This said, the scale and structure of shipyard costs, efficiency and productivity will be influential in creating the margins for price differentials on the international market. Direct labour costs - and output per employee - clearly are important but so too are steel and energy costs, other operating costs and the level to which pre-fabrication and sub-contracting is a feature of the shipbuilder's operation.

Also to be considered is the shipbuilder's experience and expertise in designing and building the type of vessel sought by the individual buyer. Clearly, the yard's "standard design" is likely to offer considerable savings against a similar sized "bespoke design". Equally, whether the buyer seeks one ship or a series of ships will be influential in determining the price per unit.

The final key variable may be currency. Traditionally, the Japanese yards have quoted and sought yen-denominated contracts. Consequently, Japanese builders have seen their market position become more vulnerable as the yen has progressively strengthened against other currencies - especially the US dollar. Other key builders - e.g. South Korea and China - have opted for US dollar contracts which has given them some competitive edge.

In summary, therefore, the key components influencing newbuilding prices are:

(a) General levels of demand; shipyard costs and profit margins.
(b) Secrecy (yards' concern over their competitive position and similar motivation by owners).
(c) Geographical location (influencing costs, capabilities of workforce, availability of subsidies, etc).
(d) Levels of subcontracting, extent of pre fabrication, etc. - i.e. the influence of the yard's state of technological development.
(e) Origin of equipment and raw materials - some yards may have to import items ranging from steel plate to main propulsion systems and cargo gear.
(f) Nationality of the ship owner (this may influence the availability of subsidies).
(g) Lead time (this being governed by general demand levels, berth occupancy, the mix of vessels stemmed, the calibre and efficiency of the yard).
(h) Currency (and exchange rates).
(i) Availability of finance and staging of payments (prices could be favourable on a cash basis).
(j) Order size (unit prices should fall as the number of vessels in the series increases).
(k) Historical relationship between the owner and the yard (in some cases, owners may have an equity stake in the yard).
(l) Yard experience in the construction of the vessel type/size sought.
(m) Level of customisation involved in the vessel design.

2.5.1.2 Newbuilding Prices: 1972-93

Although the 1990s is starting to see their dominant position coming under threat, for most of the period under consideration in this historical review bulk carrier shipbuilding activity has been dominated by Japan. Consequently, it is to indicative Japanese prices that the Consultants have turned to in order to produce Table 2.15 and Figure 2.21.

To gain a brief insight into current differentials, the following comments have been extracted from the October 1993 issue of Drewry's *Dry Bulk Market - Quarterly Report.*

"Having reduced their yen prices in order to improve their competitiveness in the newbuilding market, the Japanese have found themselves losing out to the Koreans, who, helped by the lower won/$ rate, have been securing the majority of the genuine export orders placed for bulk carriers since the start of 1993. The yen went up from 125 to 105 to the US dollar, while the won went down from 600 to 800.

"Korea's orderbook is increasing while Japan's is decreasing, and as long as the yen/dollar rate remains where it is, at about 105, Japanese shipyards will have to rely on domestic owners who are renewing their fleets - principally the "Big Six" and the leading trading houses - for work.

"Quite a few orders for bulk carriers - mainly for 40/45,000 dwt **Handymax** types priced at $24/25 million - have materialised in this way, but more and more Japanese owners are considering ordering bulk tonnage from yards outside Japan, because of the high yen. The new building cost of, say, a Capesize bulk carrier, can be reduced by as much as 10% by going to Korea or Taiwan through a trading intermediary.

"From the few orders for large bulk carriers placed recently, one would put **Capesize** prices in Japan at about $50-52 million per ship at present exchange rates, while elsewhere the same vessel could be ordered for a lot less, with the Koreans quoting $48-49 million and the Taiwanese $46-47 million.

"Even lower prices - down to $40-42 million - are on offer in China and Eastern Europe. The price differentials for standard **Panamax** types are not as great, but whereas the Koreans are offering at $28-29 million, the price in Japan, under yen-based contracts, is unlikely to be less than $30-31 million (or ¥3.1-3.2 billion). This is on a par with the price being paid by Swiss owners for two 74,500 dwt Panamaxes in Denmark. The highest prices reported recently for Panamaxes - some $32 million - were for a series from Italian yards destined for domestic owners."

Table 2.15

Development of Bulk Carrier Newbuilding Prices: 1972-93*

(Million US dollars)

Type: Size:	Handy 25,000 dwt	Handymax 40,000 dwt	Panamax 65,000 dwt	Cape 120,000 dwt
1Q72	7.3	8.3	10.7	17.0
2Q72	7.4	8.5	11.1	17.0
3Q72	7.5	8.5	11.6	17.5
4Q72	7.7	8.8	12.0	18.5
1Q73	8.0	9.0	13.0	19.5
2Q73	8.4	9.5	14.5	21.0
3Q73	9.2	10.4	15.0	22.5
4Q73	9.6	11.0	15.5	23.0
1Q74	10.3	11.3	14.0	25.0
2Q74	11.0	11.5	18.0	27.0
3Q74	12.0	13.0	20.5	28.0
4Q74	13.0	15.5	23.5	28.5
1Q75	14.0	16.0	22.5	30.0
2Q75	15.5	16.5	22.0	31.0
3Q75	15.0	15.5	21.5	29.5
4Q75	14.0	14.0	20.5	28.5
1Q76	13.0	13.5	20.0	27.0
2Q76	12.5	13.0	18.5	26.0
3Q76	11.0	12.0	16.5	25.0
4Q76	10.5	11.5	16.0	24.0
1Q77	10.5	11.5	16.5	23.5
2Q77	11.0	11.5	17.0	24.0
3Q77	11.0	11.5	16.5	23.0
4Q77	11.5	12.0	16.0	22.0
1Q78	12.0	12.3	17.0	22.0
2Q78	12.5	12.5	18.5	23.5
3Q78	12.8	13.0	20.0	25.0
4Q78	13.0	13.5	21.5	26.0
1Q79	13.5	14.0	23.0	28.5
2Q79	14.0	15.0	25.0	30.0
3Q79	14.5	16.5	25.5	31.5
4Q79	15.0	17.5	27.0	33.0
1Q80	13.3	17.2	22.1	30.5
2Q80	15.8	20.2	25.7	35.8
3Q80	16.7	21.1	26.5	28.6
4Q80	17.8	22.3	28.0	41.0
1Q81	18.7	23.4	29.7	42.6
2Q81	18.3	22.8	28.6	42.0
3Q81	18.7	23.5	28.0	42.6
4Q81	18.7	23.4	28.1	43.5
1Q82	19.1	23.8	27.7	42.5
2Q82	19.0	23.7	27.2	41.1
3Q82	17.3	21.8	24.1	36.5
4Q82	15.7	20.1	21.6	35.4
1Q83	14.4	18.6	19.5	32.0

Table 2.15 (cont'd)

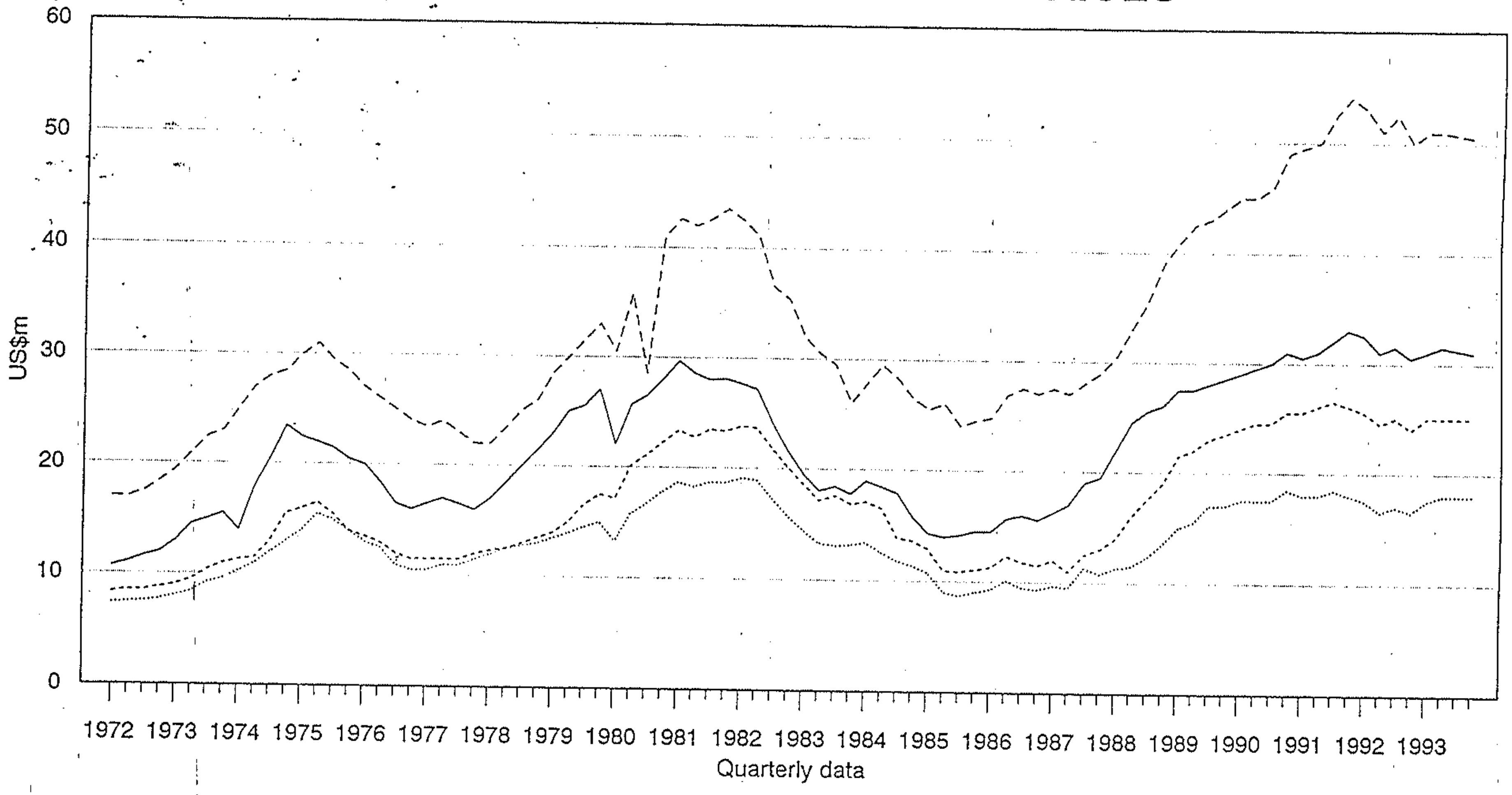
Type: Size:	Handy 25,000 dwt	Handymax 40,000 dwt	Panamax 65,000 dwt	Cape 120,000 dwt
2Q83	13.3	17.2	18.1	30.5
3Q83	13.1	17.6	18.5	29.5
4Q83	13.2	16.9	17.8	26.0
1Q84	13.4	17.1	19.0	27.8
2Q84	12.5	16.5	18.5	29.5
3Q84	11.8	13.9	17.9	28.3
4Q84	11.4	13.6	15.8	26.5
1Q85	10.8	12.9	14.3	25.5
2Q85	9.0	11.0	14.0	26.0
3Q85	8.7	10.9	14.2	24.0
4Q85	9.0	11.1	14.5	24.5
1Q86	9.3	11.3	14.5	24.8
2Q86	10.1	12.3	15.7	26.9
3Q86	9.5	11.8	16.0	27.5
4Q86	9.3	11.5	15.6	27.0
1Q87	9.7	12.0	16.3	27.5
2Q87	9.5	11.0	17.0	27.0
3Q87	11.3	12.5	19.0	28.0
4Q87	10.8	13.0	19.5	29.0
1Q88	11.3	14.0	22.0	30.5
2Q88	11.5	16.0	24.5	33.0
3Q88	12.3	17.5	25.5	35.5
4Q88	13.5	19.0	26.0	39.0
1Q89	15.0	21.5	27.5	41.0
2Q89	15.5	22.0	27.5	42.5
3Q89	17.0	23.0	28.0	43.0
4Q89	17.0	23.5	28.5	44.0
1Q90	17.5	24.0	29.0	45.0
2Q90	17.5	24.5	29.5	45.0
3Q90	17.5	24.5	30.0	46.0
4Q90	18.5	25.5	31.0	49.0
1Q91	18.0	25.5	30.5	49.5
2Q91	18.0	26.0	31.0	50.0
3Q91	18.5	26.5	32.0	52.5
4Q91	18.0	26.0	33.0	54.0
1Q92	17.5	25.5	32.5	53.0
2Q92	16.5	24.5	31.0	51.0
3Q92	17.0	25.0	31.5	52.5
4Q92	16.5	24.0	30.5	50.0
1Q93	17.5	25.0	31.0	51.0
2Q93	18.0	25.0	31.5	51.0
3Q93	18.5	25.5	32.0	52.0
4Q93	18.0	25.0	31.0	50.5

* Average "Japanese" contract prices converted from yen at ruling US dollar exchange rates.

Source: Drewry Shipping Consultants

Figure 2.21

BULK CARRIER NEWBUILDING PRICES



* Average "Japanese" contract prices converted from Yen at ruling US$ exchange rates.
Source: Drewry Shipping Consultants.

2.5.2 Secondhand Prices

2.5.2.1 Factors affecting Secondhand Prices

The secondhand market for bulk carriers attracts two broad categories of shipowner - (i) the operator with access to cargo (probably on a long-term basis) and needing acquired (rather than chartered) tonnage to work this and (ii) the speculator or "asset player". The latter regards the ship as his "commodity" and, naturally, hopes to buy at the bottom of a market cycle and sell at its peak. Clearly, therefore, there is an inbuilt expectation of future returns (which may or may not be realised) in the prices that buyers will offer for secondhand ships. As a result, the trend pattern shown by prices should show some correlation with freight rate movements.

In addition to this wider panorama, there is a further set of price influences which in turn might be considered as a set of micro supply/demand systems - i.e. with differing levels of demand and scarcity values.

In the main, these vessel-specific items are physical and tangible. Nevertheless, employment considerations and reputations are also factors of significance. However, before turning to these in more detail, a note might be made in passing of two other important points concerning ship values and market prices.

First, it does not follow necessarily that the presence of additional features or added sophistication will guarantee a higher than average price in the market place. (If the buyers in the market only want ships with gear of up to 25 tonnes safe working load (swl), there is no price bonus for having 150 tonne gear). Naturally, the prospects of achieving premium prices will occur when buying demand is strong.

2.5.2.1.1 Physical Factors

Within this category, comment is directed towards the price determining relevance of the vessel itself, its equipment and its general condition. For prospective buyers, each of the elements referred to below will be relevant though the relative weight given to each will differ between purchasers.

Vessel Type and Size

While it is self-evident that prices will differ between small and large ships and between basic and specialist vessels, the niceties of the market introduce several other tiers of complexity. These include the concentration of tonnage around popular size bands - the

Table 2.16

Selected Examples of Vessel Type Considerations in the Assessment of the Potential Market Value of Various Dry Bulk Carriers

Vessel Type (General)	Vessel Type (Sub-division)	Comments
Bulk carrier	General purpose	Able to work most free-flowing cargo. Whether ore-strengthened is a consideration, as is presence and type of gear. Not always suited to neo-bulks (e.g. lumber).
	General purpose	Square holds make vessel suitable for neo-(open hatch) bulks, cargoes such as aluminium ingots and containers. Vessels tend to be well geared. Hold shape can sometimes hinder grab discharge.
	Ore Carrier	Restricted cubic capacity. Generally gearless.
	Car/bulk carrier	Comparable to general purpose if decks are portable and can be removed. Limited scope for use in car trades which are now dominated by dedicated ships.
	Container/bulk carrier	Often indistinguishable from open hatch.
	Woodchip carrier	Specialised ship. Unusual cubic/dwt ratio.
	Self-dischargers	Highly specialised. Some loss of cargo space to conveyors. Can have unusual configurations (e.g. Canadian Lakes/Ocean "salties").
	Other	Often specialised and operating in specific markets - e.g. gypsum, cement, sugar (BIBO).
Combined carrier		Ore/oil or ore/bulk/oil or products/bulk/oil configuration.
		Some vessels no longer classed for oil cargo.

Source: Drewry Shipping Consultants

Table 2.17
Selected Examples of Vessel Size Considerations in the Assessment of Ship Values

Criteria	Example/Comments
Limits imposed by canals and seaways	Vessels dimensioned to transit various canals and seaways are likely to command higher values than units that marginally exceed these constraints (i.e. the larger vessels possess insufficient additional cargo capacity to be economic on the alternative long haul route - hence, the limited number of bulk carriers in the 80-100,000 dwt category which lies between the Panamax and Cape class bands). Indicative limitations are: Kiel Canal (linking the Baltic and North Seas avoiding the route via Skaw): Vessel of maximum length (235m loa); maximum beam 32.5m with draft limit of 7m. Vessel on maximum draft (9.5m); maximum loa and beam of 160 and 20m respectively. St Lawrence Seaway/Welland Canal: Oceangoing vessels trading to/from the Great Lakes face the constraints imposed by the system's series of locks. The limits imposed are 225.5m loa, 23.16m extreme breadth and 7.92m draft. Panama Canal: Maximum length (including bulbous bow) for commercial ships is 274.3m, though exceptions are made for container ships of up to 289.5m loa. Maximum transit draft (subject to no problems with water supply levels) is a little over 12m. The most notable constraint is on beam - 32.3m maximum. Suez Canal: The only significant constraint is on draft - the maximum limit being 16.2m.
Shiprepair docks	Many of the constraints imposed by seaways have made their mark elsewhere in the industry. There are therefore "Panamax" repair docks, etc. Oddly dimensioned vessels could face constraints over dock selection and thus be at a commercial disadvantage.

Source: Drewry Shipping Consultants

market is littered with "groupings" such as Cape class, Panamax, handymax, etc - and trade-off between flexibility and specialism.

It is possible to go through all the key ship types and elaborate on these points, but in the context of this Report this seems inappropriate. Instead, Tables 2.16 and 2.17 offer some illustrative examples.

Table 2.17 begins to indicate the reasoning behind the concentration of vessels around certain size brackets - though a number of these influences are reinforced by the fact that many newbuilding and repair docks have been designed around the dimensions of vessels able to effect the appropriate seaway transits. Port constraints have also been influential in shaping vessel size criteria - perhaps through "ultra shallow" draft developments or in creating a price premium for "short" Panamax bulk carriers (usually encompassing ships within the 220-225m loa range) - though their influence can be more transient as extra dredging or berth extension is always a possibility.

The response of the shipbuilding industry to many of these developments has been to create standard design or series built vessels. Where these designs have proved successful, the secondhand market finds itself with a known quantity with which it can monitor trends over time and use as a yardstick to rate the values of other designs.

Vessel Age

A couple of years ago, the consideration of the impact of age on the likely realisable secondhand ship price would have focused on obsolescence and survey status. While the importance of these remains, age-related factors have taken on a greater complexity.

Obsolescence is generally accepted as being a feature of increasing age. The vessel has experienced greater "wear and tear", expensive steel replacement becomes more likely, its machinery and equipment may be more prone to breakdown, spares may be less easy to obtain and its operating technology may have become antiquated.

But, does this mean that values must automatically decrease as vessels get older? The answer has shown some movement from "yes" to "probably". The reason for this lies with the fact that it is possible to encounter well maintained old ships (there is a tendency in the industry to cite some of the fleets of the oil majors or various liner companies in this context) and, given the current very high cost of securing a replacement newbuilding, several owners have considered or proceeded with fairly expensive (i.e. with bills running into millions of US dollars) life extension/refit programmes. In some specialist trade sectors this has produced talk of 15 year-old ships obtaining a future working life expectancy of perhaps ten years.

However, the equation is not simply about pumping money into old ships. Questions also are being asked about the soundness of middle-aged vessels. These tend to focus on two counts. First, these vessels were built in the age of minimum cost (loss making) shipbuilding. Steel contents are reckoned by several observers to have been at the absolute minimum permitted. Moreover, a good portion of their trading life has been during deepening market recession with its inherent picture of reduced crew levels, questionmarks over crew quality and "over-economising" in the area of repairs and maintenance. In addition, note has to be taken of the fact that many of these vessels were constructed against a background of demands for super fuel efficiency. Some took the option of fitting main engines with, compared to older vessels of similar size, much reduced horsepower ratings. Apart from the obvious disadvantage of being unable to increase vessel speed in better times (thereby incurring an opportunity cost penalty), there have been stories, perhaps semi-apocryphal, of such vessels when operating in severe weather conditions having the engine set at maximum forward power but in reality going backwards. While one can accept an element of over-exaggeration in this, there must be some concern among prospective buyers that the necessity to operate propulsion equipment at or around its maximum tolerance for regular periods must increase the prospect of mechanical breakdown.

While the attracting of the "over age" epithet (normally arising in an insurance or, perhaps, political context) may place some trading limitations on a vessel - and hence influence its value in the marketplace - a more crucial price determining issue will be vessel condition. While it is true that ships of any age can show signs of physical neglect, the probability increases as the unit passes into the hands of "low entry cost" operators, which tends to become more common as vessels get older.

Obviously, a further age related consideration will be survey status - with enhanced value expected for "survey passed" as opposed to "survey due".

Equipment

One area of significance will be the vessel's propulsion equipment with buyers often having a preference for a particular main engine manufacturer or for a set power output level. Speed and consumption figures will also matter as will any shaft generator or similar fittings enabling the at sea consumption of marine diesel oil to be eliminated.

For a ship of given type and deadweight tonnage (dwt), the parties seeking to agree on a market price will give a good measure of thought to the ship's basic layout (general arrangement) and in some cases the materials used in key cargo areas. This can be an area where the presence of standard designs ships can be helpful. Assuming that a significant number of such ships have been built, this suggests a degree of popularity within the marketplace. Other advantages might include the fact that they are a "known quantity" in terms of operating performance and earnings potential. They offer a better chance of crew familiarity and good availability of spares. In other words, they can set a useful indicator price for a sector of the market. There might also be an argument for the standard design being more favourably rated (i.e. priced) than other similar vessels, however, this is not always true. For example, the vast handy/handymax bulk carrier ordering programme embarked upon by Sanko in the early/mid 1980s was based on various yards' basic standard designs and contracted at bargain prices. In fact, informed opinion for S&P broking sources, tends to the view that the majority of these ships are "minimum specification" and hence their S&P market standing is diminished.

Other considerations might include:

(i) Size of hatch opening.
(ii) Are the holds square or are wing tanks present?
(iii) Are the holds strengthened for heavy cargo (e.g. ores)?
(iv) If the vessel has 'tweendecks - are they strengthened, fixed or folding, removable?
(v) Are the hatch covers flush or are there coamings?
(vi) Do any or all of the holds have cell guides or reefer points?
(vii) Is there any insulated cargo capacity?
(viii) What type of hatch covers are fitted? Are they strengthened for deck cargo?

Other Factors

This will involve consideration of such factors as:

■ Gear

(a) The type and swl of the gear, its manufacturer and physical condition. (Availability of spare parts ought to be a consideration).

(b) Whether all the gear has the same swl or if there is a mix. (This will affect the ability to mix cargo parcel permutations).

(c) Its physical positioning relative to the holds and hatches. (Apart from whether each crane serves one or two holds, there may be certain negative aspects to consider, such as does the gear reduce the potential for deck cargo or does the gear hamper operation of shoreside equipment being used to work the vessel?)

Remaining with the physical aspects of the vessel, it is possible to identify a further selection of price influencing factors.

The following list is not complete but it does offer a degree of insight into some of the issues that specific buyers and sellers might see as being of relevance.

- The extent of automation applicable to vessel's operation - e.g. the degree of unmanned machinery spaces (UMS).

- The capability for hold ventilation - important for a variety of cargoes from agricultural products through forest products to vehicles.

- Ice strengthening. (The "ice class" notation can influence some trading patterns and hence the value of a vessel to a prospective owner.)

- Crew accommodation. (Is it satisfactory for the numbers and nationality of the complement envisaged?)

Employment History

The influence on a ship's secondhand market value that can be attributed to its trading history is to some extent subjective as it impinges on the topic of reputations. (By this, the reference is to the view that the prospective purchaser places on the quality of the charterers who have been interested in providing employment for the vessel.)

However, there are a number of other more tangible influences that emerge from the ship's trading history.

The most immediate would be the charter status at the time of sale. The vessel could be charter free. If not, the buyer would wish to evaluate whether the outstanding charter - assuming that the charterer is prepared to accept the new ownership arrangement - is a bonus or a handicap and adjust his bid price accordingly.

The other major influence to arise from the ship's employment history will be the extent to which the vessel has been laid-up. For some items, lay-up reduces the degree of wear and tear and this might be deemed a plus factor. However, the lay-up location and the degree of supervision and monitoring undertaken could be crucial.

Finally, the vessel's record in terms of off-hire, due to mechanical breakdowns or damage will probably have some bearing on buyer's price ideas.

Owner and Shipbuilder Reputations

When considering influences on secondhand ship prices, this is the most controversial subject area as it encompasses a mix of both tangible facts and subjective bias or prejudice. The question of reputation can apply at three levels - the ship, the shipbuilder and the ship owner/operator.

Within the industry, certain **vessels** acquire a reputation as being a "problem ship". This can manifest itself in a variety of ways ranging from the vessel that has spent a sizeable time period at the builder's yard between completion and delivery (examples of vessels in this state for around two years can be identified) to a "reinstated" scrapyard re-purchase or a "patched up" constructive total loss.

The first area where attention might focus is with the **shipbuilder**. This is a difficult subject area but one where it is likely that most owners, operators, managers and brokers will be in agreement - at least in private. The sort of factors that the industry's players (including those active in the S&P market or their advisors) will note for future reference will include:

(a) Orders cancelled (usually followed by lengthy litigation) due to owners' claims of deficiencies, failings or sub-standard work, etc.
(b) Inordinate delays in the building process.
(c) Lengthy periods between completion and delivery.
(d) Use of relatively obscure component manufactur-ers or poor quality materials.
(e) Undesirable working practices - e.g. painting in unsuitable weather conditions.

It is also likely that some consideration will be given to the standing of the vessel's **previous owners and charterers.**

Thought here might cover a variety of topics, such as: Has the vessel been primarily spot traded or have there been long term commitments? Were the charterers major market players concerned with vessel quality? Were the previous owners financially sound - and if not, has there been "skimping" on crew and R&M expenditure? Has the vessel's previous ownership, charter employment or trading pattern resulted in the vessel being placed on a blacklist - e.g. by the Arab states? Has there been any history of enforced or judicial sales?

To some extent, clues might be sought also from the vessel's trading history (did it secure above average freight rates?) and any records of previous sales (how did the price obtained compare with market expectations?).

2.5.2.2 Secondhand Prices: 1972-93

From the discussion presented in other sections of this Report dealing with changing demand patterns and ship size preferences, the moves to develop standard ships as well as fuel efficient (ecoships) bulk carriers, it has become the case that the typical bulk carrier of a generic type (e.g. Panamax) in the 1970s is some way removed from its counterpart of the 1980s and 1990s. As a result, some caution needs to be used when examining long run data series covering representative secondhand prices.

Moreover, because of the development and age profile of different sectors of the fleet, it is impracticable to offer representative prices in some early years and - until quite recently - in the case of the Handymax ship. This last type - the modern Handymax - is really a development of the mid/late 1980s with its predecessors being either high specification, specialised 40,000+ tonners or the "medium" bulk carrier of about 37,000 dwt. For the Handy sized sector (which has to act as the long term proxy for the Handymax trend) the fleet has steadily aged. In the Panamax sector the modern 64-66,000 dwt type has taken the place of the 1970s vintage types where perhaps ±60,000 dwt was a more typical size marker. For the Capes the significant feature has been the phasing out of ore carriers by more trade-flexible ore strengthened bulk carriers. However, these do not really feature in the early part of the review period because of (a) their then very modern fleet profile and (b) the commitment of virtually all new ships of this size to long term contracts.

The long run time series, presented as Table 2.18 and Figure 2.22, therefore, covers the size/age permutations maintained by the Consultants. Table 2.19 looks more closely at approximate estimates for five and ten year-old ships in the recent past.

Table 2.18
Development of Bulk Carrier Secondhand Prices: 1972-93
(Million US dollars)

Dwt: / Age (yr):	26,000 / 8	40,000 / 5	65,000 / 5	120,000 / 8
72	4.0	-	8.7	-
73	5.2	-	11.7	-
74	6.9	-	14.0	-
75	6.0	-	11.5	-
76	5.3	-	10.5	-
1Q77	4.8	-	7.5	7.5
2Q77	4.5	-	7.3	6.8
3Q77	4.6	-	7.0	5.3
4Q77	4.0	-	6.5	4.8

Table 2.18 (cont'd)

Dwt: / Age (yr):	26,000 / 8	40,000 / 5	65,000 / 5	120,000 / 8
1Q78	3.8	-	6.5	4.3
2Q78	3.7	-	7.3	4.8
3Q78	3.3	-	8.0	5.5
4Q78	3.8	-	10.5	8.0
1Q79	4.8	-	11.0	12.5
2Q79	6.7	-	13.5	17.5
3Q79	7.5	-	16.8	19.3
4Q79	8.3	-	17.8	21.0
1Q80	7.5	-	16.5	18.5
2Q80	8.6	-	17.7	22.5
3Q80	9.8	-	18.5	24.0
4Q80	10.3	-	22.0	25.0
1Q81	11.2	-	21.5	24.5
2Q81	10.8	-	19.0	20.5
3Q81	8.3	-	14.0	17.0
4Q81	6.1	-	10.5	13.0
1Q82	5.5	-	9.0	11.0
2Q82	4.8	-	7.8	9.5
3Q82	4.1	-	7.3	8.5
4Q82	4.0	-	7.0	6.8
1Q83	4.8	-	7.5	7.0
2Q83	6.7	-	8.6	9.5
3Q83	6.3	-	8.8	9.0
4Q83	6.6	-	9.4	9.8
1Q84	5.6	-	8.7	11.0
2Q84	5.1	-	9.2	10.5
3Q84	4.0	-	8.8	10.5
4Q84	3.7	-	8.3	10.3
1Q85	3.3	-	7.7	9.9
2Q85	3.3	-	6.5	8.8
3Q85	2.3	-	6.0	7.0
4Q85	2.5	-	6.0	5.7
1Q86	2.3	-	5.7	5.6
2Q86	1.7	-	6.5	5.3
3Q86	2.1	-	7.0	8.2
4Q86	2.4	6.5	7.7	8.0
1Q87	2.9	5.8	8.2	8.5
2Q87	3.9	7.5	10.8	12.5
3Q87	4.5	8.6	12.0	14.5
4Q87	6.0	12.0	13.9	16.5
1Q88	7.0	11.5	14.5	19.0
2Q88	7.8	12.3	15.0	21.0
3Q88	8.7	13.8	16.3	22.0
4Q88	9.8	16.5	17.3	23.0

Table 2.18 (cont'd)

Dwt: / Age (yr):	26,000 / 8	40,000 / 5	65,000 / 5	120,000 / 8
1Q89	10.3	15.0	18.5	28.5
2Q89	10.5	19.0	19.5	30.0
3Q89	10.8	19.5	22.0	30.5
4Q89	11.3	19.0	22.5	31.0
1Q90	10.8	18.5	22.0	30.0
2Q90	9.7	18.0	20.5	28.5
3Q90	8.5	17.0	19.0	27.0
4Q90	7.5	15.5	16.5	24.0
1Q91	8.0	16.0	17.0	26.0
2Q91	9.0	17.5	18.5	31.0
3Q91	10.5	18.5	20.0	34.0
4Q91	10.0	18.0	19.5	32.5
1Q92	8.5	16.5	18.0	30.5
2Q92	8.0	16.0	17.5	27.0
3Q92	7.5	15.5	17.0	25.5
4Q92	8.5	16.5	18.5	26.5
1Q93	10.5	18.0	19.5	27.0
2Q93	11.0	19.0	21.0	27.5
3Q93	11.0	19.5	21.5	27.0
4Q93	10.0	18.0	19.5	26.0

Source: Drewry Shipping Consultants

Table 2.19

Price Trends for 5 and 10 Year-Old Bulk Carriers: 1987-93

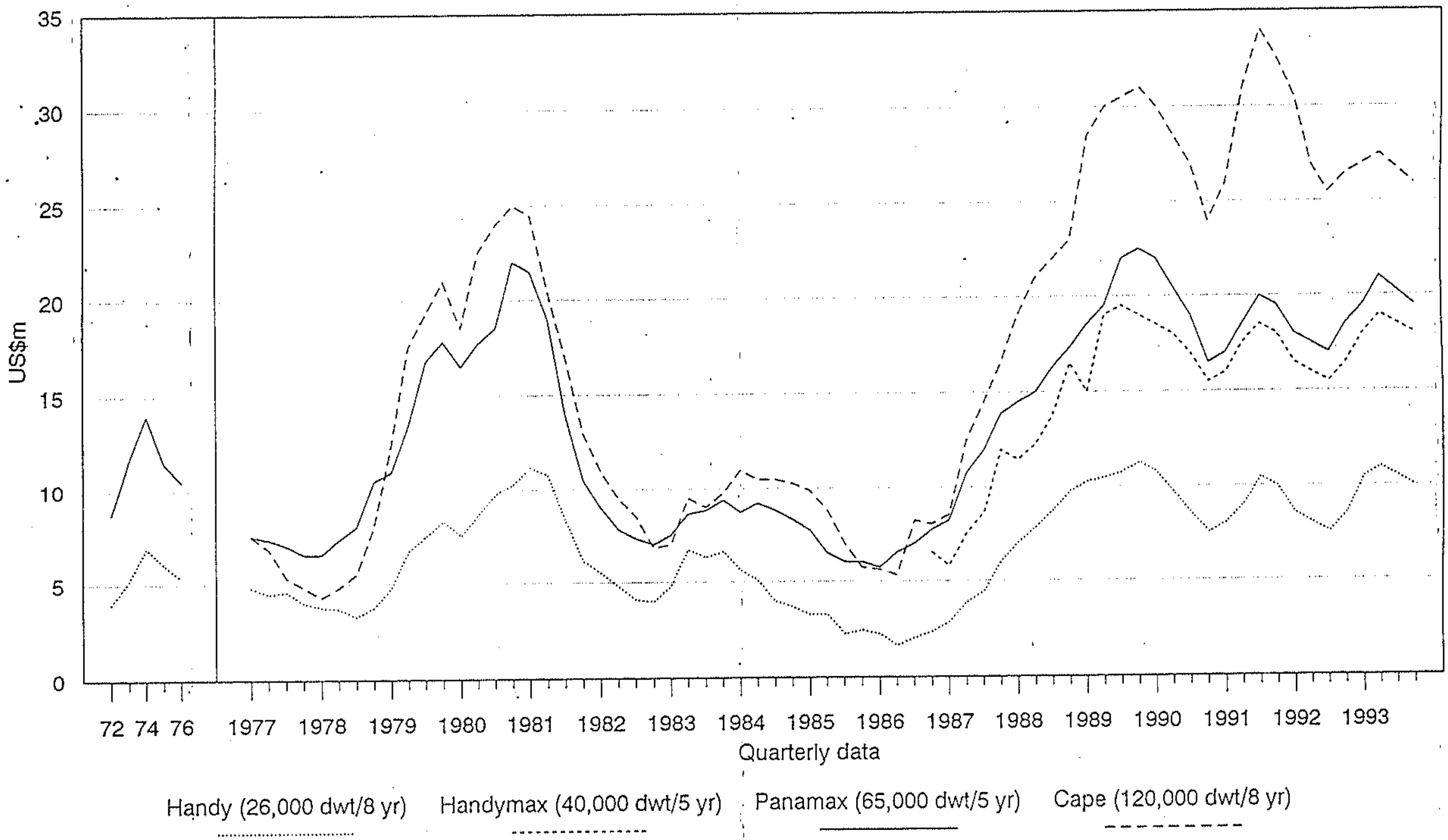
Size:	Handymax		Panamax		Cape	
Age (yr):	5	10	5	10	5	10
1987	8.5	4.9	11.3	8.5	19.5	11.5
1988	13.5	8.5	15.8	11.0	27.5	19.5
1989	18.1	13.2	20.7	15.0	32.0	27.5
1990	17.3	12.3	19.5	14.5	29.5	22.5
1991	17.5	12.2	18.8	14.0	37.0	28.5
1992	16.1	11.3	17.8	13.5	29.0	19.5
1993(p)	18.6	13.5	20.4	15.5	30.0	20.0

(p) Provisional.

Source: Drewry Shipping Consultants

Figure 2.22

DEVELOPMENT OF SECONDHAND BULK CARRIER PRICES



Source: Drewry Shipping Consultants.

2.6 Ship Price and Freight Rate Relationships

It is generally held that the pattern exhibited by ship prices and freight rates is broadly comparable. This relationship tends to hold best between freight rates and secondhand prices as both have their basis in the same market circumstances and perceptions of the future.

For newbuildings, the timespan is different both from the builder's point of view - i.e. the costs anticipated over the period from ordering through to delivery, which could be ±18 months - and the owner's standpoint - i.e. the amortisation period for a newbuilding may be assessed differently from that of a speculative, asset play acquisition on the secondhand market.

In order to try and illustrate these relationships, the Consultants have sought to reduce some of the series data contained elsewhere in Section 2 to indices. By focusing on a fixed point when all the indices stand at 100, the relative movement of prices and rates can be observed.

The indices considered are as follows:

(a) Single Voyage Rates - Monthly index based on January 1981=100.

(b) Period Rates - Monthly index complied by comparing monthly figures with those prevailing in January 1981. January 1981 is calibrated as 100.

(c) Secondhand Prices - Quarterly index complied by comparing subsequent quarterly levels with those assessed for the 1st quarter of 1981. 1st quarter 1981 is calibrated as 100.

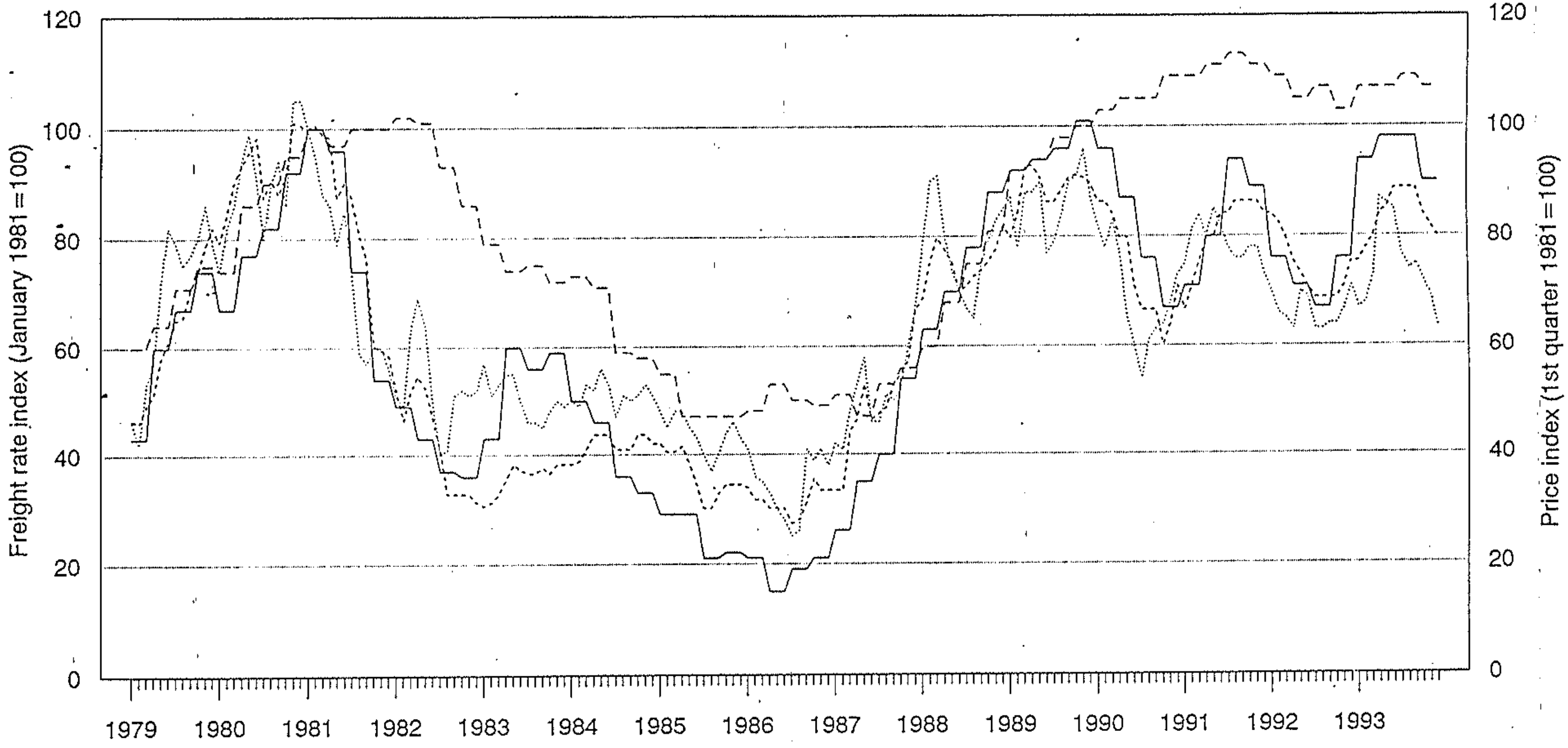
(d) Newbuilding Prices - Compiled on the same underlying basis as used for secondhand prices.

The results - shown for each of the three bulk carrier size classes under evaluation - are contained in Figures 2.23-2.25.

Looking at the charts, while one can observe obvious trend similarities, it is clear that "hard and fast" rules or precise statistical formulae cannot be applied. There are several reasons for this - including the differing age profile of the fleet sectors, differences in the number of available "modern" sales candidates and of ships open for charter - which are superimposed onto the general circumstances of the market. As a "rule of thumb" guide, in

Figure 2.23

FREIGHT RATE AND PRICE INDICES: HANDYMAX BULK CARRIERS



Single voyage rates (monthly, left axis) ....

Period rates (monthly, left axis) - - - - - - - -

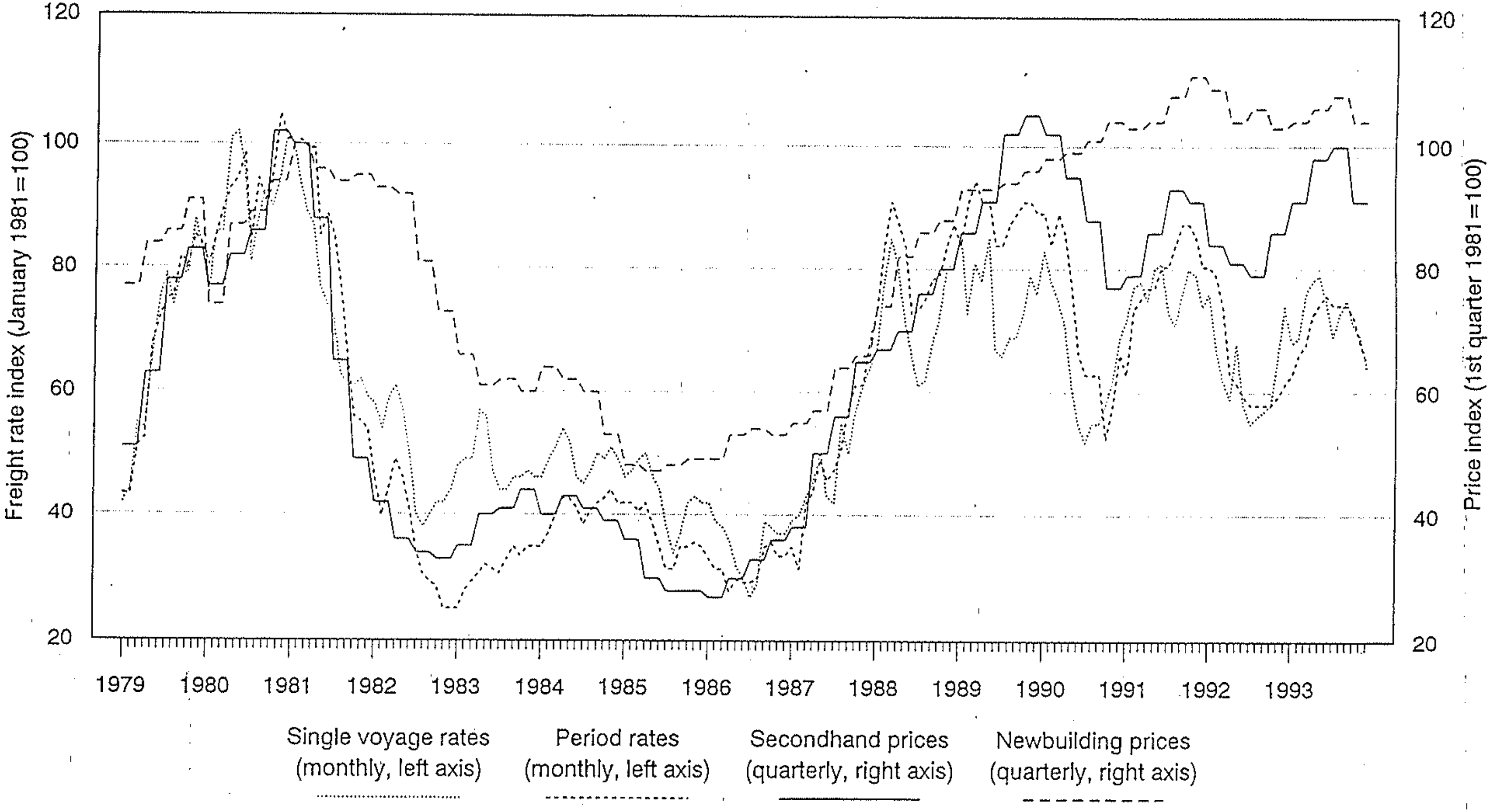
Secondhand prices (quarterly, right axis) ———

Newbuilding prices (quarterly, right axis) — — — —

Source: Drewry Shipping Consultants.

Figure 2.24

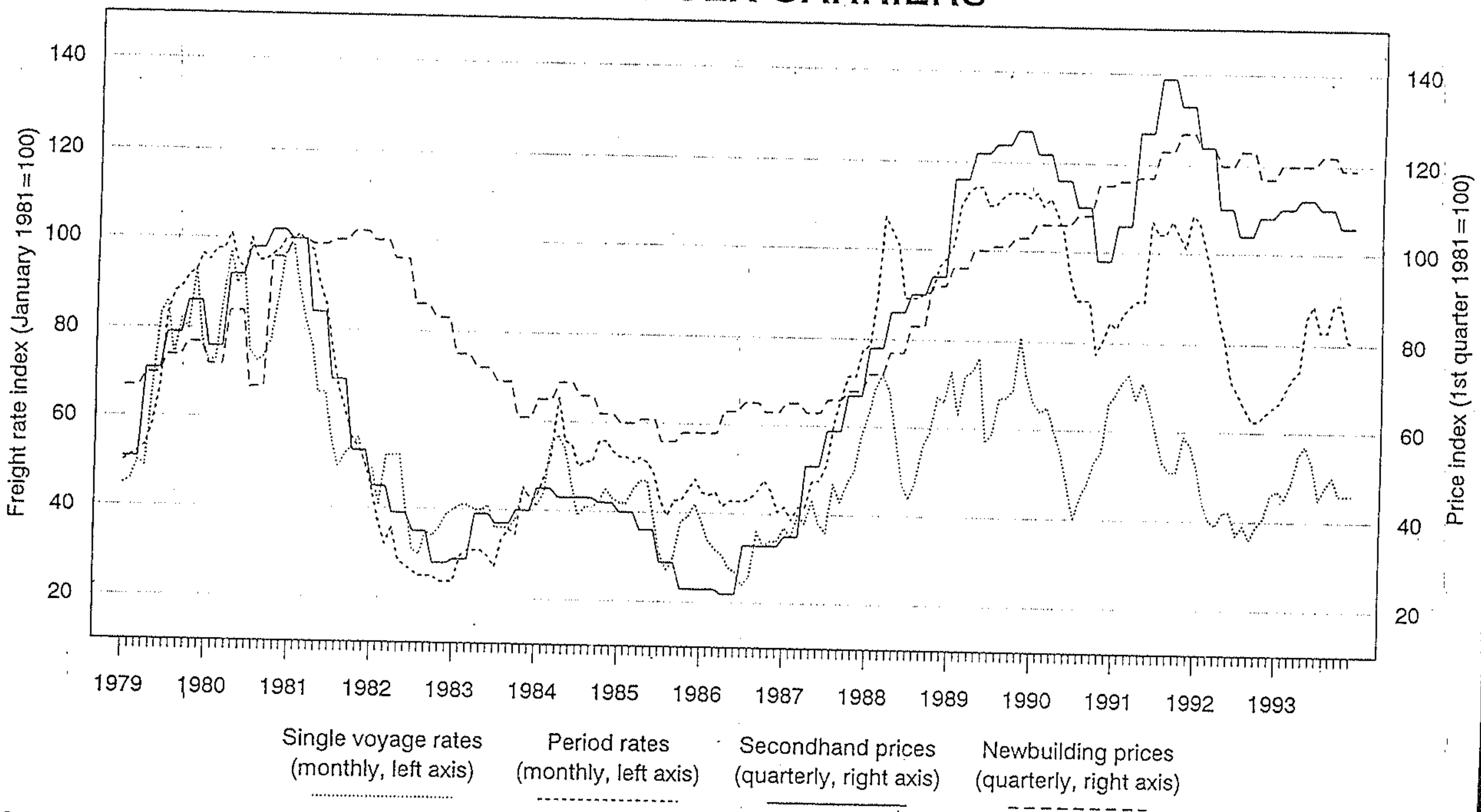
FREIGHT RATE AND PRICE INDICES: PANAMAX BULK CARRIERS



Source: Drewry Shipping Consultants.

Figure 2.25

FREIGHT RATE AND PRICE INDICES: CAPE BULK CARRIERS



Source: Drewry Shipping Consultants.

a poor market the differentials for vessel age, on-board fixtures and fittings, etc tend to be reduced to a minimum. Conversely, in a buoyant market these factors can be used as leverage to claim higher rates or prices. Obviously, while one can look to changes in the main supply/demand fundamentals to point to the likely direction and pace of overall market rate or price developments, there will always be the "chance factor" - e.g. the failure of a key grain crop or severe weather conditions - that will introduce added volatility into the market for particular sizes of bulk carrier.

Having raised a voice of caution against reading too much into the detail of bulk carrier price and freight rate relationships, one indicative statistical consideration has been developed with the results being offered via Tables 2.20 and 2.21. These estimates cover the period from 1987 onwards and attempt to relate average prices and earnings on a Price/Earnings (P/E) ratio basis. Table 2.20 assumes the vessels involved are five years old. The prices and rates shown are averages derived from data presented elsewhere in Section 2.

The initial implication that emerges from Table 2.20 is that the Panamax type shows the nearest relative fit in terms of the P/E ratio - i.e. the price outstrips earnings by a lower rate than is the case for the Handymax and Cape types. However, this conclusion merits a few ancillary comments. In the case of both the Cape and Handymax types, there are fewer modern ship sales candidates. Also, ship specification is of increased importance because these vessels may need to operate in something of a niche market. In contrast, the Panamax sector has become the dominant market sector for global chartering - and this is reflected to a degree in sales activity - with this category of ship featuring increasingly as a general purpose market "workhorse".

Table 2.21 undertakes the same exercise in connection with newbuilding prices. In this case, a good deal more caution is needed when looking to interpret the figures. First, the comparison is between order prices and rates prevailing at the time of ordering. (One might argue that these earnings ought to be compared with earlier newbuilding prices since the rate comparison is with that obtained on delivery. On the other hand, an investor can make judgements about the existing position and apply his own assessment of the position at vessel delivery). Second, the rate assumed is the same as for the "modern" vessel. One could put forward the argument that the newer ship should command a higher period charter rate. However, market observation does not always bear this out. Market players sometimes exhibit a wariness over new ships and "discount" until they have established a performance record. As a result, it is not all that uncommon to see higher rates attributed to 1-3 year-old ships than similar newbuildings.

In each instance, the earnings calculations assume a nominal ten days all purposes "off-hire" allowance.

Table 2.20

Five Year-Old Bulk Carrier Price/Earnings Ratios: 1987-93

Size:	Handymax			Panamax			Cape		
Age (yr):	5			5			5		
	Value ($m)	Hire* ($pd)	P/E	Value ($m)	Hire* ($pd)	P/E	Value ($m)	Hire* ($pd)	P/E
1987	8.5	5,430	4.41	11.3	7,550	4.22	19.5	9,090	6.04
1988	13.5	8,350	4.55	15.8	12,350	3.60	27.5	15,525	4.99
1989	18.1	9,875	5.16	20.7	13,585	4.29	32.0	18,460	4.88
1990	17.3	8,190	5.95	19.5	10,915	5.03	29.5	15,930	5.22
1991	17.5	9,005	5.47	18.8	12,110	4.37	37.0	16,160	6.45
1992	16.1	8,240	5.50	17.8	9,815	5.11	29.0	12,855	6.35
1993(p)	18.6	9,245	5.67	20.4	10,940	5.25	30.0	13,540	6.24

(p) Provisional.

* Based on 12 month period rate.

Time charter revenue annualisation allows for ten days' "off-hire".

Source: Drewry Shipping Consultants

Table 2.21

Bulk Carrier Newbuildings Price/Earnings Ratios: 1987-93

Size:	Handymax			Panamax			Cape		
Age (yr):	New			New			New		
	Value ($m)	Hire* ($pd)	P/E	Value ($m)	Hire* ($pd)	P/E	Value ($m)	Hire* ($pd)	P/E
1987	12.1	5,430	6.28	18.0	7,550	6.72	27.9	9,090	8.65
1988	16.6	8,350	5.60	24.5	12,350	5.59	34.5	15,525	6.26
1989	22.5	9,875	6.42	27.9	13,585	5.79	42.6	18,460	6.50
1990	24.6	8,190	8.46	29.9	10,915	7.72	46.3	15,930	8.19
1991	26.0	9,005	8.13	31.6	12,110	7.35	51.5	16,160	8.98
1992	24.8	8,240	8.48	31.4	9,815	9.01	51.6	12,855	11.31
1993(p)	25.1	9,245	7.65	31.4	10,940	8.09	51.1	13,540	10.63

(p) Provisional.

* Based on 12 month period rate.

Time charter revenue annualisation allows for ten days' "off-hire".

Source: Drewry Shipping Consultants

2.7 The Baltic Freight Index (BFI) Trend, Biffex and their Market Context

Given that it has been active since May 1985, the Freight Futures market has never really developed to the level of prominence that might have been expected. Nevertheless, it has survived while seeing both a competing screen-based freight futures system come and go along with a short-lived and ill fated foray into the area of tanker freight futures. It has also seen a change of home - moving from the Baltic Exchange to the London Fox. Perhaps curiously, the market has different "controllers" in terms of the day-to-day index and the trading of its contracts. The index (the BFI) is compiled daily by a panel of shipbrokers. The results of their deliberations and the announcement of the BFI fall under the auspices of the Baltic Exchange. However, the trading of futures is the responsibility of the Baltic International Freight Futures Exchange (Biffex).

Everyone familiar with freight markets is aware of their volatility and the high risks that are often associated with bulk carrier ownership and chartering. Indeed, some would argue that the very essence of shipping is taking risks. For shipowners, the freight market's traditional option for changing the risk parameters has been the spot versus period decision. That is, the benefit/risk of exposure to potentially very profitable (though also possibly catastrophically poor) rates lies in keeping the vessel open for spot trading and looking to exploit every opportunist option. In contrast, owners looking for greater security (and willing to forego peak market opportunities) can lock into either period time charters or contracts of affreightment. The latter is not risk free - charterers are not immune from market pressures. The proponents of freight futures claim there is a need for an alternative "hedging" vehicle designed - in theory at least - to compensate losses from the physical market by gains on futures contracts and vice-versa. In practice, a few unfortunate players have on occasion contrived to "lose both ways".

As evidenced by the number of lots traded daily, the shipping industry continues to show a stubborn resistance (even scepticism) towards any involvement in Biffex trading. The nature of the market's trading is that the buyers and sellers of contracts are not identified publicly. However, there is a widespread view that the main players are the major grain trading houses - an industry sector well versed in commodity futures trading. Lack of volume - and, perhaps surprisingly, lack of volatility - has discouraged the speculator involvement that Biffex apparently craves. It may well be that these influences have been significant in the latest changes to the composition of the BFI, which are discussed below.

2.7.1 The BFI and its Construction

Reservations have been expressed regularly about how valuable an instrument Biffex is, whether it will ever function as intended and whether the BFI is good enough for the purpose for which it was created. Regular criticism has been levelled at the construction of the BFI, its alleged biases and its claimed failure to reflect changes in the physical market. However, paradoxically, since its inception the index has become the most widely followed indicator of the dry bulk shipping market.

However, before focusing on the BFI in detail, note needs to be made at least in passing of the futures contract which Biffex offers and for which the index is critical - not least in establishing settlement figures (the average of the BFI over a contract's last five trading days). The Biffex contract is cash settled on the basis of the BFI's settlement figure.

Contract units are bought and sold at the rate of $10 per index point. Contracts are cleared and guaranteed for settlement to clearing members of the Exchange by the International Commodities Clearing House (ICCH).

As in the case of commodity futures, ICCH, in effect, acts as bankers to the Baltic International Freight Futures Exchange, providing a guarantee to dealing members that contracts will be fulfilled. In terms of the functioning of the market, it is a distinct advantage that ICCH produces "dealing" statements on the same day as the transaction takes place so that clearing members (brokers) and their clients have rapid confirmation of their trading positions.

The Baltic Freight Index itself is valued, for trading purposes, at US $10 per full Index point, with the base level - 1,000 - reflecting market levels as at 4 January 1985, the date official BFI calculations began.

A panel of leading shipbrokers, all Baltic Exchange member companies, submit daily their own individual assessment of actual or nominal (if no business is reported) freight rates on each of the routes from which the Baltic Freight Index is calculated. After eliminating the highest and lowest indications received that day, the rest is weighted and averaged to compute the daily Baltic Freight Index.

Since the inception of Biffex, several changes have taken place in the composition of the Baltic Freight Index, with new routes being added, old ones withdrawn or amended and the weightings changed as allowance has been made for time charter trip employment and rates.

The first BFI was wholly voyage rate based and sought to encompass the routes on which the largest volumes of regularly reported fixture information came into the public domain. While laudable and, essentially, logical this approach proved to have a number of failings, including:

(a) Some selections were influenced by "extraneous" factors which seemed to be subject to developments not geared wholly to supply/demand or other overt market fundamentals.

(b) The increasing difficulty in finding Handy size carrier routes that provided rates that were both readily available and felt to be representative attracted criticism. Latterly, these may have been slightly unfair arguments as this vessel class has benefited from booming rates largely created by high import demand and related port congestion in China. This can be argued to have "distorted" the market - if the market is seen principally as being a Panamax/grain operation. Biffex critics might argue that this is not so much a "distortion" as an "inconvenience".

(c) Criticism became vociferous over the absence of any time/trip charter based fixtures.

November 1993 has brought additional change to the composition of the BFI - the elimination of all Handy/Handymax references. A limited Cape sector input remains (and despite views expressed that this understates the importance of the huge volumes of coal and iron ore traffic moved globally by sea, it should be remembered that the vast bulk of this business is tied up under long-term contractual arrangements). The changes evident in November 1993 can be gauged from Table 2.22.

Table 2.22

The BFI and its Route Weightings - Before and After 3 November 1993

(a) Before

	Route	Carrier class	Charter type	Weighting
1	US Gulf-ARA	Panamax	Light Grain	10.0%
1a	Transatlantic RV	Panamax	Trip	10.0%
2	US Gulf-S.Japan	Panamax	HSS	10.0%
2a	Cont./USG/F.East	Panamax	Trip	10.0%
3	USNP-S.Japan	Panamax	HSS	7.5%
3a	Transpacific RV	Panamax	Trip	7.5%
4	US Gulf-Venezuela	Handy	HSS	5.0%
5	Cont./ECSA/F.East	Handymax	Trip	5.0%
6	Hampton Roads/ Richards Bay-Japan	Cape	Coal	7.5%
7	Hampton Roads-Rotterdam	Cape	Coal	5.0%
8	Queensland - Rotterdam	Cape	Coal	5.0%
9*	F.East/Nopac/Cont.	Panamax	Trip	5.0%

* ARA: Amsterdam, Rotterdam, Antwerp (两三个荷兰, 比利时)

* Hampton Roads: 美国东岸 Virginia 南部一区域 (包含 Norfolk, Portsmouth, Chesapeake)

Table 2.22 (cont'd)

(a) Before (cont'd)

	Route	Carrier class	Charter type	Weighting
10	Tubarao-Rotterdam	Cape	Iron Ore	5.0%
11	Casablanca-W.India	Handy	Phosphate Rock	2.5%
12	Aqaba-W.India	Handy	Phosphate Rock	5.0%

* Early 1993 replacement for WCNA-ARA, Panamax, Petroleum Coke.

(b) After

	Route	Carrier class	Charter type	Weighting
1	US Gulf-ARA	Panamax	Light Grain	10.0%
1a	Transatlantic RV	Panamax	Trip	10.0%
2	US Gulf-S.Japan	Panamax	HSS*	10.0%
2a	Cont./USG/F.East	Panamax	Trip	10.0%
3	USNP-S.Japan.	Panamax	HSS	10.0%
3a	Transpacific RV	Panamax	Trip	10.0%
6	Hampton Roads/ Richards Bay - Japan	Cape	Coal	7.5%
7	Hampton Roads-Rotterdam	Cape	Coal	7.5%
8	Queensland-Rotterdam	Cape	Coal	7.5%
9	F.East/Nopac/Cont.	Panamax	Trip	10.0%
10	Tubarao-Rotterdam	Cape	Iron Ore	7.5%

Source: Drewry Shipping Consultants

* HSS = Heavy Grain, Soybean, Sorghum.

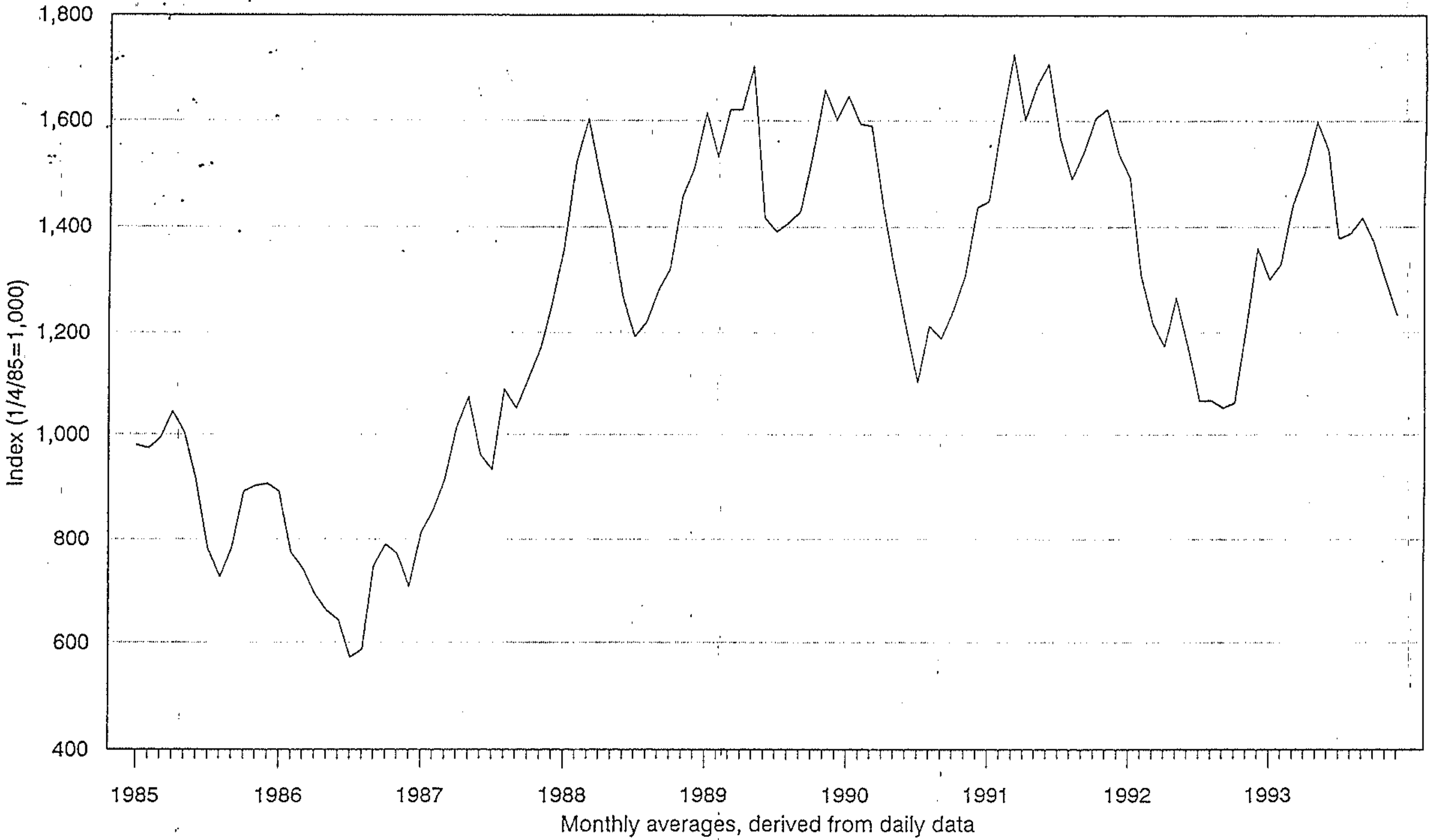
2.7.2 Changes in the BFI Index Level

Given that the BFI is reported daily (or, specifically, for every trading year of the year) presenting long run statistical series becomes complex. To circumvent this problem, the Consultants have considered two options - a simplified long-term picture and a more detailed short term assessment. For the first, reference can be made to Figure 2.26. This chart plots the monthly **average** derived from the particular month's daily reports. From this, the trend similarities with other monthly data provided elsewhere in this report can be compared and contrasted.

In contrast, Figure 2.27 plots the daily pattern over the latest three years.

Figure 2.26

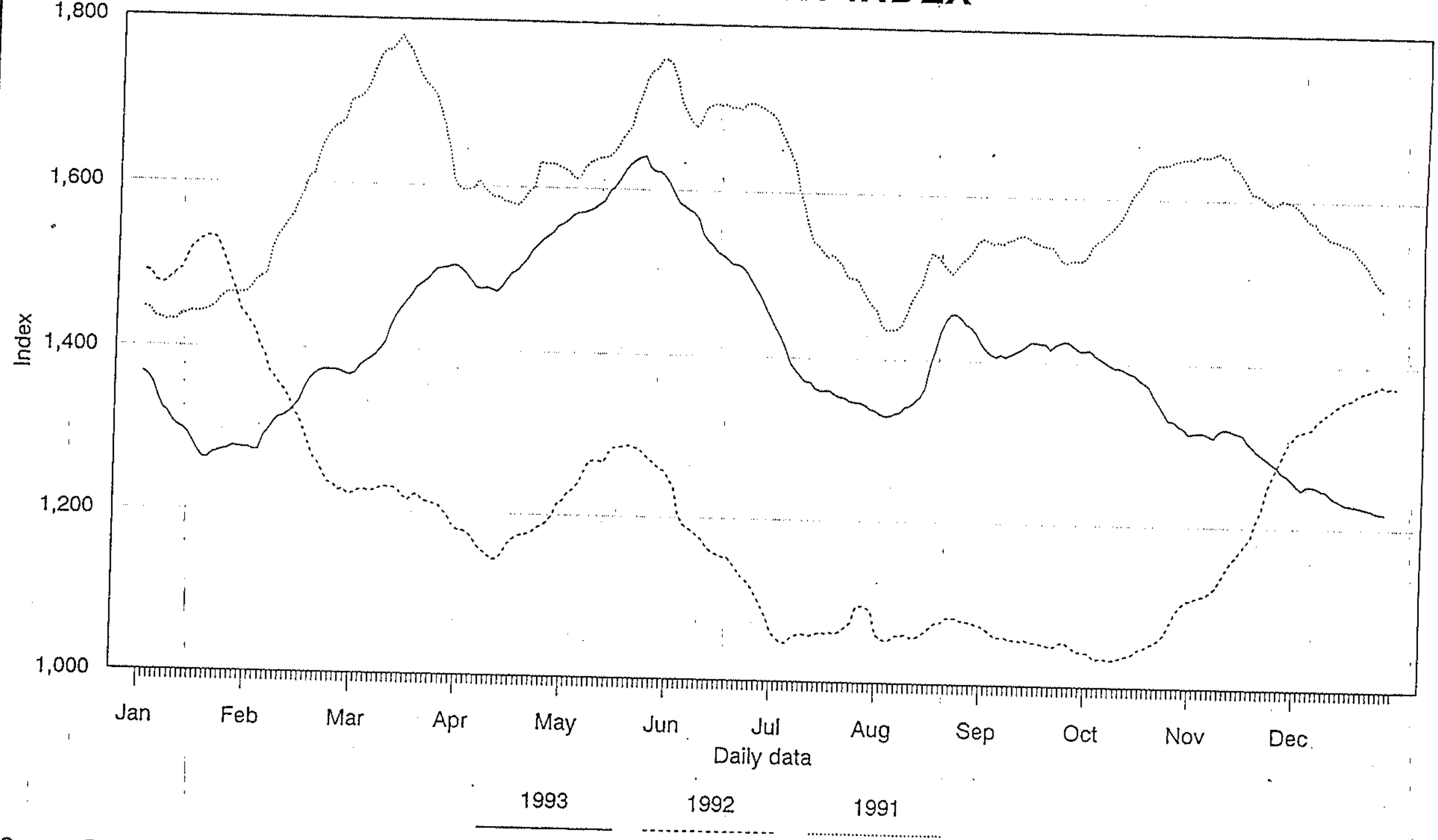
EVOLUTION OF THE BFI



Source: Drewry Shipping Consultants.

Figure 2.27

BALTIC FREIGHT INDEX



Source: Drewry Shipping Consultants.

SECTION 3

FORECAST DEVELOPMENT OF DRY BULK TRADE AND SHIPPING DEMAND - THE NEXT TEN YEARS

Within Section 2.3 consideration has been given to the recent evolution of the dry bulk trades, the tonne-mile demands they create and historical levels of bulk carrier productivity. In addition to serving as a historical record, this earlier discussion provides the context for the projections which follow.

Once again, the process begins with prospective tonnage movements then explores tonne-mile implications, market shares of the different bulk carrier sectors (Handymax, Panamax, Cape, etc), with the aim of reaching an implied dwt demand figure for each of these sectors at various points over the next ten years.

The procedures and projections discussed and quantified in Section 3 - as well as the supply (Section 4) and demand/supply balance (Section 5) considerations that follow - draw on a continuing "stock-in-trade" concept developed by Drewry Shipping Consultants.

3.1 Global Economic Outlook

The recent slowdown in world economic activity has proved to be more protracted than had been evisaged and economic predictions by the OECD, International Monetary Fund and other institutions have proved to be wrong and, consequently, have had to be revised downwards.

As 1991 ended, it was widely believed that a cyclical recovery would be well underway by 1993, with GDP advancing by more than 3%. A year later, in December 1992, the OECD had lowered its 1993 growth forecast to less than 2% and there has been a downward revision since then, with growth actually failing to match even 1992's depressed growth and averaging only a little over 1%.

Moreover, when it finally materialises, recovery from this quite severe downturn is likely to be very sluggish, with OECD real GDP growth remaining below 3%. With a strong upward cycle still some way off - perhaps not until 1996 - it is likely that the dry bulk carrier markets will receive only limited stimulus from trade growth over the next two years.

There have been various reasons put forward for the errors in the economic forecasts for the industrialised countries. However, the net result has been that the developed economies have experienced a longer and much deeper recession than any forecaster anticipated. Amongst the reasons put forward are:

- The recent downturn is not merely part of the normal economic cycle. The fall in prices of assets such as property (real estate) and stocks is exerting an unexpectedly negative influence on the economy, leading to so-called "asset deflation".

- Individuals and companies are heavily indebted and have difficulty settling their debt.

- Employment has been reduced by the restructuring of companies.

- In Europe, interest rates have remained high due primarily to Germany's high interest ate policy brought about by the much higher than expected costs of reunification.

- The social, economic and political upheaval in the former USSR and Eastern Europe.

On the positive side, the Gatt agreement reached in December 1993 could produce far-reaching measures designed to liberalise world trade and remove barriers. There is talk of an increase in world trade worth $200 billion, or about 5%. However, agreement and implementation are not the same thing.

3.1.1 Short Term Economic Growth Forecasts

Basic assumptions are described individually for major countries and areas below.

SA

The US economy started to recover strongly during the second half of 1992, with 4.8% growth in the fourth quarter. Contributing factors included:

- A recovery in personal spending.

- Growth in investment due to lower long term interest–rates based on hopes for successful Federal financial deficit reductions by the Clinton administration.

- Psychological effects of investment tax credits.

- Growth in housing investment due to the bottoming of the property slump.

- Increased exports.

However, US recovery from the recession of 1990/91 remains rather hesitant, with GDP growth in 1993 failing to rise above 3% (2.6% is forecast). 1993 data for GDP and industrial production presents a picture of an economy still struggling to achieve anything more than a very moderate rate of growth.

Japan

Shaking off the mid-1980s recession, Japan's economy started growing rapidly in 1987 and favourable economic conditions continued for nearly five years. An annual growth rate of around 5% was achieved, led by domestic demand centring on both consumption and plant and equipment investment. In the spring of 1991 the economy peaked and began to retreat, affected by monetary stringency, inventory adjustments and the falling stock market.

From over 4% in 1991 real GDP growth slowed to 1.8% in 1992, dashing hopes of a early recovery. The Japanese failed to realise just how weak their economy had become and completely underestimated the effect on industrial production. In the event, Japan's industrial production decreased by 6% in 1992. The main causes of the slump were:

- Recessionary stock adjustment.

- The necessity of adjusting excessive capital stocks as a result of an over 10% growth rate of plant and equipment investment over the three years from 1988.

- The negative effects of asset deflation and turmoil in the monetary system.

Responding to the slowdown in the economy, the Japanese government unveiled a package aimed at reviving domestic demand. However, it was not until mid-1993 that the benefits of these fiscal measures began to feed through to industrial production and, by then, the yen had surged to an all-time high against the US dollar, severely damaging prospects for early recovery. The OECD is forecasting a second year of sub-2% growth in the Japanese economy, with real GDP up no more than 1%.

Europe

Europe is in a slump. In Germany, the economy has been receding since 1991 due to the swelling budget deficits associated with German reunification and the high interest rate policy intended to reduce inflation. High European interest rates continue to hamper economic recovery prospects.

In conclusion, the economic conditions in developed countries will lead to low growth during 1993, while relatively high growth will occur in 1994 and 1995. The economic cycle indicates that 1996 will probably see a downturn.

Developing Countries

Newly industrialised economies (NIEs) and Asean countries maintained a high growth rate of over 7% on average during the 1970s and 1980s. The increased interdependence in these regions helped growth. In 1992 and 1993 growth has slowed slightly but it will accelerate again with the economic recovery of developed countries.

Developing countries, especially Latin American countries, suffered slow growth in the 1980s due to accumulated debts. This indebtedness has been improving recently due to the inflow of foreign capital from developed countries, usually where economic restructuring and privatisation is underway. Developing countries in general, particularly those in the Pacific Rim, will enjoy steady economic growth.

FSU, Central Europe and China

Almost all developments in Eastern Europe and particularly in the former Soviet Union (FSU) have been negative, with a sharp drop in output being recorded in 1992. The FSU suffered the severest decline, but these economies are expected to remain depressed, at least in the near term.

China recorded a high growth rate of over 10% in 1992 due to the reform and the "open economy" policy. Although there are uncertainties such as inflation and political problems, growth of about 8% can be anticipated. Domestic demand for steel continues to outstrip the PRC's production, resulting in rapid growth in imports. The main concern is for "overheating" of the economy leading to some retracement of activity. Periodic "stop/go" cycles are feasible.

3.1.2 Medium Term Economic Growth Forecasts

Although a cyclical dowturn is probable around 1996, particularly in the developed countries, this will be more than compensated for by the continuing growth of developing countries and, also, increasing growth in the former centrally planned economies as the political and economic problems are solved.

The rates of growth for developing countries are expected to outstrip anything being achieved in the developed countries though the Asian economies in particular are not expected to experience such rapid growth in the remainder of the 1990s as in the 1980s and early 1990s. As the developing countries produce more of world output they will have a greater influence on world average growth rates.

The average growth rate in the period 1996-2003 is expected to be at least 2.4% per annum. This figure has been calculated by averaging the actual world average growth rates for the period 1980-90 and 1991-92 and the forecast growth rates for the period 1993-95. However, because of the increasing role of developing countries in the aggregate world economy, this figure is probably an underestimate and the actual growth rate will probably be nearer 2.6% per annum.

3.2 Forecast Growth of Dry Bulk Trade, 1993-2003

Future developments in commodity trading cannot be known with certainty. In quantifying international trade volumes, both globally and in particular markets, many factors have to be taken into account and judgements are required.

3.2.1 Major Bulks - Iron Ore

- More than 40% of the world's iron ore demand is met by imports, mostly seaborne. The steel industries of the EC and Japan have to import virtually all their iron ore consumption.

- World iron ore trade peaked in 1989 and since then shipping volumes have fallen in line with the global slowdown in steel production.

- The two main markets for traded iron ore - the EC and Japan - are facing the prospect of zero or low growth in steel production, and their consumption and imports of iron ore are expected to fall.

Iron ore is the largest of all the dry bulk trades (assuming coking and thermal coals are considered separately), its importance reflecting not only the size of the world steel industry but also the fact that major producers like the EC countries and Japan have to import almost all of their ore feedstock.

At the present time, nearly 45% of global iron ore consumption is met through imports, mainly by sea, and the proportion has been increasing as steelmakers have replaced indigenous ores with the higher-grade products - lump ores, fines, and pellets - available in the international market. Dominating the import side are the two main markets - the European Community (EC) and Japan. These markets received in excess of 240 million tonnes in 1992, or more than two-thirds of the ore traded internationally, predominantly by sea. Their seaborne imports amounted to 122 and 114 million tonnes respectively.

Almost three-quarters of the iron ore traded is supplied by the four leading exporters - Brazil, Australia, India and Canada. In 1992, they exported 265 million tonnes, other countries less than 100 million tonnes.

While the volumes shipped to these two major markets have grown, other markets have come to the fore. Currently, South Korea and Taiwan account for 10% of world trade when, as recently as 1985, their share was no higher than 5%. China, too, has stepped up its purchases of iron ore from the world market, importing six times as much in 1992 - nearly 26 million - as it did a decade earlier. By the year 2000, it is possible that China could be importing over 40 million tonnes/year, though the realisation of this goal remains subject to question.

In evaluating trends in iron ore trade to 2003, the most useful starting point is the outlook for the world steel industry, which is slowly recovering from the cyclical downturn in demand which has afflicted it since 1990. Recently, raw steel output has begun to increase, although the improvement has been patchy. Growth areas include Japan (+5%), the USA (+3%), South Korea (+20%) and China (+13%), but Europe has been weak. In the 12 member EC, output is down 4% from 1992, while large declines have taken place in Central Europe and the FSU (-15%)

1993 saw a small increase - 1% is likely - in world output and the improvement should continue in 1994 but any strong upswing in the present global economic climate is considered unlikely.

It seems, from the latest demand forecasts, that three of the leading importers of iron ore - the EC, USA and Japan - are facing the prospect of extremely limited growth in raw steel production over the remainder of the 1990s, expansion of steelmaking capacity largely being confined to the developing countries.

Excess steelmaking capacity remains a serious problem in Europe despite cutbacks. In the **EC-European Community**, a major restructuring of the industry is taking place with further planned steelworks closures. Not only will total EC capacity decline, but integrated steelmakers are expected to account for a smaller share of future output, due to the rise of EAF-based mini-mills. Against this background, only moderate growth rates in steel production are being projected in the EC markets, constraining pig iron consumption and, therefore, iron ore demand. In fact, a decline is forecast, reducing EC iron ore imports to 125 million tonnes by 2000.

By the end of the decade, the steel industries of **Eastern Europe** and the **FSU** are assumed to have completed the more difficult aspects of their transition and this should translate into increased imports of iron ores.

Japan's steel production is expected to recover moderately in line with economic growth, but in the long-run the electric furnace sector is expected to gain share at the expense of the integrated, blast furnace/ BOF steelmakers. Consequently, iron ore imports are predicted to be lower in 2000-2003 than in 1993.

In contrast, strong growth is expected to occur elsewhere along the **Asian Pacific Rim**, o[illegible]g to the advance of steel production. Consumer demand and industrial production are forecast to grow rapidly in China, with the PRC emulating the rapid advance of the RoK and Taiwan. This points to substantial growth in steel consumption, spurring further expansion of steel capacity and a much high dependency on imports of iron ore. The PRC's purchases are expected to reach the 30 million tonnes mark by the turn of the century.

In South Korea, the latest expansion of Posco's Kwangyang steelworks has taken iron ore imports above 30 million tonnes. However, no further BF/BOF capacity is planned and it is probable that future growth in steel demand will be met by EAF steelmakers. Taiwan is expected to bring new blast furnace capacity on-stream later in the decade and this will raise iron ore requirements to 12 million tonnes.

Other East Asian countries - led by Indonesia, Thailand, and Malaysia - are expanding th[illegible] DRI-based steel industries, as are their counterparts in South and West Asia. Together, these producers - which imported 18 million tonnes in 1992 - are expected to become a 33 million tonnes per annum market for traded iron ore pellets and lumpy ores.

Future steel production in the **United States** should sustain an import requirement of 16 million tonnes, with up to 70% of the demand being met by domestic iron ore pellet production.

Increasingly, the iron ore entering international trade has originated in those regions - principally Latin America and Australia - with the developed export infrastructure necessary for supplying the world steel industry with large tonnages of high-grade ores at comparatively low cost. The trade pattern has reflected this, with exporters like Brazil and Australia steadily increasing their share of the global market.

Table 3.1

Forecast Seaborne Iron Ore Trade

(Million tonnes)

Year:	1993	1996	2000	2003
Importing Region				
EC-12	118.0	135.0	125.0	120.0
Rest of Europe	6.0	10.5	13.5	14.5
USA	11.0	15.0	16.0	16.0
Japan	111.0	115.0	109.0	107.5
South Korea	31.0	31.0	32.0	33.0
Taiwan	9.0	11.0	12.0	13.0
China	24.0	26.0	30.0	32.0
Other	33.0	41.5	42.5	43.0
World	343.0	385.0	380.0	379.0

Source: Drewry Shipping Consultants

3.2.2 Major Bulks - Steam Coal

- Strong growth is forecast for the steam coal market, in response to increased demand by electric utilities and industrial users in Europe and Asia.

- This growth will be underpinned by the continued expansion of coal-fired power generating capacity.

- indigenous supplies are replaced by imports, seaborne steam coal trade is expected to rise 50% from 1993 levels, to surpass 300 million tonnes per annum.

By far the largest and fastest growing market for coal is in power generation and, over the course of the past decade, seaborne steam coal trade volumes have almost trebled as this comparatively cheap source of process heat has been substituted for alternative fuels in power stations.

Successive oil price increases - the second in 1979 - led not only to the conversion of existing oil and gas-fired plant to coal but also resulted in coal being chosen to fuel many new power stations. The nature of steam coal usage means that the main importers are countries which combine the highest levels of electricity consumption - mainly Western industrial countries - with a large thermal power dependency and limited indigenous coal supplies. Denmark is a good example.

At present Western Europe ranks as the largest market for imported steam coals, with coal the leading source of electric power in the EC countries. Imports rose again in 1992, reaching 111 million tonnes but future growth prospects appear to hinge more on developments on the Pacific Rim of Asia, since not only is coal-fired capacity predicted to expand more rapidly in this region but most of the additional coal required will have to be imported.

In Japan, the world's largest import market, consumption of "energy" coal is still growing and 1992 imports rose 11% to 45 million tonnes, supported by increases in electricity generation and cement production. High economic growth in South Korea, Taiwan and Hong Kong is underpinning increases in electricity generation and the power station coal burn. These three countries imported 41 million tonnes of steam coal in 1992 - five times as much as in 1984 - although there is evidence that Kepco, Taipower and the two Hong Kong utilities are preparing to scale-down or defer their coal-fired power station programme.

The future growth of steam coal trade depends essentially on how much new coal-fired generating capacity is commissioned - and when. This, in turn, is a function of electricity demand and fuel economics, with factors such as environmental problems also entering the equation.

The growth of coal consumption has slowed markedly since 1987 and, although this is mainly due to the weak global economy, changes in fuel prices and expectations of more stringent environmental controls have also had an effect. The fall in oil prices has impacted on fuel choice in the electricity supply industry (ESI), favouring the "dash to gas". In Europe, for example, the proposed "Carbon Tax" is deterring coal use.

Trade growth and coal use in power generation in the 1993-2003 period will depend on:

- Electricity demand growth and power needs.

- The pace at which new generating capacity capable of being fuelled by coal is brought on line by the electricity supply industry to meet power demand.

- The utilisation of existing coal-fired power stations for baseload electricity (which in some countries will depend on the output of hydro-electric stations and in others on the progress of nuclear operations.)

- Fuel-price trends and the comparative costs of generation from coal's rivals - fuel oil, natural gas and nuclear.

- Environmental pressures and the effect of controls on fuel choice and ESI planning.

- The availability of indigenous coal supplies.

Cement production is the major end use for steam coal outside the electricity industry.

Supported by strong gains in consumption in the electricity sector and declining domestic coal production in several key markets, annual seaborne imports in the early part of the next century are expected to surpass 300 million tonnes (with around 150 million tonnes bound for West European markets and over 130 million tonnes committed to Asia Pacific centres), rising by more than 50% from 1993 levels.

The supply side of the market is more difficult to predict, with many factors liable to influence future market shares. The key factors liable to determine future exports are:

- The pace of mine development, and effect of new export capacity on steam coal availability.

- The quality of the export steam coal being supplied in terms of its heat value and environmental cleanliness.

- Proximity to world markets as, the further away the supplier is, the more difficult it is to compete on freight with nearby sources.

- Market perceptions of the exporter's reliability and political stability.

Australia, South Africa and the USA are the leading sources of internationally traded steam coals. These mature producers, however, are facing mounting cost pressures and increased competition in their traditional markets from newer, low-cost entrants.

Australia has maintained its lead in Asian markets due to its freight advantage, its ability to supply a high quality coal and its reputation for being a reliable source. However, its pre-eminent position in Pacific Rim markets is being challenged by Indonesia and, to a lesser extent, China. Indonesia's coal exports - virtually all of which is non-coking - more than doubled in 1992, rising to 15.8 million tonnes. China shipped 16 million tonnes of steam coal or anthracite in 1992.

The relaxation of sanctions has allowed South African exporters to capitalise on their excellent export infrastructure and low-priced coals. In the European market, South African coals have already begun to make gains, largely at the expense of the US suppliers. The USA, with its large mine and export capacity, will continue to have a role as a "swing" supplier, however, despite losing market share to both South Africa and Colombia. Most Colombian coal comes from one mine (11.9 million tonnes out of a current total export level of 15 million tonnes). However, output from other mines is increasing. Moreover, it is possible that future years could see Venezuela feature more strongly as a competitor on the export scene.

Table 3.2
Forecast Seaborne Steam Coal Trade
(Million tonnes)

Year:	1993	1996	2000	2003
Importing Region				
EC-12	97.0	111.0	135.0	140.0
Rest of Europe	7.0	10.0	14.5	20.0
Japan	43.0	41.5	58.0	65.0
Other Asia	42.5	48.0	69.0	80.0
Other	12.0	17.5	27.0	33.0
World	201.5	228.0	303.5	338.0

Source: Drewry Shipping Consultants

3.2.3 Major Bulks - Coking Coal

- For the period up to 2003, the only possible scenario for coking coal is one of long-term decline, with a sizeable reduction in global imports.

- Consumption in the two main markets, the EC and Japan, will stagnate or decline due to steel production trends and the effect of changing steelmaking technology on coke use.

- The main technological development will be the wider application of pulverised coal injection (PCI) techniques, allowing lower-grade coals to be substituted for coking coals in blast furnaces.

In its other main market, the steel industry, demand for coal has been less than buoyant lately, with consumption declining in line with falling steel output. Latterly, however, trade has found some support as markets like Western Europe have sought to replace indigenous supplies with imports and the steel industries of some of the newly industrialised countries - Brazil, India, South Korea, Taiwan and Turkey - have become major buyers of coking coal on the world market.

This said, coking coal trade contracted in 1992, with exports falling by 6% as a result of lower steel industry activity.

Moreover, the downtrend looks set to continue due to the continuing decline of the mature steel industries of Western Europe and Japan and technological developments such as PCI, which are reducing coking use.

Japan remains the largest single market for coking coal, accounting for over 40% of seaborne trade. In recent years, import volume has fluctuated in line with steel output, a rise in 1991 being followed by an even sharper fall in 1992, when Japanese imports fell from 69.4 to 66.5 million tonnes.

On the positive side, both South Korea and Taiwan are now sizeable markets - in 1992, the RoK imported 16 million tonnes of coking coal, while more than 6 million tonnes entered Taiwan.

India, too, has emerged as a major market, with import demand rising to 8 million tonnes per annum.

Strong growth in BOF-route steel has also sustained increased import demand in countries like Algeria, Brazil and Turkey.

However, an overall assessment of steel industry trends, developments and prospects points to the prospects of constrained coking coal consumption (and trade) over the rest of the 1990s and trade forecasts reflect this.

The overriding factor, in assessing the prospects for coking coals, must remain the outlook for the EC and Japanese steel industries.

Steelmakers in these two markets still buy over 70% of the "coking" coal traded by sea, despite the emergence of expanding markets in Asia, Africa and Latin America.

These projections for seaborne coking coal trade allow for:

- Increased consumption of PCI coal, as additional blast furnaces change over to this technology, which allows lower grade coals to be substituted for coking coal.

- Reduced blast furnace/BOF steel production in the EC and Japan, combined with a further decline in coke rates (the amount of coke required to produce a tonne of pig iron) in these markets.

- Growth in coke consumption in other Asian countries - India, South Korea, Taiwan, Turkey - and Brazil, as their integrated steel industries expand.

- A rise in the global share of electric arc furnace (EAF) steel plants, which bypass the blast furnace/BOF route and do not use coke.

In commanding an increasing share of the the world's steel, EAF steel plants - which are small in size and use steel scrap as their main feedstock - are undermining the position of the integrated mills. Taking these factors into consideration, world coking coal trade is forecast to decline from an estimated 161 million tonnes in 1993 to 138 million tonnes in 1996, but demand should improve somewhat later in the decade, restoring imports to 148 million tonnes by 2000. The estimate for 2003 is 150 million tonnes.

In a number of countries where coking coals have been mined for a long time, the remaining reserves are limited and increasingly costly to mine. These countries include Germany, the United Kingdom, Poland, the FSU and Japan. Almost all of these countries have plans to phase out subsidies to domestic mines, so their production must surely go on declining in the near-term. Privatisation of the power companies in the United Kingdom has speeded up the substitution of imported coal for indigenous supplies. Here, as elsewhere in Europe, an ongoing industry restructuring is likely to result in many mine closures through 2000.

Over the longer term, coking coal supply is relatively secure, as mine capacity is easily expandable, either through extensions of existing mines or greenfield projects in countries that are already major producers and exporters. Future development will either be in established coal-exporting countries - the USA, Australia, South Africa, China - or in newcomers such as Colombia, Venezuela and Indonesia.

3.2.4 Major Bulks - Grain

- The two most important factors impacting on global grain trading are the future import requirements of the FSU and the rate of growth in the global economy.

The FSU should, in the short-run, remain a major grain importer, although the actual volumes it buys will depend on the availability of credit assistance, food aid and concessional sales by grain exporting countries.

■ On balance, population and income growth will support increases in global grain imports through to 2003, with the projected expansion focusing on the developing countries in Asia, Africa and, to a lesser extent, the Americas, offsetting the decline in FSU and Chinese imports.

Subject to seasonal surges in export activity or sudden shifts in the pattern of imports, world grain trade is notoriously unpredictable. Both the quantity and quality of the grain produced can be affected by weather conditions.

Annual outturns can vary markedly as adverse weather (floods, drought, unseasonal frost, etc) can reduce export availabilities in any of the five main exporting countries - Argentina, Australia, Canada, European Community (EC) and USA. Equally, the same factors increase import requirements. However, a variety of other factors can influence both grain supply and the level, mix and - more importantly - timing of purchases in international grain markets.

Trading in grain has political overtones. On the export side, wrangles over subsidies, "set aside" schemes, credit facilities and unfair practices are never far from the surface. For many of the world's importing countries, the most pressing problem is the ability to fund purchases. Credit arrangements are vital in sourcing.

Around half the grain traded is food grain, mainly wheat. The rest is feed grain, used for livestock. Stimulated by the growing utilisation of grains such as maize for animal feeding, first in Europe and then in other areas, international trade in coarse grains exhibited steady growth through the 1970s peaking at nearly 110 million tonnes in 1980.

Since then, shipments have stagnated, partly as a result of the sluggish world economy and reduced livestock feeding, but also because of larger supplies in a number of importing countries.

If the emerging Asian Pacific economies had not offset the decline in Western European imports, trade would have slumped below 90 million. In 1992/93, only a surge in imports of maize (corn) by drought stricken southern Africa prevented yet another decline in coarse grain shipments.

For grain trading, two factors appear critical - future purchasing by the FSU and Eastern Europe, and the economic advance of the developing countries - projected to be the main source of growth in world grain imports during the 1990s.

Eastern Europe and the former USSR have been large net importers since the mid-1970s;

during the 1980s, their purchases averaged more than 40 million tonnes and regularly accounted for 20% or more of global grain trade.

The break-up of the FSU into independent republics is having a dramatic impact on the world's grain market. Already, imports have been sharply reduced, because of mounting debts, the withdrawal of credits and reduced needs (economic problems have led to a significant reduction in the head of livestock being supported). No more than 24 million tonnes will be imported by the 15 republics which were once part of the USSR in the current season. This compares with an import level in the preceding season of almost 40 million tonnes.

During the rest of the decade, the FSU should remain a major grain importer, with the actual volumes dependent on the availability of credit assistance, food aid and concessional sales by grain exporting countries. However, the FSU's import dependency - a function of poor farming, outdated machinery and high losses - should be greatly reduced.

China is another erratic grain market; in 1992, imports were halved after rising to a record 16 million tonnes in 1991, and the slower pace of shipments continued in 1993.

The underlying trend in wheat trade in a large number of developing countries remains one of growth, with imports being stepped up to satisfy demand from increasing incomes and populations. With nearly 60% of the world's population and the fastest projected income growth, Asia is expected to offer the largest growth potential, with the main import demand arising in countries along the Pacific Rim.

Elsewhere, higher imports will primarily take the form of wheat for human consumption. North Africa also remains a major importing region, but slow income growth will severely constrain purchases by other African countries. Africa is, of course, the chief recipient of food aid, taking nearly 50% in recent years.

These deficit areas, over the longer-term, can be expected to raise production and reduce their import dependency but, on balance, population and income growth point to growth in grain imports through to 2003, with increases in the developing countries offsetting the decline in FSU imports.

Grain trade is dominated by the USA. As the world's largest producer of maize, the USA normally accounts for up to two-thirds of all trade in coarse grains, as well as providing between one third and one half of the wheat entering international trade.

After rising strongly in 1990 and 1991, Canadian grain exports fell back in 1992, with shipments down by around 5%. All of the decline took place in coarse grain; wheat exports were maintained at the 25 million tonnes/year rate despite the decline in shipments to the FSU.

High seasonal variations in Argentine production and exports are due mainly to the vagaries of the weather and an absence of stocks. Australia is the fourth largest exporter of wheat, normally shipping 10-12 million tonnes, but its coarse grain surplus is much smaller, amounting to only 2-3 million tonnes. The proximity of Australia to the Asian Pacific Rim, including China and Japan, explains why this is the largest market. This advantage also features in Australia's second most important market, the Near/Middle East, where the largest importer is Iran.

Table 3.3
Forecast Seaborne Grain Trade
(Million tonnes)

Year:	1993	1996	2000	2003
Canada	23.5	25.5	28.0	30.0
USA	102.0	106.5	111.0	115.0
EC-12	21.0	22.5	24.5	25.0
Argentina	12.0	11.0	15.5	17.5
Australia	12.5	13.0	14.5	16.5
Others	32.0	34.5	34.5	35.0
World	203.0	213.0	228.0	239.0

Source: Drewry Shipping Consultants

.5 Major Bulks - Bauxite and Alumina

- Future global demand for bauxite and alumina feedstocks is basically a function of operating rates at aluminium smelters in the Western World aluminium industry and their output of new (primary) metal.

- Aluminium output has stagnated - the result of over-expansion of primary capacity, growth in secondary (scrap metal) recovery and a large increase in the West's imports from the former Soviet Union (FSU).

- The market is expected to recover in 1994-96, promoting increased alumina trading. Bauxite volumes - recently running at 34 million tonnes - are predicted to fall, due to the reduction in production at refineries employing imported feedstock.

1993 has turned out to be another poor year for the aluminium industry. The continuing flood of cheap aluminium from the Former Soviet Union (FSU) into a world market already facing oversupply and static demand held prices down and inventories up, forcing Western World producers to initiate further production cutbacks.

Potlines, even entire plants, remained idle and the lower operating rates sharply reduced consumption of the industry's principal raw material feedstocks - bauxite, the ore, and alumina, the intermediate refinery product.

The combination of a slow, but steady recovery in aluminium consumption, further temporary closures of high-cost primary capacity, a reduction in inventories and more orderly FSU exports - recently running at about 900,000 tonnes per annum - are widely predicted to lead to a return to a better balance between supply and demand in the middle of the 1990s, promoting increased consumption and trade in feedstocks.

What is being seen in the aluminium industry today, however, is not merely a response to weak prices and demand. Major structural changes are taking place, associated with:

- A continuing decline in the annual rate of growth in aluminium demand, with aluminium intensive end-uses growing only slowly in industrial countries.

- Excess supply, the result of over-expansion of primary capacity and growth in secondary (scrap metal) recovery - the large increase in net imports from the former Soviet Union (FSU) hardly helps Western producers facing these difficulties.

- Sharply rising costs, which has resulted in a shift away from older-established producing countries towards those with low power costs (e.g. in the Arabian Gulf) and/or access to raw material feedstocks.

There are many smelter projects on the drawing board, but only one seems certain to proceed - a 460,000 tonnes/year greenfield Alusaf expansion in South Africa. This makes it difficult to project the growth of capacity in the second half of the decade. The final timetable for expanding production capacity in the aluminium industry depends on the expected price of primary metal, the likely growth in demand and predicted cost trends.

Future global demand for alumina feedstocks is a function of:

- Operating rates at aluminium smelters in the Western World aluminium industry and their output of primary metal.

- Plant capacities, production and alumina imports into the Former Soviet Union, Eastern Europe and China.

- The growth of non-metallurgical consumption. In the Western World, chemical and other alumina products have accounted for 8-9% but, globally, the proportion is thought to be only 5%.

Current thinking points to growth in world consumption of alumina of over 20% between 1993 and 2000.

In the short-term (i.e. up to 1995) no new, greenfield alumina refineries are expected to come on stream, with all of the projected increase being achieved by enlarging existing plants or upgrading the technology employed. Most supplemental capacity increases will take place in Australia, Brazil, Jamaica, Venezuela, and other locations close to sources of metal-grade bauxite feedstock.

Australia and Guinea now rank as the world's top two bauxite producers, their mine output reaching 41.5 and 17.0 million tonnes respectively in 1992, well over half the total supply. In the past ten years, Western World production has increased by as much as 50%.

There have also been major developments in Brazil, with the start-up of MRN's Trombetas mine raising output there from 4 to 10 million tonnes. Jamaica ranks as the other major producer and, between them, the big four mine and ship almost 80% of the total Western World supply.

Table 3.4
Forecast Seaborne Trade in Bauxite and Alumina
(Million tonnes)

Year:	1993	1996	2000	2003
Bauxite	34.5	34.0	27.0	25.0
Alumina	18.0	20.8	22.0	23.0
Total	52.5	54.8	49.0	48.0

Source: Drewry Shipping Consultants

International trade in bauxite is projected to decrease over the 1993-2003 period, with import demand declining. This reflects the trend towards local refining and the eventual closure of high-cost European and US alumina capacity refining imported bauxite feedstocks.

Global imports of alumina, in contrast, are projected to show significant growth.

3.2.6 Major Bulks - Phosphate Rock

- Far more of the world's production of phosphate rock (phosrock) is processed in the country in which it is produced than was once the case, with downstream processing being established in a number of exporting countries.

- Phosrock imports now meet a much smaller proportion of world demand for phosphate material, their share declining from 48% to 20%.

- The future trend in phosrock trade is expected to be downwards, despite increased worldwide consumption, due mainly to a sharp decline in fertiliser output in Europe, the major market for both Morocco and the USA.

With nearly 90% of the world's phosphate rock supply destined for agricultural use, mainly in the form of manufactured fertilisers, trade prospects are bound up with the way in which production and usage of phosphate fertiliser is evolving on a regional basis. Industrial and feed phosphates account for the other 10%.

Rock usage has been relatively depressed lately, at some 15% below 1988, the most recent peak in consumption.

The supply of phosrock to the world market is concentrated on three areas - North Africa, the Middle East and Florida. Together, these exporters ship well over 70% of all seaborne phosrock trade. However, US exports - recently recorded at only 3.7 million tonnes - now contrast distinctly with the 1979 peak of 14 million tonnes.

As far as the volume of international trade is concerned, the critical variable is the form in which these phosphates are imported - i.e. as unprocessed phosrock, as intermediates like phosphoric acid or ammonium phosphates (DAP or MAP) or in the form of finished phosphate fertilisers - and, since the early 1970s, there have been far reaching changes in the global supply pattern.

In the first place, a much higher proportion of the world's production of phosrock is processed in the country in which it is produced, with the vertical integration of mining and processing operations in a number of exporting countries. As a result, phosrock imports now meet a much smaller proportion of world demand.

Morocco - still the world's largest phosrock exporter despite the fact that its exports have fallen from 16.5 million tonnes in 1980 to only around 9 million tonnes - now channels more than half its output into downstream fertiliser plants, whereas in 1980 the percentage was much lower - less than 15%. Tunisian phosrock exports are now negligible, reflection the growth of downstream capacity, and most future investment in fertiliser production will be by phosrock exporters, not importers. In the USA, 90% of the phosrock output is processed domestically - and of this, 60% is now exported in the form of phoshoric acid or fertiliser products.

The global trend in phosrock trade remains one of continuous decline, despite increased worldwide consumption. The increase in the amount of $P_2 0_5$ traded in the form of acid, intermediates and finished fertilisers, but has been accelerated by:

- Permanent plant closures and a sharp decline in phosphate fertiliser output in Western Europe, caused by rising costs, stagnant demand and environmental problems.

- The far-reaching political upheavals in the FSU, Eastern Europe and China which have reduced fertiliser consumption, causing these countries to cut their rock imports.

3.2.7 The Minor Bulk Trades

Collectively, other categories of dry bulk cargo are becoming increasingly influential in bulk carrier trading. This is partly the result of rising trade volumes in the "minor bulks" sector but the main factor has been the increasing size of shipments. Consequently, dry bulk carriers progressively have been displacing the smaller vessels previously employed, either on economic grounds - perhaps linked to port or storage upgrades - or because suitable general-purpose (usually 'tweendeck) types are no longer available.

Practices vary considerably and although in certain minor bulk trades - for example, ores and minerals - a very high proportion of the cargo is shipped bulk in single shiploads, in others , such as fertilisers, minor agribulks, steel, etc - the utilisation of bulk carriers is less well developed.

In reviewing developments in minor bulk trades, the following classification has been used: (a) **agricultural products** (i.e. "agribulks" other than the main grains), (b) **forest products,** (c) **fertilisers,** (d) **ores and minerals,** (e) **iron and steel products** (including scrap) and (f) **manufactures** and other cargo.

3.2.7.1 Agricultural products

- Significant shifts have occurred in the sugar trade in response to political changes, but renewed consumption growth is beginning to stimulate exports of both "raws" and refined "white" sugars.

- Some increase in rice shipping volumes is expected in response to an increase in exportable supplies, but no more than 5% of rice output is traded on the world market.

- Growth in tapioca trading will depend on East Asian demand because of the quota ceiling placed on European and, particularly, EC imports.

Sugar, extracted from either sugar cane or beet, is produced in all but a few countries worldwide and is consumed everywhere, with an annual production of around 110 million tonnes (raw basis) required to meet current global demand.

Just under two-thirds of the world's sugar is produced from cane,the remainder comprising beet sugar.

A large part of the world's sugar output is exported. However, the proportion entering international trade has declined in recent years, with less than one third of the total supply being sold into the world market. Latterly, annual exports of sugar have been around 27.5 million tonnes - no more than 25% of world output.

Usage in recent years has levelled out, mainly due to political developments. Chinese consumption has been affected by import controls and the upheavals in the FSU and Eastern European countries have been very disruptive, greatly reducing their consumption and imports of raw sugar and causing them to sever their "traditional", largely barter-related trading links with Cuba. FSU imports in 1993 are expected to have totalled 5 million tonnes but as much as 50% may be white sugar supplied by, among others, China.

The recent slowdown is not expected to continue, however, with consumption outpacing population and income growth in the developing countries. Asia is seen as the area with the greatest potential for growth, but a global growth rate of 2% per annum seems to be in prospect as consumption advances.

The effect of this on trade is difficult to gauge, because of continuing political and economic developments. On the balance of probabilities, it is likely that a shift in production away from Cuba and certain other producers towards Australia, Brazil, Thailand and some of the smaller suppliers will occur, resulting in changes in the pattern of international trade.

One would also expect exports to grow to meet the increased demand for sugar, especially as imports of white sugar will be required to replace lost beet production in the FSU.

Trends suggest that seaborne shipments - both raws and white sugar - will grow slowly and unspectacularly to between 29 and 30 million tonnes by 2000, although fluctuations around this growth trend cannot be ruled out.

The main "negative influence" could be further moves towards the use of other sweeteners (sugar substitutes) which, certainly in the 1980s, has been significant in re-shaping demand in the USA.

It is surprising that **rice** is so low down the list of internationally-traded commodities as it is the staple food of half the world's population; in some countries it represents more than 90% of all cereal consumption. Moreover, there has been a marked upward trend in world consumption in the past 25 years, rice utilisation virtually doubling. Yet, no more than 12-14 million tonnes of rice - less than 5% of the global outturn of nearly 400 million tonnes - actually enters international trade channels. The reason is that rice is grown mainly for subsistence rather than as an export crop.

The rice market, like that of the cereal grains, is dominated by a small number of suppliers with five countries - the USA, Thailand, Pakistan, China and Burma - accounting for two-thirds of all rice exports. Thailand now has the largest share of the market (around 35%), achieving this by aggressive marketing policies in those areas where imports are growing. Vietnam may also be an emerging export presence.

Indeed, since the early 1970s the rice trade has seen some significant shifts, most notably a big increase in shipments to the Middle East and Africa and declining import demand in South East Asia as once-large importers like China and Indonesia have striven for self-sufficiency. Increased exportable supplies should, however, result in a rise in world imports over the latter half of the 1990s, with the quantities moving by sea rising above 16 million tonnes.

The other immediate factor in the equation is the Japanese import market which in effect has been totally protected. A disastrous crop has forced short term imports. The Gatt agreement is seeking to open this market permanently.

There is still a very sizeable trade in the starchy root crop, **tapioca**, between South East Asia and Northern Europe. This developed in response to the growing demand for low-cost substitutes for traditional feed ingredients like maize (corn). Because tapioca was available cheaply in Thailand and could be imported at low cost, imports into the European Community (EC) expanded rapidly, rising to over 7 million tonnes by the early 1980s. Indeed, Cape class ships found employment in this sector. However, in 1983, considerable political pressure led to a ceiling being placed on EC tapioca imports. Since then, EC imports have been regulated tightly under a system of quotas.

To offset the loss of volume in Europe, Thailand began developing new markets in Japan, South Korea, Taiwan, Israel, the former USSR and even the USA. As a result tapioca trade remains a significant employer of bulk shipping, with total annual shipments amounting to between 8 and 11 million tonnes of dry tapioca (cassava) products. However, no increase in trade from recent levels is foreseen.

Global trade in the diverse group of agricultural products known collectively as **oilseeds** is very sizeable, as are shipments of the protein-rich **meals** (commonly called "oilcakes") which are produced during crushing. Driven by population and income growth, international trading in oilseeds and meals has grown rapidly over the past decade to reach nearly 80 million tonnes per annum, and will continue to do so through to 2000 and beyond, despite year-to-year fluctuations in volumes.

Although technically not an oilseed, but a pulse (or legume), the **soyabean** accounts for something like half the world output of oilseeds. The uncrushed beans, together with the meals left over after the extraction of oil, are by far the largest items in international oilseed trading.

Trade in beans is running at over 30 million tonnes per annum. Meal trade is around the 28 million tonnes per annum mark.

Half the world's supply of soyabeans is grown in the USA, which is also the world's largest exporter. However, increased competition from Brazil - now No.1 in meals - and Argentina, the only other exporters of any size, has eroded the US market share.

In the early 1980s, the major markets - USA and Canada, Western Europe and Japan - consumed nearly two-thirds of all oilseed meals. A decade later, their share has dropped to an intake of just over 50% of the global supply.

Significantly, consumption is growing most rapidly outside the major producing areas, stimulating international trading, and seaborne volumes will certainly rise during the rest of the 1990s.

3.2.7.2 Forest Products

- Since 1989, the last peak in the trade cycle, global trading in forest products has sagged, but exports should recover later in the decade.

- Volumes will grow, with the increase in traffic being accompanied by changes in the composition of forestry trade. The main "volume" trend will be a reduction in log shipments. The focus for growth will be "downstream" or "added value" materials.

- The focus of seaborne trade in logs and most other products continues to be the Far East, where Japan, South Korea and Taiwan are by far the largest importers, although, not surprisingly, the European and North American sectors have a significant role in the higher value product trades.

The world market for forest products has been affected adversely by the global economic downturn and, in particular, by falling construction activity - most notably in Europe and Japan. Indeed, of all the sectors, forestry is perhaps the most vulnerable to the business cycle.

Japan, the world's top importer, is currently experiencing a sluggish economy and this has affected its forestry trading which is mainly focused on softwoods (logs as well as lumber), tropical hardwood logs imported from South East Asia, and for the pulp industry, wood chips. Here, as well as in other Asian markets, there has been a steady trend towards more processed forms of timber.

Adding to their economic woes, the forestry industries find themselves under attack from environmentalists on a number of fronts. Major issues include the protection of the rain forest (and reduced tropical logging), the preservation of wildlife habitats and the prevention of pollution.

The predicted recovery in the world economy should begin to filter through to forestry by the middle of the decade, encouraging investment and promoting large increases in trade volumes. The projected development of seaborne trade is as in Table 3.5.

The composition of global trade is changing as exports of processed products increase, and the availability of logs decreases. The main trends in the 1990s are expected to be:

- A steady decline in shipments of logs - particularly tropical hardwoods - due to deforestation and the expansion of sawmilling and wood processing.

- Growth in exports of sawn timbers and added-value products such as plywood as there is further investment in forestry processing.

- Continuing expansion of the woodchip sector in line with growing demand for paper and paperboard.

Table 3.5
Forecast Seaborne Trade in Forest Products
(Million tonnes)*

Year:	1993	1996	2000	2003
Logs	39.5	36.5	32.0	29.0
Pulpwood	8.5	10.0	13.0	14.0
Woodchips	11.0	13.5	15.0	16.0
Sawnwoods	30.0	32.5	35.0	37.0
Boards/Panels, etc	12.0	14.5	16.0	17.0
Woodpulp	19.0	24.5	30.0	32.0
Newsprint	7.0	7.5	8.5	9.0
Other paper,etc	29.5	33.5	35.0	37.5
Total	156.5	172.5	184.5	191.5

* Some tonnages are estimates converted from more usual cubic measures.

Source: Drewry Shipping Consultants

■ A recovery in pulp and paper volumes as the global economic recovery gathers momentum, with a shift in "market pulp" production from the US/Canada/Northern Europe to Latin America, etc.

3.2.7.3 Fertilisers

■ Falling potash consumption has reduced the quantities traded by sea and, owing to changes in the pattern of use in the FSU and other major markets, only limited growth is in prospect up to 2003.

■ Sulphur trade prospects depend on the pattern of phosphate fertiliser production and the trend towards downstream processing in developing countries.

■ Fertiliser imports will meet a higher percentage of world fertiliser consumption, which will continue to grow, promoting increases in exports.

Production of food for a global population of some 5.3 billion - and one increasing at nearly 2% annually - requires the application of large amounts of plant nutrients - nitrogen, phosphorus and potassium. World consumption of these nutrients, applied to the soil in the form of fertilisers, is nearing 150 million tonnes annually. Industry feedstocks, intermediates and finished single-nutrient and compound fertiliser products are widely traded, with large tonnages being shipped by sea.

Not all are bulk cargoes, but the leading ones are. They include phosrock (already reviewed as a "major bulk"), potash, sulphur, urea, ammonium phospates and a long list of mixed fertilisers.

Surprisingly large quantities of **potash** are traded on the world market, with as much as two-thirds of global potash consumption being met by imports. Almost all consumption in Asia, Latin America and Africa is satisfied by imports. Currently, potash exports amount to almost 26 million tonnes product (or, in terms of K_2O content, the unit the industry uses to measure potash output, 15.5 million tonnes).

Trade volumes have fallen considerably since 1989, due mainly to the falling consumption in Eastern Europe. However, demand has also weakened in the mature potash markets in Western Europe and North America. The only bright spot in an otherwise gloomy picture has been the continuing advance of potash use in Asia, which is now the largest import market accounting for one third of world trade.

Led by China, the main Asian importers have become the focus of potash trading, as their requirements have continued to grow, rising to some 9 million tonnes product. China is the world's largest single import market, purchasing more than 3 million tonnes per annum. India is No.2 in Asia, followed by Japan and the other Pacific Rim markets.

Middle East entrants to the potash market - Jordan, Israel - are strategically placed to supply the growing demand for potash in Asia and have captured an important share of this growth market.

Exports of potash fertilisers are concentrated in a few countries. Canada - where there are 12 mines, ten of which are located inland in Saskatchewan and two near the east coast, in New Brunswick - ranks as the leading exporter, with more than 40% of global trade.

From Canada, over 11 million tonnes of bulk potash product are being exported on an annual basis - 6.5 million tonnes to the USA and 4.5 million tonnes to offshore markets.

1991 and 1992 were poor years for exporters of **sulphur** ("brimstone"), with lower sales volumes and very weak prices. Exports, both solid bulk and liquid (molten), were the lowest since 1983. Yet sulphur remains a major internationally-traded raw material, with current brimstone imports meeting some 25% of global consumption in this form.

Divided about equally between fertilisers and industrial uses, consumption is concentrated in the industrialised countries. Indeed, a high correlation has always existed between the level of economic development of a country and demand, as sulphur - principally in the form of sulphuric acid - is used at some stage in most processing and manufacturing industries, ranging from steel to pharmaceuticals.

Of the current world output of brimstone, about 60% is a by-product, recovered from natural gas, from oil refinery gas or from tar sands, coal, stack gases, etc. Canada and Saudi Arabia are the largest exporters of "recovered" sulphur.

The rest of the output is extracted from Frasch-process (brine) mines operating in the USA, Mexico, Poland, the USSR and Iraq.

These half dozen or so producers who compete with one another for international sales have in recent years seen shipments focused increasingly on the expanding fertiliser industries of a few Third World countries - countries like Brazil, India and Morocco, each of which now imports more than 1 million tonnes of brimstone annually.

Consequently, trade prospects are linked closely to the fortunes of the fertiliser industries in the Third World and, in particular, the further expansion into downstream processing by leading producers of phosphates.

World fertiliser consumption, which can be related, in a general way, to population growth, per capita incomes, agricultural production and fertiliser prices, will go on growing through the 1990s, albeit relatively slowly. Most of the increase will take place in the developing countries - countries where agriculture is less advanced and current fertiliser use relatively low - with Asia the major growth area for **fertiliser** trade.

Changes in the political and economic systems of the FSU and Eastern Europe - which have accounted in the past for a quarter of world consumption - are important factors affecting future fertiliser demand. Their long-term effects are difficult to predict but, overall, an expansion of trade in fertilisers is forecast to take place in the 1993-2003 period, lifting seaborne shipments to over 50 million tonnes. The USA is expected to remain the largest exporter, by virtue of its important role in the phosphate market.

3.2.7.4 Ores and Minerals

- The shift, in key mining regions, towards an expansion of alloy output in countries like South Africa, Brazil and India is reducing international trade in chrome and manganese ores.

- Seaborne trade in these ores will be static, with shipments in 2003 being little changed from 1993 levels.

- Some growth is forecast in the metal concentrates trade, taking shipments up to around 15 million tonnes by the end of the decade.

Mainly utilised for ferro alloy-making (although there are other important end-uses outside the steel industry), consumption of **chrome ore** grew strongly in the 1980s, underpinned by the expansion of world stainless steel production. More recently, reduced demand for ferro-alloys, reflecting decreasing stainless steel production, has reversed the trend. Alloy is now in oversupply and demand for ore weak.

If trade growth was disappointing, with shipments rising no higher than 4.5 million tonnes, it was a symptom of the changes taking place in the pattern of chrome alloy production, with the decline in chrome alloy output in the industrialised countries being offset by continued expansion of furnace capacity in countries producing chrome ores.

By far the most important of these supply sources is South Africa, which is by far the largest producer of chromite and accounts for almost one half of Western World chrome alloy output.

The same influences seen in chrome are at work in the **manganese ore** trade, with expansion of alloy production in the countries mining the ore reducing consumption elsewhere. Import demand for manganese ores is concentrated in the Western industrialised countries - mainly the EC countries, USA and Japan - and, in these key markets, the requirement for both ore and alloys has been declining as a result of:

- Scaling-down of the alloy-making industry as uneconomic plants have been forced to close.

- Stagnation and long-term decline of the steel industry in these markets.

Some new markets are emerging - China, for example, imported 640,000 tonnes of manganese ore in 1992.

The economics of present-day alloy production dictate that plants should be sited where there is cheap access to raw materials rather than power. Leading producers - like South Africa - have been exporting more of their manganese in the form of ferro-alloys or metal rather than as ore and this, too, has affected international trade adversely, causing it to fall well below the levels of the early 1970s.

Inter-continental trade in ores or concentrates containing non-ferrous metals other than chrome and manganese is not inconsiderable, amounting to about 15 million tonnes annually. However a number of these ores, either because of their high value or small lot sizes, are not shipped in bulk. The big-volume bulk flows are, in fact, in concentrates (upgraded ores) containing the so-called "base" (or "major") metals - that is, copper, lead and zinc - in varying percentages, and it is these sub-markets which are considered here under the heading **metal concentrates.**

The complex pattern of flows tends to disguise the size and importance of these trades, but in 1992, shipments are estimated to have totalled nearly 11 million tonnes. Both US and European smelters draw supplies from offshore mines but the focus of concentrates trade is Japan, whose imports are in the 5-6 million tonnes range. Future trade will be determined by the growth of metal consumption and smelter capacity based on imported concentrates. There is expected to be some growth in seaborne trade through to 2000 and beyond but this will be relatively moderate, lifting concentrates shipments to about 13 million tonnes.

North America and the Asian Pacific Rim are the two main markets for the construction material, **gypsum.** From mines in Canada, the Caribbean area and the west coast of Mexico, there are sizeable flows to the USA, whose imports have recently been around 8 million tonnes per annum. Far Eastern trade focuses on Thailand, from where 4-5 million tonnes are exported to Japan, Taiwan and other countries.

Consumption and trade have shown cyclical fluctuations, rising or falling with construction activity, and the demand for plaster, plasterboard and cement products. The key US and Japanese markets are slowly emerging from a severe downturn and the forecast is for moderate growth in this sector, with seaborne trade rising to 16 million tonnes.

Table 3.6
Forecast Seaborne Ores and Minerals Trade
(Million tonnes)

Year:	1993	1996	2000	2003
Chrome Ores	2.4	3.0	3.0	2.8
Manganese Ores	6.0	6.5	6.0	5.8
Nickel Ores	3.7	3.3	3.0	3.0
Metal Concentrates*	11.0	11.6	12.5	13.0
Gypsum Rock	12.8	13.9	15.0	16.0
Salt	21.1	22.8	25.0	26.0
World	57.0	61.1	64.5	66.6

* Copper, lead, zinc containing.

Source: Drewry Shipping Consultants

3.2.7.5 Iron & Steel

- International trade in steel has become increasingly important, with the industry exporting more than 30% of its output. Global exports have exceeded 170 million tonnes, about 55% of which is seaborne.

- China's import boom has provided a major stimulus to trade, with surging imports of steel products. 1993 saw another big increase in PRC steel trade, with purchases reaching 11 million tonnes in January-June alone.

- The outlook for the rest of the 1990s is one of continuing growth as steel demand recovers, with shipments growing at an annual rate of 2% per annum.

- Amid cyclical fluctuations, trade in iron and steel scrap will continue its upward trend in the 1990s with the growth of EAF steelmill output boosting global consumption.

International steel trading never seems to be far from the political arena - a factor which makes prospective shipping patterns and volumes difficult to predict with any certainty. The focus of steel trading has traditionally been the USA - the only major producer of steel which is a net importer. For many years, allegations that steel was being "dumped" in the USA by exporters led to various Voluntary Restraint Agreements and the USA has peristed with its protectionist stance under the new administration, imposing anti-dumping duties on steel early in 1993.

US imports rose in 1992, but the increase owed more to rising steel demand than increased penetration by importers. Less Japanese steel entered the US market - the fifth consecutive annual fall reducing sales to 2.6 million tonnes - but these exporters were able to sell more products into the international market. Their exports rose to nearly 19 million tonnes, thanks to big increases in shipments to Asian markets generally and to China in particular. Nonetheless, Japanese exports are far below the levels of the mid-1980s, when they peaked at over 33 million tonnes.

In Europe, three issues dominate events - the severe steel slump, the threat from US protectionism and two-way trade with Eastern Europe and the FSU.

Adjectives such as "volatile" and "erratic" are used frequently to describe the market for **iron and steel scrap.** Amid the annual fluctuations in the quantities traded internationally, the underlying trend, however, has been one of strong growth, with global scrap imports rising by over 40% in the 1980s. 1989 was the peak year, with over 37 million tonnes traded on the world market.

Growth in scrap trade is being generated by:

- Process changes in the world steel industry - particularly the widening application of continuous casting, a technique which reduces scrap supply inside steelworks.

- Continuous expansion of electric arc furnace (EAF) capacity, with scrap-based "mini-mills" producing a steadily increasing amount of the world's steel.

- Changes in the geographical pattern of steel production, with output increasing most rapidly in areas where there is a limited domestic scrap supply. Korea is a case in point.

Among the biggest scrap buyers are the European steelworks, but much of the trade takes place within the region, with large intra-EC exchanges accounting for much of the traffic. In the international market, it is newly industrialising countries - China, India, Korea, Taiwan, Turkey, etc - which have come to the fore.

They buy from many sources, including the FSU, but by far the largest flows are from North America - principally the USA - and the European Community. The USA is the largest supplier, its exports peaking at nearly 12 million tonnes in 1990. In the past three years, shipments have been lower, averaging 9 million tonnes. Japan has joined the ranks of leading exporters too, shipping over 1 million tonnes.

Reflecting the steel slump, demand for ferrous scrap has declined in some markets, but the outlook for the rest of the 1990s is expected to be one of strong growth, with seaborne imports rising by 33% from 1993 levels.

3.2.7.6 Other Bulk Cargoes

- The outlook for petroleum coke in the 1990s is one of rapidly increasing supply leading to low prices and growing consumption of fuel grades.

- An expansion of petcoke exports is predicted, with global shipments growing to nearly 20 million tonnes per annum by 2000. The USA will remain by far the largest supplier.

- Seaborne cement trade has declined by 25% from the peak levels of the late 1980s, due to the downturn in construction activity and larger domestic supplies.

Worldwide, shipments of **petroleum coke** amount to around 16 million tonnes/year, making this by-product of oil refinery coke plants an important bulk cargo. "Raw" (uncalcined) or "green" petcokes, used mainly as fuel by power companies and the cement industry, make up about two-thirds of this total; the rest of the trade consisting of the more highly-priced anode and calcined grades.

Because of the nature of the oil products market in the USA and the types of crude oil refined there, the greater part of the fuel grade, or "green", petcoke sold on the world market is actually of US origin. Exports from USA - mainly to Japan and the European market - recently have declined by 10%, due to weak demand and a global slowdown in key consuming sectors.

The balance of trade is a mix of European (mainly intra-EC) exchanges and relatively minor flows originating at refineries in the Caribbean, East Asia, Middle East and the FSU.

Generally, global petcoke production has been increasing as refinery cracking capacity has grown and oil companies have sought to maximise the output of "light" ends from the oil barrel. Oversupply is a continuing problem in the petcoke trade, but consumption has expanded significantly since the early 1970s as a result of the growing demand for fuel grade coke.

The slowdown in the world's aluminium industry in recent years has impacted on the market by reducing demand for calcined anode-grade petcoke. This sector of the market is expected to remain rather slack. Developments in the energy sector are less easy to predict but low, stable prices should promote increased use of solid fuels like petcoke and shipments are forecast to rise from the current 16 million tonnes to between 19 and 20 million tonnes by 2000 with the prospect of higher volumes subsequently.

The generally weak performance of the world economy has blunted demand for **cement**, with consumption falling as construction has slowed. Sluggish demand, coupled with the increasing scale of production in several key importing countries has led to a sharp decline in world cement trade, with 1993 shipments 25% down on the peak levels of 1987.

Shipments are widely distributed, but the main import markets are North America, North and West Africa, Middle East and Far East.

Demand has picked up in the USA, the largest of these markets, but US imports have been in decline for five successive years. The tonnages received from offshore suppliers (now only about 6 million tonnes) have fallen most sharply from the countries which have been accused of dumping, one of which is Japan. Despite the slump in their domestic market and disappointing sales in the USA, the Japanese delivered more cement and clinker to Asian markets, their exports rising to over 11 million tonnes.

Table 3.7

Forecast World Seaborne Trade in Major and Minor Bulk Commodities: 1993-2003

(Million tonnes)

Year:	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Agribulks:											
Grain (a)	203.0	206.5	215.0	213.0	217.0	220.0	224.0	228.0	232.0	236.0	239.0
Rice	14.8	15.0	15.3	15.0	15.3	15.0	15.7	16.5	16.5	17.0	17.5
Soyameal	27.5	28.0	28.5	29.0	28.3	28.0	28.5	29.5	30.5	31.5	32.5
Other M/P/S (b)	22.5	23.0	23.0	23.5	23.0	23.5	24.0	25.0	26.0	27.0	28.0
Sugar	26.8	27.3	28.1	28.0	28.4	27.9	28.8	29.5	30.0	30.5	31.0
Tapioca	8.8	9.0	9.5	8.8	8.4	8.0	7.8	8.5	8.5	8.7	9.0
Forestry:											
Forest Products	156.5	161.0	167.0	172.5	176.5	180.0	181.0	184.5	186.5	188.5	191.5
Fertilisers:											
Manufactured	48.0	48.5	49.0	48.5	49.0	50.5	51.0	51.5	52.0	52.5	53.0
Phosrock	28.5	29.3	28.0	27.0	26.5	25.5	24.5	24.0	24.0	23.0	22.0
Potash	18.0	18.3	17.9	18.1	18.4	18.7	18.5	19.0	19.0	19.5	19.5
Sulphur (dry)	11.0	11.5	12.0	11.6	11.7	11.5	12.0	12.5	12.5	12.5	12.5
Coal:											
Steam Coal	201.5	206.5	214.0	228.0	243.0	276.0	292.0	303.5	312.0	323.0	338.0
Coking Coal	161.0	150.5	143.0	137.5	140.0	142.0	144.0	147.5	147.5	150.0	150.0
Ores and Minerals:											
Iron Ore	343.0	365.0	380.0	385.0	382.5	378.0	372.0	380.0	380.0	380.0	379.0
Manganese Ore	6.0	6.5	6.3	6.5	6.0	5.5	5.0	6.0	6.0	5.9	5.8
Nickel Ore	3.7	4.0	3.5	3.3	3.5	3.2	3.0	3.0	3.0	3.0	3.0
Chrome Ore	2.4	2.4	2.9	3.0	3.0	3.3	3.4	3.0	3.0	2.9	2.8
Concentrates	11.0	11.2	11.4	11.6	11.8	12.0	12.2	12.5	12.5	12.7	13.0

Table 3.7 (cont'd)

Year:	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Ore and Minerals:											
Gypsum	12.8	13.2	13.5	13.9	14.2	14.5	15.0	15.0	15.5	15.5	16.0
Salt	21.1	21.6	22.2	22.8	23.4	24.0	24.5	25.0	25.0	25.5	26.0
Aluminium:											
Bauxite	34.5	36.0	35.5	34.0	31.0	29.5	28.0	27.0	27.0	26.0	25.0
Alumina	18.0	18.8	19.9	20.8	19.1	19.5	20.0	22.0	22.0	22.5	23.0
Iron/Steel:											
Scrap	27.0	29.0	31.0	32.5	33.0	35.5	35.0	36.0	36.5	37.0	37.5
Products	95.0	98.5	101.0	103.0	104	107.0	109.5	112.5	114.0	116.0	118.0
Other:											
Cement	33.0	31.0	34.0	33.0	34.0	35.0	36.0	37.0	37.0	36.0	35.0
Petcoke	15.8	16.5	17.0	17.3	17.5	18.0	18.5	19.5	19.5	20.0	20.0
Others	45.0	46.0	51.0	53.5	58.0	55.0	57.0	61.0	63.0	64.0	65.0
Total	1,596.2	1,634.1	1,679.5	1,700.7	1,726.5	1,766.6	1,790.9	1,839.0	1,861.0	1,886.7	1,912.6
	0.3%	2.4%	2.8%	1.3%	1.5%	2.3%	1.4%	2.7%	1.2%	1.4%	1.4%

(a) Wheat, maize, barley, oats, rye, sorghum, wheatflour. For convenience, soyabeans are also included, reflecting typical shipping linkages of heavy grain/sorghum/soyabeans (hss).

(b) Other meals, pellets and seeds - e.g. rapeseed and sunflowerseed.

(c) Logs, lumber, board, panels, pulpwood, chips, pulp, paper and paperboard.

Source: Drewry Shipping Consultants

The Near East is no longer the market it once was, with more and more cement being sourced from local plants rather than from offshore suppliers, but growth prospects in the Far East are better. With countries like Thailand turning to Japan, Korea, etc for supplies, import demand undoubtedly will improve but seaborne trade will remain below the levels of the late 1980s.

The projected development of seaborne trade in both major and minor bulk cargoes in shown in Table 3.7. All the principal bulk trades are identified, but grouped under "Others" are a range of minor commodities. These are primarily ores and minerals - **barytes, borax, clays, fluorspar, magnesite, mineral sands, perlite, pumice, stone aggregates**, etc - but included in the seaborne totals are **fish meal** and **maize gluten.** By the early part of the next century, shipments of these commodities are forecast to be much larger than they are now, rising by 45% from 1993 levels.

3.2.8 Projected Trade Growth, 1993-2003

With the three biggest trades - iron ore, coal and grain - projected to rise to over 850 million tonnes by 2000, it is possible given the trends identified in other sectors of the market, that world seaborne dry bulk trade will exceed 1,800 million tonnes by then - up by over 15% from 1993 levels. By 2003, the possibility might be over 1,900 million tonnes, if the ongoing trend is extrapolated further.

The predicted composition of global bulk trade, by commodity, is shown in Table 3.7 which provides a summary of projected 1993-2003 seaborne shipments of both major and minor bulks, in tonnes.

3.3 Forecasting Bulk Carrier Demand - Methodology

The conclusion arising from Section 3.2 was that, in many of the trades employing bulk carriers, a considerable increase in cargo volumes will take place between now and 2003. This trade growth, in turn, implies growth in bulk shipping requirements - but less readily discernable is how this increase can be quantified in terms of deadweight tonnes and, hence, the increase in bulk carrier demand.

Global estimates of the future demand for bulk shipping - in this case, bulk carriers larger than 10,000 dwt - clearly have significant limitations - a point decision makers must always keep in mind - as they are dependent on a large number of assumptions arising from "best estimate" economic and trade scenarios. The method of approach used in this Report required:

- The aggregation of the dry bulk **cargo volumes** which are expected to enter seaborne trade in future years.

- The projection of the shipping demand generated by this seaborne trade growth, employing **tonne-miles** as a measure.

- The estimation of the likely **market shares** of the bulk carrier fleet as a whole and the five main size sectors within it, denoted as Handy (10-30,000 dwt), Handymax (30-50,000 dwt), Panamax (50-100,000 dwt), Cape (100-150,000 dwt), and VLBC-class carriers (150,000+ dwt).

- The selection of a suitable measure of the performance - **productivity** - of the bulk carrier fleet and the five main size divisions within it.

- The conversion, by this method, of the projections of tonne-mile shipping demand to a **deadweight tonnage (dwt)** requirement.

The first of these elements - the trend in cargo tonnage volumes - has been addressed in Section 3.2 and Table 3.7. For both convenience and to provide a measure of internal completeness within Section 3.3, a résumé - split between the major and minor bulks - is offered via Table 3 9(i).

3.3.1 Transport Distances in Bulk Carrier Trading

Bulk carrier demand is not solely a function of the volume of bulk cargo entering seaborne trade. There is another crucial variable - the transport distance between loading and discharging ports, as this dictates the length of time that the average vessel will require to complete the voyage. The longer the haul, the fewer the number of voyages which can be undertaken in a year (and the lower the volume of cargo shipped). For example, a 10,000

Table 3.8
Average Hauls in Dry Bulk Trade, 1993-2003
(Nautical miles)

Year:	1993	1996	2000	2003
Major Bulks	5,222	5,312	5,435	5,436
Minor Bulks	4,755	4,658	4,738	4,760
All Bulk Cargo	5,045	5,093	5,167	5,176

Source: Drewry Shipping Consultants

mile haul at the normal speed of 13 knots will take around a month, one of 1,000 miles little more than three days.

Although there is historical data on average hauls (i.e. the distances travelled with certain commodities) and this has been used in calculating demand, initially, in estimating future trends it is necessary to be aware of possible changes in the pattern of shipments which may revise average shipping distances. A summary position is noted via Table 3.8.

Hauls in certain sectors of the bulk market are much higher than they are in others. For example, the average voyage with iron ore is quite high - around 5,550 n. miles - whereas in the phosphate rock trade it is nearer 4,500 n. miles.

Table 3.9

Forecast Development of Dry Bulk Trade, 1993-2003

1 - Tonnage Shipments (Million tonnes)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Iron Ore	343.0	365.0	380.0	385.0	382.5	382.5	372.0	380.0	380.0	380.0	379.0
Coking Coal	161.0	150.5	143.0	137.5	140.0	142.0	144.0	147.5	147.5	150.0	150.0
Steam Coal	201.5	206.5	214.0	228.0	243.0	276.0	292.0	303.5	312.0	323.0	338.0
Grain	203.0	206.5	215.0	213.0	217.0	220.0	224.0	228.0	232.0	236.0	239.0
Bauxite/Alumina	52.5	54.8	55.4	54.8	50.1	49.0	48.0	49.0	49.0	48.5	48.0
Phosrock	28.5	29.3	28.0	27.0	26.5	25.5	24.5	24.0	24.0	23.0	22.0
Total Major Bulks	989.5	1,012.6	1,035.4	1,045.3	1,059.1	1,090.5	1,104.5	1,132.0	1,144.5	1,160.5	1,176.0
Agribulks	100.4	102.3	104.4	104.3	103.4	102.4	104.8	109.0	111.5	114.7	118.0
Forest Products	156.5	161.0	167.0	172.5	176.5	180.0	181.0	184.5	186.5	188.5	191.5
Fertiliser Materials	77.0	78.3	78.9	78.2	79.1	80.7	81.5	83.0	83.5	84.5	85.0
Ores and Minerals	57.0	58.9	59.8	61.1	61.9	62.5	63.1	64.5	65.0	65.5	66.6
Iron & Steel	122.0	127.5	132.0	135.5	137.0	142.5	144.5	148.5	150.5	153.0	155.5
Others	93.8	93.5	102.0	103.8	109.5	108.0	111.5	117.5	119.5	120.0	120.0
Total Minor Bulks	606.7	621.5	644.1	655.4	667.4	676.1	686.4	707.0	716.5	726.2	736.6
Total Bulk Trade	1,596.2	1,634.1	1,679.5	1,700.7	1,726.5	1,766.6	1,790.9	1,839.0	1,861.0	1,886.7	1,912.6

2 - Ship Demand (Thousand Million Tonne-Miles)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Iron Ore	1,903.7	2,080.5	2,166.0	2,194.5	2,180.3	2,154.6	2,120.4	2,204.0	2,204.0	2,204.0	2,198.2
Coking Coal	869.4	812.7	772.2	742.5	756.0	766.8	777.6	796.5	796.5	810.0	810.0

Table 3.9 (cont'd)
2 - Ship Demand (Thousand Million Tonne-Miles) (cont'd)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Steam Coal	926.9	949.9	1,003.7	1,094.4	1,202.9	1,393.8	1,489.2	1,578.2	1,622.4	1,679.6	1,757.6
Grain	1,136.8	1,177.0	1,193.2	1,192.8	1,215.2	1,232.0	1,254.4	1,276.8	1,299.2	1,321.6	1,338.4
Bauxite/Alumina	203.1	212.0	213.0	207.7	192.9	188.6	184.9	193.1	193.5	191.6	189.6
Phosrock	128.0	131.6	125.7	121.2	119.0	114.5	110.0	107.8	108.0	103.5	99.0
Total Major Bulks	5,167.9	5,363.7	5,473.8	5,553.1	5,664.2	5,848.3	5,934.6	6,152.4	6,223.6	6,310.3	6,392.8
Agribulks	531.9	537.9	551.6	549.1	544.6	538.3	548.9	594.6	596.5	613.6	631.3
Forest Products	649.5	668.1	693.0	715.9	732.5	747.0	751.2	765.7	774.0	782.3	794.7
Fertiliser Materials	461.7	469.7	475.0	469.4	474.8	483.9	488.8	498.3	501.0	507.0	510.0
Ores and Minerals	196.2	203.3	206.4	210.9	211.9	213.2	213.6	219.5	221.0	222.7	226.4
Iron & Steel	661.6	690.7	714.4	732.8	740.8	769.6	781.1	802.8	812.7	826.2	839.7
Others	384.0	387.3	420.8	430.7	452.0	445.4	463.6	490.8	501.9	504.0	504.0
Total Minor Bulks	2,884.8	2,957.2	3,059.8	3,108.7	3,156.6	3,197.4	3,247.3	3,350.1	3,407.1	3,455.8	3,506.1
Total Bulk Trade	8,052.7	8,320.9	8,533.6	8,661.8	8,820.7	9,045.7	9,181.9	9,502.4	9,630.7	9,766.1	9,898.9

Source: Drewry Shipping Consultants

To estimate tonne-miles in each sector, the actual and projected 1993-2003 cargo volumes have been multiplied by the average distance that this cargo is expected to be shipped.

For bulk trade as a whole, the average haul at the end of the forecast period is expected to be 2.5% higher than in 1993, at around 5,175 n. miles.

Taking previous findings into account, Table 3.10 summarises the total forecast tonne-mile demand in terms of the major and minor bulks.

Table 3.10
Forecast Dry Bulk Tonne-Mile Demand,
1993-2003 (Billion tonne-miles)

Year:	1993	1996	2000	2003
Major Bulks	5,168	5,553	6,152	6,393
Minor Bulks	2,885	3,109	3,350	3,506
All Bulk Cargo	8,053	8,662	9,502	9,899

Source: Drewry Shipping Consultants

3.3.2 Forecast Bulk Carrier Market Shares

The demand figures derived in Section 3.3.1 refer to the total global traffic in all potentially bulkable cargoes, irrespective of whether this cargo is actually transported in bulk, or loaded by bulk carriers.

Certainly, in the case of some of the minor bulk commodities, not all of the available cargo will be "bulked" and shipped as single shiploads or even aggregated into bulk "parcels". Some will be shipped as "break-bulk" cargo. Nor will all bulkable cargo be loaded by ships of the single-deck, bulk carrier type.

3.3.2.1 Bulk Carrier Penetration of Dry Bulk Trade

The traffic share captured by bulk carriers can vary considerably from one commodity to another but, in the majority of the identified bulk trades, part of the traffic will continue to be transported:

- By ships not of the bulk or combined carrier type, most notably 'tweendeck/multi-purpose/semi-liner types, some of which have capacities of as much as 25,000 dwt.

- By ships smaller than 10,000 dwt, the lower limit adopted in this analysis of bulk carrier trading prospects.

Table 3.11
Forecast Bulk Carrier[(a)] Trade Shares of International/Non-Coastal Dry Bulk Movements
1990-2003 (% of tonne-mile demand)

	1993	1996	2000	2003
Major Bulks:				
Iron Ore	100	100	100	100
Coal	100	100	100	100
Grain	96	96	96	96
Bauxite/Alumina	94	94	94	95
Phosphate Rock	82	83	85	85
Minor Bulks	77	79	83	83
All Bulk Trade	91	92	93	93

(a) Data relates to bulk carriers over 10,000 dwt.

Source: Drewry Shipping Consultants

Table 3.12

Forecast Employment of the Bulk Carrier Fleet

(Bulk vessels over 10,000 dwt)

1 - Market Shares (% of tonne miles)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Iron Ore	100	100	100	100	100	100	100	100	100	100	100
Coal	100	100	100	100	100	100	100	100	100	100	100
Grain	96	96	96	96	96	96	96	96	96	96	96
Bauxite/Alumina	94	94	94	94	94	94	94	94	94	95	95
Phosrock	82	83	83	83	84	84	85	85	85	85	85
Total Major Bulks	98	98	99	99	99	99	99	99	99	99	99
Agribulks	78	78	79	79	80	81	83	83	84	84	85
Forest Products	78	79	79	82	83	83	85	86	86	86	86
Fertiliser Materials	71	72	72	72	73	74	75	75	75	75	76
Ores and Minerals	79	80	80	80	81	81	81	82	82	82	82
Iron & Steel	81	81	82	82	83	84	86	87	87	87	87
Others	74	75	75	76	77	78	79	79	79	80	80
Total Minor Bulks	77	78	78	79	80	81	82	83	83	83	83
Total Bulk Trade	91	91	91	92	92	92	93	93	93	93	93

2. Tonne-Miles Performed (thousand million)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Iron Ore	1,903.7	2.080.5	2,166.0	2,194.5	2,180.3	2,164.6	2,120.4	2,204.0	2,204.0	2,204.0	2,198.2
Coal	1,796.3	1,762.6	1,775.9	1,836.9	1,958.9	2,160.6	2,266.8	2,374.7	2,418.9	2,489.6	2,567.6
Grain	1,091.3	1,130.0	1,145.5	1,145.1	1,166.6	1,182.7	1,204.2	1,225.7	1,247.2	1,268.7	1,284.9
Bauxite/Alumina	190.9	199.3	200.2	195.2	181.3	177.3	173.8	181.5	181.9	182.0	180.1
Phosrock	104.9	109.2	104.3	100.6	99.9	96.2	93.5	91.6	91.8	88.0	84.2
Total Major Bulks	5,087.1	5,281.5	5,391.9	5,472.3	5,587.0	5,771.4	5,858.8	6,077.6	6,143.8	6,232.3	6,316.0
Agribulks	414.9	419.6	435.8	433.8	435.7	436.0	456.6	474.8	501.1	515.4	536.6
Forest Products	506.6	527.8	547.5	587.0	608.0	620.0	638.5	658.5	665.6	672.8	683.4
Fertiliser Materials	327.8	338.2	341.0	338.0	346.6	358.1	366.6	373.7	375.8	380.3	387.6
Ores and Minerals	155.0	162.6	165.1	168.7	171.6	172.7	173.0	180.8	181.2	182.6	185.6
Iron & Steel	535.9	559.5	585.8	600.9	614.9	646.5	671.8	698.4	707.0	718.8	730.5
Others	284.2	290.5	315.6	327.3	348.1	347.4	366.3	387.7	396.5	403.2	403.2
Total Minor Bulks	2,224.3	2,298.3	2,390.8	2,455.7	2,524.7	2,580.7	2,671.8	2,774.0	2,827.2	2,873.1	2,926.9
Total Bulk Trade	7,311.4	7,579.8	7,782.7	7,928.0	8,111.7	8,352.1	8,530.6	8,851.5	8,971.0	9,105.4	9,241.9

Source: Drewry Shipping Consultants

While there is no way of knowing precisely how ship type/size preferences may evolve through to 2003, assumptions have been made about the potential participation of these other ship types, with trade shares being assigned to them.

From around 9% currently, their share of the market reduces to 7% by 2003 as a result of the progressive increase in shipload sizes.

3.3.2.2 Requirements in the Bulk Carrier Fleet Sectors

Once the available shipping demand which is accessible to dry bulk carriers has been deduced, the next consideration is the demand requirement accounted for by the various sectors of the fleet, namely:

10-30,000 dwt	-	Handysize BCs
30-50,000 dwt	-	Handymax BCs
50-100,000 dwt	-	Panamax BCs
100-150,000 dwt	-	Capesize BCs
150,000+ dwt	-	Very Large BCs

The current and projected market share of each bulk carrier size tranche, expressed as a percentage of all laden tonne-miles performed by the fleet as a whole, is noted in Tables 3.13 and 3.14.

The forecast market shares - expressed as percentages - are felt to be realistic, both in terms of fleet development and future tonnage supply and the changing ship size preferences within individual commodity trades.

Table 3.13
Forecast Market Shares for Identified Bulk Carrier Fleet Sectors: 1993-2003
(% of attributed tonne-mile demand)

Fleet Sectors:	1993	1996	2000	2003
10-30,000 dwt	21	20	18	16
30-50,000 dwt	19	18	18	19
50-100,000 dwt	28	29	30	31
100-150,000 dwt	17	18	18	18
150,000+ dwt	15	15	16	16
Total	100	100	100	100

Figures may not sum, due to individual rounding.
Source: Drewry Shipping Consultants

Table 3.14

Development of Dry Bulk Carrier Demand by Size Sector, 1993-2003

(% of tonne-mile demand)

	Size ('000 dwt)					
	10-30	30-50	50-100	100-150	150,000+	Total
Iron Ore						
1993	-	5	18	32	45	100
1996	-	5	18	32	45	100
2000	-	3	15	33	49	100
2003	-	2	15	33	50	100
Coal						
1993	9	10	36	32	13	100
1996	7	8	38	34	13	100
2000	5	8	39	33	15	100
2003	4	9	39	33	15	100
Grain						
1993	21	26	50	3	-	100
1996	19	26	51	4	-	100
2000	14	26	56	4	-	100
2003	12	26	58	4	-	100
Bauxite and Alumina						
1993	24	29	47	-	-	100
1996	23	27	50	-	-	100
2000	20	27	53	-	-	100
2003	19	27	54	-	-	100
Phosphate Rock						
1993	38	40	22	-	-	100
1996	38	37	25	-	-	100
2000	30	42	28	-	-	100
2003	28	43	29	-	-	100
Minor Bulks						
1993	47	32	19	1	-	100
1996	45	34	20	1	-	100
2000	43	34	21	2	-	100
2003	40	35	23	2	-	100

Source: Drewry Shipping Consultants

The conclusions to be drawn from this analysis are that size preferences are moving increasingly towards the larger vessels, as a result of growth in the major bulk commodities. In the **iron ore** trade, penetration by bulk carriers is now estimated to be 100%, with an increasing proportion of the cargoes being handled by vessels in excess of 100,000 dwt. This trend reflects:

- Improvements in the port infrastructure serving steelworks, with more high-capacity, deep-draft loading and unloading facilities installed.

- Newbuilding, with a continuous increase in the number of large Cape and Very Large bulk carriers in the world fleet.

The larger carriers - those above 100,000 dwt - now transport more than 70% of the iron ore traded by sea, and their share of the traffic is projected to rise to 83% by 2003. From 41% currently, the share of the VLBC-class above 150,000 dwt rises to 50%.

This trend mirrors:

- The overall growth of iron ore trade.

- The increasingly dominant position of the two leading iron ore suppliers, Australia and Brazil.

Meanwhile, the market share of the 50-100,000 dwt range is expected to decline.

In **coal**, Panamax sizes retain a larger share of the traffic, performing almost 40% of the forecast bulk carrier tonne-miles. This is the result of the growing trade in steam coals which, for a variety of logistical and market factors, demand smaller shiploads. Factors include:

- The distribution pattern, the quantities of steam coal required annually by many power stations and cement works being comparatively small.

- High shoreside coal handling costs which tend to discourage the use of transshipment and result in smaller, direct shiploads.

- Logistics, the low plant throughputs, high inventory costs and lack of ground storage often place an upper limit on the lot sizes which can be conveniently handled.

Present knowledge of trade practices, port constraints and the preferences shown by those shipping or receiving coals suggest that long-haul coal trade will be served predominantly by bulk carriers of Panamax size and larger. The share of the 10-50,000 dwt range is predicted to decline to 13% of the tonne-miles from 20% currently. The 50-100,000 dwt range increases its share, meeting an estimated 39% of the forecast coal shipping demand.

The larger carriers, meanwhile, increase their penetration of coal trade, performing 48% of the bulk carrier tonne-miles by 2003.

In grain trading, the use of Panamax sizes has broadened to such an extent since the start of the 1980s that the 50-100,000 dwt sector is now estimated to be performing half the laden tonne-miles. Despite constraints on ship size, their overall market share is expected to go on rising, reaching 58% by 2003.

Gains made by the 50-100,000 dwt band will mainly be at the expense of the Handy/Handymax types, with these sizes seeing their share eroded by Panamax bulk carriers. From around 48% currently, their share is expected to drop back to under 40% by the turn of the century.

3.3.3 Forecast Requirement for Bulk Carriers

Previously, the analysis has centred on the prospective increase in tonne-miles generated by the growth of bulk traffic, bulk carrier fleet participation in future trading, and the likely market shares of each fleet sector. The next - and most difficult - step is to determine what the effect on bulk carrier demand will be by converting the tonne-mile figures to the usual measure of bulk carrier capacity, deadweight tonnes (dwt). This reintroduces the concept of bulk carrier productivity discussed in Section 2.3.4.2. For the purposes of projection, the "base case" assumptions as set out in Table 3.15 have been applied.

Table 3.15
Productivity Performance Bulk Carrier Fleet Sector: Base Case Assumptions
(Million tonne-miles per dwt per year)

Fleet Sector:	
10-30,000 dwt	34
30-50,000 dwt	30
50-100,000 dwt	35
100-150,000 dwt	36
150,000 + dwt	33

Source: Drewry Shipping Consultants

The differences in productivity which arise as a result of bulk carrier size are, in the main, due to the differences in the way each sector of the fleet is employed, and the effect of this on haul lengths, port turnround times, frequency of ballasting, entry to congested ports, passages through canals, etc.

The clear conclusion to be drawn from Table 3.15 is that two key fleet sectors - Panamax and Capesize - have been among the most productive in recent years, consistently outperforming the fleet as a whole.

Rather surprisingly, the Handymax (30-50,000 dwt) sector of the fleet has been the worst performer overall and this appears to be mainly due to multi-port trading, port congestion and delays experienced in key areas of employment, such as the steel trade.

Table 3.16 sets out the base case projection of demand, showing forecast tonne-miles and the productivities assumed in estimating bulk carrier requirements by size tranche.

Employing the average productivity figures selected for each bulk carrier size category, and increasing these by 250 tonne-miles per dwt/year, the overall dwt requirement increases from just under 219 million dwt in the base year, 1993, to almost 257 million dwt at the end of the forecast period, a rise of some 38 million dwt or over 17%.

The detailed demand forecast is displayed in Table 3.16 with the results as summarised in Table 3.17.

The assumption that the improvement in levels of bulk carrier productivity in the past few years, will continue in future, with the overall fleet performing over 36,000 tonne-miles per dwt by the end of the century, against the present level of 33-34,000, can be challenged. However, with fleet expansion and renewal later in the decade altering the age profile, it is reasonable to expect an improvement in operational efficiency and average fleet productivity expressed in tonne-miles per dwt/year. The alternative is an increased dwt need but poorer operating returns. Given the high prospective replacement costs of the fleet, the "efficient" option seems the more probable.

3.3.3.1 Handysizes, 10-30,000 dwt

In virtually all trades where they are currently employed, utilisation of the smaller bulk carriers - that is, those smaller than 30,000 dwt - is expected to decline, the projected loss of market share not only reflecting port improvements and the desire to reduce costs but also the increasing availability of larger vessels - especially Handymax types larger than 40,000 dwt.

Table 3.16

Forecast Dry Bulk Demand by Sector 1993-2003

(Thousand million tonne-miles)

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
10-30,000 dwt											
Major Bulks	476.5	456.3	459.9	429.3	433.6	414.2	395.1	354.1	359.5	311.0	314.7
Minor Bulks	1,046.5	1,071.3	1,093.6	1,095.2	1,116.1	1,134.6	1,148.7	1,179.3	1,215.7	1,149.2	1,170.8
Additional Demand(a)	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4
Total	1,561.5	1,566.0	1,591.9	1,562.9	1,588.2	1,587.2	1,582.2	1,571.8	1,613.6	1,498.6	1,523.9
30-50,000 dwt											
Major Bulks	655.9	672.5	661.7	644.3	637.0	651.1	643.3	662.3	671.6	685.0	694.0
Minor Bulks	721.5	754.7	788.1	828.7	847.0	874.3	911.0	953.9	961.2	1,005.6	1,024.4
Total	1,377.4	1,427.2	1,449.8	1,473.1	1,484.0	1,525.4	1,554.4	1,616.2	1,632.8	1,690.6	1,718.4
50-100,000 dwt											
Major Bulks	1,647.8	1,706.1	1,722.0	1,799.8	1,826.6	1,984.3	2,011.9	2,065.0	2,094.5	2,161.2	2,198.0
Minor Bulks	423.1	438.7	469.8	492.7	522.4	528.3	566.5	593.3	593.7	660.8	673.2
Total	2,070.9	2,144.8	2,191.9	2,292.5	2,349.1	2,512.6	2,578.4	2,658.3	2,688.2	2,822.0	2,871.2
100-150,000 dwt											
Major Bulks	1,216.7	1,281.3	1,342.7	1,372.6	1,451.7	1,514.5	1,517.1	1,560.0	1,575.4	1,599.6	1,624.1
Minor Bulks	33.2	33.6	39.2	39.0	39.2	43.6	45.6	47.5	56.5	57.5	58.5
Total	1,249.9	1,314.9	1,382.0	1,411.6	1,491.0	1,558.1	1,562.7	1,607.5	1,631.9	1,657.1	1,682.6
150,000+ dwt											
Major Bulks	1,090.2	1,165.4	1,205.6	1,226.3	1,238.0	1,207.2	1,291.3	1,436.2	1,442.8	1,475.4	1,484.2
Minor Bulks	-	-	-	-	-	-	-	-	-	-	-
Total	1,090.2	1,165.4	1,205.6	1,226.3	1,238.0	1,207.2	1,291.3	1,436.2	1,442.8	1,475.4	1,484.2
Total Fleet											
Major Bulks	5,087.1	5,281.5	5,391.9	5,472.3	5,587.0	5,771.4	5,858.8	6,077.6	6,143.8	6,232.3	6,315.0
Minor Bulks	2,262.7	2,336.7	2,429.2	2,494.1	2,563.2	2,619.1	2,710.2	2,812.3	2,865.6	2,911.5	2,965.3
Total	7,349.8	7,618.2	7,821.1	7,966.4	8,150.1	8,390.5	8,569.0	8,889.9	9,009.4	9,143.8	9,280.3
% Change	0.3%	3.7%	2.7%	1.9%	2.3%	2.9%	2.1%	3.7%	1.3%	1.5%	1.5%

(a)Tonnage Demand Arising from Trade in Containers/Break-Bulk.

For convenience, this value has been kept as a constant.

Totals may not agree due to independent rounding.

(b) includes (a).

Source: Drewry Shipping Consultants

Table 3.17
Forecast Dry Bulk Carrier Demand by Fleet Sector, 1993-2003
(Million dwt)

Market Sector:	1993	1996	2000	2003
10-30,000 dwt	45.9	45.0	44.0	41.8
30-50,000 dwt	45.9	47.9	50.9	52.9
50-100,000 dwt	59.2	64.1	72.3	76.6
100-150,000 dwt	34.7	38.4	42.6	43.7
150,000 + dwt	33.0	36.3	41.3	41.8
Fleet Total	218.8	231.8	251.1	256.8

Totals may not add due to rounding.

Source: Drewry Shipping Consultants

In the grain trade, for example, the forecast erosion of Handysize market share (from 21% to 12%) reduces employment levels substantially. One of the few sectors of the market where bulk carriers of this size make any real headway is steel.

The tonnage requirement, by the year 2003, is expected to be lower than it is today, declining to about 42 million dwt.

A relatively high measure of productivity was applied to the Handysize employment projections - 34,000 tonne-miles per dwt per year rising to 36,500 at the end of the forecast period - because this seemed to be consistent with the actual performance of the fleet.

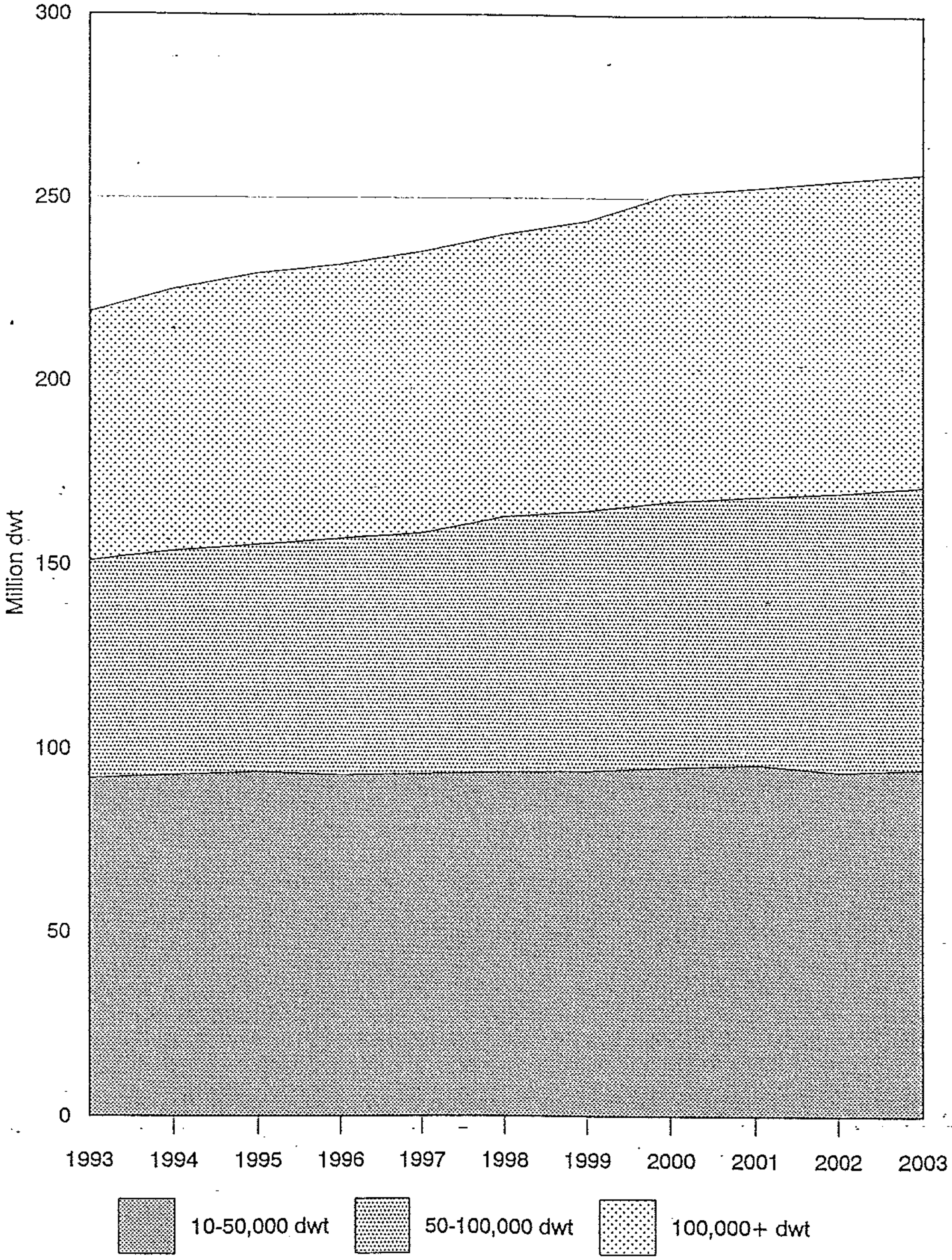
It will be appreciated that if a lower efficiency - something nearer the fleet average of 33,000 tonne/miles - had been assumed, the overall tonnage requirement would be higher than than that projected. The likelihood therefore is that "surplus" units of this size will look increasingly to "non-bulk" options. For "open types" this might include some container/bulk options. More probable will be 'tweendecker-replacement, "generals" options. However, a further supply-induced factor will be that a good measure of any "oversupply" could well be redundant "loggers".

3.3.3.2 Handymaxes, 30-50,000 dwt.

In contrast, the larger handy bulkers - the so-called "Handymax" class - succeed in holding on to or enlarging market share in a number of key trading areas. Gaining cargo from the smaller carriers, this size range maintains its overall share of the bulk market at a little

Figure 3.1

FORECAST DRY BULK CARRIER DEMAND: BASE CASE REQUIREMENTS



Source: Drewry Shipping Consultants.

under 20% over the forecast period, matching and then surpassing that of the 10-30,000 dwt fleet.

It is the minor bulks which are the mainstay of Handymax bulker employment, and which help push up tonnage requirements in this market sector between 1993 and 2003. The additional demand foreseen is 7 million dwt, perhaps justifying the recent newbuilding orders for Handymaxes and this would increase further if productivity fails to increase to the eventual forecast level of over 32,000 tonne-miles per dwt per annum.

3.3.3.3 Panamaxes, 50-100,000 dwt.

Populated mainly by Panamax types (i.e. ships of up to 80,000 dwt), the 50-100,000 dwt sector of the fleet will increase market share through to 2003, tonne-mile performance lifting dwt requirements from some 59 million dwt to approaching 77 million dwt. The main influence on employment is expected to be the growth of coal trade and, in particular, the expansion of steam coal shipments, but this sector of the fleet will also benefit from the broadening of employment opportunities in many minor bulk trades. The grain trades will be a further "swing factor".

3.3.3.4 Capesizes, 100-150,000 dwt

The overall market share of bulk (and combined) carriers between 100,000 and 150,000 dwt - the so-called "Capesize" sector - is not expected to increase very much through to 2003. Nonetheless, the overall expansion of bulk trade - especially the increased traffic in coal - will push up tonnage requirements considerably. Forecast demand is up by over 9 million dwt - or 26% - by the end of the period, rising to some 43.7 million dwt.

Coal overtakes iron ore, becoming the largest employer of Capesizes, with these two trades accounting for 94% of the tonne-miles that the 100-150,000 dwt sector is expected to perform in 2003.

3.3.3.5 VLBCs 150,000 dwt and Over

The biggest of the bulk carriers will benefit from the forecast increase in iron ore and coal trade, as these are virtually the only cargoes loaded by these vessels. This, together with their increased share of ore and coal traffic, boosts demand by 8.8 million dwt or almost 27% between 1993 and 2003. By the end of the forecast period, bulk trade is expected to be employing approaching 42 million dwt of vessels in the VLBC category, against 33 million dwt currently.

In iron ore, the larger carriers are expected to capture 50% of the traffic, their share rising to this level from 43%. Similarly, in coal, this size category is expected to perform 15% of the forecast tonne-miles, compared to 13% currently.

SECTION 4

PROJECTED BULK CARRIER SUPPLY - THE NEXT TEN YEARS

The difficulties of forecasting demand for dry bulk shipping are evident from Section 3. Projections of bulk carrier supply and the future growth of the fleet are equally uncertain, even though - at least to 2000 - a large part of the fleet is already visible in the sense that the vessels either exist or form part of the current order backlog. The main areas of uncertainty are:

- **Newbuilding** - with ordering patterns and the size of the orderbook the main factors dictating the future pace of bulk carrier deliveries and fleet growth.

- **Demolition** - the rate at which tonnage is withdrawn from the bulk carrier fleet and sold for scrapping.

4.1 Forecasting Supply - Methodology

The plausibility of projected bulk shipping supply scenarios and their implications for market balances rest with the assumptions made about the following parameters:

- The size of the existing bulk carrier fleet and its age profile.

- The size and status of the existing orderbook for bulk carriers.

- The rate at which new bulk carriers join the fleet.

- Future contracting activity and the tonnage ordered annually.

- The future rate of demolition (scrapping).

- The combined carrier tonnage employed in dry trades.

As noted in the introduction to Section 3, the supply/demand assessments presented in this Report involve the use of a special appraisal based on a standard projection technique. For this reason, the base point for the ship supply position in Section 4 is mid-1993. This allows for subsequent mid-year projections to be made. The rationale for this is the theoretical assumption that cargo volumes and fleet levels develop evenly over the year -

not wholly true, but attempting greater sophistication can only make the prospective results more misleading - and therefore the mid-point is the optimum point for comparative purposes.

However, an updated and more detailed orderbook is presented as Appendix 2.

The supply scenario in Section 4 starts with the "visible" supply - that is, the existing fleet plus the orderbook as at mid-1993 - and then employs assumptions about delivery rates, orderbook "slippage", future ordering patterns, scrapping activity and the deployment of the combined carrier fleet.

For the forecast period, 1993-2003, a "base case" scenario has been developed for the bulk carrier fleet with this being felt to represent the most likely forecast, given the prevailing market outlook.

Naturally, other options (e.g. "high" or "low" supply case scenarios) could be developed but, in the context of the primary aims of this Report, this seems unnecessary. Instead, this seems better left to a later evaluation of the sensitivities of implied "market" that the projections point to, where due consideration can be given also to the impact on potential profitability and investment timing/strategy.

4.2 Market Determined Growth in Bulk Shipping Supply

The approach adopted for the projection of future bulk carrier supply seeks to take into account the dynamic nature of the market. Cyclical influences are incorporated into the projection with annual variations in deliveries and deletions.

- Bulk carrier deliveries and scrappage rates for the first year of the forecast period i.e. - from mid 1993 to mid 1994 - are the most likely levels that can be expected, given current market conditions. These first year estimates take account of the age profile of the bulk carrier fleet, the current (1993) low level of scrap prices and recent trends in the newbuilding market.

- For the rest of the forecast period (1994-2003), rather than applying constant, predetermined rates of ordering and scrapping, the rates are varied with the forecasts reflecting changes in the supply/demand balance and prospective rise and fall of the freight market. Obviously, this poses some difficulties as the reality of the marketplace is that supply side developments react to "perceptions of change" and the response this creates may completely negate the original perception.

4.2.1 Newbuilding Orders

The mid-year orderbook shown in Table 4.1 is formed from three constituents: (a) the existing bulk carrier orderbook, from which phased deliveries will take place; (b) assumed "slippage" and (c) estimates of future ordering. By linking contracting levels to predicted changes in supply/demand balances, the rate at which new orders are received ranges from 5 to 12 million dwt per annum.

Contracting for new tonnage in the Handysize/Handymax ranges (10-50,000 dwt) has been stepped up since 1991, with the good returns in this market sector encouraging investment in these types. The level of contracting is assumed to remain high through to 1995/96 and then decline to only 1% of fleet capacity in the ensuing downturn in the market. However, high levels of newbuilding are expected to return late in the present decade, following the removal of a lot of older tonnage from this sector of the fleet.

In the 50-100,000 dwt fleet sector, ordering of Panamax bulk carriers is assessed as reaching a rate of 6.5% in the high market of the mid-1990s. There are fewer orders from 1996 onwards but contracting activity is stepped up later, in line with the better supply/demand balance and the growing need for fleet renewal, following the scrapping of the over-aged elements in this fleet sector.

Further up the bulk carrier size scale, in the 100-150,000 dwt Capesize band, ordering is expected to rise to a 7% rate during the mid-1990s peak in the market. High ordering levels are also assumed in the VLBC band (150,000+ dwt), with the pattern conforming with the predicted movement of the market. Over the forecast period (i.e. up to and including 2003) the pattern of ordering is predicted to be (million dwt):

Fleet sector:		
10- 50,000 dwt	30.0	30%
50-100,000 dwt	31.6	31%
100-150,000 dwt	16.7	16%
150,000+ dwt	23.0	23%
Total	101.3	100%

4.2.2 Demolition

The slow rate of scrapping activity evident in the latter part of 1992 and the first half of

1993 is continuing, with the annual rates of demolition sales low by the standards of the mid 1980s.

Several factors are contributing to the low level of bulk carrier scrapping. Undoubtedly the most important is the fact that demolition remains an unattractive option to owners of elderly vessels as they can still trade profitably in the bulk freight market at the rates prevailing in 1993. Also, they could still sell the ship in the secondhand market for more than the prevailing demolition price.

Both these factors have led to owners being either unable or unwilling to commit their older tonnage to the shipbreakers. This over-aged tonnage will ultimately need to be scrapped but conditions must be sufficiently enticing to tempt owners to scrap or to make such action unavoidable, a prospect which appears to be unlikely in the short term.

Between mid-1993 and mid-1994 a total of about 6 million dwt is expected to be removed from the bulk carrier fleet, as Table 4.1 shows. Given the age profile of the existing fleet, it is likely that most of this will be withdrawn from the small ship sectors - that is, from the size ranges below 50,000 dwt. This rate of scrapping is high compared with the rates observed over the last few years but is felt to be a realistic level given the fleet ageing process.

Even lower scrapping rates are predicted in 1994 and 1995 as a perceived upturn in the freight market encourages owners to continue trading older bulk carriers. It is not until 1996 that a predicted downturn in the market once more leads to greatly increased scrapping rates, with bulk carrier demolition rising to a peak in 1997. In that year, it is predicted that nearly 13 million dwt - some 6% of the fleet - will be removed.

The latter period of the forecast will see a reduction in the rate of scrapping with annual demolition levels mirroring the improvement in the supply/demand balance.

4.2.3 Dry Trading Combined Carriers

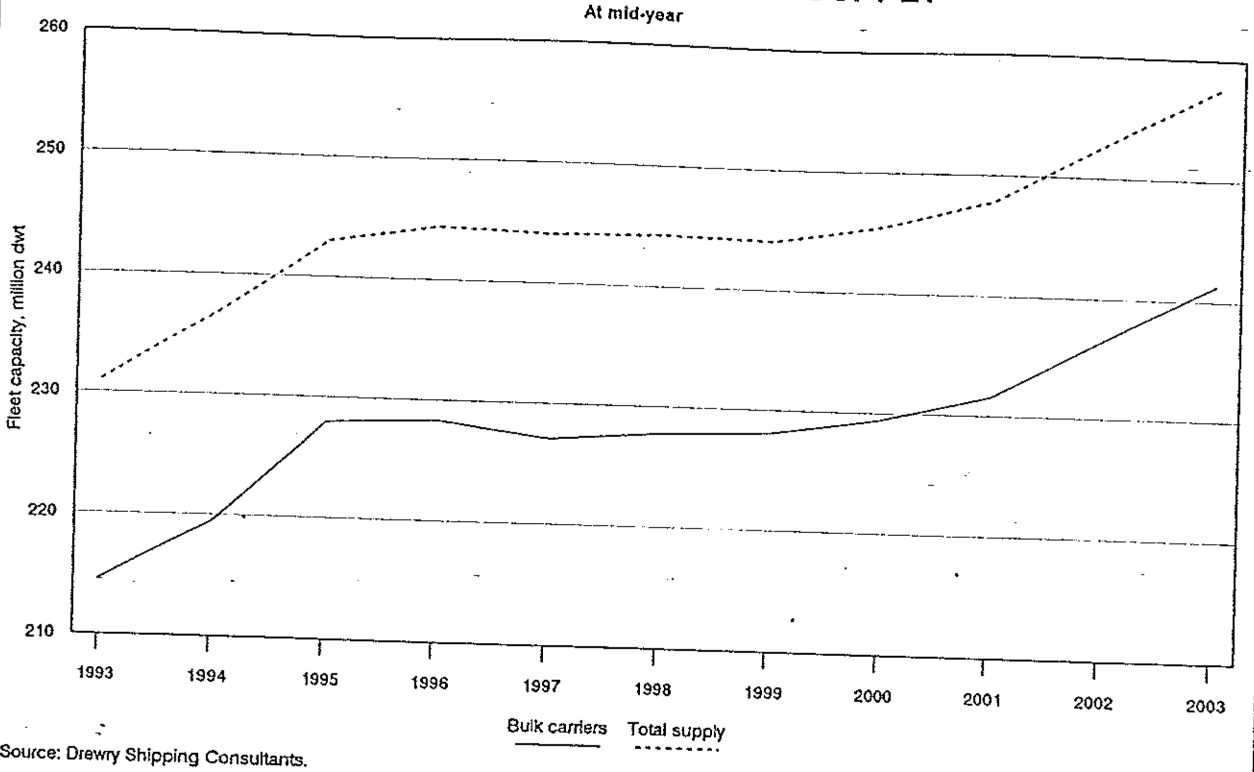
Instead of employing a static tonnage to represent this supply element, it has been varied with the tonnage rising during the projected peaks in the freight market and dropping back at other times. The participation of combined carriers is expected to be highest in 1995 and 1998, when ships of this type will constitute between 7% and 8% of the total available tonnage.

One implicit assumption here is that these ships are maintained to keep their "oil trading" certificates. If not, they would be absorbed totally into the bulk carrier fleet.

Figure 4.1

FORECAST BULK CARRIER SUPPLY

At mid-year

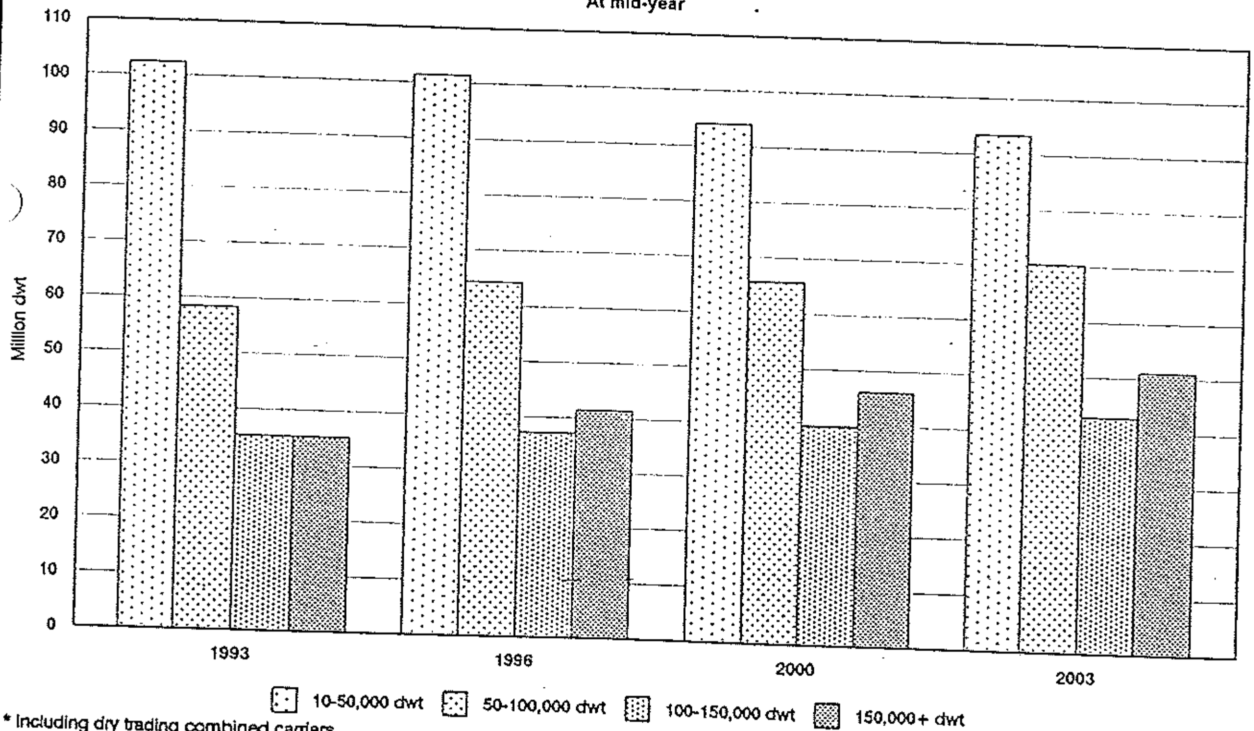


Source: Drewry Shipping Consultants.

Figure 4.2

FORECAST TOTAL BULK SHIP SUPPLY BY SIZE RANGE*

At mid-year



* Including dry trading combined carriers.

Source: Drewry Shipping Consultants.

Table 4.1
Forecast Dry Bulk Carrier Supply

Year	Supply (1)	Current +	Orderbook Slippage	+ New(b)	Total Orderbook	Additions	Deletions	New Orders	Supply (2)	Combis In Dry	Total Supply (3)
10-50,000 dwt											
1993	103.6	1.3	-	-	1.3	1.0	2.6	2.6	102.1	0.2	102.3
1994	102.1	1.8	0.3	-	2.1	1.6	2.0	3.6	101.7	0.3	102.0
1995	101.7	0.9	0.4	2.6	3.9	3.1	2.0	4.1	102.7	0.3	103.0
1996	102.7	-	0.8	3.6	4.4	3.5	5.1	2.1	101.1	0.3	101.4
1997	101.1	-	0.9	4.1	4.9	3.9	7.1	1.0	98.0	0.2	98.2
1998	98.0	-	1.0	2.1	3.0	2.4	3.9	1.5	96.5	0.1	96.6
1999	96.5	-	0.6	1.0	1.6	1.3	2.9	2.9	94.9	0.1	95.0
2000	94.9	-	0.3	1.5	1.8	1.4	2.4	3.8	93.9	0.1	94.0
2001	93.9	-	0.4	2.9	3.3	2.6	3.3	2.8	93.3	0.2	93.5
2002	93.3	-	0.7	3.8	4.4	3.6	3.3	2.8	93.5	0.2	93.7
2003	93.5	-	0.9	2.8	3.7	3.0	3.3	2.8	93.2	0.2	93.4
50-100,000 dwt											
1993	54.3	1.8	-	-	1.8	1.4	0.8	1.9	54.9	3.5	58.4
1994	54.9	2.4	0.4	-	2.8	2.2	0.5	2.7	56.6	3.5	60.1
1995	56.6	2.9	0.6	1.9	5.4	4.3	0.6	3.7	60.3	3.1	63.4
1996	60.3	-	1.1	2.7	3.8	3.1	2.4	2.4	60.9	3.4	64.3
1997	60.9	-	0.8	3.7	4.4	3.6	3.4	1.8	61.1	3.5	64.6
1998	61.1	-	0.9	2.4	3.3	2.3	1.8	1.2	61.6	3.5	65.1
1999	61.6	-	1.0	1.8	2.8	2.0	1.5	2.8	62.1	3.3	65.4
2000	62.1	-	0.8	1.2	2.1	1.4	1.2	3.7	62.3	3.3	65.6
2001	62.3	-	0.6	2.8	3.4	2.4	1.6	3.7	63.1	3.5	66.6
2002	63.1	-	1.0	3.7	4.7	3.3	1.6	3.8	64.8	3.5	68.3
2003	64.8	-	1.4	3.7	5.2	3.6	1.6	3.9	66.8	3.5	70.3

Table 4.1 (cont'd)

Year	Supply (1)	Current +	Orderbook Slippage	+ New(b)	Total Orderbook	Additions	Deletions	New Orders	Supply (2)	Combis In Dry	Total Supply (3)
100-150,000 dwt											
1993	29.4	1.1	-	-	1.1	0.8	0.4	0.7	29.7	5.5	35.2
1994	29.7	1.8	0.3	-	2.1	1.5	0.3	1.5	30.9	5.8	36.7
1995	30.9	0.1	0.6	0.7	1.5	1.0	0.3	2.2	31.6	5.0	36.6
1996	31.6	-	0.4	1.5	1.9	1.4	1.1	1.1	31.9	5.3	37.2
1997	31.9	-	0.6	2.2	2.7	1.9	1.3	1.0	32.5	5.8	38.3
1998	32.5	-	0.8	1.1	1.9	1.3	0.8	1.3	33.0	5.5	38.5
1999	33.0	-	0.7	1.0	1.6	1.1	0.7	1.6	33.4	5.4	38.8
2000	33.4	-	0.6	1.3	1.9	1.2	0.3	2.0	34.3	5.4	39.7
2001	34.3	-	0.7	1.6	2.3	1.5	0.7	1.7	35.1	5.5	40.6
2002	35.1	-	0.8	2.0	2.8	1.8	0.7	1.8	36.2	5.5	41.7
2003	36.2	-	1.0	1.7	2.7	1.8	0.7	1.8	37.2	5.5	42.7
150,000+ dwt											
1993	27.2	1.5	-	-	1.5	1.0	0.3	1.1	27.9	7.3	35.2
1994	27.9	3.5	0.5	-	4.0	2.6	0.1	1.5	30.4	7.6	38.0
1995	30.4	2.2	1.4	1.1	4.7	3.1	0.2	2.3	33.3	6.6	39.9
1996	33.3	-	1.6	1.5	3.2	2.1	0.8	1.7	34.5	7.0	41.5
1997	34.5	-	1.1	2.3	3.4	2.2	1.2	1.4	35.5	7.5	43.0
1998	35.5	-	1.2	1.7	2.9	1.7	0.5	1.2	36.7	7.4	44.1
1999	36.7	-	1.1	1.4	2.5	1.5	0.4	2.0	37.8	7.2	45.0
2000	37.8	-	1.0	1.2	2.3	1.4	0.2	2.8	39.0	7.2	46.2
2001	39.0	-	0.9	2.0	2.9	1.8	0.6	2.9	40.2	7.0	47.2
2002	40.2	-	1.2	2.8	4.0	2.4	0.6	3.0	42.0	7.0	49.0
2003	42.0	-	1.6	2.9	4.5	2.7	0.6	3.1	44.0	7.0	51.0

Table 4.1 (cont'd)

Year	Supply (1)	Current +	Orderbook Slippage	+ New(b)	Total Orderbook	Additions	Deletions	New Orders	Supply (2)	Combis In Dry	Total Supply (3)
Total Fleet											
1993	214.5	5.7	-	-	5.7	4.2	4.1	6.3	214.6	16.5	231.1
1994	214.6	9.5	1.5	-	11.0	8.0	3.0	9.3	219.5	17.2	236.7
1995	219.5	6.1	3.0	6.3	15.4	11.5	3.1	12.2	228.0	15.0	243.0
1996	228.0	-	3.9	9.3	13.3	10.0	9.5	7.2	228.4	16.0	244.4
1997	228.4	-	3.3	12.2	15.5	11.6	12.9	5.2	227.1	17.0	244.1
1998	227.1	-	3.9	7.2	11.1	7.7	7.1	5.2	227.8	16.5	244.3
1999	227.8	-	3.4	5.2	8.6	5.8	5.5	9.3	228.1	16.0	244.1
2000	228.1	-	2.7	5.2	8.0	5.5	4.1	12.4	229.5	16.0	245.5
2001	229.5	-	2.5	9.3	11.9	8.2	6.1	11.2	231.6	16.2	247.8
2002	231.6	-	3.6	12.4	16.0	11.1	6.1	11.3	236.5	17.0	252.7
2003	236.5	-	4.9	11.2	16.1	11.0	6.2	11.7	241.3	16.2	257.5

(1) Fleet at 30 June year t.

(2) Fleet at 30 June year t+1.

(3) Bulk carrier fleet plus combis-in-dry at 30 June year t + 1.

(a) Tonnage due for delivery in 2H year t/1H year t+1.

(b) Assumes 2 year lead time.

Source: Drewry Shipping Consultants

4.2.4 Outcome

The detailed results of the forecast for supply are presented in Table 4.1. The predicted ordering and scrappage patterns foreseen in the early years increase the capacity of the bulk carrier fleet (including combined carriers) by 13.1 million dwt, or 6%, in the three years to mid-1996. Thereafter, with increased demolition halting growth, the fleet stabilises and, by 2000, its capacity is 244 million dwt. By 2003, the expected bulk carrier fleet is projected to total 252.7 million dwt. Changes in the individual fleet sectors are summarised in Table 4.2.

Table 4.2
Forecast Growth of the Bulk Carrier Fleet(1), 1993-2003
(Million dwt)

At:	Mid-1993	Mid-1996	Mid-2000	Mid-2003	Growth 1993/2003 (% p.a)
Fleet sector:					
10-50,000 dwt	103.8	103.0	95.0	93.7	-1.0
50-100,000 dwt	57.1	63.4	65.4	68.3	+1.8
100-150,000 dwt	34.8	36.6	38.8	41.7	+1.8
150,000+ dwt	34.2	39.9	45.0	49.0	+3.7
Total	229.9	243.0	244.1	252.7	+1.0

(1) Including combined carriers in dry.

Source: Drewry Shipping Consultants

SECTION 5

PROJECTED SUPPLY/DEMAND BALANCE CHANGES

For any sustained upturn to take place in the freight market, the supply of dry bulk shipping must move more closely into line with demand than it has been in 1993, reducing over-capacity in the bulk market and restoring a better balance between supply and demand.

To gain an insight into the prospective movement of market balances between now and 2003 and the existence of a notional tonnage surplus (or deficit), the projections of tonnage availability have been compared with the forecast requirement for tonnage developed earlier.

The results are shown in Table 5.1.

Sensitivities

The very nature of the market and its volatility make forecasts of supply/demand vulnerable to unforeseen developments or unexpected events (such as the 1991 Gulf war). Inevitably, with the interaction of so many variables, the future movement of tonnage balances in the bulk market is highly uncertain. The further into the future one goes, the greater the uncertainty.

It cannot be otherwise, because any forecast, however carefully developed, is sensitive to changes in the assumptions made for:

- The growth of dry bulk trade volumes.
- The pattern of shipments and, hence, shipping distances.
- The participation of bulk carriers.
- Operating efficiencies.
- The deployment of the combined carrier fleet.
- The development of the fleet.

Given the general improving trading prospects assumed to present themselves over the next ten years, it can be expected that the proportion of combined carriers trading in the dry market will remain an important element of supply, assuming that the dry market continues to present more profitable opportunities than the wet side.

In mid-1993, 58% of the actively trading combined carrier fleet (51% of the total fleet including inactive tonnage) was operating in the dry bulk market. At the peak of the 1989 boom, however, as much as 80% of the fleet was operating on the dry side.

This percentage could well be regarded as the theoretical maximum, implying that an additional 8-9 million dwt could be transferred to the dry market from "wet" in a high freight market. Allowance has been made for switching in the projection (where the total ranges from a low of 15 million dwt to a high of 17.2 million dwt).

Table 5.1
Forecast Supply/Demand Balance, 1993-2003
(Million dwt)

Year	Bulk Carrier Fleet	Combined Carrier Dry	Total Supply	Forecast Demand	Tonnage Surplus (Deficit)	%
1993	214.5	15.4	229.9	218.8	11.1	4.8
1994	214.6	16.5	231.1	225.1	6.0	2.6
1995	219.5	17.2	236.7	229.3	7.4	3.1
1996	228.0	15.0	243.0	231.8	11.2	4.6
1997	228.4	16.0	244.4	235.2	9.2	3.8
1998	227.1	17.0	244.1	240.2	3.9	1.6
1999	227.8	16.5	244.3	243.7	0.6	0.2
2000	228.1	16.0	244.1	251.1	(7.0)	-2.9
2001	229.5	16.0	245.5	252.7	(7.2)	-2.9
2002	231.6	16.2	247.8	254.8	(7.0)	-2.8
2003	236.5	17.0	252.7	256.8	(4.1)	-1.6

Source: Drewry Shipping Consultants

Within the demand forecast, respective market shares have been applied to the various bulk carrier size categories in order to derive the tonne-mile demand for each market sector. Such an approach assumes that market shares are discrete and there is no overlap between one size category and another.

In reality, the boundaries between each sector are not well defined, because of part-cargoes and other practices. One ship will trade "up", another "down". The reality, therefore, is that the supply/demand balances in each market sector are more "fluid".

Another factor to be taken into consideration is the ability of the dry bulk fleet as a whole to attain a higher level of productivity through better tonnage utilisation. The demand forecasts developed will be adversely affected by such improvements in efficiency, but the general trend in bulk carrier operation - that of improved productivity - is likely to be maintained, especially in the larger size ranges. (The implication, though, is that productivity improvements, in practice, will slow up in the early part of the new decade).

Nevertheless, it is felt that heavy contracting for new tonnage, plus a high dry trading combined carrier fleet figure, will maintain a sizeable level of oversupply until 1996, when the gap will begin to narrow, reducing sharply in the latter part of the decade.

By 1998/99, the market is anticipated to have reached a close balance between supply and demand, presumably supporting a strong freight market. Indeed, the market enters 2000 in a state of near-equilibrium, with the visible surplus reducing to zero in the face of strong demand growth.

This favourable supply/demand scenario reflects the more restrained growth in the orderbook and with a steady flow of tonnage going to the breakers.

5.1 Fleet Sector Balances to 2003

A key difference between the market in the 1990s and that ten years ago is the visible surplus - i.e. the level of inactivity. Not only is the tonnage surplus smaller but, in the 1980s, many of the bulk carriers that were surplus to requirements and unemployed were relatively new ships - mostly less than ten years old. Today, the ships laid-up or otherwise idle are older - typically more than 20 years old.

Looking at the potential balances in the individual sectors of the dry bulk fleet - shown in Table 5.2 - the following trends are evident:

- **Handysize Sector (10-50,000 dwt)**

The weak demand growth which springs from the loss of market share by the smaller carriers precipitates a decline in this sector of the fleet. The fleet is forecast to fall from its present size of 104 million dwt to 95 million dwt by 2000 and about 93.5 million dwt by 2003, resulting in persistent near term oversupply.

This contrasts to the relative strength of this sector in 1993, which was caused by the Chinese import boom, port congestion and shifts in key trades employing the smaller sizes, rather than any change in the fundamentals of supply and demand. The suggestion is that oversupply starts to erode around the end of the decade but in the near term this sector looks to be the main "under-performer". Persistent port congestion may be a necessity for marked strength for these types. Early into the new century, the position becomes more volatile though this owes much to the presumption continuing of (a) improving vessel productivity and (b) the continuing erosion of interest in these types, especially the small "Handies".

■ Panamax Sector (50-100,000 dwt)

If the supply/demand balance predicted is reproduced in the market place, the Panamax bulk carrier will remain popular. Strong growth in demand is predicted through to 2003, resulting in a very close balance between tonnage supply and the projected requirements in the 50-100,000 dwt range despite the expansion of the fleet which consistently falls short of the predicted requirement. In practice, Panamaxes may not achieve the market share predicted, losing cargo to more economically vulnerable smaller and larger carriers, but the employment prospects appear to be favourable. The implication is that the Panamax is potentially the best performing sector, adopting a general "workhorse" role but not being constrained by restrictive port facilities.

■ Largesize Sector (Over 100,000 dwt)

Combining the Capesize (100-150,000 dwt) and VLBC (150,000+ dwt) sectors produces a segment of the fleet which undergoes considerable expansion through to the end of the present decade and beyond. This translates into a high annual growth rate even with restrained ordering and newbuilding. The forecast requirement for such sizes also grows strongly but is outpaced by supply early on, resulting in a rise in the surplus through to 1998. Thereafter, the gap is narrowed, promoting an improvement in the Cape and upwards size balance. It is predicted to be at its most favourable in 2000. However, an important point to remember here is the commitment of considerable volumes of, mainly newer, vessel tonnage to specific contracts of affreightment. By being route and sailing "tied" the scope for productivity improvements is much less than in other sectors. As a result, the apparent oversupply in practice may be less serious.

5.2 Reconciling the Apparent Anomalies

Any attempt to forecast the supply/demand position within a market as diverse, complex and dynamic as the dry bulk sector is fraught with difficulty and, inevitably, subject to criticism. Most problems occur when supply/demand balance projections are viewed as "an end in themselves". A cursory glance will raise the point - which is perfectly true - that,

Table 5.2
Forecast Dry Bulk Shipping Supply/Demand
by Market Sector
(Million dwt)

Year:	Tonnage Availability	Forecast Demand	Tonnage Balance
Handysize Sector - 10-50,000 dwt			
1993	103.8	91.8	12.0
1994	102.3	92.9	9.4
1995	102.0	93.6	8.4
1996	103.0	92.9	10.1
1997	101.4	93.3	8.1
1998	98.2	93.8	4.4
1999	96.6	93.9	2.7
2000	95.0	94.9	0.1
2001	94.0	95.8	(1.8)
2002	93.5	93.8	(0.3)
2003	93.7	94.7	(1.0)
Panamax Sector - 50-100,000 dwt			
1993	57.1	59.2	(2.1)
1994	58.4	60.8	(2.4)
1995	60.1	61.7	(1.6)
1996	63.4	64.1	(0.7)
1997	64.3	65.3	(1.0)
1998	64.6	69.3	(4.7)
1999	65.1	70.6	(5.5)
2000	65.4	72.3	(6.9)
2001	65.6	72.7	(7.1)
2002	66.6	75.8	(9.2)
2003	68.3	76.6	(8.3)
Largesize Sector - Over 100,000 dwt			
1993	69.0	67.7	1.3
1994	70.4	71.3	(0.9)
1995	74.7	73.9	0.8
1996	76.5	74.7	1.8
1997	78.7	76.7	2.0
1998	81.3	77.0	4.3

Table 5.2 (cont'd)

Year:	Tonnage Availability	Forecast Demand	Tonnage Balance
1999	82.6	79.1	3.5
2000	83.8	83.9	(0.1)
2001	85.9	84.2	1.7
2002	87.8	85.2	2.6
2003	90.7	85.5	5.2

Totals may differ due to rounding.

Source: Drewry Shipping Consultants

'while it is possible to have a tonnage surplus (i.e. an oversupply of bulk carriers), the opposite is an impossibility. As has been noted already, the market's reaction will be to improve operating efficiencies and/or for the trading shares of different sizes of bulk carrier to exhibit greater fluidity. Some of this fluidity will be temporary but some will become permanent market features - guessing which of these will occur in specific trades in, say, 2000 is not a realistic option. Equally, one could develop other analytical "niceties" such as bulk-versus-combined carrier productivity differentials.

However, if certain elements are not kept as constants the projection process cannot offer any real guidelines on **relative changes against the current (known) position.** For instance, one could postulate circumstances where, say, 2 million dwt was visibly in surplus - i.e. laid up. The rest of fleet would be employed and, arguably, this would be "demand". However, if in one case trade was expanding - especially on long haul routes - and there was a degree of port congestion building whereas, in the other case, trade was slackening and time spent "awaiting orders" was on the increase, the movement of rates would be the opposite in the two cases. The approach used to produce Tables 5.1 and 5.2 helps in moving the outlook for freight rates and ship prices into context - which, surely, *is the real purpose in developing supply/demand change pictures* - and, even though there may be a little lack of sophistication (in practice, greater detail may obscure more than it reveals), there are **pointers to both market direction and the pace of this movement.** These perceptions effectively *are* the instruments that the market utilises in practice.

A further, final supporting argument for the approach adopted in this Report is the fact that the "perception response" undergoes a further distortion in practice. This arises due to a substantial, variable - and impossible to quantify - amount of business being concluded under long-term contractual arrangements such as contracts of affreightment (perhaps supported by lengthy period or bareboat charters). The basis for opting for these arrangements, in fact, is market perception, based on charterers' willingness or otherwise to "hedge" between weak and high spot rates by switching to longer term arrangements.

Clearly, therefore, all market participants are aware of the inexact science (even art) that constitutes the "perception response". Naturally, the Consultants accept this with the result that the arguments put forward within Sections 3, 4 and 5 are targeted principally on looking for when market peaks may be building (or troughs deepening) and the pace and severity of these changes. From this, a framework for the revenue aspects considered in Section 8, as well as the ship price questions addressed in Section 6, begins to emerge.