



Default risk drivers in shipping bank loans



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ABSTRACT

This paper proposes a credit scoring model for the empirical assessment of default risk drivers of shipping bank loans. A unique dataset, consisting of the credit portfolio of a ship-lending bank is used to estimate a logit model with two-way clustered adjusted standard errors, ensuring robust inferences. Industry specific variables, captured through current and expected conditions in the extremely volatile global shipping freight markets, the risk appetite of borrowers—the shipowners – expressed through the chartering policy they follow – and a pricing variable, are shown for the first time to be the important factors explaining default probabilities of bank loans.

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1. Introduction

The international ocean-going shipping industry is characterized capital intensive as investment to even a single vessel can often require funds in excess of \$100mln, depending on type and size (Stopford, 2009). Such large amounts of capital are not easy to raise. Bank loans to finance shipbuilding's or second-hand ship acquisitions are historically the most popular source of capital in the shipping industry (see Albertijn et al., 2011). They are based on relationship banking and are providing companies with the required capital faster in comparison to other sources of finance. The latter is important in a market where speed of decision making can make the difference when striving to achieve the best deal. Moreover, it leaves the ownership structure of the company unchanged, which is not the case for sources of finance, such as Initial Public Offerings (IPO's). In addition, bank loans do not require the shipping company to disclose its business information to the general public as with IPO's and bond issues – see for instance Kavussanos and Tsouknidis (2014).

Typically, shipping bank loans are assessed by credit analysis departments of banks specializing in transportation and ship finance or by shipping departments of commercial and investment banks lending to the industry. As observed in Fig. 1, the total value of the loans advanced globally to shipping firms fluctuates, in line with the cyclical shipping markets. It remains substantial, reaching a high of \$115 billion in 2007 at the peak of the market, while falling later in 2012 to \$46 billion. Before the subprime financial crisis of 2007–2009, 75% of the external funding in the shipping industry took the form of bank loans. However, this has changed substantially after the subprime crisis period, and the onset of the shipping market

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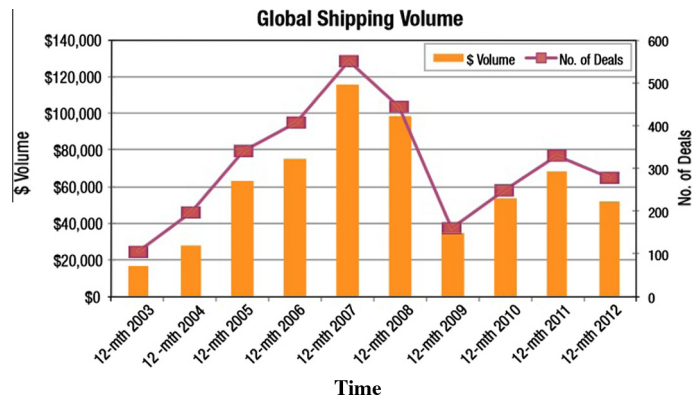


Fig. 1. Total volume and number of deals for global shipping bank loans. *Notes:* This figure presents the total volume and the number of new deals for shipping bank loans worldwide for the period 2002–2012. Volume is in \$ million. Source: Marine Money (based on data by Dealogic).

crisis after the middle of 2008. As a consequence, mainly because of liquidity issues, the substantial restructuring of the banking sector and the very low earnings of shipping freight markets, banks have either decided to withdraw or significantly reduce the financing of the sector. It came to a point when, in 2009 for instance, funding through bank loans only accounted for 32% of the total ship finance market - see [Albertijn et al. \(2011\)](#). During the post 2009 period, banks' main operations shifted from originating new loans to restructuring the repayments of defaulted or technically defaulted¹ shipping bank loans - see [Gong et al. \(2013\)](#). This was a consequence of the excess uncertainty in the global economy and the absence of liquidity in banking - see [Santos \(2011\)](#). However, for the reasons outlined earlier, bank finance is likely to remain the most important source of capital for the financing of the shipping industry.

As experienced in financial markets on a massive scale, starting from 2007, default risk can lead banks and bank-dependent firms to bankruptcy - see for instance [Chava and Purnanandam \(2011\)](#). Therefore, identifying the factors which drive default risk in bank loans is extremely important for the survival of banks and other financial market participants, the stability of the financial system and ultimately the global economy.

Traditionally, loans account for the largest part of total assets in the balance sheets of commercial banks.² Thus, lending activity exposes financial institutions to substantial default risk, as potential default events in individual bank loans lead to losses in the value of the loan portfolio. In this case, at the micro level, the bank's profitability deteriorates, while at the macro level significant losses can affect the stability of the financial system. Specifically, if a default occurs, typically there is negotiation between the two parties where the bank may agree to provide a refinancing of the loan by extending its maturity and/or charge a higher spread. In this case, the borrower is downgraded in the internal credit rating scale of the bank and the whole amount of the loan is added to non-performing loans (NPLs). Thus, it is extremely useful for banks to mitigate the credit risk originating from NPL's by identifying from the outset the correct risk level entailed in a bank loan application and as a consequence the potential defaults. Even if a bank does not eventually lose the whole amount of a defaulted loan, the process of refinancing and amending the terms of the loan (e.g. extending its maturity, charge higher spreads, transfer the missed payment to the remaining payments) is a major issue since it creates substantial operational cost and significantly alters the bank's asset value and strategy. For this reason it is a matter of paramount importance to develop a model that can detect such cases from the outset.

This paper proposes a systematic framework for assessing default risk entailed in bank shipping loans by examining for the first time a complete commercial credit loan portfolio from the international ocean-going shipping industry. Apart from the importance of the shipping industry for the global economy, being the leading mode of transportation worldwide and carrying over 90% of the global trade in volume terms - see for instance [World Trade Organization \(2014\)](#), there are a number of special characteristics of the sector that set it apart from other industries in the economy. This is mainly due to the ocean-going cargo carrying shipping companies: being affected by international events see [Amiti and Weinstein \(2011\)](#); being structured as one-ship - one-company offshore legal entities; involving high levels of capital investment, where individual ships can cost up to 250 million dollars; operating in markets in which conditions of perfect or near-perfect competition prevail; and facing substantial investment and operating business risks - for a comprehensive overview of business risks in shipping see [Kavussanos \(2010\)](#) and [Kavussanos and Visvikis \(2006\)](#).³ As a consequence, the cash-flow generating

¹ A technical default of a bank loan occurs when the obligor of a loan agreement cannot comply with at least one of the covenants (terms) in the agreement for a pre-determined period of time. For example, due to adverse movements in vessel prices, the asset coverage ratio (ACR) of a loan - being the ratio of the ship's value over the amount of the loan granted - may fall below the agreed threshold, making the obligor face a technical default situation. In this case, the lending bank may require additional collateral from the obligor in order for the ACR ratio to be maintained above the agreed threshold.

² According to end-of-2014 Federal Deposit Insurance Corporation (FDIC) annual report, the balance sheet item "net loans and leases" accounts for 52.63% of total assets for all commercial banks in the US.

³ The risky shipping business environment has traditionally led market participants and especially investors to hedge the documented high levels of risk by holding diversified portfolios of shipping assets, by employing vessels in longer term time charter contracts and by using Forward Freight Agreements (FFA's) - for more formal analysis of this see [Kavussanos \(2003, 2010\)](#).

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