

Economic Evaluation of a Cruise Ship Dock Marine

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Abstract

Cruise industry has increased in popularity all around the world, serving a heterogeneous clientele with well-differentiated expectations and preferences mainly in Asian, European and North American Markets. Greece as one of the most attractive tourism destinations is ranked highly among the most popular cruise destinations in the Mediterranean, mainly due to the country's geophysical characteristics and the extensive island network. In this paper a short overview of the cruise industry for world-wide and especially for Mediterranean market is presented, while an economic evaluation of a cruise ship mooring dock infrastructure is also performed. The main aim of this paper is to examine the economy impact on both National and Local level, of the cruise ship mooring dock located at the port of Argostoli in Kefalonia using a Discounted Cash Flows (DCF) analysis. Using actual data provided by local port authorities, several scenarios are examined in order to identify to most crucial parameters for a cruise ship mooring dock economic evaluation.

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1 Introduction

The concept of maritime tourism at an international level includes the total of tourist, recreational and leisure activities which take place in the marine space of a country receiving and offering hospitality to tourists [1]. This paper attempts to obtain a precise evaluation of investment in mooring piers for cruise ships as a subset of maritime tourism

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development.

A key component for the sustainability of tourism in general and especially of cruise tourism in a regional area is the contribution of all members involved: contributing to decision making in the development process and during the life cycle of the tourism product is crucial in order to prolong the stage of regional development. In a tourist destination area, those involved in tourism are local residents, tourists, businesses that benefit directly or indirectly from tourism, the public sector (both national and local level) and social groups involved (environmental organizations, etc.). Yet, the sector is characterized by difficulties in the recording of statistical data for precise estimation of its real size and the exact number of tourists that select any form of maritime tourism remains unknown [22].

The cruise industry has experienced an increasing process of popularization, becoming a major part of the tourism sector and reaching a level of enormous significance world-wide as an economic factor and one of the most significant examples of globalization [2]. Many economies and ports all over the globe are turning their attention at cruise industry as potential source of development and economic growth. Therefore, issues concerning the impact of cruise tourism on local or national level constitute a significant field of research.

The rest of this paper is organized as follows: Section II provides an overview of the cruise shipping market on a world-wide scale, while section III restricts the geographical overview to Mediterranean area. Sections IV and V present the Greek cruise industry overview and the state of mooring facilities available. Section VI describes and expands the model used to evaluate the mooring dock impact on the port of Argostoli.

2 Cruise Shipping Market Overview

On a global level, the cruise industry is relatively a “new” industry. Since 1980 it is estimated that 100 million passengers have realized a cruise of at least two days duration. 61% of this total refers to passengers of the last decade and 37% refers to the last 5 years [1].

According to Peisley [3] (2005), the cruise industry is considered to be the most rapidly growing alternative tourism sector over the last two decades, with an annual rate of growth around 8% in the past 20 years, against traditional tourism (4%). The North American cruise industry alone generated 329,943 jobs that contributed a \$15.2 billion wage impact on the U.S. economy in 2010, a 5.1 percent increase in employment and a 7.0 percent rise in wages over 2009 [4]. The total cruise industry economic impact in the U.S. in 2010 was \$37.85 billion of gross output, a 7.8 percent increase over last year [5]. The total worldwide cruise industry for 2012 is estimated at \$33.5 billion with 20.3 million annualized passengers carried, a 5.6% increase over 2011 [6]. This phenomenal growth also created the need of more efficient managerial, organizational and planning structures to best the increasing competition and deal with the many changing factors in an also evolving market. Despite this growth, the outlook of future demand and the resilience of the industry to the recent economic crisis, the empirical research on the economic impact of cruise industry, remain thin [7].

The consumer profile targeted by cruise firms has changed over the years; Cruise is not a “luxury product” anymore, targeting high net worth customers. The “new” consumer profile targeted includes consumers of different economic status to be traveling together

in the same vessel [8].

Cruise industry has a significant economic impact which diffuses throughout an economy via an income multiplier effect [9]. The cruise is a multi-complex concept and combines a large part of the so called tourism chain: transport, catering, provisioning, tourism, entertainment and travel [23]. This business affects local, regional and national economy; The main economic benefits can be summarized in [10]:

- 1) Supplies (fuel, lubricants, food, vessel spare parts)
- 2) Port Services (mooring, pilot rights, watering)
- 3) Local and State Taxes
- 4) Passenger and Crew spending

Additional income categories may include passenger's baggage rights (transfer of baggage from the cruise ship to special places off board), liquid or solid slop collection and customs rights.

As far as the cruise market shares concerned, Caribbean stands at the top with a 50% share in tourist flow and Europe (Mediterranean) follows with an approximately 20%. The remaining 30% includes other destinations such as Alaska and Hawaii [11]. Despite the fact that Caribbean tops in the market share list, it is considered a mature cruise market, so the shipping companies seek for new destinations across Europe, targeting a 400 million potential customer base. Over 4.9 million European residents booked cruises in 2009, an 11,5% increase over 2008, representing 29% of all cruise passengers worldwide, compared with 22% ten years earlier [18]

A major change since the development of cruise industry in the 1970s is the average size of the ships; from 20.000gt to 220.000gt four decades later, and from 800 passengers to 5.500 passengers. This increase in size demanded a new bundle of services added to the cruise package which are promoted by the cruise companies, creating a "new destination" in addition to regular itineraries. Multimillion investments into new and bigger cruise ships, offer lower fares and shorter cruises, to benefit from economy of scale and onboard activities. Modern cruising provides pure elements of integrated maritime tourism, since beside the port-calls of tourist interest and the onboard activities it is also connected with a series of off-board recreational activities.

On global scale, the cruise industry is controlled by few and large corporations which hold 80% of the market share [6]. The volume of the cruise market is relatively small with important barriers both to entry and exit, associated with the extremely high cost of purchasing or selling a single cruise ship. Carnival Corporation is the undisputed leader in the sector, followed by Royal Caribbean Cruises and Star Cruises Group. Although the corporate administrative offices of major cruise companies are located in the United States and Europe, their clients also come from the same areas. As far as the registration of their fleet concerned, cruise ships are registered under Panama, Liberia, Bermuda and Bahamas flags in order to obtain a series of benefits allowing a better economic balance and competitiveness derived from more favorable standards concerning taxation, labor laws, safety and environmental regulations [12]. Apart from this fact, cruise companies contribute to the European economy: Over a period from 2010-2014, 31 cruise vessels have been scheduled for delivery for worldwide trading with capacity for 70.820 passengers. Of these 12 ships with 26.600 berths (38%) are primarily for the European source market, representing an investment of 5,1 billion euros [18]. This fact underlines the industry's commitment to the future of its business both in Europe and elsewhere in the world. Two of the largest cruise ships to date, Oasis and Allure of the Seas, owned by Royal Caribbean, were built in Finland.

3 Cruise in the Mediterranean Sea

The vast majority of cruise port calls in Europe are at the Mediterranean and Baltic ports. The top ten destination countries accounted for 86% of cruise passenger visits in 2009; the top four are in the Mediterranean [18].

The Mediterranean cruise market is part of a complex and dynamic environment. The structure of the market and the regulatory framework are major factors structuring this environment [13].

A major factor that affected key variables of Mediterranean Tourism was the geopolitical events in the Mediterranean basin: Crises in countries like Tunisia, Morocco, Libya and Egypt made the tourism organizations review their partnerships giving the opportunity for Greece to increase its arrivals.

The largest cruise ship management companies have defined a map of the Mediterranean cruise ports to central ports (circular cruise) such as Barcelona, Marseille, Rome and Istanbul. These companies have supported their decisions by creating ship terminal infrastructures.

An important element to be reported and plays an important role in the attendance of the cruise is the economic stimulation of local markets. This is directly dependent on the number of passengers disembarking at the port compared to the total passengers boarding the ship. For example, the port of Piraeus landed 30% of total embarked and similar figures are reported at the port of Santorini. Europe and the Mediterranean have a 7 million passenger market share on the global market [6]. This market is among the market segments whereas social and economic trend contribute to the presence of a market expansion potential [1].

4 Greece Cruise Industry

Greece is one of the most attractive destinations for development of maritime tourism activities. Out of the Greek population, 33% lives in coastal cities or villages not more than two kilometers from the coast [14]. Greece is ranked highly among the most popular cruise destinations in the Mediterranean, due to the country's geophysical characteristics and an extensive island network (227 inhabited islands). Most of cruise programs that include Greece as destination most frequently visit multiple Greek ports-Islands. The prime domestic port is Piraeus. Cruising in Greece is provided by two types of vessels [1]:

- Large Ships departing from Piraeus or foreign ports, performing tours and calling at national ports or those of neighboring countries and
- Smaller Ships departing from Greek Ports and call at in-between Greek ports during the voyage and performing short voyages to domestic destinations most of the time.

The duration of stay for the cruisers at the Greek ports ranges from 5-6h to 10h or more. The companies involved in cruising perform their programs from April to November while during the winter period realize cruises off Greek waters. In 2009, Greece was the leading destination with nearly 5 million cruise passengers with Santorini, Mykonos and Rhodes being the leading island calls [18].

4.1 Cabotage

Cabotage is the restriction for carriage of cargo or passengers within a country by a vessel registered in another country. This restriction is widely practiced, both by OECD (Organization for Economic Co-operation and Development) and non-OECD members, and is generally considered, but never demonstrated, to be crucial to ensure the maintenance of domestic transport capability, as well as acting as an inhibitor to foreign influence in domestic transport services. Therefore, liberalization of cabotage trades in OECD member countries has not progressed to the same extent as liberalization in international maritime trade [15].

In European Union the relevant legal framework for cabotage mainly consists of the EU Council Regulation 3577/1992. This EU regulation grants freedom to provide maritime transport services within a Member State (maritime cabotage) for Community ship owners operating ships registered in a Member State and flying the flag of that Member State, subject to these ships complying with all the conditions for carrying out cabotage within that Member State. Maritime cabotage was liberalized on 1 January 1993. In the case of France, Italy, Greece, Portugal and Spain mainland cabotage was gradually liberalized according to a specific timetable for each type of transport service. Mainland-island and inter-island cabotage for these countries was liberalized in 1999. This exemption was prolonged until 2004 for scheduled passenger and lighter services and services involving vessels of less than 650 gross tonnage in the case of Greece.

The national legal framework for cabotage consists mainly of the Law 3872/2012 as amended by the Law 4072/2012. Article 222 of the new Law (4072/2012), among others, fully liberalize the cruise services in Greece also for ships with flags outside the EU. In particular article 222 removes the requirements of Law 3872/201 in relation to signing a contract between the shipping company or the company operating the ship and the relevant Ministry in Greece. It is expected that the new national framework, in relation to cabotage removal, will bring the desired release in the cruise industry and has the potential to result in revenue of 1.5 billion dollars a year.

5 Mooring Services in Greece

The establishment and operation of port and land services for cruise ships and leisure crafts, constitute an essential infrastructure for the development of maritime tourism [1]. Today there are 19 marinas with 6661 docking berths in Greece that offer relevant services. Quite a few of these marinas have been awarded through the European Blue Flag Program. In recent years, the Greek National Tourist Organization and some of the 13 administrative regions of the country have started implementing a program for the creation of an integrated network of anchoring and related services for vessels along the Greek coasts. New modern marinas, hotel ports and moorings for the safe docking of vessels are already functioning or are in the process of starting their operations, in order to meet the needs of tourists arriving in Greece by sea in the most satisfactory way and under the safest conditions.

As far as the port dues concerned, commercial harbors are supervised by local Port Authorities. Ships that use the ports of the country are obliged to pay port dues, as specified by the regulations of the competent Ministry of Mercantile Marine. Docking dues are paid to the local Port Authorities (Port Fund) and are calculated on the basis of

craft category, total length of the craft in meters, registered total capacity in tons and duration of stay in the port. This cost is lower than the corresponding one of the Northwestern Mediterranean; the prices of the expensive Greek marinas are 20-40% lower than the prices of marinas in the above region and 30% higher than the Turkish ones [1].

6 Economic Evaluation of Argostoli Mooring Dock

The contribution of the cruise sector to national and local economy depends on the expenditure realized by “producers and consumers” of the cruise product [11]. In order to identify the channels that the output of the cruise business affects the economy, we should distinguish whether the port under study is a “stopover port” or a “home port” [20]. Argostoli is a stopover port.

According to Dwyer and Forsyth [10,21] (1998,2003), the economic impact is anticipated to diverge in local and national level; at local level, cruise activity can be of major importance, while, its contribution to GDP may be not be substantial.

As far as the Argostoli mooring dock concerned, the construction works began on December 19th, 2006; while the first cruise ships docked in summer 2009 although the project was officially delivered in March 31th, 2011.

The project was financed by 75% by European Funding and 25% by National funding. The original estimated project budget was 7.050.000€, while the final expenditure was 5.638.907 Euros of which 4.229.180€ derived by EU Funds and 1.409.727 by National funds.

6.1 Introduction to DCF Model

Discounted Cash Flow (DCF) analysis is one of the most fundamental, commonly used valuation methodologies. It is being developed and supported in academia and widely used in applied business practices. DCF analysis uses future free cash flow projections and discounts them (most often using the weighted average cost of capital - WACC) to arrive at a present value, which is used to evaluate the potential for investment. If the value arrived at through DCF analysis is higher than the current cost of the investment, this investment is treated as advantageous. In the alternative approach, all present and future incoming and outgoing flows are calculated and valued in present time. The outcome, Net Present Value (NPV) must be above zero in order to characterize an investment as beneficial. The latter approach has been used in this study and it is given from the following formula:

$$NPV = \sum_{t=0}^n \frac{NCF_t}{(1 + WACC)^t}$$

Where:

NPV is the Net Present Value,

NCF is the present and projected Net Cash Flow for each season, *t* is the season and takes values from 0 (present) to *n* (where *n* determines the period of evaluation) and

WACC stands for Weighted Average Cost of Capital and used as discount rate.

6.2 Variables Based on Actual Data

The input data for the DCF model used in this study were provided by the local offices of Ionian Islands Region and local port authorities, since there is no single authority or official database to focus specifically on the cruise sector.

The main key input variables for our model are the cruise ship's arrivals and the number of passengers; 90.808 passengers on board 61 ships for 2009, 82.893 passengers on board 64 ships for 2010 and 87.171 passengers onboard 56 ships for 2011. Local authorities also provided the expected number of cruise ships for 2012 season as stated by shipping companies: 100 cruise ships are expected, and around 190.00 passengers on board. This suggests a remarkable 78% increase on arrivals over 2011.

The second input variable introduced into the model is the yearly average operational costs and according to Local Port Authority (Hellenic Coast Guard) is estimated as 33.000€ per year, including security services (approx. 8000€), cleaning services (2000€), lighting and water supply charges (11.000€), equipment maintenance (2.000€) and brochure prints for passengers visiting the city (10.000€).

The next input variable is relevant to tax revenues divided into two main categories: Taxes on docking and taxes per cruise passenger onboard. These taxes depend on the size of the vessels (measured in gross tonnage (gt)). According to local authorities the average tax revenue is estimated around 600€ per ship mooring in dock. If a ship moors outside the dock and passengers disembark at port using the cruise ship's motorboats, no tax is paid. The second type of tax is relevant to the number of passenger and is paid in all cases; 0,30€ per passenger whether the ship uses the dock or not. The 95% of this amount is paid to Port's Management Authority and 5% to Coast Guard.

The last input variable is related to evaluation period. Taking into account the lifetimes of the components consist the mooring dock infrastructure we choose a period of twenty (20) years for the economic evaluation. Cash flows are estimated using actual data and averages for years 2009, 2010, 2011 based on the values of input variables contained in this section, while for 2013-2028 periods the projections are based on the values of the variables provided in the following section.

6.3 Variables Based on Projections – Assumptions

Weighted Average Cost of Capital (WACC) is the discount rate which cash flows are discounted to obtain the NPV estimation.

Projections in Passengers per Cruise (PpC) per season are calculated based on the average actual data of last 4 years. As regards the expected number of cruise ship arrivals per season, we expect that the recent approved national legal framework in relation to cabotage will increase the number of cruise ships arrived in Kefalonia compared to the relevant actual number of the last three years. Therefore as starting point for the Average Cruise Ships (ACS) parameter season, the number of cruise ships expected to arrive in within 2012 season, is taken.

The yearly growth in operational costs of the mooring dock, used to estimate the yearly cash flows, is determined at 0,50%. This percentage represents the expected annual increase of operational expenditures during the period of evaluation, although the current economic crisis in Greece may results to negative value for this parameter.

Two basic business model approaches are examined in relation to the NPV estimation. The first one evaluates the investment taking into account the benefits for the Local

Economy and the State (Local&State hereafter) while the second approach examines the benefits only for the State. Accordingly the two basic formulas used to calculate cash flows for each season from 2009 to 2029:

$$CF_{State\&Local} = (DSR + ISR) - OPEX - TI - AI$$

$$CF_{State} = DSR - OPEX - TI_{State} - AI$$

Where:

CF is the yearly Cash Flow,

DSR is the Direct State Revenues,

ISR is Indirect State Revenues,

OPEX stands for Operational Expenses,

TI is Total Investment funding by the State and the EU (the initial implementation cost spent in year 2009 only),

TIState is the part of Total Investment funding by the State and

AI represents the Additional Investments required for improvements, during the duration of this evaluation. We have assumed that the AI value for each season is the 5% of the relevant OPEX.

The Direct State Revenues calculations are based on the following formula:

$$DSR = [ACS * MS * TDR] + [TpP * PpC] + TP * IP \quad (1)$$

Where:

ACS is the Average Cruise Ships per season as defined above,

MS is the percentage of Ships using the Mooring dock,

TDR are Taxes for Dock Revenue per cruise ship,

TpP are Taxes per passenger

TP are taxes as percentage to profit per destination passenger for local economy and

IP are Indirect Profit for local economy, after taxes, calculated by the following formula:

$$IP = ACS * APpP * DP * PpC$$

Where :

DP (Destination Passengers) is the percentage of cruise passengers on board which disembarked in the port and

APpP is the Average Profit per Passenger and is estimated as a percentage of the direct spending of DP to the local economy [17].

6.4 Examined Scenarios

We examine four (4) groups of scenarios in relation to State and Local & State NPV estimations.

In the first group of scenarios we examine the impact of selected parameters on NPV (both for State and Local & State). In order to determine the most crucial parameters a sensitivity analysis is performed. In each scenario only one parameter varies while the others remain constant: The parameters altered are: ACS (Average number of Cruise Ships), APpP (Average Profit per Passenger), WACC and DP (Destination Passengers Percentage).

The second group of scenarios demonstrates the benefits for Local Economy and State in four (4) year step. In this group of scenarios, NPV is calculated also in the case that no mooring dock installed and the percentage of passengers disembarking the ship is lower compared to the case of mooring dock installed.

The third group of scenarios provides a multiple parameters variation organized into the following scenarios: Optimistic, Pessimistic and Best, with simultaneously variations in yearly growth of arrivals, APpP and DP.

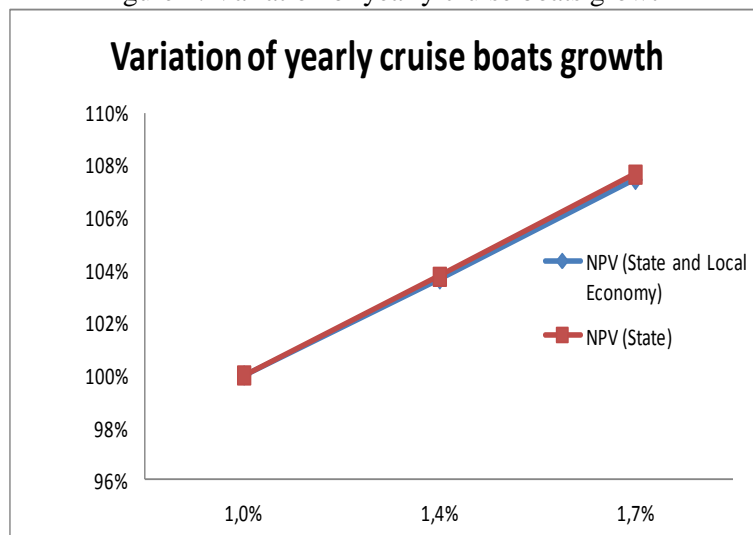
In the last group of scenarios, we examine a potential substitution query through an intersection of NPV curves with and without the mooring dock presence in the port.

In each of the following graphs the vertical axis shows the variation of NPV in nominal basis while horizontal axis shows the variation of examined parameter. In each graph the NPV actual values have been normalized to the NPV's real value of the first value of the examined parameter. It should be mentioned here that our aim is to reveal the sensitivity of each examined parameter to the NPV and not to determine the actual values of the NPVs.

6.4.1 Group A – Determination of the most Crucial Parameters

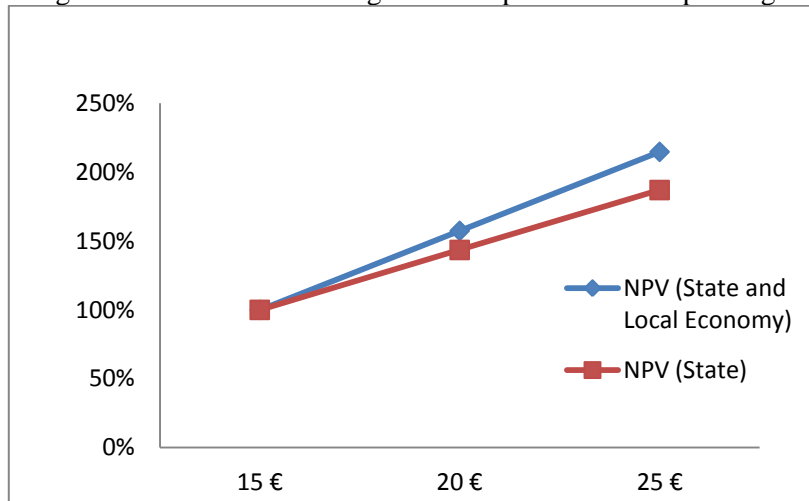
In the first scenario, the yearly growth of ship arrivals varies from 1,0% to 1,7%. Both the NPV for State & Local and the NPV for State economy change proportionally suggesting an increase of around 7%, as shown in figure 1. The initial (the value corresponds to 1% growth) NPV for State & Local economy is estimated around 10,9 millions €:

Figure 1: Variation of yearly cruise boats growth



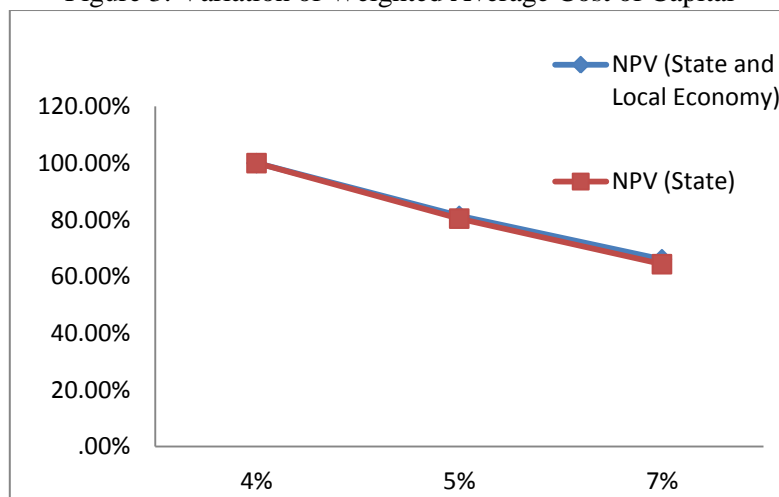
In the second scenario the average profit per destination passenger varies from 15€ to 20 and finally, 25€. The range of variation is based on the estimated passenger spending of 97,26 USD (74,50 EUR) [17] per port of call. The result is a significant growth in both NPVs for State & Local Economy (+114,75%) and State only (+87,01%). In this case NPV for Local & State, ranges from 100% of the original NPV estimation to almost 210% and NPV for State from 100% to 180%, as shown in Figure 2:

Figure 2: Variation of Average revenue per destination passenger



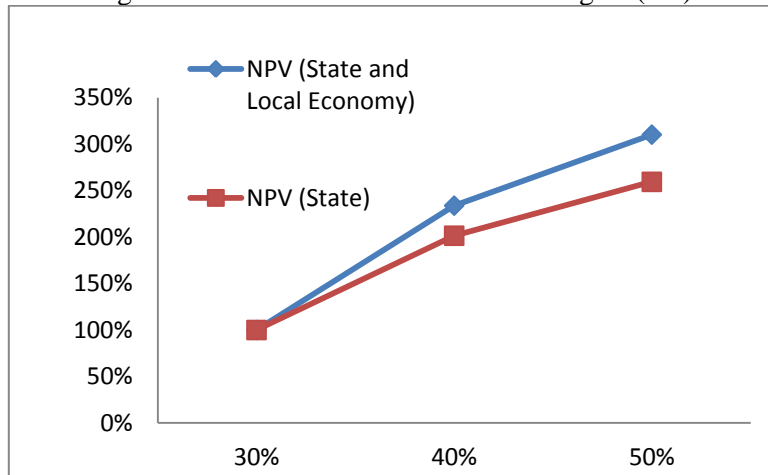
The third scenario examines the impact of WACC variation to NPVs. In both business model scenarios (State, Local&State), no weighted average can be estimated due to absence of equity cost. Cost of debt is the only participant to the average. Therefore in our model three values of WACC are used, ranging from 4% to 7%. This range of WACC values excludes the risk premium generated by Greece's probability of default, IMF Funding and other determinants. As a discount rate, an increase in value results lower NPVs; in particular an increase from 4 to 7% results in a decrease of around 34% to NPV (approximately 70% of the originally estimated NPV) (Local & State) and of 36% to State NPV as displayed in Figure 3:

Figure 3: Variation of Weighted Average Cost of Capital



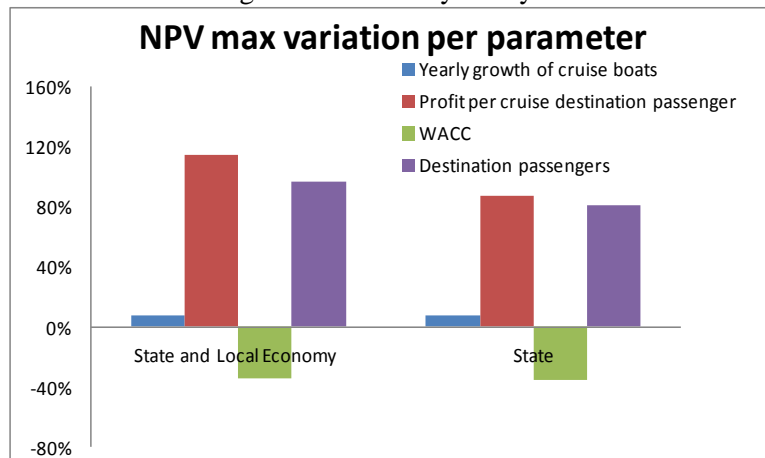
The last scenario examines the impact of destination passengers' percentage variation in NPV outcomes. An increase from 30% to 50% in the value of DP results an increase of 97,22% in NPV (Local & State) and 80,84% in NPV(State), more than 300% of the initial NPV value. (Figure 4):

Figure 4: Variation of Destination Passengers (DP)



As shown in the previous figures the NPV is highly sensitive to Destination Passengers value and the value of the Average Profit per cruise destination Passenger. In the following figure are illustrated the results of a sensitivity analysis performed for the scenarios presented in this section. (Figure 5):

Figure 5: Sensitivity Analysis



6.4.2 Group B – Benefits for Local Economy and State

In this group of scenarios we present the revenues and profits for the period of the evaluation with 4 years step.

Three NPVs are calculated in this case. The first one is with the mooring dock installed (indicated “with mooring” in the relevant figure). Two additional NPV are examined on the assumption that no mooring dock exists; the first assumes that with no mooring dock in the port, only 55% of the number of cruise ships will arrived in the port compared to ones with the mooring dock installed. The second recalculates the NPV using 65% percentage in the number of cruise ships. In both scenarios is assumed that the percentage of destination passengers will be 20% lower than in the case with the mooring dock installed.

The Direct State Revenues, as defined in a previous section of this paper, is estimated around 762.096€ for 2013-2016 period reaching 858.505€ for 2025-2028 period. The used values for the model parameters in the case of the Scenario with mooring were: ACS 1%, MP 95%, TDR 600€, TpP =0,30€, PpC 1605 (actual data until 2012 and 1605 for years after 2012), TP 20%, AppP 20€ and DPt 30%.

In the second and third scenario (55% of mooring and 65% of mooring) has been assumed that only the 55% or 65% of the cruise ships arrived in the scenario with mooring will arrive in the port during each season respectively. In addition in both scenarios has been assumed that the average number of destination passenger will be 20% lower compared to the scenario with mooring. In the no mooring installed scenarios, no Operational Expenses exist, nor Additional Investment for each year. Our results are displayed in Figures 6 and 7:

Figure 6: Direct State Revenues (€)

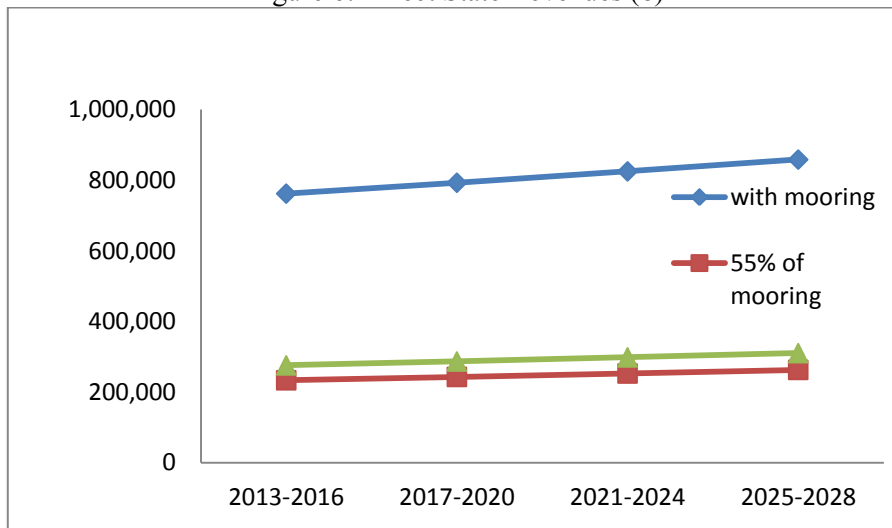
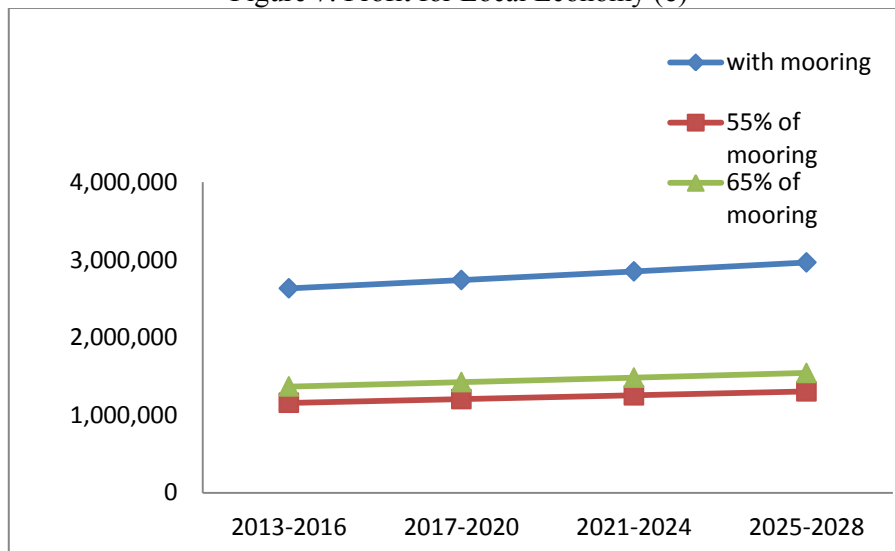


Figure 7: Profit for Local Economy (€)



6.4.3 – Group C: Best, Optimistic and Pessimistic (BOP) scenarios analysis

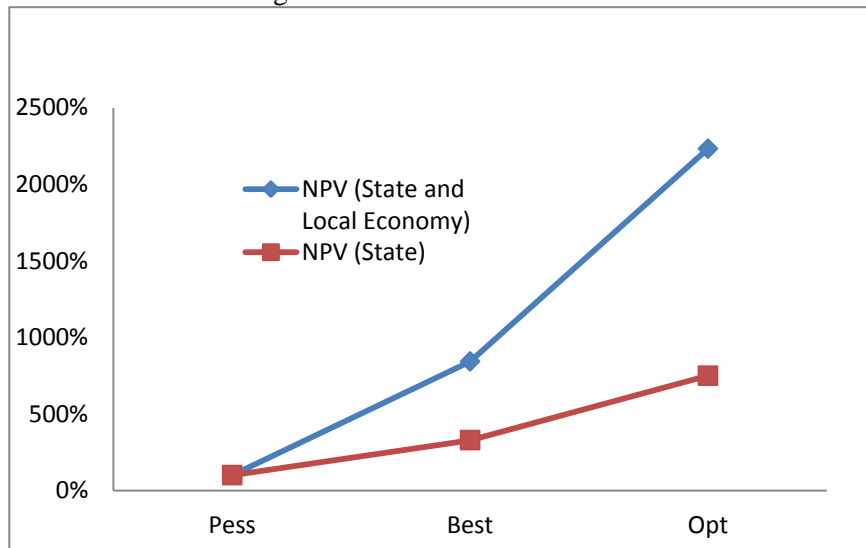
In this group of scenarios we use the same fundamental techniques as sensitivity analysis. The method attempts to take into consideration how certain variables of our model may be interrelated. Instead of altering a single variable independently and observing the change in NPV, we consider a scenario under which a number of related variables may change, resulting in a collective change in NPV.

In the best (or actual) case scenario we assume there is no yearly growth in ship arrivals, average profit per passenger (APpP) equals to 15€ and destination passengers (DP) are 30% of on board passengers. This modifications result a NPV 800% larger than the initaly estimated for Local & 250% for State economy only. In the optimistic case scenario we assume that annual growth in ship arrivals is +1%, average profit per passenger (APpP) equals to 20€ and destination passengers (DP) are 40% of onboard passengers. This modifications result a NPV approximately more than 2250% compared to the initially estimated NPV for Local & State economy and approximately 600% for State economy only.

Finally in the worst case scenario, we calculate a decrease of 1% in ship arrivals is, an average profit per passenger (APpP) equal to 10€ and destination passengers (DP) as 25% of onboard passengers. This modifications result a net present value slightly larger than the initially estimated NPV for Local & State economy and for State economy only. In all cases NPV estimations remain larger than the NPV calculated without use of alternative scenarios.

The constant variables were the average number of passengers on board (1605), WACC value (4%), taxes as percentage to profit per destination passenger TPlocal calculated at 20%, OPEX yearly growth (0,5%) and Additional Investments (AI) at 5% of OPEX with 1% yearly growth rate. The above NPV results are provided in Figure 8:

Figure 8: BOP Scenarios Results



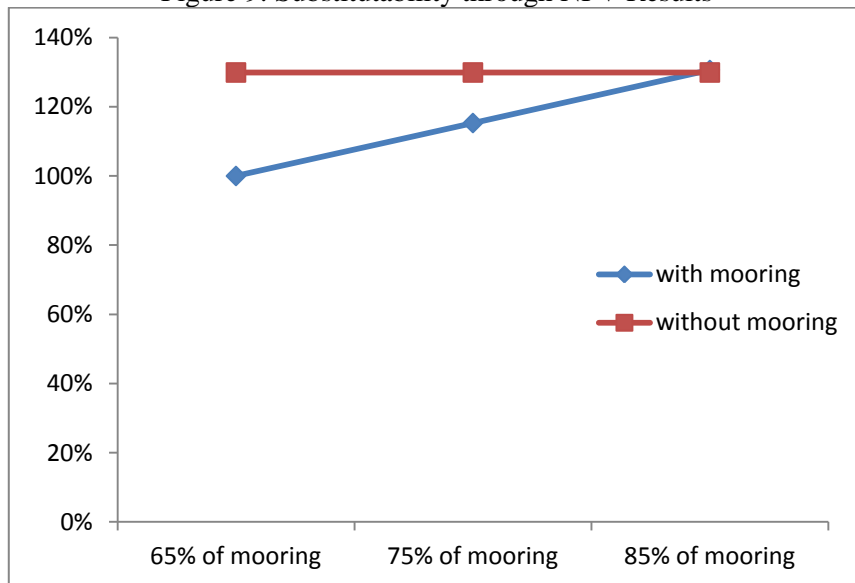
In all three scenarios significant gains are observed for Local & State economy; even in the worst case scenarios NPV remains constantly positive.

6.4.4 Group D: Economic Substitutability of the mooring dock

In this group of scenarios we are trying to explore under which conditions the mooring dock is “unnecessary” in terms of economic substitutability, using the following assumptions: in the scenario of no mooring dock is installed we assume that the port will be less attractive for cruise ships and therefore the number of ships arriving at port will be a percentage of the ships arriving with the dock installed. Several percentages are used to determine the intersection between NPV for Local and NPV for Local & State economy

At first we calculate the NPV of the mooring dock using the following data and assumptions: yearly growth of +1% in ship arrivals, an average profit per passenger (APpP) equal to 20€, destination passengers (DP) as 20% of on board passengers. Average number of cruise passengers defined as 1605. This set of input parameters result a NPV of 1,305.million € for State economy. The following step is to calculate the NPV(State) without the mooring dock; the same assumptions are made compared to the previous case except Average Cruise Ships per year and the DP: without the mooring dock the ACS input is reduced at 65, 75, 85% percentage of ACS with the dock installed, while the DP is decreased by 20% compared to the case of mooring installation. As depicted in the following figure the 85% percentage scenario, the NPV for state economy. is 130% compared to the initially estimated NPV as shown in the Figure 9:

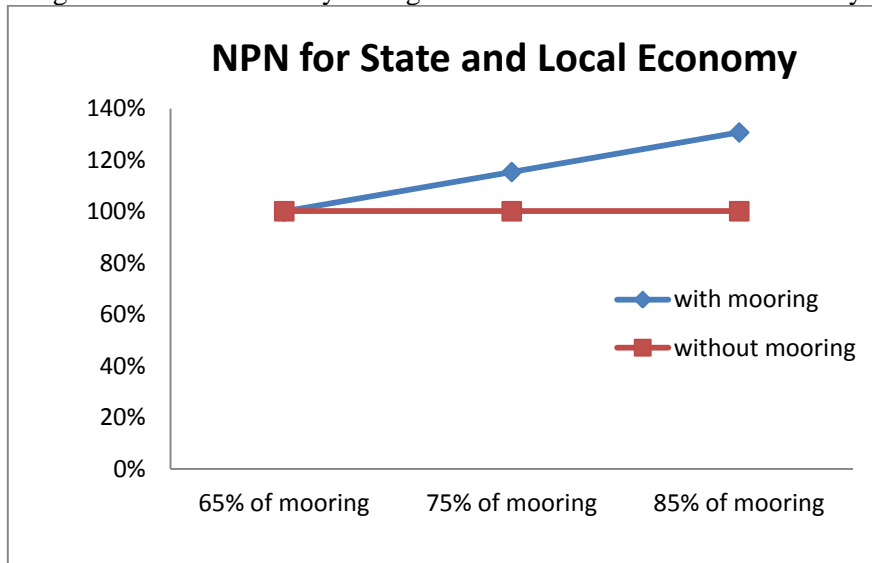
Figure 9: Substitutability through NPV Results



In other words we conclude that the mooring dock could be assumed as unnecessary for the State Economy only if the average cruise ship number (ACS) is 85% or higher than the number achieved with the mooring dock.

The relevant percentage in the case of Local & State NPV is 65% of the average number of cruise ship arrivals using the same assumptions and input data with the previous case. (Figure 10):

Figure 10: Substitutability through NPVs for Local and State Economy



7 Conclusion

The cruise industry has the potential to provide multiple economic benefits to local economies. However, accommodation of large cruise ships into port requires a great deal of initial capital investment in infrastructure as well as maintenance costs.

The primary aim of this analysis was to investigate the way and the degree in which the cruise activity can contribute to the national economy and even more to the local economy.

The impact of mooring dock in Argostoli was examined and the main conclusion is that it provides substantial benefits for local economies and state revenues. In all scenarios and cases examined the Net Present Value of the investment remained constantly positive both on Local and State & Local business model. This benefit is not limited to State revenues only: it creates a dynamic development potential with multiple externalities which contribute significantly although they cannot easily be measured and aggregated into a single evaluation techno-economic model. Considering all the available data, the mooring dock gives a competitive tourist advantage in Kefalonia; Cruise ship industry has the ability to establish effective relations with the land based tourism industry and local communities. These benefits remain at the discretion of local and national administrations to exploit the possibilities unfold. Apart from the economic impacts that a national and a local economy profits, cruise activity creates social and environmental impacts as well, such as modifications of the natural environment, certain types of pollution [11]. Although, data concerning the environmental impacts is poor and limited to estimations [19].

As cruise ships continue to grow larger and increase in numbers, further investment may be required. A future work could re-evaluate the potential impacts and investigate whether a second mooring dock in Kefalonia could be a reasonable and profitable investment.

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