Proposal for an index for tracking input costs

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Input Costs in Maritime Economics Research

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1. **A suitable proxy for shipbuilding capacity**
2. **A suitable proxy for input prices**

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Two determinants have always presented problems for economists in trying to analyse and model commercial shipbuilding:

1. **A suitable proxy for shipbuilding capacity**
2. **A suitable proxy for input costs**

Today I am going to make a proposal for the second of these.

The ‘traditional’ proxy for economic analysis of input price

The literature (limited as it is) shows that the most common proxy for input costs in the past has been steel price.

Clearly this relates to only one part of the cost and is therefore very limited as a proxy.

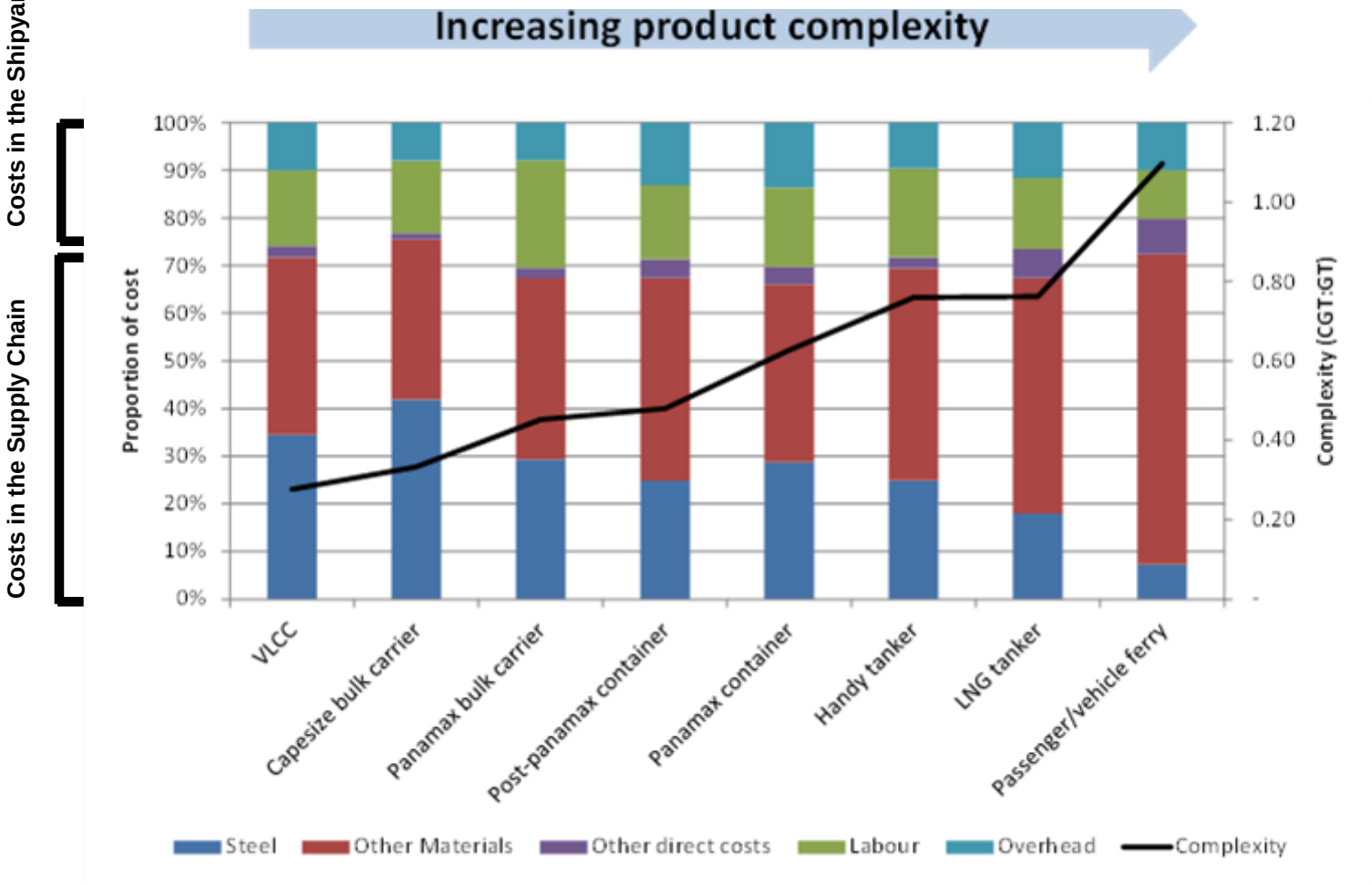
What we need is a proxy that more closely relates to the full structure of shipbuilding costs and to the underlying mechanisms that determine the prices of inputs into shipbuilding.

The structure of ship costs

Clearly, this is a variable and a reference cost structure (or set of reference cost structures) would need to be established to make this work.

To develop the technique, I have used the cost structures established for different ship types in EU cost modelling exercises undertaken about 15 years ago.

The structure of ship costs



Cost structure definitions

Cost category	Definitions
Steel	Structural steel of all grades, including primarily plate and rolled sections.
Other materials	All other materials (other than steel) and subcontractors (other than labour subcontracts), including propulsion and main engines, auxiliary engines and generators, cargo handling equipment, cargo containment equipment, deck equipment and all other equipment and materials.
Other direct costs	Design licenses, classification and surveys, warranty reserve, builders risk insurance, and any other costs that may be required depending on the ship type and design.
Labour	Cost of direct labour in all areas of the shipyard and including subcontracted labour.
Overhead	Provision for selling, general and administrative overheads and all overhead labour.

Not included are depreciation and profit.

Cost-varying mechanisms

There are five:

1. **External commodity price movements – specfically for steel;**
2. **Shipbuilding-specific market related prices – for example main engines and other ship-specific equipment where prices are influenced by demand for ships;**
3. **General inflation, related to general producer prices and wage inflation;**
4. **Shipyard-specific inflation, for example relating to productivity progress.**
5. **Exchange rate movements for imported materials, assuming that the shipbuilding contract is executed in $US.**

Index mechanism

I have chosen easily available external parameters with which to develop an index of costs, when applied to the cost breakdown.

The following is an example relating specifically to an index for VLCCs:

Cost component	VLCC basis cost breakdown	Varying parameters
Steel	35%	Hot rolled steel plate price
Other materials	37%	2/3 varied by number of ships on order, 1/3 by Producer Price Index and exchange rate
Other direct costs	2%	Producer Price Index
Labour	16%	Producer price index and exchange rate
Overhead	10%	

Clearly there is an underlying assumption in this estimate relating to where the ship is produced.

The productivity problem

Additionally, it will be observed that this mechanism includes no assumption for shipyard productivity changes.

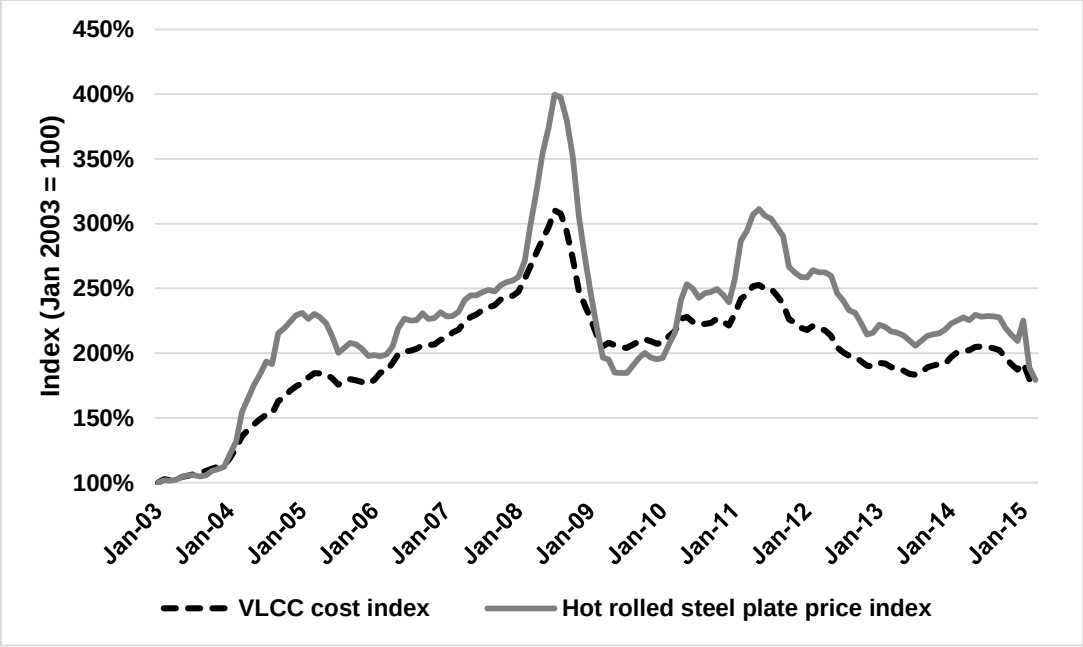
The underlying assumption, therefore, is that the shipyard is mature (i.e. not in a development phase where productivity would be expected to change rapidly*).

Productivity in the shipyard is therefore assumed to increase in line with industrial productivity in general, as represented in the producer price index.

*Past research has shown shipbuilding productivity improvement to be asymptotic at about 10 to 15 manhours per CGT

Index example (2003 = 100)

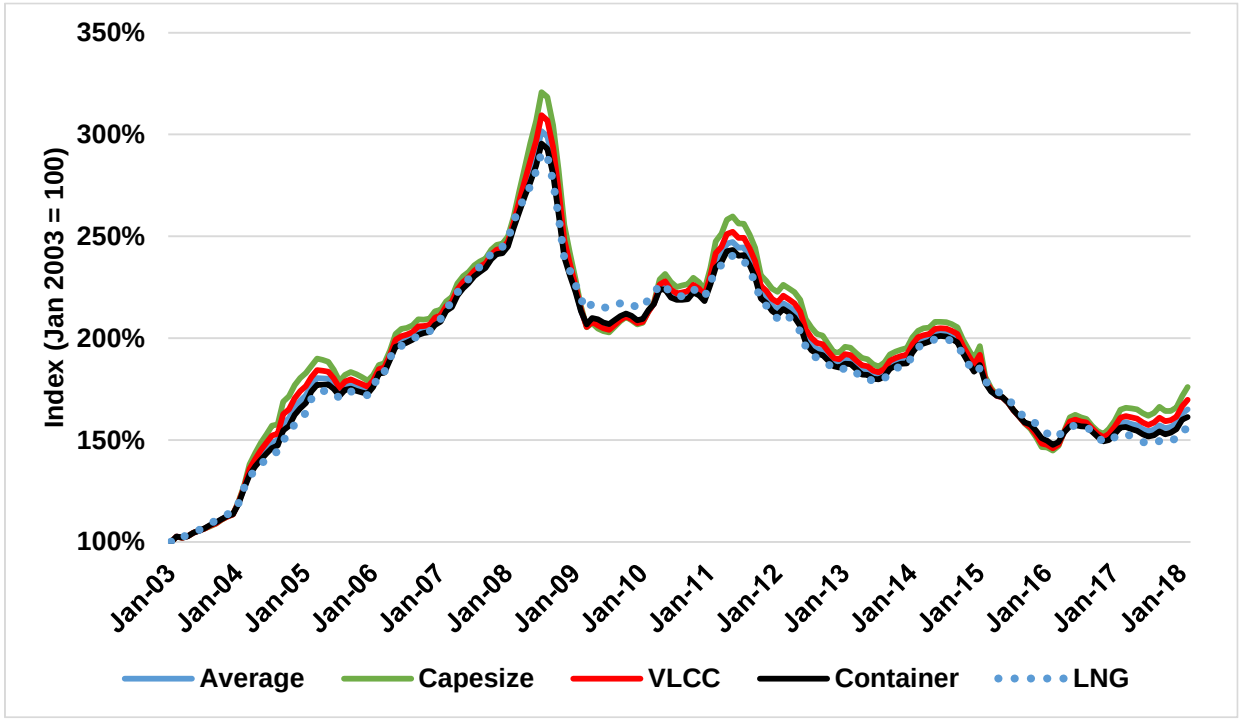
The breakdown is developed into an index, based on the initial assumed cost breakdown structure and using externally available varying factors.



We find that the use of steel price alone is over-sensitive and exaggerates input cost movements.

Index mechanism

We then re-ran the index for the different cost structures.



We found it to be very robust to changes in the input cost structure.

Index mechanism

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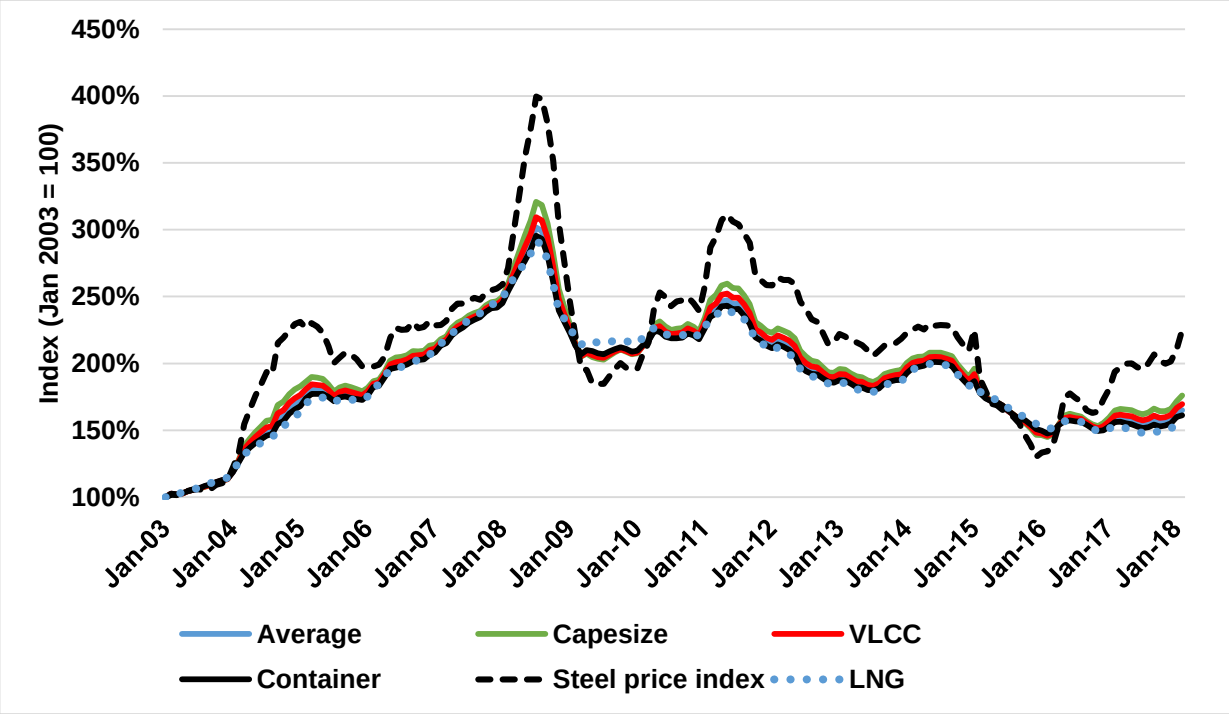

And consistently to show a different characteristic to steel alone.

Conclusions

1. We find that this approach provides a **different** cost index to the use of steel cost alone. Whether or not it is **better**, requires some cost modelling to confirm.
2. The index is **robust** in relation to assumptions of cost structure, but could be tailored to a country-specific average.
3. Derivation of this index could be pursued in **collaboration** between industry and OECD – in the same way that CGT was developed 50 years ago. Declaration of costs is not needed as the index works on cost structure, not absolute costs.