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REVIEW OF MARITIME TRANSPORT 2012

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Chapter 3

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FREIGHT RATES AND MARITIME TRANSPORT COSTS

Freight rates in 2011 and the beginning of 2012 have often remained at unprofitable levels. Within the three segments – dry bulk, liquid bulk and containerized cargo – substantial freight rate drops have been reported. Vessel oversupply can be identified as a driving factor behind this development. The investment in large capacity ships within the tanker and the dry bulk segment accelerated competition as ship operators were willing to accept freight rates below or close to operating costs.

Daily earnings of Capesize vessels dropped below those of the significantly smaller Handysize class for several months. This fuels an ongoing debate at a time when ship size rallies are coming to an end. While smaller vessels offer greater flexibility and serve ports that are not equipped with state of the art handling equipment, large vessels are constraint to navigate between the world's busiest ports, and these routes have often experienced a pronounced capacity oversupply this year.

While freight rates have declined or remained at historically low levels, ship operating costs have grown moderately. In addition, bunkering prices continue to recover from their collapse during the economic crisis, offsetting temporary freight-rate increases.

For developing countries in Asia and the Americas, the cost of transport expressed as a percentage of the value of the goods imported continues to diminish, thus converging to that of developed nations. Africa also followed this trend until 2001, but currently, these transport cost shares are stagnating on the continent at relatively high levels.

This chapter also discusses three generic strategies for individual countries to influence transport costs within their seaborne trade network. These include the development of coastal shipping and efficiency programmes for ports. In addition, policies should be applied that aim at improving the port connections with hinterland markets.

This chapter covers the development of freight rates and maritime transport costs and is structured in the following order. Section A analyses developments in maritime freight rates in 2011 and the beginning of 2012 for three major cargo types: containers, liquid bulk and dry bulk. Building on this, section B discusses the factors behind freight rate volatilities, mainly focusing on transport costs and the demand and supply structure in the individual shipping segments. Finally, section C proposes three generic strategies to reduce maritime freight rates and evaluates the impact of these measures on the components of freight rate costs.

A. FREIGHT RATES

This section presents an analysis of maritime freight rate developments for containers, dry bulk and liquid bulk shipping. It highlights significant events leading to major price fluctuations, discusses recent industry trends and gives a selective outlook on future developments of freight markets.

1. Container freight rates

Having experienced one of the steepest freight rate cuts in history in 2008, the recovery remains sluggish in 2011. Current freight rates are still far from reaching pre-crisis levels, having experienced another downturn in the second half of 2011 after a temporary resurgence. Time charter rates for container ships have declined from May to December 2011 for most ship types, reaching a loss of 66 per cent within the 2,300–3,400 20-foot equivalent units (TEUs) class (table 3.1). This is reflected by the New ConTex index, a condensed container freight rate indicator covering a wide range of ship sizes, which experienced a dip of almost 60 per cent of its value from May to December 2011 (figure 3.1).[1]

An overstretched container cargo market on the supply side precipitated the low freight rate levels in 2011. While the demand is currently still recovering from the seaborne trade collapse during the financial crisis, the growth rates of the global container carrier capacity have remained relatively stable (figure 3.2), due in part to shipowners not being able to withdraw from their buying contracts. In addition, ship operators suffer from substantial bunkering price increases that are not reflected in developments in freight rates.

As a result, the industry has experienced aggressive pricing policies of boxship operators competing for market shares.[2] Many box carriers are still operating at a loss, inciting them to cull capacity on unprofitable trade routes and/or raise prices for shippers. An example is Hanjin, which announced freight price increases of between $200 and $400 on routes linking Asia to Northern Europe and Western Africa. Companies such as CMA CGM, CKYH and OOCL cut their capacity on the transatlantic lanes.[3] These measures did not, however, lead to a substantial freight rate increase in the overall container shipping market in 2011. It is estimated that the total loss to the industry will reach $5.2 billion this year.[4]

High-volume routes, in particular, are experiencing an increasing competition. Operators place their largest ships in these networks and aim at offering more regular services. As a result, shipping lines build alliances to share costs, bundle capacity and streamline their operations. Examples of this industry trend include the partnership of MSC and CMA CGM, or the merging of Asia–Europe services between the Grand Alliance (Hapag-Lloyd, NYK and OOCL) and the New World Alliance (HMM, APL and MOL).[5] Individual shipping lines with smaller vessels will find it increasingly difficult to remain competitive on the world's busiest shipping lanes. Furthermore, with a growth rate predicted at 25 per cent for the above-8,000 TEUs fleet in 2012, large-scale capacity is continuing to enter this market segment.[6]

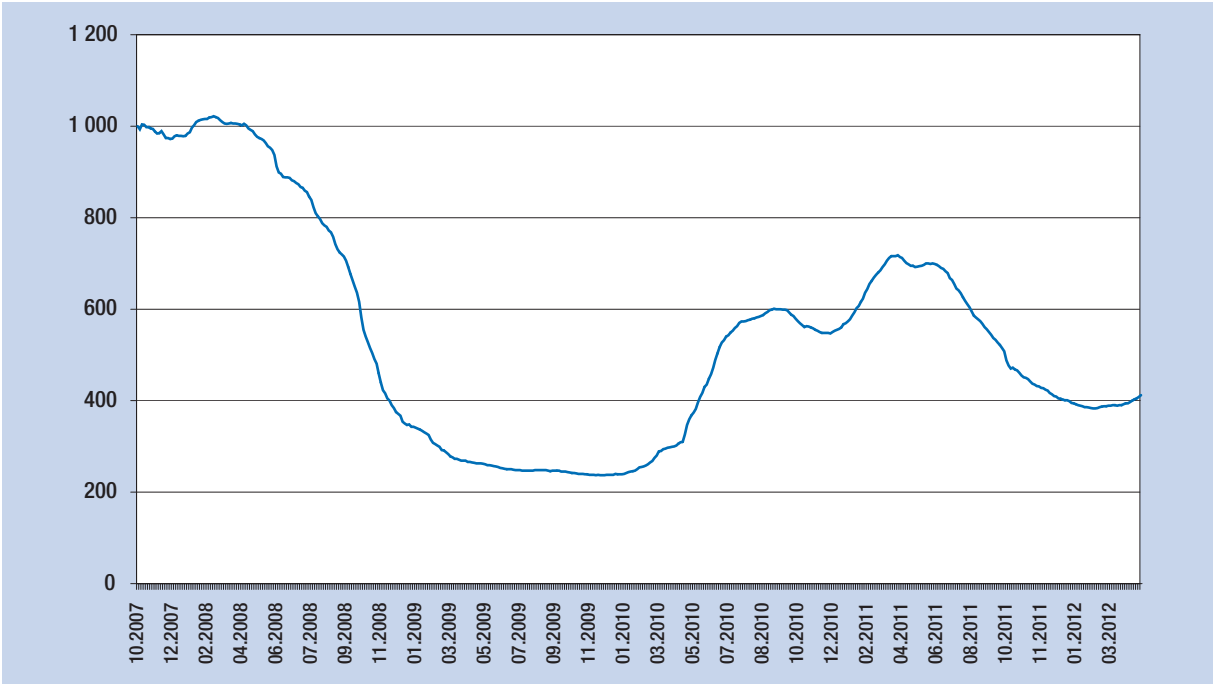
Container ship operators entering the reefer business

The decline in freight rates in the container shipping business increasingly puts competitive pressures on specialized reefers. Refrigerated cargo is used by container ship operators as an opportunity to fill some of the idle capacity in the business. This trend is also reflected in the ship buyers' orderbook, which contains an increasing share of vessels with large reefer capacity (see also chapter 2).[7]

Industry-leader reefers such as Star Reefers have described 2011, as for 2010, as one of the poorest years in the industry's history, companies being hit hard by the low freight rates and increased competition from container ship operators.[8] The spot market rates for larger reefer ships reached an average of 43 cents per cubic feet per 30 days in 2011, following 42 cents in 2010.[9] The near collapse of banana exports from Ecuador and Central America since April 2011 brought additional stress to reefer freight rates. Although a strong growth in demand for the transport of perishable goods is being predicted, the shipping industry will most likely also experience an ongoing cargo shift from specialized reefers to container ships. International container lines are constantly introducing new regular services for the transportation of perishable goods connecting the major production centres with the largest consumer markets, such as Europe and North America. According to Drewry, in 2014 about 74 per cent of perishable reefer goods will be transported by container ships, these providing some 95 per cent of the entire reefer market cargo capacity.[10]

This industry trend is also reflected in the structure of the reefer fleet and the orderbook for specialized reefer vessels. The reefer fleet is comparably old, with

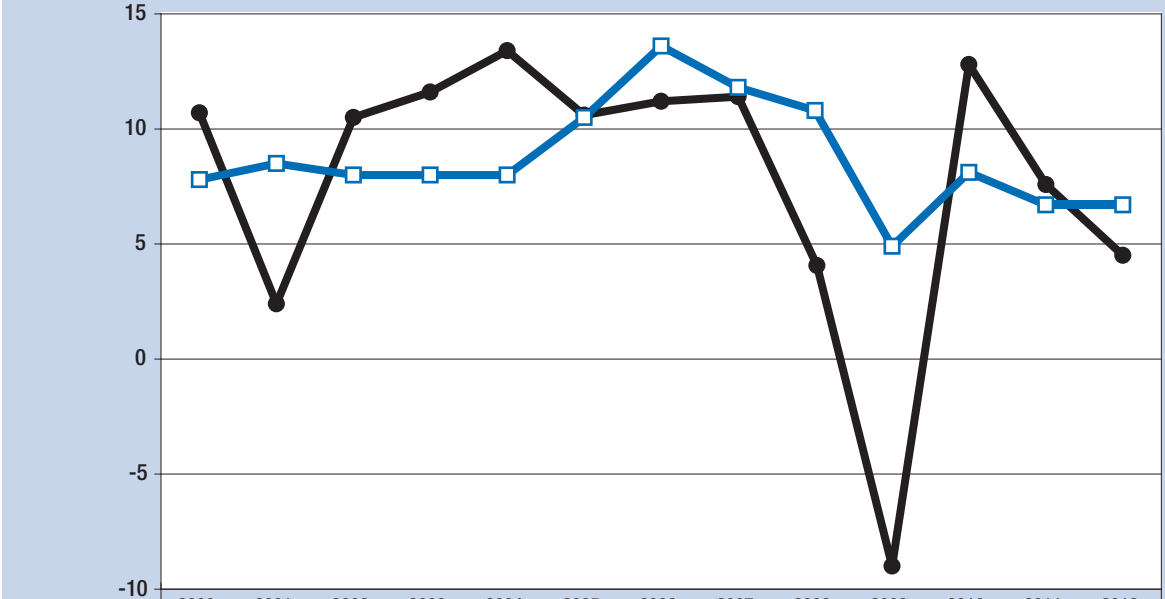
Figure 3.1. New ConTex 2007–2012 (Index base October 2007, 1,000 points)



Source: Compiled by the UNCTAD secretariat, using the New ConTex index produced by the Hamburg Shipbrokers' Association. See http://www.vhss.de.

Note: New ConTex is a container ship time charter assessment index calculated as an equivalent weight of percentage change from six ConTex assessments, including the following ship sizes: 1,100, 1,700, 2,500, 2,700, 3,500 and 4,250 TEUs.

Figure 3.2. Growth of demand and supply in container shipping, 2000–2012 (Annual growth rates)



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Demand	10.7	2.4	10.5	11.6	13.4	10.6	11.2	11.4	4.2	-9	12.8	7.1	4.8
Supply	7.8	8.5	8	8	8	10.5	13.6	11.8	10.8	4.9	8.1	6.7	6.7

Source: Compiled by UNCTAD secretariat on the basis of data from *Clarkson Container Intelligence Monthly*, various issues.

Note: Supply data refers to total container-carrying fleet capacity, including multi-purpose and other vessels with some container-carrying capacity. Demand growth based on million TEU lifts. The data for 2012 are forecast figures.

Table 3.1. Container ship time charter rates (Dollars per 14-ton slot per day)

Ship type and sailing speed (TEUs)	Yearly averages									
	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Gearless										
200–299 (min 14 kn)	16.9	19.6	25.0	31.7	26.7	27.2	26.0	12.5	12.4	12.4
300–500 (min 15 kn)	15.1	17.5	21.7	28.3	21.7	22.3	20.0	8.8	9.9	12.8
Geared/gearless										
2 000–2 299 (min 22 kn)	4.9	9.8	13.8	16.4	10.5	11.7	10.0	2.7	4.8	6.3
2 300–3 400 (min 22.5 kn)	6.0	9.3	13.2	13.0	10.2	10.7	10.7	4.9	4.7	6.2
Geared										
200–299 (min 14 kn)	17.0	18.9	27.0	35.4	28.0	29.8	32.1	16.7	18.3	22.1
300–500 (min 15 kn)	13.4	15.6	22.2	28.8	22.0	21.3	21.4	9.8	11.7	15.4
600–799 (min 17 - 17.9 kn)	9.3	12.3	19.6	23.7	16.6	16.1	15.6	6.6	8.4	11.2
700–999 (min 18 kn)	9.1	12.1	18.4	22.0	16.7	16.9	15.4	6.0	8.5	11.5
800–999 (min 18 kn)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	4.9	7.8	10.8
1 000–1 260 (min 18 kn)	6.9	11.6	19.1	22.6	14.3	13.7	12.2	4.0	5.9	8.7
1 261–1 350 (min 19 kn)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	3.7	4.9	8.1
1 600–1 999 (min 20 kn)	5.7	10.0	16.1	15.8	11.8	12.8	10.8	3.5	5.0	6.8

Ship type and sailing speed (TEUs)	Monthly averages for 2011												Monthly averages for 2012	
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb
Gearless														
200–299 (min 14 kn)	13.3	14.4	14.9	15.6	15.7	13.8	15.4	15.5	14.3	15.1	12.6	14.4	13.1	14.4
300–500 (min 15 kn)	11.3	12.3	13.4	14.4	14.4	14.1	13.6	13.1	12.6	12.4	11.9	10.3	9.8	12.3
Geared/ gearless														
2 000–2 299 (min 22 kn)	6.6	7.3	7.4	8.2	7.5	7.8	6.6	6.3	5.1	4.8	4.3	3.6	3.4	7.3
2 300–3 400 (min 22.5 kn)	7.6	8.5	9.1	8.6	8.7	8.1	6.7	5.1	3.3	2.7	2.7	2.7	3.0	
Geared														
200–299 (min 14 kn)	22.1	22.9	22.5	22.5	27.2	24.7	23.0	22.1	20.5	19.5	19.1	19.1	13.5	22.9
300–500 (min 15 kn)	17.2	16.1	17.2	15.5	15.3	18.2	17.1	15.4	14.6	13.2	13.6	11.4	12.3	16.1
600–799 (min 17 - 17.9 kn)	10.4	12.9	12.6	12.4	13.4	12.7	11.7	11.3	10.6	9.8	8.9	7.9	7.4	12.9
700–999 (min 18 kn)	11.9	12.7	13.4	13.8	13.5	13.3	12.3	11.0	10.4	9.5	8.7	7.8	7.7	12.7
800–999 (min 18 kn)	10.3	12.7	12.2	12.3	12.4	12.1	11.8	10.8	9.8	9.0	8.7	7.1	7.3	12.7
1 000–1 260 (min 18 kn)	7.5	8.7	9.9	10.1	10.4	10.3	9.6	8.9	8.4	7.9	6.9	6.2	6.3	8.7
1 261–1 350 (min 19 kn)	7.6	8.0	8.9	9.4	9.5	9.6	8.9	8.2	7.8	7.3	6.1	5.4	5.2	
1 600–1 999 (min 20 kn)	6.7	7.5	7.9	7.8	8.0	8.0	7.3	6.9	6.2	5.7	4.8	4.4	4.1	7.5

Source: Compiled by the UNCTAD secretariat based on data from *Shipping Statistics and Market Review*, various issues from 2002–2012, produced by the Institute of Shipping Economics and Logistics, Bremen, Germany. See also www.isl.org.

50 per cent of the tonnage having operated for more then 20 years and only 2 per cent of the ships with an operating age below six years.[11] Despite this fact, most carriers were not willing to invest in modern vessels to upgrade their ageing fleets and the orderbook dropped to zero in September 2011 for the first time. In addition, an annual average of 36 reefer ships was sent for scrapping between 2008 and 2010.[12]

2. Tanker freight rates

The tanker market, which encompasses the transportation of crude oil and petroleum products, represents approximately one third of the world seaborne trade volume.

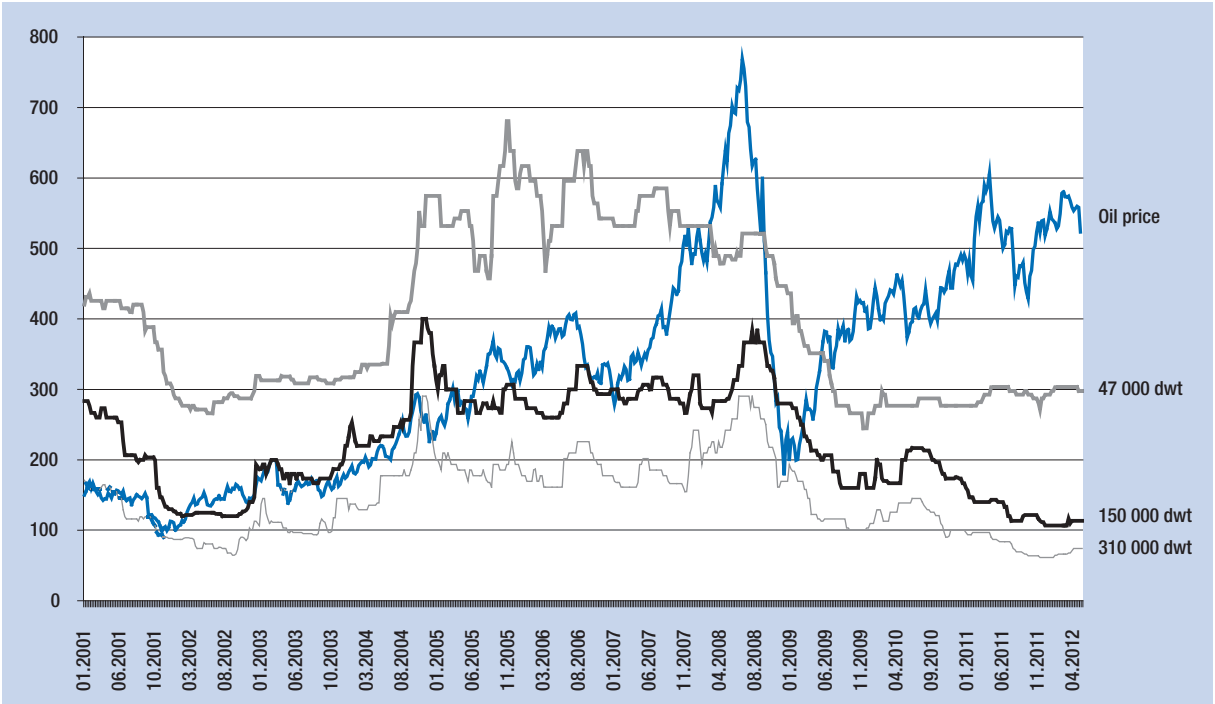
Freight rates for different ship sizes

Figure 3.3 visualizes tanker freight rates for different vessel sizes in dollars per 10,000 dwt capacity. The results confirm the significance of economies of scale in the tanker business, with substantial price gaps between the largest (310,000 dwt) and the smallest (47,000 dwt) ship category.

The comparison of oil prices and tanker market freight rates in the same figure demonstrates that freight rates and oil prices trend in similar patterns.[13] This is because vessel bunkering contributes a large share to the total ship operating costs (see also the vessel operating cost split in figure 3.7). In addition, the world demand for oil and maritime transport services are both strongly linked to overall economic growth. During times of economic growth, the demand for maritime transport services and oil increases substantially, possibly outweighing, in parallel, their demand and supply balance and thus leading to price increases. In the past, seaborne trade has grown approximately two times faster than the world's gross domestic product (GDP) (see also chapter 1). Oil demand increases during periods of economic prosperity not only because it is a major source of energy for the transport of goods, but also because it is used in some 70,000 manufactured products, such as synthetic fabrics, plastics and medicines.

From 2009 onwards, however, a divergence between the trends of oil price and freight rates can be observed. While the crude oil price has recovered to

Figure 3.3. Daily tanker time charter rate in dollars per 10 000 dwt capacity for various vessel sizes, 2001–2012 (Dollars per day per 10 000 dwt)



Source: Compiled by UNCTAD secretariat based on information from *Clarkson Shipping Intelligence Network*. Oil price data from United States of America Energy Information Administration, available at http://205.254.135.7/dnav/pet/pet_pri_spt_s1_w.htm.

Note: The x-axis represents weekly figures. The y-axis represents daily time charter rate in dollars per 10,000 dwt capacity for a modern tanker. Oil price is indexed with index base 150 in May 2001. Ship sizes are expressed in deadweight capacity (in thousands of dwt).

Table 3.2. Daily time charter rates and tanker indices, 2011–2012 (monthly figures)

2011	*Daily tanker time charter rate in $, monthly average*					Exchange Baltic Tanker	
	310	150	110	74	48	Dirty Index	Clean Index
January	30 250	24 375	17 875	14 750	13 000	842	635
February	29 500	21 750	16 875	14 750	13 000	660	642
March	30 000	21 000	16 125	15 188	13 188	965	749
April	30 000	21 000	16 000	15 800	13 700	927	836
May	27 250	21 500	15 812	15 562	14 250	822	882
June	26 125	21 000	15 375	15 500	14 250	750	706
July	25 800	18 600	15 450	15 450	14 150	746	690
August	22 125	17 000	15 312	14 875	13 875	720	682
September	21 000	17 700	15 050	14 650	13 850	677	679
October	19 750	18 250	14 500	14 000	13 688	704	721
November	19 562	17 750	13 938	13 438	13 250	763	721
December	19 000	16 300	13 600	13 000	13 650	784	725
Average 2011	25 030	19 685	15 493	14 747	13 654	780	722
January	19 250	16 000	13 625	13 000	14 000	783	762
February	20 375	16 000	13 938	13 000	14 250	803	645
March	20 700	16 400	13 650	13 000	14 250	781	711
April	22 750	17 000	13 750	12 500	14 250	819	645

Source: Daily time charter rates expressed as monthly averages are based on information from *Clarkson Shipping Intelligence Network*. The indices are produced by the Baltic Exchange, the figures represent the value at the first working date of each month.

Note: The numbers in the second row, columns 2–6, refer to vessel size expressed in thousands of dwt.

pre-crisis levels, tanker freight rates have not shown substantial signs of recovery. On the contrary, freight rates on most routes can be seen to have decreased when comparing the figures from the beginning with those at the end of 2011 (table 3.2). Tanker capacity oversupply can be identified as one of the main factors behind these discrepancies.

Freight rates on different trade routes

Freight rates vary on different trade routes depending on their specific demand and supply structure. table 3.3 illustrates average freight rates quantified in Worldscale, a unified measure for establishing spot rates on major tanker routes for various vessel sizes. Developments on some of these routes will be presented in this section.

Almost 17 million barrels of oil, accounting for 35 per cent of seaborne petroleum trade, were transported through the Persian Gulf in 2011, making it the world's busiest shipping strait for this product.[14] In terms of voyages, 73 per cent of the world's 3,722 very large crude carrier (VLCC) trips have passed through the Persian Gulf.[15] Transport restrictions due to the oil embargo on the Islamic Republic of Iran could, therefore, heavily affect the world tanker shipping market as a whole. The cut in transport demand for oil from the Islamic Republic of Iran was expected to trigger freight rate drops. However, prices on the Persian Gulf–Europe route, as an example, rose from 37 to 44 on the Worldscale from February to April 2012 (table 3.3). This is because Saudi Arabia has ramped up oil production to compensate for the drop in exports from the Islamic Republic of Iran. Other oil producers filling the supply gap are located in West Africa, the Caribbean and the North Sea region. The routes from these sources to Asia are much longer than those from the Persian Gulf, thus increasing tanker ton miles and capacity utilization rates.[16] With oil-consuming countries such as the United States and China building up their energy reservoirs, additional vessels have been taken out of the spot market.[17]

Freight rates on routes from West Africa were exposed to volatilities in 2011, with drops in the West Africa–North-West Europe route from 107 on the Worldscale in March to 69 in August. Increasing demand for cargo and resistance of Suezmax tanker owners to accept

Table 3.3. Tanker market summary: clean and dirty spot rates, 2011–2012 (Worldscale)

Vessel type	Routes	2010	2011													2012			
		Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Percentage change Dec 2011/ Dec 2010	Jan	Feb	Mar	Apr
VLCC/ULCC (200,000 dwt+)																			
	Persian Gulf–Japan	61	48	74	63	50	51	53	50	48	45	50	57	59	3.3%	67	52	59	63
	Persian Gulf–Republic of Korea	56	50	55	60	49	49	54	48	46	43	46	54	57	-1.8%	61	51	58	58
	Persian Gulf–Europe	57	34	37	..	38	38	43	43	39	34	32	34	..	..	..	35	40	44
	"Persian Gulf–Caribbean/East Coast of North America"	36	32	37	42	38	37	39	37	35	34	33	39	37	-2.8%	40	34	35	42
Suezmax (100,000–160,000 dwt)																			
	West Africa–North-West Europe	118	63	75	107	83	84	..	74	69	70	89	79	86	27.1%	91	77	87	68
	"West Africa–Caribbean/East Coast of North America"	103	60	72	101	79	81	66	69	66	69	84	75	83	19.4%	85	75	84	65
	Mediterranean–Mediterranean	113	71	82	130	86	80	74	75	69	81	110	74	86	23.9%	98	86	84	73
Aframax (70,000–100,000 dwt)																			
	North-West Europe–North-West Europe	162	88	97	121	107	110	98	102	98	96	117	104	122	24.7%	111	93	95	99
	"North-West Europe–Caribbean/ East Coast of North America"	120	131	90	109	95	102	80	..	92	..	98	92	..	..	119	99	..	..
	"Caribbean–Caribbean/East Coast of North America"	146	125	98	125	123	104	98	110	113	90	104	104	112	23.3%	118	129	112	131
	Mediterranean–Mediterranean	138	75	97	122	95	99	94	88	90	87	127	87	130	5.8%	105	82	104	94
	Mediterranean–North-West Europe	133	69	103	135	85	90	84	86	88	84	138	84	118	11.3%	97	82	105	91
	Indonesia–Far East	111	88	87	110	115	99	98	98	96	91	91	102	104	6.3%	100	90	60	85
Handy size (less than 50,000 dwt)																			
	Mediterranean–Mediterranean	168	140	116	134	155	138	130	132	107	119	135	134	153	8.9%	147	157	147	140
	"Mediterranean–Caribbean/East Coast of North America"	146	134	111	147	139	133	116	115	115	114	116	125	121	17.1%	124	121	118	127
	"Caribbean–East Coast of North America/Gulf of Mexico"	200	155	105	174	155	139	128	118	122	124	121	141	133	33.5%	113	148	145	131
All clean tankers																			
70,000–80,000 dwt	Persian Gulf–Japan	125	107	98	105	123	129	111	125	124	124	115	100	105	16.0%	100	86	84	91
50,000–60,000 dwt	Persian Gulf–Japan	128	119	111	122	142	145	124	125	142	133	114	118	119	7.0%	107	101	100	117
35,000–50,000 dwt	"Caribbean–East Coast of North America/Gulf of Mexico"	158	133	120	190	191	171	152	152	155	136	151	167	155	1.9%	150	165	152	155
25,000–35,000 dwt	Singapore–East Asia	193	139	135	159	185	..	177	..	185	..	234	216	..	..	..	150	155	183

Source: UNCTAD secretariat, based on Drewry's *Shipping Insight*, various issues.

Note: The figures are indexed per ton voyage charter rates for a 75,000 dwt tanker. The basis is the Worldscale value 100, which represents the per ton break-even costs for this tanker size, estimated individually for each tanker route.

lower freight rates pushed price levels up again to 89 on the Worldscale in October.[18] While piracy along the Gulf of Guinea was almost non-existent about 10 years ago, it has become an issue of growing concern, leading to insurance premium increases for vessels operating in the region.[19] Expenses for rerouting to avoid high-risk piracy areas and investment in security equipment are additional cost drivers caused by piracy. Ships also navigate at higher speeds to avoid hijackings, which increases fuel costs. Up to 2011, no ship has been successfully hijacked that operated at 18 knots or higher.[20] The direct costs of piracy for the maritime industry were estimated to have reached a value of between $3.4 billion and $8.7 billion in 2010.[21] The International Maritime Organization (IMO) reported 46 piracy incidents in 7 countries in 2010 along the Gulf of Guinea. This number expanded to 64 incidents in 9 countries in 2011.[22]

Freight rates on export routes from the Mediterranean dropped in mid-2011 compared with the previous year. Price increases during 2011 were mostly caused by exceptional events and do not imply a long-term change in the market. The freight-level jumps in March 2011 were mostly caused by the unrest and military operations in Libya that pushed buyers to ship their cargo out of the country. Due to the war, oil-extraction volumes dropped in Libya from 1.57 million barrels to around 300 thousand barrels per day. This dragged the freight rates down again and reduced the likelihood of a quick recovery.[23] The rally in freight rates in October was triggered by congestions on the Bosporus Strait, which is one of the maritime choke points for oil shipments. These were caused by bad weather conditions, which increased tanker freight prices across the Mediterranean and on routes out of West Africa. Three million barrels of oil pass through this bottleneck on Suezmax tankers every day.[24]

The announcement of the closure of the oil refinery on Saint Croix, one of the United States Virgin Islands, in January 2012, one of the world's largest refineries, caused short-term freight rate drops on the route linking the Caribbean to the United States Atlantic Coast. The closure has been caused by the economic slowdown during the financial crisis and a growing competition from new-build oil-refining capacity in emerging markets.[25] The facility will now be used as a trans-shipment hub. Refined oil for the United States market will have to be imported from more distant sources to compensate for the capacity loss. This can positively affect product tanker freight rates on long-haul voyages from refineries in the Middle East and Asia. The added ton-miles may also increase freight rates within the product tanker market as a whole.[26]

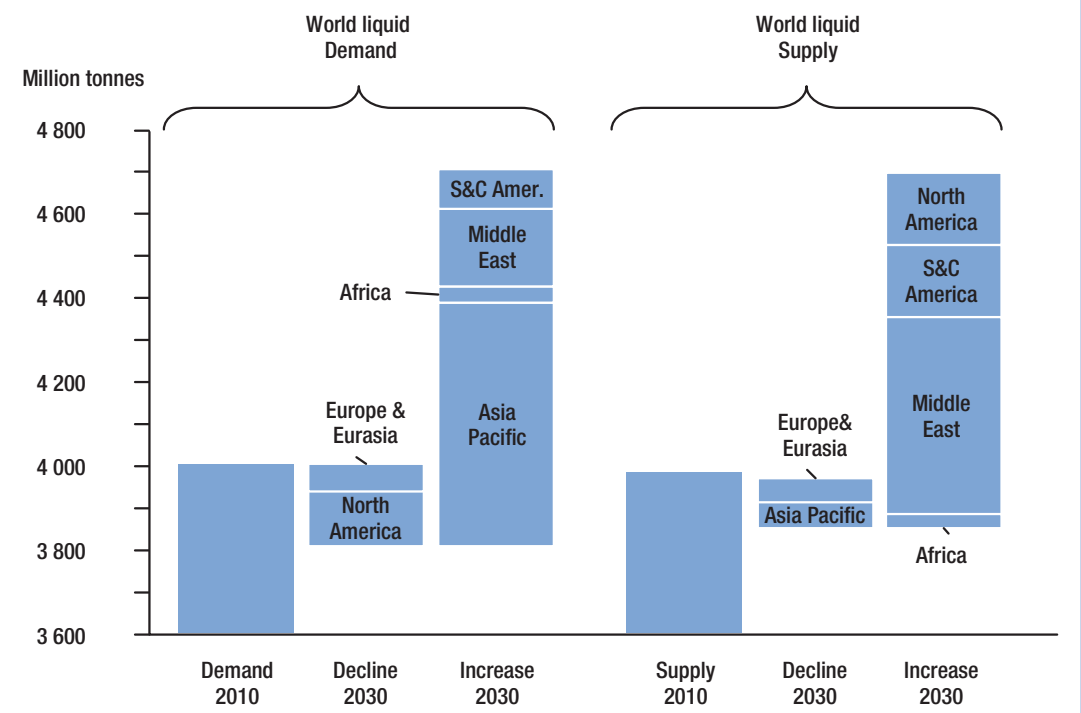
Tanker market outlook

Tankers connect oil producing countries with energy consumers. A change in the geographical structure of oil demand and supply will therefore cause modifications within the global tanker route network. British Petroleum (BP) predicts liquid-market developments until the year 2030 (figure 3.4) and it forecasts an ongoing oil-demand shift from the Organization for Economic Cooperation and Development (OECD) countries to Asia, with China contributing 50 per cent to the oil consumption growth until 2030. The BP analysis foresees that productions from the Middle East, and South and Central America together will add another 30 per cent to the demand expansion. On the production side, the Middle East will supply more than 60 per cent of the growth in oil production capacity, including large shares from Iraq and Saudi Arabia. Another 35 per cent of the projected growth will be delivered by countries from North and South America, with significant contributions from Brazil.

An ongoing volume expansion on the routes linking the traditional production centres around the Persian Gulf to major Asian markets will be the consequence if these predictions materialize. At the other end, we will observe a sluggish capacity development on tanker routes to most developed economies. British Petroleum have predicted a balanced growth of oil supply and demand in Africa – accordingly the continent's role as a world energy supplier will not significantly increase.

Developments in tanker freight rates will also depend heavily on the willingness of oil producing and buying countries to invest in their tanker fleets. China, for example, has announced that it aims to ship more of its seaborne oil imports with a domestically owned fleet. This strategic goal is also reflected in the growth of the country's VLCC fleet, which has increased from 11 vessels in 2006 to 38 in 2011. Competitive pressures have driven existing tanker operators out of the business. European shipowners have halved their market share to around 16 per cent on the Middle East–China lane from 2006 to 2011, losing capacity to their Chinese competitors.[27] If industry policies of emerging economies increasingly focus on expanding their market shares in oil transportation, this will add more capacity to the current oversupply and keep freight rates at low levels. McQuilling predicts that

Figure 3.4. Growth in liquids demand and supply until 2030



Source: UNCTAD secretariat based on *BP Energy Outlook 2030*.

tanker freight rates will continue to be under pressure, estimating a total delivery of 767 tankers over the next five years. Surplus increases are going to be more pronounced among larger ship sizes with a forecasted number of 62 VLCCs and 43 Suezmax entering the market in 2012.[28]

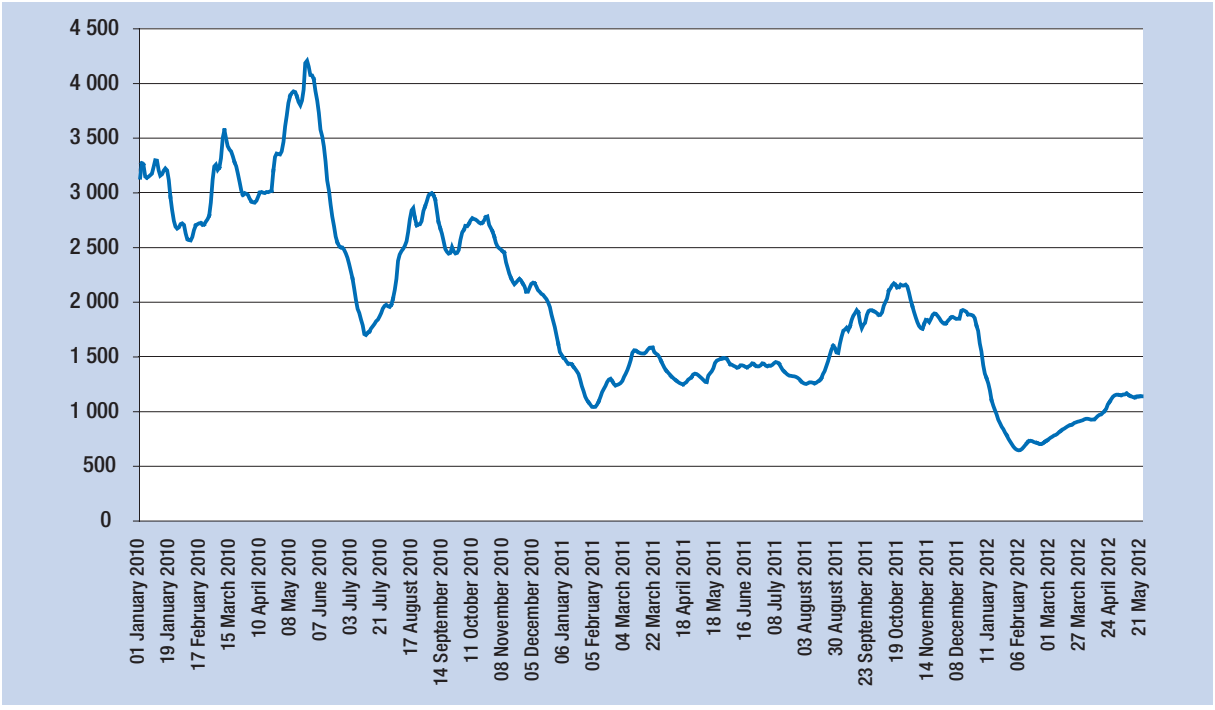
3. Dry bulk freight rates

The dry bulk shipping market can be classified into the two categories major bulk and minor bulk. Major bulk includes iron ore, coal and grain, typically transported by large Capesize and Panamax vessels. They contribute about two thirds of the world dry bulk trade. Minor bulks include fertilizers, steel products, construction materials such as cement and aluminium, non-grain agricultural products, forest products and sundry minerals (for example, phosphate rock), these adding another third to the total dry bulk seaborne trade. These goods are most commonly shipped by the smaller Handymax and Handysize vessels.[29]

The increasing vessel utilization rate reinforced hopes of a market recovery in mid-2011. This indicator reached 88 per cent in August 2011, making the difference between a sluggish and a firm market environment.[30] Freight-rate increases were reflected in the development of the Baltic Exchange Dry Index (figure 3.5). The index picked up in August 2011 from 1,256 points to 2,173 points in October. One of several factors behind the rally was the increasing Asian demand for iron ore and coal.[31] Japan, for example, increased its imports of these raw materials for reconstruction of areas affected by destruction as a result of the tsunami and earthquake.[32] However, this has been a short-lived trend. Since October a continuous decrease of the index can be observed, persisting until February 2012 where it reached its bottom value of 647 points.

Because of the unique characteristics of each individual ship class, large gaps in freight rates occur between the different dry bulk vessel segments. Small dry bulk carriers performed better than their larger counterparts (figure 3.6). Hence the need, in this section, to look at the individual developments within the four segments: Handysize, Supramax, Panamax and Capesize.

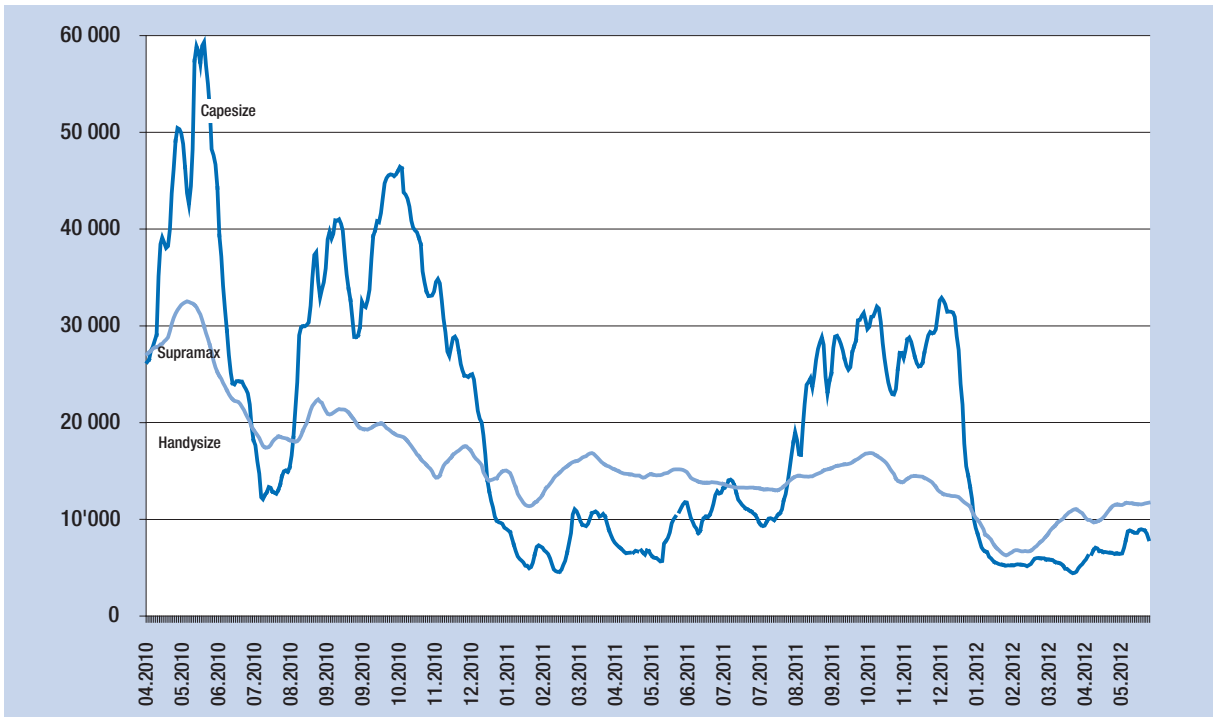
Figure 3.5. Baltic Exchange Dry Index, 2010–2012 (Index base year 1985, 1000 points)



Source: UNCTAD, based on London Baltic Exchange data.

Note: The index is made up of 20 key dry bulk routes measured on a time charter basis. The index covers Handysize, Supramax, Panamax and Capesize dry bulk carriers, carrying commodities such as coal, iron ore and grain.

Figure 3.6. Daily earnings of bulker vessels, 2010–2012 (Dollars per day)



Source: UNCTAD, based on data from Clarkson Shipping Intelligence Network, figures published by the London Baltic Exchange.

Note: Handysize: average of the six time charter (T/C) routes; Supramax: average of the five T/C routes; Panamax: average of the four T/C routes; Capesize: average of the four T/C routes.

Capesize vessels

Figure 3.6 illustrates daily earnings of the four different vessel sizes described in this section. The results underline that Capesize vessels are facing the most difficult market environment when compared to smaller bulk ships. From January 2011, daily earnings of Capesize carriers dropped over a period of several months to levels below those of the smaller Handysize, Supramax and Panamax ships.[33] This can be described as a post-financial-crisis phenomenon. According to Baltic Exchange, between 2000 and 2008 Capesize vessels have constantly reached higher daily earnings than smaller ships. On 5 June 2008, Baltic Exchange reported record earnings for Capesize vessels of $244,000 per day. Four years later, in May 2012, the same ships could be chartered for around $8,000 dollars.

Pronounced fluctuations of freight rate in the Capesize segment are often the result of demand volatility in the coal and iron-ore market, these being goods typically transported by large bulk carriers. Low raw material prices most commonly indicate a sluggish world demand for these goods. However, in 2011, prices for iron ore were are at highs ($140.4 per ton in February 2012).[34] In addition, thermal coal prices had not fluctuated much since December 2010, reaching a historically firm level of $123.4 per ton in February 2012.[35] Therefore, the supply-side overcapacity in the largest dry bulk segment appears again as the decisive factor precipitating current declines in freight rate.[36] Bulk carriers accounted for two thirds of all newbuildings delivered in 2011. Recent investment figures do not suggest a cessation of competitive pressures in the Capesize segment. The orderbook for ships with a dwt of more than 200,000 amounts, in February 2012, to a 93 per cent share of the existing fleet.[37] Competitive pressures are also triggered by the specific characteristics of this market segment. Large Capesize vessels are restricted to navigate between a few ports mostly located in Australia, China and Brazil.[38] Demand fluctuations on one key route between these countries can therefore cause pronounced fluctuations of freight rate in the market as a whole.

Panamax vessels

Freight rates in the Panamax segment have been exposed to a long-term downward trend. Clarksons counted 1,632 Panamax bulkers at the beginning of 2010 and during the same period the Baltic Exchange Panamax average time charter fluctuated between $24,000 and $34,000 (figure 3.6). In early 2011, the fleet grew to 1,818 vessels and freight rates slumped to a $11,000–$15,000 corridor.[39] In 2012, this trend has not yet reversed: the deployed fleet now counts 2,035 ships and the average daily time charter rate of below $9,000 reached its lowest level since July 2008.[40]

The turbulent economic environment and mild weather conditions in Europe reduced the coal demand from the continent, thus leading to weak prices on the Atlantic route in early 2012. Per-day charges fell to $4,000 on the Baltic Exchange United States–Europe/Europe–United States route. Pacific daily rates increased by more than a factor of two, this also provoked by the demand for coal shipments from Indonesia to Asia.[41] With the grain season ramping up in March in South America, freight rates on the spot market have risen, but this momentum has been lost again in May with the ebbing of the season.[42]

Supramax vessels

Supramax vessels increasingly compete with Panamax ships. This is due to their growing size. In 2008, Supramax vessels had an average capacity of 55,554 dwt, and this figure has, in 2011, increased to 57,037 dwt. Some of the modern carriers being handed over from shipyards reach a capacity of 61,000 dwt. In addition, they benefit from better fuel efficiency. These vessels are often geared with cranes on board for loading and unloading, which can be an advantage in small and medium-sized ports in developing countries that often do not provide sufficient handling facilities.[43] The competitiveness of Supramax vessels when compared to Panamax is also reflected in the freight rate developments.[44] The estimated three-year dry bulk time charter rates in 2011 were higher in 6 out of 12 months for Supramax than the larger Panamax vessels (table 3.4).[45] However, the segment also experienced a steep cut in freight rate, with daily rates falling from $12,296 at the end of 2011 to $6,348 in February 2012. Nevertheless, the subsequent recovery of Supramax chartering prices has been more sustainable, reaching earnings mostly above those of the larger Panamax class (table 3.6).

Handysize vessels

Handysize vessels have been more resilient in the bleak dry bulk market and benefit from several competitive advantages. They can load more than 30 cargo types, compared to only a handful of different goods carried

Table 3.4. Estimated three-year dry bulk time charter rates 2011–2012 (Thousands of dollars per day)

	Handysize 37 000 dwt		*Supramax 55 000 dwt*		*Panamax 75 000 dwt*		*Capesize 170 000 dwt*	
	2011	2012	2011	2012	2011	2012	2011	2012
January	13.0	10.5	15.2	11.0	16.5	11.0	12.0	12.0
February	13.0	9.5	15.2	10.0	16.7	10.0	20.5	11.0
March	13.1	10.5	15.5	10.8	17.0	10.9	20.5	10.0
April	13.5	10.7	16.3	11.0	15.5	11.2	16.0	11.5
May	13.1		16.0		16.5		13.5	
June	12.5		15.0		14.0		12.0	
July	12.0		14.0		13.0		12.5	
August	12.5		14.0		13.5		14.5	
September	13.0		14.5		14.0		16.5	
October	13.5		14.5		14.0		17.0	
November	12.0		13.0		13.0		16.0	
December	11.3		12.5		12.5		18.0	
Annual average	12.7	10.3	14.6	10.7	14.7	10.8	15.8	11.1

Source: UNCTAD secretariat, based on various issues of *Shipping Insight*, produced by Drewry Publishing.

by larger vessels. Secondly, smaller ships can enter almost any port, while larger carriers are restricted to the high volume routes connecting the world's busiest ports. Thirdly, ship oversupply ratios have been more pronounced among larger vessels: the yearly fleet growth rate beginning in December 2011 reached 19 per cent for Capesize and 13 per cent for Panamax vessels, while the Handysize fleet only grew by around 4 per cent during the same period.[46] Three-year time charter rates for Handysize and Panamax vessels were almost equal between January and April 2012 (table 3.4). Bearing in mind that Panamax vessels can carry about two times more than the Handysize class, this comparison underlines the weak demand for the larger vessel types.

B. FREIGHT MARKETS AND TRANSPORT COSTS

The uniqueness of freight rate patterns for bulkers, tankers and container ships can be quantified through a comparison of the maximum fluctuation of freight rate within each segment. The maximum freight rate fluctuation refers to the divisor between the highest and the lowest freight rate reported between March 2011 and April 2012. Freight rates have fluctuated most in the bulker segment, with rates being 2.17 times higher at the top level when compared with their lowest value. The two other segments appear to be much more stable, with a maximum fluctuation rate of 1.4 for tankers and 1.87 for container ships during the same period.[47]

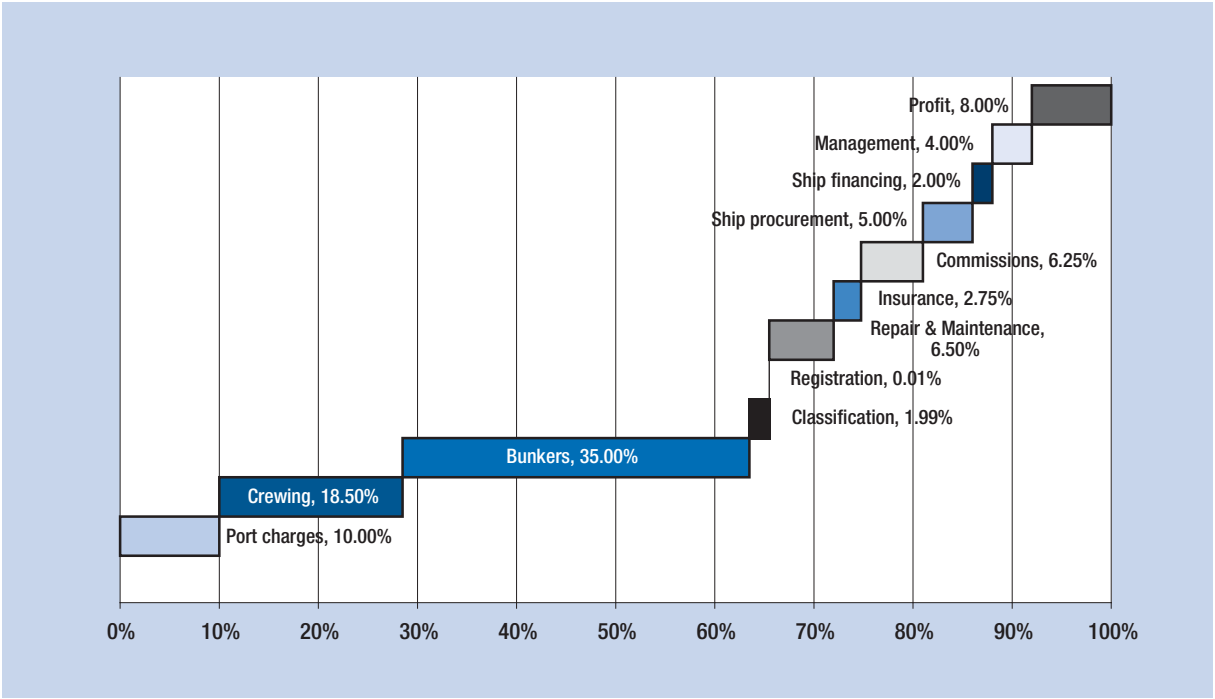
Three major factors can trigger price fluctuations in a competitive market environment: first, the costs of running a maritime shipping business; second, to break even the freight rates must cover all incurred expenses; third, the minimum freight price range that a vessel operator is willing to accept. Two other major external factors determine the price in a fundamental way: the demand and the supply in the maritime transport market. The following sections discuss these pricing factors.

1. Maritime transport costs components

Maritime transport service providers that invest in the procurement and operation of a vessel aim at creating a profit on their capital employed. Fluctuations in the costs of buying and maintaining a vessel will impact on the freight rate a ship operator is willing to accept to ensure cost recovery and profit. A cost breakdown of the total vessel expenses allows an assessment of how each component affects freight rates and contributes to the total vessel costs. In addition, the volatility of each cost component is of importance when assessing freight rate fluctuations.

Figure 3.7 illustrates freight rate cost components for a 10,000 dwt tanker with an assumed operating life of 20 years. Fuel consumption, representing 35 per cent of total expenditures, is the largest cost factor. Crewing is the second largest, contributing 18.5 per cent, followed by port charges at 10 per cent. Most cost input factors do not appear to be subject to

Figure 3.7. Freight rate cost components for a tanker of 10,000 dwt with 20 years of economical life



Source: Data received from a ship operator in February 2012.

Note: Figures refer to share of cost component as a percentage of total costs. Results are based on the assumption that the ship is staffed with a Turkish crew. Relative costs depend on many factors that may change over time.

major price fluctuations. The price of crude oil is an exception, as shown in figure 3.3, and is a major influencing factor on freight rate volatility.

2. Maritime transport cost and revenue comparison

Based upon the information from the freight rate cost breakdown, a more comprehensive cost and revenue comparison is conducted below for the three shipping sectors and their different vessel sizes. Such an analysis allows the identification of characteristic cost structures for different vessel types and potential changes in the cost structure over time. table 3.5 illustrates the results of the calculations for 2006 and 2011.

The yearly time charter rate represents the revenue side of the analysis. The ship operating costs have been derived from a yearly survey that is based on indications from ship operators, owners and brokers for over 2,600 vessels.[48] As bunker costs and port handling charges are usually not included in the time charter rates, these expenses have also been excluded from the calculations. Assumptions have been made for several variables influencing cost, such as ship utilization rates, interest rates or the commercial life expectancy of the ship, with the aim of obtaining a comparable dataset.[49]

Results for 2011

The results in table 3.5 illustrate the effect of economies of scale that can be reached with large scale vessels. Panamax tankers, for example, reported daily ship operating costs of $8,871 while the same expenses for the four-times-larger VLCC tanker were less than 30 per cent above this value. It can also be observed that the share of vessel procurement costs as a percentage of the total vessel costs increases with a larger vessel size. This indicator reaches 42.2 per cent for a Handysize bulker and 51.9 per cent for a Capesize carrier.

The ship profitability figures for 2011 illustrate that year's unfavourable economic environment for maritime transport service providers and show that most ship segments have had negative profitability rates. Only the bulker segment has estimated positive margins. The results also show that, in 2011, larger ship sizes mostly operated on a lower profitability rate

Table 3.5. Baltic Exchange Dry Index, 2010–2012 (Index base year 1985, 1000 points)

Ship type	Daily time charter rate in 2011, daily rate in $[a]	Costs for operations in 2011, daily in $[b]	Contribution margin I[c]	Newbuilding prices 2011, in $	Linear vessel depreciation costs, daily in $[d]	Costs for capital employed, daily in $[e]	Total vessel procurement costs, daily in $	Total costs (operations + vessel), daily in $	Percentage share, procurement costs of total vessel costs	Contribution margin II, daily in $[f]	Profitability in percent[g]	Newbuilding ship type
Tanker												
Product	13 600	8 740	4 860	36100 000	3 956	1 978	5 934	14 674	40.4%	-1,074	-7.3%	50 000 dwt
Panamax	13 800	8 872	4 928	44500 000	4 877	2 438	7 315	16 187	45.2%	-2,387	-14.7%	75 000 dwt
Suezmax	19 700	10 102	9 598	64100 000	7 025	3 512	10 537	20 639	51.1%	-939	-4.5%	160 000 dwt
VLCC	24 650	11 342	13 308	101300 000	11 101	5 551	16 652	27 994	59.5%	-3,344	-11.9%	300 000 dwt
Bulker												
Handysize	12 596	5 589	7 007	24800 000	2 718	1 359	4 077	9 666	42.2%	2,930	30.3%	30 000 dwt
Handymax	14 888	6 318	8 570	30000 000	3 288	1 644	4 932	11 250	43.8%	3,638	32.3%	55 000 dwt
Panamax	14 863	6 854	8 009	32600 000	3 573	1 786	5 359	12 213	43.9%	2,650	21.7%	75 000 dwt
Capesize	16 354	7 876	8 478	51600 000	5 655	2 827	8 482	16 358	51.9%	-4	0.0%	170 000 dwt
Container ships												
Feedermax (100-1,000 TEU)	4 250	4 656	- 406	11400 000	1 249	625	1 874	6 530	28.7%	-2,280	-34.9%	500 TEU (geared)
Container ship (1,000-2000 TEU)	9 825	5 522	4 303	27400 000	3 003	1 501	4 504	10 026	44.9%	-201	-2.0%	1 500 TEU (geared)
Main Liner (2,000-6,000 TEU)	14 479	8 040	6 439	45600 000	4 997	2 499	7 496	15 536	48.2%	-1,057	-6.8%	3 500 TEU (gearless)

Ship type	Daily time charter rate in 2011, daily rate in $[a]	Costs for operations in 2006, daily costs in $[b]	Contribution margin I[c]	Newbuilding prices 2006, in $	Linear vessel depreciation costs, daily in $[d]	Costs for capital employed, daily in $[e]	Total vessel procurement costs, daily in $	Total costs (opera-tions + vessel), daily in $	Percentage share, procurement costs of total vessel costs	Contribution margin II, daily in $[f]	Profitability in percent[g]	Newbuilding ship type
Tanker												
Product	26 792	6 541	18 570	46 800 000	5 129	2 564	7 693	15 915	48.3%	10,877	68.3%	50 000 dwt
Panamax	23 225	6 640	14 879	48 000 000	5 260	2 630	7 890	16 236	48.6%	6,989	43.0%	75 000 dwt
Suezmax	42 667	7 560	33 164	75 500 000	8 274	4 137	12 411	21 914	56.6%	20,753	94.7%	160 000 dwt
VLCC	55 992	8 489	45 322	124 900 000	13 688	6 844	20 532	31 202	65.8%	24,790	79.5%	300 000 dwt
Bulker												
Handysize	15 860	4 048	10 582	22 300 000	2 444	1 222	3 666	8 944	41.0%	6,916	77.3%	30 000 dwt
Handymax	21 800	4 576	15 834	31 500 000	3 452	1 726	5 178	11 144	46.5%	10,656	95.6%	55 000 dwt
Panamax	22 475	4 964	16 003	35 700 000	3 912	1 956	5 868	12 340	47.6%	10,135	82.1%	75 000 dwt
Capesize	45 645	5 705	38 208	62 100 000	6 805	3 403	10 208	17 645	57.9%	28,000	158.7%	170 000 dwt
Container ships												
Feedermax (100-1,000 TEU)	6 871	3 567	2 499	15 800 000	1 732	866	2 597	6 969	37.3%	-98	-1.4%	500 TEU (geared)
Container ship (1,000-2000 TEU)	16 492	4 231	11 307	33 400 000	3 660	1 830	5 490	10 675	51.4%	5,817	54.5%	1 500 TEU (geared)
Main Liner (2,000-6,000 TEU)	24 233	6 160	16 684	54 500 000	5 973	2 986	8 959	16 508	54.3%	7,725	46.8%	3 500 TEU (gearless)

Sources: UNCTAD calculations. Newbuilding prices and daily time charter rates from Drewry's *Shipping Insight*. Operating cost data from Moore Stephens' report *OptCost 2011*.

[a] The assumption is made that the vessel is 100 per cent utilized.

[b] Based on operating cost data from Moore Stephens for the year 2010. Data for 2011 are forward projections achieved by multiplying 2010 data by the average operating cost growth rate over the last 10 years. Data for 2006 data are backward projections of the 2010 data based on Moore Stephens' operating costs index. Operating costs include crew costs, spares, repairs and maintenance, insurance and administration.

[c] Contribution margin I = (one year time charter rate) – (costs for operations).

[d] Depreciation costs determined on the basis of a period of 25 years depreciation.

[e] Costs determined by multiplying half of the procurement costs by an assumed interest rate of 4.0 per cent.

[f] Contribution margin II = (contribution margin I) – (costs for capital employed) – (vessel depreciation costs).

[g] Profitability = (time charter rate / total vessel operating costs) – 1.

than smaller vessels. The reason for this is that, in 2011, the advantage of economies of scale has been offset by a pronounced oversupply of larger vessels, particularly in the bulker segment. When interpreting these numbers, it should to be taken into consideration that the calculations are based on the assumption that vessels have been 100 per cent utilized. However, among most operators utilization rates were much lower in 2011, which would translate into even lower profitability rates.

Results for 2006

The calculations for 2006 illustrate that the cost and revenue structures have changed significantly over the last five years. Freight rates have been considerably higher. The yearly time charter rate for a Capesize tanker stood at an average of $45,645 in 2006 and reached only $16,354 in 2011. Operators also benefited from lower operating costs, which demonstrated moderate and stable growth rates in the last five years. Therefore, profitability rates were much higher in 2006, varying from -1.4 per cent for Feedermax containerships to 158.7 per cent for Capesize bulkers. The promising revenue figures led to massive investment in additional tonnage, pushing up vessel prices. Hence, the share of ship procurement costs as a percentage of the total vessel expenses was considerably higher in 2006. The indicator reached 57.9 per cent in 2006 for a Capesize bulker, in comparison to 51.9 per cent in 2011 for the same type of vessel.

Second-hand prices were exposed to even higher volatilities as there is usually no significant time gap between the ship being sold and handed over. Buyers can benefit directly from high profitability rates in a positive business environment, making them willing to accept elevated second-hand prices. A contrary effect occurs if freight rates are low: second-hand prices will then drop due to a lack of investors who are willing to operate a ship in an unprofitable market. Prices for second-hand vessels are illustrated in table 3.6. Along with freight rates, second-hand values have been exposed to losses – the price for a Capesize ship, for example, dropped from an average $54 million in 2010 to $43 million in 2011.

The calculations within this section have quantified the effect of economies of scale on freight rates. In addition, the potential fluctuations of new building costs and their impact on the overall vessel expenses have been evaluated. The figures also illustrate that ship operating costs fluctuate only moderately over time. Finally, the pronounced profitability volatility between the years observed underlines the large impact of structural changes in demand and supply on the maritime shipping

Table 3.6. Second-hand prices, 2003–2011 (Millions of dollars, end-of-year figures)

Type and size of vessel	2003	2004	2005	2006	2007	2008	2009	2010	2011	Percentage change 2011/2010
Oil tanker – Handy, 45 000 dwt, 5 years old	25	35	44	47	40	51	30	26	28	7.7
Oil tanker – Suezmax, 150 000 dwt, 5 years old	43	60	72	76	87	95	59	62	54	-12.9
Oil tanker – VLCC, 300 000 dwt, 5 years old	60	91	113	116	124	145	84	86	77	-10.5
Chemical tanker – 12 000 dwt, 10 years old	9	11	12	14	23	23	20	13	11	-15.4
LPG carrier – 15 000 m^3, 10 years old	21	23	30	39	40	39	30	25	26	4.0
Dry bulk – Handysize, 28 000 dwt, 10 years old	10	15	20	20	28	31	17	20	17	-16.5
Dry bulk – Panamax, 75 000 dwt, 5 years old	20	35	40	39	83	70	31	25	31	24.0
Dry bulk – Capesize, 150 000 dwt, 5 years old	..	..	..	..	..	..	47	54	43	-20.4
Container – geared, 500 TEUs, 10 years old	5	7	11	10	9	13	4	6	7	16.7
Container – gearless, 2 500 TEUs, 10 years old	20	29	39	41	24	36	18	23	30	30.4
Container – gearless, 3 500 TEUs, 10 years old	25	34	43	44	43	45	24	28	34	21.4

Source: Compiled by the UNCTAD secretariat on the basis of data from Drewry's *Shipping Insight*.

business, as discussed in the following section, when commensurate demand is present.

3. Transport demand and supply

During different stages in the shipping market cycle, diverging demand and supply lead to substantial fluctuations in freight rates. It can be observed that freight rates and the volume of new ship orders often evolve in parallel. In times of high freight rates, ship owners tend to invest in new vessel capacity, this being also due to an increased willingness of banks to lend money, thus expanding the orderbook. With an increasing supply of capacity, freight rates fall and less efficient ships line up for cargo, thus reducing the industry's appetite to invest in new vessel capacity.[50] With this interplay between supply and demand in mind, this section will assess selected indicators for the two elements.

Growth rates of both supply (vessel capacity) and demand (shipped volumes) are illustrated in table 3.7. In all three segments, vessel capacity has grown faster than the seaborne trade volume. Between 2000 and 2011, bulk carrier supply expanded almost two times faster than the transport demand. In the tanker segment, this gap was even larger, with a vessel capacity increasing 2.3 times faster than the transported volume of goods. In the coming years, the dry bulk sector in particular will experience high fleet growth rates. The orderbook to current fleet size ratio of the dry bulk segment stands at 27.8 per cent, compared with 13.1 per cent for tankers and 21.3 per cent for container ships. This will put freight rates under additional pressure within an already oversupplied bulk shipping segment.

The supply side can also be assessed through a comparison of indicators that describe the structure of the fleet. The analysis of market concentration levels, for example, reveals the degree of competition in the market, which may influence the pricing mechanism. Container shipping reaches the highest market concentration levels out of all the three segments. The 10 largest companies account for more than 50 per cent of the world's containerized shipping market. On routes to remote regions with low trade volumes in particular, this may lead to higher freight rates and less volatile price reactions to changes in transport demand. Market concentration levels are significantly lower in the bulk trade business, with the 19 largest operators sharing only 22 per cent of the world transport supply.

4. Freight costs in developing countries

Figure 3.8 shows the maritime freight costs as a percentage of the total value of imported goods. The results illustrate that although volatilities occur over time, in the long term a tendency towards a lower ratio

Table 3.7. Comparison of maritime transport segments

		Container ships	Bulk carriers	Tankers
Demand and supply	Ø Transport supply growth per year (2000–2011, based on fleet growth in dwt)	10.1%	6.1%	4.9%
	Ø Transport supply growth per year (2009–2011, based on fleet growth in dwt)	6.6%	12.8%	6.6%
	Ø Transport demand growth per year (2000–2011, based on tons loaded)	7.2%	3.3%	2.2%
	Ø Transport demand growth per year (2009–2011, based on tons loaded)	5.9%	6.8%	2.1%
	Ratio of orderbook to fleet size (April 2012, based on dwt)	21.3%	27.8%	13.1%
Market concentration (supply side)	Market share of the the top 3 companies	28.6%a	n.a.	11.8%b
	Market share of the the top 10 companies	50.8%a	22.0%c	26.7%b
	Market share of shipping business (2012, based on fleet capacity in dwt)	14.9%	46.9%	38.2%

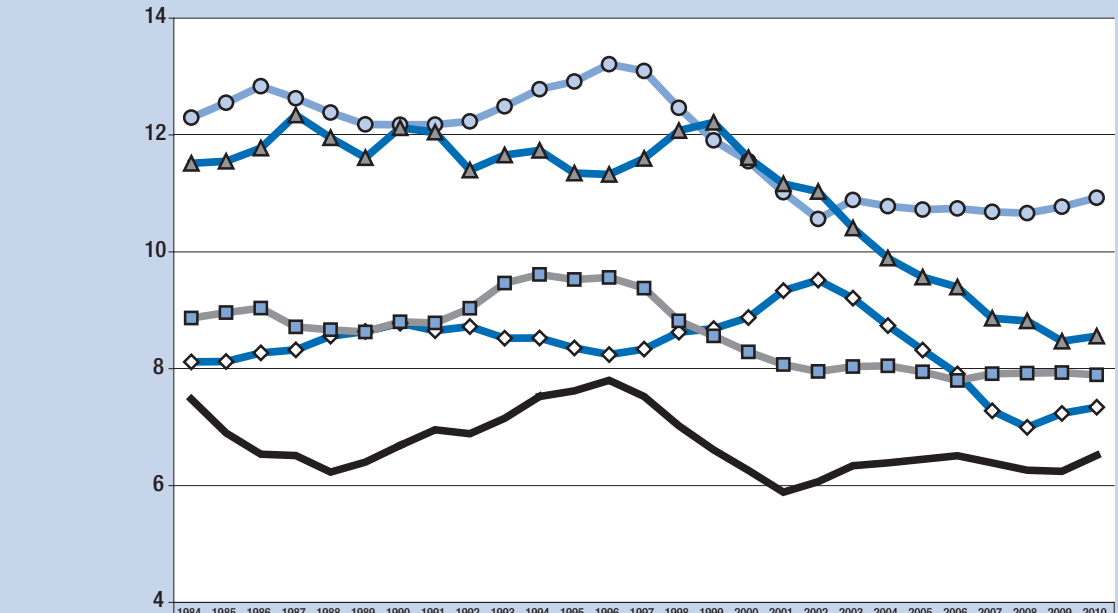
Sources: Growth in transport supply, transport demand and market shares from UNCTAD's *Review of Maritime Transport 2011*; ratio of orderbook to fleet size from *Lloyd's List Intelligence*.

a Data for 2010 from *Review of Maritime Transport 2011*, based on the number of containers shipped.

b Data for 2008 from *Tanker Operator Annual Review March 2009*, based on fleet size in dwt.

c Data for 2006. figure includes the 19 largest operators, based on dwt.

Figure 3.8. Freight cost as percentage of value of imports (five-year moving average)



	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Developing Africa	12.3	12.55	12.83	12.63	12.38	12.18	12.18	12.18	12.23	12.49	12.78	12.92	13.21	13.1	12.46	11.91	11.55	11.02	10.56	10.89	10.78	10.72	10.74	10.68	10.66	10.77	10.93
Developing Oceania	11.52	11.55	11.78	12.34	11.95	11.61	12.12	12.05	11.4	11.66	11.74	11.35	11.32	11.6	12.08	12.22	11.61	11.16	11.03	10.41	9.893	9.567	9.397	8.864	8.817	8.47	8.559
Developing America	8.117	8.122	8.27	8.323	8.556	8.639	8.778	8.65	8.721	8.523	8.525	8.355	8.243	8.337	8.626	8.688	8.875	9.335	9.517	9.208	8.738	8.318	7.91	7.278	6.998	7.235	7.342
Developing Asia	8.867	8.959	9.039	8.714	8.665	8.628	8.802	8.784	9.034	9.466	9.614	9.526	9.563	9.378	8.817	8.561	8.288	8.07	7.954	8.035	8.049	7.945	7.799	7.913	7.924	7.932	7.894
Developed economies	7.479	6.899	6.537	6.515	6.232	6.402	6.688	6.954	6.887	7.152	7.523	7.622	7.801	7.524	7.021	6.61	6.26	5.886	6.065	6.339	6.388	6.448	6.51	6.389	6.264	6.244	6.517

Source: UNCTAD.

between freight costs and value of goods has occurred among all country groupings. Furthermore, the freight rates share of developing countries tend to converge to those of developed economies. Developing Oceania achieved a transport cost share reduction from 11.7 per cent in 1994 to 8.6 per cent in 2010, while the developing nations of America and Asia have already reached a transport cost share approximately 1 per cent above that of developed economies. An exception from this trend of convergence is developing Africa, with a stable ratio of freight costs to import value of 10.9 per cent between 2003 and 2010.

Low productivity, high charges and congestions in many African ports are some of the factors explaining these discrepancies.[51] Vessel operators tend to pass these costs on to shippers when calculating their freight rates. In addition, African ports are often difficult to access from the hinterland due to a lack of transport infrastructure.[52]

On the shipping side, the UNCTAD Liner Shipping Connectivity Index (LSCI) (see also chapter 4) reveals a lack of economies of scale and competition in many African countries. African ports cannot host the largest ships that offer the most competitive freight rates. The relatively small number of alternative operators serving most African ports results in low competitive pressure, thus keeping freight rates high. Trade imbalances are another factor contributing to higher freight rates in Africa. With an import surplus for containerized cargo, and exports that mostly comprise bulk goods, which are transported by tankers and dry bulk carriers, vessels can often only be fully utilized on one route.[53] Consequently, ship operators have to charge a freight rate for a single trip that compensates their expenditures for both the fronthaul and the backhaul lanes.

C. POLICY OPTIONS TO REDUCE MARITIME TRANSPORT COSTS

Transport costs remain an important component of the price of the goods when purchased by the final consumer. High maritime transport costs for imported goods impact the price level of the basket of consumer goods. Conversely, excessive freight rates for exports affect the trade competitiveness of the products of a country in the global markets. Hence, countries may want to define approaches to reduce inbound and outbound maritime transport costs in their trade with partners, as discussed below.

The freight rate cost analysis, conducted for the case of a 10,000 dwt tanker (figure 3.7), illustrates major cost elements of freight rates and can assist when identifying policy measures aimed at reducing individual cost drivers. The policy options available to a single country that could produce a substantial reduction of freight rates are, nonetheless, limited. Vessel operators can choose worldwide between many alternative suppliers when procuring the goods and services they need for their vessel operations, thus levelling comparative cost advantages of individual destinations. In most large ports, for instance, cheap fuelling services are offered and, even if these services are not provided, a ship can choose to use bunkering services at an alternative destination. If one country alone were able to offer goods and services at costs significantly below the level of other nations, these competitive advantages would probably not be reflected in the freight rate to or from that country. Hosting competitive insurance service providers, for example, will not assist a country to reduce its maritime transport costs. These cost advantages are likely to be passed on equally to the freight rates for all routes a vessel operator serves within his shipping network.

When evaluating the elements comprising freight rate costs, three major strategic options remain that countries can choose from, and by which maritime freight rates from and to that country can be influenced. Figure 3.9 summarizes these options and their potential effect on ship operating costs and freight rates.

Option 1 – developing coastal shipping

Individual countries can exercise only a limited influence on international maritime shipping, which operates as an open market with very little regulation other than relevant international rules on carrier liability, security and safety. An exception to this is coastal shipping and specifically cabotage, which lies completely within the jurisdiction of a single nation. Countries can directly influence the price level for these services through the design of ship registration requirements, industry development policies and infrastructural investments such as the development of a feeder port network.

In a market where cabotage is restricted to domestic carriers only, ship operators have no choice but to comply with the country's regulatory set up. An improvement of the ship registration requirements will therefore directly affect operating costs. The potential monetary impact has been quantified by a study of the United States Department of Transportation. It estimates, for example, that the costs for United States-flag vessels in 2010 were around 2.7 times higher than those of foreign flag equivalents.[54]

Opening cabotage to international shipping lines is another policy option. The entrance of new market players may reduce freight rates for shippers and lead to better and more diverse services. However, most countries often give cabotage rights exclusively to domestic carriers with the aim of protecting and promoting the national shipping industry.

Another measure to support cabotage is the expansion of a country's feeder port network. This will facilitate access of traders to coastal shipping and encourage them to shift from land to maritime transport. The increased volumes may lead to higher utilization rates and lower freight rates.

Option 2 – developing port competitiveness

Countries with sea access can apply a wide range of policies that aim at increasing the operational and administrative efficiency of their port network. This includes decisions on the legal and institutional framework, the selection of an ownership model or the allocation of funds for infrastructure investments. The reforms should target all entities having a relevant role in the port, such as the landlord, regulator, operator, marketer and cargo handler, thus reducing port charges related to each function.

The negotiation of a balanced concession agreement between the terminal operator and the responsible regulatory institution is a critical element when shaping a performance-orientated port business environment. This should include appropriate incentives that promote a continuous improvement of operations, competitive price setting mechanisms and a comprehensive performance monitoring system. However, considering that port charges only constitute about 10 per cent of the total freight rate, the lever of these measures appears to be limited – according to the figures indicated in the example freight rate breakdown in figure 3.7, a reduction of port handling charges by 50 per cent would only lead to a total freight rate reduction of 5 per cent.

Option 3 – developing port hinterland connections

The first two options contain policy measures targeting directly the improvement of maritime transport chain elements. In contrast, the third option addresses other modes of transport that indirectly affect freight rates of ships through their role within the multimodal transport chain.

Inland transport linkages are the arteries of ports connecting them to regional markets. They enable ports to consolidate exports from the region and distribute imports to their final destination in the hinterland.

As an example, the port of Durban in South Africa offers more modern and extensive rail linkages than the neighbouring port of Maputo in Mozambique, thus giving it an advantage when competing for customers. Another example is the structure of the transport network within Mozambique. It offers well-developed north–south road connections, which specifically serve the transport needs within the country's territory. However, only a few east–west linkages exist that connect domestic entrepreneurs with ports along the country's long coastline, making it difficult for them to present their goods on the international markets.

Improving transport connections to and from markets in the hinterland, therefore, enables ports to attract greater cargo volumes. This does not only lead to economies of scale within the ports. It may also attract larger vessels with lower unit transport costs or more alternative maritime transport service providers.

Figure 3.9. Strategies to reduce maritime freight rates

	Three national policy related generic strategies to reduce maritime freight rates		
Strategy	1. Developing coastal shipping	2. Developing port competitiveness	3. Developing port hinterland connections
Selected field of policy making	▪ Opening cabotage to global competition or restricting it to domestic operators ▪ National ship registration policies ▪ Institutional framework (e.g. maritime authority) ▪ Investment policies and ownership model ▪ Maritime infrastructure (e.g. feeder ports)	▪ Port administration related laws and regulations ▪ Port management structures and ownership model ▪ Institutional framework (e.g. port authority) ▪ Port operations ▪ Port infrastructure (e.g. links to other modes of transport)	▪ Intermodal interface connecting port with national and regional markets (options: Rail, road, waterway and air transport) ▪ Regulatory and institutional framework for land transport modes ▪ Regional transit and transport development agreements ▪ Public private partnerships
Potential impact on freight rates	▪ The compliance with new ship registration requirements may reduce or increase operations costs ▪ Opening cabotage can increase competitive pressure thus reducing freight rates ▪ Improving coastal shipping infrastructure connects remote regions to international trade networks → modal shift to maritime transport and better economies of scale	▪ Reducing port related charges for maritime transport service providers through: a. efficiency gains in port operations and port administration b. reasonable profit margin of port operator in a more competitive business environment → Includes charges for all port functions: Landlord, regulator, operator, marketer and cargo - handler (e.g. cargo handling fees, channel fees)	▪ Improved port connectivity: a. Increases cargo handling volumes in ports → lower unit handling costs b. attracts larger ships → lower unit transport costs c. attracts new transport service providers → lower margins due to increased competition

Source: UNCTAD secretariat.

ENDNOTES

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