HARVARD | BUSINESS | SCHOOL

9-211-014
REV: DECEMBER 6, 2010

BENJAMIN C. ESTY
ALBERT SHEEN

Compass Maritime Services, LLC: Valuing Ships

On Tuesday, May 6, 2008, Tom Roberts walked into Basil Karatzas's office to discuss a request he had just gotten from a new client interested in buying a capesize bulk carrier. Roberts, a founding partner, and Karatzas, the director for projects and finance, worked at Compass Maritime Services, a New Jersey–based firm specializing in the sale and purchase of ships and offshore vessels ("S&P brokers" in the industry parlance), valuations, recycling and demolition of ships, shipping research, and consulting. In this case, the potential client was interested in buying a ship, but wanted assistance with identifying an appropriate ship, assessing its value, and making an offer. As the head of the firm's valuation practice, Karatzas was the key person responsible for advising clients on sale and purchase transactions. Roberts said the client would be calling back later that day and hoped Karatzas might have a specific ship in mind, a reasonable price to offer, and some suggestions regarding the negotiation strategy.

As Karatzas looked through his own proprietary files of ships for sale and reviewed the "ships for sale" bulletins he had received from other S&P brokers, he found the Bet Performer, an 11-year-old (built in 1997), 172,000 deadweight ton (DWT) capesize bulk carrier. This ship had a Burmeister & Wain (B&W) 6S70MC engine, had nine holds and hatches, and was built by Nihon Kōkan Kabushiki-Kaisha (NKK) in Japan in 1997.[1] The ship, under a different name (Mineral Poterne) had been sold two years earlier for $70 million,[2] and the current owners had expressed an interest in selling the ship through private communications. (**Exhibit 1** shows a picture of the ship.) While this ship appeared to meet the client's desired physical characteristics, the question was how much to pay for it.

The Global Maritime Industry

Although cargo transportation by sea had existed for thousands of years, the modern maritime industry was based in several key cities around the world: New York (U.S.), Hamburg (Germany), Oslo (Norway), Athens (Greece), London (England), Singapore, and Shanghai (China). As of 2007, ships transported over 90% of world trade and generated industry revenues of US$380 billion.[3]

The world merchant fleet consisted of more than 20,000 ships (also known as "vessels," but not "boats") with total capacity of 1.1 billion deadweight tons (DWT).[a] The industry was 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. Each ship type defined a submarket operating on different dynamics. The

[a] Deadweight tonnage: the total weight in metric tons (1,000 kilograms or 2,204.6 pounds) of cargo, fuel, fresh water, stores, and crew that a ship could carry when immersed to its load line.

Professors Benjamin C. Esty and Albert Sheen prepared this case. HBS cases are developed solely as the basis for class discussion. Cases are not intended to serve as endorsements, sources of primary data, or illustrations of effective or ineffective management.

market for container ships, for example, was a long-term market with charters lasting up to 10 years, in part due to the specialized design of container ships and their ports, and the complicated logistics of capacity management (i.e., running ships full of small containers from different parties with different cargoes and different destinations). In contrast, the market for bulk carriers was more of a spot market with short-term charters reflecting the commodity nature of the cargo and the ability to redeploy ships easily.

The dry bulk segment consisted of almost 7,000 ships in 2008. This category could be further segmented by size. While the smallest ships had a capacity of less than 10,000 DWT, the "handysize" and "handymax" categories contained ships ranging from 10,000 to 30,000 DWT and 30,000 to 50,000 DWT, respectively. "Panamax" ships, so named because they were the largest ships that could pass through the Panama Canal, carried up to 80,000 DWT. The largest bulk carriers were the "capesize" ships, which carried up to 200,000 DWT or more. The name "capesize" referred to the fact these ships rounded the capes, Cape Horn off Chile and the Cape of Good Hope off South Africa. A typical bulk carrier carried 170,000 DWT, was 900 feet long, had a crew of 20 to 25 people, took a year to build, and had a useful life of 25 years. After 25 years, most ships were demolished and sold for scrap in a process known as "ship breaking." Similar size categories existed for other kinds of ships, and the economics (charter rates and values) differed by ship type and size category.

The sale and purchase of ships typically occurred through brokers. Roberts, who was not only a founding partner at Compass Maritime Services, but also the president of the Association of Ship Brokers and Agents (U.S.), described the role of an S&P broker:

> S&P brokers are like real estate agents. We help put buyers and sellers together, help draft the documents, and then get a commission for completing the sale. It's a very competitive business where your reputation—your ability to provide good market intelligence, to protect confidentiality, and to close deals quickly—matters a lot. And your ability to close deals depends on having deep knowledge of the industry (ships, markets, and international trade) and the players, and good relationships with customers and other S&P brokers. Our relationships with other S&P brokers are very symbiotic. Although we compete for deals, we regularly collaborate to get them done. We are also actively involved in the valuation process, providing ship valuations for clients including owners, lenders, and potential buyers.

Ship Valuation

Ship owners, appraisers, bankers, and brokers valued ships using three main approaches. The first approach was the *market approach* where value equaled the market price of a recently completed sale of a comparable ship between a willing and knowledgeable buyer and a willing and knowledgeable seller in an arm's-length transaction. This approach was also known as the "last done" or "mark-to-market" approach. Karatzas described this method:

> 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.[4]

Under the second approach, known as the *income approach*, value equaled the net present value of future cash flows. Because this method required a forecast of future cash flows (i.e., a financial model), people referred to it as the "mark-to-model" approach. A major determinant of a ship's cash flows was the daily charter rate (short-term charter or "rental" rates were set in the spot market, while longer-term or time charter rates were set in a separate market). (**Exhibit 2** shows the daily spot

market and one-year time charter rates for capesize ships over the past five years. **Exhibit 3** shows the Baltic Dry Index for both bulk carriers generally (the dry index) and for capesize ships specifically—the indexes provided a composite measure of charter rates across ship types and markets. Both charts show rising charter rates due to a combination of factors, including a booming global economy, increasingly global supply chains, increased demand for exports from and imports to China, record-high commodity prices, and a shortage of ships.) A third, but much less common, valuation methodology was the *cost approach* where value equaled the *cost* of replacing a given ship and its functionality, in essence, the cost to buy and retrofit a ship. Appraisers and brokers used this approach to value ships with unique functionality or customized features.

Despite the existence of multiple valuation methods, the market approach was by far the most commonly used approach. To use this approach, one had to identify a set of "comparable" ships, where comparability was based on four main factors: ship type (e.g., capesize vs. Panamax), age, size (measured in DWT), and condition. The type of ship mattered because it served as a proxy for the depth of the market (e.g., how many potential buyers there were) and the charter rates a ship could earn. Other factors such as type of main engine, confirmed time charter contracts with creditworthy counterparties, loading equipment (derricks and cranes), shipyard (original builder), and location (where the ship was at the time of sale) also affected the price.

The next step was to identify the purchase prices for the most recently completed transactions of comparable ships. In an active market where ships sold frequently, there were many benchmark transactions, ideally at least five. In slower markets, pricing became more complicated because there were fewer representative transactions. In these situations, the appraiser had to relax either the comparability criteria (e.g., the type of ship) or the time horizon over which prior sales had occurred, or both. Because almost every transaction provided some information about the market or the relative pricing of specific ship attributes, it was beneficial to include multiple ships in the analysis.

Conclusion

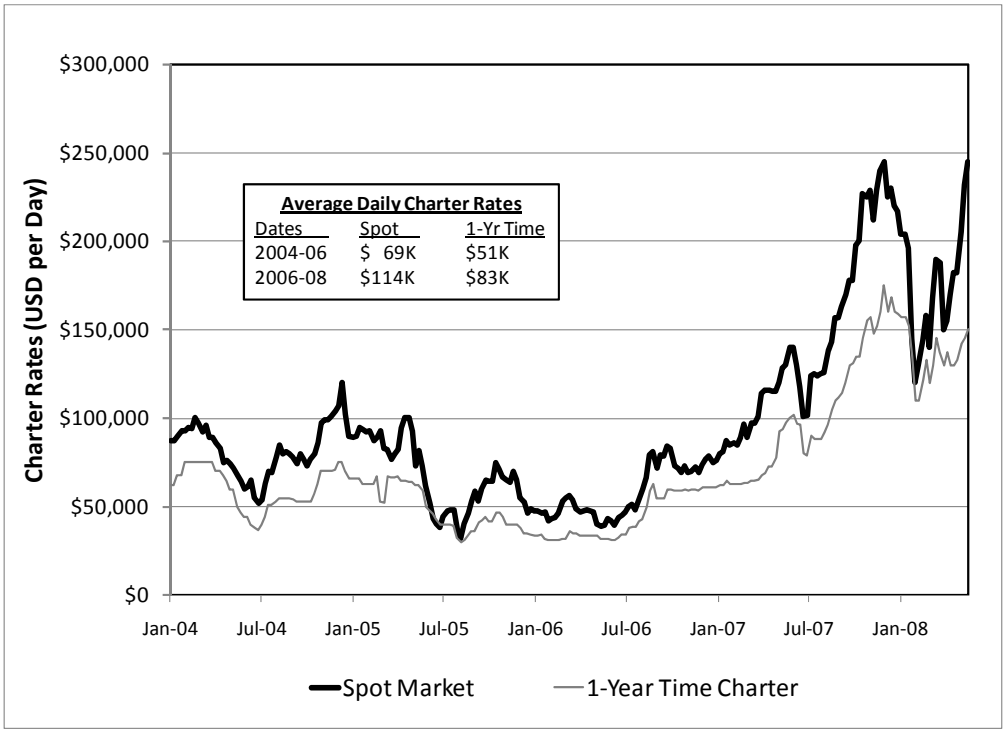
As Karatzas sat at his computer, he pulled up a list of capesize ship sales since January 2007 from the firm's proprietary database (see **Exhibit 4**) and began to estimate a reasonable price for the Bet Performer, knowing that Roberts wanted to have a conference call later that afternoon to discuss his preliminary findings with the prospective client and to gather additional information. As Karatzas reviewed the list, he was once again reminded of just how volatile the market had been since 2007. For example, a Greek ship owner had purchased the Cape Kassos in March 2007 for $100 million without even making a physical inspection (buyers typically conducted a pre-purchase technical inspection before making an offer). The owner changed the name to Nightflight and "flipped" (sold) the ship in April 2008 for $158 million, a profit of $58 million in just 13 months!

In determining a reasonable price for the client, Karatzas knew the stakes were high. This was a time when sellers rarely made counteroffers. An offer that was even just a shade below the asking or market price jeopardized the chance of buying the ship. Moreover, below-market offers often shut down negotiations, as sellers interpreted low bids as indications the buyer was not serious. There were just too many serious buyers in the current market to spend time negotiating insincere offers. And in an era of easy credit, with low rates, non-amortizing loan structures, and loan-to-value ratios reaching 90% (compared to the historical average of 60% to 70%), Karatzas knew that this client would have little trouble financing the purchase if its bid were accepted.

Exhibit 1 Picture of the Bet Performer Leaving Port

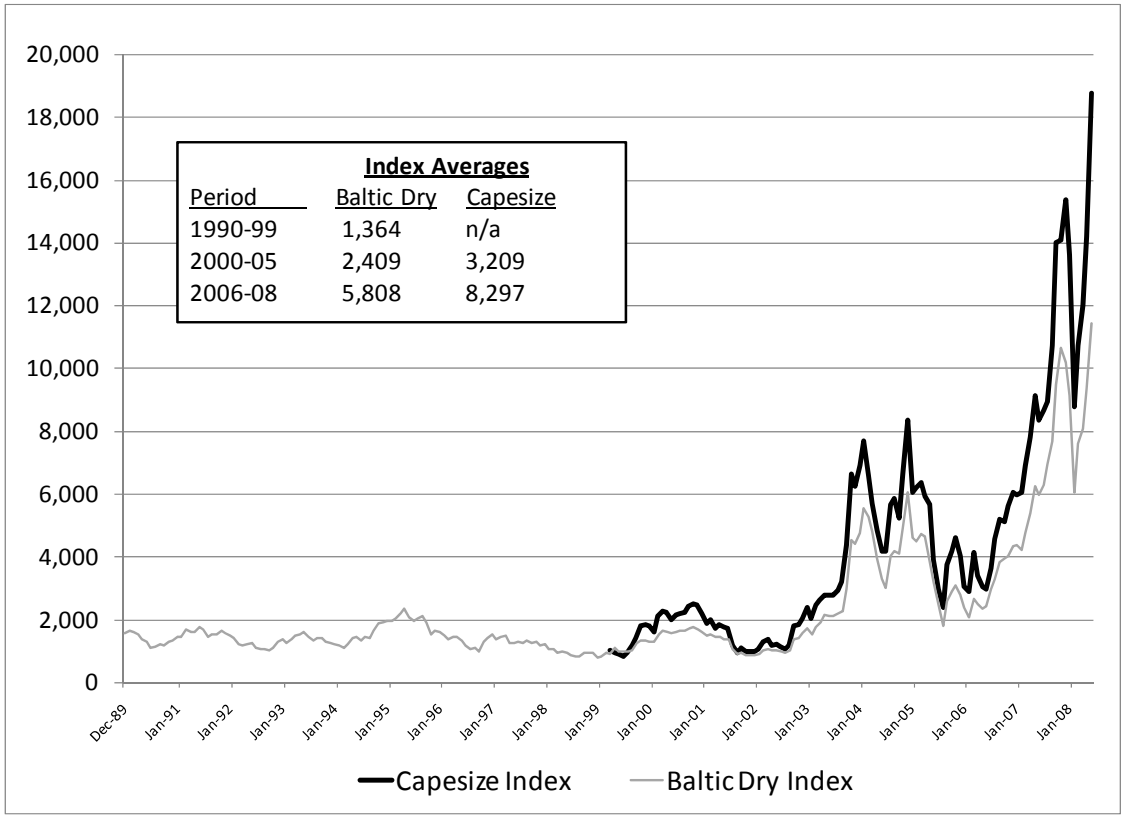
Source: Photograph by Mehmet Yapici, courtesy of Foto-IO Istanbul.

Exhibit 2 Average Daily Charter Rates for 170K DWT Capesize Ships (January 2004–May 2008)



Source: Adapted from *Fearnleys Weekly Report* (various issues), accessed July 2010.

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



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

Note: The Baltic Exchange Dry Index measured the price of moving the major raw materials by sea. The index covered 26 routes on a time charter and voyage basis and covered handymax, Panamax, and capesize dry bulk carriers carrying a range of commodities including coal, iron ore, and grain. The capesize index measured charter prices for capesize ships only.

Exhibit 4 Sales of Capesize Ships from January 2007 to May 2008

	Sale Date	Vessel Name	Sale Price ($US millions)	Year Built	Age at Sale (Years)	Dead-Weight Tons (000)	Trailing 1-Year Average Monthly Baltic Dry Capesize Index
1	Jan-07	Lowlands Beilun	$73.0	1999	8	170.2	4,647
2	Jan-07	CHS Moon	$45.0	1991	16	150.2	4,647
3	Jan-07	Spring Brave	$62.0	1995	12	151.1	4,647
4	Jan-07	Martha Verity	$60.0	1995	12	158.0	4,647
5	Jan-07	TMT TBN	$61.3	1993	14	174.7	4,647
6	Feb-07	Pantelis SP	$83.0	1999	8	169.9	4,878
7	Feb-07	Amazon	$45.0	1990	17	149.5	4,878
8	Mar-07	Cape Kassos	$100.0	2004	3	170.0	5,245
9	Mar-07	Johnny K	$65.0	1994	13	165.3	5,245
10	Mar-07	Zorbas	$70.0	1996	11	165.1	5,245
11	Mar-07	Americana	$33.0	1987	20	149.0	5,245
12	Mar-07	Martha Verity	$63.0	1995	12	158.0	5,245
13	Mar-07	Ullswater	$43.0	1990	17	123.5	5,245
14	Apr-07	Formosabulk Brave	$95.0	2001	6	170.1	5,752
15	Apr-07	Formosabulk Clement	$95.0	2001	6	170.1	5,752
16	Apr-07	Nautical Dream	$63.5	1994	13	151.4	5,752
17	Apr-07	Formosabulk Allstart	$67.0	1995	12	150.4	5,752
18	Apr-07	Arimathian	$62.0	1994	13	149.8	5,752
19	Apr-07	Boss	$31.0	1985	22	139.8	5,752
20	May-07	Zorbas II	$86.0	1996	11	174.5	6,201
21	May-07	Fertilia	$50.5	1997	10	172.6	6,201
22	May-07	Ingenious	$64.2	1996	11	170.0	6,201
23	Jun-07	Anangel Dawn	$67.0	1994	13	149.3	6,618
24	Jun-07	Orient Fortune	$28.0	1984	23	161.4	6,618
25	Jul-07	Great Moon	$30.0	1984	23	146.0	6,980
26	Jul-07	Gran Trader	$105.0	2001	6	172.5	6,980
27	Aug-07	Cape Brazil	$22.0	1981	26	140.8	7,441
28	Sep-07	Thalassini Kyra	$133.0	2002	5	164.2	8,181
29	Oct-07	Tiger Lily	$90.0	1995	12	149.2	8,886
30	Oct-07	Dong-A-Helios	$47.0	1986	21	146.9	8,886
31	Oct-07	Marine Hunter	$45.0	1984	23	164.5	8,886
32	Oct-07	Peace Glory	$57.0	1984	23	166.1	8,886
33	Nov-07	Sumihou	$106.0	1996	11	171.1	9,663
34	Nov-07	Gran Trader	$152.0	2001	6	172.6	9,663
35	Nov-07	Netadola	$97.0	1993	14	149.5	9,663
36	Nov-07	Nordstar	$38.0	1983	24	150.7	9,663
37	Nov-07	Captain Vangelis L	$87.5	1992	15	148.2	9,663
38	Dec-07	Voutakos	$78.0	1987	20	188.3	10,299
39	Dec-07	Sachuest	$35.0	1986	21	98.4	10,299
40	Jan-08	Sinfonia	$83.7	1991	17	184.4	10,526
41	Jan-08	Jin Tai	$155.0	2004	4	173.9	10,526
42	Feb-08	Dias	$58.0	1988	20	135.0	10,844
43	Mar-08	Desimi	$83.0	1989	19	207.1	11,193
44	Mar-08	Samos	$25.0	1982	26	137.0	11,193
45	Mar-08	Cape Sun	$135.0	1999	9	171.7	11,193
46	Apr-08	Nightflight	$158.0	2004	4	170.0	11,614
47	May-08	Cape Falcon	$87.2	1993	15	161.5	12,479
48	May-08	Castle Peak	$82.0	1990	18	145.4	12,479

Source: Adapted from *Compass Weekly Market Report* (various issues) and Thompson Reuters Datastream, accessed July 2010.

Endnotes

[1] Trond Lillestolen, "Polembros snaps up 'low-priced' capesize," *TradeWinds*, January 9, 2009, p. 3.

[2] Jamie Dale, "Confidence grows for secondhand bulkers," *Lloyd's List*, May 28, 2008, p. 18.

[3] International Chamber of Shipping, http://www.marisec.org/shippingfacts/worldtrade/index.php, accessed April 2010.

[4] Basil Karatzas, "What's in the value of a vessel?" *Tanker Operator*, November/December 2009, p. 4.