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Liquidity risk premium and asset pricing in US water transportation

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ABSTRACT

The water transportation of freight has been one of the most important sectors in facilitating international trade and contributing to the growth of the world economy. Bearing in mind the importance of the relation between asset returns and liquidity in water transportation, this paper examines this relation within the context of US traded international water freight transportation firms. Using a Fama–MacBeth analysis, it is shown that the illiquidity risk premium is priced in the water transportation sector beyond the Fama and French and market-wide illiquidity risk factors, indicating higher average returns for stocks with greater illiquidity measures. It is also shown that the market-wide illiquidity factor and the Fama–French SMB and HML risk factors are significant in explaining stock returns. In contrast, market risk is found not to be priced in the water transportation sector. The results are also robust to asset pricing tests over two alternative sub-periods.

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1. Introduction

The efficient transportation of freight by sea has been instrumental in facilitating international trade and global economic development. The ocean shipping industry is characterized, however, by certain idiosyncratic characteristics that exert a significant influence over the nature of the sector's market microstructure. One important aspect of this is that shipping companies operate in what is, arguably, the most internationalized of industry sectors. Ships not only sail globally, they also source their resources on a worldwide basis and serve a diverse and wholly international clientele. In addition, shipping stocks are internationally traded.

As well as the international nature of shipping, market uncertainty is compounded by the cyclicity and volatility of market prices (freight rates). This dramatic volatility of market prices and, hence, the extreme level of uncertainty faced by investors is evidenced in movements of the key indicator of freight rates for dry bulk shipping, the Baltic Dry Index (BDI). During the worst period of the recent worldwide recession in May–October 2008, for example, the BDI fell by 80%. Similar levels of volatility were witnessed in the tanker markets, where spot charter rates declined from the 2008 peak of US\$170,000 per day early in the year to US\$90,000 per day by July 2008 (Lloyd's Shipping Economist, 2008).

The shipping industry is highly capital intensive and, in consequence, is generally very highly leveraged. For instance, in order to realistically operate container ships within the liner shipping market, it is essential to invest in a fleet of ships that can provide the frequent, geographically diverse and interlinked services required by customers. This necessitates a

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substantial investment in ships which necessarily renders the containership market highly capital intensive. In addition, the volatility of freight rates in shipping is mirrored by the extent and direction of asset price volatility; due to short-term imbalances in supply and demand, the value of the assets themselves can decline considerably within a short period of time. This merely adds to the uncertainty and risk faced by investors.

All these characteristics of the shipping market have been discussed in detail by, for example, Alizadeh and Nomikos (2011), Grammenos et al. (2008), Stopford (2010) and Grammenos and Arkoulis (2002). These characteristics are likely to affect the liquidity risk of shipping stocks. Liu (2006) describes liquidity as the ability to trade large quantities quickly at low cost with little price impact. This description highlights four dimensions to liquidity, namely, trading quantity, trading speed, trading cost and price impact, all of which imply the great diversity of liquidity measures which have been empirically applied within the literature.

While illiquidity has been used in empirical asset pricing models, certain authors contend that the results have been rather mixed and inconclusive (e.g., Marcelo and Quiros, 2006; Martinez et al., 2005). The recent literature examining the concept builds on the pioneering work of Amihud and Mendelson (1986) that asset returns are positively related to transaction costs (an initial proxy for illiquidity). An important milestone in the development of the literature is the study by Amihud (2002), which provides a compelling motivation for the use of an illiquidity ratio as a risk characteristic in asset pricing tests. Specifically, Amihud (2002) shows that over time, expected market illiquidity positively affects *ex ante* stock excess return, suggesting that expected stock excess return partly represents an illiquidity premium. On the other hand, various studies have revealed that market and illiquidity risk premium are dependent on country and market specific characteristics, illiquidity proxy and seasonality effects (King, 1966; Corhay et al., 1989; Tinic and West, 1984, 1986). This provides a further rationale for examining the concept in the context of specific industrial sectors with an international outlook.

King (1966) examined how market and industry factors affect stock price behavior. He was the first to suggest that many investors think of stocks as falling into groups based on similarity of performance and showed that stock price changes are caused by the weighted sum of a market, an industry, and a company effect. This and subsequent research has led to the understanding that industry stock returns are linked to market and other microeconomic factors. Recently, Hou and Robinson (2006) showed that firms in more concentrated industries earn lower returns, even after controlling for size, book-to-market, momentum and other return determinants. They concur that the particular financial and operational characteristics of individual firms bring about the generation of divergent cash flows. These risky cash flows are in turn priced in financial markets. They suggest that, through their operating decisions, firms are likely to affect the riskiness of their cash flows. These operating decisions arise from an equilibrium in the product market that potentially reflects strategic interactions among market participants. Therefore, the structure of product markets may affect the risk of a firm's cash flows, and hence a firm's equilibrium rate of return. Hou and Robinson (2006), however, do not provide conclusions for non-concentrated industries such as the shipping sector. Additionally, Drobetz et al. (2010) conclude that shipping stocks exhibit remarkably low stock market betas, suggesting that shipping stocks have the potential to serve as a separate asset class.

Given this context, the relation between the illiquidity and asset returns of ocean shipping firms represents an unexplored area of considerable research interest. This sector is chosen since financial (and operational) characteristics of maritime firms are found to diverge significantly from those of the "average" firm. For instance, freight transportation firms tend to hold high valuation physical assets and operate in a highly competitive environment with market uncertainty and extreme volatility culminating in high risks (see Behrens and Picard, 2011; Hesse and Rodrigue, 2004 for an economic and spatial analysis of freight transportation characteristics). On the basis of the particular sector characteristics described above, however, it follows that the analysis of a shipping industry sample would provide evidence and insights that diverge from those of previous studies that analyze more generic samples. Such an analysis is facilitated by the fact that in recent years a number of shipping companies have used the capital markets for raising funds and, therefore, asset pricing studies for this specific sector are highly relevant to investors as well. All this underscores the compelling reasons for investigating shipping company liquidity issues in a capital markets context and to supplement the existing asset pricing literature in transportation, in particular the pioneering work of Kavussanos and Marcoulis (1997a,b, 1998, 2000a,b) and Kavussanos et al. (2003).

To this end, the main objectives of this study are to: (a) provide a comprehensive asset pricing model based on data for the US water transportation sector for the period 1960–2009, (b) provide (for the first time in the literature) information on the liquidity characteristics of US water transportation stocks, and (c) determine whether the illiquidity risk premium of US water transportation stocks is priced or has a significant role in the determination of stock returns. The paper extends the previous contributions in the transportation literature in at least two ways. First, it examines whether liquidity risk is priced and affects the returns of the sample of listed water transportation firms. Second, the extensive period covered by the analysis provides the opportunity to collect comprehensive evidence on the main risk determinants (such as beta, volatility, unsystematic risk), while controlling for the influence of the significant cyclical behavior which characterizes the shipping market. The results could be potentially useful to portfolio managers and other stakeholders, since they can form the basis for developing investment decision practices that account for illiquidity risk; an aspect that has thus far been largely ignored.

The rest of the paper is organized as follows. Section 2 provides a review of the relevant literature on liquidity and capital asset pricing, as well as capital asset pricing in shipping specifically. The research methodology is described in Section 3, while in Section 4 the empirical results are presented and discussed. Finally, Section 5 details the implications arising from the results and final conclusions are drawn.

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