



Economic Impacts of the 2007-2008 New Zealand Cruise Ship Season

Prepared for

CRUISE NEW ZEALAND

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Executive Summary

The 2007/08 cruise ship season began on 24th of September 2007 with the arrival of the Regal Princess in Auckland and carried on into the winter of 2008 with cruises aimed at New Zealanders heading up to the Pacific Islands. Overall, 116,200 people embarked and/or disembarked or were in transit in New Zealand as a direct result of the cruise season. In addition, total crew of 51,500 visited during the season. During this period 31 vessels offering 98 cruises visited New Zealand carrying passengers to 20 ports and making 342 port visits. In total, more than 452,000 passenger days were spent in New Zealand ports. The majority of passengers arrived on large vessels of 50,000 tonnes or more, these ships accounted for 65% of total passengers. In the forthcoming 2008/09 season, a total of 100 cruises are expected to carry over 134,200 passengers and 53,500 crew.

North Americans and Australians continue to dominate international passenger numbers. Collectively they accounted for 72% of international passengers (58% of all passengers) – Americans alone accounted for 39% of international passengers. Passengers from Australia are the next largest contributors, accounting for around 24% of international cruise passengers. New Zealanders who fill winter cruises to the Pacific, account for 19% of all passengers.

Auckland attracted the most cruise activity with passenger exchanges focussed on this port. Approximately 89,600 passenger days were spent in Auckland or around 21% of all passenger days spent in New Zealand.

The industry generated \$412m in direct spend during the 2007/08 season. The majority of this was spent within New Zealand, however a significant portion (50%) flows directly offshore to pay for fuel and international airfares. The remaining \$204m was generated by passengers and crew on the one hand and the cruise lines and their agents on the other. The nature of the spend varies greatly between the two groups, both in terms of its geographic and sectoral distribution. Passengers and crew spend in much the same way as other groups of international tourists, their spend concentrated in the port cities and focused on entertainment/sightseeing, retail and hospitality sectors. Cruise line and agent spend is more focused in the major interchange ports and primarily on berthage as well as servicing and maintaining the needs of the ship and passengers whilst on the cruise.

The direct spend generated over \$406m in total gross output, once all the flow on effects are included. Of this, around \$182m contributed to the nation's wealth in the form of value added (synonymous with GDP). The cruise industry sustained, either directly or indirectly, 2,790 full time equivalent workers (FTE's) for a year. Each passenger that travels on a cruise ship to New Zealand generates around \$1,568 in value added for the economy.

During the 2007/08 season, Auckland Region received \$123.8m including of total cruise industry direct expenditure including airfares and bunkering – this equates to around 60% of the national direct spend (\$204m). The second largest region was Bay of Plenty with 8.6%, Canterbury 8.2% and Otago with 7.8% (\$17.7m, \$16.8m and \$15.1m respectively). Lesser amounts were spent in Wellington (\$10.4m) and Southland (\$7.1m).

The total effect of this injection into the regional economies generated \$94.6m of value added in Auckland Region¹, \$14.8m in Bay of Plenty and \$15.6m in Canterbury, \$12.7m of value added was generated in Otago and in Wellington, \$9.8m. It is estimated that this activity sustained the employment equivalent of 1,434 full time workers in Auckland region for a year, 257 in Canterbury and 216 in Otago. Employment sustained in Bay of Plenty region was equivalent to 249 full time workers for a year.

Forecasts for the 2008/09 Season

The coming season sees a increase in the numbers of cruises and passengers visiting New Zealand waters. In total, 100 cruises are expected to carry 134,200 passengers along with 53,500 crew. This represents growth of 2% in cruises but some 16% in passengers. Again, larger vessels dominate accounting for 80% of total passengers. Cruise passengers are expected to spend 592,155 days in New Zealand ports contributing \$478m directly to the economy, representing growth of around 16% in real terms over the 2007/08 season. In the upcoming season the 100 cruises will carry passengers to 20 ports and making 532 port visits (a 56% increase in port visits).

It is expected that the season will generate \$487.0m in total output, contribute \$219.0m in total value added to the New Zealand economy and sustain the equivalent of 3,221 FTE's for a year.

Activity is again focused on Auckland Region where direct spend of \$128m generates total value added of \$98m sustaining 1,413 FTE's. In Canterbury, \$22.7m in direct expenditure sustaining the equivalent of 335 FTE's contributing \$21.3m to the economy in value added terms. Otago is expected to receive \$19.0m in direct spend, sustaining 264 FTE's and generating \$16.3m in value added.

The industry has grown reasonably steadily in New Zealand over the past five years. In the 1996/97 season 27 cruises brought 19,400 passengers to New Zealand. The 2008/2009 season represents a 461% growth in passenger numbers of the 1996/97 season. The current global economic environment is not expected to have any significant impacts on passenger numbers for the forthcoming season, commencing in October. However, continuing negative economic factors, coupled with continuing high fuel prices, may see some downward adjustments; particularly so in the USA market. An offsetting trend is the rapid growth of the Australians visiting NZ on cruise vessels.

¹ Note this includes the flow on effects from Auckland's portion of international airfares and fuel bunkering

1 Introduction

The worldwide cruise industry is expected to grow to more than 17m passengers by 2010, up 70% on 2000 and 54% up on 2002². This represents a significant reduction in forecasts over previous years. Nevertheless, it is an impressive growth projection compared to other tourism sectors, representing a 400% increase in total passenger numbers over the past 20 years.

The cruise industry in New Zealand has shown strong growth in recent years, from 27 cruises catering for 19,400 passengers in the 1996/97 season, to 98 cruises catering for 116,200 passengers in 2007/08 and potentially over 134,300 passengers in 2008/09. Total direct expenditure has increased from \$42m in 1996/97 to over \$412m in 2007/08.

As the industry grows in New Zealand it constantly stimulates new activity and initiatives. Many ports around the country are improving their facilities to handle cruise ships – some for the first time (such as Gisborne). Coach line companies (that play a key role in transporting cruise passengers on tours and pre- and post-cruise packages) are also investing to increase capacity. There has been an increase in international airlifts with passengers either joining or leaving a cruise ship in New Zealand. The hotel industry has, likewise, benefited from pre and post cruise bookings. There is also now a dedicated cadet training programme which allows navigation and engineering officer graduates to move directly into cruise related employment. In addition, cruise lines are visiting hospitality schools and technical institutes to directly recruit trainees into the onboard hotel and hospitality divisions of the lines.

The industry has identified the need for additional port infrastructure at Auckland as being critical to ensure that both local and nationwide growth is enabled. The industry also notes port capacity constraints as a more general issue.

Note that all figures presented in this report are in New Zealand dollars. At the time of writing the \$NZ/\$US exchange rate was 0.75.

1.1 Background and Scope

The economic impact of the New Zealand cruise ship season has been assessed every year or every second year since its inception in 1997. The first study involved in-depth investigation of the structure of the industry and the expenditure in the New Zealand economy resulting from the cruise ship activity. This enabled the development of a set of spend ratios and economic multipliers that reflected the nature of the industry at that time. These ratios and multipliers were subsequently applied each year since 1997 – inflation adjusted – to new cruise and passenger numbers.

In 2003, the ratios and multipliers were updated to reflect changes in the global cruise industry (namely advancements in ship operation, ship capacity, ship technology and how ships are serviced locally and globally), changes in the scale of the industry in New Zealand (over time the number of

² 'Global Changes in the Cruise Industry 2003-2010' July 2003, Tony Peisley

cruises have increased but also the number and variety of businesses involved with and servicing the cruise ships whilst in New Zealand ports has increased), and because more up to date economic input-output tables became available from Statistics New Zealand.

This 2003 base model (with inflation adjustments) has been applied for this assessment of the 2007/08 and 2008/09 (forecast) season. It will remain relevant until such time as the industry structure shifts considerably or, there are new input-output tables available from Statistics New Zealand. Minor changes have been made to the spend ratios where changes in legislation have meant that the base ratios are no longer appropriate, or where particular spend categories have grown faster than the rate of inflation (such as fuel costs). Other changes brought about by the availability of survey data on passenger expenditure patterns have been applied to better reflect the structure of the recent and forecast season.

However, the scope of this assessment is essentially unchanged from earlier studies; focusing on understanding expenditure by cruise lines, passengers and crew over the cruise season.

1.2 Objectives

This paper has two main objectives and a number of related secondary objectives. The first is to establish the size and nature of the cruise industry in New Zealand for the 2007/08 season by collating the number of passengers, ships, and cruises that visited New Zealand, and to estimate the impact the industry has on the economy. This has involved the following:

- Estimating the total economic output generated by ship visits;
- Calculating the direct, indirect and induced contribution to gross output, value added and GDP;
- Estimating the effective employment generated, as full time equivalents (FTEs);
- Estimating the distribution of economic impact by major port-of-call and region.

A second key objective involves providing some estimates of economic impact for the upcoming 2008/09 season based on pre-bookings and current expenditure ratios. This is to provide guidance and information to port authorities, local authorities and Cruise New Zealand seeking to secure cooperation and consideration of the needs of this high value sector of the tourist market.

1.3 Report Structure

Section 2 of this report explains the methodology used, including vessel classification, data collection and economic impact analysis. Section 3 reports on the direct spend results for the 2007/08 season by size band of ship and by cruise, passenger and crew contributions. It also includes a breakdown of that expenditure by port and region. Section 4 gives the results of national economic impacts of the 2007/08 season, while Section 5 gives the estimated forecast economic impacts of the up-coming 2008/09 season. Section 6 includes a regional breakdown of economic impacts over the last season and estimates for the coming season. Section 7 includes a brief summary showing the national economic impacts (under the 2003 base model) from the 2000/01 season to the upcoming (forecast) season of 2008/09.

2 Methodology

2.1 Introduction

To estimate the economic impacts of cruise ships on the New Zealand economy this report applies an Economic Input Output model (2003, inflation adjusted) that calculates the flow on effects of direct expenditure generated by the cruise lines, their passengers and crew whilst in New Zealand. The model is generated at a national level and therefore generates multipliers for New Zealand as a whole.

2.2 Cruise Data Collection

A schedule of all port arrivals by date and vessel was provided for the 2007/08 season. The season has been defined as beginning on 24th of September 2007 with the arrival of the Regal Princess in Auckland. It was followed 23 days later by the arrival of the Statendam and a steady stream of ships through to 24th of April 2008 when the Sapphire Princess left Auckland. In addition to the main summer season, the Pacific Star and Sun Princess that runs voyages between New Zealand and the Pacific Islands during the winter is also included. As these voyages are dominated by New Zealand passengers, the majority of passenger related expenditure in the model is based on international visitors, but crew and ship expenditure is included. This is because spend by New Zealanders is not considered to be additional spend in the local economy.

A complete model of the vessel movements was generated from port schedules, cross checked with information provided by McKay Shipping Limited (shipping agents) on all stop-overs, including minor ports.

Accurate passenger and crew numbers were also provided by Cruise New Zealand along with information on ship tonnage and port charges. This enabled confident appraisals of the numbers of passengers on board at any one time, the numbers embarking and disembarking at key ports and to help ensure that double counting of passengers was eliminated.

These figures are used in preference to International Visitor Arrivals data collected by Statistics New Zealand and NZ Customs, as it includes those passengers listed as being in transit. These are people that are not embarking or disembarking in New Zealand so do not fill in arrival card information and are not collated with the official government statistics. However, they represent a significant portion of the total and their impacts need to be included in this study.

Vessel Classification

For the purposes of this report, all expenditure has been classified according to the GRT of the vessel. Table 2.1 outlines which vessels from the 2007/08 and 2008/09 seasons fall into each GRT band. All ships have been classified into 4 bands ranging from less than 20,000 tonnes to more than 50,000 tonnes. GRT and passenger numbers are considered the most relevant means of understanding costs and expenditure in New Zealand ports, compared to the earlier system of basing costs on vessel 'star' class/rating. Anecdotal evidence also points towards passenger nationality being a stronger determinant of potential daily spend rather than 'class' of vessel.

Table 2.1 Classification of Cruise Vessels Visiting New Zealand 2007-08 and 2008-09

Vessel Band	GRT Range	Vessel Name 2007/08	Vessel Name 2008/09 (f)
1	50,000-70,000	Amsterdam Aurora Crystal Serenity Mercury Queen Elizabeth 2 Queen Victoria Regal Princess Rhapsody of the Seas Sapphire Princess Statendam Sun Princess	Aurora Crystal Serenity Dawn Princess Diamond Princess Millennium Oriana Queen Victoria Queen Mary 2 Rhapsody of the Seas Sun Princess Volendam
2	35,000-50,000	Asuka II Pacific Star Pacific Sun Seven Seas Mariner Seven Seas Voyager	Asuka II Pacific Sun Seven Seas Mariner Seven Seas Voyager
3	20,000-35,000	Albatros Amadea Black Watch Delphin Voyager Nautica Pacific Princess Saga Rose Scholar Ship Silver Whisper Topaz (peace boat)	Amadea Nautica Nippon Maru Royal Princess Saga Rose Silver Shadow Silver Whisper Tahitian Princess The Scholarship
4	5,000-20,000	Astoria Clipper Odyssey Oceanic Discoverer Orion Van Gogh	Bremen Clipper Odyssey Columbus Oceanic Discoverer Orion

Cruises in New Zealand waters also vary considerably in length of stay. For the purposes of this report a “cruise” has been defined as beginning at the first New Zealand landfall, then continuing until either a complete passenger change or it leaves New Zealand waters.

By matching vessels and passengers to ports, estimates of regional impacts can be produced with the proviso that certain expenditure will be focused on a few ports such as Auckland or Lyttelton (bunkering, re-provisioning, flights) which means some expenditures are not shared regionally.

2.3 Ship, Crew and Passenger Expenditure

Having established the scale of the industry in terms of numbers of vessels, cruises and passengers, the next step is to quantify their impacts on New Zealand’s economy.

Direct expenditure from the cruise industry has been classified into its component parts:

- Cruise Vessel related

This covers all expenditure related to the cruise and the operation of the cruise vessel. It includes ship specific expenses such as; port costs, marine expenses, bunkering and maintenance as well as; passenger flights to join the cruise, pre- and post-cruise packages booked with the cruise, re-provisioning costs, and various crew related expenses such as crew exchanges, crew accommodation and re-positioning flights.

- Cruise Passenger related

This covers all incidental expenditure that occurs as a result of a cruise but is not necessarily part of the cruise itself. It includes items such as; all retail expenditure on shore, all café and restaurant expenditure on shore, sightseeing day trips whilst in port (excursions) and other services such as visits to doctors.

- Cruise Crew related

This includes all staff spending whilst in port – except that related to crew changes that are paid for by the cruise lines. It includes spend on: retail goods, personal services, casinos, recreational activities and transport.

Cruise vessels, their crews and the passengers spend money on a wide range of goods and services in the New Zealand economy. It is beyond the scope of this report to investigate the details of every transaction that occurred. By necessity averages have been applied within each vessel size category.

Providoring in New Zealand

It is important to note that New Zealand suppliers are mainly asked to provide fresh vegetables and fruit as well as some dairy products for cruise vessels rather than providing a comprehensive range of food stuffs. The relatively high New Zealand dollar in relation to the US dollar restricts the ability of New Zealand to supply a wider range of goods. The majority of food stuffs are freighted into New Zealand in climate controlled containers and loaded aboard. This ensures consistency of product and often ensures that the tastes of passengers are met.

Given that cruise lines are extremely price conscious they are often buying product globally at specific price points. For example, many are reluctant to pay more than \$US3-\$US5 for a bottle of wine. They also require the wine to be available globally. Many New Zealand suppliers simply cannot meet these requirements and therefore do not get the opportunity to supply the sector. Often the only time significant volumes of product is used is when a ship has a specific “New Zealand” night in the dining halls.

This has led to a reduction in the volume of product sourced locally and intense pressure on New Zealand based suppliers to offer the most cost effective options. The economic impact of this is a reduction overall in the amounts being spent locally and an increase in the amount of product shipped into NZ to meet the needs of cruise passengers and ships.

Cruise Passenger and Crew Spend

Cruise passenger related expenditure is that spent directly by the passenger whilst in port or on shore based excursions. This covers the excursions themselves and retail expenditure by passengers on food, entertainment and souvenirs.

Historically this has been the area of greatest uncertainty in the model. For the previous report and in the absence of survey data an estimate of \$225/day/passenger was applied (YE December 2006) to estimate retail spend while in port. This was based on studies of tourism impact and averaged International Visitor Survey (IVS) spending data (weighted by passenger nationality mix and a Cruise Industry Factor of 1.5).

However, during the current 2006/07 season Tourism New Zealand carried out a survey of passengers through the Port of Tauranga. This survey asked a range of questions relating to activity, experiences and satisfaction whilst cruising in New Zealand and questions about expenditure. The survey represented a snapshot of a portion of the industry, as the majority of respondents originated on two vessels (Statendam and the Sapphire Princess made up around 92% of the 550 responses). However, those vessels represent a high proportion of the industry overall (55% of passengers).

In addition to the survey figures Cruise New Zealand has had access to information from similar surveys carried out in the Australian Cruise market. The averages provided from that survey in combination with the Tourism NZ survey numbers and information from Cruise New Zealand covering the actual cost of undertaking certain activities and excursions in New Zealand has been combined to produce expenditures that are then applied to passengers days spent in port and for pre and post tour excursions and activities.

Crew related expenditure figures reported in previous studies are estimates and did not have the rigor that would come from a structured survey into their spending habits. The assumptions in the previous models have been tested against crew spend data from an Australian Survey conducted by AEC Group. This data was used to update our models assumptions, the results show that the previous assumptions were reasonable close to the likely spend levels. The resulting changes have caused a small decline in the overall economic impact from the industry.

2.4 The Economic Model

Market Economics apply a set of Input Output models to the direct expenditure to assess the indirect and induced effects of spend to produce a total economic impact. Details of the model used to calculate the flow on effects of the cruise industry are appended to the 2007/08 report produced for Cruise New Zealand. It is important to note that in order to accurately assess economic impacts, total expenditure has been split between cruise related (for which specific cruise industry multipliers have been calculated) and passenger and crew related (which are passed through standard economic multipliers). Total economic impact is simply the addition of these two components.

3 Direct Expenditure - 2007-2008 Season

3.1 Introduction

When a cruise vessel arrives in New Zealand it begins a long chain of economic transactions that add employment and value in the New Zealand economy. Expenditure occurs well before a vessel docks, and continues after it leaves. In the interim, direct expenditure occurs across several sectors and regions of New Zealand.

To add structure to this information, direct expenditure has been divided into three major categories:

- Passenger related expenditure;
- Crew related expenditure;
- Cruise related expenditure.

These relate to specific elements of the industry and help to refine the analysis. The information is reported across the different size bands of vessel by category of spend and total spend is also disaggregated by port and region.

3.2 Cruise Season Details 2007-2008

As a base for establishing expenditure levels in New Zealand for the 2007/08 season, it is important to accurately assess cruises in terms of ports visited, numbers of passengers and duration of cruise by size band of cruise vessel.

Cruises

Over the 2007/08 season 31 different vessels offered 98 separate cruises in (or from) New Zealand waters. This compares with 2006/07 season 24 different vessels offered 69 separate cruises, 2005/06 season 22 different vessels offered 69 separate cruises, 22 vessels offering 50 cruises in 2004/05, 21 vessels offering 44 cruises in the 2003/04 season, 22 vessels offering 62 cruises in 2002/03 and 16 vessels offering 59 cruises in the 2001/02 season. In the 2007/08 season, 23 cruises (23%) were the small Band 4 vessels, 13 cruises (13%) were Band 3 vessels, 22 cruises (22%) were Band 2 vessels, and 40 cruises (41%) were the large Band 1 vessels. As the size of the vessel directly correlates to the number of passengers it can carry, Band 1 vessels also carried 65% of all passengers, 26% of passengers by Band 2 vessels, followed by 7% and 2% respectively for Band 3 and 4 vessels.

Table 3.1 Passenger and Cruise Summary 2007-08 Season

Vessel Band	GRT Range	Vessels	Cruises	Passengers Carried	Port Passenger Days in NZ
1	50,000-70,000	11	40	75,962	388,099
2	35,000-50,000	5	22	30,364	34,417
3	20,000-35,000	10	13	7,616	23,897
4	5,000-20,000	5	23	2,260	5,665
TOTAL		31	98	116,202	452,078

Over the past eight seasons there have been some significant changes in the type and nature of vessels and cruises offered in New Zealand. In general, vessels are getting larger, however in any two given years the vessel mix can vary widely. Vessels fall into three broad categories – round the world vessels (such as Queen Elizabeth II) that travel seasonally around the world and passengers purchase sections or all of the trip, vessels that are positioned in a set of waters for a season (such as the Clipper Odyssey in the 2007/08 season), and those based in Australasia for the season. These ships carry out a number of cruises around New Zealand ports before departing to other locations.

Cruise lines vary the location of ships they place. This is because repeat passengers are often loyal to one cruise ship (even to one cabin), therefore it is important to vary the location to ensure this business remains. Cruise lines also change where round the world vessels call. These vessels will often alternate between two areas in similar parts of the globe. It is difficult to predict with any real certainty what is likely to happen before pre bookings are established. Table 3.2 shows the split of cruises over the past eight seasons.

Table 3.2 Cruise Vessel Summary – Trends in Voyages 2000 - 2008

Vessel Band	GRT Range	2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	11	24	19	9	11	18	23	14
2	35,000-50,000	6	5	22	11	10	20	12	47
3	20,000-35,000	11	9	10	7	11	10	8	13
4	5,000-20,000	23	21	11	17	18	21	26	24
TOTAL		51	59	62	44	50	69	69	98
Share of Cruises		2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	22%	41%	31%	20%	22%	26%	33%	14%
2	35,000-50,000	12%	8%	35%	25%	20%	29%	17%	48%
3	20,000-35,000	22%	15%	16%	16%	22%	14%	12%	13%
4	5,000-20,000	45%	36%	18%	39%	36%	30%	38%	24%
TOTAL		100%	100%	100%	100%	100%	100%	100%	100%

Passengers and Passenger Port Days

In total some 116,202 passengers embarked and/or disembarked or were in transit in New Zealand as a direct result of the 2007/08 cruise ship season. Specifically, 28,304 passengers disembarked a cruise ship in New Zealand, 50,257 embarked a cruise ship in New Zealand and 37,641 passengers were in transit but still visited New Zealand ports (Appendix 2). For the purposes of this study however, 110,973 unique passengers are considered to have participated in New Zealand oriented voyages in the 2007/08 season the difference being vessels arriving and passengers disembarking without cruising New Zealand waters (Table 3.3).

Table 3.3 Cruise Passenger Summary – Trends

Vessel Band	GRT Range	2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	22,334	36,009	28,435	21,350	23,979	35,722	44,303	75,962
2	35,000-50,000	7,075	11,025	16,614	14,650	15,912	23,612	12,735	30,364
3	20,000-35,000	8,948	6,417	3,685	4,795	7,242	5,102	4,701	7,616
4	5,000-20,000	6,156	4,108	2,100	4,315	2,587	2,433	3,650	2,260
TOTAL		44,513	57,559	50,834	45,110	49,720	66,869	65,389	116,202
Share of Passengers		2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	50%	63%	56%	47%	48%	53%	68%	65%
2	35,000-50,000	16%	19%	33%	32%	32%	35%	19%	26%
3	20,000-35,000	20%	11%	7%	11%	15%	8%	7%	7%
4	5,000-20,000	14%	7%	4%	10%	5%	4%	6%	2%
TOTAL		100%	100%	100%	100%	100%	100%	100%	100%

Whilst it is important to understand how many cruise passengers are visiting New Zealand, it is more important from an economic standpoint to know how many passenger days are spent in New Zealand waters and particularly in the ports, as this defines spending opportunities and vessel expenditures.

In total 452,080 passenger port days were spent in New Zealand during the 2007/08 season (Table 3.4) – an overall average of 3.89 port days per passenger. This represents a large increase over the 2002/03 season where 172,170 passenger days were spent in New Zealand ports (the average port days per passenger was 4.1). Of total port days in 2007/08, 86% were made by the largest Band 1 vessels, followed by 8% by the smaller Band 2 vessels. Table 3.4 outlines total passenger port days in New Zealand waters for the past eight seasons.

Table 3.4 Passenger Port Days Spent in New Zealand

Vessel Band	GRT Range	2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	64,588	180,860	110,104	84,325	95,831	178,327	209,328	388,099
2	35,000-50,000	14,880	17,375	47,045	19,950	27,173	50,695	23,716	34,417
3	20,000-35,000	22,334	21,344	8,622	18,760	26,158	23,363	22,790	23,897
4	5,000-20,000	18,015	18,650	6,399	20,955	10,930	16,878	12,753	5,665
TOTAL		119,817	238,229	172,170	143,990	160,092	269,263	268,587	452,078
Share of Passenger Port Days		2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	54%	76%	64%	59%	60%	66%	78%	86%
2	35,000-50,000	12%	7%	27%	14%	17%	19%	9%	8%
3	20,000-35,000	19%	9%	5%	13%	16%	9%	8%	5%
4	5,000-20,000	15%	8%	4%	15%	7%	6%	5%	1%
TOTAL		100%	100%	100%	100%	100%	100%	100%	100%

Finally, it is important to understand the nationality mix of cruise passengers, as nationality has been used to estimate average retail expenditures while in port. While no official statistics are recorded that cover the entire sector, Cruise New Zealand collate accurate statistics on passenger nationality from information provided directly by each ship.

Table 3.5 outlines the nationality mix for the 2007/08 season. It is important to note that there are a significant number of New Zealanders that cruise during any one year (20%). These are primarily up to the Pacific Islands during the early winter months on the Pacific Sky and Pacific Sun. They also visit NZ ports on both trans-Tasman and world voyages. Cruises to NZ are dominated by American passengers (31%). Australians account for 19% of passengers and 11% are from the United Kingdom.

Table 3.5 Nationality of Cruise Passengers, 2007-08 Season

Nationality	Passenger Estimates	Share of Total
USA	35,814	31%
Canada	8,250	7%
German	4,013	3%
United Kingdom	12,812	11%
Other/Not Spec	5,781	5%
Australian	22,563	19%
Asian	3,602	3%
NZ	23,367	20%
Total	116,202	100%

Crew and Crew Days

Each vessel also has a set number of crew required to cater for the passengers. There is a limited amount of crew exchanging that occurs whilst in New Zealand but the bulk of the crew remain with the ship during its time in New Zealand waters. For example, 40 crew may exchange per cruise (ie, 80 people) on Band 1 vessels, dropping to 30 exchanged on each Band 2 cruise and correspondingly less on Band 3 and 4 cruises. Cruise NZ note that the lines advise that due to comparative compliance issues in Australia; that more crew will be exchanged in New Zealand .

In most ports, crew will go ashore and spend on a variety of retail items. Table 3.6 shows the number of crew port days in the last eight seasons. In this last season there were 209,210 crew port days, up from 2001/02 season with 123,350 crew port days. Intuitively, most of the crew port days are associated with the larger vessels – 82% on Band 1 cruises and 9% on Band 2. These proportions vary slightly from passenger port days as the class rating of a vessel – which is independent of GRT, can often mean a higher ratio of staff per passenger on top class vessels.

Table 3.6 Cruise Crew Port Days Summary

Vessel Band	GRT Range	2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	30,052	84,027	53,562	38,595	42,256	44,022	91,967	172,428
2	35,000-50,000	8,475	9,195	40,987	9,338	17,245	26,043	21,225	18,215
3	20,000-35,000	14,508	15,328	8,238	10,585	17,407	10,368	12,384	15,261
4	5,000-20,000	14,810	14,803	5,266	12,681	9,538	10,106	9,357	3,306
TOTAL		67,845	123,353	108,053	71,199	86,446	90,539	134,933	209,210
Share of Crew Port Days		2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
1	50,000-70,000	44%	68%	50%	54%	49%	49%	68%	82%
2	35,000-50,000	12%	7%	38%	13%	20%	29%	16%	9%
3	20,000-35,000	21%	12%	8%	15%	20%	11%	9%	7%
4	5,000-20,000	22%	12%	5%	18%	11%	11%	7%	2%
TOTAL		100%	100%	100%	100%	100%	100%	100%	100%

3.3 Direct Expenditure Estimates

Direct expenditure estimates have been based on the inflation adjusted 2003 spend ratios applied to the cruise and passenger details of the latest season. Each cruise is assessed using these spend ratios, meaning expenditure can be disaggregated between ports and regions according to their cruising schedule for more detailed localised assessments.

Cruise Industry Expenditure

The largest expenditure category is that related to the vessels presence in New Zealand waters. This includes not only the physical presence of the ship and the associated costs of running, berthing and maintaining the ships, but also cruise related passenger and crew activity – activities that are directly attributable to the cruises in New Zealand. This includes:

- spend by vessels on fuel, berthage, security, stevedoring, port fees etc;
- cruise passenger spend on flights, pre- or post- package accommodation;
- spend by the cruise lines on moving crew to and from New Zealand;
- spend on provisioning for all passengers and crew while on board;
- spend on onboard entertainment.

It is these expenses that make up the cruise industry in New Zealand. The specific (2003) cruise industry multipliers developed for this study are applied to these components of expenditure. As discussed in more detail in Section 2, passenger and crew spend has been limited to independent expenditure (primarily on retail) while in port or before and after cruises – in the same way as any international tourist might spend. For this component of expenditure, normal national retail multipliers are applied and the combined economic impacts from this and the cruise related expenditure form the total economic impact of the cruise season.

In total \$322.8m of cruise related expenditure occurred in the 2007/08 season (Table 3.7). Band 1 cruises accounted for \$226.8m (70%), Band 2 cruises \$70.9m (22%). The smaller Band 3 cruises accounted for \$17.6m in direct spend (5%) and the small Band 4 cruises the remaining \$7.7. In total cruise related expenditure accounts for 2% of the total direct expenditure in the 2007/08 season (Table 3.10).

Note that this total includes the entire amount paid by the cruise lines and independent travellers for external air travel and for bunker fuel oil. It is important to account for this as part of the total activity associated with the industry, however, it is noted that only around 20% of airline spend and 10% of bunker fuel spend “sticks” to the national economy. The bulk of this expenditure flows offshore.

Table 3.7 Cruise Industry Related Direct Expenditure 2007-08 Season (NZ\$m)

Vessel Band	GRT Range	2007-2008*	Share of Total
1	50,000-70,000	\$ 226.60	70%
2	35,000-50,000	\$ 70.91	22%
3	20,000-35,000	\$ 17.63	5%
4	5,000-20,000	\$ 7.68	2%
TOTAL		\$ 322.83	100%

* Incorporates total amount spent on ship fuel and international airfares

Cruise Passenger Expenditure

Passenger related expenditure covers all expenditure that is not directly tied to the activities of the cruise itself. This is primarily retail spend while on excursions or during free time spent ashore (during port stops or before or after the cruise). Total passenger spend in the 2007/08 season was \$86.2m, or an average of \$741.44 each. Passenger spend accounts for 21% of total expenditure (Table 3.10). Table 3.8 outlines passenger related expenditure by size band of vessel.

Table 3.8 Passenger Related Spend 2007-08 Season (NZ\$m)

Vessel Band	GRT Range	2007-2008	Share of Total
1	50,000-70,000	\$ 73.23	85%
2	35,000-50,000	\$ 7.10	8%
3	20,000-35,000	\$ 4.40	5%
4	5,000-20,000	\$ 1.42	2%
TOTAL		\$ 86.16	100%

The largest category is the Band 1 cruise passengers, as the large volume of this group translates to total passenger spend of \$73.2m (85%, at an average spend of \$964 per passenger). Band 2 cruise passengers spent a total of \$7.1m (8% or \$234 per passenger). Band 3 passengers spent a total of \$4.4m (5% or \$578 per passenger while in New Zealand). Lastly, the passengers on the smallest boats spent \$1.4m in New Zealand (2%), the average spend was the \$629 each.

The variations in average spend reflects the mix of vessels in terms of their passenger market (Americans versus Europeans for example) and their number of port days, which dictates a large part of passenger opportunities to spend money and is determined by their cruising route and schedule. All passengers on the Band 4 Clipper Odyssey for example, undertake a domestic flight between Auckland and Queenstown and an overland tour between Queenstown and Milford Sound. This is reflected in the high spend/passenger for this group.

Cruise Vessel Crew Expenditure

The final category of spend covers crew related spend. As with passenger spend, crew related expenditure covers only that money spent independently in New Zealand while in port or before and after cruises - primarily retail spend. Total crew spend in the 2007/08 season was \$3.9m (Table 3.9). Crew spend accounts for less than 1% of total expenditure (Table 3.10) – this is because all of their food, flights, accommodation (if necessary) etc., is included in their employment and is therefore part of the cruise related spend. Table 3.9 outlines crew related expenditure by size band of vessel.

Table 3.9 Crew Related Expenditure 2007-08 Season (NZ\$m)

Vessel Band	GRT Range	2007-2008	Share of Total
1	50,000-70,000	\$ 2.37	61%
2	35,000-50,000	\$ 0.79	20%
3	20,000-35,000	\$ 0.56	15%
4	5,000-20,000	\$ 0.14	4%
TOTAL		\$ 3.85	100%

Crew on Band 1 cruises spent the most at \$2.4m (61% of total crew spend). Band 2 crew spent \$790,000 or 20% of the total. Bands 3 and 4 crew spent a combined total of \$700,000 (15% and 4% respectively).

Total Direct Expenditure

Summing the components of expenditure detailed above gives total cruise season direct expenditure for the 2007/08 season of \$412.8m (Table 3.10).

Table 3.10 Total Direct Expenditure 2007-08 Season (NZ\$m)

Vessel Band	GRT Range	Passenger Related	Crew Related	Cruise Industry Related *	Total Direct Expenditure *
1	50,000-70,000	\$ 73.23	\$ 2.37	\$ 226.60	\$ 302.19
2	35,000-50,000	\$ 7.10	\$ 0.79	\$ 70.91	\$ 78.80
3	20,000-35,000	\$ 4.40	\$ 0.56	\$ 17.63	\$ 22.60
4	5,000-20,000	\$ 1.42	\$ 0.14	\$ 7.68	\$ 9.24
TOTAL		\$ 86.16	\$ 3.85	\$ 322.83	\$ 412.84
Share of Total Direct Expenditure		Passenger Related	Crew Related	Cruise Industry Related	Total Direct Expenditure
1	50,000-70,000	24%	1%	75%	73%
2	35,000-50,000	9%	1%	90%	19%
3	20,000-35,000	19%	2%	78%	5%
4	5,000-20,000	15%	1%	83%	2%
TOTAL		21%	1%	78%	100%

* Incorporates total amount spent on ship fuel and international airfares

3.4 Regional Economic Impacts

Cruise vessel based tourism is not limited to a single area. The ships made a total of 342 stops or port calls throughout New Zealand, 203 in the North Island and 139 in the South Island. Passengers undertook land based excursions all over New Zealand and spent money in many different areas. In this section of the report an attempt is made to allocate expenditure to the various regions it is most likely to have occurred in.

A number of assumptions have had to be made due to a lack of hard facts about how much is spent by passengers, and where. It is assumed that passengers spend an equal amount per day in each port and that retail spending only occurs in major ports i.e., excluding Milford Sound, Ship Cove, Kawau and other small stopovers. It is also assumed that pre- and post-cruise expenditure only occurs in Auckland, and fuel bunkering occurs mainly in Auckland followed by Tauranga, Lyttelton and other ports when these three main ports are not on the cruise route. In addition, international airfares have been isolated out in total rather than distorting the total for Auckland (where the exchanges occur), however the reality this is where the spend occurs.

Table 3.11 Port Disaggregation of Cruise Industry Direct Spend 2007-08 Season

Port	Direct Expenditure (\$'000s)	Port Share of Direct Expenditure
Bay of Islands	\$ 3,686	2.2%
Auckland	\$ 86,833	52.7%
Tauranga	\$ 15,373	9.3%
Gisborne	\$ 160	0.1%
Napier	\$ 7,613	4.6%
Wellington	\$ 10,698	6.5%
Nelson	\$ 166	0.1%
Ship Cove	\$ 2	0.0%
Picton	\$ 2,040	1.2%
Kaikoura	\$ 17	0.0%
Lyttelton	\$ 16,031	9.7%
Akaroa	\$ 23	0.0%
Dunedin	\$ 15,097	9.2%
Stewart Isl	\$ 11	0.0%
Fiordland	\$ 7,051	4.3%
Bluff	\$ 27	0.0%
TOTAL REGIONS	\$ 164,829	100%
OTHER NEW ZEALAND		
Ship Fuel	\$ 10,200	
International Airfares	\$ 29,052	
TOTAL NEW ZEALAND	\$ 204,082	
INTERNATIONAL		
Ship Fuel	\$ 91,804	
International Airfares	\$ 116,207	
TOTAL CRUISE INDUSTRY	\$ 412,092	

While most spend has a known port location, some expenditure is more easily estimated at the per voyage or season level. To ensure that this is encapsulated in the analysis, the assumption has been made that this spend occurs in Auckland in most cases, or alternatively is spread across each port

according to their share of total port passenger days. Table 3.11 outlines the (implied) direct expenditure associated with each port.

The largest port share is captured by Auckland 52.7% or \$86.8m (excluding air transport and bunkering). The majority of cruises either begin or end in Auckland therefore it captures the pre- and post-cruise activity. As well as capturing most of the provedoring, Auckland captures most of the bunkering, and the New Zealand portion of airline spend. This has the effect of lifting direct expenditure to around \$123.8m in the Auckland economy.

Table 3.12 aggregates the port expenditure into regions. In total the Auckland region captures 53% of regional direct expenditure with 10% going to Canterbury and 9% to Otago.

Table 3.12 *Region Disaggregation of Cruise Industry Impacts 2007-08 Season*

Region	Direct Expenditure (\$m)	Region Share of Direct Expenditure
Northland	\$ 3.7	2%
Auckland	\$ 86.8	53%
Bay of Plenty	\$ 15.4	9%
Gisborne	\$ 0.2	0%
Hawke's Bay	\$ 7.6	5%
Wellington	\$ 10.7	6%
Nelson	\$ 0.2	0%
Marlborough	\$ 2.0	1%
Canterbury	\$ 16.1	10%
Otago	\$ 15.1	9%
Southland	\$ 7.1	4%
TOTAL	\$ 164.8	100%

4 National Economic Impacts 2007-08

The direct expenditure by passengers, ship owners and crew generates second and subsequent rounds of spending as businesses, either supplying the sector directly (providing companies, bus tour operators, retail outlets etc) or indirectly (farmers, manufacturers etc) increase their demands for intermediate goods and services, labour and capital to meet the needs of cruise vessels and tourists. This in turn causes suppliers to produce more goods, pay more wages or employ more workers; these transactions are called the **indirect effects**. Workers and owners are paid wages for the additional work they do or take additional profits which are in turn saved or spent (generating additional activity). These are termed the **induced effects**.

Having established the scale of direct economic impacts, indirect, induced and employment impacts can be estimated by applying national level Cruise Industry multipliers (as described in Methodology, above). Multipliers are a simple way to measure the flow on effects throughout the economy arising from additional direct expenditure. They are expressed as a 'multiple' that is applied to the value of direct expenditure to generate total value added, total gross output or additional employment. In effect multipliers mimic the operation of the economy by summing sales of intermediate goods and services that make up final goods purchased by the cruise industry.

It is important to understand that multipliers assume the economy is operating at full capacity and that the additional spend generated by the cruise sector will create 'new' employment or new activity rather than utilise spare capacity. It is also important to focus on the beneficial effects of additional economic activity – that is those components that contribute to New Zealand's Gross Domestic Product (GDP). If all that was achieved by cruise ships visiting New Zealand was increased imports, then there are no benefits to the country. Contributions to GDP are measured by assessing the **Value Added** component of activity generated by the cruise industry. This is done by way of the Value Added ratio and multiplier.

Table 4.1 presents the total economic effects of the cruise industry throughout the New Zealand economy for the 2007/08 season.

Table 4.1 Summary Direct, Indirect, Induced and Employment Impacts 2007-08 Season

Economic Impact	Total Industry	Cruise Related	Passenger and Crew Related
Economic Impacts (\$m)			
Expenditure *	\$ 204.8	\$ 114.8	\$ 90.0
Total Output	\$ 406.4	\$ 191.9	\$ 214.5
Direct Value Added	\$ 89.0	\$ 46.0	\$ 42.9
Total Value Added	\$ 182.2	\$ 81.5	\$ 100.7
Employment Impacts (FTE Years)			
Direct Employment	1,423	445	978
Total Employment	2,790	1,113	1,676

* Note that for the Economic Impact Assessment, direct expenditure excludes the majority of spend on international airfares and ship fuel that does not stay in the NZ economy

In total, the \$204.8m of direct expenditure that “sticks” to the New Zealand economy³, generated almost \$406.4m in total economic activity during the 2007/08 season. Of this total \$182.2m was contribution to GDP (Total Value Added). The equivalent of 2,790 full time jobs was sustained by the direct, indirect and induced activity associated with the Cruise Industry. The total can be broken down into two main components – Cruise related and Passenger and Crew related.

Cruise related expenditure accounted for \$114.8m in direct spend and \$81.5m in total value added, sustaining 1,113 FTE’s overall. Passengers and Crew spent approximately \$90.0m directly generating \$214.5m in total economic activity and \$100.7m in total value added. This spend sustained 1,676 full time equivalent employees (Table 4.1).

Table 4.2 Economic Impacts by Band 2007-08 Season

Vessel Band	Direct Expenditure (\$m) *	Total Output (\$m)	Total Value Added (\$m GDP)	Total Employment (FTE years)	Share of Direct Expenditure
1	\$ 154.3	\$ 311.9	\$ 140.6	2,045	75%
2	\$ 32.4	\$ 59.3	\$ 25.9	474	16%
3	\$ 12.7	\$ 25.0	\$ 11.2	191	6%
4	\$ 5.4	\$ 10.2	\$ 4.5	80	3%
TOTAL	\$ 204.8	\$ 406.4	\$ 182.2	2,790	100%

* Note that for the Economic Impact Assessment, direct expenditure excludes the majority of spend on international airfares and ship fuel that does not stay in the NZ economy

Segmenting the impact by band highlights the dominance of larger vessels. Band one accounts for 75% of the direct expenditure and generates \$140.6m in total value added. Band two accounts for 16% of total spend with Bands 3 and 4 accounting for 6% and 3% respectively (Table 4.2).

It is important to understand the difference between Total Economic Output and Total Value Added. Total economic output measures all transactions in the economy including; imports, raw materials, and the purchase of goods already manufactured, whereas total value added measures only **additional value generated** in the economy – essentially, it is the cruise industry’s contribution to GDP. **Total Value Added is the most important measure of economic impact as this is the component that makes the nation as a whole better off.**

The 2007/08 season the cruise industry contributed \$182.2 to GDP in New Zealand.

The per passenger contribution to GDP increased from \$1,400 in 2000/01 to \$2,440 in 2001/02, however it declined to \$1830 in 2002/03, even further to \$1,380 in 2004/05. In the 2005/06 season impact jumped to \$1,930 per passenger, the sudden increase was reversed in the 2006-07 season with a drop back to \$1,670. In the current season the value added per passenger has recovered to \$1,570. On a per cruise basis the average contribution to GDP in 2002/03 was \$1.5m. This has increased to \$1.86m per cruise in 2007/08. Table 4.3 shows these trends.

³ Note that total industry spend equated to \$236m. This is comprised of \$123.1m in New Zealand and \$113.9m of external airfares and bunker fuel

Table 4.3 Contribution to GDP 2006-07 Season

GDP Contribution	2000-2001	2001-2002 (f)	2002-2003	2003-2004 (f)	2004-2005	2005-2006	2006-2007	2007-2008
Total (\$m)	\$ 62.14	\$ 140.50	\$ 92.90	\$ 69.80	\$ 68.39	\$ 129.29	\$ 109.51	\$ 182.19
Per Passenger (\$)	\$ 1,400	\$ 2,440	\$ 1,830	\$ 1,550	\$ 1,380	\$ 1,930	\$ 1,670	\$ 1,570
Per Cruise (\$m)	\$ 1.22	\$ 2.38	\$ 1.50	\$ 1.59	\$ 1.37	\$ 1.87	\$ 1.59	\$ 1.86

5 Forecast 2008-09 Season Impacts

It is possible to provide some estimates of the likely impacts from the 2008/09 cruise season which begins around 18 October 2008 with the Dawn Princess exchanging passengers in Auckland, followed a day later with the Volendam arriving in the Bay of Islands. Advance cruise bookings are known, however not all passenger numbers are known so are estimated using average occupancy rates for passengers and crews applied to vessel passenger and crew capacities. Even though many costs will increase slightly over the one year period, average expenditures used for the 2008/09 season are applied to the forecast schedule and passengers to produce estimates of the economic impacts and implications of the upcoming season.

Cruise New Zealand are expecting 29 vessels providing 93 cruises during the 2008/09 season plus 7 winter cruises to the Pacific Islands. It is estimated that they will bring around 115,019 passengers to New Zealand (plus approximately 19,261 New Zealanders are expected to take cruises around the coast and up to the Pacific in winter). This gives a total cruising population of 134,280 (details of cruises are contained in Appendix 2).

5.1 Cruise and Passenger Numbers

As mentioned above a total of 100 cruises are anticipated during the 2008/09 season. Overall there will be almost 592,155 passenger days spent in New Zealand ports (Table 5.1). This represents a 31% increase in passengers days from the 2007/08 season where 98 cruises accommodated over 116,202 passengers for a total of 452,078 passenger days. Note that total passengers presented in Table 5.1 counts passengers cruising for the majority of their time in NZ waters and excludes those simply ending a cruise here.

Table 5.1 Cruise, Passenger and Passenger Day Estimates 2008-09 Season

Vessel Band	Vessels	Cruises	Passengers	Port Passenger Days
1	11	49	107,420	509,830
2	4	13	18,860	43,670
3	9	10	5,095	19,890
4	5	28	2,905	18,765
TOTAL	29	100	134,280	592,155

5.2 Direct Expenditure

Based on these figures, and spend/passenger day estimates from the 2007/08 season, direct expenditure and total economic impacts can be assessed. During the 2008/09 season \$478.0m of direct expenditure is expected to be generated by the cruise industry (Table 5.2). Note this includes all external airfares and bunkering costs. The total amount that is expected to stick to New Zealand is around \$240.0m (Table 5.3)

Table 5.2 Forecast Direct Cruise Industry Expenditure 2008-09 Season (NZ\$m)

Vessel Band	Passenger Related	Crew Related	Cruise Industry Related *	Total Direct Expenditure *
1	\$ 94.00	\$ 2.80	\$ 309.17	\$ 406.0
2	\$ 6.85	\$ 0.55	\$ 28.41	\$ 35.8
3	\$ 3.99	\$ 0.47	\$ 16.00	\$ 20.5
4	\$ 3.86	\$ 0.12	\$ 11.81	\$ 15.8
TOTAL	\$ 108.7	\$ 3.9	\$ 365.4	\$ 478.0

* Incorporates total amount spent on ship fuel and international airfares

The bulk of the expenditure is associated with large vessels (Band 1 accounts for 85% of spend). Overall, total direct expenditure is up on the 2007/08 season (\$312.1m) by 16% due mainly to the increase in cruise port days and consequent passenger port days.

5.3 Regional Expenditure

By utilising the forecast schedule of port visits it is possible to distribute direct expenditure across the various regions. The same caveats apply as for the 2007/08 analysis, that is, it is not possible to know exactly where money will be spent, however, by assuming an average daily spend and assuming ports provide excursions and opportunities for retail expenditure it is possible to provide some estimates of regional impact.

Table 5.3 Forecast Port Expenditure 2008-09 Season

Port	Cruise Industry Related (\$m)	Passenger and Crew Related (\$m)	Total Direct Expenditure (\$m)	Port Share of Direct Expenditure
Bay of Islands	\$ 0.74	\$ 4.74	\$ 5.49	2.8%
Auckland	\$ 58.84	\$ 27.59	\$ 86.43	44.4%
Tauranga	\$ 4.75	\$ 16.05	\$ 20.80	10.7%
White Island	\$ 0.08	\$ 0.12	\$ 0.19	0.1%
Gisborne	\$ 0.01	\$ 0.01	\$ 0.03	0.0%
Napier	\$ 2.10	\$ 8.64	\$ 10.74	5.5%
Wellington	\$ 3.21	\$ 13.16	\$ 16.37	8.4%
Nelson	\$ 0.03	\$ 0.06	\$ 0.09	0.0%
Ship Cove	\$ 0.01	\$ 0.01	\$ 0.02	0.0%
Picton	\$ 0.85	\$ 2.92	\$ 3.77	1.9%
Kaikoura	\$ 0.00	\$ 0.13	\$ 0.13	0.1%
Lyttelton	\$ 5.28	\$ 16.43	\$ 21.71	11.1%
Akaroa	\$ 0.05	\$ 0.80	\$ 0.85	0.4%
Port Chalmers	\$ 3.56	\$ 15.41	\$ 18.97	9.7%
Stewart Island	\$ 0.03	\$ 0.10	\$ 0.13	0.1%
Fiordland	\$ 2.47	\$ 6.46	\$ 8.93	4.6%
Bluff	\$ 0.06	\$ 0.01	\$ 0.07	0.0%
SUB-TOTAL	\$ 82.09	\$ 112.64	\$ 194.73	40.7%
NEW ZEALAND				
Bunkering	\$ 11.42		\$ 11.42	
External Airfares	\$ 33.82		\$ 33.82	
TOTAL NEW ZEALAND	\$ 127.33	\$ 112.64	\$ 239.97	50.2%
INTERNATIONAL				
Bunkering	\$ 102.79		\$ 102.79	
External Airfares	\$ 135.28		\$ 135.28	
TOTAL	\$ 365.40	\$ 112.64	\$ 478.04	

* A significant share of non-port specific spend is assigned to Auckland Region

It appears as though the proportion of spend in Auckland Region is likely to decrease from 52.7% to 44.4% as the total spend has decreased from \$86.8m to \$86.4m in the face of an overall increase in spend. For the Auckland region the data shows a significant decline in Class 2 ship visiting in 2008-09 this combined with a decrease in Class 3 ship visits has off set the growth from the Class 1 ships.

Other regions with a significant share of direct spend include Canterbury (11.7%), Otago (9.7%) and Bay of Plenty (Tauranga) with 10.8%. Note that Table 5.4 does not include the portion of external airfares and bunkering that is liable to remain within the New Zealand economy. Collectively they are expected to add a further \$42.0m – primarily to the Auckland economy.

Table 5.4 Forecast Regional Expenditure 2008-09 Season

Region	Cruise Industry Related (\$m)	Passenger and Crew Related (\$m)	Total Direct Expenditure (\$m)	Port Share of Direct Expenditure
Northland	\$ 0.74	\$ 4.74	\$ 5.49	2.8%
Auckland *	\$ 58.84	\$ 27.59	\$ 86.43	44.4%
Waikato	\$ -	\$ -	\$ -	0.0%
Bay of Plenty	\$ 4.82	\$ 16.17	\$ 20.99	10.8%
Gisborne	\$ 0.01	\$ 0.01	\$ 0.03	0.0%
Hawke's Bay	\$ 2.10	\$ 8.64	\$ 10.74	5.5%
Wellington	\$ 3.21	\$ 13.16	\$ 16.37	8.4%
Nelson	\$ 0.03	\$ 0.06	\$ 0.09	0.0%
Marlborough	\$ 0.86	\$ 2.94	\$ 3.79	1.9%
Canterbury	\$ 5.34	\$ 17.36	\$ 22.69	11.7%
Otago	\$ 3.56	\$ 15.41	\$ 18.97	9.7%
Southland	\$ 2.57	\$ 6.57	\$ 9.14	4.7%
TOTAL	\$ 82.09	\$ 112.64	\$ 194.73	100.0%

* In addition, a significant share of non-port specific spend is assigned to Auckland Region

5.4 National Economic Impacts

By applying the cruise industry base multipliers it is possible to forecast economic impacts at a national level from this level of expenditure. Direct expenditure of \$240.0m (the portion that remains within New Zealand) is expected to generate total gross output of \$487.0m, up from \$406.4m in the 2007/08 season. Total value added is expected to be \$219.0m, up from \$182.2m in 2007/08. This level of activity is expected to generate employment for about 3,221 full time equivalent workers (Table 5.6).

Table 5.5 Forecast Direct, Indirect, Induced and Employment Impacts 2008-09 Season

Vessel Band	Direct Expenditure (\$m) *	Total Output (\$m)	Total Value Added (\$m GDP)	Total Employment (FTE years)	Share of Direct Expenditure
1	\$ 199.9	\$ 407.6	\$ 183.6	2,428	83%
2	\$ 19.5	\$ 38.3	\$ 17.1	482	8%
3	\$ 10.8	\$ 21.7	\$ 9.7	187	5%
4	\$ 9.7	\$ 19.4	\$ 8.7	124	4%
TOTAL	\$ 240.0	\$ 487.0	\$ 219.0	3,221	100%

* Note that for the Economic Impact Assessment, direct expenditure excludes the majority of spend on international airfares and ship fuel that does not stay in the NZ economy

6 Regionalisation of Cruise Industry Impacts

6.1 Regionalisation Issues Caveats

It is possible to provide estimates of the economic impacts that flow from direct expenditure by cruise passengers, crew and cruise lines within each region. However, these figures should be viewed with caution. The Cruise Industry Model that generates multipliers to estimate the flow on effects of cruise related spend, has been constructed at a national level. This means that the economic impacts reported above are applicable to New Zealand as a whole. The reason behind this is to minimise error margins in the calculation.

It is however important to be able to present information at a regional level, in order to show the local effects of cruise ship visits around the country. This raises an issue in that applying a national level model to each of the regions is likely to overstate the local impacts because it implicitly makes the assumption that every industry present at the national level is available at a local level. While this may be true of the larger regions (Auckland, Wellington, Canterbury and Otago) it is not likely for the smaller regions (Northland and Southland).

The end result is an overstatement of the impacts in smaller regions and an understatement of impacts in the larger regions. This arises because the smaller regions will import from the larger regions to meet the needs of the cruise ships rather than produce everything locally.

However, this caveat only applies to the cruise industry related spend, it does not apply to passenger of crew related spend. This spend is able to be applied to a standard regional economic input-output model that takes account of the under representation of the industry in smaller regions. Therefore, approximately half the impacts in the following tables are very accurate whilst the other half in the smaller regions is likely to overstate impacts.

6.2 Regional level impacts – 2007-08 and 2008-09 (forecast)

The cruise industry generates the greatest level of impact in the Auckland regional economy. In the 2007/08 season the \$123m of direct spend (including airfare and bunkering component) generated total output of around \$216m and total value added of \$95m. This level of activity generated employment equivalent to 1,424 full time workers for one year. These numbers are expected to increase in the coming season, when \$128m of direct spend is expected to generate \$225m in total output and \$98m in total value added sustaining 1,413 FTE's for a year.

The second largest region is Bay of Plenty, where in 2007/08 \$18m of direct spend generates \$32m in total output and \$15m in total value added, sustaining 249 FTE's. In 2008/09 this is expected to increase to \$24m in direct spend generating around \$44m in total output and \$20m in total value added, sustaining 327 FTE's.

It is important to note that regional direct spend information is run through individual regional models. This means that the sum of the regions does not equal the national total. In each case regional multipliers are lower than national multipliers.

Table 6.1 Regional Economic Impacts of Cruise Industry, 2007-08 and 2008-09

Region	Season	Direct Expenditure (\$000s)	Total Output (\$000s)	Total Value Added (\$000s GDP)	Total Employment (FTE years)	Share of Total Value Added
Northland	2007 - 08	3,743	6,306	3,003	54	1.8%
	2008 - 09(f)	5,702	9,703	4,607	80	2.4%
Auckland *	2007 - 08	123,756	216,372	94,579	1,424	57.8%
	2008 - 09(f)	128,456	225,365	98,301	1,413	50.5%
Bay of Plenty	2007 - 08	17,659	31,867	14,819	249	9.1%
	2008 - 09(f)	23,801	43,606	20,268	327	10.4%
Gisborne	2007 - 08	160	256	120	2	0.1%
	2008 - 09(f)	29	49	22	0	0.0%
Hawke's Bay	2007 - 08	7,613	13,194	6,218	109	3.8%
	2008 - 09(f)	10,741	18,962	8,922	149	4.6%
Wellington	2007 - 08	10,698	20,585	9,786	164	6.0%
	2008 - 09(f)	16,368	32,029	15,211	245	7.8%
Nelson	2007 - 08	166	298	140	2	0.1%
	2008 - 09(f)	86	156	73	1	0.0%
Marlborough	2007 - 08	2,042	3,332	1,565	29	1.0%
	2008 - 09(f)	3,791	6,323	2,958	52	1.5%
West Coast	2007 - 08	0	0	0	0	0.0%
	2008 - 09(f)	0	0	0	0	0.0%
Canterbury	2007 - 08	16,793	33,337	15,589	257	9.5%
	2008 - 09(f)	22,712	45,508	21,255	335	10.9%
Otago	2007 - 08	15,097	26,885	12,730	216	7.8%
	2008 - 09(f)	19,004	34,394	16,251	264	8.3%
Southland	2007 - 08	7,099	11,371	5,162	80	3.2%
	2008 - 09(f)	9,279	15,331	6,937	103	3.6%

* A significant share of non-port specific spend is assigned to Auckland Region

7 Annual Summary of Economic Impacts

Direct expenditure Total Output and Total Value Added for the preceding six seasons and the coming season have been compared below in Table 7.1. This is presented for comparison purposes only, note that spend figures from 2000/01 through to 2003/04 are in 2003 dollars, whereas the 2004-05, 2005-06, 2006-07, 2007-08 and 2008-09 season figures are in 2005 dollars in line with the updated Cruise Industry Economic Impact Model. **This means the figures are not directly comparable.**

The trend indicates a significant jump in direct expenditure between the 2000/01 season and the 2001/02 season. This is followed by reductions between 2001/03 and 2004/05. The 2005/06 shows a significant jump in cruise industry expenditure which was followed by a small decline in the 2006/07 season. In the 2007-08 season the industry grew significantly (66%) with the forecast 2008-09 season showing the continued growth of an additional 17%.

However, there have been a number of changes in the calculation and the spend ratios (discussed in sections above) that are likely to have had a significant bearing on these figures. For example, the average retail spend was estimated in the past using supply side and New Zealand Tourism data. In the 2005-06 year an average retail spend figure of \$221 per day has been used to estimate much of the port spend. For the 2002-03 season the figure used was \$236 per day. The model has since been updated using data from surveys of passenger spend. The surveys indicate that the average spend for retail was significantly lower than the averages used in previous studies. For these reasons in this study an average of \$110 per day has been applied (discussed above). In addition to this figure, passengers are spending on excursions and transport and pre and post tour accommodation.

Differences in the number of cruises, port visits, mixes of vessels and passengers also contributed to these changes.

Table 7.1 National Cruise Industry Economic Impacts 2000-2008

Season	\$ of the Day	Direct Expenditure (\$m) *	Total Output (\$m)	Total Value Added (\$m GDP)	Employment (FTE years)
2000-2001	2003	\$ 71.9	\$ 136.4	\$ 62.1	1,020
2001-2002 (f)	2003	\$ 148.7	\$ 300.4	\$ 140.5	2,340
2002-2003	2003	\$ 101.7	\$ 203.7	\$ 92.9	1,670
2003-2004 (f)	2003	\$ 76.0	\$ 152.9	\$ 69.8	1,250
2004-2005	2005	\$ 75.6	\$ 151.6	\$ 68.4	1,130
2005-2006	2005	\$ 137.2	\$ 247.4	\$ 129.3	2,130
2006-2007	2005	\$ 123.1	\$ 244.2	\$ 109.5	1,670
2007-2008	2005	\$ 204.8	\$ 406.4	\$ 182.2	2,790
2008-2009 (f)	2005	\$ 240.0	\$ 487.0	\$ 219.0	3,221
GROWTH					
00/01 - 01/02		106.9%	120.3%	126.1%	129.4%
01/02 - 02/03		-31.6%	-32.2%	-33.9%	-28.6%
02/03 - 03/04		-25.3%	-25.0%	-24.9%	-25.1%
03/04 - 04/05		-0.5%	-0.8%	-2.0%	-9.6%
04/05 - 05/06		81.5%	63.2%	89.1%	88.5%
05/06-06/07		-10%	-1%	-15%	-22%
06/07-07/08		66%	66%	66%	67%
07/08-08/09		17%	20%	20%	15%

Note, this number was incorrectly reported in 2003, and has been corrected for this report

Note, the model PAX spend has been updated using a 2006 cruise industry survey.

Impacts for 2006-2008 are not directly comparable with the past

* Note that for the Economic Impact Assessment, direct expenditure excludes the majority of spend on international airfares and ship fuel that does not stay in the NZ economy

The study carried out in early 2007 provided a forecast for the 2007-08 season, however the results from this study were significantly lower than the actual result reported in table 7.1.

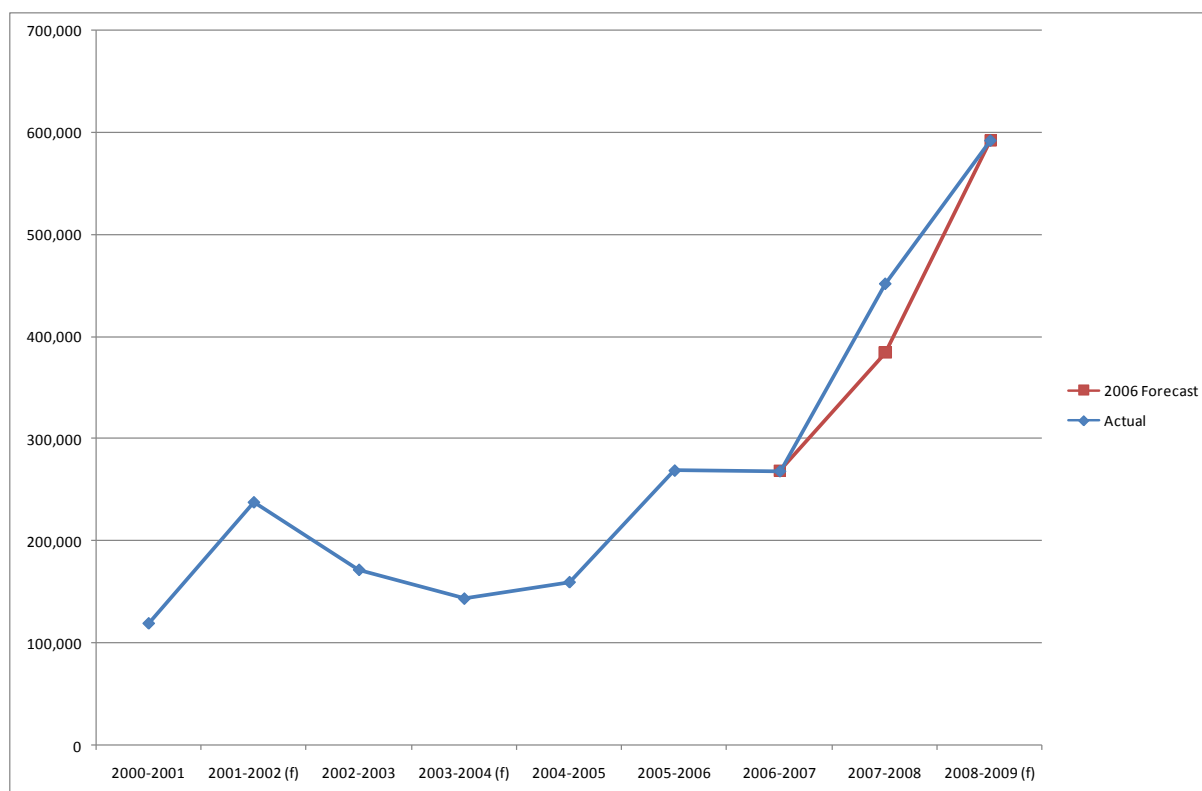
The main reason for the difference between the forecast and the actual for 2007-08 is that the one large ship undertook more voyages and port calls than was anticipated. The Sun Princess was forecast to visit New Zealand once and stop at four ports. The Sun Princess actually visited New Zealand six times during the season, visiting 37 ports. This has increased all types of spend, crew, passenger and industry related.

Table 7.2 Difference Between the Forecast and Actual Port Passenger Days for the 2007-08 Season⁴

2007-08	Port Passenger Days	Port Passenger Days
1	- 72,664	107%
2	- 3,042	4%
3	- 1,922	3%
4	10,005	-15%
Total	- 67,623	100%

⁴ Note that a negative value indicates a shortfall in the forecast 2007-08 figures compared with actuals

Table 7.3 Line Graph of the Cruise Industry Passenger Port days 2000-2009



This underestimation of port calls was offset by a change in the crew spend estimation method. The crew spend assumptions have been updated using data from the Australian Cruise Ship Survey conducted by AEC⁵. The older data was under counting for some spend types and an over counting for other spend types as it was based on industry 'best guesses' rather than surveyed information. The overall impact on the total spend from the industry is minor because the crew spend only contributes to 1% of the Industry spend.

7.1 Future Season Trends

What has become apparent is that the industry in New Zealand is on the cusp of another significant jump in passenger numbers and potential expenditure. Cruise New Zealand, Port Authorities, Regional Councils Central Government and other infrastructure providers will need to work closely to ensure this potential is maximised. The danger the industry and New Zealand overall faces is that Cruise Industry tourism simply displaces other forms of tourism as hotels and tours fill with cruise passengers, reducing capacity for other tourists.

This situation significantly reduces the benefits that flow as the numeric increases in passengers are not net additional therefore the impacts and the GDP that flows from spend can not be said to be added to the economy.

⁵ Economic Impact of the Cruise Shipping Industry in Australia, August 2007 ACE Group

The upcoming 2008/09 season is almost 6 times the size of the 1996/97 season when these assessments began, preliminary bookings for the 2009/10 season show a similar level of interest to the up coming season.

Appendix 1: Economic Models & Multiplier Analysis

National Economic Model

The basis of this study is a multiplier analysis of the flow on effects arising from direct expenditure generated by cruise ships, passengers and crew. A national level 48 sector Input Output model of the New Zealand economy has been adapted to include the Cruise Industry as the 49th sector. This allows specific multipliers to be calculated for cruise related expenditure that can be used in future years. The model is based on Statistics New Zealand's Inter-Industry Study carried out in 1995/96. The inter industry study collected transaction information between different sectors of the economy so that it is possible to tell how much one sector purchases from another in order to produce final outputs. This study collected information across 123 sectors of the economy allowing multipliers to be calculated at the 48 sector level across regions.

Once all the primary data was collected and checked for accuracy, it was coded into one of 123 economic sectors in order to develop a "Cruise Industry" within the New Zealand economy. In reality, the "Cruise Industry" is an amalgam of smaller parts of a wide range of other sectors. It is therefore necessary to isolate each component and subtract it from its current sector before forming the "Cruise Industry" sector within the national economic model. This is carried out because the basic national economic model assumes that the cruise industry exists, that passenger spend is captured by retail outlets already reporting expenditure to Statistics New Zealand. If cruise related spend was simply added to the economy then a high degree of double counting would occur.

Multiplier Analysis

The original Cruise Industry model was created in 1998 with multipliers calculated by Butcher Partners of Christchurch (economic analysts with significant experience in input-output modelling and the application of multipliers). The earlier model was based on information that can be traced back to the last full inter-industry study carried out by Statistics New Zealand in 1986/87. While this had been partially updated in the interim it is not as current, ie it doesn't represent the current economy as accurately as the new model which is based on the 1995/96 study.

This is due to the significant structural changes that have occurred in the New Zealand economy between 1984 and the mid 1990's. The economy has been exposed to more international competition resulting in more goods and services being purchased off shore. In terms of the economy as a whole, New Zealand is now more integrated with the rest of the world but less self sufficient, more intermediate goods and services used in the production of final products are sourced from overseas. This means that economic multipliers are in general lower than in the previous model, because if a higher proportion of goods are purchased offshore to supply the Cruise Industry then there is less money flowing through the New Zealand economy.

Multipliers

Multipliers measure the flow on effects of direct expenditure in the economy. They measure two things specifically;

- The Indirect effect of direct spending. The indirect effect occurs when suppliers to the cruise industry increase their demands for goods and services from their suppliers in order to meet

the increased demand from the cruise industry. For example, a provisioning company receives an order for \$20,000 worth of fresh fruit and vegetables from a cruise line. They immediately place orders with a range of suppliers for the goods. These suppliers in turn, purchase more seed, fertiliser and machinery in response to the increased sales they are making. The indirect or Type I multiplier attempts to capture all these transactions in a single “multiple”. In effect it measures how many times a single dollar of increased demand is multiplied through the economy.

- The **Induced effect** of direct and indirect spending. The induced effect captures increased spending due to increases in wages and salaries paid to workers and owners in directly, and indirectly affected sectors. As people earn more money for the additional work they do they spend more. The induced multiplier attempts to capture this round of increased economic activity. The induced multiplier is usually added to the indirect multiplier to produce a Type II multiplier that measures the total economic effect of additional spend.

Economic impacts can be measured a number of ways therefore multipliers have been calculated for three different aspects of economic activity;

- **Gross Output.** Gross output measures the total activity within the economy. It is the broadest measure of economic activity and does not necessarily provide an accurate measure of economic benefits. For example, if an economy has a very high import component then a gross output measure might be high, however as most of the goods are not produced locally the economy is creating very little internal wealth.
- **Value Added.** Value added is the most appropriate measure of economic impact. It measures the level of value that is generated within an economy. It is closely related to GDP, the standard measure of economic performance of an economy.

Employment. This is measured in full time equivalent workers for one year.

The balance of this appendix describes the derivation of regional input-output models, and multipliers developed for impact analysis. It outlines the fundamentals of input-output modelling, including definitions and structures, and the methodology that generates sub-national economic accounts through a series of mechanical steps. Finally, the key aspects of multiplier analysis are described.

Input-Output Modelling

The origins of input-output modelling may be traced back to the Physiocrats of the 18th Century. Francois Quesnay's *Tableau Economique* of 1758 traced successive rounds of wealth generated by agricultural expenditure. While the *Tableau Economique* investigated the concepts of circular flow and general equilibrium, it was not until another Frenchman, Leon Walrus in his *Elements d'Economie Politique Pure* of 1874, that a detailed theoretical framework for analysing economic interdependence was created. Contemporary input-output economics is attributed to Wassily Leontief, a Noble prize winning American economist, who in 1936 published an input-output table for the American economy. Leontief simplified the Walrus model to develop a theory of production based on the general equilibrium concept of economic inter-dependence.

The Input-Output Table

An input-output table describes inter-industry linkages in an economy for a given period. Information on such linkages is normally obtained from national economic accounts, which are, in turn, derived from a national census of production. Information on final demand consumption and expenditure on primary inputs is also included. Input-output tables share an intimate relationship with the national accounts and as such allow the derivation of standard economic indicators such as Balance of Trade, Gross Domestic Product (GDP), contribution to GNP by sector, and gross output by sector.

Conventionally, an input-output table is presented in a matrix format, with each industry assigned a row and column. The element x_{ij} in row i column j indicates the volume of goods flowing from industry i to be used as inputs in industry j . In other words, each row indicates the flow from each industry to all other industries and to final demand, while each column indicates the purchasing pattern of each industry.

An input-output table may be divided vertically into two parts: the part on the left represents the inputs into the production process of the productive industries, while the part on the right represents the sales to the final disposal sectors. Each part may further be subdivided horizontally into two sections so as to distinguish between intermediate inputs and primary inputs. The resulting input-output table consists of four quadrants (labelled I to IV) (Table A.1).

Table A.1 An Input-Output Table

	Industry 1	Industry ... j ...	Industry n	Sub Total	House -holds	Govt. Expen- diture	Other Final Demands	Exports	Sub Total	Total Gross Output
Industry 1	Quadrant I x_{ij}				Quadrant III					X_i
Industry ... i ...										
Industry n										
Sub Total										
Labour Value Added	Quadrant II				Quadrant IV					
Other Primary Inputs										
Imports										
Sub Total										
Total Gross Input	X_j									

Quadrant I, known as the processing or intermediate demand quadrant, represents the flows of transactions between industries used in the intermediate stages of production. A key characteristic of the intermediate demand quadrant is that there must be the same number of rows as columns. Furthermore, the total value of output of each intermediate industry must always be equal to its total expenditure on inputs.

Quadrant III displays the sales by each sector to final demand, ie. the part of an industry's output not used by another industry as an input. This quadrant describes the consumer behaviour of a number of important markets including household consumption, government consumption, increases in stock, capital formation, and exports.

Quadrant II describes the primary inputs used in each industry. These inputs are described as 'primary' because they do not form part of the output of intermediate production as defined by the rows forming quadrants I and III. The following primary input categories are typically included: subsidies⁶, indirect taxes, depreciation, wages and salaries, gross operating surplus and imports. The total of the primary inputs for each industry less imports represents the value added to commodities consumed in the production process i.e. the contribution made by that sector to GDP.

Quadrant IV displays the primary inputs that are directly used by final demand sectors. This includes non-market transfers such as benefits and pensions as well as imports of commodities for consumption by households and investors.

Input-output tables are often converted into technical coefficient format that more clearly represents the purchasing patterns of industries. This is undertaken by dividing column elements by their respective column totals. Such coefficients represent the first round inputs from each row industry *i* following a unit increase in output of any row industry *i* per unit of output produced by column industry *j*.

Assumptions of Input-Output Modelling

Four major assumptions make the derivation of input-output tables feasible:

- Homogeneity. This states that each industry in an input-output table produces only one output. Implicit in this assumption is the notion that all businesses that constitute an industry use the same product mix in production of this one output.
- Additivity. This states that the total effect of carrying out several types of production is the sum of the separate effects. This implies the absence of any synergistic effects and external economies (or diseconomies) of scale.
- Linearity. This presumes that the ratio of inputs to outputs decreases and increases in a linear nature. This also infers that there are no external economies (or diseconomies) of scale.
- Fixed coefficients of production. This states that inputs are required in fixed proportions to outputs in each industry. Inherently this assumes that there are constant returns to scale in production and that the elasticity of substitution between inputs is zero.

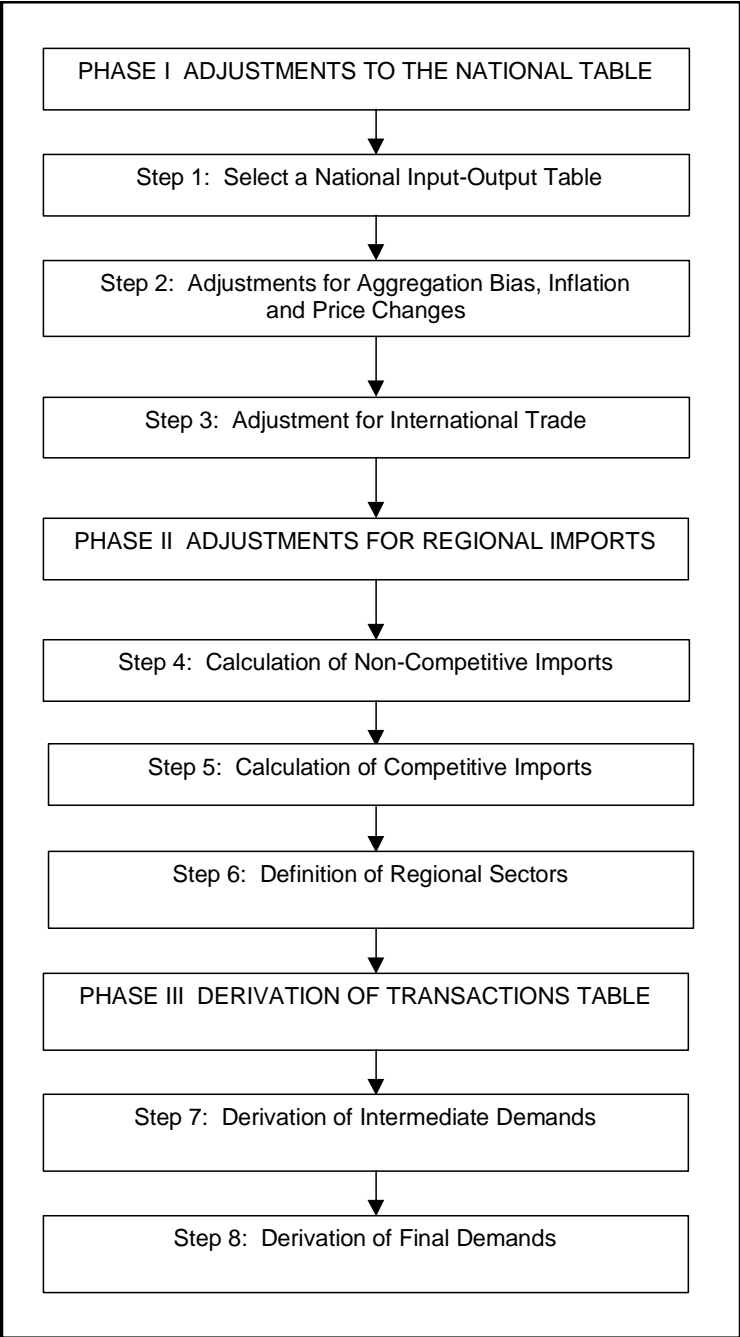
Regionalisation Methodology

The various approaches available for generating regional input-output tables are usually categorised as 'survey' or 'non-survey'. In survey methods, the elements which make up the transactions table are generated from primary data gathered through the use of various survey techniques and are often considered the most attractive in theoretical terms. In non-survey methods, transactions table elements are derived from other tables by various adjustment techniques. These methods are employed when data is unavailable and/or time and cost constraints exist.

⁶ Subsidies are entered with a negative sign as they represent receipts, not expenses.

The economic accounts used for this study have been derived using a non-survey approach. This approach employs a series of mechanical steps to reduce national coefficients to regional equivalents, but also provides opportunities for insertion of superior data. The economic account construction methodology is shown in Figure A2.

Figure A.2 *The Economic Account Methodology*



Phase I: Adjustments to the National Table

In this phase an appropriate national input-output table is chosen and adjustments for aggregation bias, inflation and price changes, and international trade are made.

Step 1: Select a National Input-Output Table

The economic accounts were generated from the 1995-96 Inter-Industry Study of the New Zealand Economy published by Statistics New Zealand (SNZ). This study has been updated by Market Economics using employment and output information collected by SNZ to 2003/04. This study covered 126 sectors, with 9 primary input and 7 final demand categories. All sector definitions are compatible with the New Zealand Standard Industrial Classification (NZSIC) system.

Step 2: Adjustment for Aggregation Bias, Inflation and Price Changes

Reduction of national coefficients to form regional equivalents almost always results in aggregation bias. This occurs because the constituent businesses that form a sector do not have homogenous output, even though they are classified in the same sector. Thus the more aggregated an industry, the greater the over-estimation of self-sufficiency. While aggregation bias cannot be eliminated, it may be partially overcome by sector disaggregation.

This adjustment was undertaken using SNZ's 1995-96 Inter-Industry Study of the New Zealand Economy, which allowed for a 126 sector breakdown. Specifically:

- The 126 sectors for 1995-96 were aggregated to form 123 sectors that, in turn, could be uniquely aggregated to form the 48 sectors for 2001-02.

To obtain a national input-output table by 123 industries for 2001-02 the following simple extrapolation method was used:

- Productivity estimates (output per full-time equivalent (FTE) employee) were calculated for the years 1995-96, 1997-98, 2000-01 and 2001-02.
- For each of these years the Producers' Price Index (PPI) was used to convert sector output, at the 123 sector level, into constant dollars. This allowed for changes in inflation and prices.

These output estimates were then aggregated and compared with Statistics New Zealand's SNA figures, and adjustments were made where deemed appropriate.

Final demand and primary input totals for 2001-02 were obtained from Statistics New Zealand. Components of final demand for aggregated sectors were applied to the 123 sectors, assuming equal splits across like sectors, to determine estimates of primary inputs for each sector.

Step 3: Adjustment for International Trade

Adjustments are made for international trade using Statistics New Zealand's Harmonised System, which disaggregates physical imports and exports into 10,000 commodities. As exports are coded by sector it is possible to obtain an exact match with the 123 sectors used at the national level. Matrix manipulations allow categorisation of the imports as sector inputs.

Phase II: Adjustment for Regional Imports

In this phase approximations of regional coefficients were produced through the calculation of non-competitive and competitive imports.

Step 4: Calculation of Non-Competitive Imports

Where production in sector *i* does not occur within a region then any inputs from sector *i* into sector *j* are treated as regional imports. Therefore the regional technical coefficient is set to zero, and its value in the national table is added to imports.

Step 5: Calculation of Competitive Imports

Following the calculation of non-competitive imports, it is necessary to adjust the national coefficients for sectors known to exist in each region. This is accomplished by determining the component of the national coefficients allocated to competitive imports. The Simple Location Quotient (SLQ) may be used to achieve this.

The SLQ is a measure which compares the relative importance of output or employment of a sector in a region to its relative importance in the nation. Mathematically, this may be modelled as,

$$SLQ_j = (X^r_j/X^r)/(X^n_j/X^n)$$

Where *X* represents employment and the superscripts *r* and *n* respectively the region and nation, and *j* row sector. Operationally, the regional coefficients for row sector *j* are estimated by multiplying the national coefficient by SLQ_{*j*}, and apportioning the difference to imports, that is,

$$r_{ij} = a_{ij}SLQ_j \text{ where } SLQ_j \leq 1$$

This means that the region produces less than its share of national output in industry *j* and imports are therefore required. If the SLQ for an industry exceeds 1 then the size of the regional industry is greater in relative terms, than its national equivalent and is assumed to be capable of satisfying local demand. The SLQ technique assumes that national and regional technologies are identical, and that there are no product or sector mix problems. The SLQ technique allow national coefficients only to be revised downwards but not upwards.

The SLQs for Auckland were calculated using 2001 FTEs from Statistics New Zealand Business Directory.

Step 6: Definitions of Regional Sectors

A total of 48 sectors were used to represent economic transactions in the model. Inputs into production not covered by the 48 sectors were described by the following primary input categories: compensation of employees, operating surplus, indirect taxes, subsidies, consumption of fixed capital, imports and import duties and other primary inputs. Similarly, consumption of commodities not covered by the 48 sectors was described by the following final demand categories: household consumption, local and central government consumption, and other final demands (exports, net increases in stocks and capital formation).

Phase III: Derivation of Transactions Tables

In this phase transactions tables were derived for the region. Two functions were required: (1) the derivation of the intermediate demand transactions, and (2) the completion of the final demand quadrants.

Step 7 Derivation of Intermediate Demands

This involved the conversion of regional coefficients to transactions by multiplying the elements of each column sector by estimates of that sectors' share of total gross output. Shares were derived by calculating the regional (or TLA) share of national employment. This resulted in the intermediate demand and primary input quadrants of the regional transactions table.

Step 8 Derivation of Final Demands

This involved the generation of estimates for the final demand quadrants of the transactions table. Household consumption is particularly important as it is necessary for the calculation of multipliers. Local and central government consumption were also calculated. Other final demands were calculated as the residual achieving the necessary row and column consistencies.

Household consumption along with local and central government consumption were estimated by applying a population index (for example):

Population of region	404,200
Population of New Zealand	3,454,900
Population index : $404,200/3,454,900 = 0.1170$ (4 d.p.)	

In turn, estimates of household consumption for each regional sector were obtained by multiplying the population index by the national output for each sector. For example, if the national household consumption for the other farming sector was \$241 million, then for the region this was estimated as:

$$\text{Other farming: } 241 * 0.1170 = \$28.20 \text{ million}$$

Multiplier Analysis

Introduction

A major extension of the input-output model is the derivation of multipliers. Multipliers are a summary measure of the economic interdependence produced as a result of secondary benefits. Specifically, an increase in final demand for any sector has repercussions throughout the whole economy, causing increases in output beyond the initial change in demand. This is known as the multiplier effect.

Multiplier Definitions

In general, multipliers are capable of measuring output, income, value added and employment generated from economy activity within a region. Three types of multiplier are conventionally used:

- Output Multipliers. These show the relationship between an additional unit of spending and changes in the level of output.

- Employment Multipliers. These show the relationship between an additional unit of spending and changes in the level of employment.
- Value Added Multipliers. These show the relationship between an additional unit of spending and changes in the level of value added.

There are two different types of output, employment and value added multiplier commonly used:

- Type I Multiplier. This multiplier attempts to explain indirect effects initiated from second and subsequent round effects as successive waves of necessary output increases occur in the economy. It is expressed as the ratio of the direct and indirect change to direct change.
- Type II Multiplier. This multiplier explains induced effects initiated through consumer expenditure i.e. this includes the effect of household expenditure generated by wages and salaries resulting from variations in demand in a given sector. It is expressed as the ratio of direct, indirect and induced change to direct change.

Multiplier Derivation

The transactions table may be converted into a table of technical coefficients. These are calculated by dividing the elements of the columns of the transactions table by the respective column total. These coefficients are often termed 'direct', 'input-output', or 'technical' coefficients, they are usually noted as A_{ij} . They represent the first round inputs from each sector i (row) following a unit increase in output of any sector j (column) i.e. $a_{ij} = X_{ij}/X_j$. However, this only shows the direct purchases from a sector i per unit of output produced by sector j .

To account for indirect effects, and to calculate Type I multipliers, it is necessary to subtract the quadrant I matrix from an identity matrix $((I - A)$, or Leontief matrix) and to invert the result, resulting in the Leontief inverse matrix, or $(I - A)^{-1}$. Mathematically, this may be expressed in matrix terms as:

$$X = AX + Y$$

By transposition,

$$X(I - A) = Y$$

By solving the above system we derive the general solution:

$$X = (I - A)^{-1}Y$$

$(I - A)$ is termed the Leontief matrix

$(I - A)^{-1}$ is termed the Leontief inverse matrix

where:- $A = (n \times n)$ matrix of quadrant I technical coefficients

$X = (n \times 1)$ matrix of gross inputs

$Y = (n \times 1)$ matrix of final demand

$I = (n \times n)$ identity matrix

To account for direct, indirect and induced effects, and to calculate Type II multipliers, it is necessary to expand the quadrant I matrix to include the households coefficients (A^*) then to subtract this matrix from the identity matrix ($(I - A^*)$, Leontief* matrix) and to invert the result, resulting in the Leontief* inverse matrix, or $(I - A^*)^{-1}$. This treats household inputs and household consumption as sectors, producing income and requiring inputs from other sectors.

The indirect effect for any sector can be calculated simply as technical coefficient element minus corresponding Leontief inverse matrix element. The induced effect for any sector can be calculated simply as Leontief inverse matrix element minus the corresponding Leontief* inverse element.

Appendix 2: Passenger Activity by Cruise – 2007-08 and 2008-09 Season

Vessel	Voyage Description	Pax Disembark	Pax Embark	Transit	Pax on Cruise	Crew

Vessel	Voyage Description	Pax Disembark	Pax Embark	Transit	Pax on Cruise	Crew
TOTAL PASSENGERS		39,550	50,830	43,900	111,580	53,464
		134,280				