

Development of container ship size

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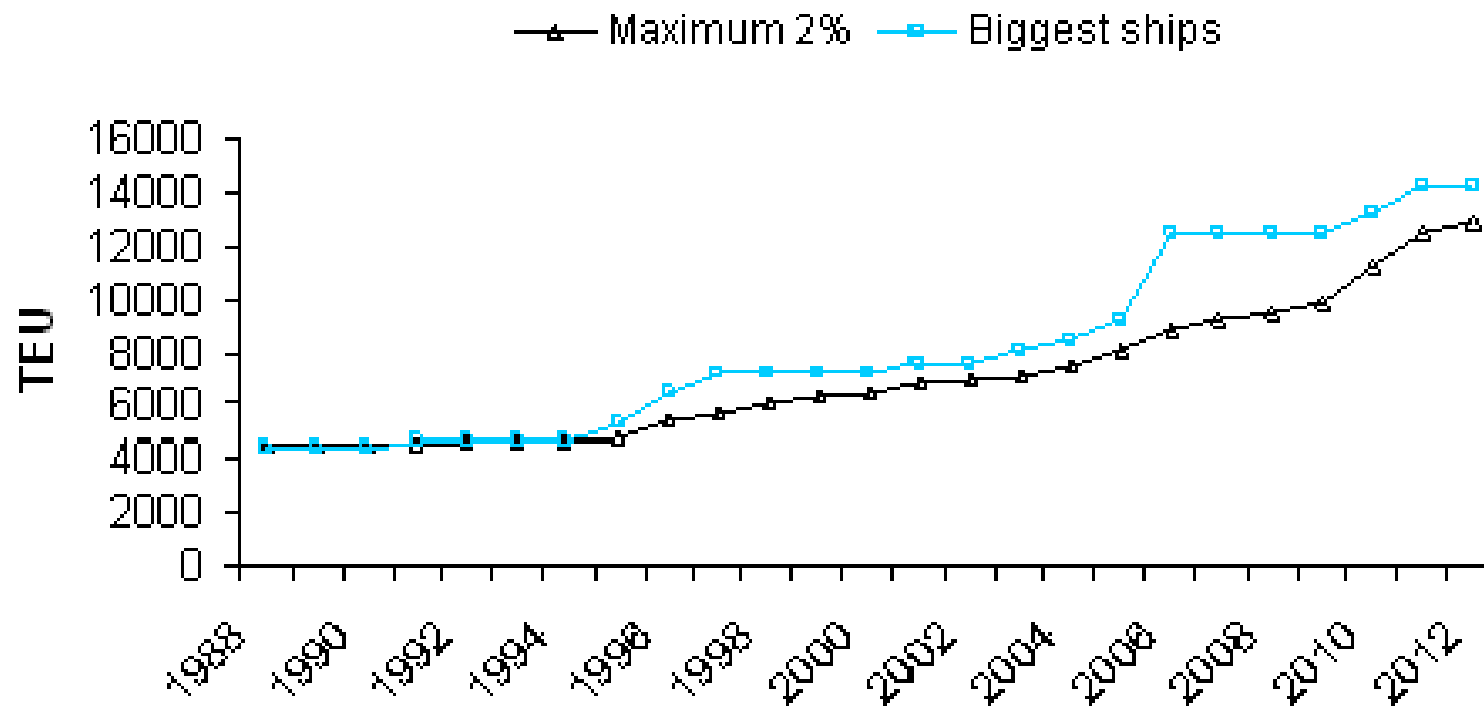
International Symposium on Port Logistics and Environment

Objective of presentation

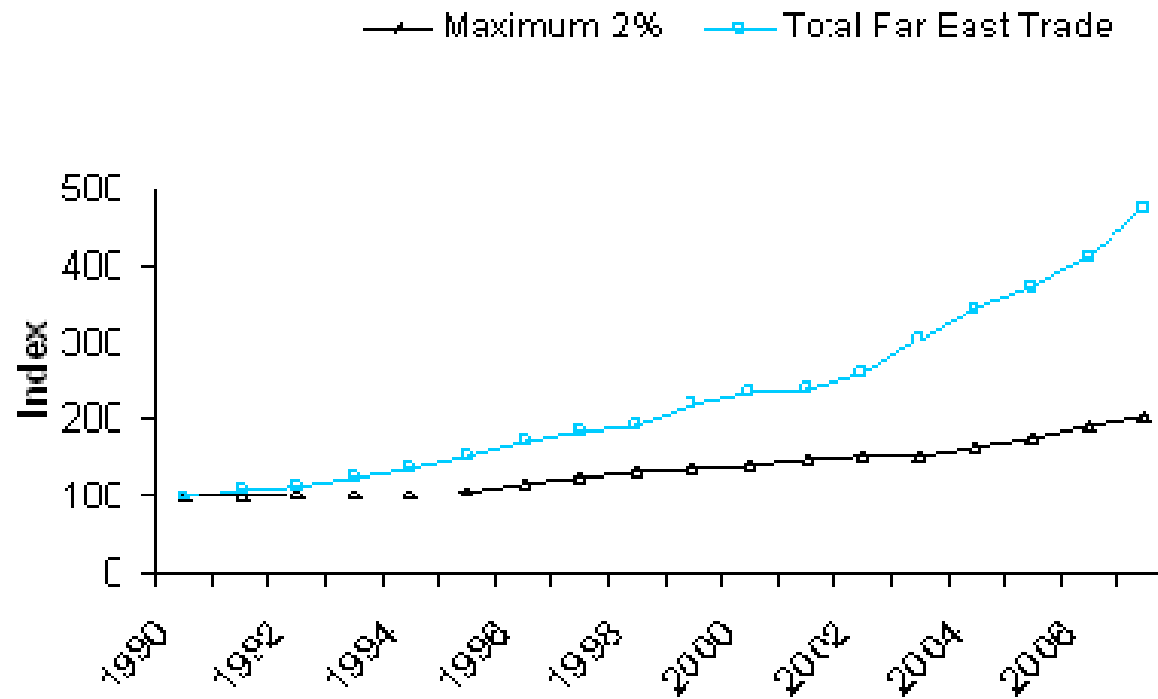
To show:

1. That economies of ship size continue to exist for Post Panamax ships and much bigger ships
2. That the rate of introduction of bigger ships relates to the demand growth rate
3. That transshipment is reaching a ceiling for a number of trades

Development of the biggest containerships in the past



Increasing demand and increasing size of biggest ships



Relation increase in ship size and increase in trade

Over the period 1990 – 2007 annual increases were:

- Demand Europe – Far East route: 10%
Size of 2% biggest ships: 4.3%
Number of roundtrips Europe – Far East trade: 7%

These figures suggest that quality of service aspects as far as related to frequency of service improve, at least at aggregate level

Important question

Will the increase in ship size continue?
If so, at what rate?

Capital related costs (1)

Capital related costs including depreciation, interest, maintenance, repairs and insurance all depend on the ship's price, thereby show economies of ship size

One percent increase in size leads to a less than one percent increase in cost

A statistical analysis for the largest ships show that these effects are applied to the largest-sized ships

Capital related costs (2)

For ships ranging from 5000 to 14,000 TEU, a 1% increase in size leads to a 0.7% increase in costs and thereby to a 0.3% decrease in costs per TEU

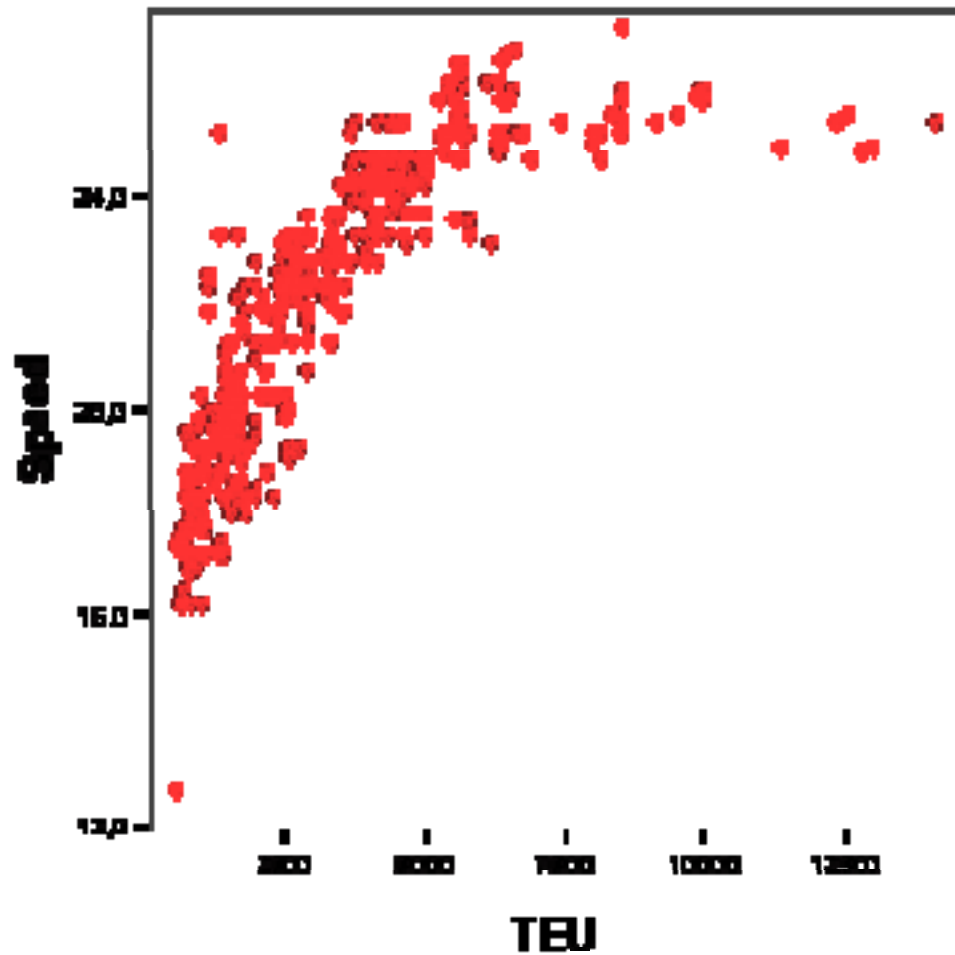
Note that this relation does not differ much as for Panamax and up to Panamax ships

Fuel related costs

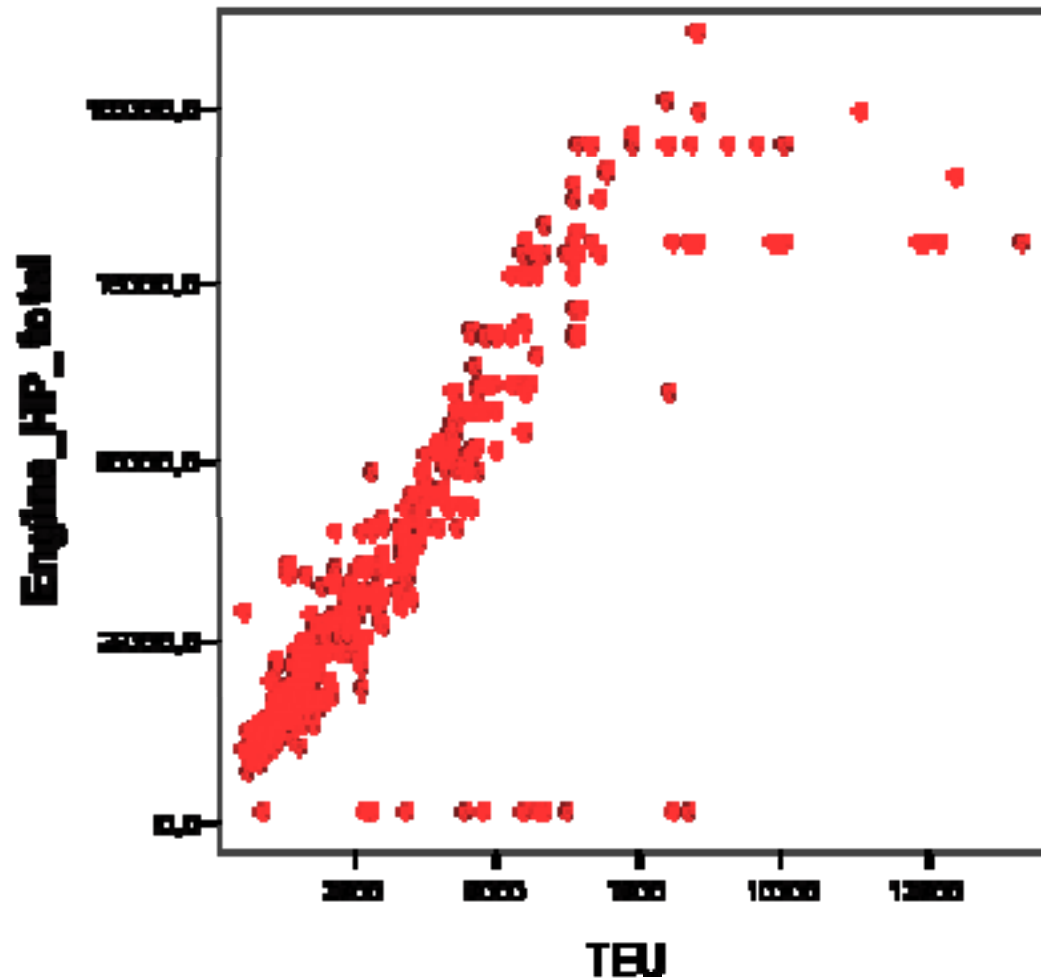
These costs depend on the vessel's size and speed and show similar economies of ship size

For ships ranging from 5000 to 14,000 TEU, a 1% increase in size leads to a 0.5% increase in costs and thereby to a 0.5% decrease in costs per TEU

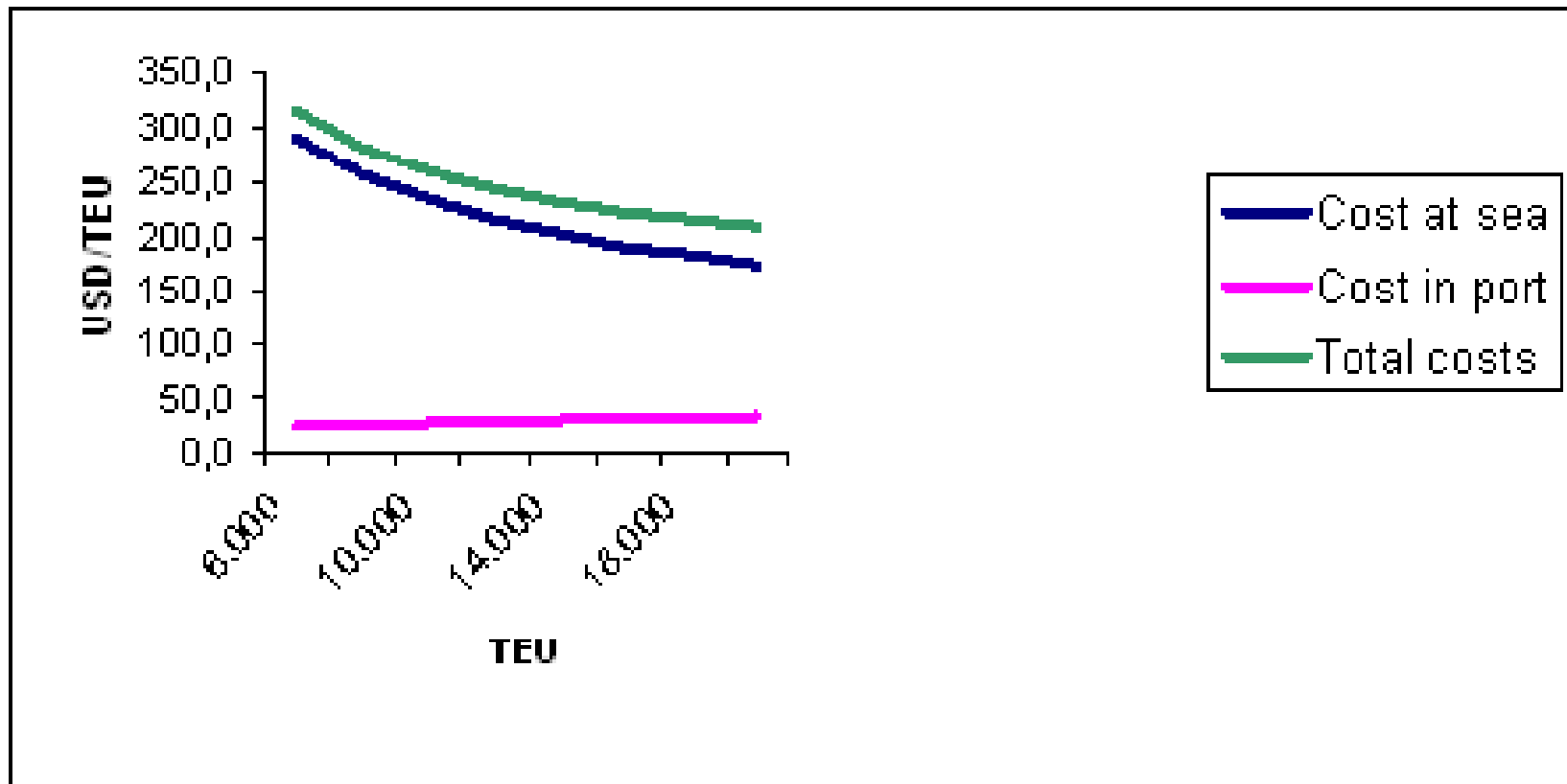
Speed and ship size



Engine capacity and ship size



Relations Between Shipping costs and ship size



Elasticity of shipping costs per TEU versus ship size

This study: 6000-20000 TEU: -0.34

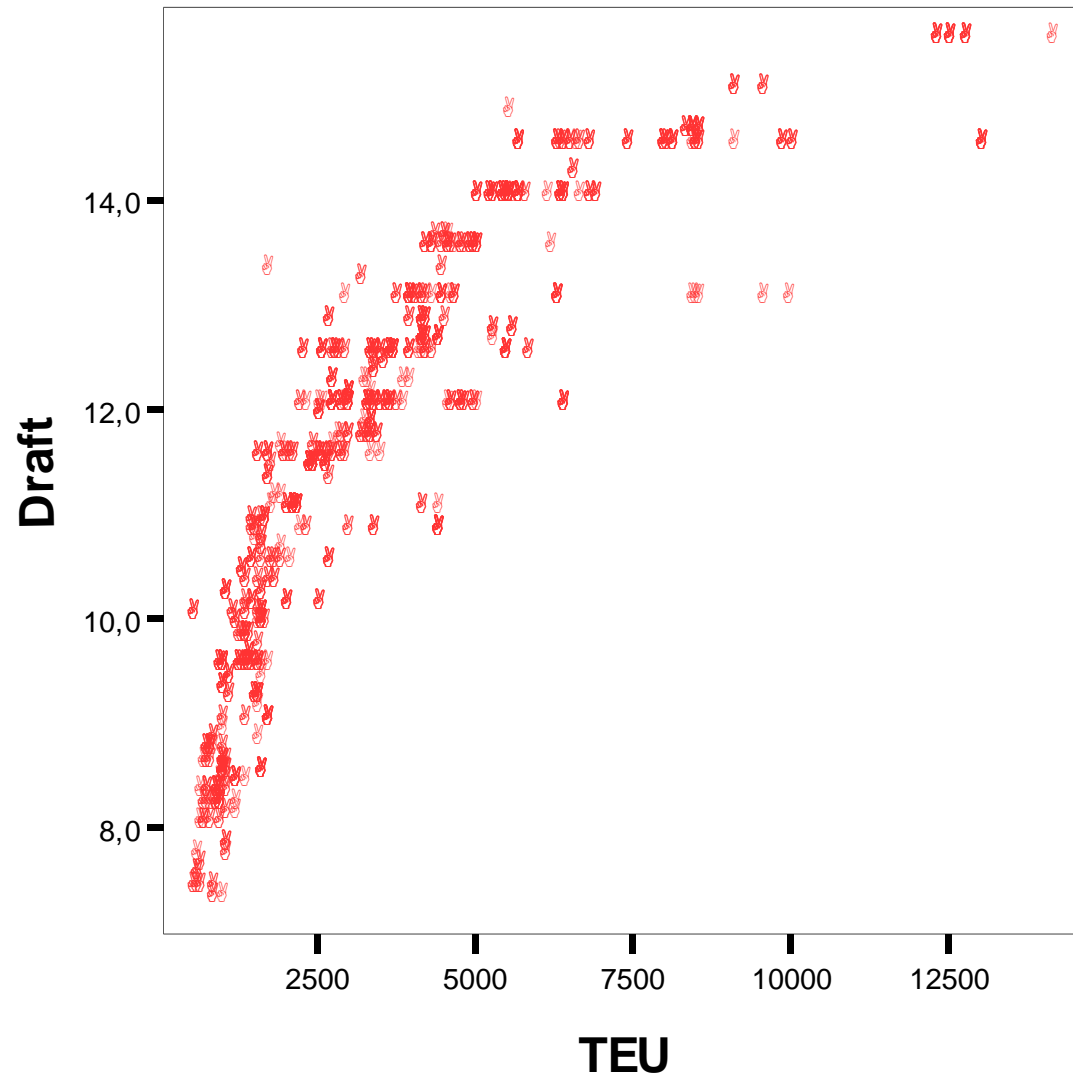
Jansson and Shneerson 1987: 240-3200 TEU: -0.34 to 0.0

Cullinane and Khanna 1999: 1000-8000 TEU: -0.25

Factors limiting the economies of ship size

- Structural design, engine and cavitation problems
- Draft in seaports
- New Panama Canal
- Multi-porting versus hub-and-spoke

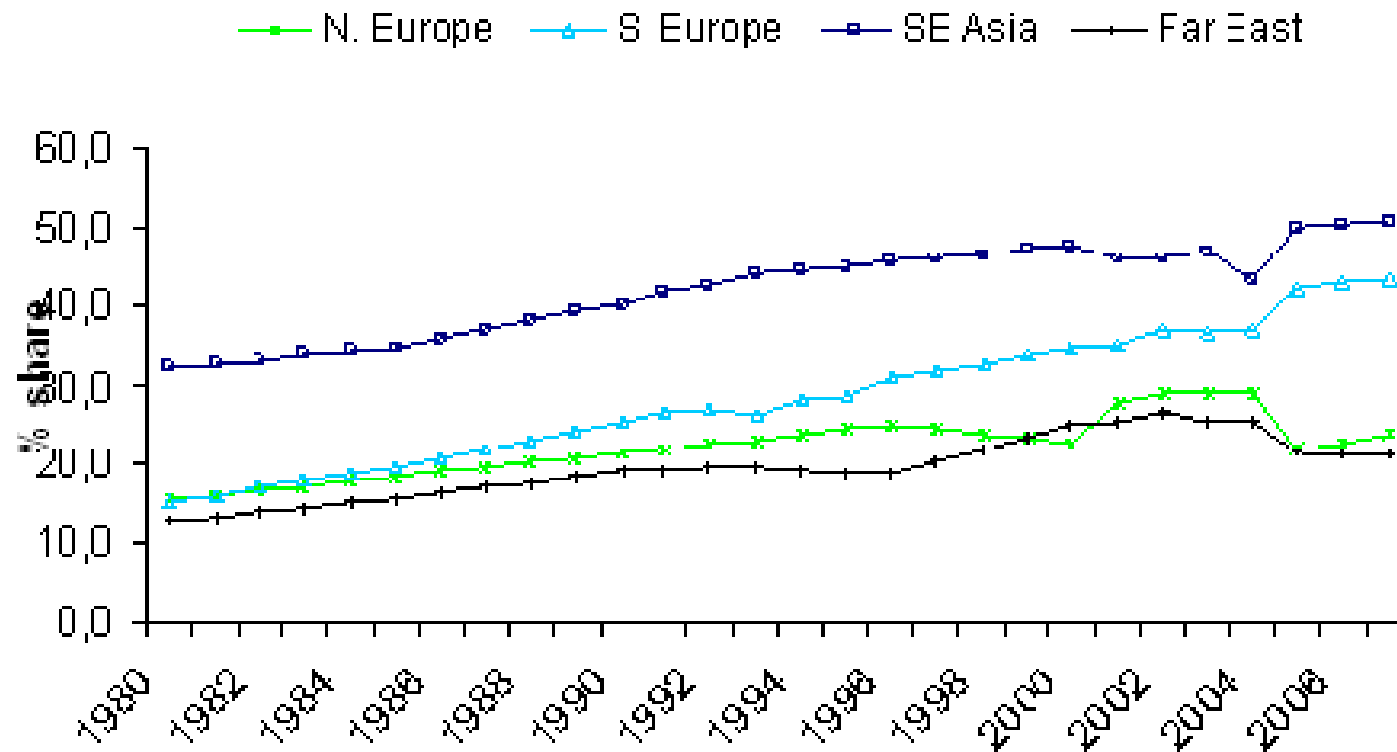
Draft and size



New Panama Canal dimensions

Vessel dimensions (in meters)	Existing Panama Canal	New Panama Canal
Length over all (LOA)	295	366
Beam	32.2	48.8
Draft	12.0	15.3

The transshipment development trend in some coastal areas



Hub-and-spoke systems (1)

- Bigger ships lead to more transshipment
- Does the share of hub-and-spoke operations increase?
- This increase leads to longer transit times and thereby to a lower quality of service
- Thereby bigger ships might reach a ceiling

Hub-and-spoke systems (2)

- Figures suggest that share of transshipment has reached its maximum for trades between Western Europe and the Far East
- The trades in the Mediterranean are an exception

Some speculations on the future increase in the size of containerships

- Assume that the size of 12,800 TEU for the top 2% biggest ships will be realised in 2012 (according to the existing orderbook)
- Assume that the Far East – Western Europe container market will recover from 2012 onward with a modest 6% increase per year
- Assume that market equilibrium will be reached from 2015 onward
- Assume that the size of the biggest 2% will continue to increase with a ratio of $0.38 \times 6\% = 2.3\%$ annually

In that case the Malacca-Max will account for 2% of the market in 2030. With a demand growth of 10% this will happen earlier in 2024, while the first 18,000 TEU ships may be already ordered from 2016 onward.

The question is: Will this happen?



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