

CONSIDERATIONS ON THE FINANCIAL RISKS IN THE SHIPPING INDUSTRY

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ABSTRACT

In general, business-risk management is concerned with the possible decline in the value of a shipping company due to an event, or a change, in any of the factors that affect its value. Fundamentally, the value of a company depends on the expected net cash flows from its operations. Therefore, any factor that may have a negative impact on the expected net cash flows is identified as a risk. Due to the capital-intensive nature of shipping and the fact that most vessel acquisitions are financed through term loans priced on a floating-rate basis, unanticipated changes in interest rates may have an adverse impact on the assets and liabilities of a company and can lead to severe liquidity problems and cash-flow mismatch, especially given the business-cycle dynamics of shipping markets. Consequently, interest-rate risk measurement and mitigation is an indispensable aspect of shipping risk management.

Keywords: *risk management, hedging, forward-rate agreement, interest-rate futures, interest-rate swaps, interest-rate options*

1. INTRODUCTION

Risks are embedded in any business activity. For a shipowner, the decision to invest in a vessel may signify his belief that freight rates will go up, earning him a return on his investment that is higher than the risk-free interest rate. His decision to invest creates at the same time a natural exposure to freight rates, accepting the risk that freight rates may in fact go down. Risks are simply unavoidable in any profit-taking activity.

In addition to fluctuations of freight rates, bunker prices and asset prices, unanticipated interest rate changes justify a substantial fraction of the shipping risk management function. Unanticipated changes in interest rates may create cash flow and liquidity problems for companies which may no longer be able to service their debt obligations. Vast amounts of capital are required for the financing needs of shipping companies, the majority of which are provided through loans via international commercial banks. Shipping finance structure has changed as the industry evolves and becomes more mature, with sophisticated financial instruments and well-informed market participants. Interest-rate risk is directly related to the individual debt structure of the company, since the elevated gearing ratios of shipping companies involve liabilities susceptible to interest-rate instability. Furthermore, most shipping loans are quoted in US dollars. If debt and revenues are denominated in different currencies, this exposes the borrower to exchange-rate risk. Hence, shipping companies face another aspect of risk, namely currency risk, which is directly related to interest-rate exposure, since each currency is linked with a different interest rate yield curve. These facts provide evidence that interest-rate risk measurement and mitigation is an indispensable aspect of shipping risk management.

2. RISK MANAGEMENT IN SHIPPING

There is a wide misconception among practitioners who consider risk management as synonymous to

hedging. This is an oversimplification and does not reflect the true dimension of risk management. In fact, risk management is a three-step process: risk modelling which implies identifying the underlying risk factors and modelling their dynamics, risk measurement which implies quantifying the impact of risk factors on financial results and risk management which implies controlling risk with risk-informed decision making.

Risk management does not necessarily imply risk reduction. In fact, the objective of risk management is not to reduce risk, but more importantly to quantify and control risk. Most of the times, the intention is not to eliminate risk, but rather to alter our risk profile according to the prevailing market conditions, our risk preferences, and potential regulatory or contractual requirements. In this context, hedging is just one possible alternative for the active management of risk.

There are two components of our inability to be able to precisely predict what the future holds: these are variability and uncertainty. Risk management can do very little to reduce variability (markets will continue to fluctuate no matter how advanced risk management gets), but can be very effective in reducing uncertainty for those involved in risk-taking decisions.

Most industries can distinguish between business risks and market risks. Other industries cannot distinguish between business risks and market risks. Shipping can be said to belong to the industries that cannot distinguish between business risks and market risks. Financial results in shipping are directly affected by movements in the world's freight rate markets. Freight rates have historically been very volatile. The impact of unforeseen geo-political events and the slow speed of adjusting supply to demand have often resulted in dramatic fluctuations in the level of freight rates. Fluctuations in freight rates directly affect fleet cash flow and cash flow performance is the topmost concern in shipping, both from an owner and a lender perspective. So, what really matters when measuring freight market risk is the impact of freight rate variability on cash flow performance. Shipowners are in effect in

the business of managing shipping risk affecting a portfolio of physical assets, rather than simply managing a fleet of vessels.

Risk management in shipping is also justified by various industry inefficiencies. Regarding the capital needs, shipping is a capital intensive industry with significant funding needs for fleet expansion and replacement purposes. Yet, it has very limited opportunities to diversify its sources of funding, as most of its financing comes in the form of bank debt. Secondly, regarding the bond between asset and liability, asset economic life is usually much longer than the term of debt financing, variable revenues meet fixed debt obligations and there is a high positive correlation between freight rates and vessel values, leading to a situation of low collateral support when default is most likely. Finally, many banks tend to be influenced by the general sentiment of shipping markets: they appear more willing to lend when the market (and vessel prices) is high, despite the fact that the market will eventually revert back to lower levels; in contrast, they appear rather hesitant to extend credit at a period of low freight rates, although these are likely to rise to more sustainable levels.

3. TYPE OF LOANS

The majority of ship finance is carried out through plain vanilla term loans. These loans are financial products of international commercial banks and refer to a specified amount of money, called drawdown, for a specific maturity (usually above three years) depending on the qualitative and quantitative characteristics of the asset to be financed, such as whether it is a newbuilding or a second-hand vessel, the vessel's age or market conditions. The borrower makes periodic interest payments plus repayments of capital according to a pre-specified amortization schedule. The most common reference rate is either the three-, six-, and 12-month LIBOR rates and is reset at regular intervals, every three or six or 12 months, respectively. In addition to LIBOR rates, borrowers pay a spread of usually 0.5 per cent to 3 per cent over the floating rate which reflects the creditworthiness, terms of credit, general business and financial risk as well as the bank's profit margin.

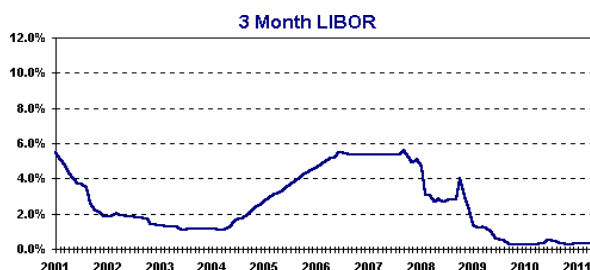


Figure 1 The evolution of 3 Month LIBOR

The contractual structure of term loans is negotiated on the basis of the creditworthiness of the shipping company and the financier's confidence in the company's corporate management and investment plan. The financial status of the potential borrower is cautiously examined, because the probability of default

of the candidate company will determine the decision and the terms of funding. Term loans are flexible and the repayment schedule can be arranged to meet the demands of the borrower. A fixed-rate loan has a uniform interest rate until maturity, whereas a floating-rate loan has an interest rate reset at predetermined time intervals. We can note that fixed-rate loans are beneficial for borrowers if interest rates in the market increase above the fixed rate; similarly, fixed-rate loans are beneficial for lenders if interest rates in the market decrease below the fixed rate level. Regarding the floating-rate loans, borrowers can benefit from falling LIBOR rates, but if interest rates increase they will be exposed to higher interest payments.

A common repayment plan involves equal instalments, consisting of constant payments. Each payment includes an amount of the principal plus the accrued interest on the unpaid balance. A more frequent repayment schedule is to assume unequal instalments because yields on shipping loans are attached to the benchmark LIBOR. Moreover, a balloon repayment may be arranged which involves a large lump-sum payment of the outstanding capital due at or near the maturity date of the loan. The main purpose of the balloon payment is to reduce substantially the size of the periodic payments, whereas the balloon payment will usually be covered by the resale or scrap value of the vessel. Obviously, this strategy generates residual value risk and as an alternative, if market expectations permit, it is not uncommon to spread out the balloon payment by refinancing and/or restructuring the loan. If the balloon repayment refers to the payment of the entire capital upon maturity, this payment is known as bullet repayment. However, due to the capital-intensive nature of the shipping industry, bullet payments are not common. Other clauses may include a moratorium, where the lender is authorized to permit suspension of capital repayments for a period known as grace or holiday period, which may often last one or two years immediately following the commencement of the loan agreement.

4. METHODS OF REDUCING THE FINANCIAL RISK

In finance, hedging is the strategy of mitigating risk exposure by establishing an offsetting position in the derivatives market. Derivate markets allow market agents to minimize their exposure to risk by reducing the variance of their portfolio. Hence risk-management tools and their effectiveness in terms of hedging are of utmost importance. The hedging techniques and instruments used to hedge interest rate risk include interest-rate forwards, called "forward rate agreements", interest-rate futures, interest-rate swaps and interest-rate options.

A forward-rate agreement is a bilateral contract to exchange interest-rate payments on a notional amount, at a certain future date, over a specified time interval. The underlying asset for the FRA contracts is usually a LIBOR rate with a specified maturity, but other reference rates can be agreed as well. FRA contracts are over-the-counter cash-settled contracts on the difference between the interest rate stipulated in the contract and

the prevailing interest rate at maturity. Hence, FRAs are off-balance-sheet transactions; there are no up-front margin requirements and they are not marked-to-market. A wide range of maturities is available, starting from a few days up to terms of several years. However, three, six, nine and 12 months are usually more liquid. Each payment on the differential between FRA rate and current spot rate is settled at the beginning of each period. Because interest payments accrue from the loan's commencement date and are not due until maturity, each payment should be discounted accordingly.

Regarding the mechanism of FRAs, if interest rates rise above the agreed rate then the seller of the FRA pays the buyer the increased interest expense. Similarly, if interest rates fall below the agreed rate the buyer of the FRA pays the seller the increased-rate cost. Because a FRA contract is used to hedge a single-period interest payment, usually a strip of FRAs is required to fully hedge a term loan. A portfolio of FRAs is equivalent to a plain vanilla swap.

Futures contracts on interest rates are extremely liquid, with high traded volumes and open interest, because interest-rate volatility affects a wide range of market participants. Interest-rate futures are standardized contracts, traded in organized exchanges and thus do not incorporate credit risk as do over-the-counter derivatives contracts.

Futures contracts on interest rates are quoted as 100 minus the implied interest rate or yield. Therefore, when interest rates increase, interest rate futures decrease and vice-versa. Consequently, borrowers in the market wishing to hedge their interest-rate risk will be sellers of futures and lenders will be buyers. Hedging with interest-rate futures works in the same way as it does with FRA contracts. The main advantage compared to the FRA market is that because the contracts are exchange-traded, credit risk is reduced. On the other hand, FRA contracts do not require any cash outflows prior to maturity whereas for futures contracts both initial-margin requirements and daily marking-to-market have to be considered because they may cause liquidity problems if the participant cannot meet margin call payments.

Because a single-maturity FRA contract can only hedge a single reset period, a strip of FRAs is required to fully hedge a term loan. In this case, it is common to bundle this strip of FRAs as a single contract with a common price across all maturities. Such a contract is called an interest-rate swap. An interest-rate swap is a bilateral OTC contractual agreement to exchange streams of interest payments for a specific maturity, called the tenor, based on a notional principal. The notional principal is only used for the purposes of calculating interest payments and is not exchanged between the two parties. In its basic form, also called a plain vanilla swap, the contract involves the exchange of a fixed-for-floating interest payment. However, floating-for-floating swaps, called basis swaps, are also possible.

Swap transactions involve intermediaries, usually banks that get commission and brokerage fees for their services. It should be noted that usually for a shipping company, the swap will be arranged directly through the lending bank and in most cases, the shipowner will

simply be paying the fixed rate instead of paying or receiving the offsetting cash flows.

Valuation of financial derivatives is vital from a risk-management perspective and any portfolio of derivatives contracts should be valued on a daily basis. At the initiation of the swap agreement, the value of the contract will have zero market value; this is a no-arbitrage condition and implies that in order for the deal to be fairly priced, the present values of the expected floating and fixed stream of payments should be equal. The value of the swap today describes how much the swap is worth today and thus the amount of money the counter-parties have to pay or receive in order to terminate the contract early. Calculating the value of the swap is important because it enables companies to mark-to-market their positions and also calculate their counter-party exposure for each swap transaction. Although not all swaps can be settled prior to expiry, they can change hands under the approval of the swap facilitator who has to verify the creditworthiness of the new counter-parties. A common alternative way to unwind the swap is to neutralize the swap payments by reversing the position and agreeing another offsetting swap contract. Nowadays, cancellable swaps exist, but the embedded option to cancel makes these transactions more complex and more expensive.

Swaps are very useful hedging tools and provide an effective hedge against fluctuations in interest rates. However, a borrower is locked into a fixed rate and cannot take advantage of any decrease in the level of interest rates in the market. Interest-rate options provide a more flexible alternative.

"Caplets" and "floorlets" are risk-management tools, designed to provide insurance by setting a maximum (cap) and a minimum (floor) floating rate respectively for a certain interest-rate period. A caplet is defined as a long position on a single call option on an underlying interest rate. An interest rate caplet gives its holder the opportunity to limit any possible future losses due to an increase in interest rates. The purchase of the call option compensates the floating-rate borrower in the case of an interest-rate rise and provides an upper bound on the spot interest-rate payment which the borrower has to pay at expiry. A floorlet, on the other hand, is defined as a long position on a single put option on an underlying asset. An interest-rate floorlet gives its holder the opportunity to limit any possible future losses due to a drop in interest rates. The purchase of the put option compensates the floating-rate lender/investor in the case of an interest-rate fall and provides a lower bound on the spot interest-rate payment that the investor receives at expiry. Caps and floors are structured on the basis of a specific reference rate, for example, three-month LIBOR, which is reset at regular intervals. A caplet (long call) pays at expiry an amount equal to the difference between the spot interest rate and the strike rate, if this amount is positive, and zero otherwise. In the same way, a floorlet (long put) pays at expiry an amount equal to the difference between the strike rate and spot interest rate, if this amount is positive, and zero otherwise.

Caplets and floorlets are used to hedge interest-rate risk over a single reset period. In practice, in order to

hedge a term loan with multiple resets, we require multiple caplets that cover successive interest-rate periods. A “cap” is a portfolio of two or more caplets with the same exercise price but different maturity dates, while a “floor” is a portfolio of two or more floorlets with the same exercise price but different maturities. Therefore, both pricing and hedging techniques for caps and floors are the same as those used in the case of caplets and floorlets.

Collars are very effective risk-management instruments designed to confine the gains and losses of the potential holder of the instrument within certain limits. Collars are a combination of caps and floors, which allow the profit/loss of the investor to be limited to a maximum (cap) and minimum (floor). For example, a shipowner who plans to borrow a certain amount of capital in the future can buy an interest-rate call option (cap) and sell an interest-rate put option (floor) with a notional principal equal to the amount of the loan and expiration dates that match the tenor of the loan. If the shipowner is borrowing money at a floating LIBOR rate, the cap will limit any possible future losses due to an increase in interest rates by compensating the borrower at each reset. For this insurance, the shipowner will pay a cap premium. A way to offset the higher premium is to sell a put option for the same maturity but lower strike and receive the floor premium. However, by doing so, potential profits are limited if interest rates fall. The purpose of collars is to limit the effective borrowing cost by setting upper and lower bounds.

A forward swap is a bilateral contractual agreement whereby two counter-parties enter into a swap agreement on a notional specified capital commencing on a pre-determined future date, at a specified swap rate; in other words, it is an interest-rate swap with a forward start date. Forward swaps are useful for securing the future level of swap rates and can also be used for speculation on the future value of the underlying reference rates. On the other hand, in a forward swap, the purchaser has the obligation – rather than the right – to enter into a specified swap agreement with the issuer on a specified future date. It is for this reason that forward swaps are usually traded with embedded options that provide flexibility with respect to exercising the forward swap. These instruments are called “swaptions” (swaps with an option).

A swaption is an OTC contract which gives the purchaser the right – but not the obligation – to enter into a specified swap agreement with the issuer, on or by a specified future date, either as a fixed-rate payer and floating-rate receiver, called a “payer swaption”, or as a fixed-rate receiver and floating-rate payer, called a “receiver swaption”. Therefore, a payer swaption is exercised when interest rates increase and a receiver swaption when the opposite occurs; in other words, a payer swaption is a call option on a forward swap and a receiver swaption is a put option on a forward swap. Swaptions are also used to offset the payments on an existing swap in later years.

In shipping markets, most cash inflows and outflows are US-dollar denominated. For instance, freight rates and bunker prices are quoted in US dollars, while most shipping loans are issued in US dollars in

Eurocurrency markets. However, there are also cases where shipping companies undertake debt issued in currencies other than US dollars. In these cases the corporate management is interested in matching the interest-rate payments to the same currency as their revenues, that is, US dollars. Such an exposure can be managed using currency swaps. A currency swap is a bilateral OTC contractual agreement to exchange the principal and streams of interest payments from one currency to another for a specified time horizon. Unlike interest-rate swaps, the principal actually changes hands, both at the inception and redemption of the deal. Since the cash flows of the two parties are not in the same currency, the counter-parties’ respective payments are made in full.

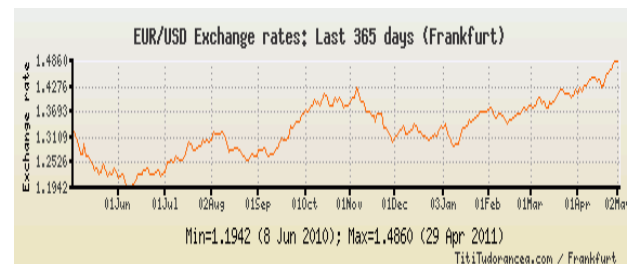


Figure 2 EURO/USD exchange rates historical evolution

5. CONCLUSIONS

The shipping markets are becoming increasingly risky as fluctuations in freight rates and ship prices have increased substantially. This calls for prudent control of not only freight rates and ship prices, but also a range of other financial risks. Therefore, high volatility and cyclicity in rates and prices make risk management a vital issue which takes a central role in the effective strategic management of business.

These risks, if managed effectively, can stabilize cash-flows, with positive repercussions for business in a number of directions. Shipping derivatives have been developed in order to manage risks, emanating from fluctuations in freight rates, bunker prices, vessel prices, scrap prices, interest rates and foreign exchange rates, more effectively, in a cheaper and more flexible manner.

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