CHAPTER 1.8

The Merchant Fleet: A Facilitator of World Trade

HANS OUST HEIBERG
DNB Bank ASA

This chapter attempts to present the world merchant fleet in the context of world trade, to explain some of the challenges the industry is facing, and to consider how some of these challenges can work as potential trade barriers.

The analysis will include a brief overview of recent maritime industry history and the current cost of seaborne trade, followed by a look at the opportunities to be found in terms of coping with three key issues: (1) fuel cost, (2) an expected decade of environmental regulation, and (3) fleet renewal.

SHIPPING AND WORLD TRADE

The merchant fleet broadly consists of bulk carriers (bulkers), which are designed to transport unpackaged bulk cargo; tankers, which are designed to transport liquid cargo; and container ships. Together these vessels account for 85 percent of the fleet. Niche segments—such as gas carriers, car carriers, and refrigerated vessels—account for the remaining 15 percent. The entire fleet comprises more than 50,000 seagoing vessels, with a total carrying capacity of close to 1.4 billion metric tons.[1] The economic life expectancy of a ship is typically 25 years.

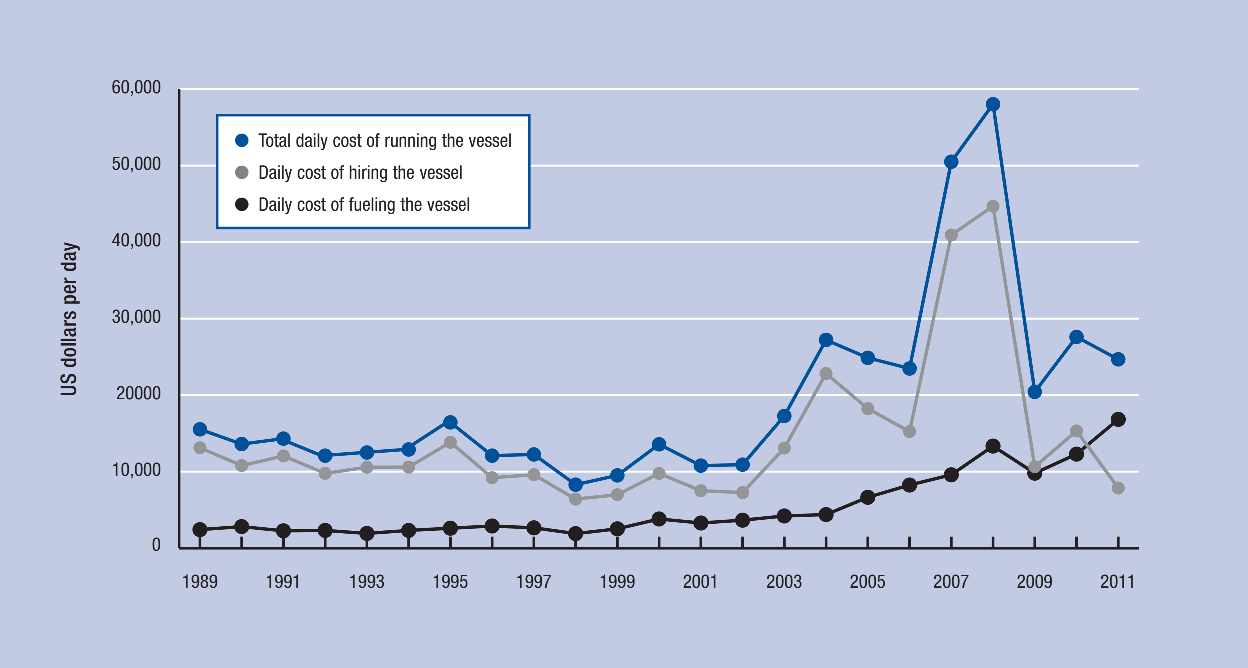
In 1950 the world seaborne trade comprised about 0.5 billion metric tons, whereas today it has expanded to about 9 billion metric tons. Thus seaborne trade has grown about 18-fold, while GDP has grown roughly eight- or ninefold in the same period. In volume terms, according to Lloyd's Marine Intelligence, 75 percent of world trade is by sea whereas 16 percent is rail and road, 9 percent by pipeline, and 0.3 percent by air. The expansion of world trade has accelerated in the last decade, coinciding with China joining the World Trade Organization. Shipowners and shipyards reacted to this by building more ships to accommodate the growth in demand. As a result, from a historical perspective, the current fleet is very modern.

In value terms, seaborne trade accounts for about 60 percent of world trade. The value of all of world trade today is about US$15 trillion, of which US$9 trillion is by sea. To put this into perspective, total world GDP is about US$63 trillion. GDP growth influences trade growth, but GDP growth is in turn affected by factors such as trade barriers, foreign direct investment, and infrastructure development.

The primary development seen in the shipping industry since the 1950s is the appearance of the container ship. Over the last 60 years, the seaborne container trade has grown from zero to about 1.5 billion metric tons. In 2010, the global value of the seaborne container trade we believe is about US$5.6 trillion, which is about 60 percent of the world's seaborne trade. The remaining US$3.4 trillion, or 40 percent of world seaborne trade, is comprised mainly of commodities such as oil and oil products, iron ore, coal, grain, and other minor bulk cargoes.

Data in this chapter come from Clarksons Research Services Ltd, DNB Bank ASA, Lloyds Marine Intelligence, and the World Trade Organization.

Figure 1: Daily cost of moving 65,000 metric tons of coal



Sources: Clarksons Research Services Ltd; DNB Bank ASA.

THE CURRENT COST OF SHIPPING GOODS AND BUILDING SHIPS

The cost of seaborne transportation today for major commodities is in the region of 2 to 15 percent of the cost of the commodity. Transportation distance is the main driver of this cost: for example, transporting iron ore from Brazil to China would cost about 15 percent of the cost of the ore itself, whereas transporting the iron ore from Australia to China would cost only 6 percent of the cost of the ore.

There is no specific fixed value for the contents of a container, because contents vary. But a crude approximation of average content value can be derived by dividing the global seaborne container trade of US$5.6 trillion by 140 million containers: this gives an average content value of US$42,000. A container can be shipped from the Far East to Europe for US$1,000, which means that the cost of shipping is roughly 2.4 percent of the value of the contents.

The daily cost of transporting the foremost commodities—iron ore and oil—is historically high, even though the actual earnings of the shipowners operating in the spot market are below their breakeven point.

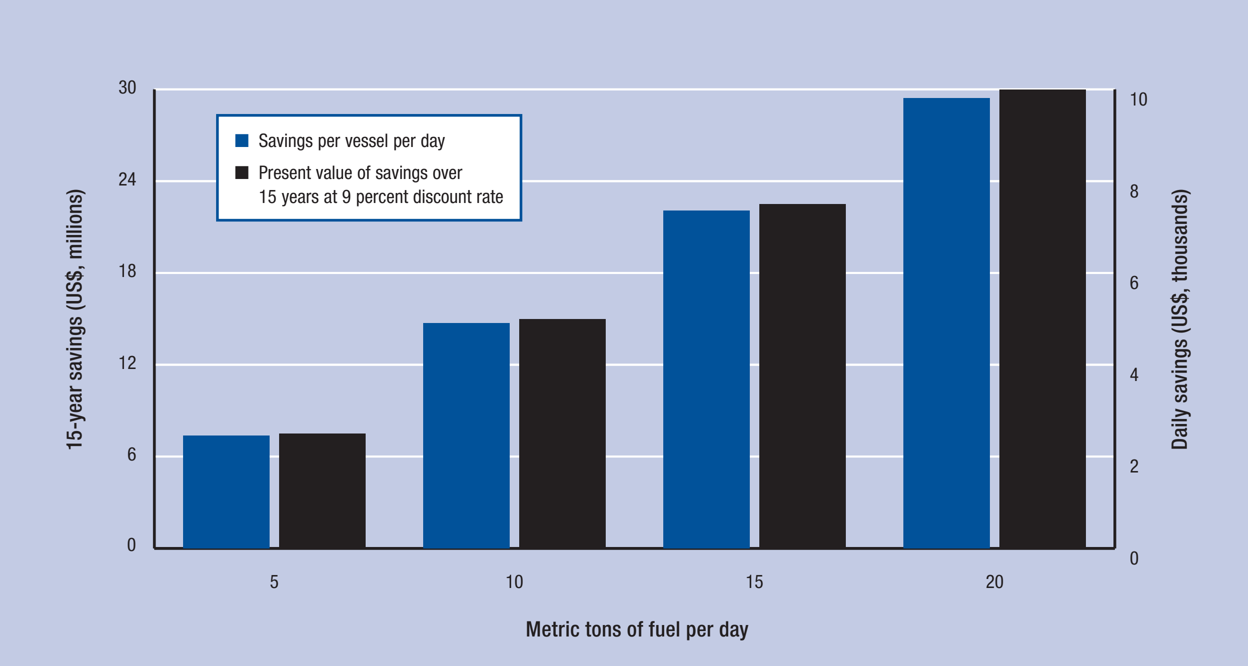
The Clarksons' ClarkSea earnings index has fallen from a peak in excess of 46,000 points in mid 2008 to 8,761 points on average so far in 2012. In comparison, the last low point occurred in 2002, when the index stood at 10,341 points. The average for 2002–11 was 21,000 points, whereas the average for the last three years (2009–11) was 12,000 points.

The graph in Figure 1 shows that the current cost of fuel for the transportation of coal is the key cost component and currently stands at about 80 percent of the cost of the coal. It can be further noted that fuel cost has been higher than transportation cost in the last two decades except during the last 5 years. In the last 10 years, the average bunker price was about US$340 per metric ton; today the price is more than US$700 per metric ton. Currently the daily breakeven cost of moving such a coal cargo is in excess of US$30,000 per day when including fuel, operating costs, and vessel amortizing costs. At breakeven, fuel accounts for about 60 percent of total cost.

Back in 2002, for example, the cost of building a very large crude carrier (VLCC) was US$64 million. At the peak of the market in 2008, the price was US$150 million. The construction cost for such a vessel today is quoted at US$90 million. Current prices for constructing new ships are now between 30 percent and 45 percent higher than they were in 2002. Such an increase over 10 years, when taking into account the rise in steel prices and in the costs of compliance with regulations introduced during the period to improve the quality of ships, is not excessively high. In fact, we may be at a low point in terms of new ship construction cost.

Port congestion, however, is one variable that is not controlled by the shipowner. Port congestion is primarily a problem for dry commodities, such as ore and coal. The dry cargo fleet currently spends about 6 percent of its time idle in ports because of the lack of infrastructure for getting the cargo onboard in a timely fashion. This

Figure 2: Savings opportunities with new technology: Fuel price US$500 per metric ton—illustration of savings with new technology versus old technology



Source: Author's estimates.

equates to roughly 20 days of lost efficiency. Assuming 9,000 bulk carriers at a cost of US$10,000 per day, the annual global cost of this inefficiency is about US$18 billion. With possible future increases in demand, congestion is likely to increase.

In summary, in the current market situation freight rates are high but not sufficient for shipowners to break even because of the high cost of fuel. Thus demand for ships has dropped, resulting in substantially lower ship values and in a lower cost of building new ships.

ADJUSTING TO HIGH FUEL PRICES

The whole industry is adjusting to high fuel costs by reducing speed (a method called *slowsteaming*) in order to reduce consumption. In general, existing vessels in similar segments of the fleet have rather similar fuel consumption needs, regardless of their age.

By slowing a vessel down from 15 knots to 11 knots, fuel consumption may well be reduced by 50 percent. On the run from Brazil to China, for example, this means a round-trip increase from 65 days to 86 days. For a typical ship carrying iron ore on this route, the fuel cost would be reduced by close to US$1 million. The cargo is worth close to US$25 million. Assuming a 10 percent holding cost of the cargo value for the additional 10.5 sailing days on the laden leg, the cost increase in sailing time is about US$80,000.

The value of the cargo on board a VLCC at today's oil prices (April 2012) of about US$120 per barrel is about US$240 million. A container ship with 10,000 containers with a value of US$42,000 each yields a total cargo value of US$420 million. Slowsteaming with such valuable cargoes seems to be beneficial even after compensating the cargo owners for costs associated with holding such inventory. Thus there is an opportunity to reduce cost by reducing speed and at the same time financially compensating the cargo owner for the loss of time caused by slower speeds.

The rise in bunker price, coupled with the implementation of new emission control regulations, is making the industry focus more on fuel efficiency. Already new designs promise a 20 percent reduction in fuel consumption.

For a new-design VLCC, the reduction in consumption over that of a five-year-old vessel is in the region of 20 metric tons of fuel per day, which implies a daily savings of US$10,000 on average. On an annual basis, this savings comes to US$3.65 million. Assuming 15 years of trading, a constant fuel price, and a discount rate of 9 percent, the present value of the savings is close to US$30 million (see Figure 2). This is about 33 percent of the cost of the asset, currently priced at US$90 million. It may be a fair assumption that the shipowner will retain half of these savings. Recently delivered vessels that are built with the previous year's technology should then be valued at US$75 million. Resale value for a ship to be delivered this year (one built with old technology) is estimated by some to be US$85 million.

Doing a similar exercise for a large dry cargo vessel, annual savings are in the region of US$1.8 million with a net present value of US$18 million, which equates to 37 percent of the cost of the asset. Doing the same for a 10,000 twenty-foot equivalent container ship, the annual savings is in the region of US$5.8 million with a net present value of US$46 million, which equates to 42 percent of the cost of the asset. Across the sectors of the fleet, substantial savings are possible by using an eco ship. The present value is in the range of 30 to 40 percent of the value of the asset.

It is important to note that there is a difference between shipyards' research and development departments, and they are not equally good on design. Many yards have traditionally focused on producing tonnage as cheaply as possible; these yards have not paid much attention to fuel efficiency. There is already a two-tier, or perhaps even a three-tier, market in the quality of vessels that shipyards produce. This will be intensified as eco ships become prevalent because the top-quality yards are typically those with good research and development capability.

In sum, the fuel-cost challenge is likely to have three main consequences. First will be a reduction of speed, which reduces fuel consumption. Second, pressure is being felt to build ships that are more fuel efficient. Third, inefficient vessels will lose ground to fuel-efficient vessels, and the rate of scrapping older ships is therefore likely to increase.

RULES AND REGULATIONS IN THE COMING DECADE

Regulators are moving onto the high seas with strict emission controls for sulfur and ballast water. The regulations are likely to be delayed because of technological and logistical issues, but by 2015 owners will have to adhere to a stricter regime.

However, the initial phase of requiring less than 1 percent sulfur in the fuel oil when trading in Emission Control Areas (ECA) in coastal areas such as the Baltic and the North Sea has worked smoothly. The global deep-sea limit of 3.5 percent sulfur in fuel oil has also come into force. Beginning in August, 2012, the United States will be introducing an ECA within 200 nautical miles. It is expected that Tokyo Bay, Singapore, Hong Kong, the Mediterranean, and the Caribbean will follow shortly. The challenge for the fleet is to meet the 2015 limit of 0.1 percent sulfur content within ECAs. By the year 2020, the limit of sulfur in international waters is to come down to 0.5 percent. In effect, the 2015 and 2020 limits will mean that the industry will have to burn marine diesel oil (MDO) or marine gas oil instead of heavy fuel oil (HFO). Currently there is not sufficient refining capacity to take the industry from residual fuel to middle distillates.

The price difference between HFO and MDO is about US$300 per metric ton. The technology—scrubbers that can clean the exhaust in order to reduce sulfur content—does exist. It appears that the price for average size ships (smaller than capesize vessels and VLCCs) is in the region of US$3.5 million for new construction and US$4 million plus for a retrofit.

Assuming a fuel consumption of 30 metric tons per day on an average size ship, the annual price of HFO is US$7.7 million whereas the annual price of MDO is US$11 million. The one-year differential of US$3.3 million is in line with the cost of a scrubber. In order to comply with the 2015 ECA sulfur limit, the need for fuel oil segregation on board will be an issue for some vessels.

Alongside emission control, the merchant fleet has to adapt to ballast water treatment in order to prevent contaminated water and unwanted species from being carried from one region to another. Implementation is at the early stages, and some newly constructed ships have been fitted with the system. The system will be compulsory by 2015, but suppliers and yards will have to have the capacity in terms of production and the logistics to retrofit the existing fleet. Prices of ballast water treatment systems are in the region of US$1 to 4 million, depending on the size of the vessel, and such a system requires 30 to 45 days in a yard to be fitted. In the case of a VLCC, spending 45 days in a yard represents a million dollars in lost revenue in today's market.

Both scrubbers and ballast water treatment will demand a great deal from suppliers and yards for retrofits. Timelines are likely to be pushed back. However, investment decisions will be difficult because technology is still under development, cut-off dates uncertain, and it is difficult to know when and how to choose MDO or HFO as fuel. The cost of fitting the necessary equipment is likely to come down as technology improves, but there will still be the logistical issue of fitting equipment and downtime, which will necessarily lead to a one-off loss of income.

Even if HFO remains the primary fuel for the merchant fleet, it will become more expensive because it will have a lower sulfur content than the fuel currently in use. Older ships are likely to be scrapped because upgrading them will be uneconomical. Furthermore, fuel cost will rise as consequence of having to burn cleaner fuel.

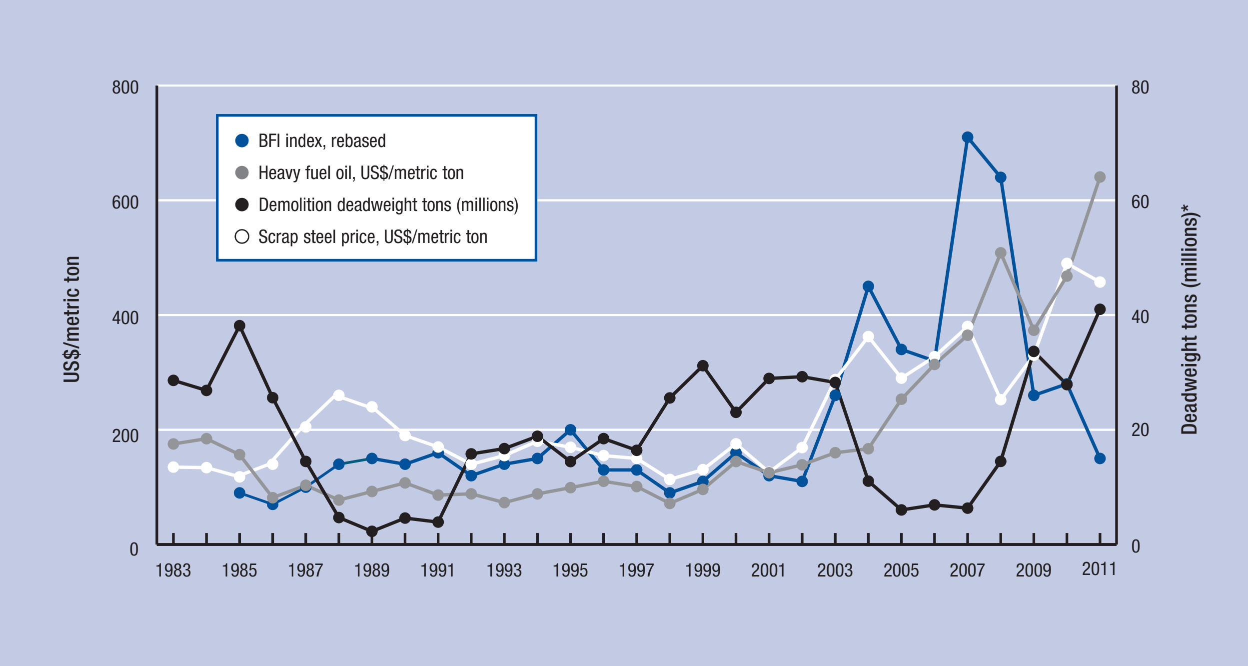
The lack of clarity in implementation dates and exactly what the requirements and limits will be contributes to an uncertainty that itself may become a trade barrier. Not being able to plan increases risk. Not being able to implement new technology hampers development when it cannot be tested in real life.

RENEWAL OF THE FLEET

Rates and ship values are linked, and thus in bad markets, values come down. High scrap steel prices may also entice shipowners to scrap old vessels. Often scrapping coincides with an expensive docking and when expensive upgrades are needed in order to comply with regulation (see Figure 3).

The cost of a VLCC ordered today is US$90 million; a five-year-old vessel today is valued at US$58 million. On average, from 2002 to 2011 a five-year-old vessel was priced at 84 percent of the price of a new construction. Now a five-year-old vessel is priced at 60 percent of a new ship, and a 15-year-old vessel at 25 percent of the cost of building new. A 10-year historic average is not available for 15-year-old vessels, because double-hull tankers came into production early in the 1990s. However, the 2002–11 average ratio of 10-year-old to new construction price was 64 percent. Scrap value is now historically high, and VLCC scrap value is

Figure 3: Scrapping and scrapping indicators



Sources: Clarksons Research Services Ltd; DNB Bank ASA.
* Demolition in million deadweight tons and Baltic Freight Index (BFI) is rebased by dividing the index by 100.

now at 20 percent of the cost of new construction. We see similar trends in the dry cargo and the container segments.

It seems that the fleet is depreciating faster in value than before. It may be the case that the useful life of a non–fuel-efficient ship is 15 years for a VLCC and 20 years for a capesize. When they reach this age, the value of the vessels is close to their scrap value. For crude tankers, many charterers will not take ships older than 15 years. Every five years, ships need to dock and pass a special survey with a classification society.[2] The cost of making any modifications necessary to pass this survey for 15- and 20-year-old vessels may be high. The cost of drydocking a 15-year-old VLCC and a 20-year-old capesize vessel is easily US$3.5 million; 40 days in a shipyard with no income must also be taken into consideration.

As we saw earlier, the earnings of the world global fleet have dropped dramatically. Even the last three years—with average earnings of 60 percent of the 10-year average—have witnessed 115 million deadweight tonnage (DWT) of the fleet being scrapped. This amounts to about 8 percent of the fleet—not a very high percentage, but it has been increasing during the period, and last year some 40 million DWT was scrapped. Earnings have deteriorated since last year by 25 percent and bunker prices have come up by 15 percent. It is not unlikely, then, that scrapping will continue at more than 40 million DWT per annum the next couple of years.

Assume a sluggish world economy and high oil prices for two years, and scrapping 75 million DWT per annum—or 150 million DWT over the two years—is equal to the entire fleet's vessels that are older than 25 years. But, more importantly, by 2015, 50 million DWT of large tankers will pass the 15-year age mark and 75 million DWT of large bulk carriers will pass the 20-year mark. This level of scrapping for large tankers is equal to 100 percent of the vessels currently on order with the shipyards' orderbooks. In terms of the bulkers, such scrapping is equal to about 60 percent of the order for large bulk carriers.

Scrapping 200 million DWT over the next three years is not unlikely. Current orders are for 340 million DWT, with building capacity for more tonnage in 2013 and 2014. The key to further ordering, apart from what has so far been discussed, is financing capacity.

Most numbers concerning bank capacity in shipping include offshore units such as rigs and supply vessels. An aggregate value of the world fleet—including specialized ships such as chemical tankers, gas tankers, and offshore units—is probably in the region of US$800 to 900 billion. Bank commitments are probably in the region of US$400 to 450 billion. It is likely that this is shrinking because some banks wish to reduce exposure. Over the next couple of years, loan repayments will probably be in the range of US$70 billion per annum, of which US$40 billion is likely to be committed by the banks to new business. Pure shipping orders are to the tune of US$190 billion, or US$270 billion when including offshore units (oil rigs and vessels supporting the offshore industry). It is likely that half of this amount is financed, thus some US$135 billion will need to be funded over the next two years. At 50 percent of the value of the asset being financed, this represents some US$40 billion per annum. This amount leaves little room for financing either further new construction or secondhand tonnage. However, export credit agencies are expected to play a greater role in new construction because countries such as China, the Republic of Korea, and Brazil are expected to assist in financing ships built at their local yards. Furthermore, the bond market is expected to be part of the funding equation, although that will probably have a greater impact on the offshore side than the shipping side.

There has been a substantial reduction of values and earnings since the height of the market. However, owners with low financial gearing or low operational gearing have weathered the volatile market fairly well. Thus far there have not been many casualties, and most of the ordering spree at high prices has been absorbed into the fleet. However, a prolonged downturn will be a further damper on banks' ability to fund new tonnage.

We expect high scrapping and ships as young as 15 years to be scrapped. We do expect more tonnage to be ordered for 2013/14, but only in limited numbers. A substantial part of the funding will have to come from equity and nonbank debt. It is also to be expected that shipyards that cannot build competitive tonnage will go bankrupt.

CONCLUSION

Continued high oil prices and requirements for cleaner fuel are expected to place an upward pressure on transportation cost. More fuel-efficient tonnage will ease this pressure somewhat over time. However, because of capital constraints and low earnings, the renewal of the fleet in any meaningful way will take time. The current low rates, coupled with high scrap prices, will increase demolition to new peaks—possibly as high as 70 million DWT a year.

A further reduction in speed will reduce the availability of tonnage and put upward pressure on rates. A bit further out in time, tonnage availability will also reduce somewhat because of ships going to shipyards to be upgraded with emissions and ballast water treatment systems.

Once financing is more available, tonnage renewal will accelerate. With fuel costs above US$500 per metric ton, fuel savings of 20 percent or more will be appealing to shipowners. A savings of 10 metric tons per day on average, at US$500 per metric ton, currently has a present value of US$15 million. Thus it is not unlikely that a capesize vessel at a current new construction cost of US$48 million can reduce consumption on average by 10 metric tons daily when slowsteaming. This will be enticing for both owner and charterer. Clarity on emissions technology and improved fuel efficiency will also be catalysts for accelerated renewal, and a pattern of a two-tier merchant fleet will evolve.

The actual cost of the shipping assets is expected to be lower than it was in the last decade. Operating shipping cost inflation is not expected to be high. Thus the cost of the ship itself is not expected to put upward pressure on shipping cost unless there is a shortage of tonnage. For the dry cargo business, better infrastructure around ports will reduce the cost of transportation because ships will wait less time for cargo, thus making the fleet more efficient.

These factors—high fuel cost, congestion in ports, lack of financing, and ability to innovate—will determine the degree to which shipping cost will serve as a significant trade barrier in the future.

NOTES

1 A metric ton is equal to 1,000 kilograms.

2 All ships need to be of a certain quality. Classification societies such the American Bureau of Shipping, Det Norske Veritas, Bureau Veritas, and so on check compliance and issue compliance certificates.