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AN ANALYSIS OF THE EFFICIENCY OF ITALIAN CRUISE TERMINALS

Assunta Di Vaio* · Francesca R. Medda**
Lourdes Trujillo***

Abstract: The cruise industry has recently witnessed considerable growth, during which time the Mediterranean Basin and, in particular, the Italian area has gained an increasingly competitive position. A significant role in the investment and management decisions and in the level of efficiency and performance of terminal cruise operations is played by the possible partnerships between private and public actors (port authorities, cruise terminals, cruise line companies). The aim of this paper is to measure the technical efficiency of Italian cruise terminals in the Mediterranean Basin when public and private actors participate in the management of terminals. Cruise terminal efficiency is measured by the calculation of the production function with multi-outputs. We apply stochastic frontier analysis based on the distance function. The study shows that the partnership between private and public (with a strong private management component) has a positive impact on the technical efficiency of the cruise terminals.

Keywords: Cruise Terminals, Efficiency, Management.
jel Classification: L91, R42.

1. Introduction

In the last two decades the cruise line industry has significantly increased its market share in the travel industry; starting from the 1990s it has become the fastest growing segment of the tourism industry (Hobson, 1993; Cartwright and Baird, 1999). The demand for cruising worldwide has increased exponentially (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).

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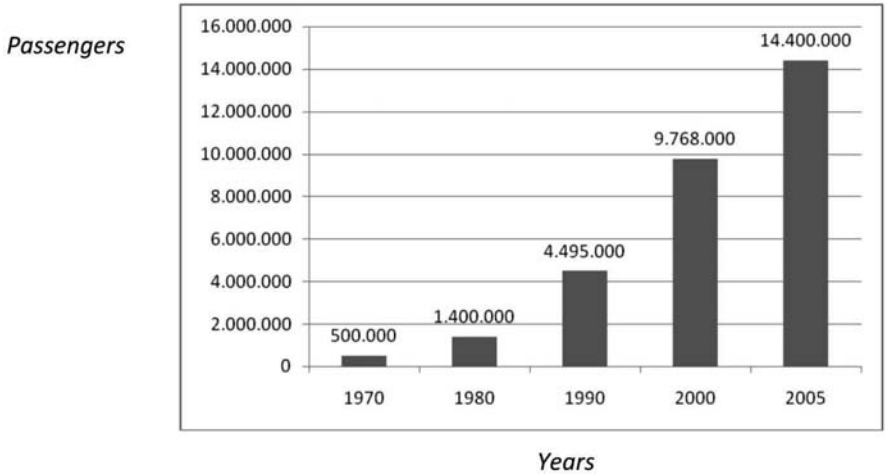

Source*:* Peisley, 2003; CLIA, 2005-2006; European Cruise Council, 2007

Figure 1. Demand for cruising worldwide 1970-2005.

This fast-paced growth has necessitated a profound transformation of the cruise line industry, for instance, companies have focused on providing high levels of comfort and quality on board and have introduced flexible route choice or personalized routes in order to satisfy and target a very competitive demand (Coleman et al., 2003; Cottam et al., 2007). Moreover, greater attention has also been given to the operations and management at the terminal level. The literature dedicated to the cruise industry has focused mainly on demand and customer provision (Wild and Dearing, 2000; Bjornsen, 2003; Dickinson and Vladimir, 2008) but scant literature has examined the development of terminal operations. The aim of the present paper is to fill this gap in the literature.

In relation to market structure, an increasing number of cruise terminals are owned or partially-owned at present by cruise line companies. It is clearly evident that the cruise market is mainly 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 Industry News Annual Report, 2007; Soriani et al., 2009).[1] The oligopolistic nature of the cruise

[1] Carnival Corporation & Plc, Royal Caribbean Cruise Line Ltd, Star Cruises Ltd (SCL) - Norwegian Cruise Line Ltd (NCL), Louis Cruise Lines and MSC Crociere S.p.A (European Cruise Council, 2009; 2010).

industry has determined in terminal operations an upstream integration of the supply chain with passenger liners that offer services combining rail, sea passage and hotels (Véronneau and Jacques, 2008). In this context a similar dynamic has also been observed in the container industry, whereby shipping companies and container terminals have developed similar strategies of upstream integration (Peters, 2001; Notteboom, 2004a, 2004b; Midoro et al., 2005; Olivier, 2005; Parola et al., 2007; Slack, 2007).

In Europe, and in particular in Italy, there are different forms of terminal management 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 (Cruise Industry News, 2009; European Commission, 2009; European Cruise Council, 2010).

Having said that, a significant role in the investment and management decisions and consequently in the level of efficiency and performance of terminal cruise operations, is played by the possible partnerships between private and public actors (port authorities, cruise terminals, cruise line companies). The objective of the present paper is to measure the technical efficiency (TE) of Italian cruise terminals in the Mediterranean Basin when public and private actors intervene in the organization and management of terminals.

Given this background, the analysis will be structured around two main hypotheses:

a) TE increases when the cruise terminals are *managed* by a combination of public and private actors and terminals are *operated mainly* by private companies under a concession contract;

b) TE decreases when the terminal *management* type is public.

At the core of the hypotheses is the structure of the port management based on the roles that the private and public sectors play in the management and operation of port facilities. The paper is organized as follows: Section 2 addresses port management reform. Reform in Italy is discussed in Section 3, and Sections 4 and 5 describe the data and methodology. Results and conclusions are drawn in Sections 6 and 7, respectively.

2. Port Management Reform

Baird (1995), Liu (1995) and Baudelaire (1997) classify three port management structures: service ports, tool ports and landlord ports; whereas other scholars (Goss, 1990; Thomas, 1994; Heaver, 1995; De Monie, 1996) assert that port management is essentially divided into two types: landlord ports and service ports. Service ports and tool ports are usually publicly managed and therefore the superstructure development and cargo handling operations are the responsibility of the public sector. Landlord ports are characterized by a mixed management of private sector and public sector, i.e., the Port Authority. The Port Authority handles the regulatory function in relation to both shipping and port operations and it makes land and superstructures available to private cargo-handling companies (World Bank, 2004).

The analysis can now turn to the port functions derived from the port management reform. The initial conditions for the port management reform included restrictive labor practices, lack of an adequate response to increased demand, unsatisfactory port service quality, and an inability of many governments to invest in port infrastructures (World Bank, 2004; UNCTAD, 1995, 1998). Indeed, according to a World Bank Report (2004), the port management reform implemented two main port functions, landowner and operator, in order to improve port efficiency and service quality, increase competitive power and consequently to improve the attitude towards port clients/users.

We can now combine the different aspects of ports such as management and function. It is therefore possible to identify three main port types (Table 1).

(1) Public port, where the two functions (landowner and operator) are controlled by the public authority or government;

(2) Public/private port, where the landowner function remains in the hands of the public sector and operations are controlled by the private sector;

(3) Private port, where the two functions are controlled entirely by the private sector (Cullinane and Song, 2001; Cullinane et al., 2002; World Bank, 2004).

Table 1. Management structure and functions of ports.

PORT FUNCTIONS	**PORT MANAGEMENT MODEL**				
	Service Port		**Tool Port**	**Landlord port**	
	Public	**Private**		**PUBLIC/private**	**PRIVATE/public**
Landowner	Public	Private	Public	Public	Private / Public
Operation	Public	Private	Public / Private	Private	Private

When examining the port sector in Italy, numerous reforms have been implemented since the 1980s in order to decouple the control of port operations from port services (e.g., Confindustria document – 1984). This reform has led to the development of an increasing number of public-private joint ventures for the management of port areas (Autorità Garante della Concorrenza e del Mercato, 1998). In this context, 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 control functions; b) the implementation of a free enterprise competition for port operations under the specific form of a business-authorized 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); and d) the capacity to set fares, which must be publicly communicated by the Port Authority.

The applications of the principles and practices of Italian port reform have been put into effect in the cruise terminal management structures, and the next section will examine in detail the Italian cruise management framework.

3. Terminal Cruise Management: The Italian 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 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, integration 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 the loyalty and willingness of cruise line companies and terminals to maintain long-term relationships (Pantouvakis et al., 2008).

It can be observed that in empirical studies there is no clear-cut relationship between the type of ownership structure and port efficiency (Tongzon and Heng, 2005). Therefore, in our analysis two different types of port scenarios can be identified: 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 in order to set up an agreement on the cruise terminal management. In such a situation the cruise line company manages investments and the cruise terminal becomes a "home port". In the second scenario, when the port does not create a partnership with a cruise line company, the port simply promotes the cruise business.

The Italian cruise terminals can be distinguished as follows:

• Terminals fully managed by port authorities (Cagliari, Palermo, Portoferraio)

• Terminals managed through concession contracts for the cruise operation by private companies (ATI Comet Srl – Messina Sea Terminal, Palacrociere of Savona, Roma Cruise Terminal Srl)

• Terminals partly managed for the cruise operation by private and public companies (Bari Porto Mediterraneo Srl, Porto di Livorno 2000 Srl, Stazioni Marittime S.p.A., Terminal Napoli S.p.A., Trieste Terminal Passeggeri S.p.A., Venezia Terminal Passeggeri S.p.A.)

Moreover, three cruise line companies have a share in the Italian cruise terminal operation concession contract:

1. Costa Crociere S.p.A has 100% of the concession contract for the operation of the terminal Palacrociere of Savona, 33,33% share of Roma Cruise terminal Srl concession contract, 20% share of Terminal Napoli S.p.A., and 5,91% share of Stazioni Marittime S.p.A.

2. MSC Crociere SpA has 33,33% of Roma Cruise Terminal Srl concession contract and 5% of Terminal Napoli S.p.A.

3. Royal Caribbean Ltd has 33,33% of Roma Cruise Terminal Srl and 20% of Terminal Napoli S.p.A. concession contract for operations.

In order to carry out the efficiency analysis, the output of the model is the boarding/disembarkation and transit traffic. The analysis evaluates only the technical efficiency of the Italian cruise terminals because the provision of infrastructure is difficult to change over a short-term period; therefore, this element has a significant impact on the management of the terminal. The technical efficiency represents the ability of a terminal to maximize its output (the boarding/disembarkation and transit traffic) from a given input mix. The input mix is represented by infrastructure categories in cruise operations: 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.

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

- 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.

The estimation of the technical efficiency of the considered cruise terminals is based 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. The next section fully describes the considered variables.

4. The Data

The dataset for the analysis is composed of a panel data of 14 Italian cruise terminals, observed between 2006 and 2008. The database is constructed by combining data from the cruise terminals collected directly and compiling data from official port reports. In order to validate the database we have conducted a follow-up by telephone and email with the cruise terminals and port authorities.

As discussed earlier (Law DL 84/94), Italy underwent port reform and the reorganization of its terminal activities and operations. Given the objective of the paper, the dataset needs to include all the different management structures of the Italian cruise terminals and for this reason, the period of observation is limited. Before 2000 in Italy there existed only four concessionary companies of cruise infrastructure in Genoa, Livorno, Naples, and Venice; from 2000 to 2005 two cruise terminal companies began operation in Messina and Savona; by 2006, 14 cruise terminal companies were operating in Italy.

The sample size provides a comprehensive representation of the Italian cruise terminals. Among the 14 ports, two ports (La Spezia and Ravenna) do not own cruise infrastructure and have therefore declined to participate in the research. It is noteworthy that each cruise terminal has its own unique characteristics which are captured in the dataset. For instance, Venezia Terminal Passeggeri S.p.A. is not designated in one physical location but rather uses various terminals: n.103, n. 107/108, n. 117, San Basilio, and Riva Sette Martiri quay.

The cruise terminals considered in the analysis are the following (Figure 2):
1) Bari Porto Mediterraneo Srl (Bari Port)
2) Cagliari Port Authority (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) Palermo Port Authority (Palermo Port)
9) Piombino and Portoferraio Port Authority (Portoferraio 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 has been compiled by the Messina Port Authority.

Figure 2. Italian Cruise Terminals.

The 12 ports comprising the sample are heterogeneous; they differ in terms of size as well as specialization. In terms of specialization, three categories of ports can be observed: ports that are specialized only in cruise passengers; ports that are specialized in ferry-only passengers; and ports that have a mix of both cruise and ferry passenger traffic. In the dataset the ferry passengers are not considered as cruise output.

4. 1. *Output*

The cruise passenger flow for each year represents the cruise terminal output, that is, its productivity. And as previously mentioned, the data aggregates two types of cruise flow: boarding/disembarkation and transit traffic.

4. 2. *Inputs*

The analysis considers 10 explanatory variables, four of which are related to the physical characteristics of the berths: number (I1), total length (I2), maximum length (I3), and 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, the dataset includes 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*

In the dataset five environmental variables are introduced in order to consider the exogenous factors that impact on cruise terminal production. The first environmental variable is the utilizing capacity of terminal berth, whether it employs either cruise and ferry activities or merely cruise activities (E1). The second environmental variable indicates how the terminal is used for multi-purpose activities (E2); 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 the third environmental variable (E3). The fourth is represented by the prevalent terminal traffic types (over 50% of the traffic): transit or boarding/disembarkation traffic (E4). The last variable is berth employment, which distinguishes between ferry business and cruise business (E5).

5. The Model

The Data Envelopment Analysis (DEA) and the Stochastic Frontier Analysis (SFA) represent two alternative methods for measuring terminal efficiency based on frontier models (Bergantino and Musso, 2009; Gonzales and Trujillo, 2009). Both techniques allow for the derivation of relative efficiency ratios within a group of analyzed units, so the efficiency of the units is compared to an *efficient envelope*. However, while frontier function estimation uses econometric methods, the DEA is a non-parametric technique based on linear programming. These methods apply to a cross-section of samples, but if panel data are available they can also be used to measure technical and efficiency changes.

Both DEA and SFA have advantages and drawbacks. DEA neither imposes any functional form to the frontier nor does it assume a distributional form for the inefficiency error terms. DEA can handle multiple outputs easily, but it can be influenced by noise; moreover, traditional hypothesis tests are not possible except through the use of bootstrapping techniques (Simar and Wilson, 2000). On the other hand, SFA requires a particular functional form and particular distributional assumptions for the one-sided error term associated with technical efficiency, which introduces a potential source of error. However, SFA also has advantages. To begin with, it is capable of managing random shocks and/or measurement errors and traditional hypothesis tests can be used; in addition, environmental variables are easier to deal with.

We have chosen SFA for our estimation of cruise port 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 allows for the capture of multi-output processes, it does not require the use of optimizing assumptions, and it only uses physical data, so information on outputs or factor prices is not necessary.

The distance function can adopt an input orientation or an output orientation. The analysis of the conditions under which port authorities develop their activity has led us to the estimation of an output-oriented distance function. As Gonzalez and Trujillo (2008) state in their analysis of the 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:

$$1 = D_o(y_p, x_p, d_p; \alpha, \beta, \psi) \exp\left[v_p - u_p\right]$$

where $1 = D_0(y_p, x_p, d_p; \alpha, \beta, \psi)$ 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 v_p and u_p 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 it must allow for the imposition of the homogeneity condition. The translogarithmic functional form meets these conditions, which is why, at present, most authors use it in all research fields.

In order to determine the frontier, D_O 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 developed by Battese and Coelli (1988) 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

$$-\ln(y_{Mi}) = TL_0(x_i, y_i / y_{Mi}, \alpha, \beta, \psi) + v_i + u_i$$

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).

As mentioned previously, the information available about output only allows us to consider one output, 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 above. We provide an estimate of the evolution over time of the performance since we are able to generate data across various points in time.

In spite of the translogarithmic functional form theoretically being the first best, in our application the log-linear Cobb-Douglas function worked better, possibly due to the limitation of the database. The information collected is sufficient to estimate various models, but depends on how many inputs are aggregated. The best econometric results were obtained from a Cobb-Douglas with two outputs (aggregated), ten factors and five environmental variables.

6. Analysis of the Results

The analysis has estimated the value of the technical efficiency for the Italian cruise terminals over the years 2006-2008; however, attention is given first to the efficiency results for year 2006 (Table 2). This decision is justified by the fact that, in 2006 the cruise industry was still in an upward trend of growth, and it was not yet affected by the possible impacts of the financial crisis which started in 2007-08 (UN-WTO, 2010; UN-WTO, 2008). The results in Table 2 show that the Italian cruise terminals have a significant variation in their levels of technical efficiency, with the lowest level for the Cagliari Terminal (0.54), and the highest level for the Genoa Terminal (0.97). In relation to the two hypotheses set up for the analysis, the technical efficiency of cruise terminals within the entire dataset has a high level when terminals are mainly operated by private companies under concession contracts (hypothesis a), and terminals achieve low levels of technical efficiency when they are fully managed by public companies (Table 2).

Table 2. Management types and Technical efficiency estimates, 2006.

Cruise Port	**Type of Management**	**Efficiency (year 2006)**
Bari	Private and Public	0.82887
Cagliari	Public	0.54343
Civitavecchia	Private	MD*
Genoa	Private and Public	0.96985
Livorno	Private and Public	0.87792
Messina	Private	0.86916
Naples	Private and Public	0.90715
Palermo	Public	0.77425
Portoferraio	Public	0.94209
Savona	Private	0.79097
Trieste	Private and Public	MD*
Venice	Private and Public	0.86778

*MD: Missing Data

Data Source: Parthenope and UCL calculation.

The three terminals Genoa, Naples and Venice, which are characterized by being dedicated cruise terminals, achieved the highest level of technical efficiency in the dataset for 2006, whereas Cagliari, which did not have dedicated infrastructure for cruise operations, but rather used infrastructure dedicated for ferry, achieved the lowest value in the analysis. Genoa, Naples and Venice terminals are operated by public and private companies, and Cagliari is fully operated by the Port Authority, that is, the public sector. Therefore, both hypotheses are verified by the analysis.

In this context, Portoferraio Terminal appeared to be an anomaly in the dataset, because although the terminal is fully managed by public companies and also does not have a dedicated cruise infrastructure, in 2006 it had a high technical efficiency index (0.942). This result is justified by the presence of a significant volume of cruise passengers using Portoferraio Terminal, which however, was due to cruise company strategies and not to terminal management. After 2000, as the demand for cruise tourism began to rise rapidly and low cost flights from the USA became increasingly available, cruise companies observed the great potential of the Mediterranean Basin as a major destination; and this resulted in the definition of specific cruise company strategies aimed at seeking new calling ports in the Mediterranean (Coccia, 2010).

Within these strategies, Portoferraio became one of the new chosen ports. But given that no actual strategy was designed by Portoferraio to attract the cruise companies, the implication was that Portoferraio could have lost its role if the cruise companies were to decide to no longer call at this port. And this situation actually occurred; it can be observed in Table 3 that Portoferraio decreased in its technical efficiency due to the change in routes by the cruise company. The exact opposite can be seen in the case of Cagliari, where its increase in technical efficiency is due only to the fact that Royal Caribbean Cruise Line Ltd. had decided in 2007 to call in Cagliari.

In the estimation of the technical analysis for the three years (2006-2008), one can observe that the efficiency index does not have significant variation, and in particular it has a steady increase in all terminals but Portoferraio. These results give a strong and interesting indication of the Italian cruise terminals. The cruise output (boarding/disembarkation and transit traffic) has increased over the three years of the study; it is evident that, as a consequence the technical efficiency index has also increased, thereby showing that no major infrastructure investments were undertaken by the Italian cruise terminals. However, it is also evident that given the high level of technical efficiency, particularly for certain terminals, this is a signal that the terminals are reaching capacity (in certain terminals, cruise ships need to idle outside the ports because the cruise terminals are not available), so they will need to consider possible investment in order to increase capacity in the cruise operation (Table 3).

Table 3. Technical efficiency 2006-2008.

Terminals mainly managed by private companies under concession contracts	**Years**		
	2006	**2007**	**2008**
Bari	0.82887	0.88409	0.99852
Civitavecchia	MD*	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	MD*	0.75455	0.92602
Venice	0.86778	0.91617	0.99554
Average	0.83714	0.91313	0.97687
Terminals under public management	**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**
*MD: Missing Data			

Data Source: Parthenope and UCL calculation.

In conclusion, in relation to hypotheses a and b of the study, the partnership between private and public (with a strong private management component) has a positive impact on the technical efficiency of the cruise terminals in the analysis.

7. Conclusion

The cruise industry has expanded its world market share and operations over the last twenty years. One important development has been the participation of the private sector in the operation and management of cruise terminals. Our study has analyzed the performance of 12 Italian cruise terminals within the Mediterranean Basin in the period 2006-2008.

The Italian legislative reform of port organization (DL 84/94) has provided an impetus in the operation of the cruise terminals. However, given the highly regulated system, the management structure, whether public or private, does not have a very strong influence on the technical efficiency of the cruise terminals. Nonetheless, the estimation in the present analysis shows how the intervention of the private sector in terminal management increases the efficiency levels. 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) who can learn best practice from one another and identify common strategies for the development and governance of cruise terminals.

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