Victoria's Cruise Ship Industry: Economic Benefits and their Environmental Impacts

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Introduction

The British Columbia cruise ship industry is thought of as an integral part of the economy. 1.2 of the 1.8 billion dollars contributed by the cruise industry to the Canadian GDP is centered in this Pacific bordered province[1]. Its positive economic impact is felt all over the ocean surrounded mainland and island. Positive economic impacts from cruise ships are always at the forefront of political and fiscal support of the industry. The majority of economic data spewed out by various government organizations highlight revenues, and costs, which are easily determined using ordinary private and public resources. Though these assessments encompass the majority of plain to see accounting and economic data, most fail to assess the true scope of its provincial impact.

What most of these analyses neglect to include is that cruise ships play a major part in the deterioration of the provinces oceanic environment through high outputs of oily bilge water, raw waste, sewage, and others such photo chemicals. Do the benefits of this industry outweigh its costs? This is a question that cannot be answered simply monetarily. This report will give an informative analysis of both benefits and costs of the cruise ship industry, raising key points for each side of the debate.

Several statistical studies have been done to monitor the cruise ship industry in Victoria. In 2003, The Victoria AM association conducted a cruise ship survey which displays a data analysis of cruise ships coming into Victoria. This data, along with several other studies, provides the necessary information to analyze the benefits and costs of the cruise

[1] http://www2.news.gov.bc.ca/nrm_news_releases/2004SBED0045-000905.htm, Ministry of Small Business and Economic Development

ship industry to the Victoria Economy. However, much of the information can be interpreted as a benefit or cost, depending on how it is being viewed. From an economic point of view, the cruise industry has local and provincial benefits stemming from the increase in tourism. From an environmental point of view, the cruise ship industry is detrimental to several environmental aspects world wide.

Ogden Point is located in a residential neighbourhood near downtown Victoria. It encompasses 34.5 hectares of land, including the breakwater. To accommodate the large number of cruise ships coming into Ogden Point, improvements have been made to certain piers. Pier B was upgraded at a cost of three million dollars, and a new Canada Customs and Immigration building was put into place to accommodate the large number of passengers arriving. On average, 500 workers will be employed, while ships are docking in Victoria.[2]

Since 2001, Victoria has seen a three hundred percent increase in cruise ships visiting Victoria. One hundred and forty four cruise ships now visit Victoria in comparison to only seventy seven in 2001[3]. This is largely due to United States regulations which state that all cruise ships departing from the United States must stop in a foreign port, resulting in a vast majority of cruise ships docking at Victoria's Ogden point in passage from Seattle to Alaska[4]. In 2003, eighty visits were made by cruise ships on this route, as well as 25 vessels out of San Francisco. From September 2002 to September 2003, the

[2] Cruise Ship Survey, 2003. Victoria AM Association. November 12, 2003. (1)
[3] Cruise Ship Survey, 2003. Victoria AM Association. November 12, 2003. (4)
[4] www.victoriatravelguide.com/victoria-canada/cruise-ships-victoria.html. Cruise Ships coming in Record numbers. April 16, 2004.

number of cruise ship passengers increased from 116,000 to 188,978, resulting in a 62.6 percent increase. Passenger numbers are estimated at 250,000 for the current year.[5] The activities undertaken by all these visitors include shopping, dining out, cultural activities, water-based recreation, tourist attractions and land-based activities. On average each person spent 88$ in doing these activities, resulting in a total expenditure per cruise ship of 136,688 dollars, and a total expenditure of 16,129,184 dollars in 2003[6]. This information can seem entirely beneficial, as it expresses monetary value, however a more in depth analysis will now be shown to express both the costs and benefits of the cruise ship industry.

Costs of the Cruise Ship Industry

Cruise ships are known to be a relaxing and luxurious excursion, with lots of entertainment and leisure activities. The environmental beauty that is seen while on a cruise ship, and the vast ocean on which the cruise ship operates, keeps the cruise ship industry alive. Without either of these two environmental aspects, cruise ships could not operate. However, cruise ships are becoming one of the largest polluters of marine life, as they create millions of tons of sewage per year. About 77% of all ship pollution is from cruise ships. Of the two billion tons of waste dumped into the ocean per year, cruise ships are responsible for twenty-four percent[7]. That is almost one quarter! Being that a cruise ship functions like a small city, it will pollute like a small city as well. In

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[5] Cruise Ship Survey, 2003. Victoria AM Association. November 12, 2003. (5)
[6] Cruise Ship Survey, 2003. Victoria AM Association. November 12, 2003. (15-16)
Mathematics: 88*1553 (average # of cruise ship passengers)=136688. This gives total expenditure per cruise ship. As an industry it is 118(number of cruise ships)*136688= 16,129,184
[7] www.acnatsci.org/education/kye/hi/kye52002.html#sec3. The Academy of Natural Sciences

one week's time a single cruise ships empties 210,000 gallons of sewage (human waste), 1,000,000 gallons of grey water (water from sinks, bathing and washing), 8 tons of solid waste (paper, plastic, cardboard, food waste) and 25,000 gallons of oily bilge water[8]. Some hazardous wastes such as photo chemicals and used paint are produced also. These are only the water pollutants created by cruise ships. There are many air pollutants as well.

It is estimated that there are over 370 cruise ships on the ocean, carrying over 12 million people[9]! This large increase in cruise ships is partly attributed to the attacks of September 11. Many people now use cruise ships as a method of vacation in order to avoid flying. Although it may be a challenging process for such large ships to accommodate so many people without polluting anything, regulations need to be made in order to prevent further destruction of the environmental amenities that are being damaged.

In Victoria, much of the discharge is unmonitored and unregulated. However, in the last five years, cruise ships in the United States have accumulated millions of dollars in environmental fines due to pollution. From 1992-2003 several fines have been recorded. For example, Royal Caribbean Cruise Lines were fined 18 million dollars for oil discharge, discharge of hazardous waste, and falsifying records. As well, in 2002, Carnival Cruise Lines was fined 18 million dollars for oil discharges and then, in 2003, they were fined two hundred thousand dollars for not complying with Ballast Water

[8] http://www.stopcruisepollution.com/. Oceana Urges passage of the clean cruise ship act of 2004.
[9] http://dominionpaper.ca/environment/2004/07/20/cruise_con.html. The Dominion: Canada's Grassroot National Newspaper. July 20, 2004.

Laws[10]. In Canada there have been no fines handed out, due to lack of enforcement of the laws. Unlike America, Canada has no standards for grey water or sewage waste, and America's standards for solid wastes are far stronger then Canada's. Due to strong enforcement of environmental regulation in the United States, several cruise ships coming from the United States cannot dump wastes in American ports, so when they stop in Victoria, much of their sewage is dumped in Canadian waters. In the last year the Norwegian Sun dumped forty tons of sewage into the Strait of Juan de Fuca[11]. If the Canadian government does not bring marine laws into line with the American laws, our waters will soon become a permanent dumping ground for cruise ships traveling from the United States. Up to this point, the Canadian government has refused to consider cruise ship legislation. Marine pollution has increased rapidly due to the ever-increasing amount of cruise ships coming into Victoria, and this pollution will only continue to increase with the expanding cruise ship industry. As stated, in the last 3 years Victoria has seen a three hundred percent increase in cruise ship traffic[12]. One of the major reasons the government turns a blind eye to regulating the industry is because cruise ship tourism helps Victoria's economy. However, where is it all going to stop? Will it happen before we are faced with some environmental disaster?

There are several environmental impacts for each waste dispersed by a cruise ship. During the high season for cruise ships, 9.5 million liters of waste will be dumped into the ocean. Sewage causes health hazards for water sports such as diving, swimming and

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[10] www.cruisejunkie.com

[11] http://www.creativeresistance.ca/awareness01/2002-nov25-poison-evidence-points-to-illegal-dumping-ben-parfitt-georgia-straight.htm. Poison Evidence points to illegal dumping.

[12] Ripple Effects: The need to Assess the Impacts of Cruise Ships in Victoria B.C. Wallace, Bruce & Gorecki, Karen. VIPIRG 2003. Victoria. (6-9)

surfing, all of which are very popular in Victoria. Damage to the shellfish harvest has been caused by sewage and pollution[13].

In addition, many people aboard cruise ships will dump plastics, razors and other hazardous material into the ocean with creates debris that birds and other sea mammals will eat or become entangled in, which leads to their death. Up to 50,000 baby seals have died in one year from entanglement[14].

Grey water includes petroleum hydrocarbons, greases, metals, and bacteria. The nitrogen and phosphorus from grey water can reduce the oxygen level in the ocean water which is necessary to support marine life. Currently there are no Canadian laws prohibiting this. Oily bilge comes from water, fuel, on-board spills and from engines. This oily bilge causes immense damage to the sea life in the ocean. Some of the effects on marine life are respiratory problems, reproductive failure and pneumonia. In one week as much as one hundred forty-one gallons of photo chemicals, thirteen gallons of used paint, five pounds of batteries and ten pounds of fluorescent lights are deposited into the ocean. Chlorinade and hydrocarbon are absorbed by phytoplankton and zooplankton which are consumed by fish. These fish are then consumed by humans. This consumption is now at the point of being extremely dangerous. The dioxides in these hazardous wastes can create birth defects in sea life as well as human life, as they stay absorbed in fatty acids for years[15].

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[13] www.cruisejunkie.com

[14] Cruise Ships: Bluewater's newest campaingn. Long, Russell. Vo. 16, No 2. Summer 2001.

[15] http://plaza.kwantlen.ca/sites/enviprot.nsf/7a5802a97b61fe15882568d3006e086f/3a05b4dfaa74ce5088256d7300694c42/$FILE/Stop%20Cruise%20Ship%20Pollution.pdf. Stop Cruise Ship Pollution!

It should now be a massive understatement that sea life is suffering at the expense of cruise ships. In 2001, the Queen Elizabeth II cruise ship ran over a fin whale, 60 feet in length, on its journey to Lisbon, Portugal. In 1999, the cruise ship, Galaxy, impaled a fin whale in its bow, as it cruised into the Vancouver port. As illustrated, cruise ships endanger the lives of several whales. Whales that are especially at risk are right whales, Pacific grey whales, fin whales and humpback whales[16].

Polluting emissions from the cruise ship industry are increasing rapidly. Diesel exhaust from cruise ships surpasses the diesel pollution created by one thousand of the dirtiest trucks per day. Nitrogen dioxide contributes to smog in the air and amplifies algae growth. Sulfur, carbon dioxide, carbon monoxide, and other emissions contribute to acid rain, global climate change and respiratory diseases. Organic pollutants such as dioxins and mercury are also released from cruise ship incinerators[17]. Links from studies have found that sulphur dioxide and nitrogen dioxide impact visibility.

In Canada there is limited regulation on air pollution. The regulation in Canada is the Air Pollution Regulations (C.R.C, c. 1404). A comparative chart is used to measure the density of smoke and smog being polluted[18]. However, little attention is paid to this regulation. Since Ogden Point is located very close to the James Bay community (some houses are around 300 meters away from where the cruise ships dock), this can have a definite impact on Victoria's air quality.

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[16] Watch out for Whales. Shore, Teri. Earth Island Journal. Vol 16, No. 3. Autunm 2001.

[17] http://plaza.kwantlen.ca/sites/enviprot.nsf/7a5802a97b61fe15882568d3006e086f/3a05b4dfaa74ce5088256d7300694c42/$FILE/Stop%20Cruise%20Ship%20Pollution.pdf. Stop Cruise Ship Pollution!

[18] http://www.canlii.org/ca/regu/tocp.html. Canada Legal Information Institute.

Several studies have been conducted in order to generate ways in which to reduce the polluting air emissions into the environment. Shore side power has been the main conclusion, because it is thought to be the most cost-effective, while at the same time reducing the diesel emissions being released into the air. As long as the cruise ships' annual powered consumption does not exceed 1,500,000 kW-hrs, it is cost and power efficient[19]. In order to implement this, several determinates must be identified. This means being able to find out the amount of available power capacity within the Victoria region, knowing for certain, the actual number of cruise ships coming into the port. As well, you would have to know all the characteristics of the ship, would have to be able to estimate the polluting emissions (diesel, nitrogen and sulfur oxides), estimate the infrastructure costs to provide shore side power and identify any safety issues associated with shore side power.

In order to reach a conclusion as to whether or not shore side power is a feasible alternative for cruise ships, Juneau, Alaska can be used as a example, being they are the first port to have implemented this. Due to many air emission violations in Juneau Alaska, Princess Cruise Lines began their shore side hook-up in 2000. When the cruise ship enters the port they turn off one engine for the first 30 minutes that the ship is docked, and attach an electric line. The other engine is turned off for approximately eleven hours while the ship is docked, and turned back on 30 minutes before departure. To apply shore side power, dockside and shipboard equipment, it will cost approximately two million dollars, as well as three thousand dollars a day for electric power. All of this must be paid by the cruise company. A cruise ship will use around six megawatts of

[19] Memorandum. Moyer, Monique. May 5, 2004

power per hour, compared to a community of Juneau, which uses 45 megawatts per hour[20].

On top of it all, they are still investigating whether shore power hook up actually does reduce emissions. As far as the noise pollution goes, the residents in James Bay would most likely be able to sleep better at night with shore side power as cruise ship engines create a great deal of noise. However, others have argued that cruise ships will put out just as many pollutants into the environment when starting the engine.

Hooking up to shore power and being able to shut off our engines actually does reduce the visible emissions coming from the cruise ship smoke stacks. One could say that with fewer air emissions, there would be fewer particles in the air which could get "rinsed" into the ocean by rain. However, in terms of finances, it is actually estimated that the cost of hooking up to electrical shore side power is more costly than sitting at the dock with generators operating. Cruise ship companies such as Princess Cruise Lines feel that shore power hook up is the proper route to take in order to minimize those visible emissions and show that they are concerned with the amount of pollutants being released[21].

Cruise ships coming into Victoria are looked at as a negative externality from an environmental point of view. The activity of the cruise ships directly affects the welfare of the surrounding communities. For the cruise ship industry to operate efficiently, cruise ships should pay a price that reflects the waters value and the local communities value.

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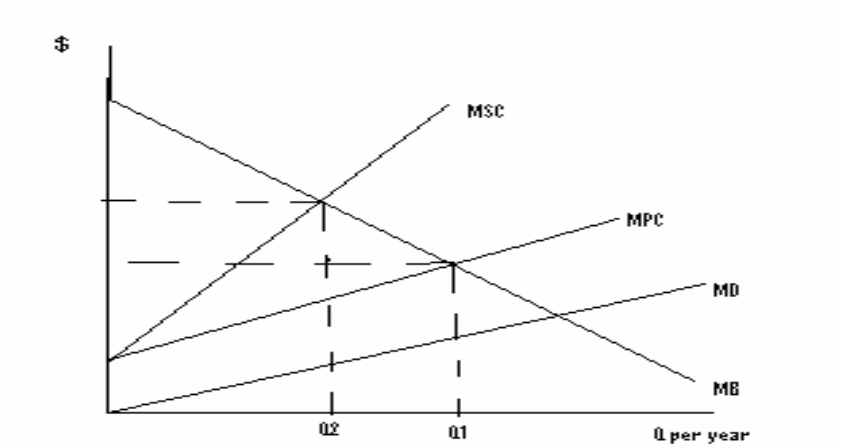
[20] Cruise ships to use local power in port. Fry, Eric. The Juneau Empire. September 28, 2000

[21] Cruise ships to use local power in port. Fry, Eric. The Juneau Empire. September 28, 2000

However, cruise ships pay a value of zero for this, consequently using the amenities inefficiently. A graph can illustrate this more clearly. On the horizontal axis, output by the cruise ships is measured, and the vertical axis measures dollars. The curve labeled MB reflects the marginal benefit to the cruise ship industry at each level of output. Marginal Private Cost, MPC, reflects the payments made by the cruise ship industry for the productive inputs. As a by-product of its activities, the cruise ship industry produces pollution that makes the neighboring communities worse off. As the number of cruise ships increase, so is the amount of pollution being created. The marginal demand curve represents the demand inflicted on society by the cruise ship industry. This shows that society is becoming worse off at an increasing rate. Since cruise ships are concerned with maximizing profit, they will produce each unit of output where marginal benefit for cruise ships exceeds the marginal cost to cruise ships. In the graph, this is where all levels of output for MB exceeds MPC, but does not produce where MPC exceeds MB. Thus cruise ships produce output where MPC intersects MB, at output Q1. From society's point of view, production should occur as long as the marginal benefit to society exceeds the marginal cost to society. Marginal social cost is MPC plus MD, and the socially optimal level is shown at Q2[22].

[22] Public Finance in Canada Second Canadian Edition. Rosen, Harvey S. Dahlby, Bev. Smith, Roger. Boothe, Paul. 2003 McGraw-Hill Ryerson Limited. Toronto. (73)

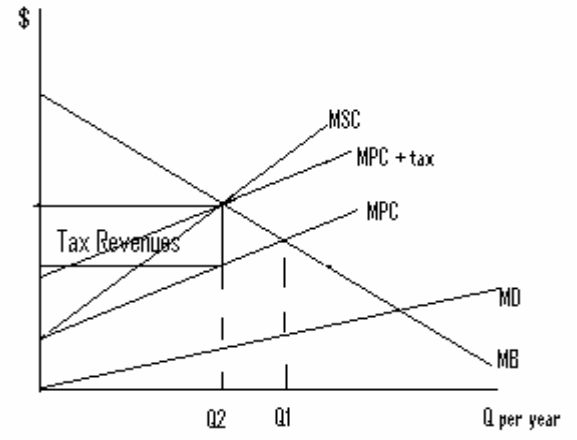


If output were to be reduced to Q2, the socially optimal level, net gain would equal the difference between the two quantities. Yet, zero pollution is not socially desirable either. Finding the right amount of pollution requires the trade off between the costs and benefits, which will most likely be some positive level of pollution. If pollution was set at zero, this would require banning production, which is an inefficient solution.

If our environmental economy keeps on being degraded by cruise ships polluting the air and waters, what will happen to our future generations? Although it may be thought that cruise ships enhance economic activity, is it really worth while if they can only enhance this activity for a certain period of time before the environment is ruined? Sustainable development states that economic growth must occur at a rate which is compatible with the environment. Natural resources are a vital part in the production of cruise ships, and the depletion of the environment would lead to a depletion in the cruise ship industry. Furthermore, there are no substitutes for the natural resources that cruise ships use. To have strong sustainable development, the emphasis should be on future generations, and

thus the environment needs to be preserved[23]. If the government is not willing to somehow intervene to help regulate cruise ship pollution, then there will be very few cruise ships in the generations to come.

From the 143 cruise ships coming into Victoria this year, almost none of them will pay any federal, provincial or municipal taxes, as they would in the United States. How is it fair that people have to pay an airport tax, but not a cruise ship tax? If a tax equal to the damage caused by the pollution of cruise ships was levied on the cruise ships, some damage to society could be corrected. The tax would force cruise ships to take into account the costs that they create, and would encourage them to become more efficient. In theory, this tax level may be hard to measure, but it should be based on the amount of harmful emissions going into the air in water. Here is an illustration of how a tax could help bring the pollutants from cruise ships to the socially optimal level.



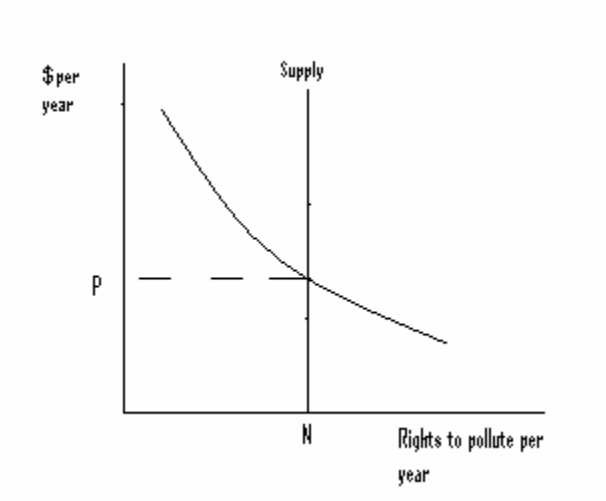
Furthermore, the provincial government is subsidizing many of the cruise ships now, so as to attract cruise ships to the economy. Looking at this subsidizing from an

[23] The Economics of Nature , Managing Biological Assets. Van Kooten, G. Cornelis. Bulte, Erwin H. 2000 Blackwell Publishers Inc. Malden Massachusetts. (243)

environmental point of view, the only reason that cruise ships should be subsidized is if they are doing their part to reduce the amount of pollution to the socially optimal level[24]. However, it seems bizarre for the government to pay cruise ships, when cruise ships are already making millions of dollars in profits.

Another method that can be used to reduce pollution from cruise ships is regulation by the government. Creating a market for clean air and water would constitute the government selling a certain number of permits which would allow only a certain amount of pollutants into the air and water. The different cruise ships would bid to own these permits, and they would only go to the firms with the highest bids. The fee charged is that which clears the market, so the amount of pollution equals the amount set by the government. The graph below shows the number of rights to pollute on the horizontal axis and the price of these rights on the vertical axis. The government will sell N pollution rights, making the supply perfectly vertical. Those cruise ship companies not willing to pay the price, P, for these permits for each unit of pollution they produce, must either reduce their output or adopt a cleaner technology[25].

[24] Public Finance in Canada Second Canadian Edition. Rosen, Harvey S. Dahlby, Bev. Smith, Roger. Boothe, Paul. 2003 McGraw-Hill Ryerson Limited. Toronto. (78)
[25] Public Finance in Canada Second Canadian Edition. Rosen, Harvey S. Dahlby, Bev. Smith, Roger. Boothe, Paul. 2003 McGraw-Hill Ryerson Limited. Toronto. (81)



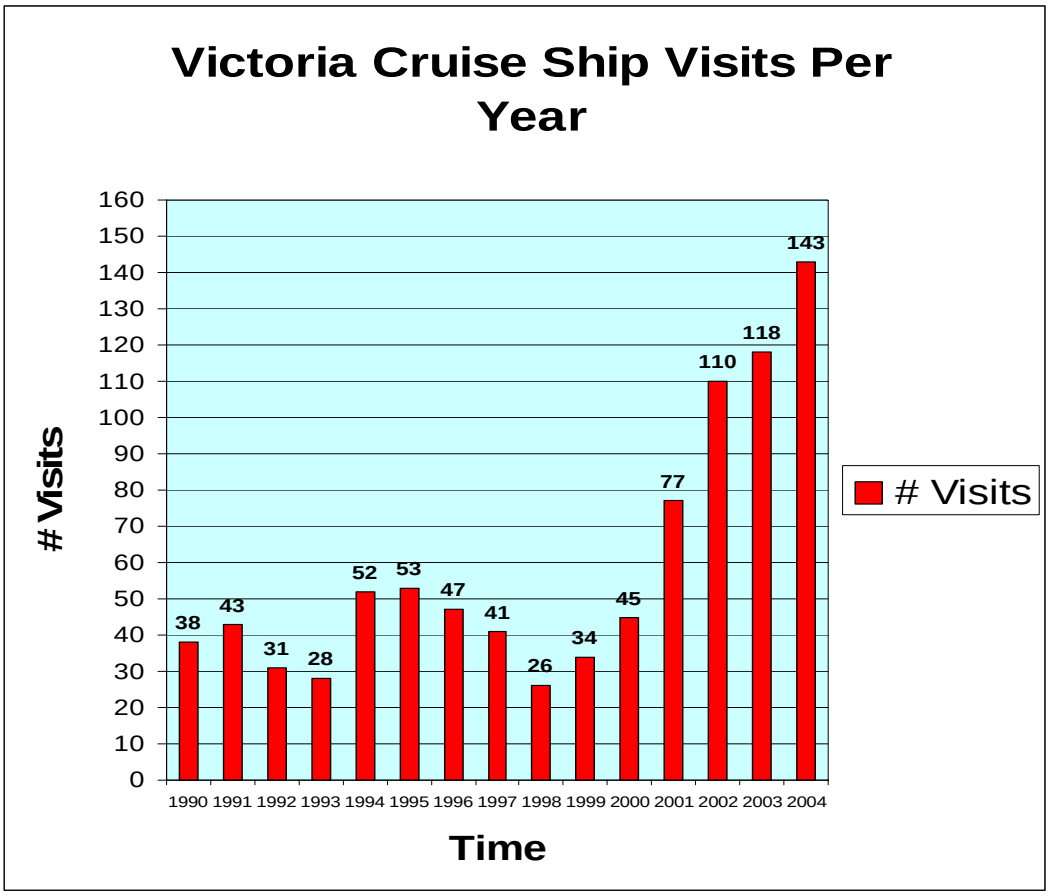
Other Regulations that the government should look at in order to administer the amounts on pollutants going into our ocean are: creating regulations for grey water, harmonizing Canadian regulations with American regulations, strengthening enforcement and monitoring of existing regulations, and creating a noise by-law. The City of Victoria is currently creating a bylaw that will hopefully reduce noise levels in Ogden point[26]. If some regulations by the government begin to be put into place, the socially efficient level of pollution can begin to be targeted. Without any regulations in place, no cruise ships will ever be punished for the harmful affects they are inflicting on the environment. Furthermore, it will never be shown that there is a need for shoe power hook-up, as cruise ship companies know they can take advantage of Canadian ports. Nothing can be done unless strict regulations are levied on cruise ships, and strict administration of these regulations takes place.

[26] Ripple Effects: The need to Assess the Impacts of Cruise Ships in Victoria B.C. Wallace, Bruce & Gorecki, Karen. VIPIRG 2003. Victoria. (22-24)

Benefits of the Cruise Ship Industry

The cruise industry is one of the fastest growing sectors of the international tourism industry. From 1980 to 1994, the average worldwide growth of tourism was approximately 4.5 percent, while that of the cruise industry was 8.6 percent[27]. The increased wealth of the American population, and baby boomers who are ready to explore the world after retirement, are only a few of the factors contributing to this rapid growth. British Columbia's major ports of Victoria and Vancouver have seen a large portion of this growth coming through its local ports. As the numbers of cruise ship visits increase, so do the number of passengers on those ships, each one of them contributing a significant amount of revenue to the local economy. As the graphs below show, port calls and number of visitors to Victoria's Ogden Point are increasing at an increasing rate.

[27] http://www.cybercruises.com/leeloongkoonspeech.htm. Poon, Alfred. Destinations, itineraries and the economic impact of cruise calls


Victoria Cruise Ship Visits Per Year
Visits
160
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
38
43
31
28
52
53
47
41
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77
110
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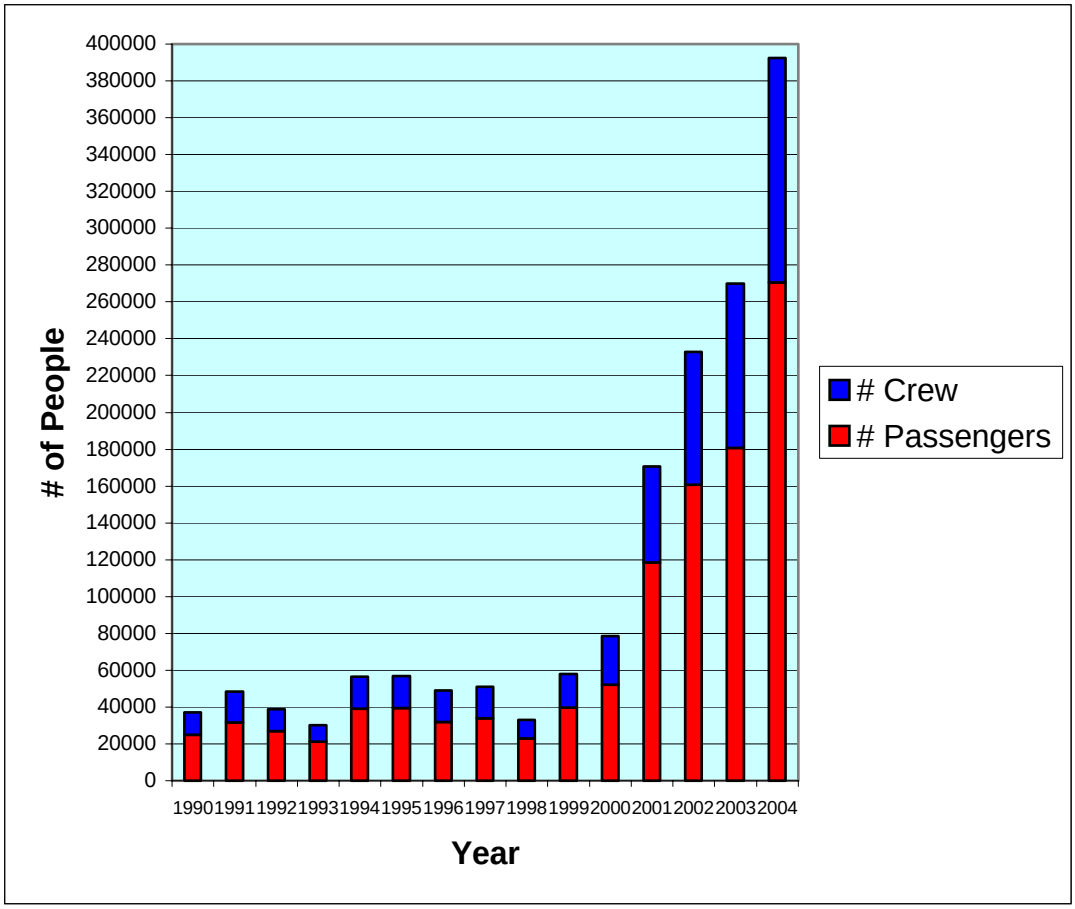
143
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004
Time
Visits



[28]

Throughout the nineties, port calls stayed relatively constant, but since the beginning of the millennium, they have seen over a three-fold increase. A significant portion of the increase can be attributed to the rising popularity of Alaskan cruise packages. Alaskan cruises began in the 1950's, as the modern luxury cruise industry was just establishing itself in the world market. At first the popularities of these cruise ships was minimal, but throughout the1980's and 1990's they saw a dramatic rise in popularity. In 2003 more than 600,000 people visited Alaska aboard cruise ships, which represent almost 6 percent of the total of worldwide cruise arrivals[29] (2). The vast majority of these cruises

[28] Cruise Ship Survey, 2003. Victoria AM association. November 12th 2003 (4,5)
[29] A Primer on the Canadian Pacific Cruise Ship Industry. Dobson Sue. Alison Gill. Sam Baird.

originated from one of the large north pacific ports of Vancouver, Seattle or Victoria. Almost all of the 26 ships servicing Alaska regularly cruise through the Straight of Georgia located on off of British Columbia's West coast, meaning almost every ship passing through will visit a British Columbia port[30].

The benefits of the Cruise industry to British Columbia's public sector are numerous. The greatest public contribution from these visits are through direct taxation raised by the increased spending by passengers and crew while in port. In 1996, it is estimated that the tourism industry generated 3.6 trillion dollars world wide in gross output. This brought in approximately 653 billion dollars worth of tax revenue and 304 billion dollars in government operating expenditures[31]. There is no doubt that eight years later, the numbers have significantly risen together with world population and wealth.

At fourteen percent, British Columbia's tax rate surpasses the tax rate of any U.S. State tax, and is one of the highest provincial tax rates in Canada. The cruise ship industry generates millions of dollars in revenue for both British Columbia's and Canada's tax system, as each passenger purchasing a good or service must pay provincial and government tax. Tax refunds for visitors to Canada are available, but are difficult to receive (i.e. strict rules), and can only be refund the government sales tax GST. Additional taxes coming into the economy means more public savings, and extra money for the government to spend. Fourteen percent of the over 50 million dollars raised are tax revenues stemming directly from passenger expenditures, berth fees, and ship

[30] A Primer on the Canadian Pacific Cruise Ship Industry. Dobson Sue. Alison Gill. Sam Baird.
[31] http://www.cybercruises.com/leeloongkoonspeech.htm. Poon, Alfred. Destinations, itineraries and the economic impact of cruise calls

maintenance. The amount of taxes that flows directly back into Victoria is ambiguous, but the benefit to the province of BC and to Canada, will indirectly benefit Victoria. Because of the small size of Victoria's contribution to the economy, these numbers must be coupled with cruise revenues from the rest of the country, which totals over 279 million dollars[32]. These numbers are growing at an exponential rate and will in the long run have a significant effect on the economy. The benefits from taxes must be analyzed from a macro economic standpoint. An augmentation of tax flow from the cruise industry will increase the amount of public savings. Public savings is the excess of public taxes generated (T), over the amount of government spending (G) (T-G). An increase in public saving leads to an increase in total savings, which is Private savings, plus Public savings. GDP, net exports, the exchange rate, investment, unemployment, and all other key elements of the economy are all tied together, and will be beneficially affected by an increase in total savings.

The benefits to Victoria's private sector are plentiful and important. To postulate what a cruise passenger will do while in a foreign city, we must first describe their characteristics. Cruise ship passengers are not poor discouraged workers needing to take a week off to reflect on life. Most passengers visiting Victoria are affluent older aged individuals, 93 percent of which carry United States passports. Approximately 70 percent of respondents of the Victoria AM survey were over the age of 45, and 44 percent of this sample was over the age of 55[33].

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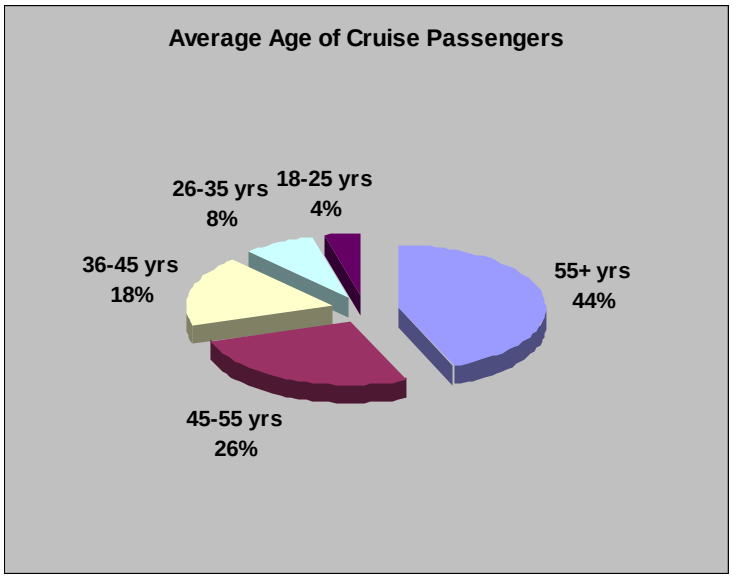
[32] A Primer on the Canadian Pacific Cruise Ship Industry. Dobson Sue. Alison Gill. Sam Baird. (18)

[33] Cruise Ship Survey, 2003. Victoria AM association. November 12th 2003 (4,5)



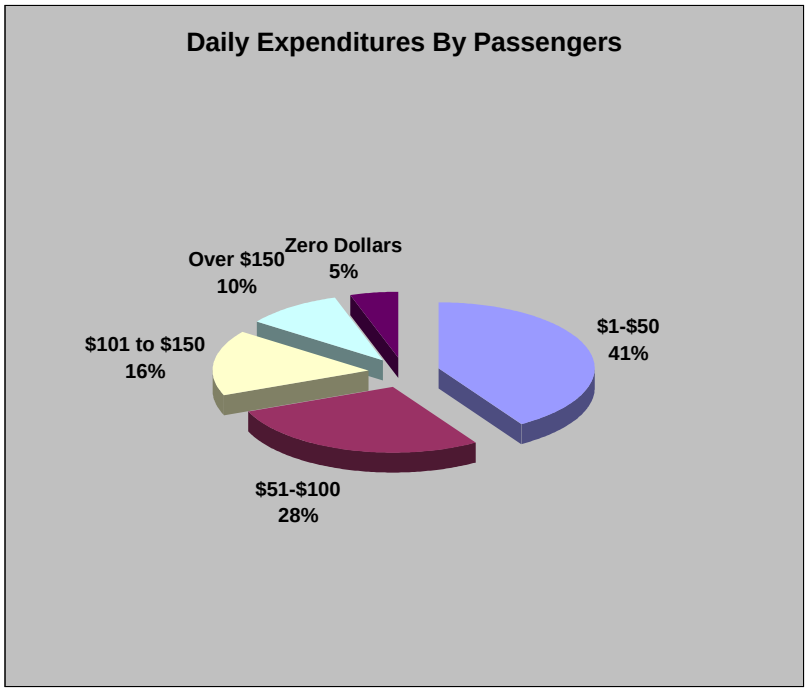
[34]

From the numbers displayed on this graph, we can infer that the majority of these individuals are retirees. When people retire, they generally enjoy things such as traveling, and "soaking" in foreign cultures. "Soaking" requires a substantial amount of spending money in a tourist town like Victoria. The duration of port stays which is on average 3 hours is positively correlated with the amount spent.

Even though average stays are relatively short, visitors still have enough time to invest their money into Victoria's local economy. In their stays, 48 percent of respondents of the Victoria AM survey had time to shop for goods other than souvenirs, 32 percent paid to visit attractions, 32 percent had time to enjoy a meal, and 11 percent enjoyed cultural, land, and water based activities. Since Victoria's main industry is tourism, the spending done by these tourists is essential to small local businesses. As the following graph shows, 26 percent of those surveyed spent over $50. Another 28 percent spent $51 to

[34] Cruise Ship Survey, 2003. Victoria AM association. November 12th 2003 (8)

$100. 41 percent spent $1 to $50, and only a miniscule 5% spent nothing on their shore leave.



[35]

The average amount spent by the passengers surveyed was 88 dollars. The average compliment of cruise ships visiting Victoria is approximately 1727 passengers. If we multiply these figures together, we find that the average expenditure per ship is $151,976. Multiplying the average expenditure per ship by the number of ships, we find that just under 22 million dollars in revenue was generated for local establishments. These additions to revenue are much needed since the year after September 11th 2001, tourism in Victoria saw a devastating 17% decrease in tourism revenue. This number is considerable considering 2003's tourism revenues surpassed 1.05 billion dollars[36].

[35] Cruise Ship Survey, 2003. Victoria AM association. November 12th 2003 (15)

[36] http://www.tourismvictoria.com/Content/EN/888.asp?printable=yes&. Thorpe Rick. Tourism Victoria Industry Update Meeting

Victoria's Esquimalt shipyard also plays an important role in the local economy. Traditionally the yard has focused on the maintenance of commercial fishing vessels, and servicing the Canadian Pacific navy fleet. This facility has now evolved into a high tech port facility with the ability to service large cruise ships. Each cruise ship that visits the shipyard contributes a great deal to the economy. An average of approximately five hundred people are employed at any one time to complete a monstrous task such as this. The maintenance requires the hiring of a plethora of workers, adding valuable skilled labor jobs into the economy. Victoria's dry dock has contracts for servicing five cruise ships this year. The servicing of each ship will cost from 1 to 2 million dollars[37] which will infuse an estimated 25 to 30 million dollars to the local economy[38].

Contingent Valuation Method: Analysis of a dichotomous survey

Non-market values are not purchased in the market place, and do not use the concepts of supply and demand. These include the environmental amenities that cruise ships use. Using a contingent Valuation method, estimates can be made to draw out what the maximum level an individual would be willing to pay in order to either have cruise ships visiting Victoria, or, be eliminated from visiting Victoria. The contingent valuation model asks, in a survey format, about the individual's value of the cruise ship industry. Willingness to pay is based on compensating surplus which is the maximum amount

[37] http://www.city.victoria.bc.ca/business/research_bus.shtml. City of Victoria Research and Statistics Business sector profile

[38] http://www.cse.gov.bc.ca/ReportsPublications/speeches/Mar19_North_West-Cruise.htm. Thorpe, Rick Minister of Competition, Science and Enterprise

someone will pay to obtain more of the goods[39]. In this survey, (listed in Appendix A) 30 people were used, 15 of which live within the James Bay area, and the other 15 were randomly selected. In this particular contingent valuation method, the dichotomous format was used. This type of survey asks a person a closed ended question, in order to get a yes or no answer from them. From asking various willingness to pay estimates, and receiving a yes or no answer, it easy to estimate willingness to pay for cruise ships.

The first question that is asked in this survey is "Do you like the fact that cruise ships visit Victoria"? The survey shows that out of 30 people 21 liked the fact that cruise ships visit Victoria and 9 did not like the fact that cruise ships visit Victoria. After surveying 30 people about the cruise ship industry, it became obvious that many people do not realize how much cruise ships pollute and only look at how they are contributing to the economy in Victoria. Out of the 9 people that said they did not like cruise ships in Victoria all of those people live in close proximity to Ogden Point, showing that the noise and pollution is more severe for the neighboring residents. Of the 21 people that answered yes, six were from the James Bay area and 15 were from other parts of Victoria. This shows that people that are not as directly affected by the cruise ship industry and generally like cruise ships more.

If a respondent had answered "yes" to the first question, they were then asked if they would be willing to pay one of (randomly selected) 10, 20, 50, 100, 200, or 500 dollars to keep cruise ships visiting Victoria. For the most part, people answered no. The total willingness to pay to keep cruise ships around for 21 people was 90 dollars. If a respondent had answered "no", they were then asked if they would be willing to pay one

[39] The Economics of Nature , Managing Biological Assets. Van Kooten, G. Cornelis. Bulte, Erwin H. 2000 Blackwell Publishers Inc. Malden Massachusetts (124, 125)

of (randomly selected) 10, 20, 50, 100, 200, or 500 dollars to prevent cruise ships from visiting Victoria. People that answered “no” were much more inclined to say yes. The total willingness to pay for the elimination of cruise ships for nine people was 395 dollars.

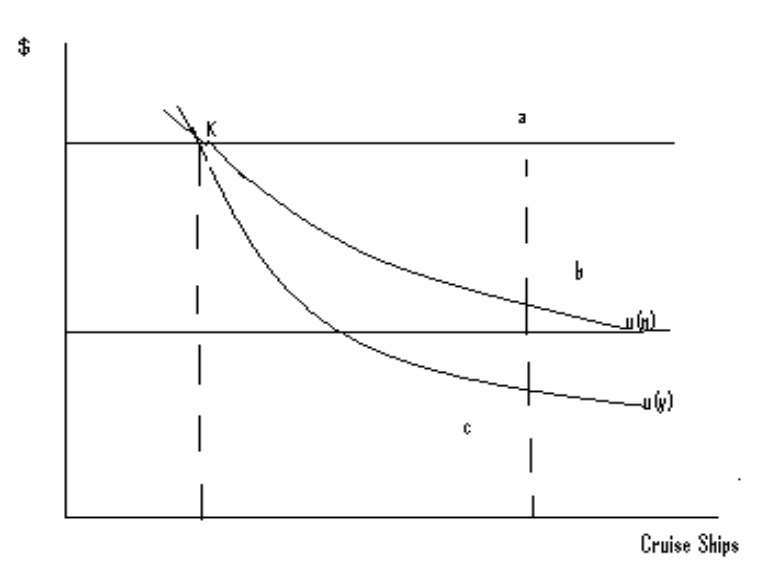
Next the survey proceeded to ask a few opinion questions using the scale “strongly agree, agree, neutral, disagree, or strongly disagree”. The first question of this section asked if one believed that cruise ship noise is a disturbance in the neighborhood. On average this question was answered neutral. Most people living in James Bay answered with, at least, “agree” while everyone else asked the survey answered neutral, disagree or strongly disagree. The next question of this section asked the respondent if they thought that the increase in tourists from cruise ships benefited the economy. Almost all 30 people answered with agree or strongly agree, 26 to be exact. In the last question of this section, which asked if the respondent thought cruise ships increase pollution in Victoria, varied between all 5 rankings. 9 people chose strongly agree, 8 people chose agree, 8 people chose neutral, 3 people chose disagree and 2 people chose strongly disagree, making the average between neutral and agree.

These results show that people living in James Bay, close to the cruise ship port, generally believe that cruise ship noise is a disturbance and that they do increase pollution. However, they also recognized that the tourism cruise ship lines generate does benefit the economy. For the people taking the survey who live father away from the cruise ship port noise was not thought to be a great disturbance, and while they thought that cruise ships somewhat increase pollution, they do benefit the economy overall.

The questions in the last part of the survey asked for information about the respondent taking the survey. Gender, education and income level were the factors that the answers to the first questions were dependant upon. These help determine why people chose Yes or No. In general, income was the most obvious factor as the amount of household income was proportionate to the amount a person would be willing to pay to keep cruise ships visiting Victoria, or, have them eliminated. Overall, as noted above, we found more people liked cruise ships coming to Victoria than people that did not like them coming. However, the people that did not like the cruise ships would be willing to pay more for the elimination of them as opposed to the people who like the cruise ships. They would be less willing to pay to keep them around. This is an interesting scenario, and brings to mind that most people are unaware of the benefits and cost of the cruise industry. This is largely due to lack of government and political involvement in the industry.

Using the Random Utility model, which the dichotomous choice model is based on, gives an accurate summary of the survey. In the case of a dichotomous survey it is based on a individual's utility function. Here is a diagram that illustrates when a person chooses "yes" they like cruise ships or "no" they do not like cruise ships. It illustrates that a person will choose to pay if it increases their utility level. This means that there utility level will increase more then the amount they pay. For example, if a person were to have chosen yes they like cruise ships then there willingness to pay is depicted by the compensating surplus. A person would not be willing to pay at u(n) because a-b (the compensating surplus) is less then the N$ for the keeping cruise ships in Victoria. However a person would choose to pay at u(y) because compensating surplus a-c is

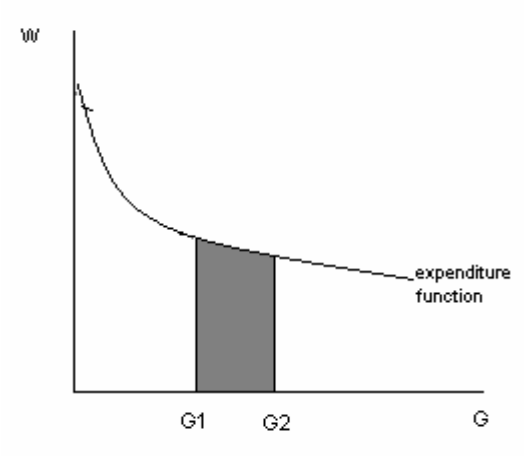
greater the N$ for keeping cruise ships in Victoria. If the person is willing to pay, it is because they are able to achieve a higher utility level, such as u(y), which gives the incentive of willingness to pay.



[40]

The second graph below demonstrates a persons incentive to say yes or no, in order to achieve a greater utility level. If a person does say "yes" for willingness to pay to either have cruise ships remain in Victoria, or have them eliminated, then a certain amount of compensating surplus will be realized from the change in the good. In this diagram, w represents welfare and G represent the good. The increase in compensating surplus is shown by the shaded are from G1 to G2[41].

[40] The Economics of Nature , Managing Biological Assets. Van Kooten, G. Cornelis. Bulte, Erwin H. 2000 Blackwell Publishers Inc. Malden Massachusetts (126)
[41] The Economics of Nature , Managing Biological Assets. Van Kooten, G. Cornelis. Bulte, Erwin H. 2000 Blackwell Publishers Inc. Malden Massachusetts (27)



To determine the correlation between the dichotomous format survey used to gauge people's like or dislike for cruise ships, a logit regression was used. A regression is the relationship between the mean, or average, value of a random variable, in this case "yes" or "no", and the corresponding values of one or more independent variables. The independent variables are opinion one, opinion two, opinion three, age, gender, education and income. A logit regression is based on probabilities, odds and the logarithms of the odds. The odds are defined as the ratio of the probability that an even will occur divided by the probability that it will not occur. The difficulty of using odds as a measure of likelihood is when an event is very likely to occur odds can be indefinitely large numbers. Whereas, if it is very unlikely the odds can be a fraction between zero and one. The irregularity can be corrected by taking the natural logarithm of the odds therefore named a logit function. Hence, a logit is the natural logarithm of the odds[42]. The chart below illustrates a logit regression for this survey. The very top line shows the dependant variable YN (for yes and no). All the independent variables are listed under "Variable". C is an independent constant. Ser01, ser02 and ser03, correspond to opinion 1,opinion 2 and opinion 3. Using a 93 percent confidence interval, this regression can demonstrate

[42] http://www.statsoft.com/textbook/glosf.html

which independent variables carry relevance in this survey. Under the probability column, which ever independent variable that has a probability of seven percent or more will be rejected from being an important determinant of determining whether a person likes or dislikes cruise ships. In this chart, ser01 has a probability of 21.5 percent, education has a probability of 71.0 percent, and gender has a probability of 66.05 percent. These are all extremely far from the confidence interval of seven percent and can be eliminated, as they process the least important correlation with the dependant variable.

Dependent Variable: YN
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 12/02/04 Time: 15:30
Sample: 1 30
Included observations: 30
Convergence achieved after 7 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-3.901588	4.469083	-0.873018	0.3827
SER01	0.754231	0.608353	1.239791	0.2151
SER02	-2.402085	1.531873	-1.568071	0.1169
SER03	1.707474	1.174249	1.454098	0.1459
AGE	0.192503	0.095913	2.007057	0.0447
EDUCATION	0.489028	1.315730	0.371678	0.7101
GENDER	-0.677962	1.543540	-0.439225	0.6605
INCOME	-1.947240	1.567599	-1.242180	0.2142

Mean dependent var	0.700000	S.D. dependent var	0.466092
S.E. of regression	0.362392	Akaike info criterion	1.095518
Sum squared resid	2.889212	Schwarz criterion	1.469171
Log likelihood	-8.432773	Hannan-Quinn criter.	1.215053
Restr. log likelihood	-18.32593	Avg. log likelihood	-0.281092
LR statistic (7 df)	19.78631	McFadden R-squared	0.539845
Probability(LR stat)	0.006050		

Obs with Dep=0	9	Total obs	30
Obs with Dep=1	21		

After eliminating ser01, education, and gender, all the probabilities were reduced to under seven percent, meaning that they can all be accepted as important variables in determining Yes or No as the dependant variable. The coefficient column shows the

effect of an increase in any of the independent variables on the dependant variables. Positive values of the independent variable, imply that if one more person was surveyed then they would have an increased probability of a chance of choosing no. As we used a 1-5 scale, 5 being strongly disagree, a positive coefficient value would represent a more likely chance of the next person answering no to the dependant variable.

Dependent Variable: YN
Method: ML - Binary Logit (Quadratic hill climbing)
Date: 12/02/04 Time: 15:27
Sample: 1 30
Included observations: 30
Convergence achieved after 6 iterations
Covariance matrix computed using second derivatives

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.122980	2.395917	-0.051329	0.9591
SER02	-2.134293	1.112097	-1.919161	0.0550
SER03	1.694373	0.778524	2.176391	0.0295
AGE	0.165402	0.088739	1.863918	0.0623
INCOME	-1.909578	0.942759	-2.025520	0.0428

Mean dependent var	0.700000	S.D. dependent var	0.466092
S.E. of regression	0.333989	Akaike info criterion	0.953918
Sum squared resid	2.788718	Schwarz criterion	1.187451
Log likelihood	-9.308769	Hannan-Quinn criter.	1.028627
Restr. log likelihood	-18.32593	Avg. log likelihood	-0.310292
LR statistic (4 df)	18.03432	McFadden R-squared	0.492044
Probability(LR stat)	0.001215		
Obs with Dep=0	9	Total obs	30
Obs with Dep=1	21		

When looking at the coefficient column we find that ser02, and income have negative signs, which indicates a negative correlation. This shows that the higher the value of income, or of the higher value selected in the 1-5 value scale used with ser02 (the close to strongly disagree), the more likely the respondents are to choose No in the Yes/No question. This is because No was assigned a value of 0 and Yes a values of 1. Income is the most important economic variable relating to this survey since it is a monetary value. The regression shows that the higher the income the more the person will not like cruise

ships visiting Victoria. Age has a positive value implying that the older a person gets the more likely they are to choose yes. Ser03 asks if the person thinks cruise ships increase pollution in Victoria. The regression indicates that the more people who choose closer to 1 (because it is a positive value), or the lower values of the scale 1-5, will choose no. By using a survey to gauge people's opinion and willingness to pay for cruise ships, we were able to indicate the characteristics that had a relationship, either negative or positive, with why people chose yes or no. Overall, the people that were more exposed to the cruise ships thought cruise ships had more negative effect on the economy, and therefore chose no. Gender and education were variables that had little relationship as to why people chose Yes or No.

Conclusion

From the economic benefits and their environmental damages discussed, it is difficult to estimate the costs and benefits to society. The thriving cruise industry benefits the economy by contributing tax dollars, which will increase national saving. As a macroeconomic concept, this is very beneficial to the economy. At the microeconomic level, increased toursim from cruise ships raise revenues of local Victoria businesses. One Victoria businessman was willing to pay fifty dollars to ensure that cruise ships would remain in Victoria, which was the highest of all respondents. As this local business estimates, in the years to come, businesses will be able to see rising dollars accruing from local tourist expenditures. Although the benefits are numerous, many environmental damages are resulting at the cost of a booming cruise ship industry. Several harmful emissions from cruise ships are causing detrimental effects in humans

and animal life in every passage they take. Sewage, grey water, oily bilge and hazardous chemicals are being deposited into ocean waters daily. As noted, Canada has minimal regulations on these cruise ships, allowing millions of tons of daily waste to be spewed into the surrounding ocean waters. How long will this last before cruise ships will be unable to operate due to environmental degradation? Will increases in technology due to the rising of the cruise ship industry be able to reduce such harmful externalities? These are questions that are unanswered as the cruise ship industry is still small, and environmental regulations have not kept pace with industry growth. Governments at all levels need to review regulations in place to ensure that cruise ships maintain a health coexistence with the environment.

Appendix A

	A	B	C	D	E	F	G	H	I
1	Survey Results for People who do not like the Cruise Ship Industry in Victoria								
2	Observation	WTP Amount	Opinion 1	Opinion 2	Opinion 3	Age	Gender	Education	Income
3	1	50	1	1	1	32	1	5	80,000
4	2	20	1	3	1	50	1	3	80,000
5	3	85	1	3	1	32	1	5	80,000
6	4	10	3	2	2	21	2	3	20,000
7	5	200	1	2	1	57	1	3	37,500
8	6	0	5	2	1	21	2	2	20,000
9	7	0	3	1	4	25	1	3	52,500
10	8	20	2	2	2	40	1	5	62,500
11	9	20	1	3	1	39	2	5	75,000
12	Mean	45	2	2.11111111	1.5555556	35.22222222	1.333333333	3.777777778	56388.88889
13	Median	20	1	2	1	32	1	3	62500
14	Standard Deviation	64.0312424	1.414213562	0.78173596	1.0137938	12.54768682	0.5	1.201850425	25190.24833
15									
16						Income	Opinion Key	Gender Key	Education Key
17						20,000-30,000=1	1=Strongly Agree	1=Male	1=High School
18						30,000-45000=2	2=Agree	2=Female	2=Some Post Secondary
19						45,000-60,000=3	3=Neutral		3=University Degree
20						60,000->80,000=4	4=disagree		4=Graduate Courses
21							5=Stronglydisagree		5=Graduate Degree

	B	C	D	E	F	G	H	I
1	Servey Results For People Who Liked Cruise Ships in Victoria							
2	WTP	Opinion 1	Opinion 2	Opinion 3	Age	Gender(1=M,2=F)	Education	Income
3	10	5	1	5	22	1	2	$ 20,000.00
4	0	5	1	2	24	1	3	$ 20,000.00
5	0	1	1	1	50	2	3	$ 57,500.00
6	0	4	2	4	77	2	3	$ 52,500.00
7	0	2	2	2	53	1	5	$ 80,000.00
8	0	3	3	2	58	2	4	$ 57,500.00
9	0	5	2	3	20	1	2	$ 20,000.00
10	0	5	2	3	24	1	2	$ 32,500.00
11	0	5	1	3	22	1	2	$ 20,000.00
12	0	4	1	1	30	1	3	$ 32,500.00
13	0	5	1	5	21	1	2	$ 20,000.00
14	10	5	1	2	25	1	2	$ 27,500.00
15	10	4	2	3	20	2	2	$ 22,500.00
16	0	3	3	3	27	1	2	$ 22,500.00
17	0	5	1	3	31	1	3	$ 57,500.00
18	0	1	1	1	28	2	3	$ 37,500.00
19	50	5	1	3	25	2	3	$ 32,500.00
20	0	2	1	3	54	1	3	$ 80,000.00
21	0	4	2	4	51	1	3	$ 80,000.00
22	20	5	1	3	21	2	2	$ 20,000.00
23	20	5	1	2	20	2	2	$ 20,000.00
24	5.7142857	3.952380952	1.476190476	2.761904762	33.47619048	1.380952381	2.666666667	38690.47619
25	0	5	1	3	25	1	3	32500
26	12.071217	1.395671226	0.679635757	1.136991281	16.44876606	0.497613352	0.795822426	21889.19607
27								
28					Income	Opinion Key	Gender Key	Education Key
29					20,000-30,000=1	1=Strongly Agree	1=Male	1=High School
30					30,000-45000=2	2=Agree	2=Female	2=Some Post Secondary
31					45,000-60,000=3	3=Neutral		3=University Degree
32					60,000->80,000=4	4=disagree		4=Graduate Courses
33						5=Stronglydisagree		5=Graduate Degree

1. Do you like the fact that cruise ships visit Victoria? (Circle)

YES NO

If you answered YES, would you be willing to pay $ _____ per year in order to ensure that cruise ships continue to visit Victoria?

If you answered NO, would you be willing to pay $ _____ per year to prevent cruise ships from visiting Victoria?

2. Using the scale – strongly agree, agree, neutral, disagree, or strongly disagree – please answer the fallowing opinion questions:

a. Cruise ship noise is a disturbance in my neighborhood.

b. The increase in tourists coming into Victoria due to cruise ships benefits the economy.

c. Cruise ships increase pollution in Victoria.

3. How old are you? _____

4. Are you? __Male __Female

5. What is the highest level of education that you have completed?

__ Currently in High school __ Some post secondary classes

__ Completed a University/college degree __ Some graduate courses

__ Completed a graduate degree

6. In 2003, what was your estimated income level?

__ less than $20,000	__ $20,001-25,000	__ $25,001-30,000
__ $30,001-35,000	__ $35,001-40,000	__ $40,001-45,000
__$45,001-50,000	__ $50,001-55,000	__ $55,001-60,000
__ $60,001-70,000		__ $70,001-80,000

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