Transportation Research Part A 90 (2016) 26–49

Contents lists available at ScienceDirect

Transportation Research Part A

journal homepage: www.elsevier.com/locate/tra

Cash flow sensitivities during normal and crisis times: Evidence from shipping

Wolfgang Drobetz [a,*], Rebekka Haller [a], Iwan Meier [b]

[a] Chair for Corporate Finance and Ship Finance, Hamburg University, and Hamburg Financial Research Center (HFRC), Von-Melle-Park 5, 20146 Hamburg, Germany
[b] HEC Montréal, 3000, chemin de la Côte-Sainte-Catherine, Montréal, Québec H3T 2A7, Canada

ARTICLE INFO

Article history:
Received 1 August 2015
Received in revised form 18 December 2015
Accepted 28 April 2016

JEL classification:
G01
G31
G32
L62
L92

Keywords:
Maritime financial management
Cash flow sensitivities
Financial constraints
Financial crisis
Collateral channel

ABSTRACT

Using a system of equations model, we analyze how cash flow shocks influence the investment and financing decisions of shipping firms in different economic environments. Even financially healthy shipping firms felt strong negative effects on their financing activities during the recent crisis. These firms were nevertheless able to increase long-term debt. Banks internalized the impact of foreclosure decisions on vessel prices and avoided an industry-wide collateral channel effect. Even during benign economic conditions, financially weak shipping firms underinvest because of their inability to raise sufficient external capital. The substitution between long- and short-term debt during the pre-2008 crisis periods shows that the composition of financing sources is more indicative of whether firms face financial constraints than the pure size of the financing-cash flow sensitivities. An analysis of firms' excess cash holdings confirms the importance of financial flexibility.

1. Introduction

The shipping industry is both big and important. Today, ships are involved in roughly 90% of global trade as low-cost maritime transport has been pivotal for the shift of industrial production to emerging countries. Shipping is an asset-heavy industry, with ships being sophisticated assets that can cost more than $150 million to build. Shipping is also a volatile business, one that is tightly linked to the business cycle.[1] As illustrated in Panel A of Fig. 1, industry revenues followed booming world trade fairly closely up until mid-2008, with the ClarkSea index of freight rates reaching its peak at the end of 2007. As the global financial crisis deepened in 2008, the index dropped almost 85% by April 2009. The market values of ships followed freight rates down, with the Clarkson Second Hand Price Index falling roughly 40% during the same time period.

Boom-and-bust cycles in investment have been studied extensively in the literature. Kydland and Prescott (1982) suggest that these cycles are more pronounced when there is a lag between investment plans and their realizations. Time-to-build delays and other adjustment costs can explain both firm-level and aggregate-level investments (Abel, 1983; Caballero, 1991;

* Corresponding author.
E-mail address: wolfgang.drobetz@uni-hamburg.de (W. Drobetz).

[1] Kavussanos (1996, 1997) provides early empirical evidence on the time-varying risks of freight rates and ship prices. See Alizadeh and Nomikos (2011) and Drobetz et al. (2012) for more recent evidence.

http://dx.doi.org/10.1016/j.tra.2016.04.015
0965-8564/

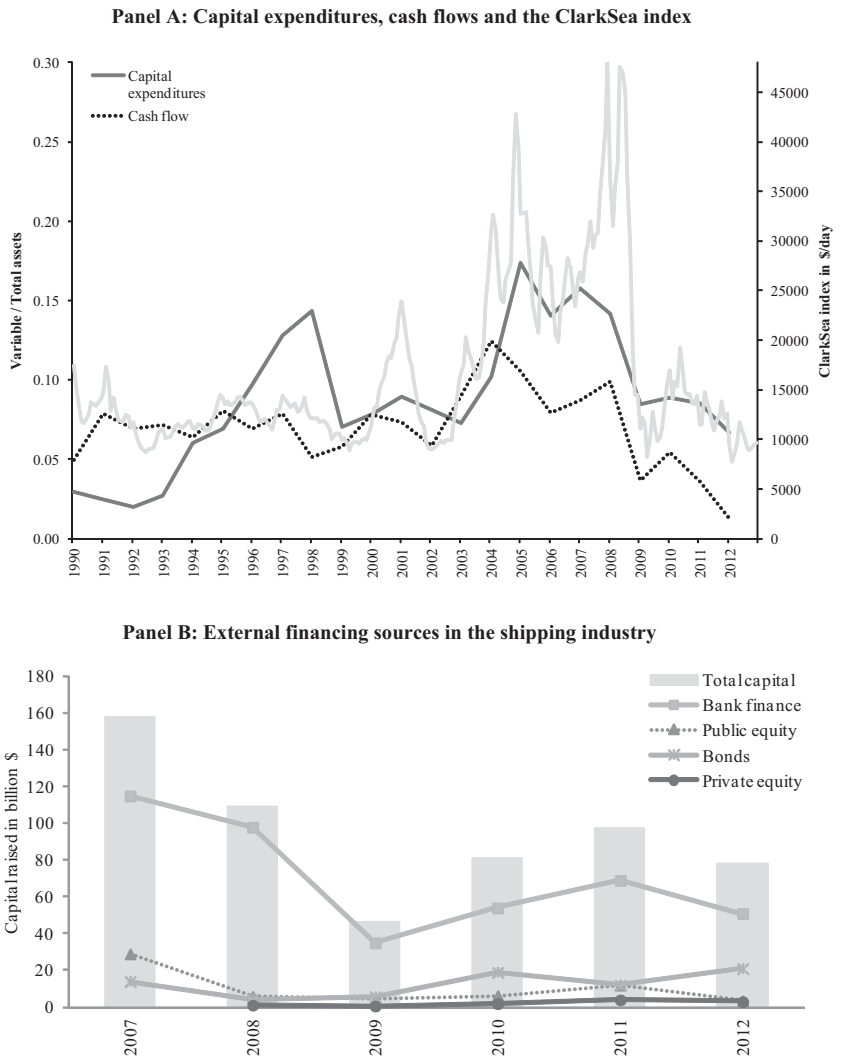

Fig. 1. Investments, earnings, and financing sources in the shipping industry. This figure shows earnings, investments, and financing sources in the shipping industry. Panel A depicts average capital expenditures and cash flows (both scaled by total assets) for the sample of 255 shipping firms from 44 countries during the 1990–2012 period (primary axis). Firms are included in the sample if they own and/or operate commercial ships. Panel A also shows the development of the ClarkSea index (secondary axis), which is a weighted average index of freight earnings for the three main vessel types, i.e., bulker, tanker, and container vessels. Panel B shows the shipping industry's external financing sources (bank finance, bonds, and public as well as private equity) in the last boom year 2007 and during the subsequent crisis years. The data is taken from Marine Money.

Dixit, 1992; Kalouptsidi, 2014).[2] The shipping industry is an ideal example. Supply is fixed in the short-run, and firms face long lags (18–36 months) between the order and delivery of a new ship. Meanwhile, the uncertain demand for sea transport may change. As a result, temporary imbalances between global demand for shipping tonnage and the size of the fleet can lead to dramatic changes in freight rates.

The growth of seaborne trade triggered a sustained increase in freight rates and a large new ship backlog between 2003 and 2008. The recent financial crisis led to an idling of the existing fleet, and, due to huge new building programs, another 70% of the existing fleet was scheduled for delivery until as late as 2012 (Kalouptsidi, 2014). This deferred increase in the supply of shipping tonnage together with the lower demand has depressed freight rates and industry returns to date, as shown in Panel A of Fig. 1.

Greenwood and Hanson (2015) study the link between boom-and-bust cycles and return on capital in the dry-bulk shipping industry. High ship earnings just before the recent crisis were associated with high used ship prices and heavy investments in new ships, but forecasted low future returns. They conclude that firms over-extrapolated exogenous demand

[2] Kalouptsidi (2014) develops a time-to-build model for dry-bulk shipping and examines the impact of demand shocks. She shows that ships' dynamic entry and exit combined with time-to-build (with cyclical variation in the construction lag due to shipyard capacity constraints) have substantial impact on the level of investment.