GOVERNANCE AND EFFICIENCY OF MEDITERRANEAN CRUISE TERMINALS

Assunta Di Vaio[1], University of Naples "Parthenope" - susy.divaio@uniparthenope.it
Francesca Romana Medda, Centre for Transport Studies University College London
Lourdes Truijllo, DAEA Universidad de Las Palmas de Gran Canaria

ABSTRACT

Over the past 25 years the cruise industry has witnessed considerable growth. The increasing size and passenger capacity characterizes the maritime industry, e.g. new vessels can accommodate more than 3000 passengers. Cruise production is concentrated in the hands of a few players, in fact, 77% of capacity (calculated in terms of berths) belongs to the top five world cruise companies (Carnival Corporation & PLC, Royal Caribbean Cruise Line Ltd, Star Cruises Ltd – NCL, Louise Cruise Lines and MSC Crociere S.p.A.). During the growth phase of the cruise industry, the Mediterranean has gained an increasingly competitive position. It has become one of the top destinations chosen by cruise companies for its position, temperate climate, historical-artistic resources, and political stability, but the importance of Mediterranean cruise ports also depends on services that ports offer to the cruise shipping enterprise. Moreover, the features of ports and passenger terminals have attracted cruise companies to this area and they have also influenced the decision of cruise operators to invest in cruise infrastructure. The characteristics of the partnerships between Port Authorities, Cruise Terminals and Cruise Companies play a significant role in investment and management decisions of every shipping player. Cruise shipping lines in this context are faced with a make or buy decision to directly control some specific operations and to obtain preferential port spaces in order to gain competitive advantage over cruise competitors.
The aim of the paper is to measure the impacts on performance of cruise terminals when public- private partnership is implemented. Despite the spread of public-private partnerships in the management of cruise terminals, there are few studies dedicated to this topic.

Cruise terminal efficiency is measured by the calculation of the production function with multi-outputs. The data analysis is conducted with the construction of an extensive dataset on Mediterranean cruise terminals and we apply stochastic frontier analysis based on the distance function. The study provides interesting insights into the organizational and

[1] Corresponding author.

governance behaviour of cruise shipping lines, but in particular we examine how the structural organisation of cruise terminals is moving towards higher operational efficiency.

Keywords: Cruise terminals, Efficiency, Performance

ACKNOWLEDGEMENTS

The authors are grateful for the generous contributions of the various port authorities and terminal operators, in particular Dott. Nicola Coccia and Dott. Sandro Scapicchio (Terminal Napoli S.p.A.) and Ing. Giovanni Spadoni (Porto di Livorno 2000 Srl). We especially want to thank Professor Gennaro Ferrara from the "*Parthenope*" University Naples for his insightful discussion and comments on the paper. Any errors are entirely attributed to the authors.

1. INTRODUCTION

The cruise line industry has experienced considerable growth in recent years (Hobson, 1993; Dickinson, Vladimir, 2008; Cartwright, Baird, 1999; Bjornsen, 2003) and starting from the 1990s the cruise industry has become one of the fastest growing segments of the travel industry. The inter-relationships between maritime tourism, cruise tourism and maritime leisure are combined in the cruise industry, which is distinctly defined as a segment of tourism and leisure industry (Wild, Dearing, 2000). Cruises are one form of vacation (Coleman et al., 2003) and international cruising is one form of tourism in which the travel element is an integral part of the consumer experience. Cruise line companies rely on high passenger intake by providing comfort, quality, safety, and enjoyment (Cottam et al., 2007).
The demand for cruising worldwide has increased exponentially as we can observe in figure 1; between 1995 and 2005 growth passed the 10 million passenger mark, and by 2005 had exceeded 14 million. According to estimates, international demand will increase from nearly 19 million passengers in 2010 to about 25 million in 2015 (Peisley, 2003).

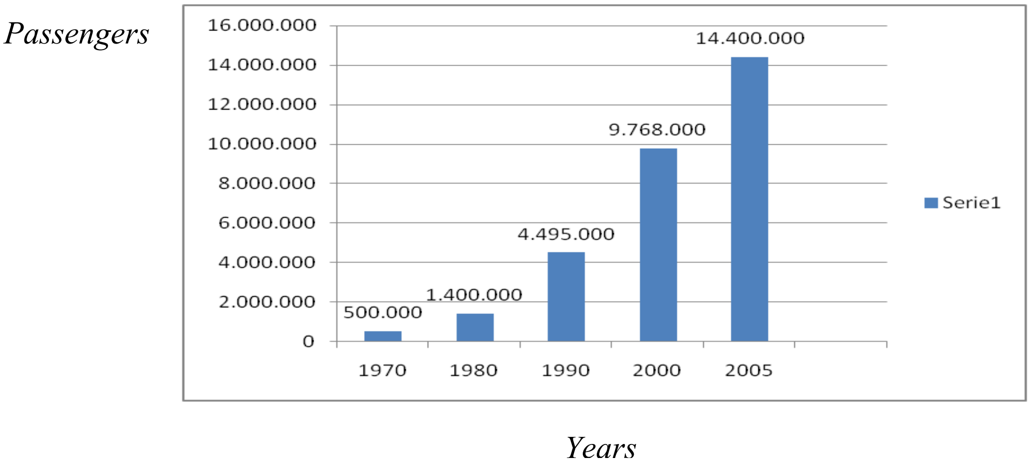

Figure 1 – Demand for cruising worldwide 1970-2005 (our estimation on CLIA, 2005-2006; Peisley, 2003; Wild, 2007)

Two main reasons allow us to justify and understand this rapid growth in the cruise industry: first, the long time interrelationships among the various actors of the supply cruise chain and second, the oligopolistic nature of the cruise market.

The many actors in the cruise supply chain (i.e., tour operator, travel agencies, cruise line companies and cruise terminals, etc.) are highly specialized, and this tends to limit the predominance of a single actor. For example, the cruise line companies are members of the Cruise Line International Association (CLIA), the European cruise terminals are members of the category association: Medcruise. These relationships can be more or less robust; we can observe simple agreements over long periods, but also sometimes important participation in firms' capital structure. The actors' behaviour shows that their strategies are flexible and liable to change and this phenomenon has indeed affected the growth of the cruise industry.

In relation to the market structure, the cruise market is concentrated in the hands of a few actors, 77% of cruise industry capacity (calculated in terms of berths) belongs to the top five world cruise line companies. Cruise line companies show an integrated cruise service supply that is in competition with other types of organized tourism. The shipping company Carnival Corporation Plc with its 12 brands (Carnival Cruise Line, Princess Cruise, Costa Crociere, Holland American Line, Seabourn Cruise Line, Windstar Cruises, P&O Cruises, Cunard Line, Ocean Village, Swan Hellenic, AIDA, P&O Cruises Australia) led the sector with 46,7% of the world cruise line market in 2007 (Cruise Industry News Annual Report, 2007). Currently, the other four cruise companies sharing the world cruise market are Royal Caribbean Cruise Line Ltd (Royal Caribbean International, Celebrity Cruises), Star Cruises Ltd – NCL (Norwegian Cruise Line, NCL America, Star Cruises), Louise Cruise Lines (LCL), and MSC (MSC Crociere S.p.A.) (Soriani et al., 2009).

At present, an increasing number of cruise terminals are owned or partially owned by the cruise line companies, therefore, we observe that, rather than pure integration with the service provider, we have an upstream integration of the supply chain. This phenomenon has evolved from the vertical integration of hotel chains with passenger liners that offer services combining rail, sea passage and hotels (Véronneau, Jacques, 2008) and as such, it tends to improve the competitive position of companies in their entry into new markets. Moreover, the relationships between liner shipping and container terminals have been shown to follow similar dynamics with upstream integration strategies. Within this context, port authorities, cruise terminals and cruise line companies play a significant role in investment and management decisions; in particular, cruise shipping lines are faced with a make or buy decision in order to control cruise terminals. Our objective in the present paper is to measure technical efficiency of Italian cruise terminals in the Mediterranean Basin when public and private actors intervene in the organisation and governance of the terminals.
In Europe and, in particular in Italy, we observe different forms of terminal governance with combined public and private sector involvement. For instance, the construction of Costa Cruise Terminal (Palacrusieros) in Barcelona arose from an agreement between the Barcelona Port Authority and Costa Crociere (a brand of Carnival Group). The strategy for the enlargement of the Port of Barcelona is based on a public-private partnership adopted

mainly due to a lack of public financial support (Petrullo, 2007). Moreover, the European Commission has approved the construction of the MPCT (Marseille-Provence Cruise Terminal) in the port of Marseilles, which is to be completed by 2011, and will be operated by Costa Cruises, MSC Cruises, and Louis Cruises. Such partnerships between the public and private sector are increasingly being preferred as a tool to attract capital for infrastructure investment and as a way to distribute the cruise management risks between the public and private actors.

Given this background, we can now formulate the hypotheses that constitute the framework of our analysis.

a) Technical efficiency (TE) of cruise terminals improves when the terminals are operated by private companies under a regulatory regime;
b) TE decreases when the terminal management type is public;
c) TE increases when the cruise terminals are owned by a combination of public and private actors but predominantly by the private sector.

At the basis of these assumptions is the port management model, which emerged during the 1980s and stresses the significance of the private sector in the investment and operations of the maritime industry. In order to understand the dynamic processes within cruise operations we review in the following section how port management reform has affected the maritime industry.

2. PORT MANAGEMENT REFORM

Port management models are based on the roles that private and the public sectors play in the management, ownership and operations of port facilities. The initial conditions for the port management reforms were the restrictive labour practices, the lack of an adequate response to increased demand, the unsatisfactory port service quality, and the inability of many governments to invest in sunk capital port infrastructures (World Bank, 2004; UNCTAD, 1995, 1998). Indeed, according to World Bank Report (2004) the reasons for implementing port management reform are the necessity to improve port efficiency and service quality, decrease costs and prices, and last but not least, to increase competitive power and consequently to improve the attitude towards to port clients/users.

Baudelaire (1997), Liu (1995) and Baird (1995) classify three port management structures: service ports, tool ports and landlord ports. Whereas other scholars (Goss 1990; Thomas 1994; Heaver, 1995; De Monie, 1996) argue that the port management is essentially twofold:

landlord ports and service ports. In the latter classification "tool port" is understood as a variant of the landlord port. Service ports are usually public managed and therefore the superstructure development and cargo handling operations are the responsibility of the public sector. Our main concern here is the lack of internal competition and the high level of inefficiency (World Bank, 2004). Landlord ports have a mixed management combined by the public sector, i.e. Port Authority and private sector. The Port Authority currently has the regulatory function of landlord, whereas port operations are carried out by private operators. In addition to these two port management organisations we have the tool port, which is often publicly managed through the Port Authority. The Port Authority makes land and superstructures available to private cargo-handling companies and thus in this structure we can envisage possible conflicts between Port Authorities and private companies arising from the operations of the cargo handling services, nonetheless, private operator is not responsible fro managing port infrastructure (World Bank, 2004).

Now that we have identified the types of port management we can address our attention to the port functions which have derived from the port management reform. In general, we distinguish three main port functions: regulatory, landowner and operator. As we have observed previously, Port Authorities often play a regulatory role in relation to both shipping and port operations. The landowner function involves the implementation of policies and strategies for ports' physical development (superstructure and infrastructure, such as fairways, berths, access roads and tunnels), and the physical transfer of goods and passengers between sea and land.

We can thus far synthesise our understanding by considering the port administration, ownership, management, and operation. In particular we can identify four main cases: (1) PUBLIC port, the three functions (regulator, landowner and operator) are controlled by the public authority or government; (2) PUBLIC/PRIVATE port, where the public sector plays the dominant role and regulatory and landowner functions remain in the hands of the public sector, and operations are controlled by the private sector; (3) PRIVATE/PUBLIC port, in which the private sector has the dominant role and the landowner and operator functions are privately owned while the public sector handles the regulatory function; and (4) PRIVATE port, where the three functions are controlled entirely by the private sector (Cullinane, Song, 2001; World Bank, 2004).

In Italy since the 1980s, numerous reforms have been implemented in the port sector in order to decentralize the control of port operations from the services carried out in the port (e.g. Confindustria document –1984). This has led to the development of numerous public-private joint ventures for the management of port areas (Autorità Garante della Concorrenza e del Mercato, 1998). In this context, the Law 84/94 is highly relevant in that it aims to reform the port sector by establishing the following key principles: a) the separation of the performance of port operations from the control functions, b) the implementation of a free enterprise competition for port operations under the specific form of a business-authorised and/or state owned enterprise concession; c) the possibility for the port company to conduct all port operations (loading, unloading, transshipment, storage, handling of goods) d) the capacity to set fares, which must be publicly communicated by the Port Authority. The application of the principles and practices of Italian port reform can be witnessed in the cruise terminal management structures. These generally follow the landlord structure, where in the management of cruise terminals the function of guidance, coordination and control is under the responsibility of port authorities and the management of the cruise terminal can be public, predominantly public, predominantly private, and finally private.

3. TERMINAL CRUISE GOVERNANCE: THE MEDITERRANEAN CASE

In recent years the Mediterranean Basin has gained a competitive market position, which is due not only to its characteristics as a tourist destination, but also to the ports and passenger terminal services offered to the cruise line companies. The competitive advantage of a port usually correlates to its infrastructure characteristics, and certainly this influences the choice and definition of the routes.

As previously noted, the growing integration of upstream and downstream strategies in the production process determines port competition, that is, it potentially takes cruise traffic away from one port to another. In this context the need for a valid measure of 'perceived service quality' has thus become paramount. Scholars and practitioners have shown that the customer's evaluation of service quality and the resulting satisfaction is associated with loyalty and willingness to maintain long-term relationship between the cruise line companies and ports (Pantouvakis et al., 2008). And this is important because private sector management influences the performance of the company that operates the cruise terminal through a concession contract.

We may define two different types of port scenarios: the port in partnership with a cruise line company, and the port without partnership. In the first scenario, a port enters into a partnership with one or more cruise line companies and the object of the contract is the cruise terminal management. In such a situation the cruise line company operates several investments and the cruise terminal becomes a "home port". In the second scenario when the port does not create a partnership with a line cruise company, the port simply promotes the cruise business.

Our dataset for the analysis is composed of a panel data of 14 Italian cruise terminals, observed between 2006 and 2008. Among the 14 ports, two ports (La Spezia and Ravenna) do not own cruise infrastructure and therefore have declined to participate in the research. The data has been compiled through official port web-sites and direct collection on site. As we have discussed earlier (Law DL 84/94), Italy underwent port reform and the reorganisation of its terminal activities and operations; our data therefore considers the terminal cruise companies which may in some cases be the Port Authority.

Terminal Cruise Companies considered in the analysis (figure 2):
.

1. Bari Porto Mediterraneo Srl (Bari Port)
2. Autorità Portuale di Cagliari (Cagliari Port)
3. Roma Cruise Terminal Srl (Civitavecchia Port)
4. Stazioni Marittime S.p.A. (Genoa Port)
5. Porto di Livorno 2000 Srl (Livorno Port)
6. ATI Comet Srl – Messina Sea Terminal (Messina Port)*
7. Terminal Napoli S.p.A. (Naples Port)
8. Autorità Portuale di Piombino e Portoferraio (Portoferraio Port)
9. Autorità Portuale di Palermo (Palermo Port)
10. Palacrociere of Savona (Savona Port)
11. Trieste Terminal Passeggeri S.p.A. (Trieste Port)
12. Venezia Terminal Passeggeri S.p.A. (Venice Port)

* The dataset was compiled by the Messina Port Authority

Figure 1 – Italian cruise terminals (*Parthenope* and UCL calculation)

In order to distinguish among these cruise terminals we consider the following classifications:

- Direct management: when the cruise terminal is managed by port authorities (Cagliari, Palermo, Portoferraio)
- Full public management: when a public company manages the terminal (Bari Porto Mediterraneo Srl, Porto di Livorno 2000 Srl, Trieste Terminal Passeggeri S.p.A., Venezia Terminal Passeggeri S.p.A.)
- Mixed management: when the cruise terminal management is over 50% private (Stazioni Marittime S.p.A.,Terminal Napoli S.p.A.)
- Private management: when the management is entirely privately operated (ATI Comet Srl – Messina Sea Terminal, Palacrociere of Savona, Roma Cruise Terminal Srl).

Three cruise line companies have a share of the cruise terminal ownership in our study:

1. Costa Crociere S.p.A. owns: 100% share Palacrociere of Savona, 33,33% share of Roma Cruise terminal Srl, 20% share of Terminal Napoli S.p.A., 5,91% share of Stazioni Marittime S.p.A.
2. MSC Crociere SpA owns: 33,33% of Roma Cruise Terminal Srl, 5% of Terminal Napoli S.p.A.

3. Royal Caribbean Ltd owns: 33,33% of Roma Cruise Terminal Srl and 20% of Terminal Napoli S.p.A.

We identify cruise terminals on the basis of their infrastructure as follows:

- Cruise terminal with designated berths exclusively for cruise traffic, without cruise terminal building.
- Cruise terminal with designated berths for cruise traffic with terminal building.
- Cruise terminal that uses commercial berths to receive transit traffic.
- Cruise terminal that uses ferry berths as origin and destination of cruise route.
- Cruise terminal that uses ferry berths for transit traffic.

It is noteworthy that each cruise terminal has is own unique characteristics, for instance, Venezia Terminal Passeggeri S.p.A. uses various terminals: n.103, n. 107/108, n. 117, San Basilio and Riva Sette Martiri quay.

In order to carry out the efficiency analysis, we employ the dependent variable upstream/downstream and transit traffics cruise which will be explained by 10 independent factors: total number of berths, total length of boarding berths, maximum berth length in meters, maximum berth depth in meters, number of check-in desks, number of elevators, number of escalators, number of mobile gangways, total area of terminal building in square meters, and number of floors in the terminal building. In addition, we also consider environmental factors.

Given the characteristics of the dataset we base our estimation of the technical efficiency of the considered cruise terminals on Stochastic Frontier Analysis (SFA) (Estache, Gonzalez and Trujillo, 2002; Gonzalez and Trujillo, 2008). Cruise terminals are multi-output in nature, therefore, SFA rather than DEA allows us to distinguish between the effects caused by random exogenous factors and the technical efficiency. In the next section we describe the considered variables in more detail.

4. THE DATA

The database is partial. The main sources of data are the cruise terminal. We also did a direct follow up by phone and email with many of the cruise terminals and port authorities.
We tried to get a sample size providing a fair representation of the Italy cruise ports. The sample includes all cruise ports of Italy. We also tried to get enough representativeness of the main types of organizational structures of ports.

We focus on technical efficiency because there is no data on costs. Information on outputs is quite good along all quality and coverage dimensions. For each of these ports, we have collected the information on the composition of the passenger traffic. We did not obtain information on the other services provided by cruise ports. Unfortunately, the information available about output only allows us to consider one output for the moment.

The 12 ports comprising the sample are heterogeneous. They differ in terms of size as well as specialization. Some are specialized in cruise passengers; others only in ferry passengers and other are a mix between both passenger traffics. Moreover, among ports dealing mainly with cruise passenger, the differences are also significant.

4.1. Output

The cruise passengers flow for each year represents the cruise terminal output, which is its productivity. Our data aggregates two types of flow: transit cruise passengers and boarding/ disembarkation cruise passengers.

4.2. Inputs

In this analysis we consider 10 explanatory variables. Four of the variables are related to the physical characteristics of the berths: number (I1), total length (I2), maximum length (I3), maximum depth (I4).

Four other variables relate to passenger flow: number of check-in desks (I5), number of elevators (I6), number of escalators (I7), and number of mobile gangways (I8). Finally, in our dataset we consider the building area of the terminal infrastructure: total area of cruise terminal in square meters (I9), and number of floors used to provide services to cruise passengers (I10).

4.3. The Environmental Variables

The environmental variables are exogenous factors that impact on cruise terminal production. The first environmental variable is the utilizing capacity of terminal berth, whether it employs both cruise and ferry activities or merely cruise activities (B1). The second environmental variable indicates how the terminal is used for multi-purpose activities (B2); this variable is an indicator of revenue stemming from activities that differ from the core business such as exhibitions, conventions, fairs, and cultural events in periods when cruise activity is slow (Soriani et al., 2009).

The average daily stop time calculated yearly, without distinguishing between turn-around and transit ships is our third environmental variable (B3). The fourth variable is represented by cruise traffic flow. We can distinguish two main cruise terminal traffic types: transit cruise terminal and home or boarding and disembarking cruise terminal (E5). The last variable is berth employment, which distinguishes between ferry business and cruise business (E6).

5. THE MODEL

The Data Envelopment Analysis (DEA) and the Stochastic Frontier Analysis (SFA) represent two alternative methods to measure port efficiency based on frontier models. Both techniques allow derivation of relative efficiency ratios within a group of analysed units, so the efficiency of the units is compared through an efficient envelopment. However, while frontier function estimation uses econometric methods, the DEA is a non-parametric technique based on linear programming. These methods apply to cross-section samples but if panel data are available; they can also be used to measure technical change and the change in efficiency.

Both methods have advantages and drawbacks. DEA does not impose any functional form to the frontier nor does it assume a distributional form for the inefficiency error terms. It can easily handle multiple outputs; but, it could be influenced by noise and traditional hypothesis tests are not possible except by using bootstrapping techniques (Simar and Wilson, 2000). On the other hand, SFA involves the cost of imposing a particular functional form and making particular distributional assumptions for the one-side error term associated with technical efficiency, which could introduce a potential source of error. However, SFA has also advantages. To begin with, it is capable to manage random shocks and/or measurement error. Moreover, traditional hypothesis tests could be used and, finally, environmental variables are easier to deal with.

We have chosen SFA in order to make our estimation of cruise ports efficiency because, in our case due to the heterogeneity of the sample, the advantages of this method outweigh its disadvantages. Furthermore, we select the distance function to estimate the relative efficiency of cruise ports. The reason behind the selection of this function lies in the advantages it presents: It allows capturing multi-output processes. It does not require the use of optimizing assumptions. It only uses physical data and, therefore, it is not necessary to have information on outputs or factor prices.

The distance function can take an input orientation or an output orientation. The analysis of the conditions under which port authorities develop their activities led us to the estimation of an output-oriented distance function. As Gonzalez and Trujillo (2008) states when analyzing technical efficiency of Spanish port authorities "…in the provision of infrastructure services, port authorities have some power to decide on the production level through the use of two mechanisms: commercial policies and concessions. Considering this capacity to influence output, port authorities encounter certain challenges in adjusting the productive factors used in the provision of infrastructure services, basically: berths, area and labor. The first two are quasi-fixed factors that, due to their indivisibility, find it difficult to adapt to changes in production, especially if the change is downward. As regards labor, this is generally made up of port authority officers and thus the difficulty of making adjustments, particularly when numbers need to be reduced".

An output-oriented distance function is defined as the smallest scalar by which all outputs can be proportionally divided, using the same level of productive factors. The general formula for an output stochastic distance function is written as:

$$1 = D_o(y_p, x_p, d_p; \alpha, \beta, \psi) \cdot \exp\{v_p - u_p\}$$

where $D_o(y_p, x_p, d_p; \alpha, \beta, \psi)$ is the output distance function; y is an output vector, x is an input vector, d is an environmental variable, p denotes port and α, β, ψ are parameters to be estimated. The vp and up error components represent statistical noise, and the magnitude of technical efficiency (TE) respectively.

The empirical econometric application of a distance function calls for the definition of an appropriate functional form. It is desirable that the functional form presents the following advantages: it must be flexible, it must be easy to calculate and, lastly, it must allow imposition of the homogeneity condition. The translogarithmic functional form meets these conditions and this is the reason why, at present, most authors use it in all research fields.

In order to determine the frontier, DO needs to be equal to one and, in this case, the term on the left of the equation, according to the neperian logarithm, will equal zero. Consequently, it is necessary that outputs meet the homogeneity condition of degree 1. On the other hand, to estimate the equation, it is necessary to determine the random disturbance term. The most common method to do so was developed by Battese and Coelli (1988); it applies an additive term as suggested by Cuesta and Orea (2002), to account for the fact that we are estimating an output oriented distance function. The error term thus has the following form: v_i+u_i, where, v_i is a symmetrical error term, iid (independent and identically distributed) with a zero average (which represents the random variables un-controllable by the operator) and u_i is a one-sided negative error term and is distributed independently of v_i.

Applied to the distance function, this yields

$$-\ln(y_{Mi}) = TL_o(x_i, y_i/y_{Mi}, \alpha, \beta, \delta) + v_i + u_i$$

This equation can be estimated by the maximum likelihood method which requires distributional assumptions on the random shock. This assumes that v_i follows a $N(0, \sigma_v^2)$ distribution and u_i follows a $|N(0, \sigma_u^2)|$ distribution (Ritter and Simar, 1997).

Unfortunately, the information available about output only allows us to consider one output for the moment. So we estimate a production function

$$y_p = f(x_p, d_p / \alpha, \beta, \psi) + v_p + u_p$$

where $f(x_i, d_i / \alpha, \beta, \psi)$ is the production function; y is an output vector, x is an input vector, d is an environmental variable, p denotes port and α, β, ψ are parameters to be estimated. The v_p and u_p error components represent statistical noise, and the magnitude of technical efficiency (TE) respectively.

The model we rely on to estimate the efficiency of cruise ports is the model presented before. We provide an estimate of the evolution over time of the performance since we were able to generate data on various points in time.

In spite of translogaritmic functional form being, theoretically, the first best, in our application the log-linear Cobb-Douglas function worked better, maybe due to the limitation of the data base. The information collected is sufficient to estimate various models, depending on how much inputs are aggregated. The best econometric results were obtained from a Cobb-Douglas with one products, 10 factors and 5 environmental variable.

6. ANALYSIS OF THE RESULTS

Table 1 shows the results of the analysis of the 12 Italian cruise terminals. We observe that, in general, the technical efficiency in the terminals has increased during the considered period.

Table I – Technical efficiency estimates, 2006-08

TERMINAL	***Year***	***Efficiency***	***Year***	***Efficiency***	***Year***	***Efficiency***
1	1	0.82887028E+00	2	0.88408540E+00	3	0.99851948E+00
2	1	0.54343191E+00	2	0.82891235E+00	3	0.97730889E+00
3			2	0.92141889E+00	3	0.97721310E+00
4	1	0.96985337E+00	2	0.99153715E+00	3	0.99677780E+00
5	1	0.87791639E+00	2	0.94097951E+00	3	0.99544623E+00
6	1	0.86915935E+00	2	0.92604839E+00	3	0.98377428E+00
7	1	0.90714732E+00	2	0.96795428E+00	3	0.99361008E+00
8	1	0.94209164E+00	2	0.92873417E+00	3	0.85553975E+00
9	1	0.77425458E+00	2	0.91531726E+00	3	0.96995603E+00
10	1	0.79097424E+00	2	0.91544968E+00	3	0.92493679E+00
11			2	0.75454610E+00	3	0.92602051E+00
12	1	0.86778409E+00	2	0.91617092E+00	3	0.99553765E+00
Mean Efficiency y = 0.90756700E+00						

Data Source: *Parthenope* and UCL calculation

In relation to the four hypotheses set up for our analysis, we can observe that cruise terminals increase their technical efficiency when they are operated by private companies under regulatory regimes (Table 1).

Table 2 – Management types, 2006-2008

Cruise Port	Type of Management	2006	2007	2008
Bari	Public	0.82887	0.88409	0.99852
Cagliari	Public	0.54343	0.82891	0.97731
Civitavecchia	Private		0.92142	0.97721
Genoa	Private and Public	0.96985	0.99154	0.99678
Livorno	Public	0.87792	0.94098	0.99545
Messina	Private	0.86916	0.92605	0.98377
Naples	Private and Public	0.90715	0.96795	0.99361
Palermo	Public	0.77425	0.91532	0.96996
Portoferraio	Public	0.94209	0.92873	0.85554
Savona	Private	0.79097	0.91545	0.92494
Trieste	Public		0.75455	0.92602
Venice	Public	0.86778	0.91617	0.99554

Data Source: *Parthenope* and UCL calculation

However, in relation to the type of management (hypotheses: b and c) we cannot reach conclusive results in both cases. We can conclude that, given the strong regulatory regime applied to the private operators, the type of management, i.e. private or public, is not discriminatory in relation to the technical efficiency of our considered cruise terminals (Table 2). The increase in the number of private companies does not influence the efficiency in our case.

Table 3 – Terminal ownership structure, 2006-2008

Terminals part owned by private companies	**Years**		
	2006	**2007**	**2008**
Bari	0.82887	0.88409	0.99852
Civitavecchia		0.92142	0.97721
Genoa	0.96985	0.99154	0.99678
Livorno	0.87792	0.94098	0.99545
Messina	0.86916	0.92605	0.98377
Naples	0.90715	0.96795	0.99361
Savona	0.79097	0.91545	0.92494
Trieste		0.75455	0.92602
Venice	0.86778	0.91617	0.99554
Average	0.87310	0.91313	0.97687
Terminals owned by public companies	**Years**		
	2006	**2007**	**2008**
Cagliari	0.54343	0.82891	0.97731
Portoferraio	0.94209	0.92873	0.85554
Palermo	0.77425	0.91532	0.96996
Average	0.75326	0.89099	0.93427

Data Source: *Parthenope* and UCL calculation

In relation to hypothesis d, we can observe that the partnership between private and public (with a strong private ownership component) has a positive impact on the technical efficiency of the cruise terminals in our analysis. This is in line with the spirit of the legislative reform, which is to promote terminal efficiency by combining two actors with different objectives (public: maximizing welfare; private: maximizing profit) but who can nevertheless learn best practice from one another and identify common strategies for development and governance of cruise terminals.

7. CONCLUSION

In the last two decades the cruise industry has expanded its world market share and operations. One important development has been the participation of the private sector in the ownership, operation and management of cruise terminals. Our study has analysed the performance of 12 Italian cruise terminals within the Mediterranean Basin.

The Italian legislative reform of port organization (D.L. 84/94) has provided an impetus in the operation of the cruise terminals. Our dataset shows how the intervention of the private sector in the ownership and operation of the terminals increases the efficiency levels. Given the highly regulated system, the management structure, whether public or private, does not influence the efficiency of the cruise terminals. This latter result can be explained by the duration of the concession contract, usually 30 years, which does not allow competitive behaviour from the various management operators.

REFERENCES

Autorità Garante della Concorrenza e del Mercato (1998). Trasporti marittimi e servizi portuali, indagine conoscitiva sul settore dei servizi portuali.

Baird, A. (1995). Privatisation of trust ports in the United Kingdom: review and analysis of the first sales. Transport Policy, 2, 35-143.

Battese, G. E. and T. Coelli (1988). Prediction of firm-level technical efficiencies with a generalised frontier production function and panel data. J. Econometrics, 38, 387-399.

Baudelaire, J. (1997). Some thoughts about port privatisation. In: Essays in Honour and in Memory of Late Professor Emeritus of Maritime Economics Dr Basil Metaxas (A. M. Goulielmos, ed.), pp. 255-260. Piraeus, Greece.

Bjornsen, P. (2003). The growth of the market and global competition in the cruise industry, Cruise and Ferry Conference. Informa Group, Earls Court, London.

Cartwright, R. and C. Baird (1999). The development and growth of the cruise Industry. Butterworth-Heinemann, Oxford.

Coleman, M. T., D. V. Meyer and D. T. Scheffman (2003). Economic analyses of mergers at the FTC: the cruise ships mergers investigation. Review of Industrial Organization, Kluwer Academic Publishers, Netherlands, 23, 121-155.

Cottam, H., M. Roe and J.Challacombe (2007). The impact of transitional changes of maritime passenger transport on Croatian tourism development. Maritime Policy & Management, (June), 34, 3, 185-202, Routledge, London.

Cruise Industry News Annual Report (2007). Cruise industry news annual report 2007. Cruise Industry News, NY.

Cruise Lines International Association (2005–2006). The overview, statistics, CLIA, Fort Lauderdale, FL.

Cuesta, R.A. and L. Orea (2002). Mergers and technical efficiency in Spanish savings banks: a stochastic distance function approach. J. banking & finance – Elsevier Scientific Publishing Company, 26, 12.

Cullinane, K. and D. W. Song (2001). The Administrative and Ownership Structure of Asian Container Ports. International J. of Maritime Economics, 3, 175-197, Palgrave.

De Monie, G. (1996). Privatisation of Port Structures, in, Ports for Europe: Europe's Maritime Future in a Changing Environment (L. Bekemans and S. Beckwith ed.), pp. 267-298. European Interuniversity Press, Brussels.

Dickinson B. and A. Vladimir (2008). Selling the Sea: an inside look at the Cruise Industry (2nd ed.). Hoboken, JohnWiley & Sons Inc, New Jersey.

Estache A., M. González and L. Trujillo (2002). Efficiency Gains from Port Reform and the Potential for Yardstick Competition: Lessons from Mexico. World Development, 30, 4, 545–560. Elsevier Science Ltd., Great Britain.

González, M. M. and L. Trujillo (2008). Reforms and infrastructure efficiency in Spain's container ports. Transportation Research, Part A: Policy and Practice, 42A, 243-257, Elsevier Science Ltd. Great Britain.

Goss, R. (1990). Economic policies and seaports: 2. The diversity of port policies. Maritime Policy and Management, 17, 3, 221-234.

Heaver, T. (1995). The implications of increased competition among ports for port policy and management. Maritime Policy and Management, 22, 125-133.

Hobson, J. S. P. (1993). Analysis of the US Cruise Line Industry. Tourism Management, 14, 453-462.

Liu, Z. (1995). The comparative performance of public and private enterprises. The case of British ports. J. Transport Economics and Policy, September, 263-274.

Liu, Z. (1995). Ownership and productive efficiency: the experience of British ports. In: Transport in Transition: Aspects of British and European Experience (J. McConville and J. Sheldrake ed.), pp. 163-182. Aldershot, Avebury.

Millward, R. (1982). The comparative performance of public and private ownership, In: The Mixed Economy (E. Roll), pp. 58-93, Macmillan Press, London

Millward, R. and D. Parker (1983). Public and private enterprise: comparative behaviour and relative efficiency. In: Public Sector Economics (R. Millward, D. Parker, L. Rosenthal, M.T. Sumner, N. Topham, ed.), Longman, London.

Pantouvakis, A., C. Chlomoudis and A. Dimas (2008). Testing the SERVQUAL scale in the passenger port industry: a confirmatory study. Maritime Policy & Management, 35, 5, 449-467, Routledge, London.

Parker, D. (1994). Nationalisation, privatisation, and agency status within government: testing for the importance of ownership. In:, Privatisation and Regulation: A review of the issues (P. Jackson, C. Price ed.), pp. 149-169, Longman Group Ltd.: Essex.

Peisley, T. (2003). Global changes in the cruise industry, 2003-2010, Seatrade Communications, Colchester.

Petrullo, A. (2007). The strategic Choices of the Port of Barcelona, Processing Cruise Shipping Conference. Opportunities and Challenges: markets, technologies and local development. In: National Research Council Institute for Service Industry Research, University of Naples “Parthenope”, pp. 437-447, International Association of Maritime Economists, Association for Tourism and Leisure Education, Naples, Italy.

Ritter, C. and L. Simar (1997). Pitfalls of normal gamma stochastic frontier models. J. Productivity Analysis, 8 (2), 121–129.

Simar, L. and P.W. Wilson (2000). A general methodology for boostraping in nonparametric frontier models. J. Applied Statistics, 27, 779–802.

Soriani, S., S. Bertazzon, F. Di Cesare and G.Rech (2009). Cruising in the Mediterranean: structural aspects and evolutionary trends. Maritime Policy & Management, 36, 3, 235-251, Routledge, London.

Thomas, B. (1994). The need for organisational change in seaports, Marine Policy, 18, 69-78.

UNCTAD (1995). Comparative Analysis of Deregulation, Commercialisation and Privatisation of Ports. UNCTAD/SDD/PORT/3, Geneva.

UNCTAD (1999). Guidelines for Port Authorities and Governments on the privatization of port facilities. UNCTAD/SDTE/TIB/1, Geneva.

Véronneau, S. and R. Jacques (2008). Global service supply chains: an empirical study of current practices and challenges of a cruise line corporation. Tourism Management, 30, 128-139, Elsevier Ltd.

Wild, G.P. (2007). Contribution of cruise tourism to the Economies of Europe. G.P. Wild (International) Limited and Business Resarch & Economic Advisors.

Wild, G.P. and J. Dearing (2000). Development of and prospects for cruising. Maritime Policy & Management, 27, 4, 315-333, Routledge, London.

World Bank (2004). Port Reform Tool Kit – Module 3 – Alternative Port Management Structures and ownership models.