



Economy of Scale, Economy of Scope and potential Diseconomies of Scale

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Vessel Economies of Scale



“The **economies of scale** offered by these larger (Mega) ships will mitigate the impact of the expanded Panama Canal, and we also highlight that supply chain links by rail from the West Coast across the country are already in place and well developed. There is a question mark over whether the Panama canal expansion will be the game changer that many predicted it would be when the project first started.”

(Business Monitor International, June 2013, United States Shipping Report Q3)

LA and Long Beach



- BMI states that while the trend has been for mega ship construction of vessels, that LA/LB expansion projects have been ‘underway so they can continue to play a role in the box supply chain.’
- “**Economy of Scope**” is the concept of being able to serve local metropolitan consumption populations and reach hinterland markets via intermodal with the same vessel call in the same port. LA/LB is the poster child for this with access to northern and southern tier intermodal markets, California and the western states.

Forecasts for major Port growth (Source BMI)



TEU	2013	2014	2015	2016	2017
LA	7.75 mn	8.07	8.37	8.67	8.99
LB	6.58	7.05	7.50	7.95	8.42
NY/NJ	5.38	5.59	5.83	6.07	6.32
SAV	2.90	3.00	3.13	3.29	3.48

Vessel Capacity increases (BMI, Lloyd's and Bloomberg)



- 9 – 10% container vessel capacity increase in 2013 (2010 : 4%, 2011 : 9%, 2012 : 8%)
- However 6.2% fleet idled in 2013, up from 5.5% year on year, and 2% scrapped.
- Global average speed is 9.8 knots in 2013, down from 10.6 knots year on year
- Market has seen some swapping of Suez routes for Panama routes due to cost and vessel supply. China to the USEC by Suez is 4- 5% longer transit, however networks can absorb this, and “Economy of Scope” of vessel utilization.

The “Other side of the Ledger” (P. Damas of Drewery)



“When ordered, most people talked about **economy of scale** of the mega ships lowering shipping costs, lowering fuel consumption per unit and lowering CO2 emissions...the other side of the ledger is higher aggregation of risks per ship, longer port stays as the larger ships tax existing land side efficiencies, and an anticipated further shift from direct to indirect services, which add both time and cost of handling to the supply chain equation.”

“Some time sensitive shippers and forwarders are already starting to look more closely at the potential negative impact of longer port stays. The issue is that there can be a 2 or 3 day difference between the first container being discharged from a mega ship and the last container being discharged.”

“Most decisive factor..”



Dr. Yoshi Sheffi of the MIT Center of Transportation correctly states:
“the most decisive factor impacting future supply chain decisions will be how well the rest of the supply chain functions – the ease with which cargo moves from a specific terminal to smaller vessels for transshipment or onto trucks or increasingly, rail to reach inland destinations. The key will be the landside.”

(World Trade 100, February, 2013, ‘The Uncertain Impact of Mega Ships’)

Scale and profitability



“The liner shipping market nowadays has entered a phase in which liner shipping companies (LSC’s) reap economies of scale. However the results of enlarged capacity may be uncertain. Standard relationships between capacity and firm performance may be uncertain.”

(T.L Yip, Y.H. Lun & Y.Y. Lau “Scale and Diseconomies and Efficiencies of Liner Shipping, Hong Kong Polytechnic University, 2012)

Scale and Profitability (cont.)



Yip, Lun and Yau looked at data from 1997 to 2008 of the top 20 liner carriers, particularly revenue and capacity. They found that 'organizational growth stimulates economy of scale and expansion of firm size is closely related to prestige. LSC's enlarge their firm size to demonstrate their ability to confront traditional and new challenges.'

Using S curve analysis, with external factors of new deliveries, scrapping, bunker prices, wages of crew, and freight rates they stated that LSC's that 'occupy a capacity share between 4 – 9% are capable of attaining 8 to 20% revenue share. Decreasing returns of scale exist at capacity share beyond 5%'.

Competitive Landscape



W.Y. Yap, J.S. Lee, and K. Cullane (Singapore Economic Review, 2011) in “A Theoretical framework for the Evaluation of Competition between Container Terminal Operators”) have basically stated that the competitiveness of a port requires a ‘port of destination whose hinterland could be extended to include an area covered by what may be considered to be the hinterland of another port’
Used Porter’s diamond model of six determinants of competitive advantage:

Factor conditions – Inputs like production

Demand Conditions – Demand for these services

Related and supporting industries – Rail connections, Distribution, etc

Firm strategy, structure and rivalry – Equity ownership in the terminal operations

Chance events – Beyond Control of port operator (weather interference, labor unrest)

Role of government – Level and form of support

Optimization



If the “Connection to the furthering conveyance and the hinterland“ is the key to the larger ships, then I would offer the approach needs to be a movement away from “Optimization” to iterative material improvements.

Harrison (The Managerial Decision Making Process, 1999) says ‘Optimality is illusory at best and is usually a matter of the critic’s perception.’

An example is the business case of On-Dock rail stowage from the larger vessels. Railroads want perfect blocks of Chicago, etc. but this is becoming more and more complex with larger ships shared by Alliances plus other partners. The ‘Optimal’ case for the rail, is not the optimal for Terminal Operators.

Summary



- Today's 12,000 TEU vessels calling at LA/LB are being operated at high cost to terminal operators in yard segregation, shift differentials, and commercial stress on gates and infrastructure.
- Tomorrow's post Panamax (above 13,000 vessels) will stress most global ports and supply chains which strive for consistency of delivery
- LSC's may not realize the "Economy of Scale", but endure a diseconomy of scale in not only rate pressure, but operating costs and limitations
- Labor negotiations in 2014 on the west coast critical to the discussion
- Terminal Operators will be at the nexus of this Diseconomy, and may not be able to recover the expenditures from customers.