



The international competitiveness of China's shipbuilding industry



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ABSTRACT

This paper introduces profit rate as a more relevant measure of international shipbuilding competitiveness. We also develop a model to identify competitiveness factors and their relative importance. Our findings suggest that Chinese competitiveness derives from shipbuilding costs, whereas contract price deviations are the driver for Japan and South Korea. We argue that China became more competitive in building of bulk carriers and tankers than Japan and to a lesser extent than South Korea after year 2000 and that a market trough would further strengthen China's competitiveness. Our results have broad implications for monitoring industrial performance and formulating competitive strategies for shipyards.

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1. Introduction

At present, the construction of tankers and bulk carriers is largely dominated by Japan, South Korea and China. Enjoying a cost advantage, China's shipbuilding industry emerged relatively recently but has experienced rapid growth. China has won market share in shipbuilding from its rivals over the past decade, and the share grew from 7% to 28% in terms of Compensated Gross Tonnage (CGT) (Clarkson Research Studies, 2011). Most orders were placed for bulk carriers and tankers, sectors in which China is competitive on a global scale.

When the global shipbuilding industry was affected by the 2008 financial crisis, China's shipbuilding industry received substantial government support to overcome the obstacles that ensued. In 2009, China overtook South Korea to become the world's largest shipbuilding nation in terms of new orders and orderbook. South Korea, however, fought back intensely and soon regained leadership in the industry by securing orders for high value-added ships.

Facing increasingly fierce competition, it is crucial for Chinese shipyards to measure and quantify their competitiveness, as such measurements could provide invaluable information to assess current yard status and simultaneously reveal the sources of and obstacles to competitiveness. The effective development and implementation of industrial policies in shipbuilding also requires accurate assessments of shipyard competitiveness. Moreover, China's competitiveness has significant implications for its competitors and potential entrants. For example, when facing strong pressures and competitions from China, competitors have two potential options: to continuously improve cost efficiency and compete with low-cost Chinese yards in existing market segments or prune unprofitable production and focus on other segments where they have distinctive advantages.

A large body of research has been devoted to understanding shipbuilding competitiveness. Researchers are more inclined to interpret shipbuilding competitiveness based on internal factors, such as cost, price, ship quality and delivery time, which

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are closely connected with daily production (Hengst and Koopies, 1996; Chou and Chang, 2004; Goldan, 1995; Bertram and Weis, 1997; Cho and Porter, 1986; Bertram, 2003; Pires and Lamb, 2008). In particular, shipbuilding costs are considered critical for securing newbuilding orders and determining the yard's competitive position (Bertram, 2003; Wijnolst and Wergeland, 1997).

However, some scholars offer the critique that an exclusively internal perspective on shipbuilding competitiveness is far from comprehensive (Stott, 1995; Pires, 1999; Pires et al., 2009). Shipbuilding is highly exposed to the external environment, especially to the strong influence of government policy and market conditions. A notable example is the rapid growth of Japanese and South Korean shipbuilding, which benefited from government-supported shipbuilding programmes and favourable credit facilities. While external factors may not directly lead to a shipyard securing a specific newbuilding order, they will affect the shipyard's performance and its competitiveness in the long run. Therefore, it is important to adopt a comprehensive perspective when studying shipbuilding competitiveness.

This paper analyses China's shipbuilding competitiveness and its determinants based on a quantitative approach and makes comparisons with South Korea and Japan. The study focuses on the tanker and bulk carrier sectors during the period from 2000 to 2009, which began with China's rapid expansion in shipbuilding, continued with a boom in the global newbuilding market and was followed by a marked slump in world shipbuilding demand. We address the following three questions: How did China's shipbuilding competitiveness develop over time? How has this competitiveness changed relative to South Korea and Japan? What are the sources of and obstacles to China's shipbuilding competitiveness?

The present study adds to the literature on shipbuilding competitiveness in general and Chinese shipbuilding in particular. Our main contributions are as follows: (i) we propose a profit-based measurement for assessing shipbuilding competitiveness, which allows for the consideration of both internal and external factors; (ii) in addition to its overall competitiveness, we demonstrate that China has been relatively more competitive with respect to Japan than to South Korea in building bulk carriers and tankers. Considering different market conditions, a market trough would be more beneficial for China's relative competitiveness than a market boom; and (iii) we develop a model of shipbuilding competitiveness that identifies the common competitive factors, as well as individual drivers, for China, South Korea and Japan. Shipbuilding costs have been the source of China's shipbuilding competitiveness; its present technology and managerial capabilities, however, are areas for improvement.

The remainder of this paper is organised as follows: Section 2 briefly discusses the measurements of shipbuilding competitiveness and proposes the profit rate as an efficient alternative. Section 3 introduces the data. Section 4 analyses the overall and relative competitiveness. A regression model of competitiveness and its determinants are presented in Section 5. Section 6 provides a discussion and concluding remarks.

2. Profit-based measurement of shipbuilding competitiveness

2.1. Ways of measuring competitiveness in the shipbuilding industry

Competitiveness is a multi-dimensional concept that can be measured in numerous ways. 'Competitiveness' specifically applied to the shipbuilding industry has been defined as: 'The ability to win and execute shipbuilding orders in open competition¹ and stay in business' (Peat Marwick, 1992).

The above definition illustrates three objectives, the achievement of which represents shipbuilding competitiveness. The first objective is the ability to attract shipbuilding orders. In ordering standardised ships, the buyer is primarily concerned with price (Rashwan and Naguib, 2006; Cho, 1984). Other factors may increase the likelihood of placing an order, but if a shipyard's tender price² is too high, ships will be built elsewhere (Wergeland, 1999). Competitiveness is often evaluated by comparing newbuilding contract prices³ denoted in a common currency (Landsburg et al., 1988; Stott and Kattan, 1997). However, contract prices are related to newbuilding market prices⁴ rather than to shipbuilding costs, and therefore fall short of being a perfect measure. For instance, a shipyard with higher shipbuilding costs will find it difficult to offer competitive tender prices. To prevent losing orders, the shipyard would have to reduce its tender prices to attract customers and consequently accept lower contract prices. In some cases, the shipyard might even set newbuilding contract prices below than its shipbuilding costs using subsidies or by accepting a loss. The decline in the shipyard's contract prices, however, should not be interpreted as an improvement in its competitiveness. On the contrary, the price cut will sacrifice the yard's profit in the short run and will seriously jeopardise its ability to compete in the long run. Similarly, a rise in the contract price need not mean a deterioration of competitiveness. For example, when shipbuilding capacity is scarce during a boom period, all yards may increase contract prices

¹ The theoretical ideal of perfect competition is widely believed to prevail in the shipbuilding industry. There are numerous shipbuilders, each controlling a small portion of capacity. At the global level, shipbuilding attempts to fulfil the requirements of an open market and those yards that fail to produce competitively priced ships will find their customers opting for alternative suppliers (Todd, 1985; Beenstock and Vergottis, 1993).

² Newbuilding tender price: The price offered by a shipyard and included in the quote when a shipyard bids for a shipbuilding order. Shipyards worldwide may offer different tender prices, which fluctuate around the newbuilding market price. If a shipyard secures the shipbuilding order, the tender price will form the basis of its newbuilding contract price, but is not necessary equal to the newbuilding contract price.

³ *Newbuilding contract price* The price agreed to in the negotiation between a shipyard and a ship buyer for building a ship on the corresponding conditions. The contract price will be included in the shipbuilding contract as one of the most important contract terms.

⁴ *Newbuilding market price* The price determined by the supply of shipbuilding capacity and the demand for newbuilding. It is evaluated by brokers for standard ships contracted at state-of-the-art yards on standard contract terms including financing and payment terms.

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