



The relationship between business cycles and capital structure choice: The case of the international shipping industry



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ABSTRACT

Research on capital structure choice depicts firm size, profitability, and asset tangibility as the main determinants of capital structure. The trade-off and pecking order theories of optimal capital structure predict contradictory relationships between each of these determinants and firm leverage. We attempt to reconcile the conflicting results in the literature by incorporating the impact of different phases of the economic cycle upon the choice of capital structure in a concentrated ownership setting. Studying 117 internationally listed shipping companies (about 60% of the entire population), we explore potential determinants of capital structure choice in periods of expansion (2003Q4), peak (2007Q4), trough (2008Q4), and sideways movement (2010Q4). Our finding that size, tangibility, and corporate performance constitute the main determinants of capital structure in the shipping sector is consistent with the literature. We employ the Generalized Method of Moments (GMM) to estimate the interaction between capital structure choice, corporate profitability and structure of ownership. Our model asserts bidirectional positive relationships between *leverage and profitability* and *leverage and concentrated ownership* in the peak period of 2007, but bidirectional negative relationships amongst these variables in all other periods. We conclude that the sentiment of the ship-owner during different phases of the business cycle, along with ownership concentration are key elements in explaining the relationship between profitability and leverage in the shipping sector.

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1. Introduction

Within transportation research, interest in the choice and implications of capital structure has been ongoing. Research has primarily focused on the determinants of capital structure, with a large number of studies, such as Harris and Raviv (1991), Rajan and Zingales (1995), Flannery and Rangan (2006), Arvanitis, Tzigkounaki, Stamatopoulos, and Thalassinos (2012), and Drobetz, Gounopoulos, Merikas, and Schröder (2013), investigating capital structure determinants in relation to the trade-off and pecking order theories. In general, it is widely accepted that the optimal choice of capital structure is determined by

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firm size, profitability, and tangibility. However, the trade-off and pecking order theories reach opposing conclusions as to the relationship between leverage and each of the determinants and the empirical evidence is mixed.

The extent to which different phases of economic activity influence capital structure choice has received much less attention. Similarly, the inclusion of concentrated ownership as a factor that may affect the choice of capital structure has been underexplored. These gaps in the literature constitute the main motivation for conducting the present study. We set out to explain conflicting results by looking into potential effects of business cycles and ownership structure. Our focus on the choice of capital structure in shipping is attributable to the apparent resistance of the sector during the downturn of the cycle, as the sector demonstrates robust business activity internationally.

This study adds to the existing literature in two ways. First, we investigate the choice of capital structure in four distinct phases of the shipping cycle. In addition, we explore the particular role that concentrated ownership, a major tenet of the international shipping industry, exerts on that decision. We use the financials of 117 international listed shipping companies, a sample size that corresponds to 60% of the entire listed population. The four points of the cycle under scrutiny are the fourth quarter of 2003, 2007, 2008 and 2010, representing expansion, peak, trough and sideways movement respectively. Consistent with previous research, we find that size, tangibility and corporate performance comprise the main determinants of capital structure in the shipping sector (Frank & Goyal, 2003; Rajan & Zingales, 1995).

We proceed to develop a simultaneous equation model where leverage, measured by the ratio of total liabilities to equity, is treated as an endogenous variable. We employ the Generalized Method of Moments (GMM) to estimate the interaction between capital structure choice and corporate profitability. In support of the trade-off theory, our results indicate a bidirectional negative relationship between leverage and profitability during the expansion period of 2003, the trough of 2008, as well as the period of sideways movement (2010). By contrast, a bidirectional positive relationship between leverage and profitability appears to be characteristic of the peak period of 2007, which attests to the pecking order theory. More importantly, our model shows that leverage is positively related with concentrated ownership during the 2007 peak. Our contribution to the literature lies in shedding light upon an untouched so far dimension of capital structure choice, namely the unique relationship between leverage and ownership concentration at the peak of the economic cycle.

The remaining of the paper is organized as follows. A review of related literature is conducted in Section 2. In the third section we lay out our hypotheses. Our sample and methodology are presented in Section 4. Section 5 presents and discusses our empirical findings. Concluding remarks and suggestions for further research are given in Section 6.

2. Prior research

All companies need to make decisions about how to build capital. The notion of capital structure choice refers to the fact that firms have to decide on how much debt they will have relative to their equity. Capital structure affects company value because it is closely related to financial risk. Therefore, optimal is the debt/equity mix that maximizes company value. Thanks to Modigliani and Miller (1958), we know that in the absence of taxes, financial distress or agency costs, the choice of capital structure does not affect company value and the cost of equity is a linear function of the firm's leverage.

Since that seminal work, two main theories attempt to explain company choice regarding capital structure by incorporating market imperfections. The first is known as the trade-off theory, developed by Kraus and Litzenberger (1973). It points to the trade-off a firm faces between the taxation advantages associated with debt and the deadweight bankruptcy costs in the event the company fails to meet its debt obligations. According to the trade-off theory, in choosing a capital structure, a company balances the value of the tax benefit from deductibility of interest with the present value of the costs of financial distress. At the optimal target capital structure, the incremental tax shield benefit is exactly offset by the incremental costs of financial distress.

The second theory on firm capital structure behavior is the pecking order theory, first introduced by Donaldson (1961). The pecking order theory claims that in the presence of asymmetric information between managers and investors, with the former possessing more information than the latter, management's choice will be the source of capital that gives out the least amount of information. This points to retained earnings as the most preferred way of raising capital and, in the event that the firm's retained earnings are inadequate, debt financing being always preferable to equity. The reason is that equity financing implies significant adverse selection, raising the costs associated with asymmetric information and thereby rendering new equity issuance the least preferred method of raising capital.

Several empirical studies have investigated the practical relevance of these two theories. In general, the results obtained are mixed. Huang and Ritter (2009) look at a sample of publicly traded US firms from 1963 to 2001. They conclude that firms turn to equity for their financing when the cost of equity is relatively low. They also find a relationship between the firms' current capital structure and their past decisions. Their findings indicate that both the market timing model and the static trade-off model explain to a large extent the optimal choice of capital structure.

By contrast, Shyam-Sunder and Myers (1999) who test the static trade-off against the pecking order theory, examining 157 US listed companies during 1971–1989, find that the pecking order model has greater time-series explanatory power than the trade-off model. More recently, Frank and Goyal (2009) test the pecking order theory by analyzing American publicly traded firms for the period 1971–1998. They find that on average, net equity issues commonly exceed net debt issues and argue that the group of large sized firms in the early years provides enough support for the pecking order theory. Flannery and Rangan (2006) use a sample of publicly traded firms from 1965 to 2001, asserting that firms target a specific capital structure (targeting behavior), but finding that market timing and pecking order considerations explain

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