LAKEHEAD UNIVERSITY

MODELLING SHORT-RUN OCEAN BULK CARRIER RATES FOR THE MOVEMENT OF GRAINS

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GLOSSARY OF TERMS AND ABBREVIATIONS*:

[Lloyds Nautical Yearbook,1988]

Berth Terms (b.t.): the rate for loading and/or unloading cargo at a particular dock or port.

Bulk Carriers: open single-deck vessels with large hatchways and holds to facilitate the handling of low density commodities. They vary in size from the mini-bulker of 3000 dwct to 60000 dwct (known as Panamax ships when built specifically to fit the Panama Canal's lock dimensions) to the the large carriers of 150,000 dwct.

Charter-Party (C/P): an agreement wherein the shipowner hires his vessel to the charterer subject to certain conditions.

Deadweight Cargo Tonnage (dwct): this is the actual number of tons of cargo, bunkers, stores, etc. that can be put on board a ship to bring her down to her marks.

Free in and out (f.i.o.): cargo to be loaded and discharged free to the vessel.

Free in and out trimmed (f.i.o.t.): cargo to be loaded, discharged and trimmed free to the vessel.

Freight Rate: the charge for transporting goods by water. (Rates are not based on the chartered vessels' capacities, but on the tonnage of cargo actually transported, capacity utilization is the owner's concern.)

Grain Cargoes: grain cargoes are put into five categories: i) H/S/S - heavy grains, sorgum, soya beans, ii) wheat, iii) soya B/meal - soya bean meal, iv) any grains, v) others.

Lay Days: days allowed by charter for loading and/or unloading cargo. (Charter parties usually specify how long a time is allowed for loading and discharging. If the allowed time is exceeded, the charterer pays a penalty to the shipowner. This lateness is called demurrage and is related to the daily costs of the ship, whereas despatch is a rebate for early loading/unloading.)

Marks: a term used to refer to the ships load-line indications painted on the side of the ship's hull.

Nautical Mile (nm.): a distance of 2,025 yards or approximately 1,852 metres. A normal or "statute" mile is 1,760 yards or approximately 1,609 metres. Therefore, to convert statute miles to nautical miles one multiplies statute miles by approximately 0.869 Nautical miles are used throughout this paper to describe distances.

Oil/Bulk/Ore Carrier (O.B.O.): a ship specially designed to easily and efficiently accommodate the three types of cargo listed, namely oil, grains, and iron ore.

Ore Carriers: single-deck vessels usually strengthened to facilitate the carriage of ores and often having ballast tanks extending for the full length of the hold space along each side. They have no cargo handling equipment.

Prompt (PPT): the date for the loading of a cargo is not specified but is to be done as soon as possible.

Sundays and Holidays Excepted (SHEX): the loading and/or discharging of cargo will not take place on Sundays or on holidays.

Sundays and Holidays Included (SHINC): the loading and/or discharging of cargo will take place on all calendar days including Sundays and holidays.

Tweendeckers (T/D): any ship having one or more decks below the main deck.

Voyage Charters: the shipowner hires his vessel, subject to various conditions, for the carriage of cargo for a single voyage.

*Like any other industry, there is a proliferation of terms, abbreviations and acronyms which one must become familiar with. In shipping this task is formidable. To facilitate the understanding of the paper for those unaccustomed to the shipping industry, effort has been made to explain that which might be unfamiliar.

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To my parents and siblings

ABSTRACT

This paper, utilizing a complete market data set from Drewry Shipping Consultants, determines short-run cost functions for dry bulk carriers. Specification of the short-run to be one month and standard log-log functional form give estimations supporting average elasticities of the magnitude .45 for voyage length and -.56 for vessel size.

INTRODUCTION

The delivery of bulk commodities such as grain requires a fully integrated multi-modal transportation network. To design and utilize this network properly it is necessary for policy makers to understand the behaviour of the market for each mode of transportation.

The structure of the international dry bulk market "... is commonly regarded as freely competitive with rates set by market forces, that is, the free interplay of demand and supply." [ABRAHAMSSON, 1980] Traditionally, the dry bulk market has been regarded as a textbook example of a perfectly competitive market. The standardization of and ready availability of charter party information has meant there is essentially perfect information in the dry bulk market. Furthermore, there are numerous buyers (charterers) and sellers (shipowners) operating in an open, almost auction like, atmosphere. Entry, often with the help of government, and exit, the laying up or scrapping of a ship, are relatively easily accomplished. Finally, the services provided by the shipowners are basically homogeneous since the ships and their cargoes do not differ to any significant degree. Historically, the continual collapse of attempted

cartels [ABRAHAMSSON, 1980] as well as chronic excess capacity illustrates a market that has been described as having almost destructive competition [DREWRY, 1987].

The basic objective of this paper is to use market data to construct a short run model of dry bulk carrier cost functions. The analysis of the hypothesized competitive structure of the market will be compared and contrasted with past research done on this topic. In particular, the statistical analysis of the cost function will hopefully improve on previous work due to the defining of the short run to be a one month period, not a one year period [deBorger and Nonneman,1981]. The strictness of having a one month short run is necessary because of the potential volatility of costs even over just one year [BONSOR, 1984]. Additionally, the ramifications of the statistical results obtained will be used as a basis for a discussion of the continued viability of the Port of Thunder Bay.

THE DATA

> "It is ... difficult to assess economic performance for the shipping industry ... because of the absence of a detailed data set pertaining to the costs of providing shipping services." [BONSOR, p.108, 1984]

Actually the availability of good data is often a problem for all researchers. This is not the case in this instance. An extensive data set

was obtained from Drewry Shipping Consultants which contains all the basic dry bulk charter information necessary to estimate cost functions from market data. Two months in 1985 were used, namely May and November, which represent active but different seasons for dry bulk carriers. The use of the entire population of dry bulk charters for the particular months in question made the task of finalizing the data used in the regression equation quite onerous. To reiterate, the data sets used in this paper are essentially populations, not samples, representing all free-world dry bulk traffic chartered in the months of May 1985 and November 1985. An appendix has been included with this paper since the actual data sets are quite large and the various techniques used to derive the final data are quite numerous. Additionally, data collection problems which may be considered important or interesting to some readers are fully documented in the appendix.

Table One, on page four, shows the basic statistical information of the two data sets. Consider just grain for the moment in a little comparison. In May of 1985, the average voyage length was 5,117 nm, average cargo size was 25,726 dwct and the rate was on average 18.78 $/T. In November of that same year, average voyage length had increased to 5,507 nm and average cargo size had increased to 33,887 dwct. The average rate, on the other hand, had fallen to 14.49 $/T. Heavier loads were being transported farther on average for 4.29 $/T less. Apparently conditions of demand, supply and/or voyage costs had changed dramatically in six months. This is clear evidence of the need to reduce the short run to one month at the longest.

TABLE ONE: Basic Statistical Information

Basic Statistical Information: May, 1985 Data Set

COMMODITY	NUMBER OF FIXTURES	AVERAGE RATE ($/T)	AVG. VOYAGE LENGTH (NM)	AVG. CARGO SIZE (DWCT)	AVG. LOADING AND DISCHARGING (DAYS)
ALL COMM. AGGREGATED	186	14.40 (9.16)	5,544.0 (3,130.2)	50,048 (39,864)	13.25 (8.83)
GRAIN	91	18.78 (8.21)	5,116.9 (2,570.9)	25,726 (14,743)	16.23 (8.48)
COAL	42	9.35 (3.32)	7,314.5 (3,777.6)	76,571 (31,266)	8.21 (2.77)
IRON ORE	36	5.70 (2.34)	5,098.6 (3,011.5)	98,222 (35,206)	6.27 (2.74)
SUGAR	17	21.85 (12.06)	4,399.4 (2,932.8)	12,696 (4,512)	24.48 (10.06)

Basic Statistical Information: November, 1985 Data Set

COMMODITY	NUMBER OF FIXTURES	AVERAGE RATE ($/T)	AVG. VOYAGE LENGTH (NM)	AVG. CARGO SIZE (DWCT)	AVG. LOADING AND DISCHARGING (DAYS)
ALL COMM. AGGREGATED	229	12.33 (6.38)	5,654.0 (2,892.5)	47,244 (30,116)	14.31 (8.53)
GRAIN	149	14.49 (5.58)	5,506.8 (2,891.2)	33,887 (16,227)	17.11 (8.10)
COAL	40	7.82 (2.64)	5,987.8 (2,767.2)	63,600 (24,044)	8.50 (3.60)
IRON ORE	33	5.45 (1.96)	5,480.5 (2,968.3)	94,394 (29,361)	5.95 (1.22)
SUGAR	7	24.63 (5.27)	7,697.0 (2,943.3)	15,829 (4,749)	27.46 (7.24)

NOTE: STANDARD DEVIATIONS IN PARENTHESES.

THE MODEL

It would seem a prima facia case is developing that requires the short run for dry bulk carriers to be of a maximum duration of one month. Theoretically a properly specified short run requires that input prices are assumed to be fixed. In shipping these inputs include (i) voyage costs such as port charges and the cost of fuel and (ii) operating costs such as crew, repair and maintenance, insurance, and administration. Outside of the short run 'window' of one month, one or more of these cost components can shift, sometimes dramatically. The best example of cost volatility is a sudden change in oil prices which can cause total voyage costs to more than double quite easily [Bonsor, 1984].

In the short run it is postulated that a shipowner upon entering a charter party will take the following factors into consideration when setting the freight rate (RATE):

i) the length of the voyage (VOYLEN)

ii) the size of the cargo to be transported (CARSIZ)

iii) the terms of the loading and discharging of cargo (TERMS)

iv) whether a canal must be traversed (CANAL)

v) type of cargo to be transported (GRAIN, COAL, IRON ORE, SUGAR)

These are the only five variables which will be included in the short run cost function estimation. The number of ports of call will be left out since this variable should be highly multi-collinear with (i) voyage length and (iii) terms. It should make no difference to the shipowner if the voyage is:

a) 1,000 nm then 5 days in port then another 1,000 nm and 5 days in port; versus

b) 2,000 nm then 10 days in port.

Therefore as long as the port times and voyage distances are determined accurately, multiple port calls should not have to be included. Furthermore, there were very few (less than 5%) multiple port calls in the data. Other considerations such as the age or technological level of the ship are unimportant, in the short run it is only necessary to meet average variable cost. If this cannot be done, the ship will simply not be offered in service.

Following the basic functional form commonly used in this type of analysis [deBorger and Nonneman, 1981], an underlying multiplicative model is specified.t

$$RATE = \beta_0 (VOYLEN)^{\beta_1} (CARSIZ)^{\beta_2} (TERMS)^{\beta_3} \Sigma^{e^*} \quad \text{(EQ'N. 1)}$$

(*The assumption is that error enters as a multiplicative term, though it is understood that there maybe a theoretical argument in econometrics underlying this type of assumption. However, error is not assumed to be normal here, only multiplicative.)

To determine elasticities directly, equation 1 is transformed by taking natural logs of both sides, giving:

$$\ln(RATE) = \ln\beta_0 + \beta_1 \ln(VOYLEN) + \beta_2 \ln(CARSIZ) + \beta_3 \ln(TERMS) + \Sigma \quad \text{(EQ'N. 2)}$$

or with new variable names and the dummy variables added:

$$LRATE = CONSTANT + \beta_1(LVOYLEN) + \beta_2(LCARSIZ) + \beta_3(LTERMS) + \beta_4(CANAL) + \beta_5(COAL) + \beta_6(IRONORE) + \beta_7(SUGAR) + \Sigma \quad \text{(EQ'N. 3)}$$

The use of equation 3 in the regression allows us to determine elasticities directly. These elasticities are deemed to be constant [KMENTA, 1971] which supports the theory of the short run, that being that a 'snapshot' in time will have specific demand and supply characteristics. Concerning the specific coefficients:

- β_1 is hypothesized to be positive but less than one, as voyage length increases, the rate charged will increase (i.e. economies of scale in distance).
- β_2 is hypothesized to be negative but greater than negative one, as cargo size increases, the rate charged will decrease (i.e. economies of size in cargo).
- β_3 is hypothesized to be positive, as number of days in port increases, the rate charged will increase.
- β_4 is hypothesized to be positive, canal passage adds to time and cost of voyage, therefore the rate charged will increase. The canal variable is an intercept dummy because it places a fixed lump sum on to the rate.
- $\beta_5, \beta_6, \beta_7$ are hypothesized to be not significantly different from zero.

An additional benefit of the transformation of the equation to log-log form is that all the data are now in an approximate range from 0 to 12, instead of approximately 1.0 to 160,000. This should help to reduce any heteroskedasticity problems inherent in cross-sectional data sets [STUDENMUND AND CASSIDY, 1987]. This will not preclude the use of White's [1980] Heteroskedastic - Consistent Covariance matrix estimation to correct the estimates for an unknown form of heteroskedasticity. Heteroskedasticity is suspected, though its form can only be speculated at, because of the huge differences in the magnitudes of the original variables. These magnitude differences create uncertainty about the size of the error variances when these variables are measured.

Another potential problem in our regression is multicollinearity of two of our variables, namely terms (TERMS), and cargo size (CARSIZ). Clearly as cargo size increases, ceteris paribus, the terms will increase also. Port efficiencies vary widely though and the variable TERMS is picking this up as well.

The potential for heteroskedastic and/or multicollinearity problems was realized when equation 3 was estimated by Ordinary Least Squares for both May 1985 and November 1985. The results of these regressions are presented in the next section.

RESULTS

Table two presents the results of the Ordinary Least Squares estimation (using White's Heteroskedastic-Consistent Covariance Matrix

and LOGLOG specification) performed on the two separate data sets. As noted all estimated coefficients were significant at the 99% level of confidence.

TABLE TWO: Regression Results

Dependent Variable: LRATE

Technique: OLS with Heteroskedastic-Consistent Covariance Matrix and LOGLOG specification

	MAY 1985			NOVEMBER 1985		
VARIABLES	ESTIMATED COEFFICIENT		t-STAT	ESTIMATED COEFFICIENT		t-STAT
CONSTANT	2.556	(.443)	5.77*	4.400	(.285)	15.41
LVOYLEN	0.581	(.024)	23.79	0.369	(.031)	11.78
LCARSIZ	-0.544	(.031)	-17.34	-0.567	(.021)	-27.37
LTERMS	0.287	(.037)	7.75	0.310	(.022)	14.21
CANAL	0.110	(.040)	2.76	0.22	(.029)	7.75
ADJUSTED R^2	.874			.915		
OBSERVATIONS	186			229		

NOTE: STANDARD DEVIATIONS IN PARENTHESES
*ALL COEFFICIENTS ARE SIGNIFICANTLY DIFFERENT FROM ZERO AT THE 99% LEVEL

The estimated coefficients when coal, ironore and sugar were dummied into the equation were insignificant at the 95% level of confidence. It is

encouraging that the specification of the data into disaggregated commodity groups is not justifiable. The cargoes are all basically one homogeneous product competing to be transported by the same ships. Even the fact that iron ore is usually transported by slightly different ships, there are enough O.B.O.'s and sufficient competitive pressure that vessels primarily designed for ore haulage can move economically into other bulk markets in time of high demand. Further study would presumably show that once adjusted for cargo density differences, the rates for the various bulk cargoes would converge even closer, this analysis is beyond the scope of this paper however.

The results of the estimation indicate that the elasticity with respect to voyage distance is significantly lower when derived from a market data cost function than those determined by engineering cost functions. This comparison, referred to in the following chart, is made with the results from the work of deBorger and Nonneman, Goss and Jones, and Heaver.

ELASTICITY COMPARISON

	VOYAGE LENGTH ELASTICITIES	CARGO SIZE ELASTICITIES
HEAVER, GOSS & JONES (FROM ENGINEERING COST FUNCTIONS)	.6 TO 1.0 (RANGE)	-.3 TO -.7 (RANGE)
dEBORGER AND NONNEMAN (MARKET DATA COST FUNCTIONS, QUASI-SHORT RUN)	.38 (AVERAGE)	-0.45 (AVERAGE)
CURRENT RESULTS (MARKET DATA COST FUNCTIONS, SHORT-RUN)	.45 (AVG) (.37 TO .58 RANGE)	-0.56 (AVG) (-.54 TO -.59 RANGE)

The following is put forth as a possible explanation of why estimated market data elasticities for voyage length are more accurate than those estimated by cost engineering methods. Engineering cost functions would predict that the movement of bulk commodities would be divided up in a sense into one or more markets. Large ships would dominate long voyage routes using economies of cargo size to overcome higher unit voyage and operating costs. That this does not really happen is because of canals. Once a ship reaches a certain size it is choked off of numerous routes. For example, grain from the United States Gulf (USG) destined for Japan, were it to be transported around South America or South Africa, would most probably have to be of incredible size to compete with those ships travelling from USG to Japan via the Panama Canal. It is postulated then that the engineering function elasticities for voyage length are not wrong per se, it is just that the functions do not properly capture the characteristics of the transportation network. Whereas large planes and small planes would fly the same distance when competing on a route, large ships and smaller ships often are not competing over the same route but simply over the same departure and destination points. The fleet mix, in terms of vessel size, may be more or less homogeneous over all routes. This scenario would explain the lower voyage length elasticities predicted by market data estimation versus those by engineering cost estimation.

Prior concerns about multicollinearity between TERMS and CARSIZ appear to be somewhat justified. The single correlation coefficients between TERMS and CARSIZ were of the order 0.4 to 0.5, which are not cause to be terribly troubled. The strong significance of the results imply

that this level of possible multicollinearity can be tolerated. On a theoretical level it might be interesting to determine a correctly specified linear combination of the two variables. While this might correct for any multicollinearity it would preclude a direct estimate of vessel size elasticity.

The corresponding data set of a third month (December,1985) was made available and when it was estimated in a similar fashion the results were quite similar.

	Fixtures	Average Rate($/T)	Avg. Voyage Length(NM)	Avg. Cargo Size(DWCT)	Avg. Loading & Unloading (Days)
All Commod.	147	13.07 (6.36)	5152.3 (2764.4)	41868 (29650)	15.86 (7.48)

(Standard deviations in parentheses) Adjusted R^2=.885

	CONSTANT	LVOYLEN	LCARSIZ	LTERMS	CANAL
Estimated Coefficient	3.37	0.391	-0.49	0.346	0.10
t-STAT	6.43	13.37	-12.38	7.18	1.99

The estimation provides a good statistical fit overall. Voyage length and cargo size elasticities are comparable to those of May and November. Also the basic statistics of average rate, voyage length, etc. are in the same range. Two points can be made here:

i) Observable differences in data and coefficient magnitudes give further credence to the practice of specifying the short-run to be one month.

ii) The basic estimating equation and procedure are strong in their

ability to accurately model short-run costs. This analysis could probably be used with a high degree of reliability to examine cross-sectional dry bulk data sets over any number of years.

IMPLICATIONS FOR THE PORT OF THUNDER BAY

The Port of Thunder Bay is at an important break-of-bulk point on one of the world's largest dry bulk transportation routes. As Canadian grain markets tilt increasingly towards the Pacific Rim and Asia, there has been a noticeable shift in the flow of grain from Thunder Bay to Canadian west coast ports. Armed with the quantifiable knowledge that the international bulk carrier market is highly competitive and appears as though it will remain thus, it may be possible to illustrate to policy makers that the Port of Thunder Bay should be utilized more than it currently is. In transportation, the shortest distance between two points is not the shortest distance, but rather the cheapest distance. Consider a hypothetical example: suppose grain from the area of the Alberta-Saskatchewan border costs $10.00 more per ton to transport by rail to Vancouver and load on a ship than it does to transport to the mouth of the St. Lawrence and put on a ship (costs being referred to here are the real costs of transportation, not costs based on administered grain railway rates). This would mean that the cargo from the mouth of the St. Lawrence can be transported on the ocean for however far a $10.00 per ton rate will take it before an equal amount of money has been spent on the transportation of each cargo.

To continue the example, suppose the ship leaving the mouth of the St. Lawrence at the competitive rate of $10.00 per ton, can traverse the Panama Canal and get to a point in the Pacific where the remaining distance to Yokohama, Japan is the same as the distance from Vancouver to Yokohama. Clearly this would mean from an economic efficiency point of view that the Canadian taxpayer should be indifferent as to whether the grain in question moves to Japan by going east or west. Of course, this is only a hypothetical example, it is highly unlikely that Canadian grain destined for Japan should not move through west coast ports. The point being made however is that an optimal transportation network should move commodities from point A to point B by the least expensive route. The key to this puzzle is to identify the real costs of domestic grain movements by rail and by seaway.

The implications of this paper for the port of Thunder Bay, in particular, and the St. Lawrence Seaway in general, is that when costs are being modelled for a totally integrated domestic and international network, the ocean going dry bulk carrier market can be considered competitive. Further, quite accurate cost function models for the dry bulk market are possible, making good rate forecasting an achievable goal. The upshot is that the optimal division of Canadian grain into east and west movements can be accurately determined.

CONCLUSIONS

In general, the results support the hypothesis that the ocean going dry

bulk carrier market is a highly competitive one. Were rates to be set by shipping conferences for example, it is highly unlikely that the statistical fits estimated in this paper would be anywhere near as strong. Furthermore, the elasticities of voyage length and cargo size correspond well to previous studies. In this sense the results build onto and support previous research. deBorger and Nonneman saw their results as having implications regarding the optimal size of proposed new port facilities. In this paper, the results have been seen to be a necessary part of determining the long term viability of a port. No doubt there are other ways the basic results can be used to argue for or against many issues in transportation economics.

The statistical fit of the equation and the statistical significance of the coefficients appear to be better than past studies of the dry bulk market. The reason for this is probably that the short run was specified to be a month rather than a year, which satisfies the economic definition of a short run much more closely in this case. Also the use of population data sets, rather than samples, added to the significance of the results. An interesting follow up project would be to gather more data sets and pool this cross-section data in an attempt to define a long run cost function based on market data.

APPENDIX: DATA COLLECTION NOTES AND DATA

The following data is a listing of all the individual observations for the nine variables utilized in this study. Following is a list of these nine variables with an accompanying explanation of (i) the units each variable is measured in, (ii) discussion of the techniques employed to derive these values, and (iii) implications for possible errors resulting from the nature in which these variables are measured.

1) FIXTURE: a number assigned by the author to each individual set of reported charter party data. No problems here, this is simply an ordering of the data used. Primarily it is used to resort the data file back to its original form if and when it is sorted in the Shazam computer package according to the magnitude of another variable.

2) RATE: the rate is readily available from the published data and is quoted in U.S. dollars per ton. A few of the rates were given in British pounds which were adjusted using the prevailing exchange rate at the time to transform the rate into U.S. $. Also, some rates were quoted in total price for the charter, these observations were simply divided by the tonnage of the cargo to arrive at a $/T rate. It is assumed that these rates are quite accurate since people seldom make mistakes when it comes to dealing with money.

3) VOYLEN: the voyage length is the voyage distance between the port

of cargo loading and the port of cargo discharge, given in nautical miles. (1 nautical mile = 2,025 yards = 1.852 kilometres, whereas 1 statute mile = 1,760 yards = 1.609 kilometres, meaning any statute mile distances were multiplied by .869 to get nautical miles) This variable was by far the most difficult to compute. The multitude of different ports specified in the charters meant that first all these places had to be found on a map. Port Marghera, Prai, Guanta and Iskenderun were just a few of the more obscure place names that had to be discovered. From here, the distance between the two ports had to be determined. Extensive reference searching did not reveal a chart with shipping distances between all world ports. However, data is readily available for primary shipping routes from which it is possible to determine many secondary routes. Some voyages, or sections thereof, had to be estimated by direct measurement in atlases.

Further, for those voyages specified to be loading and/or unloading at more than one port, the distance between those ports was added into the voyage length. Also, there were some voyages specified to a range instead of a port, the Antwerp - Rotterdam - Amsterdam (ARA Range) being the most common. In these cases, the distance to mid-point on the range was determined, therefore any difference from actual distances will on average be small and will tend to cancel each other out. Essentially, all this distance calculating has meant that a good chart for many routes has been developed which can be used as an information source in further work

of this type.

A variable called trip time could be determined, these values are given for major cargo routes. Of course it would most certainly be highly multi-collinear with the voyage length. The assumption being made by leaving out this variable (TRIP TIME) is that a nautical mile is a nautical mile, that sailing around the Great Barrier Reef is the same as sailing the North Sea. Although distance charts give alternative distances for some routes depending on the monsoon season, it seems fair to exclude trip time from the regression. All in all, the voyage distances should be quite accurate, the four or five references used seemed to agree dramatically on distances of major routes and the secondary routes were meticulously determined and checked.

4) CARSIZ: the cargo size is readily available from the published data. The cargo size is given in dead weight cargo tonnage (dwct). The data seems to suggest that these measurements are rounded off to the nearest ton, or perhaps even the nearest five tons for iron ore. To support this contention, a few cargo sizes are given to the exact ton, for instance 8,928 dwct, while neighbouring observations are 7,000 dwct and 10,000 dwct. This type of rounding may contribute to the heteroskedasticity problems that the regression technique utilized in this paper takes into account. Also evident from the data is the fact that the cargo infrequently does not exhaust the capacity of the ship. Due to the fact that these cases are small in number (1%

- 2%) and that capacity, even when not reached, is quite close to a maximum (i.e. within 95%), all ships are considered to be fully loaded. This would seem to be a relatively inconsequential assumption to make.

5) TERMS: the terms published are the loading and unloading rates and conditions. Typically, the reported rates and conditions must be manipulated to get a number for the total days that the ship can expect to be in port(s).

Here are two examples which illustrate the typical terms calculation:

Ex. 1

A 50,000 dwct charter is reported to have the following terms:

10,000 / 6,500 FIO

This means the ship will be loaded at the rate of 10,000 dwct/day, therefore loading will take 5.0 days (i.e. 50,000 dwct ÷ 10,000 dwct/day = 5 days)

Unloading (most often slower) will be at the rate of 6,500 dwct/day, therefore taking 7.7 days to discharge the cargo.

FIO, free in and out means that the charterer, not the shipowner, will pay the port charges at both ends of the voyage. This is the case almost always, there were no terms specified in this data where the shipowner would pay the port charges.

Therefore, the total terms are recorded in the data set as 5.0 + 7.7 = 12.7 days. The shipowner can expect, on average, to have his ship in

port 12.7 days. Variances from this result in demurrage or despatch payments.

Ex. 2

A 52,000 dwct charter is reported to have the following terms:

11 SHEX FIOT

In this case the total number of loading and discharging days are given, but the Sundays and Holidays excluded has added a new wrinkle. On average, a shipowner will waste some time being laid up in a port on a Sunday or a holiday. With fifty-two Sundays in a year and maybe six or seven holidays a year, docking under SHEX conditions can be expected to add approximately .16 of a day onto each day in port, (i.e. 58/365 = .156 and 59/365 = .162).

Therefore the 11 SHEX is multiplied by 1.16 to give terms of 12.76 for the data set.

The T in FIOT stands for free trimming of the load. This is an obvious, but small, benefit for the shipowner. Theoretically, it could be dummied into the regression equation but it is not considered to be a significant enough factor to have been recorded in this data set.

The foregoing described how the variable terms was calculated. It can be seen now that terms is a good proxy for port efficiency, since it is based on the loading and discharging rates of the ports in question. However, if all ports were equally efficient at loading and discharging cargo, then terms would be perfectly multi-collinear with cargo size. On the other hand, if cargoes were all the same size then terms would be perfectly

multi-collinear with relative port efficiencies. While it is obvious that terms will be partially multi-collinear with cargo size, terms are retained in the regression because they are a valuable proxy for port efficiency.

6) CANAL: this is a dummy variable used to indicate if the voyage traverses a canal. Canals have been defined to be Kiel, Suez, Panama and St. Lawrence Seaway. Canal passage was determined once the voyage route had been established (i.e. VOYLEN). Whether the voyage will pass through a canal or not is no doubt a significant variable to consider. The current treatment of it as a dummy variable implies that each canal has the same effect on rate determination. Potentially, the data could be run with each particular canal dummied in to determine if there was a significant difference from one canal to another. This modification does not seem to be a necessary one at this time.

7), 8), 9) COAL, IRONORE, SUGAR: dummies were included for these three commodity groups based on the reported cargo types. Grain, coal, iron ore and sugar were found to be the four major bulk quantities, comprising over 90% of the bulk market for the given time periods. Providing dummies in this manner allows the data to be disaggregated by commodity group and examined for any significant structural differences in the way rates are set.

10) OTHERS: (i) LAY DAYS: lay days were specified in the charter party data to the extent that the range of days when the cargo was to be loaded was given. Lay days are sometimes quite restrictive (eg. 20-22/5/85, meaning the loading must be done on May 20, 21, and 22) and other times are quite flexible (eg. 5/85, meaning load the cargo in May). Presumably one could model the number of loading lay days as a variable which would then be a proxy for a ship's scheduling flexibility. Consideration of flexibility has probably already been taken into account by the shipowner before agreeing to the charter party.

(ii) TWEENDECKERS: a small number of ships were specified to be tweendeckers. On average, these ships would be more difficult to load and unload. The small number precludes any meaningful examination of whether these ships actually have higher rates.

(iii) Finally a small percentage of data sets were rejected because of incomplete information on rates, terms, cargo size or destination - departure points. This was only 23 out of 585 cross-sectional data sets (3.9%), so it is unlikely that their inclusion would have affected the results obtained to any significant degree.

To get from the published Drewry data to a listing of the nine variables utilized was more of a time consuming exercise in the tedious business of data collection than had first been realized. However, the interesting business of discovering exactly where all the ports of the world are made the job less onerous. It would be nice if the data source

could be accessed directly through a computer, but it is understood that the shipping industry is not especially interested in making its business easily known to industry outsiders.

It appears as though all readily identifiable potential errors in the data are relatively small and would tend to cancel themselves out, that is they exhibit characteristics of well-behaved normal errors.

The data sets created are assumed to be quite reliable overall and appear to have been the main contributor to significant regression results.

FIXTURE	RATE	VOYAGE LENGTH	CARGO SIZE	TERMS	CANAL	COAL	IRON ORE	SUGAR
1.0	20.25	4427.0	16500.0	6.0	1.0	0.0	0.0	0.0
2.0	18.00	4427.0	16500.0	6.0	1.0	0.0	0.0	0.0
3.0	18.00	4427.0	25000.0	7.0	1.0	0.0	0.0	0.0
4.0	16.04	4357.0	24000.0	7.0	1.0	0.0	0.0	0.0
5.0	35.00	4445.0	5250.0	3.3	1.0	0.0	0.0	0.0
6.0	18.00	4407.0	16500.0	6.0	1.0	0.0	0.0	0.0
7.0	28.50	4910.0	15000.0	21.8	1.0	0.0	0.0	0.0
8.0	30.50	4910.0	14000.0	10.0	1.0	0.0	0.0	0.0
9.0	33.00	4135.0	15000.0	29.0	1.0	0.0	0.0	0.0
10.0	28.00	4910.0	13000.0	19.3	1.0	0.0	0.0	0.0
11.0	33.25	4910.0	16500.0	23.6	1.0	0.0	0.0	0.0
12.0	28.00	4910.0	12800.0	19.0	1.0	0.0	0.0	0.0
13.0	29.65	4910.0	16200.0	24.3	1.0	0.0	0.0	0.0
14.0	34.00	4685.0	15000.0	29.0	1.0	0.0	0.0	0.0
15.0	20.00	4488.0	18000.0	16.0	1.0	0.0	0.0	0.0
16.0	13.90	3615.0	16500.0	9.5	0.0	0.0	0.0	0.0
17.0	9.00	3135.0	40000.0	10.0	0.0	0.0	0.0	0.0
18.0	33.80	6581.0	19500.0	26.5	1.0	0.0	0.0	0.0
19.0	14.50	4149.0	27000.0	18.5	0.0	0.0	0.0	0.0
20.0	51.50	3160.0	30000.0	13.5	0.0	0.0	0.0	0.0
21.0	35.00	0.0	22700.0	0.0	0.0	0.0	0.0	0.0
22.0	35.00	0.0	18000.0	0.0	0.0	0.0	0.0	0.0
23.0	10.40	4880.0	70000.0	0.0	0.0	0.0	0.0	0.0
24.0	8.85	4880.0	55000.0	10.5	0.0	0.0	0.0	0.0
25.0	11.00	4880.0	58000.0	10.0	0.0	0.0	0.0	0.0
26.0	10.25	4880.0	53000.0	10.0	0.0	0.0	0.0	0.0
27.0	10.40	4880.0	72500.0	12.0	0.0	0.0	0.0	0.0
28.0	8.50	4880.0	50000.0	11.0	0.0	0.0	0.0	0.0
29.0	18.00	6505.0	25000.0	13.3	0.0	0.0	0.0	0.0
30.0	29.23	6455.0	13000.0	26.0	0.0	0.0	0.0	0.0
31.0	13.50	4509.0	20000.0	10.0	0.0	0.0	0.0	0.0
32.0	13.50	4509.0	20000.0	10.0	0.0	0.0	0.0	0.0
33.0	16.00	4509.0	20000.0	9.0	0.0	0.0	0.0	0.0
34.0	20.70	4509.0	20000.0	14.0	0.0	0.0	0.0	0.0
35.0	18.70	4509.0	20000.0	14.0	0.0	0.0	0.0	0.0
36.0	14.50	4509.0	20000.0	14.0	0.0	0.0	0.0	0.0
37.0	23.90	4559.0	15690.0	13.6	0.0	0.0	0.0	0.0
38.0	21.75	4559.0	15960.0	13.8	0.0	0.0	0.0	0.0
39.0	11.50	0.0	12000.0	10.0	0.0	0.0	0.0	0.0
40.0	22.80	1115.0	4657.0	6.5	0.0	0.0	0.0	0.0
41.0	14.50	0.0	5500.0	6.7	0.0	0.0	0.0	0.0
42.0	7.75	798.0	20000.0	20.0	0.0	0.0	0.0	0.0
43.0	7.75	798.0	20000.0	20.0	0.0	0.0	0.0	0.0
44.0	23.00	1390.0	5000.0	6.2	0.0	0.0	0.0	0.0
45.0	23.00	1390.0	5000.0	6.2	0.0	0.0	0.0	0.0
46.0	12.50	1860.0	20000.0	24.0	0.0	0.0	0.0	0.0
47.0	11.75	1860.0	21000.0	26.0	0.0	0.0	0.0	0.0
48.0	11.75	1860.0	34000.0	39.0	0.0	0.0	0.0	0.0
49.0	11.25	1860.0	23000.0	28.0	0.0	0.0	0.0	0.0
50.0	12.90	1860.0	21000.0	26.0	0.0	0.0	0.0	0.0
51.0	11.00	1860.0	22000.0	26.0	0.0	0.0	0.0	0.0
52.0	29.95	6715.0	12500.0	15.6	0.0	0.0	0.0	0.0
53.0	26.50	5749.0	15000.0	14.0	0.0	0.0	0.0	0.0
54.0	17.50	8088.0	25000.0	18.5	0.0	0.0	0.0	0.0
55.0	23.00	7196.0	34200.0	51.4	1.0	0.0	0.0	0.0
56.0	23.00	7196.0	29186.0	43.8	1.0	0.0	0.0	0.0

57.0	23.50	7196.0	13000.0	11.5	1.0	0.0	0.0	0.0	25
58.0	27.90	0.0	35000.0	0.0	1.0	0.0	0.0	0.0	
59.0	37.00	10016.0	11342.0	5.8	0.0	0.0	0.0	0.0	
60.0	16.10	11005.0	50000.0	12.7	1.0	0.0	0.0	0.0	
61.0	15.50	9278.0	47000.0	11.0	1.0	0.0	0.0	0.0	
62.0	15.75	9278.0	52000.0	11.0	1.0	0.0	0.0	0.0	
63.0	15.10	9278.0	45000.0	10.0	1.0	0.0	0.0	0.0	
64.0	15.00	9278.0	52000.0	13.8	1.0	0.0	0.0	0.0	
65.0	14.00	9278.0	52000.0	13.8	1.0	0.0	0.0	0.0	
66.0	16.90	9278.0	33000.0	8.0	1.0	0.0	0.0	0.0	
67.0	14.00	9278.0	52000.0	11.0	1.0	0.0	0.0	0.0	
68.0	14.00	9278.0	52000.0	11.0	1.0	0.0	0.0	0.0	
69.0	16.90	9278.0	33000.0	8.0	1.0	0.0	0.0	0.0	
70.0	30.00	10949.0	20000.0	25.0	1.0	0.0	0.0	0.0	
71.0	14.25	5602.0	50000.0	17.0	0.0	0.0	0.0	0.0	
72.0	12.50	5602.0	50000.0	15.0	0.0	0.0	0.0	0.0	
73.0	15.75	5205.0	28000.0	23.4	0.0	0.0	0.0	0.0	
74.0	10.28	5889.0	53487.0	0.0	0.0	0.0	0.0	0.0	
75.0	18.00	5259.0	28000.0	16.0	0.0	0.0	0.0	0.0	
76.0	21.25	6273.0	25000.0	15.0	0.0	0.0	0.0	0.0	
77.0	18.50	6273.0	28000.0	14.9	0.0	0.0	0.0	0.0	
78.0	22.50	6814.0	25000.0	23.0	0.0	0.0	0.0	0.0	
79.0	23.33	11098.0	33000.0	14.9	0.0	0.0	0.0	0.0	
80.0	16.00	6345.0	49000.0	16.0	0.0	0.0	0.0	0.0	
81.0	16.00	6345.0	52500.0	17.0	0.0	0.0	0.0	0.0	
82.0	27.50	6830.0	14000.0	11.7	0.0	0.0	0.0	0.0	
83.0	21.50	5365.0	25000.0	20.8	0.0	0.0	0.0	0.0	
84.0	23.75	6005.0	16000.0	13.3	0.0	0.0	0.0	0.0	
85.0	21.50	6225.0	25000.0	17.5	0.0	0.0	0.0	0.0	
86.0	15.25	2046.0	15000.0	29.0	0.0	0.0	0.0	0.0	
87.0	15.75	1716.0	15000.0	30.0	0.0	0.0	0.0	0.0	
88.0	9.00	1990.0	15000.0	9.7	0.0	0.0	0.0	0.0	
89.0	12.75	2680.0	13000.0	13.4	0.0	0.0	0.0	0.0	
90.0	10.50	1510.0	14250.0	12.4	0.0	0.0	0.0	0.0	
91.0	11.00	2976.0	31000.0	16.5	0.0	0.0	0.0	0.0	
92.0	6.00	1130.0	30000.0	12.0	0.0	0.0	0.0	0.0	
93.0	26.00	5800.0	15000.0	13.8	1.0	0.0	0.0	0.0	
94.0	7.65	2887.0	15000.0	8.0	0.0	0.0	0.0	0.0	
95.0	21.43	8000.0	14000.0	26.0	0.0	0.0	0.0	0.0	
96.0	6.75	2887.0	12000.0	19.0	0.0	0.0	0.0	0.0	
97.0	7.75	2781.0	15000.0	11.3	0.0	0.0	0.0	0.0	
98.0	16.00	2303.0	14000.0	20.5	0.0	0.0	0.0	0.0	
99.0	39.75	6814.0	14000.0	37.3	0.0	0.0	0.0	1.0	
100.0	30.25	4657.0	15700.0	41.8	0.0	0.0	0.0	1.0	
101.0	44.00	9541.0	11600.0	31.0	1.0	0.0	0.0	1.0	
102.0	32.50	5904.0	12000.0	26.0	0.0	0.0	0.0	1.0	
103.0	10.00	0.0	9400.0	0.0	0.0	0.0	0.0	1.0	
104.0	11.25	1402.0	7450.0	15.6	0.0	0.0	0.0	1.0	
105.0	8.50	1338.0	15000.0	31.4	0.0	0.0	0.0	1.0	
106.0	9.00	1338.0	5000.0	10.4	0.0	0.0	0.0	1.0	
107.0	9.50	1338.0	10000.0	21.0	0.0	0.0	0.0	1.0	
108.0	31.00	9680.0	25000.0	32.5	1.0	0.0	0.0	1.0	
109.0	39.75	6550.0	12000.0	32.0	0.0	0.0	0.0	1.0	
110.0	12.00	1830.0	6284.0	8.4	1.0	0.0	0.0	1.0	
111.0	16.00	2120.0	16300.0	34.2	1.0	0.0	0.0	1.0	
112.0	14.50	2173.0	11000.0	22.0	1.0	0.0	0.0	1.0	
113.0	26.43	8390.0	14000.0	28.0	0.0	0.0	0.0	1.0	
114.0	12.25	0.0	12600.0	0.0	0.0	0.0	0.0	1.0	
115.0	15.50	3905.0	14500.0	16.0	0.0	0.0	0.0	1.0	
116.0	15.75	3905.0	13000.0	14.3	0.0	0.0	0.0	1.0	

117.0	15.75	3905.0	13000.0	14.3	0.0	0.0	0.0	1.0	
118.0	2.60	1305.0	90000.0	7.0	0.0	0.0	1.0	0.0	
119.0	2.48	1305.0	90000.0	5.0	0.0	0.0	1.0	0.0	
120.0	2.25	1305.0	75000.0	5.0	0.0	0.0	1.0	0.0	
121.0	2.10	1305.0	100000.0	5.0	0.0	0.0	1.0	0.0	
122.0	2.10	1305.0	100000.0	5.0	0.0	0.0	1.0	0.0	
123.0	3.60	2775.0	120000.0	5.0	0.0	0.0	1.0	0.0	
124.0	8.50	4555.0	36000.0	5.0	0.0	0.0	1.0	0.0	
125.0	5.25	5260.0	125000.0	6.0	0.0	0.0	1.0	0.0	
126.0	5.75	5260.0	150000.0	7.0	0.0	0.0	1.0	0.0	
127.0	5.50	5260.0	150000.0	6.0	0.0	0.0	1.0	0.0	
128.0	5.25	5260.0	150000.0	6.0	0.0	0.0	1.0	0.0	
129.0	5.50	5260.0	120000.0	6.0	0.0	0.0	1.0	0.0	
130.0	5.10	4940.0	120000.0	6.0	0.0	0.0	1.0	0.0	
131.0	11.70	6144.0	65000.0	19.3	0.0	0.0	1.0	0.0	
132.0	7.23	9019.0	145000.0	10.2	0.0	0.0	1.0	0.0	
133.0	8.00	10942.0	140000.0	8.1	0.0	0.0	1.0	0.0	
134.0	7.40	10813.0	160000.0	9.3	0.0	0.0	1.0	0.0	
135.0	8.65	10813.0	120000.0	6.0	0.0	0.0	1.0	0.0	
136.0	8.35	10404.0	120000.0	6.1	0.0	0.0	1.0	0.0	
137.0	5.20	3202.0	80000.0	5.0	0.0	0.0	1.0	0.0	
138.0	3.05	1952.0	125000.0	6.0	0.0	0.0	1.0	0.0	
139.0	3.15	1952.0	100000.0	6.0	0.0	0.0	1.0	0.0	
140.0	4.95	3145.0	90000.0	5.0	0.0	0.0	1.0	0.0	
141.0	3.53	1587.0	100000.0	6.0	0.0	0.0	1.0	0.0	
142.0	4.95	4669.0	75000.0	5.0	0.0	0.0	1.0	0.0	
143.0	5.05	3565.0	75000.0	5.0	0.0	0.0	1.0	0.0	
144.0	5.75	3090.0	40000.0	5.0	0.0	0.0	1.0	0.0	
145.0	4.65	3565.0	80000.0	5.0	0.0	0.0	1.0	0.0	
146.0	5.00	5018.0	80000.0	6.0	0.0	0.0	1.0	0.0	
147.0	7.80	6145.0	100000.0	8.3	0.0	0.0	1.0	0.0	
148.0	7.25	7015.0	100000.0	4.2	0.0	0.0	1.0	0.0	
149.0	6.25	5348.0	60000.0	5.7	0.0	0.0	1.0	0.0	
150.0	6.20	5348.0	35000.0	3.3	0.0	0.0	1.0	0.0	
151.0	6.20	5348.0	30000.0	2.9	0.0	0.0	1.0	0.0	
152.0	9.50	9835.0	60000.0	4.5	0.0	0.0	1.0	0.0	
153.0	9.50	9535.0	130000.0	9.8	0.0	0.0	1.0	0.0	
154.0	0.00	0.0	165000.0	7.0	0.0	0.0	1.0	0.0	
155.0	4.85	2338.0	45000.0	5.0	0.0	1.0	0.0	0.0	
156.0	8.00	4794.0	65000.0	8.0	0.0	1.0	0.0	0.0	
157.0	5.15	3598.0	100000.0	6.5	0.0	1.0	0.0	0.0	
158.0	5.70	3598.0	90000.0	10.6	0.0	1.0	0.0	0.0	
159.0	7.40	3598.0	55000.0	8.0	0.0	1.0	0.0	0.0	
160.0	7.25	3314.0	70000.0	8.4	0.0	1.0	0.0	0.0	
161.0	5.40	3314.0	70000.0	7.6	0.0	1.0	0.0	0.0	
162.0	5.95	2728.0	70000.0	7.6	0.0	1.0	0.0	0.0	
163.0	7.25	4140.0	55000.0	5.0	0.0	1.0	0.0	0.0	
164.0	6.75	4140.0	65000.0	5.0	0.0	1.0	0.0	0.0	
165.0	12.25	0.0	90000.0	0.0	1.0	1.0	0.0	0.0	
166.0	10.60	15032.0	100000.0	9.7	0.0	1.0	0.0	0.0	
167.0	10.13	15032.0	110000.0	7.0	0.0	1.0	0.0	0.0	
168.0	9.99	15032.0	110000.0	7.0	0.0	1.0	0.0	0.0	
169.0	9.85	15032.0	120000.0	8.0	0.0	1.0	0.0	0.0	
170.0	8.60	4490.0	60000.0	8.2	0.0	1.0	0.0	0.0	
171.0	7.75	4490.0	60000.0	8.2	0.0	1.0	0.0	0.0	
172.0	11.40	9208.0	125000.0	0.0	0.0	1.0	0.0	0.0	
173.0	10.95	9208.0	120000.0	7.0	0.0	1.0	0.0	0.0	
174.0	14.95	9208.0	55000.0	5.9	1.0	1.0	0.0	0.0	
175.0	10.70	9208.0	110000.0	8.8	0.0	1.0	0.0	0.0	
176.0	13.80	10637.0	55000.0	6.0	1.0	1.0	0.0	0.0	

177.0	6.80	4520.0	60000.0	5.8	0.0	1.0	0.0	0.0	27
178.0	11.35	8917.0	55000.0	6.5	1.0	1.0	0.0	0.0	
179.0	10.60	8117.0	52000.0	8.7	1.0	1.0	0.0	0.0	
180.0	11.35	8917.0	55000.0	6.5	1.0	1.0	0.0	0.0	
181.0	6.20	4160.0	60000.0	6.4	0.0	1.0	0.0	0.0	
182.0	7.00	7125.0	120000.0	9.0	0.0	1.0	0.0	0.0	
183.0	6.75	7125.0	100000.0	8.0	0.0	1.0	0.0	0.0	
184.0	8.75	6085.0	58000.0	6.0	0.0	1.0	0.0	0.0	
185.0	20.25	6495.0	16000.0	11.7	0.0	1.0	0.0	0.0	
186.0	15.50	4525.0	30000.0	17.7	0.0	1.0	0.0	0.0	
187.0	8.65	6312.0	55000.0	5.7	0.0	1.0	0.0	0.0	
188.0	9.25	11595.0	140000.0	9.4	0.0	1.0	0.0	0.0	
189.0	10.00	11959.0	90000.0	6.5	0.0	1.0	0.0	0.0	
190.0	9.25	11959.0	120000.0	10.0	0.0	1.0	0.0	0.0	
191.0	10.75	11865.0	110000.0	11.0	0.0	1.0	0.0	0.0	
192.0	10.75	11049.0	90000.0	7.5	0.0	1.0	0.0	0.0	
193.0	9.20	8835.0	135000.0	8.0	0.0	1.0	0.0	0.0	
194.0	14.90	5760.0	27500.0	9.3	0.0	1.0	0.0	0.0	
195.0	15.00	5760.0	34500.0	12.6	0.0	1.0	0.0	0.0	
196.0	6.40	4470.0	60000.0	6.4	0.0	1.0	0.0	0.0	
197.0	5.30	4379.0	108000.0	7.3	0.0	1.0	0.0	0.0	
198.0	7.50	4350.0	55000.0	17.5	0.0	1.0	0.0	0.0	

FIXTURE	RATE	VOYAGE LENGTH	CARGO SIZE	TERMS	CANAL	COAL	IRON ORE	SUGAR
1.0	19.25	4005.0	19000.0	7.0	1.0	0.0	0.0	0.0
2.0	20.00	3670.0	25000.0	8.1	1.0	0.0	0.0	0.0
3.0	12.25	3615.0	25000.0	12.3	0.0	0.0	0.0	0.0
4.0	12.75	3615.0	25000.0	12.3	0.0	0.0	0.0	0.0
5.0	22.75	4580.0	13000.0	5.6	1.0	0.0	0.0	0.0
6.0	12.50	3615.0	25000.0	12.1	0.0	0.0	0.0	0.0
7.0	21.00	4110.0	18750.0	9.4	1.0	0.0	0.0	0.0
8.0	16.00	4660.0	25000.0	20.7	1.0	0.0	0.0	0.0
9.0	26.50	4822.0	16500.0	20.5	1.0	0.0	0.0	0.0
10.0	28.50	4135.0	13000.0	19.3	1.0	0.0	0.0	0.0
11.0	26.85	4135.0	17000.0	25.3	1.0	0.0	0.0	0.0
12.0	26.75	4910.0	14000.0	18.0	1.0	0.0	0.0	0.0
13.0	14.00	2755.0	22000.0	8.4	0.0	0.0	0.0	0.0
14.0	28.50	4135.0	16000.0	24.0	1.0	0.0	0.0	0.0
15.0	19.80	4081.0	15506.0	10.8	1.0	0.0	0.0	0.0
16.0	19.80	4081.0	15000.0	10.5	1.0	0.0	0.0	0.0
17.0	26.50	4678.0	16000.0	19.0	1.0	0.0	0.0	0.0
18.0	28.00	3670.0	7000.0	6.7	1.0	0.0	0.0	0.0
19.0	9.75	2705.0	26500.0	7.3	0.0	0.0	0.0	0.0
20.0	8.25	2705.0	36000.0	9.5	0.0	0.0	0.0	0.0
21.0	9.50	3410.0	35000.0	16.7	0.0	0.0	0.0	0.0
22.0	17.00	4660.0	25000.0	21.7	0.0	0.0	0.0	0.0
23.0	14.25	2908.0	16535.0	20.5	0.0	0.0	0.0	0.0
24.0	14.50	2908.0	19000.0	23.0	0.0	0.0	0.0	0.0
25.0	10.00	3365.0	32000.0	9.0	0.0	0.0	0.0	0.0
26.0	19.50	3720.0	25000.0	30.0	0.0	0.0	0.0	0.0
27.0	16.00	8069.0	45000.0	24.0	1.0	0.0	0.0	0.0
28.0	7.75	5145.0	57000.0	11.6	0.0	0.0	0.0	0.0
29.0	8.10	5145.0	46000.0	11.6	0.0	0.0	0.0	0.0
30.0	11.00	5205.0	45000.0	14.0	1.0	0.0	0.0	0.0
31.0	8.75	4880.0	75000.0	13.9	0.0	0.0	0.0	0.0
32.0	8.50	4880.0	56000.0	12.8	0.0	0.0	0.0	0.0
33.0	7.75	4880.0	55000.0	12.8	0.0	0.0	0.0	0.0
34.0	8.00	4880.0	50000.0	10.0	0.0	0.0	0.0	0.0
35.0	7.80	4880.0	55000.0	11.6	0.0	0.0	0.0	0.0
36.0	8.50	5145.0	50000.0	11.6	0.0	0.0	0.0	0.0
37.0	8.00	4880.0	60000.0	11.0	0.0	0.0	0.0	0.0
38.0	8.00	4880.0	55000.0	10.0	0.0	0.0	0.0	0.0
39.0	8.50	4880.0	52000.0	10.0	0.0	0.0	0.0	0.0
40.0	8.25	4880.0	58000.0	11.0	0.0	0.0	0.0	0.0
41.0	8.00	4880.0	70000.0	13.9	0.0	0.0	0.0	0.0
42.0	8.25	4880.0	75000.0	12.0	0.0	0.0	0.0	0.0
43.0	8.51	4880.0	60000.0	11.0	0.0	0.0	0.0	0.0
44.0	10.00	4709.0	35000.0	12.0	0.0	0.0	0.0	0.0
45.0	7.75	4559.0	53000.0	11.0	0.0	0.0	0.0	0.0
46.0	8.00	4900.0	57000.0	11.0	0.0	0.0	0.0	0.0
47.0	10.47	4900.0	32000.0	9.5	0.0	0.0	0.0	0.0
48.0	12.50	5923.0	55000.0	17.0	0.0	0.0	0.0	0.0
49.0	13.08	5923.0	50000.0	20.0	0.0	0.0	0.0	0.0
50.0	17.10	6465.0	22000.0	8.4	0.0	0.0	0.0	0.0
51.0	20.90	4974.0	15000.0	18.8	0.0	0.0	0.0	0.0
52.0	20.50	4974.0	14000.0	17.0	0.0	0.0	0.0	0.0
53.0	20.50	4974.0	25000.0	30.0	0.0	0.0	0.0	0.0
54.0	21.00	4974.0	20000.0	24.0	0.0	0.0	0.0	0.0
55.0	17.00	1910.0	6600.0	12.0	0.0	0.0	0.0	0.0
56.0	8.75	798.0	20000.0	21.0	0.0	0.0	0.0	0.0

57.0	8.88	798.0	20000.0	16.0	0.0	0.0	0.0	0.0	
58.0	10.00	798.0	20000.0	20.0	0.0	0.0	0.0	0.0	
59.0	8.35	690.0	20000.0	20.0	0.0	0.0	0.0	0.0	
60.0	15.00	1860.0	10000.0	12.0	0.0	0.0	0.0	0.0	
61.0	13.13	1860.0	22250.0	24.2	0.0	0.0	0.0	0.0	
62.0	15.00	1800.0	10000.0	13.0	0.0	0.0	0.0	0.0	
63.0	14.00	1860.0	14000.0	18.0	0.0	0.0	0.0	0.0	
64.0	16.50	1860.0	6300.0	12.0	0.0	0.0	0.0	0.0	
65.0	10.55	4200.0	25000.0	17.5	0.0	0.0	0.0	0.0	
66.0	10.55	4200.0	30000.0	19.7	0.0	0.0	0.0	0.0	
67.0	15.00	6876.0	50000.0	25.1	1.0	0.0	0.0	0.0	
68.0	16.50	9977.0	47266.0	33.1	1.0	0.0	0.0	0.0	
69.0	15.50	9977.0	45000.0	27.0	1.0	0.0	0.0	0.0	
70.0	22.50	10080.0	30000.0	17.5	1.0	0.0	0.0	0.0	
71.0	13.50	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
72.0	13.50	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
73.0	13.00	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
74.0	13.00	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
75.0	13.00	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
76.0	13.00	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
77.0	13.50	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
78.0	15.90	9208.0	30000.0	9.3	1.0	0.0	0.0	0.0	
79.0	12.75	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
80.0	12.75	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
81.0	12.50	9208.0	47500.0	11.6	1.0	0.0	0.0	0.0	
82.0	12.50	9208.0	47500.0	11.6	1.0	0.0	0.0	0.0	
83.0	12.65	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
84.0	15.75	9208.0	30000.0	8.0	1.0	0.0	0.0	0.0	
85.0	12.95	9208.0	47500.0	12.2	1.0	0.0	0.0	0.0	
86.0	12.95	9208.0	47500.0	10.6	1.0	0.0	0.0	0.0	
87.0	12.60	9208.0	45000.0	10.0	1.0	0.0	0.0	0.0	
88.0	12.75	9208.0	52000.0	11.6	1.0	0.0	0.0	0.0	
89.0	12.60	9208.0	52000.0	12.8	1.0	0.0	0.0	0.0	
90.0	18.00	10637.0	33000.0	26.7	1.0	0.0	0.0	0.0	
91.0	18.85	10637.0	33000.0	27.0	1.0	0.0	0.0	0.0	
92.0	13.50	10637.0	54000.0	20.5	1.0	0.0	0.0	0.0	
93.0	25.00	10637.0	27000.0	22.0	1.0	0.0	0.0	0.0	
94.0	29.00	10780.0	25000.0	31.5	1.0	0.0	0.0	0.0	
95.0	8.50	5692.0	35000.0	13.9	0.0	0.0	0.0	0.0	
96.0	15.50	7320.0	53000.0	31.8	0.0	0.0	0.0	0.0	
97.0	26.00	11199.0	30000.0	22.0	0.0	0.0	0.0	0.0	
98.0	26.00	11199.0	30000.0	22.0	0.0	0.0	0.0	0.0	
99.0	26.00	11199.0	30000.0	22.0	0.0	0.0	0.0	0.0	
100.0	11.00	1638.0	20000.0	17.7	0.0	0.0	0.0	0.0	
101.0	9.50	826.0	20000.0	20.0	0.0	0.0	0.0	0.0	
102.0	17.25	10248.0	45000.0	20.0	0.0	0.0	0.0	0.0	
103.0	17.25	11060.0	45000.0	20.0	0.0	0.0	0.0	0.0	
104.0	18.05	10259.0	50000.0	30.9	0.0	0.0	0.0	0.0	
105.0	18.05	10259.0	20000.0	10.7	0.0	0.0	0.0	0.0	
106.0	18.00	10259.0	35732.0	23.0	0.0	0.0	0.0	0.0	
107.0	9.15	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
108.0	9.10	4535.0	52000.0	13.4	0.0	0.0	0.0	0.0	
109.0	9.05	4535.0	52000.0	15.0	0.0	0.0	0.0	0.0	
110.0	9.15	4535.0	52000.0	12.8	0.0	0.0	0.0	0.0	
111.0	8.75	4535.0	52500.0	11.0	0.0	0.0	0.0	0.0	
112.0	8.55	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
113.0	12.80	4260.0	25000.0	21.7	0.0	0.0	0.0	0.0	
114.0	11.15	5704.0	54000.0	21.7	0.0	0.0	0.0	0.0	
115.0	14.50	5704.0	27000.0	22.0	0.0	0.0	0.0	0.0	
116.0	14.50	5704.0	27000.0	22.0	0.0	0.0	0.0	0.0	

117.0	9.75	5704.0	54000.0	18.5	0.0	0.0	0.0	0.0	
118.0	14.00	5704.0	27000.0	22.0	0.0	0.0	0.0	0.0	
119.0	16.50	8432.0	28000.0	25.2	0.0	0.0	0.0	0.0	
120.0	16.50	8432.0	28000.0	25.2	0.0	0.0	0.0	0.0	
121.0	17.70	8432.0	14000.0	12.6	0.0	0.0	0.0	0.0	
122.0	22.00	7735.0	25000.0	41.7	0.0	0.0	0.0	0.0	
123.0	25.00	6905.0	15000.0	17.5	0.0	0.0	0.0	0.0	
124.0	19.93	6905.0	21500.0	25.1	0.0	0.0	0.0	0.0	
125.0	19.00	4926.0	23000.0	26.8	0.0	0.0	0.0	0.0	
126.0	16.50	4926.0	41000.0	41.0	0.0	0.0	0.0	0.0	
127.0	20.00	5611.0	33000.0	38.5	0.0	0.0	0.0	0.0	
128.0	18.50	5611.0	35000.0	35.0	0.0	0.0	0.0	0.0	
129.0	18.50	5611.0	35000.0	35.0	0.0	0.0	0.0	0.0	
130.0	21.50	5115.0	30000.0	27.0	0.0	0.0	0.0	0.0	
131.0	18.50	5611.0	35000.0	35.0	0.0	0.0	0.0	0.0	
132.0	15.00	5611.0	35000.0	46.7	0.0	0.0	0.0	0.0	
133.0	8.00	177.0	12000.0	5.4	0.0	0.0	0.0	0.0	
134.0	10.75	3975.0	50000.0	30.9	1.0	0.0	0.0	0.0	
135.0	11.50	2792.0	25000.0	14.6	0.0	0.0	0.0	0.0	
136.0	13.00	3051.0	20000.0	11.7	0.0	0.0	0.0	0.0	
137.0	15.00	3563.0	17000.0	12.8	0.0	0.0	0.0	0.0	
138.0	12.10	3156.0	31600.0	16.8	0.0	0.0	0.0	0.0	
139.0	9.50	1990.0	18000.0	9.6	0.0	0.0	0.0	0.0	
140.0	7.25	2005.0	15000.0	8.0	0.0	0.0	0.0	0.0	
141.0	9.50	1990.0	22000.0	14.2	0.0	0.0	0.0	0.0	
142.0	16.25	1373.0	7400.0	6.8	0.0	0.0	0.0	0.0	
143.0	10.00	2607.0	22000.0	8.8	0.0	0.0	0.0	0.0	
144.0	12.25	1445.0	20000.0	24.0	0.0	0.0	0.0	0.0	
145.0	6.20	1130.0	30000.0	12.0	0.0	0.0	0.0	0.0	
146.0	8.00	950.0	21000.0	8.4	0.0	0.0	0.0	0.0	
147.0	17.50	3759.0	11250.0	11.3	0.0	0.0	0.0	0.0	
148.0	7.25	2887.0	30000.0	21.0	0.0	0.0	0.0	0.0	
149.0	9.00	630.0	6000.0	4.0	0.0	0.0	0.0	0.0	
150.0	27.00	3322.0	14000.0	37.4	1.0	0.0	0.0	1.0	
151.0	29.50	9683.0	25500.0	33.2	1.0	0.0	0.0	1.0	
152.0	24.24	8390.0	14000.0	28.0	0.0	0.0	0.0	1.0	
153.0	24.24	8390.0	14500.0	29.0	0.0	0.0	0.0	1.0	
154.0	28.00	9080.0	10800.0	21.6	0.0	0.0	0.0	1.0	
155.0	0.00	0.0	14000.0	18.6	0.0	0.0	0.0	1.0	
156.0	13.50	3905.0	14000.0	15.4	0.0	0.0	0.0	1.0	
157.0	25.95	11109.0	18000.0	27.6	0.0	0.0	0.0	1.0	
158.0	1.90	1305.0	95000.0	5.0	0.0	0.0	1.0	0.0	
159.0	3.10	1395.0	80000.0	5.0	0.0	0.0	1.0	0.0	
160.0	2.95	2705.0	110000.0	6.0	0.0	0.0	1.0	0.0	
161.0	4.35	3113.0	80000.0	5.0	0.0	0.0	1.0	0.0	
162.0	4.53	3113.0	95000.0	5.0	0.0	0.0	1.0	0.0	
163.0	4.35	3113.0	75000.0	5.0	0.0	0.0	1.0	0.0	
164.0	3.45	2704.0	140000.0	6.0	0.0	0.0	1.0	0.0	
165.0	3.35	3920.0	110000.0	6.0	0.0	0.0	1.0	0.0	
166.0	7.60	10567.0	150000.0	7.0	1.0	0.0	1.0	0.0	
167.0	5.40	5260.0	100000.0	6.0	0.0	0.0	1.0	0.0	
168.0	5.25	5260.0	100000.0	5.0	0.0	0.0	1.0	0.0	
169.0	5.30	4940.0	90000.0	6.5	0.0	0.0	1.0	0.0	
170.0	5.55	4940.0	80000.0	6.0	0.0	0.0	1.0	0.0	
171.0	7.25	10813.0	130000.0	7.0	0.0	0.0	1.0	0.0	
172.0	7.00	10404.0	95000.0	6.4	0.0	0.0	1.0	0.0	
173.0	6.00	10158.0	150000.0	7.0	0.0	0.0	1.0	0.0	
174.0	7.50	0.0	53000.0	0.0	0.0	0.0	1.0	0.0	
175.0	4.50	3202.0	85000.0	5.0	0.0	0.0	1.0	0.0	
176.0	4.45	3202.0	80000.0	5.0	0.0	0.0	1.0	0.0	

177.0	4.10	3202.0	75000.0	5.0	0.0	0.0	1.0	0.0	31
178.0	4.75	3202.0	70000.0	6.0	0.0	0.0	1.0	0.0	
179.0	5.15	3722.0	60000.0	5.0	0.0	0.0	1.0	0.0	
180.0	4.40	3565.0	60000.0	5.0	0.0	0.0	1.0	0.0	
181.0	4.30	3090.0	52000.0	5.0	0.0	0.0	1.0	0.0	
182.0	4.30	4724.0	60000.0	5.0	0.0	0.0	1.0	0.0	
183.0	3.60	3421.0	63000.0	5.0	0.0	0.0	1.0	0.0	
184.0	7.50	7100.0	100000.0	8.7	0.0	0.0	1.0	0.0	
185.0	6.20	8530.0	150000.0	8.3	0.0	0.0	1.0	0.0	
186.0	7.10	6337.0	90000.0	9.0	1.0	0.0	1.0	0.0	
187.0	10.00	9835.0	60000.0	4.5	1.0	0.0	1.0	0.0	
188.0	9.85	9835.0	60000.0	4.5	1.0	0.0	1.0	0.0	
189.0	6.70	9576.0	130000.0	7.0	1.0	0.0	1.0	0.0	
190.0	6.35	7302.0	140000.0	7.6	1.0	0.0	1.0	0.0	
191.0	9.30	7302.0	100000.0	7.0	1.0	0.0	1.0	0.0	
192.0	3.00	2798.0	100000.0	3.0	0.0	1.0	0.0	0.0	
193.0	7.60	2896.0	35000.0	7.6	0.0	1.0	0.0	0.0	
194.0	9.75	4725.0	55000.0	9.3	0.0	1.0	0.0	0.0	
195.0	5.25	3598.0	60000.0	6.0	0.0	1.0	0.0	0.0	
196.0	4.65	3598.0	75000.0	6.5	0.0	1.0	0.0	0.0	
197.0	4.50	3314.0	90000.0	8.0	0.0	1.0	0.0	0.0	
198.0	4.75	3314.0	90000.0	7.2	0.0	1.0	0.0	0.0	
199.0	5.50	3120.0	60000.0	6.0	0.0	1.0	0.0	0.0	
200.0	6.15	4355.0	55000.0	11.7	0.0	1.0	0.0	0.0	
201.0	5.75	4140.0	55000.0	5.0	0.0	1.0	0.0	0.0	
202.0	5.75	4140.0	45000.0	5.0	0.0	1.0	0.0	0.0	
203.0	5.89	4140.0	50000.0	8.3	0.0	1.0	0.0	0.0	
204.0	5.24	4140.0	55000.0	9.2	0.0	1.0	0.0	0.0	
205.0	5.19	4140.0	50000.0	8.3	0.0	1.0	0.0	0.0	
206.0	6.00	4140.0	45000.0	7.5	0.0	1.0	0.0	0.0	
207.0	10.80	9430.0	55000.0	6.9	1.0	1.0	0.0	0.0	
208.0	7.50	5431.0	54000.0	9.6	0.0	1.0	0.0	0.0	
209.0	7.66	5369.0	60000.0	7.0	0.0	1.0	0.0	0.0	
210.0	7.00	4795.0	60000.0	6.0	0.0	1.0	0.0	0.0	
211.0	7.25	5410.0	50000.0	8.3	0.0	1.0	0.0	0.0	
212.0	11.75	10637.0	67000.0	6.0	1.0	1.0	0.0	0.0	
213.0	7.25	4098.0	60000.0	11.5	0.0	1.0	0.0	0.0	
214.0	6.00	5012.0	100000.0	18.3	0.0	1.0	0.0	0.0	
215.0	11.20	8847.0	55000.0	5.7	1.0	1.0	0.0	0.0	
216.0	11.00	8847.0	55000.0	5.8	1.0	1.0	0.0	0.0	
217.0	6.00	7125.0	115000.0	9.9	0.0	1.0	0.0	0.0	
218.0	8.50	6085.0	60000.0	9.9	0.0	1.0	0.0	0.0	
219.0	7.95	6312.0	60000.0	14.4	0.0	1.0	0.0	0.0	
220.0	7.88	6312.0	55000.0	5.9	0.0	1.0	0.0	0.0	
221.0	7.20	6405.0	100000.0	9.0	0.0	1.0	0.0	0.0	
222.0	8.50	4535.0	20000.0	10.5	0.0	1.0	0.0	0.0	
223.0	11.35	11595.0	60000.0	4.8	1.0	1.0	0.0	0.0	
224.0	8.95	11595.0	140000.0	7.5	1.0	1.0	0.0	0.0	
225.0	11.65	11595.0	60000.0	7.0	1.0	1.0	0.0	0.0	
226.0	11.15	11920.0	60000.0	7.0	1.0	1.0	0.0	0.0	
227.0	10.50	11049.0	60000.0	6.0	0.0	1.0	0.0	0.0	
228.0	13.50	5760.0	33000.0	12.9	0.0	1.0	0.0	0.0	
229.0	13.50	5760.0	25000.0	9.6	0.0	1.0	0.0	0.0	
230.0	6.10	4680.0	100000.0	9.7	0.0	1.0	0.0	0.0	
231.0	7.75	4350.0	60000.0	22.0	0.0	1.0	0.0	0.0	

FIXTURE	RATE	VOYAGE LENGTH	CARGO SIZE	TERMS	CANAL	COAL	IRON ORE	SUGAR
1.0	18.75	4315.0	18000.0	9.5	1.0	0.0	0.0	0.0
2.0	17.50	3720.0	20000.0	10.7	1.0	0.0	0.0	0.0
3.0	8.25	2705.0	36000.0	9.5	0.0	0.0	0.0	0.0
4.0	15.50	4595.0	22000.0	16.0	0.0	0.0	0.0	0.0
5.0	16.75	4675.0	22000.0	16.0	0.0	0.0	0.0	0.0
6.0	19.00	3130.0	15000.0	18.0	0.0	0.0	0.0	0.0
7.0	7.25	3270.0	55000.0	10.0	0.0	0.0	0.0	0.0
8.0	11.25	3600.0	25000.0	13.3	0.0	0.0	0.0	0.0
9.0	16.00	5152.0	25000.0	23.0	0.0	0.0	0.0	0.0
10.0	18.00	3625.0	20000.0	24.0	0.0	0.0	0.0	0.0
11.0	10.75	3210.0	22400.0	11.5	0.0	0.0	0.0	0.0
12.0	8.00	4559.0	55000.0	11.0	0.0	0.0	0.0	0.0
13.0	8.35	5760.0	58000.0	11.0	0.0	0.0	0.0	0.0
14.0	7.75	5760.0	55000.0	11.0	0.0	0.0	0.0	0.0
15.0	11.00	5205.0	45000.0	14.0	1.0	0.0	0.0	0.0
16.0	11.25	5205.0	59000.0	16.8	1.0	0.0	0.0	0.0
17.0	8.50	4880.0	62000.0	10.0	0.0	0.0	0.0	0.0
18.0	8.25	4880.0	57000.0	10.5	0.0	0.0	0.0	0.0
19.0	8.78	5145.0	55000.0	10.0	0.0	0.0	0.0	0.0
20.0	8.25	4880.0	60000.0	11.0	0.0	0.0	0.0	0.0
21.0	7.75	4880.0	60000.0	11.0	0.0	0.0	0.0	0.0
22.0	8.15	4880.0	56000.0	10.0	0.0	0.0	0.0	0.0
23.0	7.75	4880.0	55000.0	10.0	0.0	0.0	0.0	0.0
24.0	7.87	4880.0	58000.0	11.0	0.0	0.0	0.0	0.0
25.0	7.75	4880.0	55000.0	11.0	0.0	0.0	0.0	0.0
26.0	8.75	5145.0	55000.0	10.0	0.0	0.0	0.0	0.0
27.0	8.25	4880.0	59000.0	10.0	0.0	0.0	0.0	0.0
28.0	8.60	4880.0	58000.0	11.6	0.0	0.0	0.0	0.0
29.0	8.65	4880.0	78000.0	15.1	0.0	0.0	0.0	0.0
30.0	8.75	5145.0	56000.0	11.0	0.0	0.0	0.0	0.0
31.0	9.00	0.0	58400.0	10.5	0.0	0.0	0.0	0.0
32.0	10.00	4709.0	35000.0	12.0	0.0	0.0	0.0	0.0
33.0	7.75	4559.0	53000.0	11.0	0.0	0.0	0.0	0.0
34.0	7.75	4559.0	55000.0	12.0	0.0	0.0	0.0	0.0
35.0	8.35	4909.0	58000.0	12.8	0.0	0.0	0.0	0.0
36.0	10.00	5165.0	50000.0	13.0	0.0	0.0	0.0	0.0
37.0	10.60	5923.0	50000.0	11.0	0.0	0.0	0.0	0.0
38.0	17.30	5152.0	25000.0	23.0	0.0	0.0	0.0	0.0
39.0	17.30	5152.0	25000.0	23.0	0.0	0.0	0.0	0.0
40.0	17.30	5152.0	25000.0	23.0	0.0	0.0	0.0	0.0
41.0	29.50	5152.0	19000.0	31.7	0.0	0.0	0.0	0.0
42.0	19.25	4974.0	20000.0	24.0	0.0	0.0	0.0	0.0
43.0	10.40	4550.0	30300.0	15.1	0.0	0.0	0.0	0.0
44.0	19.50	4974.0	14300.0	18.3	0.0	0.0	0.0	0.0
45.0	19.90	4550.0	24250.0	16.0	0.0	0.0	0.0	0.0
46.0	11.90	0.0	14000.0	11.0	0.0	0.0	0.0	0.0
47.0	9.75	798.0	20000.0	20.0	0.0	0.0	0.0	0.0
48.0	17.00	1860.0	18000.0	23.0	0.0	0.0	0.0	0.0
49.0	14.00	1860.0	22650.0	29.0	0.0	0.0	0.0	0.0
50.0	20.00	1800.0	10000.0	12.0	0.0	0.0	0.0	0.0
51.0	17.00	1860.0	13800.0	21.3	0.0	0.0	0.0	0.0
52.0	16.50	1800.0	8800.0	14.0	0.0	0.0	0.0	0.0
53.0	15.00	1860.0	14000.0	17.0	0.0	0.0	0.0	0.0
54.0	21.75	1777.0	13260.0	11.8	1.0	0.0	0.0	0.0
55.0	18.50	1777.0	21000.0	18.0	1.0	0.0	0.0	0.0
56.0	17.50	1777.0	16000.0	14.2	1.0	0.0	0.0	0.0

57.0	16.00	7196.0	45000.0	23.2	1.0	0.0	0.0	0.0	
58.0	16.00	7196.0	45000.0	23.2	1.0	0.0	0.0	0.0	
59.0	16.00	7196.0	45000.0	23.2	1.0	0.0	0.0	0.0	
60.0	16.00	7196.0	45000.0	23.2	1.0	0.0	0.0	0.0	
61.0	16.00	7196.0	45000.0	23.2	1.0	0.0	0.0	0.0	
62.0	13.50	9278.0	52000.0	12.8	1.0	0.0	0.0	0.0	
63.0	13.00	9278.0	53000.0	11.0	1.0	0.0	0.0	0.0	
64.0	13.10	9278.0	52000.0	11.0	1.0	0.0	0.0	0.0	
65.0	13.25	9278.0	50000.0	10.0	1.0	0.0	0.0	0.0	
66.0	13.00	9278.0	52000.0	11.0	1.0	0.0	0.0	0.0	
67.0	13.15	9278.0	52000.0	12.8	1.0	0.0	0.0	0.0	
68.0	13.10	9278.0	52000.0	11.0	1.0	0.0	0.0	0.0	
69.0	15.00	9278.0	30000.0	8.0	1.0	0.0	0.0	0.0	
70.0	13.50	9278.0	52000.0	11.0	1.0	0.0	0.0	0.0	
71.0	17.60	10637.0	31000.0	25.7	1.0	0.0	0.0	0.0	
72.0	17.75	10637.0	31000.0	25.7	1.0	0.0	0.0	0.0	
73.0	29.00	10949.0	25000.0	31.3	1.0	0.0	0.0	0.0	
74.0	26.23	6144.0	12000.0	18.0	0.0	0.0	0.0	0.0	
75.0	29.00	11130.0	12996.0	15.9	0.0	0.0	0.0	0.0	
76.0	17.50	6610.0	32000.0	14.7	0.0	0.0	0.0	0.0	
77.0	24.50	9345.0	20000.0	18.0	0.0	0.0	0.0	0.0	
78.0	26.00	11199.0	30000.0	22.0	0.0	0.0	0.0	0.0	
79.0	23.44	9541.0	25000.0	23.0	1.0	0.0	0.0	0.0	
80.0	23.44	9541.0	25000.0	23.0	1.0	0.0	0.0	0.0	
81.0	18.75	8991.0	21000.0	17.0	0.0	0.0	0.0	0.0	
82.0	8.75	5568.0	50000.0	12.0	0.0	0.0	0.0	0.0	
83.0	8.50	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
84.0	8.55	4535.0	52000.0	12.8	0.0	0.0	0.0	0.0	
85.0	8.65	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
86.0	8.35	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
87.0	8.55	4535.0	50000.0	11.0	0.0	0.0	0.0	0.0	
88.0	8.50	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
89.0	8.40	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
90.0	8.60	4535.0	52000.0	11.0	0.0	0.0	0.0	0.0	
91.0	12.14	4100.0	14000.0	12.8	0.0	0.0	0.0	0.0	
92.0	14.75	5704.0	25000.0	21.7	0.0	0.0	0.0	0.0	
93.0	13.75	5704.0	27000.0	23.0	0.0	0.0	0.0	0.0	
94.0	15.65	6230.0	25500.0	30.5	0.0	0.0	0.0	0.0	
95.0	13.75	11865.0	37000.0	35.8	1.0	0.0	0.0	0.0	
96.0	12.25	9592.0	14000.0	8.7	1.0	0.0	0.0	0.0	
97.0	21.50	7420.0	25000.0	33.0	0.0	0.0	0.0	0.0	
98.0	21.50	6103.0	30000.0	31.3	0.0	0.0	0.0	0.0	
99.0	18.00	8105.0	33000.0	18.6	0.0	0.0	0.0	0.0	
100.0	15.15	5611.0	25000.0	25.0	0.0	0.0	0.0	0.0	
101.0	18.00	6813.0	30000.0	22.0	0.0	0.0	0.0	0.0	
102.0	18.05	6813.0	30000.0	22.0	0.0	0.0	0.0	0.0	
103.0	31.00	6123.0	8000.0	26.4	0.0	0.0	0.0	0.0	
104.0	13.75	4121.0	37000.0	24.6	0.0	0.0	0.0	0.0	
105.0	20.00	4121.0	20000.0	23.4	0.0	0.0	0.0	0.0	
106.0	12.85	4430.0	40000.0	33.3	0.0	0.0	0.0	0.0	
107.0	11.75	1785.0	23000.0	29.6	0.0	0.0	0.0	0.0	
108.0	16.50	3368.0	30000.0	17.5	1.0	0.0	0.0	0.0	
109.0	38.00	4951.0	11643.0	16.3	1.0	0.0	0.0	0.0	
110.0	9.50	1890.0	20000.0	14.0	0.0	0.0	0.0	0.0	
111.0	10.00	2680.0	20000.0	10.7	0.0	0.0	0.0	0.0	
112.0	12.50	1373.0	15000.0	18.0	0.0	0.0	0.0	0.0	
113.0	12.50	2511.0	13200.0	17.0	0.0	0.0	0.0	0.0	
114.0	14.50	2945.0	12000.0	6.8	0.0	0.0	0.0	0.0	
115.0	9.00	1830.0	22500.0	16.0	0.0	0.0	0.0	0.0	
116.0	6.24	1280.0	20000.0	9.4	0.0	0.0	0.0	0.0	

117.0	7.50	1130.0	20000.0	10.7	0.0	0.0	0.0	0.0	
118.0	6.00	405.0	30000.0	26.0	0.0	0.0	0.0	0.0	
119.0	10.25	975.0	15000.0	24.8	0.0	0.0	0.0	0.0	
120.0	11.00	975.0	16500.0	27.2	0.0	0.0	0.0	0.0	
121.0	37.00	0.0	10602.0	10.6	1.0	0.0	0.0	0.0	
122.0	0.00	4300.0	10000.0	26.6	0.0	0.0	0.0	1.0	
123.0	19.10	4800.0	15000.0	40.0	0.0	0.0	0.0	1.0	
124.0	14.25	2000.0	7500.0	20.0	0.0	0.0	0.0	1.0	
125.0	14.00	2170.0	7000.0	14.7	1.0	0.0	0.0	1.0	
126.0	13.00	2120.0	8928.0	17.9	1.0	0.0	0.0	1.0	
127.0	13.75	6492.0	14000.0	23.3	1.0	0.0	0.0	1.0	
128.0	19.00	7895.0	18045.0	21.0	0.0	0.0	0.0	1.0	
129.0	18.75	7850.0	13000.0	19.5	0.0	0.0	0.0	1.0	
130.0	12.00	2450.0	11400.0	0.0	0.0	0.0	0.0	1.0	
131.0	19.50	9609.0	22000.0	13.2	1.0	0.0	0.0	1.0	
132.0	13.75	0.0	15120.0	16.6	0.0	0.0	0.0	1.0	
133.0	13.50	0.0	15000.0	16.5	0.0	0.0	0.0	1.0	
134.0	15.25	4121.0	14500.0	16.0	0.0	0.0	0.0	1.0	
135.0	14.00	4121.0	14000.0	15.4	0.0	0.0	0.0	1.0	
136.0	5.35	1155.0	27500.0	7.6	1.0	0.0	1.0	0.0	
137.0	1.90	1305.0	120000.0	6.0	0.0	0.0	1.0	0.0	
138.0	2.40	1385.0	90000.0	5.0	0.0	0.0	1.0	0.0	
139.0	1.95	1253.0	120000.0	6.0	0.0	0.0	1.0	0.0	
140.0	3.00	1275.0	100000.0	5.0	0.0	0.0	1.0	0.0	
141.0	2.80	1435.0	95000.0	5.0	0.0	0.0	1.0	0.0	
142.0	4.50	2705.0	100000.0	5.0	0.0	0.0	1.0	0.0	
143.0	4.00	2705.0	120000.0	6.0	0.0	0.0	1.0	0.0	
144.0	3.50	2705.0	122000.0	8.0	0.0	0.0	1.0	0.0	
145.0	3.80	2705.0	100000.0	7.0	0.0	0.0	1.0	0.0	
146.0	4.60	0.0	110000.0	5.0	0.0	0.0	1.0	0.0	
147.0	4.00	0.0	110000.0	5.0	0.0	0.0	1.0	0.0	
148.0	3.85	3920.0	110000.0	6.0	0.0	0.0	1.0	0.0	
149.0	6.90	4505.0	45000.0	5.0	0.0	0.0	1.0	0.0	
150.0	5.40	5260.0	130000.0	6.0	0.0	0.0	1.0	0.0	
151.0	3.85	5260.0	120000.0	6.0	0.0	0.0	1.0	0.0	
152.0	5.70	4940.0	80000.0	7.0	0.0	0.0	1.0	0.0	
153.0	7.50	10813.0	65000.0	3.3	0.0	0.0	1.0	0.0	
154.0	7.50	10813.0	140000.0	7.8	0.0	0.0	1.0	0.0	
155.0	7.40	10404.0	110000.0	5.7	0.0	0.0	1.0	0.0	
156.0	7.50	10404.0	120000.0	6.2	0.0	0.0	1.0	0.0	

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