Modeling the Performance of Bulk-Carriers for Islamic Equity Investors

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ABSTRACT

This paper investigates the performance of bulk-carriers as a primary shipping segment for Islamic equity investors. Shipping is a strong growth industry with 84% of global trade carried by the shipping industry, although 75% of ship lending is debt-based. Moreover, many Islamic investors have minimal exposure to ship-finance and investment. We adopt an investment analysis of a full population of historical data over 20 years, to evaluate performance involving a maritime return on investment, IRR, net yield and standard deviation measures of risk and return. Our findings reveal that whilst earnings are volatile in comparison to capital market expectations, unlevered, tax-free returns on bulk-carrier investments out-perform other assets. By communicating risk and reward more effectively, Islamic equity investors, will realize the benefit of equity finance on the basis of profit sharing, is more efficient at allocating investible resources than debt finance at interest, thereby increasing investment and economic growth.

Key words : Islamic finance, investment, international shipping

JEL classification codes : G11, G23, G24, G31, G32, R40

1.0 INTRODUCTION

Seaborne trade is fundamental to globalization: 84% of global trade, representing 11,128 million tonnes, is carried by international shipping totaling 1.75 Bn DWT, 87% of which, is carried by the primary shipping segments involving are bulkers (43%), tankers (31%) and containerships (13%): however, 75% of ship-finance is financed on a conventional basis and Malaysian Islamic financial institutions (IFIs) and investors have essentially no exposure to international ship-financing (Abdullah et al, 2016). As highlighted in the methodology below, we conducted a number of 'closed-door'

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meetings with practitioners to seek views and suggestions in order to enhance the research. These were coordinated via the Central Bank of Malaysia (BNM), with the senior management of Islamic financial institutions (IFIs) and pension and investment (P&I) institutions. IFIs have primarily focused on domestic debt financing and P&I institutions have primarily focused on investing in financial assets. Essentially, BNM was very interested to encourage IFIs to develop Islamic investment in new markets, especially since the Islamic Finance Services Act (IFSA) of 2013 was supposed to exactly encourage Islamic equity investment. This paper seeks to persuade Islamic equity investors, of the attractiveness of Islamic equity finance and profit and loss sharing, through equity investment in real assets involving investment analysis. This would clearly distinguishing between Islamic finance as equity based and conventional finance as debt based, and at the same time, promote Islamic finance internationally in new and important markets such as shipping, which has thus far been dominated by conventional debt finance at the time-value of money (TVM) involving credit analysis (Abdullah et al, 2016). The investment analysis adopted in this paper assumes the primary Islamic equity investment contracts of mudharabah and musharakah, which accept risk on the basis of profit and loss sharing, and where assets are absent of risk-free debt modes of finance at the TVM. In our meetings, industry stakeholders accepted the Islamic equity investment model and understood that as part of any due diligence undertaken by an equity investor, a full investment analysis measuring risk and reward would necessarily form part of any product disclosure, or investment prospectus.

In order to determine the willingness and ability to finance maritime assets, investors must understand the associated risks and rewards with regard to international shipping. We adopt an investment analysis of a full population of historical data over a period of 20 years to evaluate maritime performance as a tax-free (as explained in the methodology) and a debt-free investment in bulk-carriers, given their global importance for the carriage of bulk commodities, such as coal and iron ore, necessary for electricity and steel mill companies that drive the global economy. In terms of the review of literature (sections 2 and 3), we considered the underlying theories related to risk and returns for investments. We assessed inter-temporal choice for investments and the marginal efficiency of capital in evaluating returns (section 2). We also adopted the pre-requisite of market risk for income to be considered lawful in Islam, as reflected in the Islamic normative theory of profit (section 3). We then identify a suitable investment framework and methodology (section 4) for Islamic private equity investors to evaluate the investment performance of international shipping. We then present our investment analysis (section 5) over 20 years in terms of unlevered IRRs, net unlevered income yields and standard deviation measures of risk and return for bulk-carriers, We also developed investment analysis involving a maritime return on investment (MROI),

IRR, a multiple of invested capital (MOIC) and a profitability index of capsize bulk-carriers within the bulk-carrier segment, given their role in bulk shipping. Finally, we provide some concluding remarks and recommendations (section 6).

2.0 LITERATURE REVIEW ON INTER-TEMPORAL CHOICE FOR INVESTMENTS AND THE MARGINAL EFFICIENCY OF CAPITAL

In considering investment decisions for maritime assets, Fisher stated that, time preference (impatience) is a derivative of an individual's "marginal want for present and his marginal want for future income" (Fisher, 1930, p.97). An individual makes investment and savings decisions in a firm or as a consumer. With the consumer, an inter-temporal budget constraint indicates present and future income (m_0, m1) and by making a decision on present and future consumption (c_0, c_1) also makes a present savings decision ($s_0 = m_0 - c_0$) yielding future savings $(m_0 - c_0)(1+r)$, given a know market rate of interest (r). The absolute value of the budget constraint is (1+r) corresponding to the increase in future consumption from present savings.

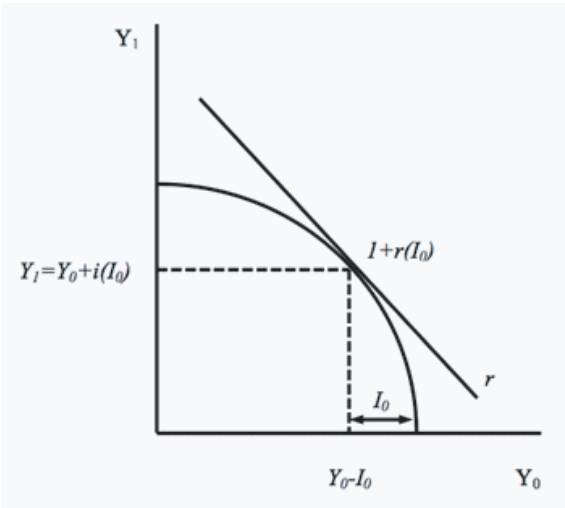
Preferences indicated by an inter-temporal utility function $u(c_0,c_1)$ are presented in the form of indifference curves. The absolute value of the slope of these indifference curves yields the individual's inter-temporal marginal rate of substitution (MRS), which measures the value of present consumption in terms of future consumption and reveals a decreasing marginal rate of substitution (MRS): as individuals increase present consumption, its value in terms of future consumption decreases. The MRS is the ratio of the marginal utility of present consumption to the marginal utility of future consumption and at optimal consumption (with the indifference curve tangent to the budget constraint line) the consumer's MRS equals one plus the interest rate (MRS = 1+r). Therefore, at optimal consumption an individual values present and future consumption at its opportunity cost.

In terms of optimal savings and investment decisions, the objective for the individual is to maximize utility subject to a budget constraint. Fisher's separation between a firm and consumer reflects that all individuals, irrespective of their preference for present or future consumption, select the same investment plan, which maximizes the PV of total income and is equivalent to maximizing the NPV of the investment (Fisher, 1930; MacMinn, 2005, pp.2-9). The Fisher model has been the foundation of corporate finance (Abdullah et al, 2017): in terms of investment analysis we discount future net cash flows involving the TVM. For Fisher, the optimal decision for the firm's investment decision is where the marginal rate of return over cost equals the interest rate. We may realize that Fisher's rate of marginal return over cost is equivalent to Keynes' marginal efficiency of capital (MEC). Keynes defined the MEC, which is

otherwise known as the internal rate of return (IRR), as "that rate of discount which would make the present value of the series of annuities given by the returns expected from the capital-asset during its life just equal to its supply price" (Keynes, 1936, p.135). It is the rate of discount, that makes the discounted present value of an expected income stream equal to the cost of capital, such that, the MEC (IRR) makes the net present value (NPV) equal to zero. Fisher's investment frontier is concave (figure 1), which reflects the diminishing marginal returns to investment. The investment decision will be optimal where the investment frontier is tangent to the interest rate (capital market) line, which is given by the combination Y_0-I_0, Y_0+i(I_0), where ***i*** is the yield on investment, ***r*** is the market interest rate, such that the condition i(I_0) = r holds. An entrepreneur will continue to invest until the marginal return over cost equals the interest rate, which is the absolute value of capital market line = 1+r.

Fisher thus laid the foundations for the Capital Asset Pricing Model (CAPM), where the value of as asset (a vessel) is independent of its capital structure, "the market value of any firm is independent of its capital structure and…the average cost of capital, to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class" (Modigliani, 1958, pp. 268-269). Whether through the discount rate, or with the IRR, in reality the cost of capital equals the unlevered cost of equity, in the form of an annual compound rate, which can be benchmarked to other assets priced along the yield curve and hence serves as a investment framework for our analysis.

Figure 1: Fisher's Investment Frontier

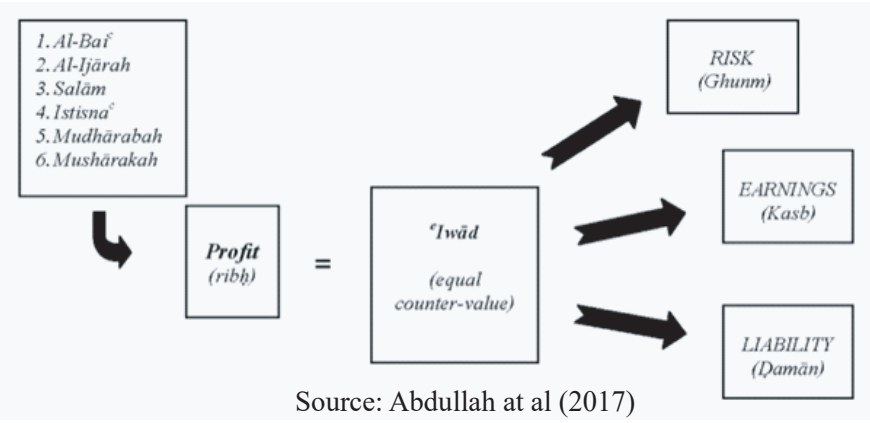


Sources: Fisher (1930), MacMinn (2005)

3.0 THE ISLAMIC NORMATIVE THEORY OF PROFIT IN DETERMINING LAWFUL TRANSACTIONS

In terms of income earned from international shipping, market risk is a pre-requisite of lawful profit in Islam. In analyzing substance over form in determining a valid transaction in Islam (Abdullah et al, 2017), Ibn al-`Arabi (1957) (d.1148) said, "Every increase which is without an equal counter-value ('iwad) is riba", and the components of 'iwad are; (1) risk (ghunm), (2) liability (daman), and (3) earnings (kasb) (Ibn al-'Arabi, 1957, 1, p.242; cited also by Ziaul, 1995, p.10; Rosly, 1999, p.1249; Rosly, 2005, p.30; Rosly, 2001). As reflected in figure 2, the necessary components of 'iwad must be present for profit (ribh) to be lawful (halal), and if any of the components of 'iwad are not present in a transaction then the income is unlawful (haram). In terms of risk (ghunm) it refers to market risk; earnings (kasb) implies to strive to earn or gain wealth, thus implying work and effort (amal); whereas, liability (daman) includes ownership (milkiyyah). The Majallah reaffirms this with a number of important maxims: "reward begets risk" (al-ghurm bi al-ghunm) (Majallah, no.87), "benefit begets liability" (al-kharaj bi al-daman) (Majallah, no.85), and "burden is proportional to benefit, and benefit is proportional to burden" (Majallah, no.88).

Figure 2: The Islamic Theory of Profit



Source: Abdullah at al (2017)

IFIs have limited expertise in investment analysis avoid real asset investments, such as shipping, whose earnings are relatively volatile as compared to financial assets. They prefer risk-free debt modes of finance at the TVM, given bank risk, liquidity and capital requirements (Abdullah et al, 2016). However, Abdullah et al (2017) provided a comprehensive framework for Islamic equity investment in maritime assets, recognizing that mudharabah and musharakah are, by default, the primary Islamic equity investment contracts by nature, and hence the importance of investment analysis

for Islamic equity investors, especially given the necessity for market risk (ghunm) in Islamic finance transactions.

4.0 METHODOLOGY

The research is essentially a quantitative empirical investigation involving investment analysis to demonstrate that the marginal efficiency of capital (MEC) confirms that equity finance and profit sharing, rather than debt finance at interest, is more efficient in allocating investible resources to develop the international shipping industry. Given the MEC, a lower interest rate will increase investment, which caused Keynes to admit that interest sets "a limit to the level of employment...[and]...holds back production" (Keynes, 1936, pp.222, 235). In order to measure our primary objectives, a full population of maritime data was sourced from Shipping Intelligence Network, an online database of time-series subscription data acquired from Clarksons Research Studies (2016), the research division of the world's largest international ship-broking company, with additional data on vessel operating costs from the Moore Stephens (2016), a leading international maritime consultant and accountant, in order to assess the economic viability of maritime investments, from the perspective of a potential investor in maritime assets.

The value of a vessel is determined from the vessel's ability to generate financial surpluses for capital providers and is a function of commercial and technical management. Financial surpluses include both income and capital appreciation. Accordingly, our research intends to adopt a financial analysis of a full population of historical data over a period of 20 years,

i) to develop a 'mark-to-model' Maritime Return on Investment (MROI) and Discounted Cash-Flow (DCF) analysis involving the Internal rate of Return (IRR).

ii) to financial appraise individual segments of the international shipping market involving bulkcarriers, tankers and containerships, involving the IRR and Net Income Yield.

iii) to evaluate risks and returns of maritime assets and compare them by shipping segment and to other real and financial assets.

Commercial management or operations are functions associated with the running of a vessel by a ship-operator and includes the commercial decisions associated with the sale and purchase and chartering of vessels, the responsibility for the employment of a vessel with cargoes (whether on the basis of time-charter or voyage charter),

scheduling, stemming or the ordering of bunkers (fuel), managing arrangements for loading and discharging of vessels at ports with associated port activities and the lay-up of vessels (Downard, 1994, p.ix).

Technical management or specifically ship-management refers to the functions not undertaken by the ship-operators and are associated with the responsibility for manning, supplying and insuring the vessel and ensuring that the vessel is available to the ship-operators for the maximum amount of time possible in terms of available trading days. The operating expenses or running costs involve the costs of managing the vessel and comprise all activities associated with ship-management (Downard, 1994, p.ix). It is not uncommon for the technical management to be sub-contracted to professional third-party ship-managers.

4.1 Determination of Free Cash Flow

The determination of free cash flows involves assumptions relating to the leasing of vessels involving charter revenues, operating expenses (OPEX), the market value of the sale and purchase of new and second-hand vessels and the residual scrap value of vessels at the end of their economic life.

Charter revenues involve actual time-charter rates or their voyage-charter equivalents involving spot (time-charter trips), short-period (2 to 4, or, 4 to 6 months), for long-period (1, 2, 3, 5 years duration) or contracts of affreightment (COAs), reported by shipbrokers or research companies. With access to on-line subscription databases (for example, from Clarksons Research) it is possible to conduct a full population investigation of long-term historical average time-charter rates, newbuilding, second-hand and demolition price data of vessels, over a period of 20 years, in order to derive an analysis of market expectations as to the future development of income and prices. Additionally, analysis conducted regarding the current fleet in terms of volume and age profile; current and additional fleet capacity, in terms of the order book, would provide an indicator for the expected market supply of vessels. Furthermore, macro-economic and industrial data would provide analysis of the prevailing economic outlook and expected market demand, in terms of the derived demand of vessels. Ship-brokerage commissions earned on freight (1.25% up to 5%) and sale and purchase of vessels (1% to 2%) should be taken into account, although ship-management fees (3% - 5%) would typically be included in operating expenses or daily running costs (DRC). The utilization rate, involving the number of operating days a vessel is employed, must be considered with regard to normal years of ship-operation and when the vessel is dry-docked for the renewal of its classification (once every 5 years). The Hamburg Ship Evaluation Standard (HSES) recommends 358 days in

normal years and 343 days in class renewal years (Mayr, 2015, p.151), which averages 355 and is adopted in this research. With individual vessel evaluations, the utilization might be affected in the short term when taking into account the age of the vessel, classification surveys and class renewal, expected off-hire periods or lay-up if market conditions are poor.

Operating expenses involve costs averaged over 365 days or daily running costs (DRC) and typically comprise crew wages and expenses, victualing, stores, spares, lubricants, maintenance, miscellaneous costs, ship-management fees, annual insurance premiums, dry-dock expenses, annual class/registration fees, and additionally, environmental costs should be taken in account. Any forecasting for capital budgeting purposes should also incorporate the effects of inflation.

Residual value or scrap value of a vessel refers to the scrap value expected at the end of the economic life of a vessel, which is typically 20-25 years (Stopford, 2009, p.263). The scrap value is a function of a vessel's light displacement (LDT) and the scrap price is expressed in USD per LDT. With individual transactions for demolition, brokerage commissions (of 1% to 2%) should be factored in.

4.2 Mark to Model

This study develops a 'mark to model' Maritime Return on Investment (MROI) and a discounted cash-flow (DCF) method of analysis involving the internal rate of return (IRR), to financially appraise the returns on the investment of a fleet of ships. Our precedent for the suitability of this approach is Sloggett (1984) and also Mayr (2015), except we adopt historical analysis as a guide to performance, as the DCF is indeed appropriate for maritime valuation and project financing. The MROI return of Economic Value Added (EVA) on the Net Asset Value (NAV) of a fleet of vessels at the end of the accounting period. This is akin to Stopford's Return on Shipping Investment (ROSI), but in reality his ROSI was an annual return of EVA over the market value of a vessel or fleet of vessels (Stopford, 2009, p.327),

$$MROI = \frac{EVA_t}{NAV_{t-1}} = \frac{EBID_t - Dep_t + Cap_t}{NAV_{t-1}} x100 \qquad (1.0)$$

EVA (Economic Value Added) is a function of EBID (Earnings Before Interest and Depreciation), which is the free cash flow generated from the daily time-charter income less operating expenses (OPEX), deducting the depreciation (DEP) and adding the change in market value of maritime assets reflected in any capital gain (CAP), over one year. Normally, depreciation is a non-cash item, but our model will deal with replacement out of cash flow, involving a fleet comprising the same number of ships

and age profile over the period of analysis in order to reflect a true reflection of economic depreciation. Also, replacement is not necessarily a fixed cost and in reality can be varied to accommodate market conditions and cash-flow: when operating cash flow fall, replacement can be deferred an older ships can continue trading, whereas if cash flow increases more ships can be acquired. Strategic decision-making through investment analysis provides flexibility and financial security to the shipowner. Another advantage of evaluating the EVA, in the context of private equity, is that it we can determine the investment multiple, which is the multiple of invested capital (MOIC) or total value to paid in capital (TVPI).

To value a vessel based on discounted cash flows (DCF), the expected future free cash flows must be discounted to a present value using an appropriate discount rate, which represents the required rate of return. The weighted average cost of capital (WACC) for maritime assets should represent the required rate of return on an alternative investment, which is equivalent to the investment in terms of timing, risk, currency and taxation cash-flows. Where vessels are denominated in USD, the discount rate should reflect U.S. capital market data. The valuation of maritime assets is based on free cash flows available for distribution to the capital providers, whether debt or equity. It is not necessary to take into account the benefit attributable to interest as a deductible expense for tax purposes, since the shipping industry is essentially tax-free. This is due to the fact that governments have either introduced tonnage tax regimes, as in the case of the U.K. for example, or stipulate that income deemed earned from shipping companies is tax exempt, as in the case of Malaysia. A tonnage tax is not a tax, but rather a method for determining taxable income, and thus taxation is independent of earned profits: shipping companies are charged corporation tax on a fixed notional profit, calculated by reference to the net tonnage of its ships, instead of the actual profits earned from its shipping activities. The taxable income as calculated by this method is considerably lower than the actual profit. Tonnage tax regimes also allow flexibility for the operation of foreign flag vessels although this flexibility can be built into wider tax exemption on shipping income as reflected in Singapore's Approved International Shipping Incentive ("AIS"), which is a tax incentive available to resident companies which own or operate foreign flagged ships. In summary, the tax-deductible benefits associated with debt finance at interest are negated in international shipping, when income earned from shipping is tax exempt for on-shore or off-shore companies. Thus, the WACC may be expressed as follows,

$$WACC = r_e \times \frac{E}{V} + r_d \times \frac{D}{V} \quad where\ V = E + D \qquad (2.0)$$

Such that, r_e = the cost of equity, r_d = the cost of debt, E = the market value of equity

and D = the market value of debt. However, in a perfectly efficient market, according to the Capital Asset Pricing Model (CAPM), the value of a vessel is independent of its capital structure (Sharpe, 1964; Modigliani, 1958, 1964). "The market value of any firm is independent of its capital structure and is given by capitalizing its expected return at the rate r_k appropriate to its class" (Modigliani, 1958, pp.268), where S denotes the market value of equity and D the market value of debt, *X* is the expected return on the assets owned by a company and V denotes the value of a firm.

$$\frac{\bar{X}}{(S_j + D_j)} \; o \; \frac{\bar{X}}{V_j} \equiv r_k \quad \text{for any firm } j \text{ in class } k \qquad (3.0)$$

Or equivalently, "the average cost of capital, to any firm is completely independent of its capital structure and is equal to the capitalization rate of a pure equity stream of its class (Modigliani, 1958, pp. 268-269).

$$\frac{\bar{X}}{(S_j + D_j)} \; o \; \frac{\bar{X}}{V_j} \equiv r_k \quad \text{for any firm } j \text{ in class } k \qquad (4.0)$$

Thus, the discount rate would reflect the cost of capital and rather than a weighted average cost of capital (WACC), with the discount rate equals the unlevered cost of equity (r_2). By adopting an annually compounded rate, the discount factor (DF), present value factor (PVF), WACC and r_2 are all equivalent and can be benchmarked to other assets priced along the yield curve. Since, the economic value added (EVA) reflects the future value of annual cash-flows (FV), then a present value (PV) or discounted cash-flow (DCF) can be derived from $(PV=FV/(1+r)^1$ in order to generate a net present value (NPV). Specifically, the NPV is the PV of an investment's expected net cash-flows, less the cost of the initial investment, and the formula for the discounted sum of all cash-flows is,

$$NPV = -C_0 + \sum_{t=1}^{T} \frac{C_t}{(1+r)^{1/t}} \qquad (5.0)$$

Where C_0 is the present value of the initial capital invested, C_t is the net cash-flow during the period ***t, r*** is the discount rate and T is the number of time periods (years). Then the IRR is the discount rate (r), which causes the discounted NPV of a series of future cash flows produced from an investment to equal 0,

$$\sum_{t=0}^{T} \frac{C_t}{(1+r)^t} = 0 \qquad (6.0)$$

Hence, MROI, IRR and NPV can be employed in developing a 'mark to model' framework for maritime investments, where the maritime investor can modify the DCF

analysis to incorporate the actual market price of a vessel (MP) and net time-charter earnings (TCE) less operating expenses (OPEX) in the form of daily running costs (DRC) together with any residual value (RV) through a trade sale or demolition when a vessel is scrapped.

$$NPV = -MP_0 + \sum_{t=1}^{T} \frac{TCE_t - DRC_t}{(1+IRR)^{1/t}} + \frac{RV_t}{(1+IRR)^{1/t}} = 0 \qquad (7.0)$$

$$\sum_{t=1}^{T} \frac{TCE_t - DRC_t}{(1+IRR)^{1/t}} + \frac{RV_t}{(1+IRR)^{1/t}} = MP_0 \qquad (8.0)$$

We can then compare the risk-equivalent required rate of return of different investments through the IRR and also a Profitability Index (PI) involving their Net Present Value (NPV) of inflows and outflows,

$$PI = \frac{\text{NPV of cash inflows}}{\text{NPV of cash outflows}} \qquad (9.0)$$

4.3 Internal Rate of Return and Net Income Yield

A rolling 20-year unlevered internal rate of return (r) can be calculated for three shipping segments (bulkcarriers, tankers and containership) for 5-year old assets, where the IRR (r),

$$r = (FV/PV)^{(1/t)} - 1 \qquad (10.0)$$

Additionally, an unlevered Net Income Yield by shipping segment, and in aggregate, over 20 years, can be calculated. The Net Income Yield (%) = Annual Income / Investment, where Annual Income = (Time-Charter Rate x 355 operating days) less Operating Expenses (Daily Running Costs x 365 days) and the investment reflects the actual market price of the vessel.

$$\text{Net Income yield (\%)} = \frac{\text{Annual Income (USD)}}{\text{Investment (USD)}} \qquad (11.0)$$

4.4 Risk and Returns

We may evaluate the risks and returns of maritime investments, by adopting the Capital Asset Pricing model (CAPM), which equates volatility with risk. As a measure of volatility of shipping earnings, the population standard deviation (?) is applied to quantify the amount of variability or dispersion around a mean and is expressed in the

same units as the original data, which in this case, is derived from a set of net time-charter rates from each type of vessel selected from each primary shipping segment, over the period of analysis. The larger the variability or dispersion is, the higher the standard deviation and vice versa.

$$\sigma = \sqrt{\frac{\sum (x - \bar{x})^2}{n}} \qquad (12.0)$$

Rates of return are measured by the net income yield (11.0) on individual vessel types and by market segment and then compared to other real and financial assets.

We can also compare various types of vessel through a correlation of net time-charter earnings in order to evaluate various investment strategies by analyzing their relationships, as some relationships are expected to be positive, whilst others negative. Ship-owners are able to reduce the volatility of earnings by incorporating vessels with low or negative correlations in their fleet. On the other hand, investors may be unwilling to reduce volatility risk as this will merely result in lower returns on their maritime assets. The Pearson product-moment correlation coefficient (r) for a population is adopted to measure the strength of the linear dependence (correlation) between two variables, reflected in two sets of net time-charter earnings over the period of analysis. The population correlation coefficient is defined in (13.0), where σ_x and σ_y are the population standard deviations, and σ_{xy} is the population covariance.

$$r_{xy} = \frac{s_{xy}}{s_x s_y} \qquad (13.0)$$

Thus, our methodology has clarified the nature of ship-operations and ship-management and clarified the nature of a stream of income and expenses associated with shipping companies. Investment analysis is undertaken using a full population of maritime price and earnings data over a period of 20 years from 1995-2015. Furthermore, the MROI, IRR and risk-reward analysis facilitates the development of a business strategy for maritime investment and demonstrates that if we define risk as the possibility of losing an investment, then in terms of the CAPM, despite the risk associated with volatile earnings, the returns over the long term reveal that international shipping is not nearly as risky as the volatility suggests. Such an analysis would form part of any due diligence conducted by retail, high net worth or institutional investors in the role of a limited partner as capital provider within an Islamic private-equity shipping fund.

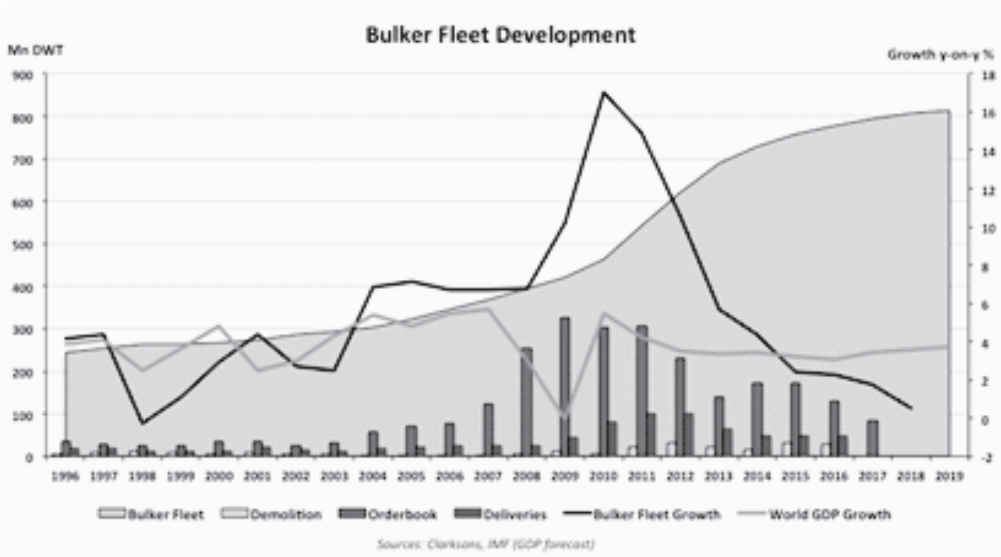
Additionally, meetings were conducted with various stakeholders, including institutional investors, Islamic banks and regulators, to obtain views and comments from practitioners, thereby enhancing the research. From a Malaysian perspective,

CIMB Islamic, Bank Tokyo Mitsubishi (BTMU), Employees Provident Fund (EPF) and EPF Islamic, the Government Pension Fund (KWAP), the Malaysian Hajj Fund (LTH) and the Investment Account Platform (IAP) owned and operated by IFIs.

5.0 Bulk Carrier Performance

Given the necessary acceptance of market risk by IFIs, investment analysis, in measuring investment performance, is central to any due diligence that would be captured in any product disclosure, or investment prospectus. In the context of appraising maritime assets and measuring performance under the umbrella of Islamic equity investment contracts, in terms of historical analysis and also in forecasting charter rates for maritime investment valuation in terms of an income mark-to-model approach, an analysis of current and expected market conditions are crucial. Additionally, the price of a vessel is a function of two ratios, the demand over supply of the vessel as the numerator, over the demand over supply of money as the denominator, since money is the denominator of all economic transactions. The impact of U.S. monetary policy on maritime investments is very much under-estimated. Nonetheless, it is appropriate to consider fleet development in terms of market supply, as well economic outlook in terms of market demand. Figure 3 summarizes the deadweight capacity of the bulker fleet (Mn DWT), the volume of new vessels on order at shipyards (order-book), the volume of scrapping of vessels (demolition) and the volume of deliveries of new ships entering the market (deliveries). Actual annual bulker fleet development therefore is primarily a function of the existing fleet, less demolition and adding deliveries. Given that ordered vessels will be delivered over a period of 2-3 years, it can be taken as an indicator for expected future market supply, so that the ratio of the order-book, less expected demolition (of vessels over 20 years of age), to the existing fleet, can be taken as an indicator for expected fleet growth. Projected fleet development, as a measure of market supply of bulk-carriers, can be compared with projections of World GDP by the IMF, as a measure of market demand for bulk-carriers. At the time of the global financial crisis in 2008, projected fleet growth was 59.2% for the 3 years from 2008-2010, whilst projected GDP was only 8.4%, thus projected market supply growth significantly exceeded expected market demand growth and we can anticipate over-capacity of vessels, which did result in a significant decline in bulker prices and charter rates. In 2016 the projected fleet growth was 7.0% for 2016-2018, whilst projected GDP is 10.1%, hence the gap between supply and demand has essentially been eliminated, implying a firmer bulker market.

Figure 3: Bulker Fleet Development



However, over the long term, nominal prices of capesize bulkers expressed in USD (figure 4), are significantly affected by U.S. monetary policy, which is apparent when expressing prices in terms of gold. Thus the supply and demand of money should be taken into account as much as, if not more so, that the supply and demand of bulk shipping.

Figure 4: Nominal and Real Capesize 5-Year Secondhand Prices (1976-2015)

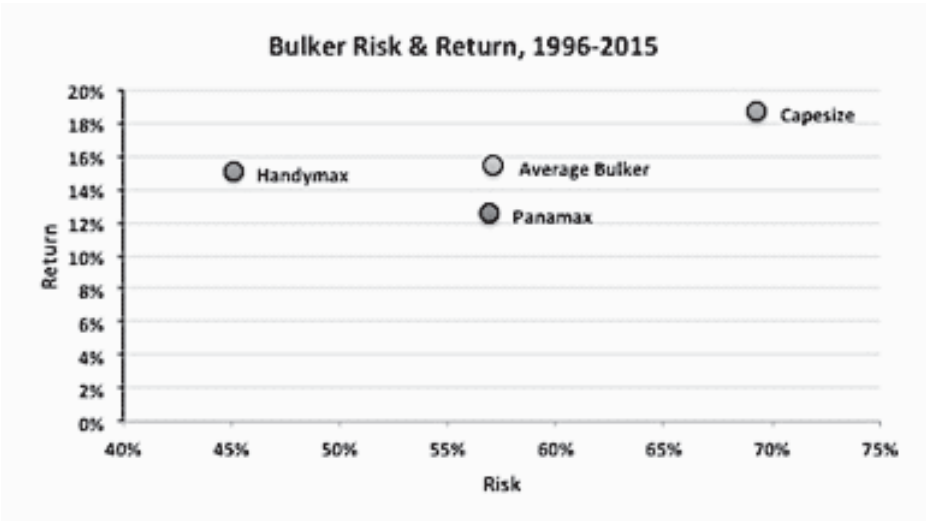
In terms of providing clarity to potential investors as to the attractiveness of investing in different classes of vessel within the bulk-carrier segment, our analysis must effectively communicate both risk and reward. We can apply the unlevered net income

yield for individual classes of vessel as a measure of return. Typically, within the framework of the capital asset pricing (CAP) model, investment analysis equates volatility with risk. By comparing the average net time-charter earnings of different classes of vessel using the standard deviation as a percentage of mean earnings we can measure risk. In terms of constructing a shipping efficient frontier for the different classes of vessel (table 1, figure 5), our analysis reveals that the yields are strong, averaging 15%. If the average earnings are the revenue stream needed to operate a shipping business to generate a 'normal profit' and we define a 'normal profit' as whatever the participants in the market settle for (Stopford, 2009, p.324), then between 1996-2015, bulk shipping companies would earn 57% more or less than is required, reflecting associated risk.

Table 1: Bulker Risk and Return (1996-2015)

Vessel Class	Risk	Return
Capesize	69%	19%
Panamax	57%	13%
Handymax	45%	15%
Average Bulker	57%	15%

Figure 5: Bulkcarrier Efficient Frontier (1996-2015)



For a typical stock market firm and in terms of the capital market, such volatility would be considered high risk. However, our 20-year unlevered IRR and net income yield data reveals that bulker returns are very healthy over the long term (figures 6 and 7).

Figure 6: Bulker 20 Year Rolling 5-Year Unlevered IRR

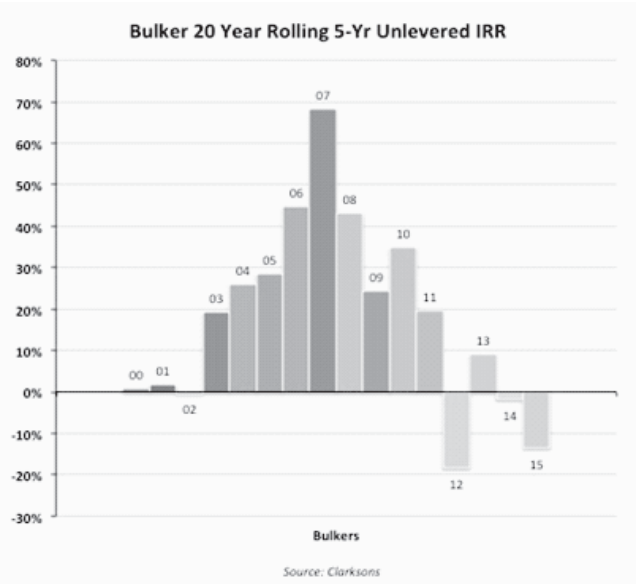
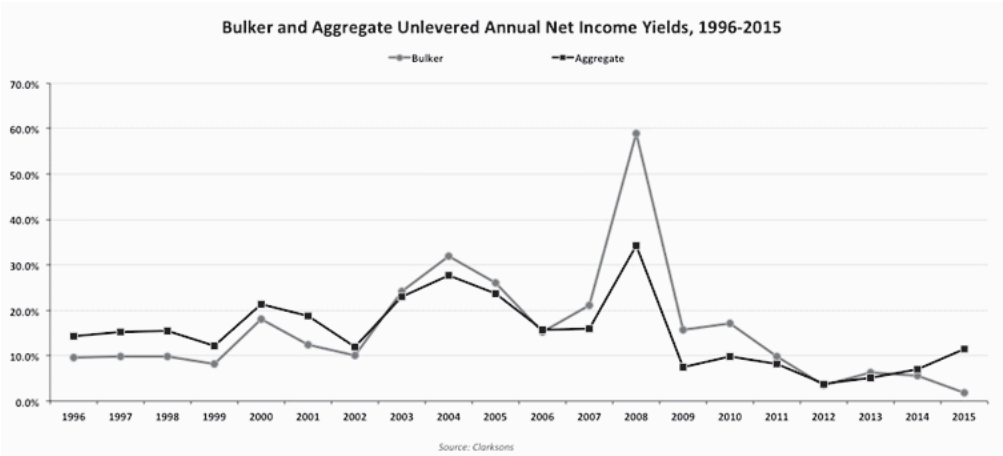


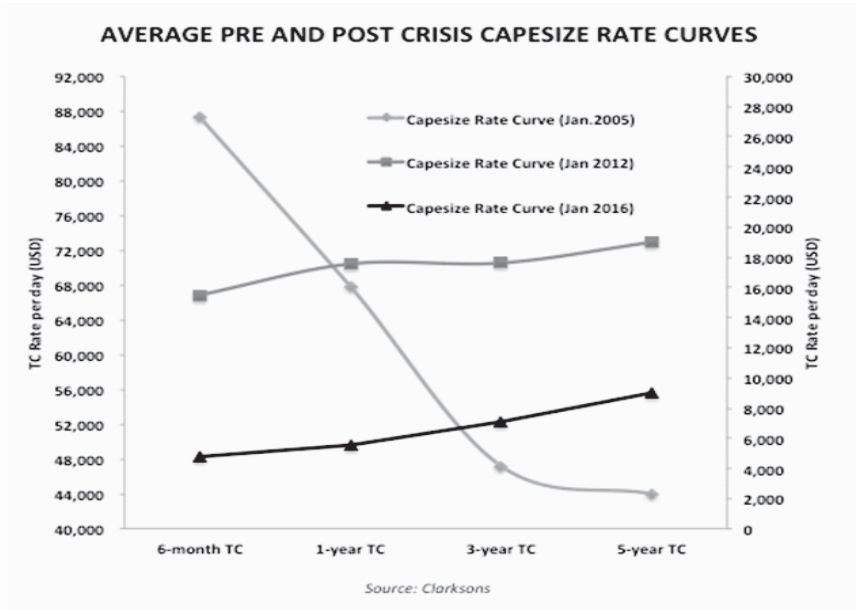
Figure 7: Bulker & Aggregate Shipping Unlevered Annual Net Income Yields (1996-2015)



So if we define risk as the risk of losing an investor's investment capital, then the answer must be that bulk shipping is low risk only if equity capital is adopted since debt financing is likely to threaten mispriced maritime investments in the presence of volatile earnings.

Unlike a normal yield curve in the fixed income market, where longer-maturity bonds have a higher yield than shorter-maturity bonds, in the firmer pre-crisis shipping market, longer-term time-charters fell below spot market rates, resulting in a downward-sloping curve. Further out in time, ship-owners were willing to accept reduced rates to lock in revenues. In this scenario, a 5-year charter generated lower average revenues than as compared to a 3-year charter, which in turn generated a lower rate than a 1-year charter. This negative time-preference reflects market risks associated with perceived imbalances in supply and demand. On the other hand, in a depressed market, the curve can be inverted and slope upward. If rates are expected to rise, charterers are willing to pay a premium in order to lock-in lower charter rates, and equally, ship-owners will demand higher compensation to forgo revenue opportunities in a rising market. With spot rates across market segments trading below long-term averages, we may observe a curve inversion in time-charter rates. For example, we may contrast the average capesize time-charter rate curve in the firmer pre-crisis dry bulk market against the average post-crisis time-charter rate curves (figure 8).

Figure 8: Capesize Timecharter Rate Curves



The pre-crisis curve exhibited a typical capacity-constrained bulk-shipping market. Time-charter rates declined from 2004 to 2007 as the time-charter period extended (e.g. Jan. 2005 capesize rate curve). In contrast, in the post-crisis period, time-charter rates were upward sloping along the curve from spot rates to 5-year time-charter rates. The Jan. 2012 capesize rate curve reflected a false dawn with over-capacity still apparent. However, the Jan.2016 capesize rate curve reflects a real bottom in the market as the

supply and demand of bulk shipping moved into equilibrium. The current environment presents a two-fold opportunity. Low historical asset values, together with firming time-charter rates, creates the potential for yields above those in other asset classes. Additionally, as the market improves, so the residual value is likely to also increase, confirming that investing in maritime assets provides for both income and capital appreciation.

In terms of determining net income or earnings before interest and depreciation (EBID), charter revenues consist of time-charter equivalent (TCE) rates less vessel operating expenses or daily running costs (DRC). Vessel incomes are typically derived from voyage, time-charter or bare-boat contracts and can be summarized (table 2) as follows:

Table 2: Summary of Main Shipping Contracts

	Voyage Charter	Time-Charter	Bare-boat Charter
Contract Length	Single voyage (or COA)	Single trip, short period (2/4, 3/5 or 4/6 months) or long-period (1 year or more)	Long-period (1 year or more)
Hire Rate[1]	· USD/MT (bulkers) · Worldscale (tankers) · USD/TEU or FEU (containers)	USD/day	USD/day
Voyage Expenses[2]	Ship-owner pays	Charterer pays	Charterer pays
Vessel OPEX[3]	Ship-owner pays	Ship-owner pays	Charterer pays
Off-hire[4]	Charterer does not pay	Ship-owner pays	Charterer pays

1 The hire rate refers to the basic payment mechanism from the charterer to the ship-owner for the use of the vessel. Bulkers are paid in USD / metric tonne (MT) multiplied by the number of tonnes of cargo carried. Tankers are paid according to a flat Worldscale rate for specific ports of call multiplied by the negotiated WS rate in the charter (e.g. WS100 flat rate of USD 5.00/MT and a negotiated WS80, would mean the freight rate is USD 5.00/MT x 80% = USD 4.00/MT). Containerships are paid USD per twenty or forty equivalent units (TEU or FEU), denoting the size of container (20' or 40') carried. Most of the voyage income is paid upon loading and the balance is paid together with the settlement of voyage accounts.

2 Voyage expenses includes all expenses associated to a single voyage and includes port and canal costs, voyage and port fuel costs (IFO) and marine diesel oil (MDO) costs, voyage routing costs, in lieu of hold cleaning (ILOHC) expenses, voyage communication/victualing/entertainment (CVE) expenses, insurance and less any demurrage or plus any despatch costs for time in port.

3 Vessel operating expenses (OPEX), or daily running costs (DRC), include crewing, victualing, repairs and maintenance, insurance, stores, spares, lube oils, ship-management fee, registration/classification and other miscellaneous costs.

4 Off-hire refers to the period of time a vessel is not available for service.

Given that the capesize bulk-carrier is the most important segment of the bulker fleet, we have developed a maritime return on investment (MROI) model as alternative to other assets. With global equities recently generating a 2.5% dividend yield and global fixed income a yield of 1.8% (J. P. Morgan, 2015), capital markets are no longer providing the returns necessary for global investors. Classical economists understood that a 'normal profit' is whatever the market participants are prepared to settle for, and shipping companies typically reflect perfect competition, where barriers to competition hardly exist (Stopford, 2009, p.324). "The unit of the private property economy was the firm of medium size. Its typical legal form was the private partnership. Barring the 'sleeping partner', it was typically managed by the owner or owners, a fact that it is important to keep in mind in any effort to understand 'classical' economics" (Schumpeter, 1994, p.545). This description not only mirrors the private equity structure, but also fits the description of many Asian or European shipping companies operating in the bulk or tanker trades. Furthermore, ship-ownership and management is akin to asset management where investors accept market risk and reward in search of income and capital appreciation. The shipping company's risk is therefore determined by its business strategy and not just merely the shipping cycle itself.

In developing an international shipping investment model, we can consider a hypothetical shipping company trading capesize bulk-carriers over 20 years between 1996 and 2015. Earnings before interest and depreciation (EBID) is a function of the average time-charter equivalent (TCE) earnings for a 10-year old capesize bulk-carrier over 355 operating days, less vessel operating costs (OPEX) or daily running costs (DRC) over 365 days. The age and size of fleet is maintained throughout in order to reflect economic depreciation. The fleet consists of 20 vessels aged 1-20 years old so that the average age of the fleet is 10 years old. Whilst depreciation is not a fixed cost since it is treated as a non-cash item, replacement is dealt with annually out of cash flow, with a newbuilding purchased for cash at current market prices and the oldest sold for scrap at the prevailing demolition price.

Depreciation is therefore defined as the cash replacement cost of one vessel. This also allows the flexibility for deferment of depreciation, if market conditions tighten where operating income does not cover replacement and the company can delay an acquisition in favour of an older vessel trading on for a period of time until the

market recovers. Capital gain is a function of the change in the average market price of a 10-year old capesize bulk-carrier, to determine the fleet value year-over-year. This will not reflect true appreciation as the replacement cost of the fleet has also increased, and the company has the same maritime assets it began with. Changes in economic value added (EVA) equals EBID, depreciation and capital gain for the current year, which determines the change in net asset value (NAV) for that year. The maritime time return on investment (MROI) is the percentage return of annual EVA in the current period over the NAV in the previous period. The average MROI over 20 years is an unlevered net return on investment that captures both income and capital appreciation.

Thus, our capesize bulk-carrier shipping company (table 3) earned USD 3,937.5 Mn in EBID over 20 years. It spent USD 925.9 Mn cash in fleet replacement, leaving USD 3,001.6 Mn in free cash-flow. The fleet increased in value from USD 380 Mn to USD 2,100 Mn in 2007 just prior the global financial crisis and subsequently reduced to USD 270 Mn by 2015, reflecting a decline in capital of USD 110 Mn over the 20-year period. Hence, the total EVA was USD 2,902 Mn (= 3,937.5 - 925.9 - 110), such that the NAV increased from USD 380 Mn to USD 3,282 Mn. Although the standard deviation of TCE earnings was 69% suggesting a risky investment from the perspective of capital market financial assets, the unlevered net MROI of 13.9% and the unlevered IRR of 25.88% (tables 3 and 4), confirms a not so risky debt-free and tax-free investment. At the time of the global financial crisis in 2008, projected bulker fleet growth was 59.2% for the 3 years from 2008-2010, whilst projected GDP was only 8.4%, thus our ship-owner would likely have anticipated market over supply in relation to demand, selling assets and deferring new acquisitions to maximize capital gain, but even still, the model was internally financed from equity and EBID was positive throughout.

Table 1: Capesize Bulkcarrier Maritime Return on Investment Analysis (1995-2015)

				EBID			**Dep**				**Cap.**			**EVA**	**NAV**	**MROI**
				Earnings Before Interest and Depreciation			Cash Replacement Cost of One Vessel					Capital Gain				
Year	No. of Vessels in Fleet	TCE $/day	less DRC $/day	EBID ($ Mn)	NB Price ($ Mn)	Light Displ. (ldt)	Scrap Price/ldt	Demolition Price ($ Mn)	Replacement Cost ($ Mn)	10-Yr Old Market Price ($ Mn)	Fleet Value ($ Mn)	Capital Gain/(Loss) ($ Mn)	EVA ($ Mn)	NAV ($ Mn)	%
t	F	TCE	OPEX	EBID	NP	LDT	SP	DP=LDT.SP	DP-NP	MP	F.MP	Cap	EBID+Dep+Cap		
1995	20	20,419								19.0	**380.0**			**380.0**	
1996	20	12,072	3,872	57.4	39.0	20,100	155	3.1	-35.9	15.0	300.0	-80.0	-58.4	321.6	-15.4
1997	20	15,109	3,992	78.1	40.5	20,100	155	3.1	-37.4	18.5	370.0	70.0	110.7	432.3	34.4
1998	20	12,775	4,115	60.7	33.0	20,100	106	2.1	-30.9	14.5	290.0	-80.0	-50.2	382.1	-11.6
1999	20	12,480	4,243	57.6	35.0	20,100	140	2.8	-32.2	17.5	350.0	60.0	85.5	467.5	22.4
2000	20	24,280	4,374	140.5	40.5	20,100	169	3.4	-37.1	19.0	380.0	30.0	133.4	600.9	28.5
2001	20	15,374	4,418	76.9	36.0	20,100	135	2.7	-33.3	16.5	330.0	-50.0	-6.4	594.5	-1.1
2002	20	13,323	4,199	63.9	36.3	20,100	178	3.6	-32.7	20.5	410.0	80.0	111.3	705.8	18.7
2003	20	41,135	4,593	258.5	48.0	20,100	260	5.2	-42.8	32.0	640.0	230.0	445.8	1151.5	63.2
2004	20	70,196	5,161	460.7	64.0	20,100	372	7.5	-56.5	46.0	920.0	280.0	684.2	1835.7	59.4
2005	20	51,451	5,336	326.3	59.0	20,100	325	6.5	-52.5	38.0	760.0	-160.0	113.9	1949.6	6.2
2006	20	44,732	5,905	274.5	68.0	20,100	390	7.8	-60.2	62.0	1240.0	480.0	694.3	2644.0	35.6
2007	20	111,380	6,342	744.5	97.0	20,100	470	9.4	-87.6	105.0	2100.0	860.0	1516.9	4160.9	57.4
2008	20	97,699	7,523	638.7	88.0	20,100	270	5.4	-82.6	31.0	620.0	-1480.0	-923.8	3237.1	-22.2
2009	20	42,971	7,479	250.5	56.0	20,100	330	6.6	-49.4	44.0	880.0	260.0	461.1	3698.2	14.2
2010	20	34,381	7,698	187.9	57.0	20,100	460	9.2	-47.8	38.0	760.0	-120.0	20.2	3718.4	0.5
2011	20	19,753	7,829	83.1	48.5	20,100	460	9.2	-39.3	26.5	530.0	-230.0	-186.2	3532.2	-5.0
2012	20	11,231	7,567	24.5	46.0	20,100	410	8.2	-37.8	21.0	420.0	-110.0	-123.3	3408.9	-3.5
2013	20	18,834	7,392	79.8	53.5	20,100	430	8.6	-44.9	31.0	620.0	200.0	234.9	3643.8	6.9
2014	20	16,315	7,348	62.2	54.0	20,100	440	8.8	-45.2	27.5	550.0	-70.0	-53.0	3590.9	-1.5
2015	20	9,060	7,304	11.0	46.0	20,100	285	5.7	-40.3	13.5	**270.0**	-280.0	-309.3	**3281.6**	-8.6
	$ Mn:	4,789.3	851.8	**3937.5**	1045.3			119.4	**-925.9**			**-110**	**2902**		**13.9%**

Table 4: Capesize Bulkcarrier IRR and NPV Analysis (1995-2015)

Year	NCF ($ Mn)	*r*	PVF	PV	FV ($ Mn)	*r*	PVF	PV
1995	-380.0		1	-380.0				
1996	-58.4	0.2588	0.7944	-46.4	-58.4	0.1000	0.9091	-53.1
1997	110.7	0.2588	0.6311	69.9	110.7	0.1000	0.8264	91.5
1998	-50.2	0.2588	0.5014	-25.2	-50.2	0.1000	0.7513	-37.7
1999	85.5	0.2588	0.3983	34.0	85.5	0.1000	0.6830	58.4
2000	133.4	0.2588	0.3164	42.2	133.4	0.1000	0.6209	82.8
2001	-6.4	0.2588	0.2514	-1.6	-6.4	0.1000	0.5645	-3.6
2002	111.3	0.2588	0.1997	22.2	111.3	0.1000	0.5132	57.1
2003	445.8	0.2588	0.1586	70.7	445.8	0.1000	0.4665	207.9
2004	684.2	0.2588	0.1260	86.2	684.2	0.1000	0.4241	290.2
2005	113.9	0.2588	0.1001	11.4	113.9	0.1000	0.3855	43.9
2006	694.3	0.2588	0.0795	55.2	694.3	0.1000	0.3505	243.4
2007	1,516.9	0.2588	0.0632	95.8	1,516.9	0.1000	0.3186	483.3
2008	-923.8	0.2588	0.0502	-46.4	-923.8	0.1000	0.2897	-267.6
2009	461.1	0.2588	0.0399	18.4	461.1	0.1000	0.2633	121.4
2010	20.2	0.2588	0.0317	0.6	20.2	0.1000	0.2394	4.8
2011	-186.2	0.2588	0.0252	-4.7	-186.2	0.1000	0.2176	-40.5
2012	-123.3	0.2588	0.0200	-2.5	-123.3	0.1000	0.1978	-24.4
2013	234.9	0.2588	0.0159	3.7	234.9	0.1000	0.1799	42.2
2014	-53.0	0.2588	0.0126	-0.7	-53.0	0.1000	0.1635	-8.7
2015	-309.3	0.2588	0.0100	-3.1	-309.3	0.1000	0.1486	-46.0
IRR	**25.88%**		**NPV**	**0**	**2902**			**1245**

The IRR of 25.88% returns the NPV to zero (table 4), whilst with a required rate of return (r) of 10%, the NPV is USD 1.245 Bn. In terms of investment or disinvestment decision-making, opportunities can be identified for vessel trade sales, by a comparison of market prices (MP) and NPV and also the IRR in relation to the risk-equivalent required rate of return (r). Vessel prices lower than the NPV (where the NPV > 0) represent a buying opportunity for an investor, whilst market prices higher than the NPV represent a selling opportunity for a ship-owner. Equally, mispriced vessels can be determined by equating the IRR to the required rate of return (r). If the expected IRR of a vessel is higher than the required rate of return (r) then the MP of vessels is cheap and investors should buy, whilst if the IRR is below the required rate of return (r), the MP of vessels are expensive and would therefore represent selling opportunity for the ship-owner (table 5).

Table 5: NPV, IRR Investment / Disinvestment Decision

Analysis	Stakeholder	Decision
MP > NPV	Investor	Don't buy
	Ship-owner	Sell
MP < NPV	Investor	Buy
	Ship-owner	Don't sell
IRR < *r*	Investor	Don't buy
	Ship-owner	Sell
IRR > *r*	Investor	Buy
	Ship-owner	Don't sell

A profitability index can also facilitate an investment decision. Assuming the PV of expected future cash flows, discounted at 10% are USD 1.245 Bn (from table 4) and the initial capital invested was USD 380 Mn, then the PI is 3.28 (table 6). A NPV clearly depends on the size of the initial investment, thus the PI can also facilitate investment opportunities by ranking. The capesize bulk-carrier profitability index can broadly be compa red to other maritime segments, other vessel classes within the bulk carrier segment, or can be applied to different types of vessels within the same vessel class (i.e. between individual capesizes).

Table 6 : Profitability Index and Investment Decision for Capesize Bulkcarriers (1995-2015)

$$\text{Profitability Index} = \frac{\text{PV of Future Incoming Cash Flows Discounted @ 10\%}}{\text{PV of Outgoing Cash Flows (Initial Capital Invested)}} = \frac{1{,}245}{380} = \mathbf{3.28}$$

Profitability Index Investment Decision:
- If > 1.0 then accept the investment
- If < 1.0 then reject the investment
- If = 1.0 then depends on other criteria

In any case, from our data we can identify the opening NAV, EVA and closing NAV (table 3) and determine (table 7) the investment multiple or the multiple on invested capital (MOIC = EVA / Opening NAV). Although the MOIC does not take into account the TVM, it nonetheless provides an important insight as to private equity fund performance for investors.

Table 7: Multiple of Invested Capital for Capesize Bulkcarriers (1995-2015)

Fund Value	USD (Mn)	MOIC
Opening NAV	380.0	
EVA	2,902	**7.64**
Closing NAV	3,282	

Additionally, in terms of balance sheet valuation, the discounted cash flow approach is widely accepted for accounting and reporting standards, with regard to the impairment testing of assets, to ensure that at each balance sheet date, "the vessel's carrying amount is not higher that its recoverable amount, which is defined as the higher of the vessel's fair value less costs to sell and its value in use" (Mayr, 2015, p.161). As such, a vessel's fair value is reflected in the market price of an arm's-length transaction between willing parties, whilst the value in use is the PV of expected future cash flows and disposal at the end of its economic life.

In summary, our mark-to-model analysis involved an initial equity investment in 20 capesize bulk-carriers over a period of 20 years from 1996-2015, with an average age of 10 years and internally financing fleet replacement from cash flow. The standard deviation of time-charter equivalent (TCE) earnings was 69% suggesting a risky investment from the perspective of capital market financial assets. However, with an average unlevered MROI of 13.9% and an unlevered IRR of 25.9%, investing in capesize bulk-carriers has proven to be a very profitable tax-free business, as reflected in both the profitability index of 3.28 and an MOIC of 7.64. Notwithstanding the volatility of earnings, the investment was surprisingly safe and would certainly be of interest to affluent retail, HNWI investors or institutional investors, whether insurance/takaful companies, public or private foundations or other public or private pension and investment funds including sovereign wealth funds. With assets of USD 3.3 Bn, such an investment, if packaged through a private-equity shipping fund, could be managed with an office staff of no more than twenty and even less with the technical management sub-contracted to a professional third-party ship-manager as is often the case in international shipping.

The commercial opportunities for an entrepreneurial ship-owner are extensive, such that through the opportune sale and purchase of vessels at the correct time in the shipping cycle combined with intelligent time-chartering out of owned vessels, bareboat leasing in and time-chartering in of third party vessels, ship-owning profitability can be substantially enhanced. Furthermore, ship-owners can become ship-operators or freight traders, by contracting in third-party cargoes and contracts of affreightment (COAs) and covering them with owned vessels, time-chartered in, or voyage-chartered vessels, such that the margins for the capesize bulk-carrier ship-owner/operator can be improved still further. Of course, there are then similar opportunities in other vessel types within the bulk-carrier segment, such as for example with panamaxes, supramaxes and handymaxes, let alone other vessel types within the other primary shipping segments including tankers and containerships. Even mispriced vessels can survive volatile earnings if financed through equity, but most ship-owners are financed involving ship-lending and structured debt finance, which has

significantly decompressed earnings and threatens the survivability of ship-owners post global financial crisis. Current depressed prices currently reflect this, but they also reveal an excellent entry level for potential equity investors.

6.0 CONCLUSION

In this paper, we have analyzed the performance for Islamic retail and institutional equity investors to investment in the bulk-carrier segment of international shipping assuming Islamic private equity structures based on the primary Islamic equity investment contracts of mudharabah and musharakah. In order to appraise such investments Islamic equity investors must accept market risk and adopt investment analysis. In terms of communicating risk and reward, we then presented our investment analysis over 20 years in terms of net unlevered IRRs, net unlevered income yields and standard deviation measures of risk and reward for bulk-carriers. We also developed investment analysis for a maritime returns on investment (MROI), IRRs, a multiple of invested capital (MOIC) and a profitability index, of capesize bulk-carriers given their role in the bulk-carrier shipping segment.

In summary, our mark-to-model analysis involved an initial equity investment in 20 capesize bulk-carriers over a period of 20 years from 1996-2015, with an average age of 10 years and internally financing fleet replacement from cash flow. The standard deviation of time-charter earnings was 69% suggesting a very risky investment from the perspective of capital market financial assets. However, with an MROI of 13.9% and an unlevered IRR of 25.88%, investing in capsize bulk-carriers has proven to be a profitable business, as reflected in both the profitability index of 3.28 and an MOIC of 7.64. Notwithstanding the volatility of earnings and advent of larger 'Valemax' designs, the investment was still safe with assets of USD 3.282 Bn (NAV), involving tax-free and debt-free investments, which could be packaged through an Islamic private-equity shipping fund to retail and institutional investors. Therefore, absent of debt, the results show that even when the capesize bulk-carrier market is in over-supply, historical long-term analysis demonstrates that cash-flow is still positive and the risk of losing one's investment capital is low.

In fact, there is an array of potential target investments including crude oil tankers, products tankers, chemical tankers, bulk-carriers, liquefied natural gas (LNG) carriers, liquefied petroleum gas (LPG) carriers and containerships with their respective homogeneous vessel types within each segment. Indeed, these types of international maritime assets were exactly targeted by J. P. Morgan Asset Management's private

equity Global Maritime Investment Fund (J. P. Morgan, 2015), which raised USD 780 Bn in commitments from institutional investors between 2010 and 2014, including even a USD 25 Mn from the Omaha Schools Employee's Retirement System (OSERS), Douglas County (J. P. Morgan, 2014). Omaha, Nebraska is in the middle of the United States without any maritime heritage. Presumably for OSERS, it was a suitable tax-efficient long-term investment that formed part of their asset allocation mix in terms of private equity, even though GMIF was a start-up. Given exceptionally low asset prices, there is currently an enormous investment opportunity available to Islamic equity investors, with the participation of IFIs as well as Pension and Investment institutions, to appreciate the importance of and participate in the development of international shipping, which would expand Islamic finance through equity investment rather than debt finance, at both the national and international level.

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