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Incentives in Cruise Terminal Concession Contracts

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MedCruise Association

Abstract

Concession contracts are widely used to structure the relationship between public managing bodies of ports and entities that are granted the right to operate a terminal at a given port. This study initiates research on incentives in cruise port/terminal concession contracts by combining managerial insights with a more economic approach using game theory perspectives. It first outlines the conflict of interests between port authority and the contracting parties, demonstrating that due to asymmetric information, a terminal operator might engage in activities that are undesirable from a Port Authority standpoint after the concession agreement is signed. Thus, incentives are needed to guarantee the terminal operator will not only act in its own interest, but also takes into account the managerial objectives of the Port Authority. A case-study of the Port of Galveston, Texas, is presented to provide an example of an existing incentive mechanism in place with provisions related to assignment and renewal of berth and terminal usage, fees, and

the minimum passenger guarantees. Based on these managerial considerations, the case also points to key factors to be incorporated if cruise lines' behavior and moral hazard problems are modelled following a more economic approach based on game theory.. The case study concludes with the discussion of the critical elements in negotiating cruise concession contracts. Among others, these elements, that distinguish the cruise industry from other market segments, might prevent the costly renegotiation of contracts at a later stage or after the termination of the awarding process.

Keywords: Cruise, Concession Contracts, Incentives.

1. Introduction

Cruise tourism, a dynamic sector experiencing growth all over the world, contributes substantially to the development of hosting economies. A global record of more than 20 million passengers went on a cruise in 2012. In the United States alone the cruise industry generated more than \$42 billion in total economic activity, involving over 356,000 jobs (Cruise Lines International Association (CLIA), 2013). In Europe, the cruise sector generated a direct and indirect employment of over 330,000 jobs, reflecting a 75% increase in a five years timespan (CLIA Europe, 2014).

Consequently, the cruise industry has gained scholarly research interest. Scholars have focused on the geography of the world cruise market and the routing of cruise ships (Hersh and Ladany, 1989; Charlier and McCalla, 2006; Rodrigue and Notteboom, 2013), the industrial organization of cruises (Papatheodorou, 2006), the demand for cruise tourism (see e.g. Petrick and Li, 2006), the supply of cruises in specific regions (see e.g. Wilkinson, 2006 and Wood, 2000 on the Caribbean), the economic significance of cruise tourism and cruise ship calls (Dwyer and Forsyth, 1996; 1998) and cruise ship passenger spending patterns (Douglas and Douglas, 2004).

Yet, cruise ports have seldom been the unit of analysis. Such cases include Marti (1990), which discussed the cruise ship port selection process, while McCalla (1998) and Vagellas and Pallis (2010) focused on the service offerings and locational qualities of cruise ports.

The related cruise port/terminal concession contracts negotiate initial investments on cruise port infrastructure and supporting logistics, and/or generate flexible financing and competitive port service charges. They also contribute to enhancing the efficient use of port land, whilst requiring private operators to take into account the economic, social, and environmental objectives of the public entities. The regulatory and pricing regime of concession agreements and the associated risk distribution reveal the priorities of public port authorities and cruise terminal operators.

This paper sheds light on the importance of the incentive mechanism in order to align the interests of the involved port authorities and terminal operators in contractual provisions in concession agreements on cruise terminal activities. Grounding on the missing scholarly analysis of the issue in cruise ports, the study first outlines the conflict of interests between port authority and the contracting parties and the need for incentives to guarantee the terminal operator will not

only act in its own interest, but also takes into account the managerial objectives of the Port Authority and vice versa. Then, a particular case-study – that of Galveston, Texas – provides an example of an existing incentive mechanism containing managerial provisions related to assignment and renewal of berth and terminal use, fees, and the minimum passenger guarantees. The case study reveals key factors that need to be incorporated when a more economic approach based on game theory is used to model cruise lines' behavior and moral hazard problems. The case study concludes with the discussion of the critical elements in negotiating cruise concession contracts. Among others, these elements, that distinguish the cruise industry from other market segments, might prevent the costly renegotiation of contracts at a later stage or after the termination of the awarding process.

2. Port concessions and the incentive mechanism: A literature review

Concession agreements offer a way to structure the relations between public managing bodies of ports (i.e. port authorities), who typically own and manage port land, and the emerging private terminal operators (also in the cruise business), who are given the right to use the land for a specified period of time subject to the payment of concession fees. Concession contracts are the dominant modes of private business entry in port operations (Farrell, 2012). They govern the details of outsourcing functions such as terminal management, terminal operations, marketing, security, waterside maintenance, and land acquisition and disposal to the private sector due to various (i.e. labor force, fiscal, financial, efficiency or risk management) considerations. In the US, port authority practices generally involve the transfer of rights to provide port services, rather than moving asset ownership to a private port terminal operator (Talley, 2009).

A common practice regarding the concession awarding procedure does not exist. Farrell (2012) demonstrates that awarding procedures and leasing schemes differ between regions, within countries, and even within a given port. Notteboom et al (2012b) concluded that there is only a limited level of convergence among concessioning practices across European ports. Dual practices exist as calls for tenders are combined with direct talks with incumbents (i.e. Rotterdam; see: De Langen et al, 2012). Others see corporatization and Stock Exchange listings as a precondition for increasing private sector investment (i.e. Greece; see: Psaraftis and Pallis, 2012). Joint ventures, in which public sector operators retain a share of at least 75% and port corporations operate as commercial entities, operate the fast-growing cargo and cruise ports in China.

On these grounds, Theys et al (2010) detailed a research agenda of issues emerging at various stages of the awarding process. One of the issues listed is the examination of asset allocation and risk distribution between Port Authorities (PA) and terminal operators (TO). These issues emerge during any concession awarding process and are made explicit while drafting and enforcing the related clauses in a concession contract.

Despite fairly recent academic advances in the study of terminal concessions, the topics related to cruise terminals concessions contracts remain understudied, as the growing literature of

empirical studies on port concessions is unilaterally focused on cargo (mostly container) terminals (cf. Notteboom et al, 2012a; for a literature review: Pallis et al. 2012). In essence, the emerging concessioning practices in the cruise sector have not yet been subject to an academic analysis. Moreover, relevant information of cruise port/terminal concessions is very limited. For example, most of the reported cruise cases in the US (Table 1) focus on the incremental functional features for building renovation, expanded office space, and other supplemental accessories.

Table 1. Examples of Cruise Terminals Concessions in the US

Port	Private Party Contractor/ Operators	Concession	Since
Galveston Port Authority	<ul style="list-style-type: none"> Royal Caribbean International, Carnival Cruise Lines, and CH2MHILL Design-Build Greenfield cruise terminal project Innovative financial scheme Fee waiver and revenue rebate in exchange for minimum passenger guarantees 	10 years	2002
Massachusetts Port Authority	<ul style="list-style-type: none"> Bronstein Center Cruise Ship Terminal, Boston One new cruise terminal and one remodeled cruise terminal Intermodal port facility in exchange for parking, office space, and landmark restaurant at cruise terminal site 	Cancelled	2008
Port Everglades	<ul style="list-style-type: none"> Redevelop waterfront facility and infrastructure around Terminal 18 Initial investment in exchange for a 10 year minimum passenger guarantees with Royal Caribbean International 	10 years	2009
Canaveral Port Authority	<ul style="list-style-type: none"> Design-Build project for Cruise Terminal 6 to enhance embarkment and disembarkment function 	n.a.	2011

Source: American Association of Port Authorities (AAPA); PAs websites.

Also in Europe, concessioning practices in cruise ports have not gained academic interest despite the presence of the most dynamic cruise market in the world, the Mediterranean and its adjoining seas. The MedCruise Benchmarking report (2013), which surveyed 66 cruise ports in the region, showed that the 197% growth of bed days-deployment in the last decade was backed by an increased presence of private cruise terminal management and operations. The private sector operates half of the surveyed 66 ports whereas 46% of the cruise ports operating under public management are in the process of identifying private actors (cruise lines or else) who are interested in operating them. The dominant mode of private involvement is the tendering and concessioning of the cruise terminals (Table 2).

Table 2. Examples of Cruise Terminals Concessions in the Mediterranean

Port	Private Party Contractor/ Operators	Concession	Since
Bar, Montenegro	<ul style="list-style-type: none"> Global Ports Holding (GPH) (cruise terminal operator) 	30 years	2013
Barcelona, Spain	<ul style="list-style-type: none"> Carnival (Cruise Line) operates Palacruceros Terminal 	25 years	2007
Civitavecchia, Italy	<ul style="list-style-type: none"> Roma Cruise Terminal (purpose company created by three cruise lines (33.33%): Costa Crociere, RCCL, MSC Crociere Spa (participating 	n.a.	2006

	through its financial holding Marininvest Ltd)		
Barcelona, Spain	• Creuers Del Port de Barcelona – (purpose company created by PA and investors)	30 years	2000
Bodrum, Turkey	• Bodrum Cruise Ports (owned by GPH 60%, and investing companies Setur and Yüksel Çağlar)	13 years	2008
Kusadasi, Turkey	• Partnership between RCCL (shipping line), (27.5%) and Global Ports Holding (GPH) (cruise terminal operator) (72.5%)	30 years.	2003
Lisbon, Portugal	• Partnership between RCCL (shipping line), and Global Ports Holding (GPH) (cruise terminal operator)	35-years	2014
Marseille, France	• Marseille Provence Cruise Terminal (private company owned by three cruise lines: Costa Crociere - 40%, MSC - 40% and Louis Cruises-20%).	25 years	2009

Source: PAs websites; and secondary information collected via Medcruise associated cruise ports..

The absence of in–depth studies on cruise terminal concession contracts also implies that the study of incentives in such concession contracts remains an unexplored territory. Even for container terminals, empirical studies on concessions typically remain limited to the procedures and leasing schemes of concession contracts. Even though it is acknowledged that incentives such as throughput guarantees are a powerful governance tool for PAs to secure reasonable land productivity, conditionally lower the entry barriers to newcomers, and provide necessary incentives to TOs to increase terminal utilization rates (i.e. Notteboom, 2006; Pallis et al, 2008), studies on performance incentives, operating incentives, and risk-sharing between PA and TOs are very scarce.

Next to being a key managerial concern in concessioning procedures, the design of optimal incentive contracts can also be studied from an economic theory perspective. As early as Holmstrom (1979, 1982), Holmstrom and Milgrom (1987), Baron and Besanko (1984), and Dewatripont (1986), renegotiations of optimal contracts, incentives, and necessary auditing and regulations are discussed in the environment with moral hazard.

Laffont and Tirole (1993) extended the theory of incentives to the case of implicit incentives in a dynamic setting with agency conflicts. Given that the first-best outcome to deal with moral hazard was achievable depending on the timing of contracting, a risk-neutral or risk-averse agent, and the setting of complete information, Tirole (1999) noted that the proper allocation of rights ensured the binding of the incentive constraint. Laffont and Martimort (2002) discussed the setting with limited liability, meaning minimum effort required by the agent, in a discrete continuum of performances. Guasch et al. (2008) reviewed the optimal form of awarding and rewarding contracts, renegotiations, incompleteness of contract due to unforeseen transaction costs, and the imperfect enforcement of contracts. Scandizzo and Ventura (2010) concluded that renegotiating prices periodically could successfully align incentives between a public and a private agent.

3. Essential incentive problems raised

This section demonstrates moral hazard problem between port authority (PA) and terminal operators (TOs). Potential information asymmetries between PAs and TOs are key to shaping concession agreements. Moreover, asymmetry resulted in a contract does not allow the PA to control or monitor the TO behavior effectively. The willingness of the agent (TO) to provide port services does not mean their interests are automatically aligned with those of the principal (PA) (Notteboom, 2006). Due to asymmetric information, there is a risk that the TO might engage in activities that are undesirable from a PA's standpoint after the concession agreement is signed. This is known as the moral hazard problem. While the moral hazard problem was conceived in economic theory, there is a clear managerial dimension in terms of dealing with potentially diverging objectives of the actors involved and any deliberate or unintended information asymmetries that go with this. In moral hazard models, information asymmetries result from the principal's inability to observe the agent's action (moral hazard problems with hidden action) or to uncover hidden information about the agent (moral hazard problems with hidden information).

Moral hazard problem usually happens in the post-bidding stage of a concession contract. Once a legal binding contractual agreement is signed between PAs and the qualified concessionaires, certain monitoring scheme needs to be in place to ensure companies' performance in line with a properly designed competitive awarding procedure.

In light with the on-going moral hazard issue raised in the post-bidding phase of concession or PPP projects, an example can be found in the latest report published by a panel on PPP in the Transportation & Infrastructure Committee, U.S. House of Representatives. The panel discussed how to balance the needs of the public and private sectors to finance the nation's infrastructure. Three recommendations were made: 1) improving public sector capacity; 2) breaking down barriers to consideration; and 3) ensuring transparency and accountability. To achieve those objectives, actions that need to be taken are:

Regarding supervision:

- To prevent cost overruns and project delays, the Transportation Procurement Office needs to develop project delivery performance standards for PPP procurements.
- For project receiving federal funds, receiving parties need to submit an annual report on project procurement performance compared to the delivery performance standards.

Regarding financial scheme:

- PPP agreements should maintain flexible to avoid costly renegotiation of contracts or negating the entire agreement.
- Without diminishing oversight, federal funding agency should make recommendations to enhance efficient application of innovative financing tools.
- Review budgetary rules for commercially-leased space to ensure long-term operating lease below market purchase options.

Regarding conducting contract:

- Due to the long-term nature of the PPP agreement, key terms and conditions such as Value for Money and time of the commitment should be made publicly available in the decision-making process.
- To ensuring public sector receive a good value of PPP project, a competitive procurement with multiple bidders is recommended.

Regarding social consensus:

- To reach community consensus, early partnership with stakeholder outreach needs to be established.

Among the guideline above in the post-bidding phase, one key issue to ensure a competitive and successful PPP is to provide incentives to the private sector and strengthen public oversight and monitoring. As such, concession agreements often take the form of performance-based contracts to create incentives for the agent (TO) to act in the principal's interest (PA).

To overcome asymmetric information problem between the awarding authority (usually PAs or any other managing body of a port) and the concessionaries (typically incumbent, terminal operators, or shipping lines), three types of principal-agent problems can be distinguished (Rasmussen, 1994): these are (a) moral hazard problems with hidden information, (b) moral hazard problems with hidden action, and (c) adverse selection problems. The latter problem only partly applies to terminal concession agreements as candidates for a concession typically have the right to verify the state of the premises and have access to all available information. Moral hazards problems are more prominent in the concession procedure.

To demonstrate moral hazard in a simplified one-period game, we assume the existence of a minimum passenger guarantee imposed by the PA linked to an early termination of the contract in case this guarantee is not reached by the TO. The payoffs of a profit maximizing TO in an agreement of n periods is determined by the unobservable efforts e in increasing passenger numbers, q , where $q'(e) > 0$ and $q''(e) = 0$. A higher effort leads to a greater passenger quantity. If the managerial effort is made, the TO provides services $q(e) > \underline{q}$, where $\underline{q}$ is the minimum guarantee imposed by the PA. Otherwise, the number of passengers served by the cruise operator will be below the performance target, $q(0) < \underline{q}$, and a TO may face penalty of early suspension of the concession contract.

With a profit function $\pi(p, e)$ over its pricing strategy p and effort level e , TO prefers a higher charge per customer served and dislikes a higher level of effort due to the rising cost $c(e)$, where $c'(e) > 0$ and $c''(e) = 0$. $c(0) = 0$. If the demand for port services is relatively inelastic, a TO can increase fees without losing its customers. Under competition, however, TOs cannot change the equilibrium price through quantity control. Pricing strategy simply reduces to $p = \bar{p}$, where $\bar{p}$ is a fixed price per unit. The payoffs of a TO with the unobservable effort in the initial period of the concession is

$$\pi_1(p, e) = p(q(e))q(e) - v_1q(e) - F - c(e) \quad (1)$$

The multiplier of unit price charged $p(q)$ and the number of customers served $q(e)$ is the revenue, where $p(q) = a - q$, where a is a constant term and q is the quantity. The costs can be decomposed into 1) variable cost $v_1 q(e)$, such as royalty fees and operating costs which vary as the passenger increases at a rate v_1 ; 2) fixed cost F , such as a lump-sum concession fees and initial investment paid at the beginning of the contract; and 3) the cost of managerial efforts $c(e)$.

If we consider the simplified case with only one period of concession, the first order condition (FOC) for the profit-maximizing TO is

$$pq'(e) \left(1 + \frac{1}{E_p}\right) = [v_1 q'(e) + c'(e)] \quad (2)$$

where the price elasticity of demand, $E_p \equiv \frac{\partial p}{\partial q} \cdot \frac{q}{p}$, indicates how sensitive port users, in this case cruise passengers, respond to price changes. For a normal good, E_p is always less than zero, showing the law of demand, a negative relationship between the price per unit and the quantity demanded. If $E_p < -1$, an interior solution for e exists when $MR = MC$. Otherwise, a corner solution is obtained for a profit-maximizing TO.

It is important to note how price elasticity of demand influences a TO's optimal decision to choose proper effort level. If market demand is relatively elastic, meaning that TO faces a price-sensitive demand for cruise, the optimal effort of a TO is determined when an additional revenue of serving one customer equals to the incremental cost for additional customer.

On the other hand, if a TO's demand is relatively inelastic, meaning that passengers' demand for cruise is rather price-insensitive, the best choice for a TO is to make minimum or no effort at all to maximize profit. The economic intuition behind is that when there is no close substitutes available, the TO tends to pay no effort to improve the quality and more likely to charge a higher price per unit of service provided.

During the implementation of a seaport concession, the principal can no longer specify choices, the activities of the agent are not observable, and the actions taken are not easily verifiable. A conflict over which actions should be taken might emerge. Moral hazard can be present at any time, as the TO might wish to take unforeseen risks or to gain from acting contrary to the principles envisaged by the PA. Therefore, in practice there has been a high percentage of costly contract renegotiation due to a poorly-designed contract in transportation sectors and seaports (Guasch, 2004).

4. An application of incentive mechanism

The Gulf Coast is considered one of the busiest areas for the cruise industry. Miami, New Orleans, and Galveston represent major cruise ports in the Southern United States. Thirteen cruise companies use Port of Miami as their port of call, seven cruise lines choose Port of New Orleans, and Port of Galveston is home to three cruise companies. Among them, Carnival Cruise Line, Norwegian Cruise Line, Royal Caribbean Cruise, Princess Cruises, and Disney Cruise Line have chosen more than one port of call.

4.1. Port of Galveston

Port of Galveston is located on the upper Texas coast in the Galveston Bay. The port is among the top twenty cruise ports in the world and ranked as the fourth busiest cruise port in the United States (port's website). In this section, we use Port of Galveston as an example to show the possible conflict of interests between PA and TO. Further, we identify incentives built in the operating contract and economic development agreements.

In 2010, a separate utility of the City of Galveston (Galveston Wharves), a Texas nonprofit corporation (Galveston Port Facilities Corporation, GPFC), and Carnival Corporation (Operator) entered into a lease of Economic Development Agreement in order to facilitate the improvements to Cruise Terminal 1. The agreement covers construction obligations for Galveston Wharves to be completed by no later than August 31, 2011. Galveston Wharves will construct at its sole cost three turning basins, provide navigational aids that meet the agreed requirements of the Galveston-Texas City Pilots, and construct waterside improvements and terminal improvements at its sole cost at or adjacent to Cruise Terminal No. 1.

Waterside improvements include an east end service platform extension, a west end mooring platform fill-in, a gangway runway extension, water station completion, and utilities relocation. The terminal improvements include an additional 5,600 square feet of baggage screening area, providing 20,800 square feet of guest overflow waiting area, 16,800 square feet of guest security screening area, additional two new 400 square foot VIP rooms, etc. The wide range of terminal improvements facilitates the operation on baggage screening, guest waiting time, guest security screening, embarkation, boarding corridor, storage, and customs and border protection processing.

In the case of Port of Galveston, the Wharves are responsible for the initial investment of construction improvements in exchange for the sustainable development of cruise business with Carnival Corporation. Subject to the completion of the improvements, the Operator shall deploy a Dream Class Vessel and replace the Ecstasy Vessel with a Conquest Class Vessel for year round operations. The development agreement signed by the Operator and GPFC listed no less than 50 port calls per year per vessel for vessels sailing on a 7-day cruise and 75 times for vessels sailing on a 4 or 5-day cruise.

To enhance long-term partnership with the Operator, Wharves provides incentives such as an annual rebate of 12.5% of parking revenues (if one of the replacement vessels is performing year

round operations) from Wharves to Operator when the total parking revenues exceed USD \$2.5 million. Given that two replacements of larger vessels are running a year round schedule, the Operator will receive up to 25% of the parking revenues and dockage fee waiver if the total parking revenues exceed USD \$2.5 million. In exchange for the initial investments and right to use the terminal facilities, the Operator committed to a 10+2 year agreement with year-round operations providing no less than two vessels of a particular class in any given time and no less than 50 times per operating year per vessel.

Next to arrangements made with Carnival Corporation, the Board of Trustees of the Galveston Wharves has recently approved a five-year improvement agreement with Royal Caribbean Cruises Ltd (RCCL) to expand Cruise Terminal No. 2 and to accommodate larger vessels. Royal Caribbean has committed an additional 30 calls in both 2014 and 2015 and agreed to replace the current vessels with larger size vessels once the construction is completed approximately by spring 2015.

Table 3 includes the covenants and premises regarding the assignment of berth and terminal use contained in the Operating Agreements between (a) GPFC and Carnival, a Panamanian corporation and (b) GPFC and RCCL, a Liberian corporation. Table 4 includes the related terms of agreement and fees paid to GPFC by Carnival Corporation and RCCL respectively.

Table 3. Assignment of Berth and Terminal Use

	Carnival Corporation	Royal Caribbean Cruises Ltd.
Assignment of berth and terminal use	<ul style="list-style-type: none"> • Non-exclusive license to conduct operations at Piers 23-25 and Terminal No. 1 • Replacement of larger size vessels based on cruise schedules • No cost for storage area • Security on, off, and to Terminal No. 1 and the adjacent apron and wharf 	<ul style="list-style-type: none"> • Non-exclusive license to conduct operations at Pier 27 and Terminal No. 2 • Minimum calls with required size vessels • No cost for storage area • Security on, off, and to Terminal No. 2 and the adjacent apron and wharf, and east and west entrance areas • Wharves can use the Berth and Terminal No. 2 on the proposed dates for marketing with the 3rd party

Source: Operating Agreements from the Port of Galveston. The agreements with the Carnival Corporation were established in 2002 with the first amendment on 2005 and the second amendment on 2010. The agreement with the Royal Caribbean Cruises Ltd was first signed in 2007.

Table 4. Terms of Agreements and Fees

	Carnival Corporation	Royal Caribbean Cruises Ltd.
Term of agreement	• Option to renew for one additional 2-year period	• Option to renew for three additional 5-year periods
Fees to the Galveston	• Payment due on the	• Payment due on the effective

Port Facilities Corporation (GPFC)	<p>commencement date</p> <ul style="list-style-type: none"> • Waive dockage charges • Passenger wharfage of USD 2.875 per passenger for the first 5 years; 75% charge of the passage wharfage later. Subject to annual escalation on 7th year • Cargo wharfage set forth in the Tariff • Guaranteed minimum annual passenger wharfage of USD 575,000 • After full payment of the loan, a 10% discount of passenger wharfage is charged 	<p>date</p> <ul style="list-style-type: none"> • Passenger fee of USD17 per passenger in the first year, subject to annual escalation later • Cargo wharfage set forth in the Tariff • Guaranteed minimum annual passenger fee of USD1,600,000 in the first year and USD2,100,000 in each subsequent year • 15% of excess passenger fees is utilized to pay capital construction/maintenance costs relating to Terminal No. 2 and operating costs of the GPFC
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Source: Operating Agreements from the Port of Galveston. The agreements with the Carnival Corporation were established in 2002 with the first amendment on 2005 and the second amendment on 2010. The agreement with the Royal Caribbean Cruises Ltd was first signed in 2007.

4.2. Game theory model applications in retrospect

In freight-based terminal concessions, one of the most common incentives used when awarding terminals to private operators relates to the expected throughput as presented by the TO or imposed by the PA. A European survey conducted in 2008 revealed that the expected throughput is considered as the most important awarding criterion in about 50% of the terminal projects considered (Notteboom and Verhoeven, 2010). A minimum throughput should encourage the TO to market the port services to attract maritime trade and to optimize terminal and land usage. In case the terminal operator does not meet the objectives as set in the concession agreement, he will either have to pay a penalty to the port authority (e.g. a fixed amount per ton or passenger short) or, in the most extreme case, the concession will be taken away from him. Imposing specific performance targets is particularly useful in cases where the level of the concession fees is not giving enough incentive to TOs to reach a high terminal utilization rate.

Given the uniqueness of the cruise industry, common arrangements in concession contracts for cargo handling services may not work in a cruise setting. Unlike cargo handling operations, the economic activities linked to port calls of cruise ships include passenger spending on flight and pre/post-cruise hotel stays; maritime tourism spending such as insurance, travel agency, advertising and engineering; cruise lines spending on goods and services; crew compensation; and port fees and dues for supplies, line handling dockage, passage wharfage, etc. Moreover, as cruise terminals are often located close to or even in urban centers, the port-city dimension is

more outspoken than in the case of cargo terminals, particularly in terms of the economic and environmental impacts of cruise ship calls on the urban community.

Regarding the use of the berth and terminal, the port authority (PA) cares more about the decision of replacement with larger vessels and the frequency of calls. From the PA's standpoint, the larger size of vessels and the higher frequency of calls will guarantee the fast payoff of the huge initial investment on terminal construction or waterside improvements. The greater number of passengers served also accelerates the growth of the maritime cluster in the region. The decisions of marketing strategy, choices of destination and itinerary, and the use of relevant service providers for tourism are determined by cruise companies who are involved in the economic and operation contacts with the port authority.

Key parameters from the Galveston case applicable to the not-yet-developed cruise concession are summarized as follows. Operator's profit, $p(q(e))q(e)$, is determined by the number of passengers served, passenger spending onboard, and cruise schedule. Meanwhile, the fixed cost, F , along with concession fees, will vary based on the size of the chosen vessel. The variable cost, $v_1q(e)$, will increase accordingly based on other relevant expenses such as cruise lines spending on goods and services and crew compensation, etc.

Another incentive mechanism comes from the minimum guarantee. The minimum passenger guarantee is an essential element when the Galveston Port Facilities Corporation (GPFC) establishes the operating agreements with cruise lines. The annual passenger fee is determined through the negotiation between liner companies and the port corporation. As detailed in Table 4, the passenger fee can vary easily from USD 17 to as low as USD 2.875 per passenger who embarks or disembarks at the port or arrives on and leaves with a vessel docking at the berth without embarking or disembarking.

In addition, the minimum passenger guarantee provides incentive for the terminal operator (TO) to behave as what is desirable from the PA's standpoint. As Table 4 details, we also observe a considerable difference in minimum guarantee from USD 575,000 for Carnival Cruise to USD 1,600,000 for Royal Caribbean Cruise. The minimum guarantee of Royal Caribbean is approximately 2.78 times higher than the threshold for Carnival. Given the unit charge per passenger, GPFC sets up the threshold of 100,000 passengers for Carnival, but anticipates close to 47,000 passengers from Royal Caribbean. The difference may reflect economies of scale. The greater the number of passengers served, meaning that the greater quantity of market demand faced by a given cruise company, the greater the bargaining power of a TO. Better fees or service charges could be the consequence.

Hence, in the game theory model, the objective function of a cruise company should include potential penalty that occurs if the minimum passenger guarantee is not met. The extra cost will be included in the profit function along with the possible condition of renewal or early termination of contract. Mismatched incentives could negatively impact the effectiveness of the concession contract. Without a proper pricing mechanism that provides incentive schemes, PAs and TOs may not perform their normal functions and sometimes costly renegotiation of contracts

are inevitable (Wang and Pallis, 2014). A contingent plan of cruise operation could be included in the clause of the concession contract. More importantly, given the timely disclosure of operating status, performance-based concession fees serve as a better incentive mechanism instead of a lump-sum concession payment at the beginning of the contract.

5. Conclusions

Given the uniqueness of the cruise industry, common arrangements in concession contracts for cargo handling services may or may not work in a cruise setting. The value of this study is not only to raise the awareness of the conflict of interest which we believe is currently missing in port studies, but also to provide insightful discussion on the latest development on cruise concession contracts. This paper discussed the importance of incentive mechanisms to align the interests of port authorities and terminal operators in contractual provisions in concession agreements on cruise terminal activities.

The paper mainly addressed the issue of incentives in a methodological manner. We outlined the conflict of interests and possible information asymmetry between the contracting parties in a theoretical way based on academic literature. It was concluded that asymmetric information poses the risk of having a cruise terminal operator engaging in activities that are undesirable from a port authority standpoint after the concession agreement is signed. The use of incentive mechanisms was modeled by focusing on a profit-maximizing TO who is confronted with throughput guarantees and related penalties.

5.1. Implications for managerial practice for cruise concession design

The case study of the Port of Galveston, Texas demonstrated an existing incentive mechanism, as detailed in the related economic development agreement and operating agreements. The case study revealed the various dimensions in the incentive mechanism set-up for cruise terminals, such as the assignment and renewal of the berth and terminal use, fees charged, and the minimum passenger guarantee. In addition, these insights, combined with existing literature on concession procedures for cargo terminals, identified the relevant provisions to be detailed in cruise ports/terminals concession contracts.

With the entry of private entities in cruise ports governed by concession agreements, those involved in the related process need - beyond empirical evidence - to answer a number of questions in order to avoid conflict of interests and possible appearance of moral hazard problems:

- What is the impact of the increased presence of private cruise terminal management and operations?
- Are there provisions or clauses in cruise concession contracts with regard to the spread of investments and of risks?

- Which incentive design mechanisms exist in contractual provisions for aligning the interests of port authorities and cruise terminal operators?
- What is the current practice regarding negotiating concession contracts and risk sharing between the involved parties?
- What could be the best practice for a risk-sharing strategy for cruise terminal concessions in combating asymmetric information?

In view of developing a theoretical framework that allows overcoming the moral hazard problem at the time of contracting, we obtain important information and managerial insights that can clearly be used in modeling incentives.

First, regarding leasing scheme, Notteboom (2006) studied various public private partnership and the responsibilities of private terminal operators in public ports. Long-term leases, operating licenses and BOT schemes are the most commonly used forms of concessions with respect to the construction improvements, available financing, operations risks, and commercial risk-sharing. What could be the best leasing scheme regarding port/terminal ownership and port/terminal operations for a given cruise terminal?

Second, in the terminal awarding process, the candidate typically needs to indicate the cash flow, maximum charges for port services, costs of operation, and maintenance, etc, based on projected throughput. What kind of bidding procedure or private negotiation applies to a cruise terminal concession? Are port unions and/or labor unions involved in negotiating the contract?

Third, concession contracts can be used to negotiate initial investments on cruise port infrastructure and supporting logistics and to exchange flexible financing and competitive port service charges. It is important to form a cruise concession contract following, negotiations for initial investments on infrastructure, supporting logistics, flexible financing schemes, and competitive port service charges.

Fourth, the willingness of the agent (terminal operator) to provide port services does not mean their interests are automatically aligned with those of the principal (port authorities). It is important to document any costly contract renegotiation due to a poorly designed contract or moral hazard problem of a cruise terminal concession and the fundamental reason causing the contract to fail.

Fifth, a fixed lump-sum concession fee is less efficient to combat a TO's moral hazard. A fixed upfront concession fee is a sunk cost, which is irrelevant to the quantity a TO produces over the entire concession period. As long as the price charged by a TO is greater than the variable cost, a TO will keep operating in the short run. Thus, a fixed concession fee alone is insufficient to provide incentive to encourage a TO to act in the PA's interest. It is vital to have a well-designed incentive scheme regarding the pricing of concession fees rather than a fixed lump sum payment (Wang and Pallis, 2014). It is crucial to document any form of throughput guarantees in the

contract and the commercial terms that go with the minimum guarantee and enclose performance criteria in the concession agreements.

Lastly, the moral hazard problem could also come from the effective monitoring from the PA (Wang and Pallis, 2012). A poorly designed lease contract can lead to situations where the port authority has no legal means to penalize inefficient companies or to end the contract unilaterally (Notteboom, 2006). It is important to monitor the concessionaires by including clauses so that certain legal action will be taken by the public sector to prevent early termination of a contract.

5.2. Contribution to scholarly knowledge – towards a research agenda

This paper discussed the incentive issue with respect to the cruise terminal concession design. In light of this discussion, we identify issues for possible future research. All of them are critical in order to provide an industry guide for the best practice of cruise concessions with incentives using game theory.

First, performance incentives are different for various types of companies participating in concessions. Different business model to best serve its customers varies across companies participating in concessions. Potential parties involved in freight terminal concessions are global/regional terminal operators, stevedores, shipping lines, other freight transport, construction companies, equipment maintenance, property developers, industrial corporations, and financial institutions (Farrell, 2012). However, parties involved in cruise concessions are a different set of market participants with numerous objectives.

Bidding processes, awarding processes, and post-awarding incentives and monitoring schemes in a situation with few dominant concessionaires (in this case cruise companies), with many qualified candidates (showing intensified competition within the region), within a well-established maritime cluster, or within a port cluster, will be significantly different from each other. Applications in various settings of cruise terminal/port concessions remain to be further examined. Different performance incentives need to be identified and incorporated into the contracts. Different types of TO imply different objectives and dissimilarities including cost differentials, governance, management strategies, and shore-side competition. All determinants of TO's profitability (Slack and Fremont, 2005) might influence the effectiveness of the incentive schemes. Further research should clarify the characteristics of the individual contracting party to enhance the degree of accuracy in modeling. With a strong surge in cruise business in the past couple of years and the gap between cruise and freight terminal concessions, cruise concessions are a promising subject for future research.

Second, given that the cost structure of a cruise terminal operator is different from a freight terminal operator, further research is needed to properly address the complex matter in cost and terminal operator's behavior. Various types of concession fees (such as fixed, flexible, up-front, or performance-based), royalty bargain (such as lump-sum royalty, operational revenue-based, or operational output-based), and possible vertical collusion between seaports and cruise liner companies should be clarified and taken into consideration.

Please note that a TO's behavior and cost structure sometimes could be a complex objective to quantify. We observe the increasing concentration of the market in few companies, cruise lines for example (i.e. the dominant market players Carnival and Royal Caribbean), bidding either alone, or in partnership with investors, or companies that are established with the sole reason being to operate cruise ports, have won most seaport concessions of the recent past. The scale of vertical and horizontal integration is a vital part of both the strategies of these companies and for analysis of profitability. Vertical integration increases the synergies of other business interests or product diversification and emphasizes the link of cruise terminal operation with the development of shore-based activities (i.e. shore excursion).

Third, under various institutional structures, the objectives of port authority or the equivalent managing body of port should be clearly addressed to achieve the balance between the public and private sectors to finance cruise port infrastructure and development. Since the operating philosophies of public seaport agencies in the US including port investment and management decisions are dictated largely by local circumstances (American Associations of Port Authorities), it is challenging to use a one-size-fit-all template to evaluate concessions. For a port that maximizes total volumes and capacity, various schemes such as tariff, fixed unit-fee, or annual rent can be applied; however, those pricing mechanisms may or may not work to increase labor participation, concession revenues, and commercial development in terms of greater market shares. While game theory is used to characterize interactions between the public and private sectors, further research should examine available pricing schemes that best serve port's objectives.

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