering bigger ships, The Herd Mentality
- Rising ship sizes...has brought some expected changes...but also exposed deeper issues
## Diminishing economies of scale from megaships?

### Liner economics and the cycle

<table>
<thead>
<tr>
<th>Factor</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Economies of scale</strong></td>
<td>Structural overcapacity</td>
</tr>
<tr>
<td><strong>Perishability</strong></td>
<td>Push for short-run contribution – rate erosion</td>
</tr>
<tr>
<td><strong>High operational gearing</strong></td>
<td>Push for short-run contribution – rate erosion</td>
</tr>
<tr>
<td><strong>Commoditised service offering</strong></td>
<td>Limited differentiation of product; price competition</td>
</tr>
<tr>
<td><strong>Fragmented industry</strong></td>
<td>No coordination of capacity development, intense competition</td>
</tr>
<tr>
<td><strong>Inelastic demand curve</strong></td>
<td>Falling rates have a limited effect on demand</td>
</tr>
</tbody>
</table>
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The Herd Mentality

“Prepare for the bad times. I’m no soothsayer, but I have been in the industry for 40 years and have weathered a lot of storms. When the inevitable lull comes, the huge ships will suffer instability.”

Chang Yun-fa, Evergreen Group founder and chairman, 2007

The story of Evergreen

- Showed restrain amid the 2007 order frenzy for ships of 10,000 teu ships
- 2010 - waited to order 20x8,450 teu ships, followed by 15 more in 2011
- 2012 - took the big-ship leap by ordering 10x13,800 teu as it moved away from its traditional independent status and forged closer ties with the CKYH carriers
- 2013-14 - backed up with orders for 5x14,000 teu and 5x14,350 teu
- 2015 - Joined the mega-ship club with an order for 11 x 20,000 teu units

Herd mentality – Once one carrier upsizes, all others have to follow
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The Herd Mentality

A common trend, Maersk Line makes the first order and others eventually follow

Regina Maersk 7,400 teu
Mid 1990s
Other carriers followed…5 Yrs

Emma Maersk 15,500 teu
Mid 2000s
Other carriers followed…2 Yrs

Maersk Triple E 18,000 teu
2013
Other carriers followed and built even bigger……less than 2 yrs

The key change is that carriers are taking less time to play catch-up
Diminishing economies of scale from megaships?
Operators facing prisoner’s dilemma

<table>
<thead>
<tr>
<th>Operator A</th>
<th>Operator B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DEFECT</strong></td>
<td><strong>DEFECT</strong></td>
</tr>
<tr>
<td>Overcapacity→low freight →low ROI</td>
<td>Overcapacity→low freight →low ROI</td>
</tr>
</tbody>
</table>
| Overcapacity→low freight →low ROI | Temporary solution→ improved ROI | \[\]
| Temporary solution→ improved ROI | Permanent solution→ High ROI | Permanent solution→ High ROI |

- **Years after the global financial crisis in 2008**, the supply-demand balance of the container shipping industry remains precarious. Expect this to continue in 2016 where imbalances at the trade route level and insufficient measures to reduce ship capacity will further accelerate freight rate reductions and industry losses. Expect 2016 to be dominated by continued weak global trade growth, sustained erosion in freight rates and weakened balance sheets – each unfavourable to a major recovery, in our view.

- **Container shipping operators face prisoner’s dilemma**: Prisoner’s dilemma is a theory that shows how two prisoners drop the best choice for the worst one because they cannot trust each other. We believe container shipping operators are faced with a similar dilemma while trying to outdo their rivals by ordering ultra-large ships. They ordered larger vessels to help increase their market share through their cost superiority, while being fully aware that the need of the hour remains to be capacity rationalisation. This strategy has not only fuelled the never-ending competition for large ships but also led to mistrust among operators, entangling them in the prisoner’s dilemma.

- **Current situation out of sync with the ideal scenario**: Self-seeking competition among container shipping operators in expanding their fleet is proving to be detrimental. Staying put will only aggravate the situation, which looks likely the case right now. We believe the operators will struggle to keep their market shares and their return on investment will come far below its current level during the next three years.

- **The only possible solution - refrain from racing**: The ideal scenario, therefore, could be for the operators to refrain from the race of acquiring ultra-large ships, failing which supply-demand scenario could worsen.
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Drivers behind the great arms race

Savings in slot cost per teu indexed to 8k teu vessel, Drewry findings, 2014

<table>
<thead>
<tr>
<th>Vessel Size (k teu)</th>
<th>Savings in Slot Cost (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>-7%</td>
</tr>
<tr>
<td>10</td>
<td>-16%</td>
</tr>
<tr>
<td>12</td>
<td>-19%</td>
</tr>
<tr>
<td>13</td>
<td>-21%</td>
</tr>
<tr>
<td>14</td>
<td>-26%</td>
</tr>
<tr>
<td>16</td>
<td>-30%</td>
</tr>
<tr>
<td>18</td>
<td></td>
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</table>

- Significant unit cost savings shown by EEEs were the real driver for the great megaships ordering spree
- Drewry’s analysis at that time suggested fuel costs/teu were 34% lower than a typical 13,100 teu vessel
- Ship operating costs were lower by an impressive 11% and combined cost savings together were a massive 30%
- **The rush to order vessels over 18,000 teu for deployment between Asia and Northern Europe continued to gain momentum as Maersk Line outperformed the competition by a wide margin**
- The cost advantages diminishing as utilisation falls, bunker prices recede and cost savings exhaust

Source: Drewry Maritime Research
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More and ever-bigger ships

Source: Drewry Maritime Research

- Newbuild containership sizes have increased at breakneck speed since 2009 as lines deploy megaships to drive down unit costs in the search for profitability
- Vessel upsizing has implications for the whole container shipping supply chain and its stakeholders
- Volumes are becoming more concentrated on larger vessels operated by larger alliances with lower service frequency
- In a low growth demand environment, the deployment of bigger ships results in lower frequency services and greater volume peaks
- Drewry analysed the historical development of vessel sizes and the effects on ports and terminals and developed a simulation model to examine the effect of vessel upsizing on liner network and port and terminal costs

Source: Drewry Maritime Research
Diminishing economies of scale from megaships?

Drewry has carried out a simulation study of the operational and financial impacts on lines, terminal operators, ports and other supply chain stakeholders as vessel size increases from 8,000 TEU to 24,000 TEU.

14,300NM round voyage
6-port rotation

4.75M TEU head-haul

3.33M TEU back-haul

Simulation parameters/assumptions

<table>
<thead>
<tr>
<th>Service Characteristics</th>
<th>Base Case</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
<th>Scenario 3</th>
<th>Scenario 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Strings</td>
<td>13</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Average ship size (TEU)</td>
<td>8,000</td>
<td>10,400</td>
<td>14,857</td>
<td>17,333</td>
<td>20,800</td>
</tr>
<tr>
<td>Maximum ship size (TEU)</td>
<td>8,000</td>
<td>14,000</td>
<td>18,000</td>
<td>18,000</td>
<td>24,000</td>
</tr>
<tr>
<td>Average TEU exchanged per call</td>
<td>2,912</td>
<td>3,786</td>
<td>5,409</td>
<td>6,310</td>
<td>7,572</td>
</tr>
<tr>
<td>Maximum TEU exchanged per call</td>
<td>4,196</td>
<td>7,295</td>
<td>8,737</td>
<td>9,675</td>
<td>11,962</td>
</tr>
</tbody>
</table>

Same volume, bigger ships
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Findings from the Drewry Study

Simulation shows liner costs fall as ships get bigger

- Simulations developed by Drewry show that while lines’ network costs fall as vessel sizes increase, the costs incurred by ports and terminals rise.

- The resulting combined lines and ports total system cost savings peak at only 5% and economies of scale diminish as vessel size rises beyond 18,000 teu.

- Terminals incur capex equivalent to adding 16% of existing capacity for no extra volume and terminal yard areas would need to increase by one third to avoid congestion.

Source: Drewry Maritime Advisors
Diminishing economies of scale from megaships?
A conflicting picture of savings and cost increases

Source: Drewry Maritime Advisors
Diminishing economies of scale from megaships?

Overall supply chain network costs

Increasing imbalance?

Shipping lines are obtaining sea transport cost savings for themselves (and cargo owners) by deploying bigger ships….

…but they are generating higher costs in other parts of the supply chain

Source: Drewry Maritime Advisors
Diminishing economies of scale from megaships?
Demand growth slowing to a lower “new normal”?

- Running up to the GFC in 2008/09, port throughputs raced ahead averaging double digit growth each year (~11%)
- Since then, the new normal has been much lower growth (~5% p.a.)
- The double digit growth could not last forever, but more worrying is the recent slow down in growth
- The reality is that growth in demand is waning faster than anticipated by anyone in the industry
- In 2015, global container port growth was only around 1% and in 2016 it is not likely to exceed 2.5%
- These are the lowest growth rates ever seen by the industry apart from in 2009
- The industry has adjusted to a new normal of ~5% growth p.a. but what if the new “new normal” is less than half of this?

Source: Drewry Maritime Research
Diminishing returns?
Key findings from the Drewry study

- Combined shipping line and port ‘total system’ cost savings peak at only 5% of total network costs and economies of scale diminish as vessel sizes rise beyond 18,000 teu

- Terminals will incur significant capital expenditure to handle larger vessel sizes and terminal yard areas will need to increase by one third to avoid congestion, even with no growth in volume

- Scale economies from megaships only work for the total supply chain if terminals can increase productivity in line with increases in vessel size

- Continued vessel upsizing risks, leading to:
  - No significant cost benefit, lower service frequency and/or less choice for shippers
  - Higher supply chain risks as volumes are concentrated in fewer vessels
  - Environmental effects arising from dredging deeper channels and expanding yard area

Source: Drewry Maritime Advisors
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- Detailed assessment of capital structure and debt profiles
- Covarianls appraisal of shipping bond structures, including pricing, and investment returns

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