Compass Maritime Services: Shipping Valuation Executive Summary

Our mission:

Compass Maritime Services, LLC is a New Jersey based firm specializing in the sale and purchase of ships and offshore vessels, valuations, recycling and demolitions of ships, shipping research and consulting. In the case provided Compass Maritime Services are assisting a potential client in assessing a value and making an offer on a ship.

The company and management:

Tom Roberts is the founding member of Compass Maritime Services and Basil Karatzas is the director for projects and finance. Basil Karatzas is the key person responsible for advising clients on sale and purchase transactions, it is his responsibility to identify an appropriate ship, a reasonable price to offer and some suggestions regarding the negotiation strategy.

The market:

The world merchant fleet consisted of more than 20,000 ships with a total capacity of 1.1 billion deadweight tons (DWT). The industry is also divided into categories based on cargo type: tankers transported liquid products such as oil; container ships transported containers filled with manufactured goods; and dry bulk ships carried raw materials such as ore, grains or coal. The dry bulk segment consisted of almost 7,000 ships in 2008. This category is further segmented by size. The “handysize” are ships with capacity 10,000 DWT to 30,000 DWT, “handymax” contained ships ranging from 30,000 DWT to 50,000 DWT. “Panamax” ships carry up to 80,000 DWT. The largest bulk carriers are “capsize” which carries up to 200,000 DWT or more.

Ship Valuation:

The first and most common approach is the “market approach” where value equals the price of a recently completed sale of a comparable ship between a willing and knowledgeable buyer and a willing and knowledgeable seller. The second approach is known as the “income approach” where the value equals the net present value of future cash flows. This method requires a financial model. A major determinant of a ship’s cash flow is the daily charter rate (either short-term charter that are set in the spot market or longer-term that are set in a separate market). The third and least common approach is the” cost approach” where the value equaled the cost of replacing a given ship and its functionality.

Market Strategy:

Market Approach/Nearest Neighbor estimate: A "market approach" estimates the value of a new ship by identifying a recently sold ship with comparable attributes. The assumption is that the most recent sale of a new ship is the best predictor of the next sale price, since, "In normalized and efficient markets, the price of a vessel is simply what a buyer, cognizant of the relevant facts and under no compulsion to act, would pay to acquire the asset from a knowledgeable seller equally under no compulsion to act. . . . [Both] the commercial and the academic values usually converge to the purchase price that a rational, well-informed investor (buyer) would pay for the acquisition of the vessel."

Our database has two variables that deal with ship attributes: Deadweight Tonnage and Age-at-sale. We can use these to identify the most recent ship within +/- 2,000 Deadweight Tons, and within +/- 3 years of the Bet Performer – the *Cape Sun*, which sold for **$135 million**.

We could also expand this and identify all ships that sold within the past 17 months, and look at the range and average of their selling prices:

Ship Name	Selling Price
TMT TBN	$61.30
Zorbas II	$86.00
Fertilia	$50.50
Ingenious	$64.20
Sumihou	$106.00
Cape Sun	$135.00
Average	**$83.83**
Range	**$61.30 - $135.00**

Table 1: Selling price of comparable ships

Variable Correlations: Before we build any models, we first want to understand relationships between variables in our data.

Strong correlations between Sale Price (the rightmost column) and other variables (represented by decimals approaching 1 or large circles) indicate ship attributes that will likely be predictive of price.

Strong correlations between ship attributes indicates that those attributes are highly connected, and that we should pick only one or the other when building our model.

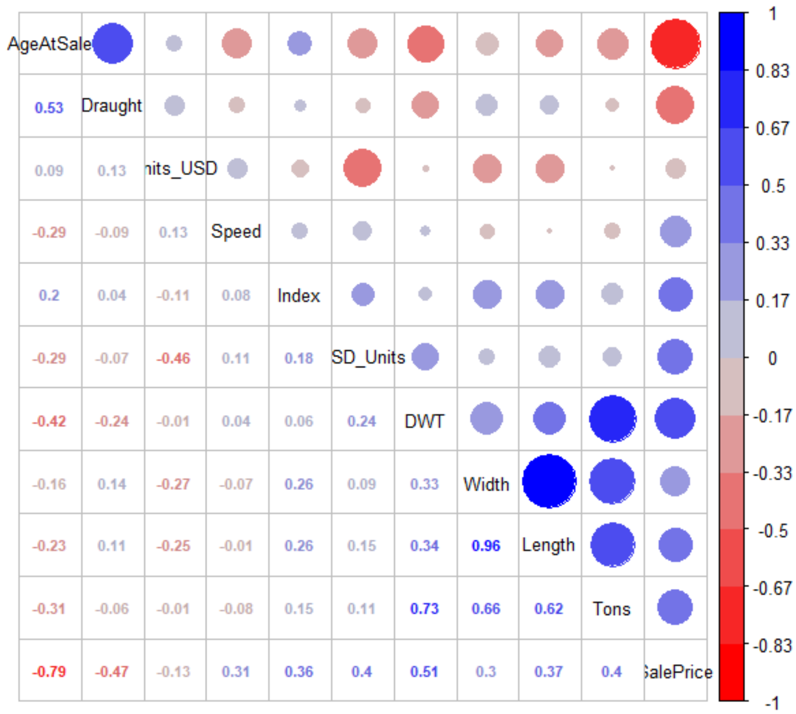


Image1: Correlation matrix between sale price and other variables

- Market Approach Model/Linear model: The problem with the "nearest neighbor" estimate is that it uses a single data point. What if we could use all the data in our database? Surely that would give us a better estimate of the ship price!

If we build a linear regression model that uses ship age and deadweight tonnage to estimate sales price, we identify an equation:

Price = 60.3520568 –3.7195541 **Age* + 0.4132831 **DWT*

Using the Bet Performer's attributes (11 years old, 172 DWT), we can estimate a sales price of $90.52 million, with a 95% confidence interval between $49.03 and $132.01 million.

This seems low compared to our rough estimate based on neighboring ships.

- Market Approach/ Linear model + Economic Index Model: If we look at the date of sale, we see that price seems to trend upward over time. Similarly, as the Capesize Index increases, sale price increases. Let's also include Capesize index economic date in our model!

The new model gives us the equation

*Price = 44.225549983 –4.543803922 *Age + 0.242154623 *DWT + 0.007206924 *CapesizeIndex*

Using the Bet Performer's attributes (11 years old, 172 DWT), with the current Capesize Index (12479), we estimate a sales price of $125.83 million with a 95% confidence interval between $104.74 and $146.92 million.

Comparing between models:
We have several models, each which provides a different result. Which model do we choose? How do we feel confident that it is the correct model?

R^2 is a measure of how much variance is accounted for by the model. The more variance the model accommodates, the more predictive it is. Thus, a higher R^2 value is better. The Adjusted R^2 value is used to compare between models with different numbers of inputs.

Model	**R^2**	**Adjusted R^2**
Price ~ Age, DWT	0.6578	0.6426
Price ~ Age, DWT, Index	0.9204	0.9150

Table 2: The model with Age, DWT and the Index accounts for 26.26% more variance than the model using only Age and DWT

Using an ANOVA test to compare models, we see that there is a significant difference between the model that uses all three variables (Age, DWT, and Index) and the model that uses only two (Age, DWT). Our p-value is extremely small, meaning that the chance that Index does NOT have an effect on the model is negligible.

We can visualize the proportion of variance that each attribute accounts for in our model. Age and Index together account for almost all of the variance, while DWT only adds a very little bit to the predictivity.

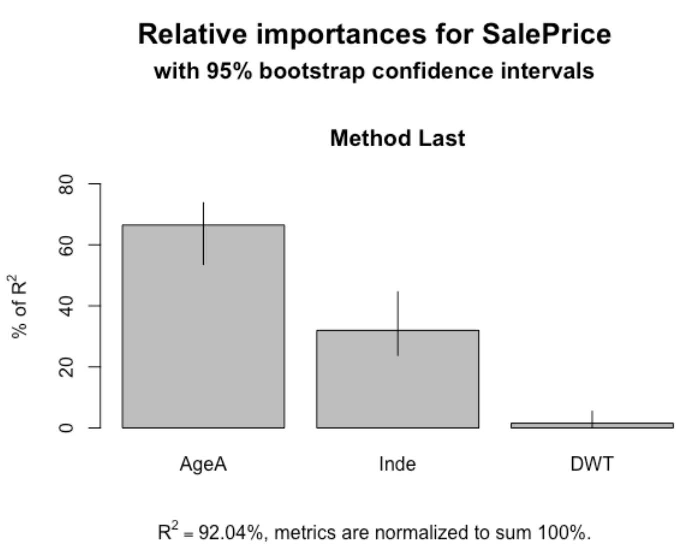


Image2: Proportion of variance that each attribute accounts for in the model

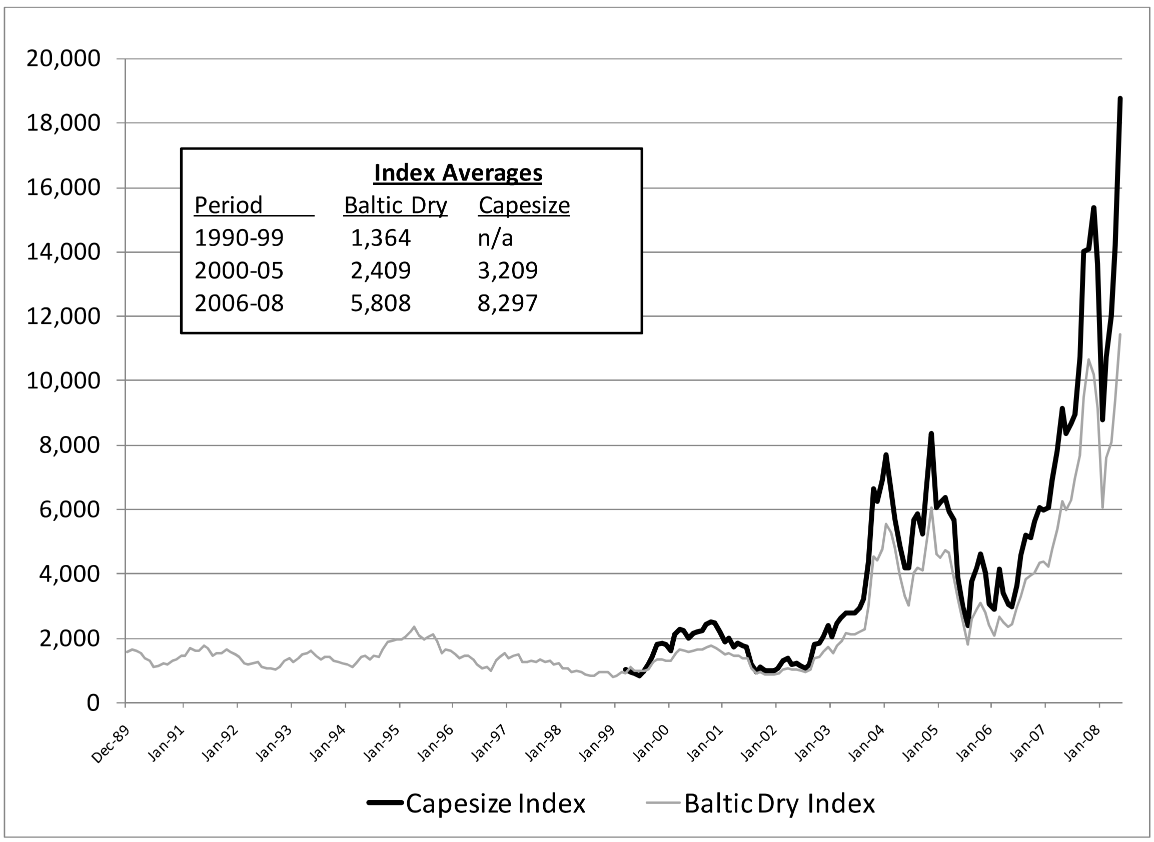
Conclusion and recommendations:

We focused on linear models, while our attributes may not have defined linear relationships with price. It is possible that a non-linear model could improve prediction accuracy.

Hypothetically, more data would improve prediction (either more variables, or data about more ships). However, when we looked at additional variables, these were less predictive than the current model.

There may be additional attributes about the Bet Performer which we have not modelled that could raise or lower the price: ship condition, personnel requirements, average time-to-un/load, country of manufacture.

Exhibit 3 Baltic Dry Indexes for Bulk Carriers (Dry Index) and Capesize Ships (1989–2008)



Source: Adapted from Thomson Reuters Datastream, accessed July 2010.

There has been a rapid increase in the Capesize Index which could signal a market bubble. The rule “buy low, sell high” comes to mind, and by purchasing now, it is likely that the client would be purchasing high, making recouping the investment a challenge. Unless there is a specific need *right now*, we might advise waiting to see if the market falls in order to get a better price.