Original Article

Linking growth to performance: Insights from shipping line groups

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Abstract Despite the interest shown by many authors in ocean carriers' strategies and operations, only a few contributions have tried to evaluate the impact of growth strategies on firms' performance and profitability. This article, adopting a holistic approach, measures the impact of growth strategies on economic and financial performances that ultimately lead to value creation for shipping lines and their stakeholders. The sampled ocean carriers, controlling over 55 per cent of the overall fleet capacity, belong to 16 listed shipowning groups. The study has been carried out by performing correlation and regression analysis. Empirical outcomes reveal an inverted U-shaped relationship between the amount of resources invested in assets and firm profitability, measured by return on assets (ROA). In fact, after a certain threshold of increasing asset (book) value, the positive returns decline. The multiple regression model also shows ROA to be positively correlated with vessel size, both in average and growth rate terms. The article, by addressing the complexity and multi-dimensionality of variables affecting firm performance, provides a pioneering and exploratory contribution on a topic that has received little attention in the literature.

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Introduction: Linking Growth to Performance

Over the last 20 years, the liner shipping sector has experienced considerable growth (Cariou, 2008; Notteboom *et al*, 2010). This has generated strong competition among leading ocean carriers in their contest to attract additional traffic flows and enter emerging markets. To exploit market opportunities, most shipowning groups have implemented aggressive growth strategies by ordering new vessels, taking over other players and joining cooperative agreements. Moreover, some major shipping lines have also pursued extensive vertical integration strategies with ports and logistics. At the same time, some carrier groups have also diversified horizontally their maritime operations into various sectors of the shipping business (that is, bulk, car, ro-ro and so on). The adoption of horizontal integration/diversification and vertical integration pathways and the deployment of vessels of increasing sizes have led to an increase in firms' dimension and to the emergence of global carriers (Slack *et al*, 2002; Cariou, 2008).

These strategies are having a significant effect on carrier groups in terms of financial performance and profitability. This is particularly evident in the container business, which historically has underperformed financially compared with other industries (Notteboom, 2004). As many authors have pointed out (Graham, 1998; Stopford, 2009; Notteboom *et al*, 2010), the weaker economic and financial performances of this sector are partially related to some of its own structural characteristics, such as its capital intensive nature and high volatility of revenues. As a result, short-term instability persists in the industry.

Despite the importance of the topic and the interest awarded by many authors to ocean carriers' strategies and operations, a limited number of studies have tried to evaluate the impact of growth strategies on firms' operational performance and profitability. This lack of information is partially justified by the objective difficulty in gathering homogeneous data and information on shipping lines' key performance indicators (KPIs). Currently, there are no consistent quantitative analyses investigating the relationship between diverse growth strategies and firm performance.

The article attempts to bridge this gap by measuring the effects of liner shipping strategies on operational and economic/financial performances. The study focuses on some listed global carriers (that is, public companies), which account for a significant share of the containerised maritime transport market.

We undertake an exploratory investigation aiming at measuring the impact of growth strategies on firms' performances (for example, return on assets (ROA), return on equity (ROE) and so on), thereby revealing some key correlations between the selected variables. Moreover, our outcomes provide an extensive quantitative platform for further investigation and analysis. The major research questions regard the impact of growth strategies on firm performance

(Research Question 1), the effect of financial leverage on performance (Research Question 2) and the correlation between operational and financial performances (Research Question 3).

The article is structured as follows. The next section offers a short literature review, introducing the importance of growth pathways, vertical integration and diversification in corporate strategy. The third section summarises data and methodology, defines the sample of firms and explains the theoretical research framework. The fourth section summarises the major outcomes and illustrates the impact of growth strategies on operational and financial performance as well as the most significant correlations between the selected variables. The fifth section contains two ordinary least squares (OLS) regression analyses, performed in order to explain *variability of profitability*, measured by ROA. The first regression explains ROA, highlighting a noticeable inverted U-shaped relationship between profitability and assets. The second regression model specifically investigates the ROA functional dependency on the value of the assets invested in the shipping business and on the average vessel size. The last section offers some concluding remarks.

Growth Strategies and Profitability in Liner Shipping: Literature Review

As widely recognised, the relative impact that growth strategies have on profit performance is an issue of considerable interest to both managers and academics (Penrose, 1959; Ansoff, 1965; Cronin and Page, 1988; Slater, 1989; Pleshko and Souiden, 2003). In fact, understanding the relationship between growth and profitability allows one to identify 'the areas of managerial discretion that have the greatest effect on ROA' (Slater, 1989) and the other KPIs (Miller and Friesen, 1986; Mitchell *et al*, 1992; Hoetker and Mellewigt, 2009). Owing to environmental instability and fierce competition, the growth pathway of companies represents a fundamental objective in the search, achievement and defense of competitive advantage and even survival (Lorange, 2001). The pursuit of this goal, indeed, also rises the dichotomous dilemma concerning the relation between long-term profitability and short-term shareholder value maximisation, as growth maximisation may compromise corporate profits (Baumol, 1967). Although some recent studies have discussed contemporary issues in liner shipping (for example, strategic alliances, inter-firm competition, vertical integration and so on) adopting a managerial perspective (Midoro and Pitto, 2000; Panayides and Cullinane, 2002), as well as the applicability of the major theoretical constructs (transaction cost economics, resource-based view and so on) to liner shipping, only a few contributions have focused on the impact of

strategic choices on performance (Haralambides and Veenstra, 2000; Lorange and Fjeldstad, 2011).

Previous studies have analysed the performance of shipping companies via different approaches. The literature shows two research mainstreams. A first line focuses on a firm's economic and financial performance, as well as operational efficiency. Panayides (2003) studied the nexus between the effectiveness of competitive strategies and the performances of ship management companies. Lam *et al* (2007), in their analysis of the economic and financial performances of shipping lines, outlined some appropriate indicators without finding any substantial correlation between firm strategy and performance. More recently, Notteboom *et al* (2010) unveiled the determinants of the 2008–2009 crisis and the financial impact on shipping and ports. Finally, Panayides *et al* (2011) examined the relative efficiency of ocean carriers in the three key sectors of the shipping industry, revealing that market and operating performance of maritime firms is not consistent.

A second stream of research concentrates essentially on shipping firms' share performance. Several authors have investigated the relationship between the financial highlights of top publicly-listed shipping companies and share value fluctuations. Grammenos and Arkoulis (2001) analysed the long-term performance of 27 shipping Initial Public Offerings. Syriopoulos and Theotokas (2007) outlined how an increasing number of shipping firms, which were previously private and family-owned, have been progressively transformed into publicly-listed, multi-shareholder companies. Moreover, Syriopoulos (2008) focused on the new shipping firms' approach towards international capital markets as a key source of funding for their aggressive investments plans. Finally, Apergis and Sorros (2010) highlighted how operating profit is particularly related to share prices.

There is still a lack, however, of a comprehensive theoretical framework capable of explaining the relationships between the pursuit of growth strategies by the largest players on one hand, and operating and financial performances, on the other. Past research has not addressed the issue of how a particular strategy relates to a firm's performance. The spur for this analysis is not only the ever-changing nature of this dynamic industry (Panayides and Cullinane, 2002), but also the well-known methodological difficulties in achieving such a research objective (for example, data inconsistency, scarce transparency of available sources).

A review of the strategic management literature reveals a number of theoretical concepts that may be applied to liner shipping, in an effort to understand and explain growth strategy. According to Ansoff (1965), the growth of the firm may be pursued through various strategic pathways, outlined by specific combinations of the product/market variables. In particular, growth strategies may be classified as: (i) market penetration, (ii) product development, (iii) market development and (iv) diversification, namely a strategy focused on the creation of a new product for a new market (Teece, 1987; Geringer *et al*, 1989;

Grant, 1991; Shyam Kumar, 2009). Within the pathways of development based on the combination of new products and new markets, it is right to include vertical integration strategy (Harrigan, 1984; Levy, 1985; Stuckey and White, 1993), namely the process of internalisation of some activities vertically linked to each other.

The academic management literature has widely discussed the various strategic options (Kogut, 1988; Prahalad and Hamel, 1990; Peng, 2002) that lead firms to grow in size, emphasising the distinction between internal and external growth paths.

The application of the most common managerial notions to the liner shipping industry means taking into account the peculiar characteristics of this business, first marked by the *derived* nature of transport demand, the latter being deeply affected by fluctuations in international trade. The specific structure of this industry pushes firms to grow in order to achieve a considerable market share and deliver significant operational, and economic and financial performances. Moreover, large funding plans are required for carrying out investments in new vessels, a factor that confirms the industry as capital intensive and asset-heavy one. This also explains why shipping lines have traditionally resorted to a rather aggressive financial leverage, often leading to undercapitalisation.

Liner shipping is an unstable and risky industry because of the volatility of freight rates and the dramatic magnitude of investments: during demand peaks, the major players show a two-digit profitability, whereas in the case of a collapse in traffic volumes even the leading firms experience deeply negative rates of return because of their strong market exposure.

Intrinsic market instability and poor financial performances have been widely debated in the literature. In this regard, Sjostrom (1989) stated that the core of the industry is empty, as shipping lines are unable to provide a total transport capacity that matches exactly the quantity demanded.

Therefore, major ocean carriers show in the long-term irregular profitability results. Fierce competition and low-profit margins induce liner shipping firms to perform complex and diversified growth strategies with the aim to improve profitability by reducing costs and increasing revenues. These strategies may be defined as: (i) horizontal integration in container shipping; (ii) vertical integration across the container supply chain; (iii) concentric diversification in other shipping businesses (see Figure 1).

Shipping lines have to resort to critical organisational and strategic solutions in order to achieve significant economies of scale in vessel size. The need of a wide international presence and the resulting diffusion of mega-vessels have driven ocean carriers to increase their global transport supply as well as average ship sizes, pursuing both technical and organisational economies of scale. As a result, the literature has widely discussed the issues of cost-cutting strategies and efficiency improvement measures (Panayides and Cullinane, 2002),

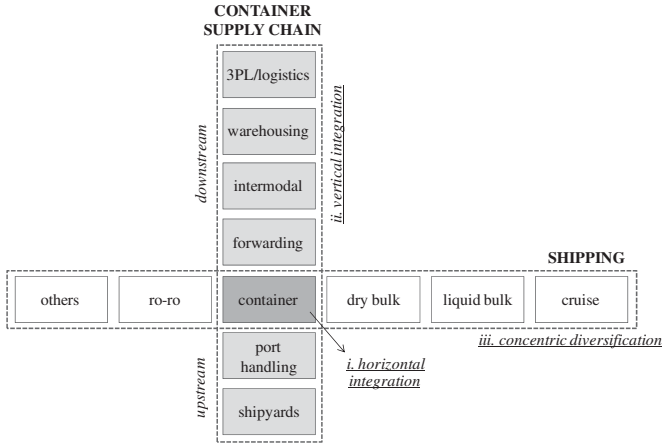

Figure 1: Shaping the corporate strategy: Shipping businesses and container supply chain.
Source: Authors' elaboration.

investigating topics like cost reduction and optimal containership size (McLellan, 1997; Gilman, 1999; Cullinane and Khanna, 1999; Stopford, 2009).

The leading pathways for pursuing a horizontal growth strategy may be classified in conformity with various levels of functional integration: (i) organic growth, by ordering new vessels, buying second-hand ships or resorting to chartering (Cariou, 2008); (ii) joining consortia and strategic alliances (Midoro and Pitto, 2000); (iii) mergers and acquisitions, including hostile takeovers (Fusillo, 2009).

Differently from organic growth and mergers and acquisitions (M&As), which profoundly affect a firm's organisation and assets, consortia and global alliances, although influencing commercial operations, have only an indirect impact on equity values and investments as these forms of agreement are primarily focused on resource sharing and rationalisation (that is, slots, vessels, equipment).

Over the last decades, the liner shipping industry has been experiencing a process of vertical integration and diversification into inland transport, terminal operations and logistics (Panayides and Cullinane, 2002). In particular, shipping lines have entered the port terminal business and, to improve the profitability generated by sea-related business, they also provide intermodal and logistics services.

Entry into the port business was driven by the need to 'defend' the assets deployed on the major deep-sea services, with the additional advantage of controlling port costs and door-to-door performance. Conversely, at corporate level carriers risk increasing their own structural rigidity, which derives from the

additional investments in port assets and the large amount of human and financial resources devoted to the new business. A carrier, however, may also decide to go beyond the internalisation of transactions through self-handling, by adopting a profit centre approach (for example, APM Terminals).

Some players also choose to integrate other activities of the transport supply chain, even providing door-to-door packages so as to improve customer retention (Selviaridis and Spring, 2007). The growing focus on value-added services, allied to a strong market orientation, opens up the possibility of achieving, in the long-run, positive effects on profitability (Fugate *et al*, 2009).

Among the numerous potential benefits of vertical integration in container shipping, the literature underlines: (i) cost reduction and increase in efficiency thanks to economies of scale and scope (Mahoney, 1985); (ii) customer retention and revenue stabilisation (Parola *et al*, 2006); (iii) survival in the competitive international environment (Archambault, 1989).

Concentric diversification offers the opportunity to diversify investments and activities around the core business, in order to potentially exploit cyclical fluctuations in freight rates across various shipping segments. This choice aims at avoiding the risk that the concentration of all resources in just one business may increase the firm's vulnerability with respect to economic cycles (Buckley and Casson, 1976). Therefore, the diversification strategy is driven by the following reasons: growth of firm size, risk reduction and profitability improvement (Caves, 1975; Morck *et al*, 1988). Finally, the major sources of competitive advantage for diversified firms are the exploitation of a fairly high market power and the achievement of economies of scope, able to produce synergies among various businesses and to partially internalise transactions.

Data, Methodology and Theoretical Research Framework

The focus of the empirical analysis is to investigate the relationships between the growth strategies of major shipping lines and some KPIs. In particular, by measuring the correlations amongst a wide set of variables, the article seeks to analyse the impact of the different growth strategies on operational performances (that is, liftings and liftings per slot), as well as economic and financial KPIs (that is, ROA, return on sales (ROS), ROE).

The sampled data set has been gathered following a three-phase collection procedure, ensuring accuracy and consistency of empirical findings. First, we selected from the Containerisation International database the 25 major ocean carriers in terms of total operated fleet capacity (at December 2009). Second, fleet data were consolidated taking into account the affiliation to the same holding company. Finally, we extracted all the listed public companies, as they

offer a more detailed and extensive level of information to investors and various stakeholders. Therefore, the final sample is made up of 16 firms, operating more than 55 per cent of the world fleet and listed on various international stock exchanges, including Singapore, Hong Kong, Tokyo and so on. Major data sources consist of consolidated annual reports, financial statements, corporate information from Exchanges, company websites and press releases. Data have been collected with reference to the 2005–2009 time period. This allowed us to obtain a high degree of completeness and consistency for all the 80 observations of our panel data (that is, firm/year balance sheets; see Qian *et al*, 2010). It is worth mentioning that economic and financial data refer to all the maritime shipping activities as well as the (vertically) related businesses (for example, ports, intermodal and so on), as it was not possible to isolate container shipping figures only. Of course, this may generate some bias in the model, as the sample comprises some players that are largely diversified in various sectors (for example, AP Moller Maersk, MISC and so on). In order to preserve data homogeneity, where possible, all the balance sheet figures not related to transport businesses (for example, retail, oil extraction and so on) were ironed out. Moreover, to avoid exchange rate variation all figures are in US dollars.

In order to evaluate the relationships between growth strategies, operating performances and economic and financial performances, a conceptual framework has been developed. Three sets of strategic variables have been defined (see Figure 2), depending on the scope of the analysis: (i) growth strategy indicators, meant to evaluate a firm's aggressiveness in pursuing a development in size; (ii) operational performances, which reveal a firm's success in increasing market demand and exploiting internal resources (that is, operating efficiency); and (iii) financial performances, showing the carrier's capacity to generate value. For each set of indicators, some variables were defined and discussed.

Growth strategy indicators (1)

The topic of the growth of the firm has attracted considerable attention in strategic management research (Gundry and Welsh, 2001; Delmar *et al*, 2003). Several authors have investigated the question, applying different measures and methods to analyse firm growth strategies. The variety of academic approaches is due to the 'heterogeneous nature of this phenomenon' (Delmar *et al*, 2003).

To manage such intrinsic heterogeneity and explain growth strategy choices, a wide set of variables has been taken into account. This includes both measures generally used as growth indicators in corporate strategy studies, such as sales and asset book value (Delmar, 1997), and specific indicators related to the container business, that is total fleet capacity, average vessel size and chartered versus owned fleet. In the empirical analysis, each variable has been calculated

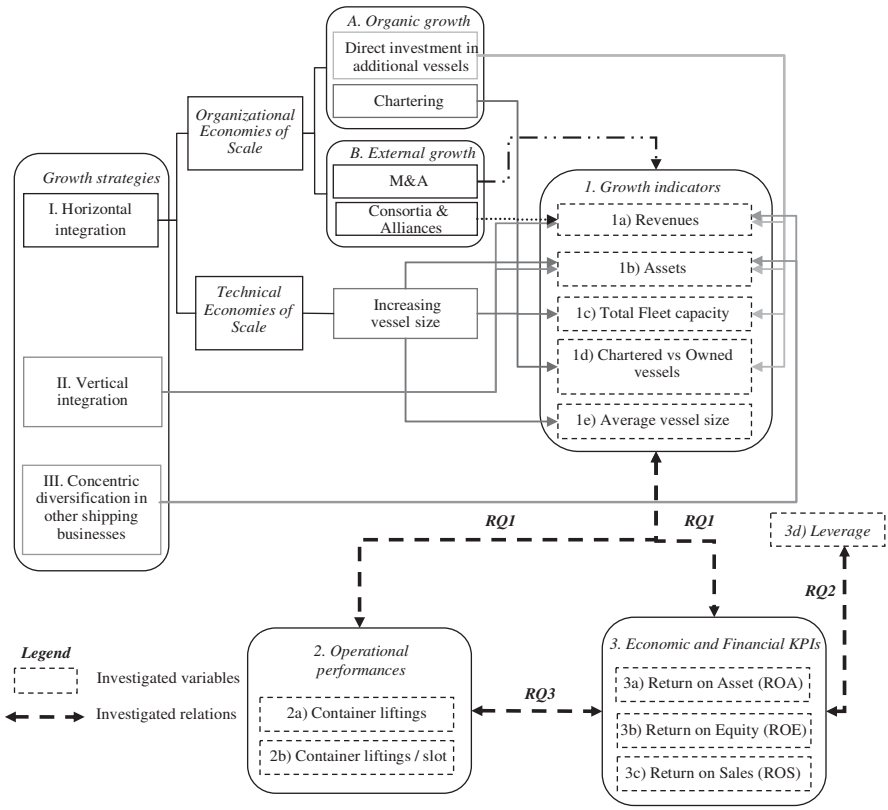

Figure 2: The theoretical research framework: Variables, indicators and research questions.
Source: Authors' elaboration.

both in absolute and compound annual growth rate (CAGR) terms, with the exception of revenue (calculated in average growth terms to better explain the growth trend) and chartering (measured as the 2009–2005 percentage variation).

Revenues (1a) and asset values (1b) provide interesting information for defining firm size, give insights about the real positioning of the firm in terms of market share and bargaining power (Gale, 1972; Porter, 1980; Chipty, 1995), and reveal the magnitude of investments and resources devoted to the business.

In liner shipping, the total capacity of the operated fleet (1c) is a key variable driving the growth strategy of firms, while the average vessel size (1e) demonstrates the cost leadership strategy pursued by most carriers. This choice has certainly helped to reduce the cost per supplied slot but, simultaneously, has generated operational and strategic problems in ports (Midoro *et al*, 2005) and has made the achievement of the break-even point (that is, vessel load factor) an

even more critical issue. Finally, indicator (1d) (chartered versus owned vessels) aims at measuring the degree of operational flexibility over the growth process. In fact, the dilemma between ship chartering and ownership (1d) is of major importance in this volatile industry, which is frequently exposed to massive price fluctuations.

Operational performances (2)

To better evaluate the impact of growth strategies on various firm's KPIs, operational performance indicators are separated from economic and financial indexes. In analysing operational performances, two basic indicators were set. First, the total containers carried over the year (that is, liftings; 2a), which is a measure of the firm's commercial capacity of attracting additional cargo flows and improving its own market share. Second, we introduce the index liftings per slot (2b), revealing the firm's operational efficiency given by fleet management. Therefore, the higher the value, the greater the shipowner's ability is of exploiting its own production capacity.

Economic and financial performances (3)

To evaluate the economic and financial performance of shipping companies, some major profitability ratios are considered, that is, ROA (Stalk *et al*, 1992; Hawawini *et al*, 2003; Lambertides and Louca, 2008), ROE (Venkatrama and Ramanujam, 1986; Anderson and Reeb, 2003) and ROS (Zahra and Covin, 1993; Hult *et al*, 2005). Moreover, also financial leverage was included in the analysis for an in-depth understanding of how firms challenge the growth pathway.

In the empirical analysis, the ROA of the *i*-th year has been calculated as follows:

$$\mathrm{ROA}_i = \frac{\text{Operating Income}_i}{(\text{Assets}_i + \text{Assets}_{i-1}) \times \frac{1}{2}} \tag{1}$$

We referred to operating income, defined as net income before extraordinary items and discontinued operations, plus interest expenses minus interest income, in order to avoid abnormal performances due to non-operating income, for example vessel sales (Apergis and Sorros, 2010). As shown in (1), asset values in the *i*-th year are smoothed by calculating the average value of the last 2 years, as usually carried out when managing stock values. The other indicators are

given by equations (2) and (3):

$$\mathrm{ROE}_i = \frac{\text{Net profit}_i}{(\text{Equity}_i + \text{Equity}_{i-1}) \times \frac{1}{2}} \tag{2}$$

$$\mathrm{ROS}_i = \frac{\text{Operating Income}_i}{\text{Revenue}_i} \tag{3}$$

Finally, the financial leverage (4) has been calculated as:

$$\text{Leverage}_i = \frac{(\text{Assets}_i + \text{Assets}_{i-1})}{(\text{Equity}_i + \text{Equity}_{i-1})} \tag{4}$$

Table 1 reports a list of all the variables and explains their operationalisation and measurement.

Research questions

The article measures the impact of growth strategies on firms' performances, revealing some key correlations be tween the selected variables. Starting from the above data set, the analysis was developed by building up a correlation matrix (Table 2) to understand the most significant relationships between each pair of variables. As stated in Figure 2, the major research questions may be summarised as follows:

Research Question 1: What is the impact of growth strategies on a firm's performances?

Research Question 2: Does financial leverage have an impact on performances?

Research Question 3: What is the correlation between operational efficiency and financial performance?

Main Statistical Results

The container shipping industry experienced a continuous demand growth since the 1960s until 2009, when the sector suddenly suffered the first downturn in its history. The selected timeframe is focused on a unique period for the container industry as, after the 2005–2007 'rally', a dramatic crisis set in. This made our analysis more valuable as it allowed us to test the various reactions of carriers in challenging the demand collapse as well as the evolution of performances.

The major results of the correlation analysis are given in Table 2.

Table 1: Description and operationalisation of the investigated variables

	Variable name	*Variable description*	*Research Question 1*	*Research Question 2*	*Research Question 3*
Growth indicators					
Revenue	Revenue (μ)	Measured as average corporate revenues in the 2005–2009 period (*Source*: Corporate annual reports and financial statements). Data are expressed in USD millions	x	—	—
	Revenue (Average growth)	Measured as average growth of corporate revenues in the 2005–2009 period (*Source*: Corporate annual reports and financial statements)	x	—	—
Assets	Assets (μ)	Measured as average assets book value in the period 2005–2009 (*Source*: Corporate annual reports and financial statements). Data are expressed in USD millions	x	—	—
	Assets (CAGR)	Measured as CAGR in the period 2005–2009 (*Source*: Corporate annual reports and financial statements)	x		—
Fleet capacity	Fleet capacity (μ)	The variable refers to the fleet operated by the carrier. Measured as average fleet capacity in the 2005–2009 period. Data are expressed in TEUs (*Source*: Containerisation International)	x	—	—
	Fleet capacity (CAGR)	The variable refers to the fleet operated by the carrier. Measured as CAGR of the fleet capacity in the 2005–2009 period (*Source*: Containerisation International)	x	—	—
Chartered versus owned	% chartered (μ)	The variable aims at measuring the degree of operational flexibility of the firm. It refers to the percentage of the fleet chartered on the total operated fleet. Measured as average value in the 2005–2009 period (*Source*: Containerisation International)	x	—	—
	% chartered (Δ 09–05)	Measured as variation of the share of chartered vessels in the 2005–2009 period (*Source*: Containerisation International)	x	—	—
Average vessel size	Average vessel size (μ)	Measured as average vessel size of the fleet operated by each carrier. Calculated as average value in the 2005–2009 period (*Source*: Containerisation International). Data are expressed in TEUs	x	—	—
	Average vessel size (CAGR)	Measured as CAGR of the average vessel size in the 2005–2009 period (*Source*: Containerisation International)	x	—	—

Operational performances					
Liftings	Liftings (μ)	The variable refers to the total containers carried over the year by each firm. Measured as average liftings in the 2005–2009 period (*Source*: Containerisation International, Drewry Shipping Consultants and corporate annual reports). Data are expressed in TEUs	x	—	x
	Liftings (CAGR)	Measured as compound average growth rate (CAGR) of liftings in the 2005–2009 period (*Source*: Containerisation International, Drewry Shipping Consultants and corporate annual reports)	x	—	x
Liftings per slot	Liftings × slot (μ)	Measured as average liftings per slot carried by each firm in the 2005–2009 period (*Source*: Containerisation International, Drewry Shipping Consultants and corporate annual reports). Data are expressed in TEUs	x	—	x
	Liftings × slot (CAGR)	Measured as CAGR of the liftings per slot in the 2005–2009 period (*Source*: Containerisation International, Drewry Shipping Consultants and corporate annual reports)	x	—	x
Economic and financial KPIs					
ROA	ROA (μ)	Reflects firm's profitability in relation to assets, that is, a key indicator related to firm's economic performance. Measured as average ROA value in the 2005–2009 period (*Source*: Corporate annual reports and financial statements). The ROA of the *i*-th year has been calculated as stated in Equation (1)	x	x	x
ROE	ROE (μ)	Reflects firm's profitability in relation to equity, that is, a key indicator related to firm's economic performance. Measured as average ROE value in the 2005–2009 period (*Source*: Corporate annual reports and financial statements). The ROE of the *i*-th year has been calculated as stated in Equation (2)	x	x	x
ROS	ROS (μ)	Reflects firm's profitability in relation to sales, that is, a key indicator related to firm's economic performance. Measured as average ROS value in the 2005–2009 period (*Source*: Corporate annual reports and financial statements). The ROS of the *i*-th year has been calculated as stated in Equation (3)	x	x	x
Leverage	Leverage (μ)	Financial leverage measured as mean accounting leverage, that is, total assets divided by the total assets minus total liabilities (in other terms total equity), in the 2005–2009 period (*Source*: Corporate annual reports and financial statements). Firm's leverage has been calculated as stated in Equation (4)	x	x	—
	Leverage (CAGR)	Financial leverage measured as CAGR of the accounting leverage in the 2005–2009 period (*Source*: Corporate annual reports and financial statements)	x	x	

Source: Authors' elaboration.

Table 2: Means, standard deviations and correlations

		1. Growth indicators									
	Variables	*1a. Revenue*		*1b. Assets*		*1c. Fleet capacity*		*1d. Chartered vs owned*		*1e. Average vessel size*	
		Revenue (μ)	*Revenue (average growth)*	*Assets (μ)*	*Asset (CAGR)*	*Fleet capacity (μ)*	*Fleet capacity (CAGR)*	*% chartered (μ)*	*% chartered (Δ 09–05)*	*Average vessel size (μ)*	*Average vessel (CAGR)*
1. Growth indicators	Revenue (μ)	1	—	—	—	—	—	—	—	—	—
	Revenue (average growth)	0.278	1	—	—	—	—	—	—	—	—
	Assets (μ)	0.967***	0.280	1	—	—	—	—	—	—	—
	Asset (CAGR)	0.284	0.863***	0.292	1		—	—	—	—	—
	Fleet capacity (μ)	0.797***	−0.012	0.856***	0.068	1	—	—	—	—	—
	Fleet capacity (CAGR)	−0.009	0.013	0.009	0.009	0.130	1	—	—	—	—
	% chartered (μ)	−0.156	−0.273	−0.257	−0.219	−0.207	0.584*	1	—	—	—
	% chartered (Δ 09–05)	0.044	0.378	0.041	0.194	0.126	−0.231	−0.305	1	—	—
	Average vessel size (μ)	0.111	−0.151	0.057	−0.038	0.153	−0.051	0.332	0.115	1	—
	Average vessel (CAGR)	−0.035	0.537*	0.048	0.609*	0.091	0.171	−0.450†∘	0.168	−0.574*	1
2. Operational performances	Liftings (μ)	**0.680****	0.035	**0.776*****	0.140	**0.948*****	0.036	**−0.378**	0.140	0.067	**0.269**
	Liftings (CAGR)	0.344	**0.403**	0.378	**0.513***	0.300	−0.296	**−0.345**	0.182	0.160	**0.359**
	Lift×slot (μ)	−0.415	0.073	**−0.394**	**0.316**	**−0.251**	−0.140	−0.200	0.085	0.264	**0.354**
	Lift×slot (CAGR)	0.292	0.091	0.297	0.224	0.193	**−0.667****	**−0.395**	0.032	0.188	0.032
3. Economic and financial KPIs	ROA (μ)	0.261	**0.671****	**0.277**	**0.547***	−0.017	**−0.512***	**−0.451**†	**0.364**	0.046	0.179
	ROE (μ)	0.265	**0.549***	**0.264**	**0.331**	−0.012	**−0.480**†	**−0.400**	**0.287**	0.067	0.030
	ROS (μ)	0.131	**0.566***	**0.224**	**0.351**	−0.105	**−0.285**	**−0.368**	**0.113**	−0.165	0.117
	Leverage (μ)	0.154	−0.037	0.055	0.119	−0.078	−0.101	0.318	0.061	0.160	**−0.319**
	Leverage (CAGR)	**−0.334**	−0.263	**−0.331**	−0.199	−0.182	0.224	0.186	−0.107	**−0.268**	0.063

		2. Operational performances				3. Economic and Financial KPIs				
	Variables	2a. Liftings		2b. Liftings per slot		3a.	3b.	3c.	3d.Leverage	
		Liftings (μ)	Liftings (CAGR)	Lift×slot (μ)	Lift ×slot (CAGR)	ROA (μ)	ROE (μ)	ROS (μ)	Leverage (μ)	Leverage (CAGR)
1. Growth indicators	Revenue (μ)	—	—	—	—	—	—	—	—	—
	Revenue (Average growth)	—	—	—	—	—	—	—	—	—
	Assets (μ)	—	—	—	—	—	—	—	—	—
	Asset (CAGR)	—	—	—	—	—	—	—	—	—
	Fleet capacity (μ)	—	—	—	—	—	—	—	—	—
	Fleet capacity (CAGR)	—	—	—	—	—	—	—	—	—
	% chartered (μ)	—	—	—	—	—	—	—	—	—
	% chartered (Δ 09–05)	—	—	—	—	—	—	—	—	—
	Average vessel size (μ)	—	—	—	—	—	—	—	—	—
	Average vessel (CAGR)	—	—	—	—	—	—	—	—	—
2. Operational performances	Liftings (μ)	1	—	—	—	—	—	—	—	—
	Liftings (CAGR)	0.450†	1	—	—	—	—	—	—	—
	Lift×slot (μ)	−0.022	0.472†	1	—	—	—	—	—	—
	Lift×slot (CAGR)	0.312	0.842***	0.320	1	—	—	—	—	—
3. Economic and F inancial KPIs	ROA (μ)	0.109	**0.657****	0.198	**0.586***	1	—	—	—	—
	ROE (μ)	0.091	**0.625***	0.104	**0.597***	0.916***	1	—	—	—
	ROS (μ)	0.007	**0.296**	−0.073	**0.244**	0.818***	0.735**	1	—	—
	Leverage (μ)	−0.287	−0.327	−0.324	−0.153	−0.269	**−0.396**	**−0.361**	1	—
	Leverage (CAGR)	−0.287	−0.564*	−0.248	−0.521*	**−0.676****	**−0.771*****	**−0.535***	0.473†	1

Note: †P-value<0.10; *P<0.05; **P<0.01; ***P<0.001.

Keys:

Research Question 1

Research Question 2

Research Question 3

Source: Authors' elaboration.

Research Question 1

Revenues appear fairly correlated with liftings. At the same time, the increase of average revenue is correlated with economic and financial KPIs. Therefore, turnover is deeply affected by the firm's operational efficiency. In fact, the adoption of growth strategies, which are expected to support increase in revenue (average growth), seems to have significant positive effects on economic and financial performances. In particular, this emerges with regard to assets profitability (ROA), as revealed by a strong correlation ($\rho = 0.671$, P-value<0.01).

Unsurprisingly, total asset values (1b) is strongly correlated with liftings (2a), and inversely correlated to chartering (1d). In addition, it emerges how considerable investments in assets (1b) apparently lead to lower operating efficiency (2b). A high average value of investments appears strongly correlated with the capacity to keep up with demand trend, by ensuring additional capacity. This is further confirmed by the substantial correlation between asset growth and the increase of liftings. The impact of assets on liftings per slot does not appear significant and therefore the relation may deserve further analysis.

With regard to the correlation between assets and economic KPIs, the model provides interesting outcomes. Given the capital intensive nature of this business, a positive correlation between asset growth and KPIs appears. In fact, the empirical findings confirm a fair correlation between assets CAGR and the major performance indicators, for example, ROA ($\rho = 0.513$, P-value<0.05). Nevertheless, the capital invested in assets (μ) does not unveil a significant correlation with firm profitability. This outcome, rather unexpected, in the light of mainstream academic literature, led us to investigate a potential non-linear correlation between firm profitability and asset values (see the next section).

The outcomes related to fleet growth clearly show the aggressiveness of the major shipping lines that try to gain market share and additional traffic flows through increasing investments in new ships. However, this is often coupled with a decrease in operational efficiency (see the relation between fleet capacity and liftings per slot, both expressed as CAGR, $\rho = -0.667$, P-value<0.01) that leads to a load factor reduction. Such effects have also been accentuated by the crisis: a collapse in demand has led to dramatic over-capacity. This is particularly evident for the most aggressive players (for example, CSAV), investing in their own fleet expansion. In the selected timeframe, growth strategies based on a robust expansion of total fleet capacity have inevitably led to a marked reduction in profitability, that is, $ROA_{(\mu)}$ (P-value<0.05) and $ROE_{(\mu)}$ (P-value<0.01).

As widely recognised, organic growth in liner shipping may be performed following various pathways (see Figure 1), which have a marked impact on firm's financial and operating rigidity and consequently profitability. In particular, empirical analyses yield some interesting relationships between the resort to

chartering and financial performances (for example, %chartered(μ) and ROA(μ), $\rho = -0.451$, P-value<0.10), while the chartering option does not appear significantly correlated with operational performance indicators. In this regard, the most aggressive players in terms of vessel ownership also appear as operational performers.

Surprisingly, the average vessel size (μ and CAGR) is not linearly correlated with any performance indicators.

Research Question 2

Empirical outcomes show a negative correlation between the resort to financial leverage (measured as leverage (CAGR)) and economic and financial performances. The outcomes show that shipping firms reducing their equity ratio achieved worse financial performances. Linear correlation is largely negative with regard to ROE (-0.771, P-value<0.001), ROA (-0.676, P-value<0.01) and ROS (–0.535, P-value<0.05). Growing leverage coupled with the difficult market conditions has led to higher debt servicing costs and subsequent sharp falls in net profit.

The most profitable shipping companies seem to prefer the re-investment of their profits during positive market trends, applying low payout ratios to shareholders, analogously to firms operating in other logistics sectors (van Driel *et al*, 2004). In this way, these firms succeeded in strengthening their financial structure, progressively reducing leverage. Once market conditions got worse, such choices proved essential in surviving turbulent times, thanks to a lower dependence on debt and financial expenses.

Research Question 3

The correlation matrix yields a strong relationship between operational performances and economic and financial indicators. In particular, liftings growth is fairly correlated with ROA ($\rho = 0.657$, P-value<0.01) and ROE ($\rho = 0.625$, P-value<0.05). This probably means that firms able to increase their physical output, by entering new markets and seeking growth opportunities, achieved the highest profitability results. Moreover, the increase in productivity generated knock-on benefits on operating income and then on all the KPIs (that is, ROA, $\rho = 0.586$ and P-value<0.05; ROE, $\rho = 0.597$ and P-value<0.05).

The Impact of Asset Values on ROA: A Detailed Investigation

The outcomes presented in the previous section unexpectedly revealed a positive albeit weak correlation between asset value and firm profitability indexes.

Such results appear in contrast with recent trends, showing instead an increasing search for organisational economies of scale (firm size) through new investments in additional assets (Lun *et al*, 2010), as well as operational economies of scale, through the deployment of bigger vessels (Cullinane and Khanna, 1999). Therefore, this suggests a different sort of relationship between these variables. In particular, as widely recognised by mainstream managerial literature, earlier research shows that firms reaching beyond a certain dimensional threshold (measured as number of employees, assets value, physical output, turnover and so on) risk to run into diseconomies of scale lowering overall profitability (Hall and Weiss, 1967; Williamson, 1981; Kaen and Baumann, 2003; Canbäck and Samouel, 2006). As a result, an inverted U-shaped relationship between the amount of resources invested in assets and firm profitability (that is, ROA) may be hypothesised. Therefore, two OLS regression models have been estimated for testing the above hypothesis. The former model (Model 1a) includes the firm size (that is asset values) as independent variable, whereas the latter (Model 2a) investigates the explanatory power of the average vessel size. Table 3 presents the output of the second-order regression models and provides collinearity diagnostics. The analysis unveils that multi-collinearity does not represent a serious concern, as the tolerance (T>0.1) and the variance inflation factors (VIF<10.0) are within the acceptable range (Belsley *et al*, 1980; Hair *et al*, 1995).

Model 1a presents a high global significance (*F*-statistic = 0.007417); both coefficients β_1 and β_2 are significant (*P*-value<0.01), whereas the intercept is not statistically significant. Coefficients shown in Table 3 refer to US$1 million invested in assets.

The findings suggest that with more moderate levels of investments in assets there is a positive return to the firm. Thus, the inverted 'U' effect found is consistent with the previous hypothesis. After a certain threshold of additional investments, the positive returns decline. According to the model, as shown in Figure 3, we estimate the optimal ROA point to be $24 260 million for assets (maximum ROA = 13.38 per cent).

The model predicts that firms' profitability given by growth strategy (specifically referring to assets) will be less for both lower and higher levels of investments and higher for more moderate levels of asset values.

In order to go more into depth about the key factors influencing firm profitability, a second model (Model 2a) was estimated, choosing as independent variables the asset values ($Assets_{(\mu)}$) and the vessel size, measured as average value in the selected time period ($VesselSize_{(\mu)}$) and compound annual growth rate ($VesselSize_{(CAGR)}$). Although the outcomes confirm the relation existing between asset values and performance, the coefficients related to $VesselSize_{(\mu)}$ and $VesselSize_{(CAGR)}$ are not statistically significant.

Table 3: OLS regression models and collinearity diagnostics
Models 1a, 1b: $ROA = \beta_0 + \beta_1 Assets_{(\mu)} + \beta_2 Assets^2_{(\mu)} + \varepsilon$
Models 2a, 2b: $ROA = \beta_0 + \beta_1 Assets_{(\mu)} + \beta_2 Assets^2_{(\mu)} + \beta_3 VesselSize_{(\mu)} + \beta_4 VesselSize_{(CAGR)} + \varepsilon$

	Model 1a	*Model 2a*	*Model 1b*	*Model 2b*	*Collinearity diagnostics*[a]	
					Tolerance	*VIF*
Intercept	−0.0227	−0.1043	−0.0292	−0.3485**	—	—
	0.0207	*0.0951*	*0.0215*	0.1015	—	—
Independent variables						
$ASSETS_{(\mu)}$	1.29E-05**	1.30E-05**	1.29E-05**	1.37E-05***	0.1020	9.7856
	3.39E-06	*3.47E-06*	*3.39E-06*	*2.56E-06*	—	—
$ASSETS^2_{(\mu)}$	−2.66E-10**	−2.70E-10**	−2.61E-10**	−2.78E-10***	0.1015	9.8515
	7.51E-11	*7.68E-11*	*7.44E-11*	*5.6E-11*	—	—
$VESSELSIZE_{(\mu)}$	—	1.04E-05	—	6.91E-05*	0.7837	1.2760
	—	*2.08E-05*	—	*2.32E-05*	—	—
$VESSELSIZE_{(CAGR)}$	—	0.7038	—	1.2143*	0.7911	1.2641
	—	*0.5629*	—	*0.4223*	—	—
Number of observations	16	16	14	14	—	—
Multiple R	0.7278	0.7685	0.7559	0.8960	—	—
R-squared	0.5297	0.5905	0.5714	0.8028	—	—
Adjusted R-squared	0.4574	0.4416	0.4934	0.7152	—	—
F-statistic	7.3220**	3.9660*	7.3319**	9.1601**	—	—
P-value	0.0074	3.13E-02	9.40E-03	3.10E-03	—	—

[a]Collinearity diagnostics refer to the whole sample (16 units).
Notes: Standard errors are in italics; *P*-values: *$P<0.05$; **$P<0.01$; ***$P<0.001$.
Source: Authors' elaboration.

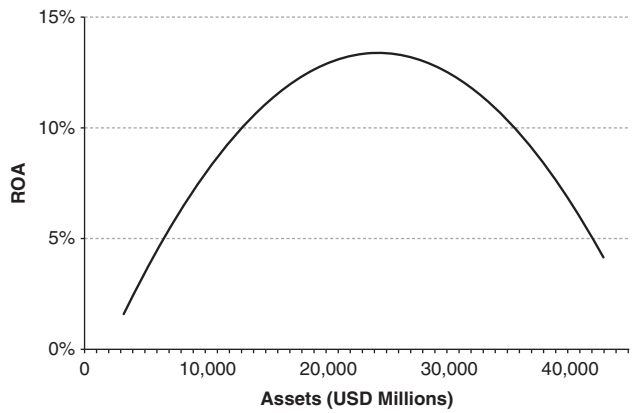

Figure 3: Asset values versus ROA (Model 1a).
Source: Authors' elaboration.

To check the robustness of the results of Models 1a and 2a, two other OLS regression models were estimated (Models 1b and 2b), excluding two outliers (that is MISC and Wan Hai Lines), as their unrelated diversification strategies

determine a lower weight of the container shipping business within their overall corporate portfolio. Indeed, this might bring some bias in the evaluation of the relation existing between the selected variables (Markides and Williamson, 1994). Models 1b and 2b, indeed, present an extremely high global significance; all the regression coefficients are significant, in particular β_1 and β_2 (P-value<0.001). Therefore, the regression results of Models 1b and 2b not only confirm and strengthen the outcomes of the previous model (that is, investment in assets unveil a strong second order relationship with ROA), but also show that ROA is positively correlated with $VesselSize_{(\mu)}$ and $VesselSize_{(CAGR)}$.

Finally, an additional robustness check has been performed for validating the empirical results and establishing their consistency. For parsimony, outcomes are not tabulated but they are summarised below. In order to account for any bias concerning the crisis effect related to the year 2009, some additional regression models (4) were estimated by operationalising the variables referring to the 2005–2008 period. Both sample sizes were tested. Three out of four models were found to be significant, basically confirming the inverted U-shaped relation between total assets and ROA. The positive association between ROA and vessel size ($VesselSize_{(CAGR)}$), instead, is confirmed only by performing the regression on the overall sample (16 units). Therefore, the findings confirm the association between ROA and the selected independent variables, regardless of any distortive effect of the economic crisis.

Conclusions and Implications for Further Research

This article has investigated the different relationships between shipping lines' growth strategies and operational and economic performances. Because of the intrinsic nature of the industry (for example, capital intensive, search for economies of scale and so on) and the conjunctural market conditions within the sampled time frame, growth has inevitably represented a common choice for global players. Nevertheless, the pathways pursued by firms as well as their behavioural patterns, appear widely contrasting and complex. Some carriers prefer to concentrate on the core business (for example, MSC and CMA-CGM), whereas others tend to diversify their investments across different segments (for example, NYK, MOL, Cosco and so on). Decisions relating to specific growth strategies have significantly affected both operational and financial performances.

Empirical findings revealed a negative correlation between total fleet growth and profitability, which was probably caused by the effects of the recent economic crisis.

In the medium term, an excessive resort to chartering results in weaker operational and financial performances. Conversely, those shipping lines which in 2005 were mostly oriented to fleet ownership were able to exploit market opportunities offered by depressed chartering rates.

Empirical analyses revealed a positive relationship between asset values and firm profitability in the medium term (5-year timeframe). This witnesses the capacity of corporate growth strategies to generate an improvement in KPI. Moreover, further investigation outlined an inverted U-shaped relation between total assets and ROA, revealing a threshold ($24 260 million), after which the positive returns decline. The regression results of the model stated a strong second-order relation between assets and ROA, also revealing that ROA is positively correlated with vessel size, both in average and growth rate terms.

The resort to financial leverage still appears important in this capital intensive business, but empirical evidence clearly shows a strong decrease of KPI in the presence of an unbalanced equity structure.

In conclusion, the growth models that exclusively focus on horizontal integration have revealed their endogenous weakness. On the contrary, more moderate growth patterns in liner shipping coupled with a progressive exploiting of technical economies of scale and a strengthening of the core business through vertical integration and horizontal diversification, generated more stable returns over the selected years (Zook, 2004).

This work, however, still presents a few limitations that may be considered in future studies. First, the sample, although rather large and consistent, does not include some major liner carriers (for example, MSC, CMA-CGM), because of their private governance structure and the consequent difficulty in getting annual reports. Therefore, further research should try to enlarge the sample as much as possible to improve the quality and significance of outcomes. Second, the 5-year timeframe could be reasonably expanded, to reach beyond medium term fluctuations and thereby catch structural factors and dynamics. Moreover, because of the lack of adequate information, some issues such as the impact of firm overcapacity and market share still remain empirically unaddressed in this study.

The article represents an exploratory contribution on a topic that has received little attention in the literature. The study, adopting a holistic approach, addressed the complexity and multi-dimensionality of both the variables and relationships affecting firm performance through growth patterns.

As such, the work represents a step forward in the analysis of the relationships between corporate growth strategies and financial performance in the shipping business, by applying notions developed in the strategic management theory.

Further research could also focus on improving some methodological aspects. In particular, future investigations could perform cross-section analysis of variables (that is, on a firm/year basis) thereby enriching the total number

of observations. Moreover, further studies are also called for to analyse the contribution given by various corporate strategy pathways (for example, vertical integration) to overall firm performance. Finally, the model represents an attempt to understand the contribution that this capital intensive and idiosyncratic sector may potentially bring to the study of service industries and to the development of management theories.

References

Anderson, R.C. and Reeb, D.M. (2003) Funding-family ownership and firm performance: Evidence from the S&P 500. *The Journal of Finance* 58(3): 1301–1328.

Ansoff, H.I. (1965) *Corporate Strategy: An Analytic Approach to Business Policy for Growth and Expansion*. New York: McGraw-Hill.

Apergis, N. and Sorros, J. (2010) Disaggregated earnings and stock prices: Evidence from international listed shipping firms. *International Advances in Economic Research* 16(3): 269–281.

Archambault, M. (1989) Intermodalism and liner shipping intermodal approach. *Transportation Practitioner's Journal* 56(2): 151–163.

Baumol, W.J. (1967) *Business Behaviour, Value and Growth*. New York: Harcourt, Brace & World.

Belsley, D.A., Kuh, E. and Welsch, R.E. (1980) *Regression Diagnostics: Identifying Influential Data and Sources of Collinearity*. New York: Wiley.

Buckley, P.J. and Casson, M.C. (1976) *The Economic Theory of the Multinational Enterprise*. London, UK: Macmillan.

Canbäck, S. and Samouel, P. (2006) Do diseconomies of scale impact firm size and performance? A theoretical and empirical overview. *Journal of Managerial Economics* 4(1): 27–70.

Cariou, P. (2008) Liner shipping strategies: An overview. *International Journal of Ocean Systems Management* 1(1): 2–13.

Caves, R.E. (1975) *Diversification, Foreign Investment, and Scale in North American Manufacturing Industries*. Ottawa, Canada: Economic Council of Canada.

Chipty, T. (1995) Horizontal integration for bargaining power: Evidence from the cable television industry. *Journal of Economics and Management Strategy* 4(2): 375–397.

Cronin, J.J. and Page, T.J. (1988) An examination of the relative impact of growth strategies on profit performance. *European Journal of Marketing* 22(1): 57–68.

Cullinane, K. and Khanna, M. (1999) Economies of scale in large container ships. *Journal of Transport Economics and Policy* 33(2): 185–208.

Delmar, F. (1997) Measuring growth: Methodological considerations and empirical results. In: R. Donckels and A. Miettinen (eds.) *Entrepreneurship and SME Research: On its Way to the Next Millennium*. Aldershot, UK: Ashgate, pp. 199–216.

Delmar, F., Davidsson, P. and Gartner, W.B. (2003) Arriving at the high growth firm. *Journal of Business Venturing* 18(2): 189–216.

Fugate, B.S., Davis-Sramek, B. and Goldsby, T.J. (2009) Operational collaboration between shippers and carriers in the transportation industry. *International Journal of Logistics Management* 20(3): 425–447.

Fusillo, M. (2009) Structural factors underlying mergers and acquisitions in liner shipping. *Maritime Economics & Logistics* 11(2): 209–226.

Gale, B.T. (1972) Market Share and Rate of Return. *Review of Economics and Statistics* 54(November): 412–423.

Geringer, J.M., Beamish, P.W. and da Costa, R.C. (1989) Diversification strategy and internationalization: Implications for MNE performance. *Strategic Management Journal* 10(2): 109–119.

Gilman, S. (1999) The size economies and network efficiency of large containerships. *International Journal of Maritime Economics* 1(1): 39–59.
Graham, M.G. (1998) Stability and competition in intermodal container shipping: Finding a balance. *Maritime Policy & Management* 25(2): 129–147.
Grammenos, C. and Arkoulis, A. (2001) The long run performance of shipping initial public offerings. *International Journal of Maritime Economics* 1(1): 71–93.
Grant, R.M. (1991) The resource-based theory of competitive advantage: implications for strategy formulation. *California Management Review* 33(3): 114–135.
Gundry, L.K. and Welsh, H.P. (2001) The ambitious entrepreneur: High growth strategies of women-owned enterprises. *Journal of Business Venturing* 16(5): 453–470.
Hair, Jr J.F., Anderson, R.E., Tatham, R.L. and Black, W.C. (1995) *Multivariate Data Analysis: With Readings*, 4th edn. New Jersey: Prentice Hall.
Hall, M. and Weiss, L. (1967) Firm size and profitability. *The Review of Economics and Statistics* 49(3): 319–331.
Haralambides, H.E. and Veenstra, A.W. (2000) Modelling performance in liner shipping. In: D.A. Hensher and K.J. Button (eds.) *Handbook of Transport Modelling*. Oxford, UK: Elsevier Science, pp. 643–656.
Harrigan, K.R. (1984) Formulating vertical integration strategies. *Academy of Management Review* 9 (4): 638–652.
Hawawini, G., Subramanian, V. and Verdin, P. (2003) Is performance driven by industry- or firm-specific factors? A new look at the evidence. *Strategic Management Journal* 24(1): 1–16.
Hoetker, G. and Mellewigt, T. (2009) Choice and performance of governance mechanisms: Matching alliance governance to asset type. *Strategic Management Journal* 30(10): 1025–1044.
Hult, G.T., Ketchen, J., David, J. and Slater, S.F. (2005) Market orientation and performance: An integration of disparate approaches. *Strategic Management Journal* 26(12): 1173–1181.
Kaen, F.R. and Baumann, H.D. (2003) Firm size, employees and profitability in US manufacturing industries, 13 January. Available at SSRN, http://ssrn.com/abstract=382402 or http://dx.doi.org/10.2139/ssrn.382402, accessed 21 March 2011.
Kogut, B. (1988) Joint ventures: theoretical and empirical perspectives. *Strategic Management Journal* 9(4): 319–332.
Lam, J.S., Yap, W.Y. and Cullinane, K. (2007) Structure, conduct and performance on the major liner shipping routes. *Maritime Policy & Management* 34(4): 359–381.
Lambertides, N. and Louca, C. (2008) Ownership structure and operating performance: Evidence from the European Maritime Industry. *Maritime Policy & Management* 35(4): 295–409.
Levy, D.T. (1985) The transactions cost approach to vertical integration: An empirical examination. *The Review of Economics and Statistics* 67(3): 438–445.
Lorange, P. (2001) Strategic re-thinking in shipping companies. *Maritime Policy & Management* 28(1): 23–32.
Lorange, P. and Fjeldstad, Ø.D. (2011) New business models and strategies in shipping. In: W.K. Talley (ed.) *The Blackwell Companion to Maritime Economics*. Chichester, UK: Wiley-Blackwell Publishing, pp. 263–280.
Lun, Y.H.V., Pang, K.W. and Panayides, P.M. (2010) Organizational growth and firm performance in the international container shipping industry. *International Journal of Shipping and Transport Logistics* 2(2): 206–223.
Mahoney, J.H. (1985) *Intermodal Freight Transportation*. Westport, CT: Eno Foundation for Transportation.
Markides, C.C. and Williamson, P.J. (1994) Related diversification, core competence and corporate performance. *Strategic Management Journal* 15(Summer): 149–165.
McLellan, R.G. (1997) Bigger vessels: How big is too big? *Maritime Policy & Management* 24(2): 193–211.

Midoro, R., Musso, E. and Parola, F. (2005) Maritime liner shipping and the stevedoring industry: Market structure and competition strategies. *Maritime Policy & Management* 32(2): 89–106.
Midoro, R. and Pitto, A. (2000) A critical evaluation of strategic alliances in liner shipping. *Maritime Policy & Management* 27(1): 31–40.
Miller, D. and Friesen, P.H. (1986) Porter's (1980) generic strategies and performance: An empirical examination with American data. Part II: Performance implications. *Organisation Studies* 7(3): 255–261.
Mitchell, W., Shaver, J.M. and Yeung, B. (1992) Getting there in a global industry: impacts on performance of changing international presence. *Strategic Management Journal* 13(6): 419–432.
Morck, R., Shleifer, A. and Vishny, R.W. (1988) Characteristics of targets of hostile and friendly takeovers. In: A.J. Auerbach (ed.) *Corporate Takeovers: Causes and Consequences*. Chicago, IL: University of Chicago Press, pp. 101–136.
Notteboom, T. (2004) Container shipping and ports: An overview. *The Review of Network Economics* 3 (2): 86–106.
Notteboom, T., De Monie, G. and Rodrigue, J.-P. (2010) Organizational and geographical ramifications of the 2008–2009 financial crisis on the maritime shipping and port industries. In: P.V. Hall, B. McCalla, C. Comtois and B. Slack (eds.) *Integrating Seaports and Trade Corridors*. Aldershot, UK: Ashgate, pp. 31–45.
Panayides, P.M. (2003) Competitive strategies and organisational performance in ship management. *Maritime Policy & Management* 30(2): 123–140.
Panayides, P.M. and Cullinane, K. (2002) Competitive advantage in liner shipping: A review and research agenda. *International Journal of Maritime Economics* 4(3): 189–209.
Panayides, P.M., Lambertides, N. and Savva, C.S. (2011) The relative efficiency of shipping companies. *Transportation Research Part E: Logistics and Transportation Review* 47(5): 681–694.
Parola, F., Lee, S.-W. and Ferrari, C. (2006) On the integration of logistics activities by shipping lines: The case of East-Asia. *Journal of International Logistics and Trade* 4(1): 109–130.
Peng, M.W. (2002) Towards an institution-based view of business strategy. *Asia Pacific Journal of Management* 19(2–3): 251–267.
Penrose, E. (1959) *The Theory of the Growth of the Firm*. New York: John Wiley & Sons.
Pleshko, L.P. and Souiden, N. (2003) The profit effects of product-market growth strategy: A financial services example. *Journal of Financial Services Marketing* 7(3): 258–266.
Porter, M.E. (1980) *Competitive Strategy*. New York, NY: Free Press.
Prahalad, C.K. and Hamel, G. (1990) The core competence of the corporation. *Harvard Business Review* 68(3): 79–91.
Qian, G., Khoury, T.A., Peng, M.W. and Qian, Z. (2010) The performance implications of intra- and inter-regional geographic diversification. *Strategic Management Journal* 31(9): 1018–1030.
Selviaridis, K. and Spring, M. (2007) Third-party logistics: A literature review and research agenda. *International Journal of Logistics Management* 18(1): 125–150.
Shyam Kumar, M.V. (2009) The relationship between product and international diversification: The effects of short-run constraints and endogeneity. *Strategic Management Journal* 30(1): 99–116.
Sjostrom, W. (1989) Collusion in ocean shipping: A test of monopoly and empty core models. *Journal of Political Economy* 97(5): 1160–1179.
Slack, B., Comtois, C. and McCalla, R. (2002) Strategic alliances in the container shipping industry: A global perspective. *Maritime Policy & Management* 29(1): 65–76.
Slater, S.F. (1989) A comment: An examination of the relative impact of growth strategies on profit performance. *European Journal of Marketing* 23(6): 34–37.
Stalk, G., Evans, P. and Shulman, L.E. (1992) Competing on capabilities: The new rules of corporate strategy. *Harvard Business Review* 70(2): 57–69.
Stopford, M. (2009) *Maritime Economics*, III edn. London, UK: Routledge.

Stuckey, J. and White, D. (1993) When and when not to vertically integrate. *Sloan Management Review* 34(3): 71–83.

Syriopoulos, T. (2008) Financing Greek shipping: Modern instruments, methods and markets. In: A. Pallis (ed.) *Maritime Transport: The Greek Paradigm, Research in Transportation Economics Series*. London, UK: Elsevier Publisher, pp. 171–219.

Syriopoulos, T. and Theotokas, I. (2007) Value creation through corporate destruction? Corporate governance in shipping takeovers. *Maritime Policy & Management* 34(4): 225–242.

Teece, D. (1987) *The Competitive Challenge*. Boston, MA: Bollinger.

van Driel, H., Volberda, H. and Eikelboom, S. (2004) Longevity in services: The case of the Dutch warehousing companies 1600–2000, ERIM Report Series 'Research in Management', August, Rotterdam, NL: Erasmus University Rotterdam, pp. 1–40.

Venkatrama, N. and Ramanujam, V. (1986) Measurement of business performance in strategy research: A comparison of approaches. *The Academy of Management Review* 11(4): 801–814.

Williamson, O. (1981) The economics of organization: The transaction cost approach. *American Journal of Sociology* 87(3): 548–577.

Zahra, S.A. and Covin, J.G. (1993) Business strategy, technology policy, and firm performance. *Strategic Management Journal* 14(6): 451–478.

Zook, C. (2004) *Beyond the Core: Expand your Market without Abandoning your Roots*. Boston, MA: Harvard Business School Press.