Economics of Transportation 11-12 (2017) 33–48

Contents lists available at ScienceDirect

Economics of Transportation

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

Are vessel sharing agreements pro-competitive?

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A B S T R A C T

Attention is focussed on a type of strategic alliance of the container shipping industry: vessel sharing agreements. In such consortia carriers jointly provide—but independently sell—a liner service. The strategic alliances studied in this work have not been extensively analyzed in the theoretical literature; a new model is proposed that embodies their main distinguishing features. By it, an examination is provided of the effects on equilibrium prices, equilibrium aggregate quantities and consumer welfare of the formation and enlargement of vessel sharing agreements. A positive answer is developed to the question raised in the title of the present work that supports a *laissez-faire* policy for these consortia.

1. Introduction

Strategic alliances are a type of inter-firm cooperation that has become increasingly important and frequent in several industries over the last thirty years.[1] Sometimes they are roughly described as "lesser forms of merger"; yet a commonly accepted distinctive definition is missing. In fact, a general theory thereof is impossible and the literature provides diverse approaches[2] to modelling this kind of industrial cooperation, since the functioning and effects of strategic alliances depend on their structure and on the characteristics of the industry within which they are implemented. Here attention is restricted to a definite pattern of strategic alliance of a precise industry: vessel sharing agreements of the container shipping industry.

A vessel sharing agreement—sometimes abbreviated as a VSA—is a consortium among the companies of a container shipping industry enforced by a contract regulating the joint use of vessels for the transportation of containers. The members of a VSA—henceforth also called (container shipping) carriers, liners or more simply firms—engaged in these cooperative agreements keep separate and independent their legal identities and strategic decisions. Decisional independence is the crucial aspect by which *the effects of the formation of VSAs* on the competition among the carriers of a container shipping industry should be analyzed by means of the conceptual categories of non-cooperative game theory: though a VSA creates a legal mechanism by virtue of which some fractions of a carrier's vessels become of exclusive operational use of the other members of the VSA, its underlying contract does not make provision for any agreement on the quantities to be carried or on the prices to be fixed.[3] Therefore, the present work devoted to the analysis of the competitiveness of VSAs—and in particular to the analysis of the effects of the formation and enlargement of VSAs on consumer welfare, equilibrium aggregate quantity of shipping service and equilibrium freight rates (i.e., the prices of transportation of a cargo unit per distance unit)—will adopt a non-cooperative approach when modelling competition among container shipping carriers bound by VSAs.

Some words must be preliminarily spent to provide a more circumstantial description of the subject matter and of a regulation issue concerning the legal enforceability of VSAs. In ELAA (2008)—a document submitted by the then[4] European Liner Affair Association (ELAA) to the European Commission concerning the October 2008 draft of the revision of the Consortia Block Exemption Regulation—the following description of a VSA was provided:

> Under a vessel sharing agreement, members agree to provide a certain number of vessels for common use in order to set up a joint liner service. On each vessel, a number of slots are reserved for individual members. The allocation of slots is based on the principle "what you put in–you get out". Therefore, capacity allocation to each member corresponds to the proportional share of capacity it is providing to the consortium. Marketing, fleet operation and commercial matters

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[1] See the Introduction in Chen and Ross (2003) for a classification of strategic alliances; see Slack et al. (2002) and Panayides and Wiedmer (2011) for a discussion on the formation and evolution of strategic alliances in the container shipping industry.

[2] For instance, the strategic alliances considered in Mialon (2014)—inspired by alliances in the telecommunications industry—considerably differ from those in Zhang and Zhang (2006)—essentially inspired by alliances in the airline industry—in the basic way firms' common interests are modelled (see Sect. III.C in Mialon (2014) for a discussion on the differences).

[3] This does not imply that the use of the categories of cooperative game-theory in the analysis of the *formation process of VSAs* is not legitimate or justifiable.

[4] ELAA flowed into the World Shipping Council since July 2010.

https://doi.org/10.1016/j.ecotra.2017.10.004
Received 6 May 2017; Received in revised form 18 September 2017; Accepted 19 October 2017

remain the private responsibility of each individual carrier: there is no commercial cooperation.

A peculiar aspect of VSAs, which makes these agreements interesting from an economic viewpoint, is that the costs faced by a member of a VSA depend also on the strategic decisions of the other members of that VSA. The reason of this is that the cargo commercially managed by a member is transported also by means of other members' vessels in accordance to the above mentioned proportional shares. It must be remarked, however, that there is no purchase of space of other members' vessels because typically[5]

the lines in question do not pay each other for the slots

in that VSAs customarily provide that[6]

each [p]arty shall operate its own vessels deployed in the VSA services and [ ] pay for the fixed and variable costs associated therewith.

Thus, as the members of VSAs continue to make independent decisions on sales, these agreements should not be somehow assimilated to mergers. In particular, there should not be any ground to contend that VSAs have the same anti-competitive effects which under certain modelling conditions can be reasonably associated to horizontal mergers "with no synergies" in the sense of Farrell and Shapiro (1990). However, a theoretical analysis of the effects on competition of the formation of these consortia is missing and up to now the assessments of these effects—actually provided for by some competition laws—are not well-grounded from an economic theoretical perspective.

VSAs are common practice in the container shipping industry and, like mergers, are often subject to some form of approval or control by antitrust authorities. Many of the largest shipping companies are involved in some type of VSA and such a phenomenon is more and more economically relevant.[7] In the course of 2014 a large VSA, named 2M, formed between the then two largest container shipping companies: Maersk Line and MSC. The 2M had been preceded by another planned VSA, named P3, that should have involved also the then third largest container shipping company CMA CGM. The P3, though approved by the EU and US authorities, failed to go into operation after the June 2014 denial of clearance from the Chinese Ministry of Commerce that deemed it essentially anti-competitive as veering away from the usual canons[8] of a VSA and excessively increasing the Herfindahl index of market concentration; the details of the decision are in MOFCOM (2014). Despite the rejection of its unfortunate predecessor, the 2M received the approval of the relevant antitrust authorities and went into operation the 9th of January 2015; see Section 5 in Premti (2016) for more on this. As an operational agreement can concern huge capacity shares on a certain route—for instance the planned P3 would have accounted for a capacity share of 46.7 percent on the Europe-Asia route—it is evident that the approval or denial of a VSA can be a decision with significant economic consequences in that a VSA can have important entailments on carriers' commercial choices which ultimately affect the freight rates set by carriers to shippers.

Despite a mild general tendency not to consider VSAs necessarily anti-competitive—see, for instance, Section 6 in Premti (2016) and the documents cited therein—the effects of such consortia on the competitiveness of a container shipping industry are actually still unclear. This is evident, for instance, when one notes that the 30% market share threshold provided for by the Consortia Block Exemption Regulation of the European Union[9] is—even according to EU representatives (see Sect. 77 in OECD (2015))—arbitrary and has no theoretical motivation. Hence the question set forth by the title of this work that naturally arises is: are vessel sharing agreements pro-competitive or not? An answer is called for from the perspective of a regulator that aims at favoring competition: if VSAs were anti-competitive then, simply, no consortium of this type should be permitted; if VSAs were pro-competitive then no threshold should exist and these consortia should not be subject to any external approval; if, however, the pro- and anti-competitive effects were determined by the internal configuration of such consortia within a container shipping industry then the threshold should be justified by some argument that draws a relationship between the internal configuration and its effects on competition.

This work will tackle the issue of the competitiveness of vessel sharing agreements by modelling a container shipping industry as an oligopoly[10] formed by carriers which produce a homogeneous good (i.e., the transportation service of containers) and examining the effects on equilibrium freight rates, equilibrium aggregate quantity and consumer welfare generated by the formation and enlargement of VSAs. Since in a container shipping industry some VSAs can already be operational when new VSAs form and since, in principle, changes in market equilibrium depend on the pre-existing configuration of such consortia, in the model here proposed all possible configurations of VSAs will be considered and the set of all such possible configurations will be endowed with an order-theoretic structure that allows for a comparison of the "consortial concentrations" of different configurations of VSAs. Employing that model, the pro-competitiveness of VSAs will be maintained by showing that their formation and enlargement yield a decrease in equilibrium prices and an increase in equilibrium aggregate quantity and in consumer surplus.

Unlike for other agreements of the transportation industry,[11] the competitive effects of the formation and enlargement of VSAs on prices, outcome and consumer welfare have not been extensively analyzed. As it is clear from recent surveys of the literature on the competition and cooperation of carriers—like for instance that in Lee and Song (2017), see in particular Sect. 2.1 therein—there is a limited number of studies formulating models where shipping carriers can share production capacities. None of these models addresses issues related to the formation or enlargement of VSAs that can be decisive for antitrust policies (note in particular that the article by Alvarez San-Jaime et al. (2013) cited in the mentioned article by Lee and Song (2017) pertains mergers and not VSAs). In a sense this is not surprising because the perspective of most of such models is a managerial one, while antitrust policies are driven by a systemic perspective. Other works, like for instance Park et al. (2001) or Zhang and Zhang (2006), are conceived to address welfare effects of strategic alliances that do not resemble VSAs: in those models firms maximize a combination of own profits and partners' profits and hence they seem to be more adequate for describing alliances based on equity exchange or some joint ventures, but not VSAs. So, at the moment, models that allow an evaluation of the pro- or anti-competitive effects of VSAs seem to be missing. One of the aims of the present work, of course, is also to contribute to fill such a gap.[12]

The rest of the article is organized as follows. Section 2 introduces the

[5] Quotation from The Transit Manual; see European Commission (2016).

[6] Quotation from the CSCL/UASC/CMA CGM Vessel sharing agreement; see FMC Agreement No. 012299 (2014b).

[7] Clearly, VSAs involve also medium and small container shipping companies. A long list of VSAs can be found at https://www2.fmc.gov/FMC.Agreements.Web/Public.

[8] It is worth to remark that, because of its cost reallocation procedures, the P3 agreement is not a VSA also according to the definition provided in this work.

[9] The 2009 Consortia Block Exemption Regulation—see European Commission (2009)—has been extended until April 2020 and allows cooperation agreements among carriers whose joint market share is below 30%. Above that threshold a VSA has to self-assess the effects on competition of its formation in order not to let the Commission open proceedings on it. Since VSAs are in fact banned by the Article 101(1) of the Treaty on the Functioning of the European Union, the self-assessment is necessary to benefit from the Article 101(3) that, under certain conditions, allows for agreements that are advantageous to consumers.

[10] See Sys (2009) for an empirical analysis of the oligopolistic nature of such an industry.

[11] About Code sharing agreements see Park (1997), Brueckner (2001), Park et al. (2001), Bilotkach (2005), Hassin and Shy (2004), Heimer and Shy (2006), Chen and Gayle (2007). See also Chen and Ross (2000) for a model of entry inspired by Code sharing agreements.

[12] Recently Jeon (2016)—see, in particular, Section 6.1 therein—has developed a counterfactual analysis of a merger between Maersk and MSC for the period prior to the formation of 2M. In her paper, however, no attempt to model VSAs is made; the present work might provide insights also for examinations of that type.