



**RESEARCH IN TRANSPORTATION
ECONOMICS**

VOLUME 12

SHIPPING ECONOMICS

KEVIN CULLINANE

Editor

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RESEARCH IN TRANSPORTATION ECONOMICS VOLUME 12

SHIPPING ECONOMICS

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2005



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First edition 2005

British Library Cataloguing in Publication Data

A catalogue record is available from the British Library.

ISBN: 0-7623-1177-0

ISSN: 0739-8859 (Series)

© The paper used in this publication meets the requirements of ANSI/NISO Z39.48-1992 (Permanence of Paper). Printed in The Netherlands.

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ACKNOWLEDGMENTS

A work such as this cannot be undertaken without incurring numerous debts. In partial repayment of what is owed, I would take this opportunity to express my heartfelt appreciation of the efforts of certain key individuals without whom this book would not have come to fruition.

In the first instance, I would like to thank Professor Martin Dresner of the Robert H. Smith School of Business of the University of Maryland for his unstinting efforts in reviewing and improving the contents of the book in his role as series editor. I would also express my appreciation of Elsevier's publishing editor, Chris Pringle, for not only accepting my proposal for this volume, but also for the support and advice he has given throughout the editing and publication process. The patience of both Martin and Chris in waiting for the final manuscript is much appreciated.

The contribution of others that have provided help and advice behind the scenes should also be acknowledged. In this respect, I am grateful to the following for their insight and timely support when needed: Roar Adland of Clarksons in London, Giuseppe Alessi of the University de L'Aquila in Italy, Anthony Beresford and Peter Marlow of Cardiff University, Stephen Gong of the Hong Kong Polytechnic University and Photis Panayides of the Cyprus Institute of Management.

Obviously, in any work of this nature, however, the greatest expression of gratitude must be reserved for the authors that have committed time and effort to the project. In all cases, contributing authors were unswerving in meeting deadlines, undertaking recommended revisions and in supporting whatever requests the editor laid before them. This work would not have been possible without their outstanding and untiring commitment to see it completed.

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1. EDITORIAL: KEY THEMES IN SHIPPING ECONOMICS RESEARCH

Kevin Cullinane

1. INTRODUCTION

In order to fully comprehend the scope of this volume in the *Research in Transportation Economics* series, it is important to recognise a distinction between *Shipping Economics* and *Port Economics*. While the area covered by the discipline of *Port Economics* may appear to be intuitively obvious, the scope of what is entailed within *Shipping Economics* is rather more difficult to define. As can be seen in the content of the chapters in this volume, the coverage of the latter is extremely eclectic and, in common with the area of *Port Economics*, draws upon many concepts, theories and methods that are ubiquitously applied in other branches of economics. Together, they may be considered to comprise *Maritime Economics*.

As with many taxonomies that are developed and utilized within the social sciences, on most occasions it is very clear what specific issue may be termed *Shipping Economics* and what *Port Economics*. However, on some occasions, the distinction may not be absolutely categorical. Many issues of relevance to the port industry simply cannot be analysed without taking into account the economic behaviour of their main customer, the shipping industry. Similarly, it is easy to visualize areas of concern to the shipping industry that are significantly affected by the economic behaviour of one of their main service suppliers, the port industry. Thus, at the interface between *Shipping Economics* and *Port Economics*, there exists a grey area where one “discipline” may impinge on the territory of the other.

Shipping Economics

Research in Transportation Economics, Volume 12, 1–17

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ISSN: 0739-8859/doi:10.1016/S0739-8859(04)12001-5

2. MARKET MODELLING AND ANALYSIS

Research in the field of shipping economics has, throughout its history, been very much concerned with various aspects of the functioning of markets. Since this is undeniably a common characteristic of many branches of economics, this certainly cannot be claimed to be a unique feature of shipping economics. Within the context of transportation economics, however, it may be true to say that market modelling is further advanced in shipping economics than in the study of any other of the transportation modes. This is undoubtedly due to the great range of markets which may be encompassed within the broad sphere of what may be considered to be *shipping economics*.

International shipping can be distinguished from intra-regional and domestic (or coastal) shipping, as well as from freight movements on inland waterways. In terms of mere revenue contribution, the shipping industry can be somewhat simplistically divided between the bulk and liner sectors. The former is broadly characterized by large single shipments of loose cargo in whole ships that are operated on tailor-made voyages and the latter by mixed shipments of containerised cargo in ships that are operated to a regular schedule on pre-defined routes. The nature of the cargoes carried within each of these two major dichotomous sectors dictates that radically different designs of ship are deployed in each. Other more specialized markets play a relatively minor, but nonetheless important, role. Examples that readily spring to mind are the cruise and ferry passenger markets, the roll-on/roll-off freight markets, the specialized bulk markets (e.g. car carriers) and the smaller non-containerised general cargo trades. In turn, the mainstream bulk cargo market can be divided between the tanker and dry bulk sectors (the “wet” and the “dry” bulk cargo markets) and the liner market into the three major East-West trades, the three major North-South trades, the important intra-Asian trades, feeder trades etc. In the bulk market, the size of ship, the cargo carried, the trade route and the contract of carriage all provide yet another basis for further segmentation of the market.

In order to serve the primary shipping markets that relate in a straightforward manner to the carriage of freight, there are important secondary markets that also provide potential avenues for research in shipping economics. The ships which carry the cargoes may be bought new or secondhand. They may also, at some point in time, need to be scrapped. This alludes to the importance of analysing the shipbuilding, ship sale and purchase (S&P) and scrap markets. Since all these shipping markets function in a totally international arena where national political boundaries pose only a minor irritation to the smooth conduct of trade and commerce, there is also a need for a worldwide focus on generic markets that are of critical import to the shipping industry, such as those for money, currencies, labour and fuel.

The potential for conducting market analysis in shipping economics is, therefore, very great; a fact not lost on the comparatively large number of consultancy companies, such as Clarksons, Drewry, Fearnleys, Platou etc., that produce a plethora of very detailed and expensive market analyses on a regular and ongoing basis. The academic community engaged in research in shipping economics also recognises this potential to conduct market analyses. Adopting a very different perspective and rationale than the consultancy companies, the analysis of shipping markets has constituted a key strand in shipping economics research over the last few decades. In this respect, it is certainly the case that some markets have received greater attention than others. Because of the extremely volatile nature of price movements within it, the bulk market has repeatedly been put under the microscope, although not always at a completely aggregate level; as well as general or holistic analyses of how the bulk market works, there have also been several more specific studies, conducted at a greater level of disaggregation.

The first chapter in this volume is by David Glen and Brendan Martin. They provide a comprehensive survey of the corpus of work done on modelling the dry bulk and tanker markets. By its very nature, inclusivity is a necessary characteristic of any effort to undertake such a task and it is this which justifies its position as the inaugural chapter of the volume. They highlight the seminal contributions of Tinbergen (1931, 1934) and of Koopmans (1939) and summarise the ensuing evolution of alternative approaches to modelling these markets. In so doing, they highlight the pivotal and seminal contribution of Beenstock and Vergottis (1993); a work that provides a reference point for much of the discussion in which Glen and Martin go on to engage.

Having reviewed the relevant literature, Glen and Martin point out that since Beenstock and Vergottis (1993), efforts to model either or both of the dry bulk and tanker markets have eschewed an approach based on hypothesized causality and structural modelling. Instead, recent preferred modelling methodologies have revolved around data-driven approaches that focus on the statistical properties of market data and determining reduced form dynamic relations therein. As the authors indicate, this contemporary approach has been motivated by data-analytic and modelling innovations that have their origins in the discipline of financial economics (e.g. Dickey & Fuller, 1979, 1981; Engle & Granger, 1987; Johansen, 1988). It has also been coincidentally facilitated by the wider availability and enhanced accessibility of better data that is characterised by higher frequency and longer duration.

Glen and Martin go on to conduct their own empirical analysis. Firstly, by collecting supplementary data to February 2003, they extend and enlarge the database originally analysed by Veenstra (1999). They then repeat the VAR modelling approach adopted in the original. Interestingly, their findings so closely

approximate those of the original that the VAR modelling methodology adopted by Veenstra (1999) is very much vindicated and the results validated. This is so much the case, in fact, that Glen and Martin continue with their empirical analysis by estimating a greatly simplified, “reduced form” model of spot market rates that actually utilizes an output from their own original VAR analysis as an input into this later model.

As Glen and Martin freely admit, this market model is “somewhat unusual” in utilizing the spread relation estimated in the VAR context in tandem with a range of “structural” variables. As such it represents a hybrid model form which spans the methodological divide between the structural and VAR modelling methodologies by very simply relating first differences in spot rates to: the lagged values of the difference between time charter and spot rates; a vector of exogenous demand variables; the existing fleet that is relevant to an individual segment of the overall market and; the unit price of the fuel used by ships. They conclude that the forecasting performance of their model is, in most cases, only “marginally better” than those derived from a “naïve” model. It is claimed, however, that forecasting performance will improve as variables are added from the estimating equation for the first differences of the spot rate from inside the original VAR model.

One of the most poignant conclusions that Glen and Martin draw from their survey of the literature and ensuing empirical analysis is that the contemporary reliance on data-driven methodologies does not yield the same insights or depth of understanding that may be derived from approaches based on structural modelling. As such, they attest that it may be time to revert again to a more traditional approach, à la Beenstock and Vergottis (1993), that is based on the modelling and testing of hypothesised causal relationships that are derived directly from economic theory. This “*crie de coeur*” is one that will resonate with many shipping economists and to which many would certainly lend their support.

In their paper on the “Econometric Modelling of Newbuilding and Secondhand Prices,” Hercules Haralambides, Stavros Tsolakis and Colin Cridland attempt to put into practice exactly the sort of “fundamental” approach, based upon the specification and testing of a structural model, that is advocated by Glen and Martin. In common with the authors of the first chapter, they too build upon the significant body of work concerned with the modelling of prices in the various markets that are pivotal to the shipping industry. As previously mentioned, such analyses have their origins in the pioneering work of Tinbergen (1931, 1934) and Koopmans (1939). Both these Nobel laureates made early seminal contributions to shipping economics and can be attributed with the original exposition of the much referred to, and often taught, *shipping market cycle*; a concept that makes explicit reference to the complex interdependence of freight and asset markets. In their review of the literature on the modelling of newbuilding and secondhand ship

prices, the authors identify and summarise the main contributions to this field over the ensuing years.

Although the focus of this paper would appear to be limited to the market for both new and for used ships, it conforms to precedent in acknowledging that each of these markets cannot be analysed in isolation. Not only does previous research suggest that the potential exists for prices in each of these markets to be dependent on the other, but also that they may be causally dependent on many other factors, not least: the charter rates (prices) which prevail in the market for the carriage of goods by sea; exchange rates; interest rates; worldwide shipyard capacity and utilization; national industrial and fiscal policies etc.

One of the most interesting aspects of this contribution lies with the authors' exposition of the difficulties faced in variable definition and data collection, as well as the varied, sometimes imaginative and sometimes downright devious, methods employed to resolve them. Those of us that have undertaken data analytic research will share the sense of frustration that can be detected in the authors' cataloguing of problems such as: the absence of appropriate data across all the variables at anything other than an annual frequency; inconsistency in the definition of market segments over time; changes to Lloyds Register ship categorization criteria in 1995 (such that certain ships that had been classified as bulk carriers until that time were suddenly found to be classified as general cargo vessels); the inconsistency of data between sources and the consequent need for the "triangulation" of data values between those sources; the incomparability of newbuilding prices under different terms of payment and; the dearth of comprehensive and reliable information to allow precision in measuring shipyard capacity.

By integrating what they consider to be the most appropriate elements of previous models, Haralambides, Tsolakis and Cridland espouse interdependent, causal model specifications for both the newbuilding and secondhand ship markets. They then test the significance of the relationships they have hypothesised. A disaggregate approach to the analyses of the two markets is adopted. This facilitates a focus on the price of new and secondhand ships for specific shipping market segments and the comparison of differences and similarities between them. It also simultaneously reduces the potential for the overall picture to be obscured by variations in price behaviour between market segments.

Even for the uninitiated in the development of complex causal models of market price behaviour, the results of the analysis are interesting. As is often the case with such analyses, this is as much due to the inconsistency of findings as it is to their conclusiveness. For instance, in drawing inferences from the estimation of their newbuilding model, the authors find that shipbuilding costs have a significant impact on the prices of both tankers and bulk carriers across all market segments and in both the long and short run. This is unsurprising since it is this factor that

largely explains the recent and continuing migration of shipbuilding contracts to the Chinese mainland and similar migrations in times past to Japan and Korea. It is also a finding that features prominently in the results of previous studies. Another conclusive result is that exchange rate fluctuations are found to have no significant impact on the price of newbuildings in any market segment. Since this would appear to be counterintuitive, it is a rather more surprising result. While the authors point to the potential for covariance amongst the independent variables as a possible explanation, there certainly remains scope for further research.

At the same time, however, the results for the newbuilding model suggest that, in the long-run, the freight market is an even more important influence on the prices of handy-sized bulk carriers than the cost of building these ships (although the latter remains a significant influence on prices). While the authors speculate as to why this should be the case, there is again significant scope for further investigation.

3. SHIPPING FINANCE

Shipping Finance is an extremely important aspect of the shipping economics discipline. Apart from air transport (see Morrell, 2002), there is no other area of transportation economics, where it plays so vital a role. The most obvious reasons why this should be the case are: (a) the capital intensity of the shipping industry; (b) the availability and cost of finance for ships is dependent upon a highly volatile and, therefore, risky freight market and; (c) the international mobility of the assets means that the issue of financial security takes a greater priority than usual.

The uniqueness of the market for shipping finance is illustrated by the fact that many banks and finance houses employ specific shipping finance expertise and that sometimes these groupings are even recognised formally within an entity's organisational structure. Similarly, the importance of shipping finance has been recognised not only by a significant heritage of books (Cheng, 1979; Grammenos, 1979; Paine, 1990; Slogett, 1999; Stephenson, 1995; Stokes, 1997) and industry guides on the subject (e.g. Euromoney, 2004/2005), but also by the continuing growth in scholarly publications disseminating the results of shipping finance research. For example, see Haralambides (1993); Grammenos and Marcoulis (1996), Sjogren (1999), Leggate (1999), Leggate (2000), Cullinane and Panayides (2000), Akatsuka and Leggate (2001), Panayides and Gong (2002), Grammenos and Arkoulis (2002), Kavussanos and Visvikis (2004), Chen and Wang (2004).

The chapter by Manolis Kavussanos and Stelios Marcoulis is again another form of specific market analysis. In this case, the work is concerned with the performance of listed shipping companies across the world and the comparison

of this performance against that of the transportation and other industries. Given the trend in recent years for shipping companies to access the funds of the general public, particularly through stock market flotation and the widening of the share ownership base, it is not surprising that the authors should focus on this form of finance. Specifically, they attempt to specify and estimate alternative models for the valuation of the shares of “water transportation companies.” The models they test range from single-index models, where a market index alone is assumed to be driving returns, through to multifactor models that incorporate micro- and macroeconomic factors as determinants of the rate of return on shares. By comparing the stock market performance of different shipping markets against that of other industries, a clear vision of the relative risk-return trade-offs can be derived that provides investors with a sound basis for making rational decisions.

The authors’ literature review suggests that previous analyses have largely found that differences between industries are highly significant in explaining differences in returns from shares. The reported empirical work of the authors suggests that, in addition to the general market movement, there are microeconomic factors at the level of the company that tend to influence the returns from shipping and other industries. For shipping, in fact, the level of gearing is found to have a particularly strong negative relationship to stock market performance.

When it comes to testing the impact of macroeconomic factors, however, their results might be perceived to be rather counterintuitive. While both monthly industrial production and oil prices are found to have a significant influence on the rate of return on shipping company shares, the former is found to be a negative relationship and the latter positive. There would seem to be a rather more complex relationship between these macroeconomic factors and stock market returns than one would expect on the basis of elementary economic theory. As such, this would again seem to justify further in-depth investigation.

As potentially the case with all research, the investigation conducted by Kavussanos and Marcoulis seems to have raised more questions than answers. However, one categorical conclusion that does seem to emerge from this work is that factors other than simply the general market movement do seem to have an influence on the prices of shipping industry shares. As such, the authors advocate the use of multifactor models in future research so that these other influential factors can be identified and the level of their influence evaluated. Implicitly, this would appear to provide yet further support for a more fundamental approach to model development. After all, the factors that are hypothesised to have some bearing on shipping share prices, and whose significance is subsequently tested within the model, are actually posited on the basis of the economics that underpins the operation of the physical market for shipping.

4. FISCAL POLICY

At first sight, a paper on the fiscal treatment of shipping in Canada may appear to be rather a specialised and esoteric topic for inclusion in a work representing the major themes of contemporary research in shipping economics. The contribution by Mary Brooks and Richard Hodgson, however, addresses one of the most controversial and oft-debated policy issues affecting the maritime industry.

In the light of increasing competition from nations with a lower cost base and in the absence of appropriate policies that ensure its continuation, the combined merchant fleet of the world's developed countries has experienced inexorable decline. The greatest impetus to this phenomenon has been the establishment of open registries, most usually in low cost nations, that deliberately set out to attract the registration of ships that are owned and controlled by overseas shipowners. Until the early to mid-1990s, in fact, private-sector shipping companies of the developed world had exhibited a consistently greater propensity to register their ships offshore with open registries. This trend was facilitated by the inherently international outlook of the decision makers involved and by the mobility of the assets – the ships themselves.

This decline in the registered fleets of many of the world's traditional maritime nations was allowed to approach crisis point. In Europe, where most of the countries affected were clustered, what appeared to bring this issue to the forefront of the political agenda was not the prospect of any form of economic loss that may or may not have been sustained as the result of the loss of a flag fleet. Nor was it the deleterious impact on the employment levels of nationals on board ships (see Goss, 1993). What really seemed to bring the matter home was the seemingly sudden recognition that: (a) a continuing decline in a nation's shipping fleet would greatly reduce the seafaring knowledge, skills and experience that would be available and could be put to good use ashore, and that this would constitute a significant loss to the national economy; and (b) flag administration remains the most viable mechanism through which safety and environmental regulation can be reliably implemented, especially where this relates to freight transport within national waters and to the domestic shipping industry.

Following decades of political and academic debate (Gardner & Marlow, 1983; Gardner & Richardson, 1973/1974; Goss, 1985, 1993; Marlow, 1991a, b, c, 2002), a decision had to be made as to whether some form of intervention was warranted. Either the traditional maritime nations had to face up to the reality that they would no longer be significant players in world shipping (in terms of ship registrations at least) or policies would need to be implemented to stem, and possibly reverse, the continuing decline in their national registered fleets.