FACTORS INFLUENCING JAPANESE TOURISM TO HAWAII: A

MACROECONOMIC ANALYSIS (1980-2006)

by

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Abstract

Japanese tourist arrivals to Hawaii contribute a substantial portion of Hawaii's annual tourism revenue. However, Japanese travelers to the State began an unprecedented trend of decline beginning in 1998. The main purpose of this dissertation was to provide some understanding regarding the decline of Japanese tourist arrivals to Hawaii to both academic researchers and local tourism planners. Using the best available proxies for three of the macroeconomic-based demand determinants of income (i.e., Japanese Real GDP), price (i.e., Honolulu CPI), substitute price (i.e., Australian CPI), along with the Japan-U.S. exchange rate, a battery of multivariate analyses were used to explain the decline of Japanese travelers to Hawaii from a macroeconomic perspective. Based on the study's results, all four macroeconomic factors definitely recorded less influence on Japanese tourist arrivals to Hawaii from 1998 to 2006, than from 1980 to 1997. Moreover, the Honolulu CPI and the Japan-U.S. exchange rate were found to have the opposite signs during 1998 to 2006 with respect to Japanese tourist arrivals to Hawaii, than in the previous period. Finally, although the Japanese Real GDP proved to be the most positive econometrically influential variable before and after the decline of Japanese tourist arrivals to Hawaii from 1980 to 2006; the Japan-U.S. exchange rate was replaced by the Australian CPI as the most negative and the Australian CPI was replaced by the Japan-U.S. exchange rate as the least econometrically influential factor, respectively, from 1998 to 2006.

Dedication

It is with all of my love that I wish to dedicate my dissertation to my family. I dedicate my dissertation to my mother Paz and father Larry, whose compassion for others shaped me into the man I am today. I also dedicate my dissertation to my brothers Leroy and Leo and sisters Maria and Stacie, whose time we shared together taught me responsibility and loyalty. Finally, I dedicate my dissertation to my beloved wife Na Wen, whose inner strength, kindness, and devotion, taught me that it was possible to love again.

Acknowledgments

For the last nine years, I have spent a great deal of time and effort in obtaining my Ph.D. Hence, I would like to acknowledge the many people who have contributed in helping me attain my doctorate degree.

I would first like to recognize the efforts of four former professors of which three of them composed my dissertation committee. I want to thank Dr. Zhenhu Jin, my dissertation chair and mentor, whose organizational and managerial prowess made the impossible become possible. I want to thank Dr. Raj Singh, my faculty evaluator, whose strategically timed contributions allowed me to identify and cover those areas I overlooked. I want to thank Dr. Charlotte Redden, my independent faculty reviewer, whose extensive background in education allowed me to ensure that every section within my dissertation was well written with careful thought and in the correct context. Finally, I want to thank Dr. Chennat Gopalakrishnan, whose sympathetic assistance to my cause during my early years as a Ph.D. student, allowed me the inner strength and courage to hold on to my dreams of earning my Ph.D.

I would next like to recognize the support of my family, whom collectively gave me the inspiration and motivation to endure my quest for a doctorate degree. I want to thank my mother Paz and father Larry, whose eternal parental love gave me the resolve to organize and achieve my life's aspirations. I want to thank my sisters Maria and Stacie as well as my brothers Leroy and Leo, whose collective encouragement allowed me to persevere the many hardships that occurred during my journey. Finally, I want to thank my wife Na Wen, whose guidance, patience, support, and unconditional love, I could never live without.

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CHAPTER 1. INTRODUCTION

According to Hawaii's State Department of Business, Economic Development and Tourism, tourism is one commerce activity that greatly contributes to Hawaii's economic base (Hawaii Department of Business, n.d.b). One of the most important sources of travelers to Hawaii is from Japan. Since the active monitoring of visitor expenditures by the State in 2003, Japanese tourist arrivals to Hawaii have been recorded to contribute nearly 20% of that total, but its contribution has continually decreased since that time (Hawaii Department of Business, n.d.a). Moreover, although Japanese visitor expenditures were not recorded prior to 2004, it also appears possible that the decline of Japanese expenditures may have begun at the same time when Japanese tourist arrivals to Hawaii began a trend of decline towards the end of the 1990's. Consequently, if the current trend in Japanese tourist arrivals to Hawaii continues, the resulting revenue loss will negatively affect the State's tourism industry and all of its constituencies.

This introduction will essentially present the background for the following study that will attempt to quantitatively uncover some of the complexities of the observed decline in Japanese tourist arrivals to Hawaii from a macroeconomic perspective. The chapter will begin building the foundation of this research by initially discussing tourist arrivals to Hawaii, the Hawaii Tourism Strategic Plan, and macroeconomic tourism demand determinants. The chapter will then present this study's problem statement, guiding research questions, and main purpose. The chapter will conclude by stating its research limitations and assumptions.

Tourist Arrivals to Hawaii

The State of Hawaii is tremendously blessed with a beautiful natural environment and tropical weather that makes it one of the most ideal travel destinations in the World. In addition, Hawaii's tourist industry has been and will continually be a vital part of the State's economy. In this section, the major constituencies, historic trends, and financial contribution of domestic and international travelers to Hawaii will be presented. Tourist arrival data presented in this section was acquired from the Hawaii Department of Business, Economic Development and Tourism (n.d.b) and transient accommodation tax revenue data was acquired from the State of Hawaii, Department of Taxation (n.d.).

Major Constituencies

For the sake of organization, the State of Hawaii classifies tourist arrivals into two groups, domestic and international (Hawaii Department of Business, n.d.b). Domestic visitors to Hawaii are further subcategorized as U.S. East and U.S. West (Hawaii Department of Business, n.d.b). Domestic tourist arrivals compose nearly two-thirds of annual tourist arrivals to Hawaii (Hawaii Department of Business, n.d.b). Moreover, since the 1990's, visitors from the U.S. West have comprised approximately 60% of the annual total visitors from the U.S. Mainland (Hawaii Department of Business, n.d.b). International tourist arrivals to Hawaii encompass all international visitation to the State; however, tourist arrivals from Japan and Canada are given subcategories of their own (Hawaii Department of Business, n.d.b). International tourist arrivals compose nearly one-third of annual tourist arrivals to Hawaii (Hawaii Department of Business, n.d.b). Moreover, since the 1990's, Japanese and Canadian tourist arrivals to Hawaii compose

almost 71% and 9%, respectively, of the annual total international visitors (Hawaii Department of Business, n.d.b).

Historical Trends

Total tourist arrivals to Hawaii are heavily influenced by the tourist arrivals of its domestic and international visitors (See Table 1). During the early 1990's (See Figure 1), total tourist arrivals to Hawaii grew negatively, due to the declining numbers of domestic visitation (Hawaii Department of Business, n.d.b). Total tourist arrivals to Hawaii would suffer similar negative growth in 1998, 2001, 2003, and 2006 (See Table 1); however, it was the declining numbers of international visitation that would be responsible during these years (Hawaii Department of Business, n.d.b).

From Table 1, domestic tourist arrivals to Hawaii would experience very positive growth, except from 1990 to 1993, 1995, and 2001. International tourist arrivals to Hawaii, however, except in the early 1990's, would suffer predominantly negative growth in 1993 and for most of the period from 1997 to 2006 (See Table 1). Due to its relative contribution, declining Japanese tourist arrivals played a significant role in the negative trend in international tourist arrivals to Hawaii (See Figure 1). Furthermore, although total visitation to Hawaii has experienced predominantly positive growth since 2000 (See Figure 1), Japanese tourist arrivals have been experiencing a predominantly negative trend from 1998 to 2006 (Hawaii Department of Business, n.d.b).
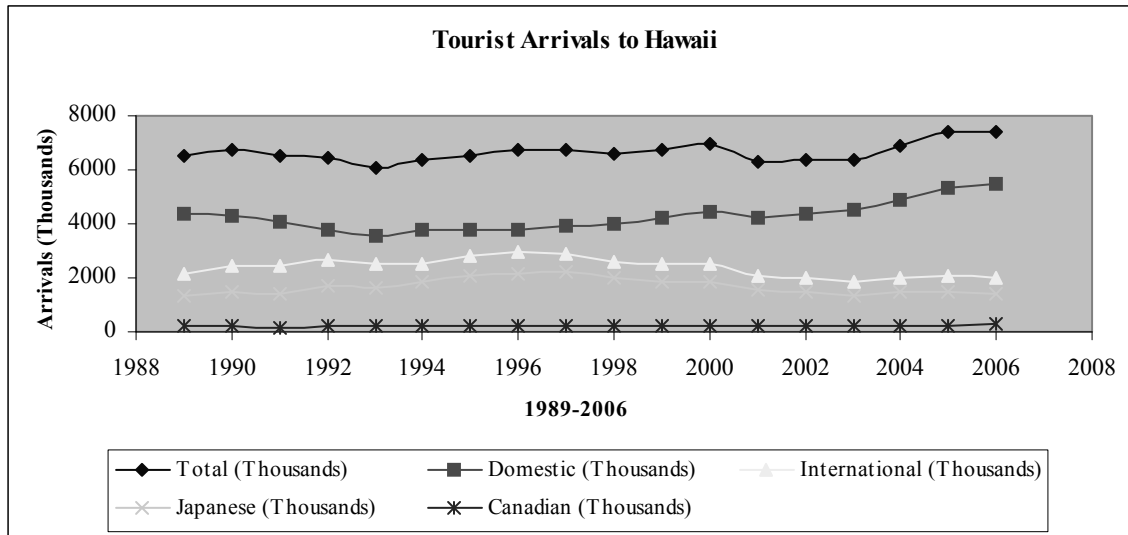
Figure 1. Tourist arrivals to Hawaii (1989-2006). From *Visitor Arrival* [Data file], n.d.b. Hawaii Department of Business, Economic Development and Tourism. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Table 1. Tourist Arrivals to Hawaii (1989-2006)

Year	Total (Thousands)	Domestic (Thousands)	International (Thousands)	Japanese (Thousands)	Canadian (Thousands)
1989	6488	4340	2149	1360	217
1990	6724	4315	2408	1493	230
1991	6518	4069	2450	1439	181
1992	6474	3792	2682	1706	193
1993	6071	3570	2501	1666	214
1994	6365	3813	2551	1819	213
1995	6547	3743	2803	2048	198
1996	6723	3794	2929	2147	210
1997	6761	3891	2870	2217	211
1998	6596	4014	2582	2004	233
1999	6741	4256	2485	1826	253
2000	6949	4447	2502	1818	252
2001	6304	4224	2079	1529	217
2002	6389	4359	2030	1483	190
2003	6380	4531	1849	1340	205
2004	6912	4893	2019	1482	217
2005	7417	5313	2103	1517	249
2006	7415	5451	1964	1374	273

Note. Tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Financial Contribution

Although the State has only recently began recording visitor expenditures directly, the measure of Hawaii's transient accommodation tax revenue (HTATR) has been used as one of the closest benchmarks to gauge the financial contributions of tourist arrivals (State of Hawaii, n.d.). From 1989 to 1997, HTATR grew continuously, except in 1991 and 1993 (See Figure 2). In addition, HTATR grew at an average rate of 7.17% per year during this period (See Table 2). In contrast, HTATR grew continuously, except in 1998, 2001, and 2002, respectively, during 1998 to 2006 (See Figure 2). However, HTATR for this period grew only at an average rate of 6.66% per year (See Table 2). As a result, the negative growth in international and Japanese tourist arrivals are seen as two of the major reasons contributing to the slower growth rate in HTATR since 1998.

Figure 2. Hawaii transient accommodation tax revenue (1989-2006). From *Transient Accommodation Tax Revenue* [Data file], n.d. State of Hawaii, Department of Taxation. Retrieved May 6, 2007, from
http://uhero.prognoz.com/Graph.aspx?serie=4873.

Table 2. Hawaii Transient Accommodation Tax Revenue (1989-2006)

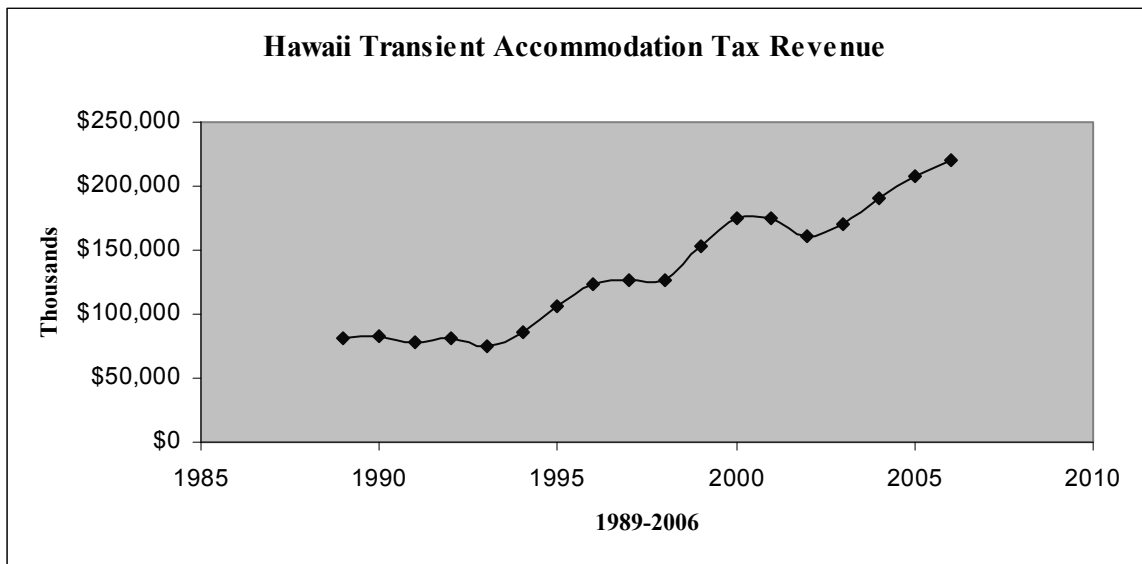| Year	HTATR (Thousands)	Marginal Change	Percentage Change
1989	$80,995	$10,306	14.58%
1990	$83,456	$2,460	3.04%
1991	$77,931	-$5,525	-6.62%
1992	$80,848	$2,918	3.74%
1993	$75,406	-$5,443	-6.73%
1994	$86,497	$11,092	14.71%
1995	$105,618	$19,120	22.10%
1996	$123,983	$18,365	17.39%
1997	$126,892	$2,910	2.35%
1998	$125,882	-$1,010	-0.80%
1999	$153,367	$27,485	21.83%
2000	$175,361	$21,994	14.34%
2001	$174,602	-$759	-0.43%
2002	$161,633	-$12,969	-7.43%
2003	$170,681	$9,048	5.60%
2004	$189,908	$19,227	11.27%
2005	$207,381	$17,473	9.20%
2006	$220,550	$13,168	6.35%
1989-1997			
Mean	$93,514	$6,245	7.17%
Median	$83,456	$2,918	3.74%
Maximum	$126,892	$19,120	22.10%
Minimum	$75,406	-$5,525	-6.73%
Variance	$403,400,647	$83,036,942	1.09%
Std. Dev.	$20,085	$9,112	10.46%
1998-2006			
Mean	$175,485	$10,406	6.66%
Median	$174,602	$13,168	6.35%
Maximum	$220,550	$27,485	21.83%
Minimum	$125,882	-$12,969	-7.43%
Variance	$802,708,394	$170,571,761	0.78%
Std. Dev.	$28,332	$13,060	8.82%

Note. Hawaii transient accommodation tax revenue data are from *Transient Accommodation Tax Revenue* [Data file], n.d., State of Hawaii, Department of Taxation. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Hawaii Tourism Strategic Plan

One of the major inspirations for this research comes from Hawaii's tourism strategic plan (HTSP). The following section will basically discuss the major features of this plan. In particular, the plan's conceptual underpinnings, strategic directions, and research and planning initiative will be presented.

Conceptual Underpinnings

The HTSP conceptual underpinnings are based on its vision, guiding principles, and values. This vision is conceptualized in the following statement.

> By 2015, tourism in Hawaii will: honor Hawaii's people and heritage; value and perpetuate Hawaii's natural and cultural resources; engender mutual respect among all stakeholders; support a vital and sustainable economy; and provide a unique, memorable and enriching visitor experience (Hawaii Tourism Authority, n.d., p. 6).

The HTSP is also based on a number of guiding principles and native Hawaiian values. The guiding principles that make-up the HTSP are the willing collaboration between stakeholders; sustainability of all tourism activities; responsibility of actions to ensure the future of the industry; quality of service; and accountability of all efforts as a means to performance improvement (Hawaii Tourism Authority, n.d.). The native Hawaiian values that make-up the HTSP are: *Lokahi* or as having harmony between all stakeholders; *Malama Aina* or protecting and replenishing all that is taken from the land to be used in the tourist industry; *Kuleana* or responsibility among those involved in the tourism industry; *Hookipa* or the continual showing of a high level of hospitality to all visitors to Hawaii; and *Aloha* or the extending the spirit of oneness between the people and the land (Hawaii Tourism Authority, n.d.).

Strategic Directions

In order to achieve the strategic vision of the HTSP, the HTSP determined a list of nine initiatives that its major public and private stakeholders would use to base the initiatives of their own respective action plans. The list of initiatives includes: access, communication and outreach, Hawaiian culture, marketing, natural resources, research and planning, safety and security, tourism product development, and workforce development (Hawaii Tourism Authority, n.d.).

The Research and Planning Initiative

For the purposes of this study, it is the research and planning initiative that is most important. According to the HTSP, the main goal of this initiative is "to perform collaborative research and planning for use in the development of programs, policies and plans that will positively contribute to the State's economy, benefit the community and sustain Hawaii's resources (Hawaii Tourism Authority, n.d., p. 46)."

In addition, the major objectives of this initiative are: the identification, monitoring, and addressing of tourism trends, including their impacts and benefits on the State and each community; the improvement, coordination, and sharing of tourism research among the various entities; the encouragement of participation in tourism planning and public policy development by all stakeholders; and the development and implementation of county tourism plans (Hawaii Tourism Authority, n.d.).

Macroeconomic Tourism Demand Determinants

In order to understand any trends in tourist arrivals, it was necessary to understand the factors that influence those trends. Although tourism demand determinants research

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can be undertaken from both a quantitative and qualitative perspective, it was impossible to conduct such a comprehensive study in a single dissertation. Instead, a study focusing on a specific number of quantitative or qualitative factors was more realistic. Hence, based on the selected quantitative nature of this proposed study, the following is a brief sampling of the major macroeconomic factors that influence tourist arrivals.

Income

Income has been one of the most important explanatory variables in the theory for tourism demand (Garin-Munoz, 2004; Gu & Kavanaugh, 2006; Kauffman, 2007), based on the Marshallian demand function (Varian, 1992; Zaratiegui, 2002). However, due to the unavailability of precise data of existing data sources, macroeconomic-based proxies are often utilized in actual research (Lim & McAleer, 2001). Some of the most common proxies for income that are used in tourism research are national income in the form of gross domestic product (GDP) and gross national product (GNP), the industrial production index, disposable income, personal disposable income, per capita private consumption, real per capita GDP, and per capita total expenditure (Goh Ka Leng, 2003).

For example, disposable income was the income proxy utilized in Fredman and Heberlein's (2005) study that looked at the constraints and motivations in visitation to the Swedish mountains. In other studies, Papatheodorou (1999) and Pouta, Neuvonen, and Sievänen (2006) both used total expenditures as the proxy for income in their tourism research. Finally, Gonzales and Moral (1995) used the industrial production index as their study's income proxy due to the unavailability of both real and disposable income data.

Price

Based on the basic Marshallian demand function (Varian, 1992; Zaratiegui, 2002), price is the next relevant explanatory variable in understanding tourism demand (Nordstrom, 2005; Trunfio, Petruzzellis, & Nigro, 2006; Younes & Forster, 2006). In actual research, however, macroeconomic-based proxies are often used due to the unavailability of precise data of existing data sources (De Mello & Nell, 2005). Some of the most common proxies for price used in tourism research are the adjusted and relative consumer price index (CPI), the CPI of the intended destination, travel price index, average hotel room rate, travel cost / ticket price, and tour package price (Goh Ka Leng, 2003).

In addition, according to a demand determinant survey of tourism studies, it was found that 86% of the studies surveyed included the cost of goods and services (i.e., Own Price) at the destination in the calculation for the price variable, while 46% of them utilized the cost of travel into the demand equation, and approximately 50% of the studies used both approaches (Goh Ka Leng, 2003).

Substitute Price

The utilization of price of substitutes is another important tourism demand determinant (Lloyd, 2005; Ramos, Rey-Maquieira, & Tugores, 2004; Roberts & Hall, 2004), based on the Marshallian demand function (Varian, 1992; Zaratiegui, 2002). However, in actual research, macroeconomic-based proxies are often utilized due to the unavailability of precise data of existing data sources (Witt & Martin, 1987). Some of the most common proxies used are the adjusted and relative CPI of the nearest substitutes or the price, travel cost, and travel price index of the nearest substitutes (Goh Ka Leng,

2003). In other studies, a weighted average of tourists' cost of living in selected

alternatives was utilized (Fleischer & Buccola, 2002; Webber, 2001), while a ratio of

tourist cost of living in a location relative to the tourists' costs of living in each

individual's selected competing destination was used for substitute price (Coenen & Van

Eekeren, 2003; Pyo, Uysal, & Warner, 1996).

Exchange Rate

The recognition of the exchange rate is another important tourism demand

determinant (Demir, 2004; Loudon, 2004; Munro & Yeoman, 2005), based on the

Marshallian demand function (Varian, 1992; Zaratiegui, 2002). One of the main issues in

the utilization of exchange rates in the tourism demand function is the inter-relatedness it

has with the consumer price index (Witt & Martin, 1987). However, because exchange

rates change more frequently than the consumer price index (Webber, 2001), exchange

rates are usually utilized as its own variable (Patsouratis, Frangouli, & Anastasopoulos,

2005). Finally, in terms of their importance to tourism demand, the effect of exchange

rates has been found to be significant in many tourism studies such as in Crouch (1995)

and Eilat and Einav (2004).

Problem Statement

Based on the Hawaii's tourism strategic plan, it is the research and planning

initiative that will provide the information necessary to update Hawaii's tourism strategic

plan as well as the subsequent county action plans that will allow the State to achieve its

vision for the tourism industry of Hawaii (Hawaii Tourism Authority, n.d.). One such area

of research that would contribute to this initiative would be a study that attempted to

analyze the predominant decline of Japanese tourist arrivals to Hawaii observed in the late 1990's. In essence, a study that analyzes the influence of the major macroeconomic factors before and after the decline of Japanese tourist arrivals to Hawaii would not only increase the knowledge base of this valuable source of tourism revenue, but could also be realistically researched in a single dissertation. Consequently, the following problem statement summarizes the main focus of this dissertation: what role did income, price, substitute price, and the exchange rate play before and after the decline of Japanese visitation to Hawaii that began in the late 1990's?

Research Questions

In order to address the above problem statement, the following research questions were used to guide the primary research effort.

1. Did the macroeconomic factors of income, price, substitute price, and the exchange rate individually have any effect on Japanese tourist arrivals to Hawaii from 1980 to 2006?

2. If such effect(s) existed, what was/were the correlation, collective level of significance, and synergetic contribution of each of those macroeconomic factors towards Japanese tourist arrivals to Hawaii before and after its trend of decline that started in the late 1990's?

Purpose of Study

The main purpose of this proposed study was to study the decline of Japanese tourist to Hawaii from a macroeconomic perspective. Hence, based on this research's problem statement and research questions, this study attempted to achieve the following research objectives.

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1. Determine, whether the macroeconomic factors of income, price, substitute price, and the exchange rate individually had any effect on Japanese tourist arrivals to Hawaii from 1980 to 2006.

2. Analyze the correlation, collective level of significance, and synergetic contribution of each of those major macroeconomic factors towards Japanese tourist arrivals to Hawaii before and after its trend of decline that started in the late 1990's.

Research Limitations and Assumptions

In narrowing the scope of this research, a number of limitations arose, which required the making of assumptions in order to properly facilitate this study. As a result, the following section will present the limitations and assumptions of this research.

Research Limitations

One of the major limitations of this study was the choice of explanatory factors. This study narrowed its focus on an analysis of income, price, substitute price, and the exchange rate in trying to understand Japanese tourist arrivals to Hawaii from 1980 to 2006. However, theses economic based factors were only a few in the tourism demand determinant spectrum. Other macroeconomic (e.g., interest rates, unemployment, & etc.), microeconomic (e.g., average hotel room rate, travel cost / ticket price, & etc.), and qualitative based tourism determinants (e.g., tourist satisfaction, service quality, crime rates, & etc.) were noteworthy variables that could have been considered.

In addition, a number of specific events also occurred in the moments before and after the decline of Japanese tourist arrivals to Hawaii that might have influenced this trend. In particular, the Asian Financial Crisis of 1997, the Terrorist Attacks on September 11, 2001, and the SARS epidemic of 2003 were all followed with large decreases in Japanese tourist arrivals to Hawaii in their aftermath. Hence, the determining of the short

and long-term effects of those specific events would also contribute to the understanding

of the decline of Japanese tourist arrivals to Hawaii that began in the late 1990's.

The second major limitation of this study was the unavailability of data. Although

the data utilized in this study came from highly credible and reliable government and

academic sources, an initial inquiry of many of those databases revealed that source data

for the macroeconomic factors sought were not uniformly collected. For example, some

macroeconomic data were collected yearly, quarterly, and monthly (e.g., Japanese Tourist

Arrivals to Hawaii), while others were only collected yearly (e.g., Japanese Real Per

Capita GDP). In addition, although Japanese tourist arrivals to Hawaii data have been

collected for over thirty years, some macroeconomic data were only collected within the

last thirty years (e.g., Japanese Real GDP). Moreover, certain macroeconomic data

categories were not available at all (e.g., disposable income of Japanese nationals). As a

result, finding and selecting the right combination of macroeconomic proxies with respect

to a uniform data frequency was a major key in effectively conducting the analyses in this

study.

Research Assumptions

The following are the assumptions that were made to assist in facilitating this

study's proposed research:

1. Although Japanese nationals arrive to Hawaii from all over the World, the
    study assumed that all Japanese tourist arrivals were Japanese nationals
    traveling to Hawaii from mainland Japan. This assumption was made to avoid
    the possible origin ambiguity of Japanese tourists.

2. The following variables were the selected proxies for the four macroeconomic
    factors analyzed in this research. In essence, the Japanese Real GDP will
    represent income, the Honolulu CPI will represent price, and the Australian
    CPI will represent substitute price, respectively. The Japan-U.S. exchange rate
    will directly represent the exchange rate variable, itself. In the case of income

and price, the selection of the Japanese Real GDP and Honolulu CPI came as a result due to the unavailability of data of other potential macroeconomic proxy candidates, among the available data sources. In the case of substitute price, the choice of the Australian CPI was based on two moderating considerations. First, Australia has been arguably the largest competitor for Japanese tourists in the Oceania market (Australian Bureau of Statistics, 2007; Japan Tourism Marketing Co., 2007; Narayan, 2006). Second, Australian CPI data was readily available from publicly accessible government and academic sources, which was also collected for more than twenty years and conveniently recorded in a number of frequencies (Australian Bureau of Statistics, 2007).

CHAPTER 2. LITERATURE REVIEW

In order to quantitatively analyze the influence of the selected macroeconomic

factors on Japanese tourist arrivals to Hawaii before and after their observed decline in

the late 1990's, it is important to review the relevant literature to provide the basic

foundation for this analysis. As a result, this study's literature review will begin by

reviewing the historic and current trends of Japanese tourist arrivals to Hawaii and the

selected macroeconomic variables (i.e., Japanese Real GDP, Honolulu CPI, Australian

CPI, & Japan-U.S. exchange rate), and conclude with a survey of the quantitative

techniques that are commonly used to analyze their econometric relationships. In

addition, due to the need to maintain uniformity, all time series data utilized in this

chapter were drawn from 1980 to 2006.

Japanese Tourist Arrivals to Hawaii

The following historical and current trend analysis analyzed the performance of

Japanese tourist arrivals to Hawaii from the periods of 1980 to 1997 and from the

beginnings of its observed decline in 1998 to 2006 (See Figure 3 and Table 3). Japanese

tourist arrivals to Hawaii data was acquired from the Hawaii Department of Business,

Economic Development and Tourism (n.d.b).

1980 to 1997

Japanese tourist arrivals to Hawaii have predominantly experienced healthy levels of growth during 1980 to 1997 (See Figure 3). With the exception of 1991 and 1993, Japanese tourist arrivals to Hawaii all had positive yearly increases in arrivals. Table 3 summarizes the major descriptive statistics of Japanese tourist arrivals to Hawaii for this period. Based on Table 3, the average yearly arrivals were 1,316,000 visitors, with an average marginal change of 87,000 visitors or 7.2% change per year. The median was 1,289,000 visitors, while the median marginal and percentage change in arrivals were 79,000 visitors and 4.9%, respectively. The maximum value was 2,217,000 visitors, while the maximum marginal and percentage change were 267,000 visitors and 23%, respectively. The minimum value was 658,000 visitors, while the minimum marginal and percentage change were -54,000 visitors and -3.6%, respectively. The variance for yearly arrivals, marginal change, and percentage change were 281,140 visitors; 8,111 visitors; and 0.5%, respectively. Finally, the standard deviation for yearly arrivals, marginal change, and percentage change were 530 visitors; 90 visitors; and 6.9%, respectively.

1998 to 2006

Japanese tourist arrivals to Hawaii predominantly experienced steady decline during 1998 to 2006 (See Figure 3). With the exception of 2004 and 2005, all other years experienced negative growth. Table 3 also summarizes the major descriptive statistics of Japanese tourist arrivals to Hawaii for this period. Based on Table 3, the average yearly arrivals were 1,597,000 visitors, with an average marginal change of -94,000 visitors or -4.9% change per year. The median was 1,517,000 visitors, while the median marginal and percentage change in arrivals were -143,000 visitors and -8.9%, respectively. The

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maximum value was 2,004,000 visitors, while the maximum marginal and percentage change were 142,000 visitors and 10.6%, respectively. The minimum value was 1,340,000 visitors, while the minimum marginal and percentage change were -289,000 visitors and -15.9%, respectively. The variance for yearly arrivals, marginal change, and percentage change were 52,452 visitors; 18,290 visitors; and 0.6%, respectively. Finally, the standard deviation for yearly arrivals, marginal change, and percentage change were 229 visitors; 135 visitors; and 8.1%, respectively.

Figure 3. Japanese tourist arrivals to Hawaii (1980-2006). From *Visitor Arrival* [Data file], n.d.b. Hawaii Department of Business, Economic Development and Tourism. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Table 3. Japanese Tourist Arrivals to Hawaii Descriptive Statistics Summary (1980-2006)

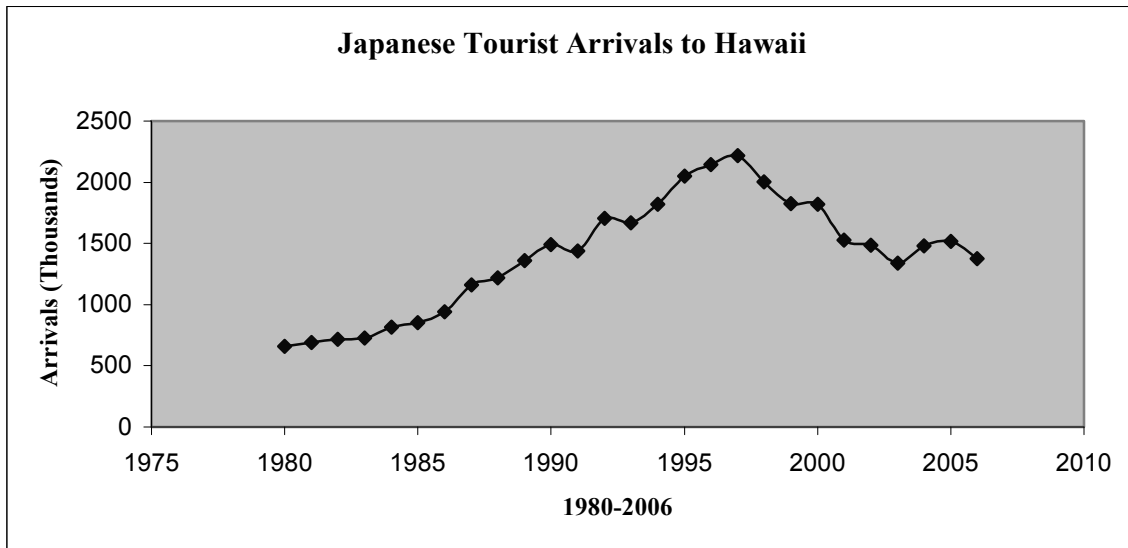| Year	JTAH	Marginal Change	Percentage Change
1980	658	4	0.7%
1981	690	32	4.9%
1982	715	25	3.6%
1983	729	14	2.0%
1984	816	87	11.9%
1985	855	39	4.8%
1986	944	89	10.4%
1987	1161	217	23.0%
1988	1217	56	4.8%
1989	1360	143	11.8%
1990	1493	133	9.7%
1991	1439	-54	-3.6%
1992	1706	267	18.6%
1993	1666	-40	-2.3%
1994	1819	153	9.2%
1995	2048	229	12.6%
1996	2147	98	4.8%
1997	2217	70	3.3%
1998	2004	-213	-9.6%
1999	1826	-179	-8.9%
2000	1818	-8	-0.4%
2001	1529	-289	-15.9%
2002	1483	-45	-3.0%
2003	1340	-143	-9.6%
2004	1482	142	10.6%
2005	1517	35	2.4%
2006	1374	-143	-9.4%
1980-1997			
Mean	1316	87	7.2%
Median	1289	79	4.9%
Maximum	2217	267	23.0%
Minimum	658	-54	-3.6%
Variance	281140	8111	0.5%
Std. Dev.	530	90	6.9%
1998-2006			
Mean	1597	-94	-4.9%
Median	1517	-143	-8.9%
Maximum	2004	142	10.6%
Minimum	1340	-289	-15.9%
Variance	52452	18290	0.6%
Std. Dev.	229	135	8.1%

Note. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Macroeconomic Factor Historical and Current Trends Analysis

To understand the historical and current performance of each macroeconomic factor in relation to the decline of Japanese tourists arrivals to Hawaii that began in 1998, the following historical trend analysis mirrored the analysis of Japanese tourists arrivals to Hawaii by examining each macroeconomic variable from the periods of 1980 to 1997 and 1998 to 2006, respectively. Data for the Japanese Real GDP was acquired from the Economic and Social Research Institute, Cabinet Office, Japan (n.d.); data for the Honolulu CPI was acquired from the U.S. Department of Labor, Bureau of Labor Statistics (n.d.); data for the Australian CPI was acquired from the Australian Bureau of Statistics (2007); and data for the Japan-U.S. exchange rate was acquired from the Federal Reserve Bank of St. Louis (n.d.).

Japanese Real Gross Domestic Product

The period from 1980 to 1997 has seen Japan experience both slow and rapid periods of growth. With the exception of 1993, Japan has experienced growth rates of 1% or more during this period (See Figure 4). Table 4 summarizes the major descriptive statistics of the Japanese Real GDP for this period. Based on Table 4, the average was ¥403,000,000, with an average marginal change of ¥11,803,000 or 3.07% change per year. The median was ¥409,785,000, while the median marginal and percentage change were ¥9,909,000 and 2.99%, respectively. The maximum value was ¥500,840,000, while the maximum marginal and percentage change were ¥25,505,000 and 6.82%, respectively. The minimum value was ¥300,188,000, while the minimum marginal and percentage change were ¥924,000 and 0.2%, respectively. The variance, marginal change, and percentage change were ¥4,904,038,780; ¥43,759,708; and 0.03%, respectively.

Finally, the standard deviation, marginal change, and percentage change for the period were ¥70,029; ¥6,615; and 1.74%, respectively.

During the 1998 to 2006 period, the Japanese Real GDP experienced two years of recession in 1998 and 1999 (See Figure 4). Table 4 also summarizes the major descriptive statistics of the Japanese Real GDP for this period. Based on Table 4, the average was ¥513,480,000, with an average marginal change of ¥5,331,000 or 1.03% change per year. The median was ¥505,978,000, while the median marginal and percentage change were ¥7,399,000 and 1.46%, respectively. The maximum value was ¥548,815,000, while the maximum marginal and percentage change were ¥13,964,000 and 2.83%, respectively. The minimum value was ¥489,982,000, while the minimum marginal and percentage change were -¥10,760,000 and -2.15%, respectively. The variance, marginal change, and percentage change were ¥416,312,202; ¥67,107,220; and 0.03%, respectively. Finally, the standard deviation, marginal change, and percentage change were ¥20,404; ¥8,192; and 1.61%, respectively.

Honolulu Consumer Price Index

From 1980 to 1997, the Honolulu CPI had double-digit inflation rates in 1980 and 1981 (See Figure 5). Inflation began to increase from 1986 to 1991, but began to increase at a decreasing rate from 1992 to 1997. Table 5 summarizes the major descriptive statistics of the Honolulu CPI for this period. Based on Table 5, the average was 129.68, with an average marginal change of 5.42 or 4.81% change per year. The median was 125.25, while the median marginal and percentage change in arrivals were 5.22 and 4.14%, respectively. The maximum value was 171.95, while the maximum marginal and percentage change were 9.8 and 11.65%, respectively. The minimum value was 83.01,

while the minimum marginal and percentage change were 1.2 and 0.7%, respectively. The variance, marginal change, and percentage change were 916.18; 6.89; and 0.09%, respectively. Finally, the standard deviation, marginal change, and percentage change were 30.27; 2.63; and 2.96%, respectively.

From 1998 to 2006, the Honolulu CPI had its only deflationary year in 1998, but has maintained a steady pace of inflation since that time (See Figure 5). Table 5 also summarizes the major descriptive statistics of the Honolulu CPI for this period. Based on Table 5, the average was 184.65, with an average marginal change of 4.16 or 2.23% change per year. The median was 180.25, while the median marginal and percentage change were 3.05 and 1.76%, respectively. The maximum value was 209.35, while the maximum marginal and percentage change were 11.55 and 5.84%, respectively. The minimum value was 171.5, while the minimum marginal and percentage change were -0.45 and -0.26%, respectively. The variance, marginal change, and percentage change were 156.11; 13.22; and 0.03%, respectively. Finally, the standard deviation, marginal change, and percentage change were 12.49; 3.64; and 1.84%, respectively.

Australian Consumer Price Index

From 1980 to 1997, the Australian CPI has been experiencing constant inflation (See Figure 6). Table 6 summarizes the major descriptive statistics of the Australian CPI for this period. Based on Table 6, the average was 88.76, with an average marginal change of 4.29 or 5.94% change per year. The median was 92.8, while the median marginal and percentage change were 4.5 and 7%, respectively. The maximum value was 120.1, while the maximum marginal and percentage change were 7.0 and 11.23%, respectively. The minimum value was 47.33, while the minimum marginal and

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percentage change were 0.30 and 0.25%, respectively. The variance, marginal change, and percentage change were 606.77; 4.35; and 0.13%, respectively. Finally, the standard deviation, marginal change, and percentage change were 24.63; 2.09; and 3.55%, respectively.

From 1998 to 2006, the Australian CPI has been experiencing constant inflation (See Figure 6). Table 6 also summarizes the major descriptive statistics of the Australian CPI for this period. Based on Table 6, the average was 137.22, with an average marginal change of 3.81 or 2.83% change per year. The median was 138.05, while the median marginal and percentage change were 3.88 and 2.77%, respectively. The maximum value was 154.35, while the maximum marginal and percentage change were 5.63 and 4.48%, respectively. The minimum value was 121.13, while the minimum marginal and percentage change were 1.03 and 0.85%, respectively. The variance, marginal change, and percentage change were 134.02; 2.56; and 0.01%, respectively. Finally, the standard deviation, marginal change, and percentage change were 11.58; 1.6; and 1.21%, respectively.

Japan-U.S. Exchange Rate

From 1980 to 1997, the Japan-U.S. exchange rate has been predominately depreciating during this period (See Figure 7). The biggest depreciation occurred in 1986, where the Japan-U.S. exchange rate depreciated -29.3%. Table 7 summarizes the major descriptive statistics of the Japan-U.S. exchange rate for this period. Based on Table 7, the average was ¥162.9, with an average marginal change of -¥5.5 or a -2.6% change per year. The median was ¥141.3, while the median marginal and percentage change were -¥6.9 and -3.7%, respectively. The maximum value was ¥249.1, while the maximum

marginal and percentage change were ¥28.6 and 15.6%, respectively. The minimum value was ¥94.1, while the minimum marginal and percentage change were -¥70 and -29.3%, respectively. The variance, marginal change, and percentage change were ¥3,060.7; ¥430.2; and 1.2%, respectively. Finally, the standard deviation, marginal change, and percentage change were ¥55.3; ¥20.7; and 11.1%, respectively.

From 1998 to 2006, the Japan-U.S. exchange rate has been sporadically appreciating and depreciating during this period (See Figure 7). In essence, the Japan-U.S. exchange rate was at its highest point in 1998 and at its lowest point in 2000. Table 7 also summarizes the major descriptive statistics of the Japan-U.S. exchange rate for this period. Based on Table 7, the average was ¥116.6 with an average marginal change of -¥0.5 or -0.1% change per year. The median was ¥115.9, while the median marginal and percentage change were ¥2 and 1.8%, respectively. The maximum value was ¥130.8, while the maximum marginal and percentage change were ¥13.7 and 12.7%, respectively. The minimum value was ¥107.8, while the minimum marginal and percentage change were -¥17.1 and -13.1%, respectively. The variance, marginal change, and percentage change were ¥62.6; ¥101.4; and 0.7%, respectively. Finally, the standard deviation, marginal change, and percentage change were ¥7.9; ¥10.1; and 8.4%, respectively.

Japanese Real Gross Domestic Product
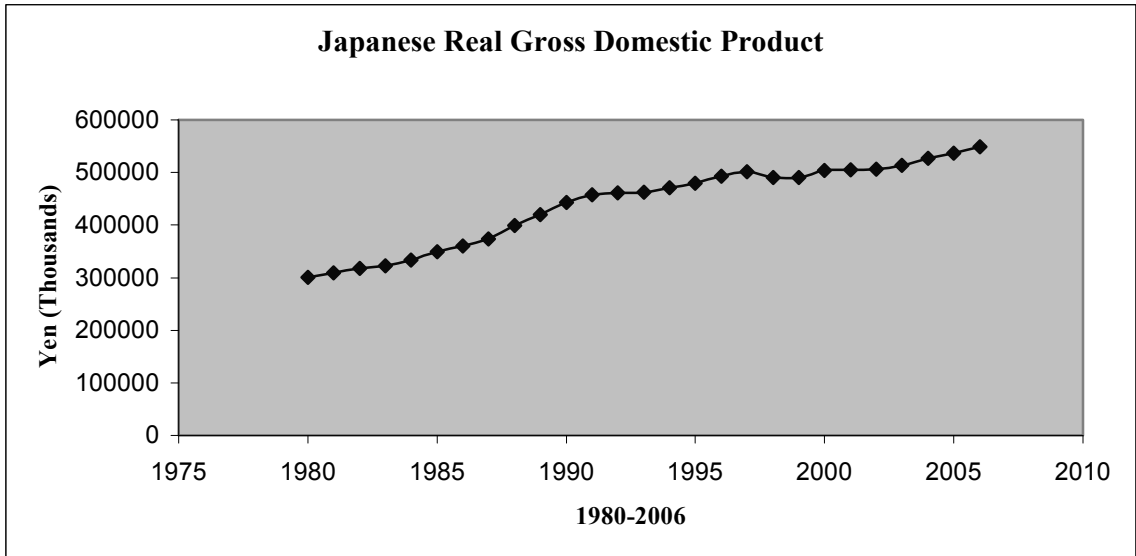
Figure 4. Japanese Real GDP (1980-2006). From *Japanese Real Gross Domestic Product* [Data file], n.d. Economic and Social Research Institute, Cabinet Office, Japan. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Honolulu Consumer Price Index
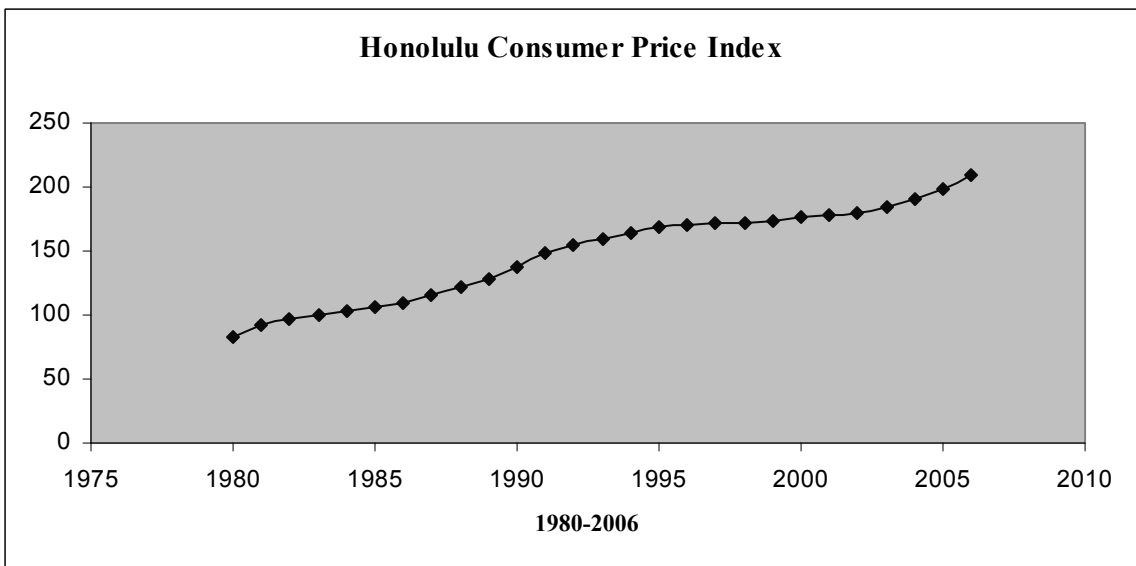
Figure 5. Honolulu CPI (1980-2006). From *Consumer Price Index* [Data file], n.d. U.S. Department of Labor, Bureau of Labor Statistics. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Australian Consumer Price Index
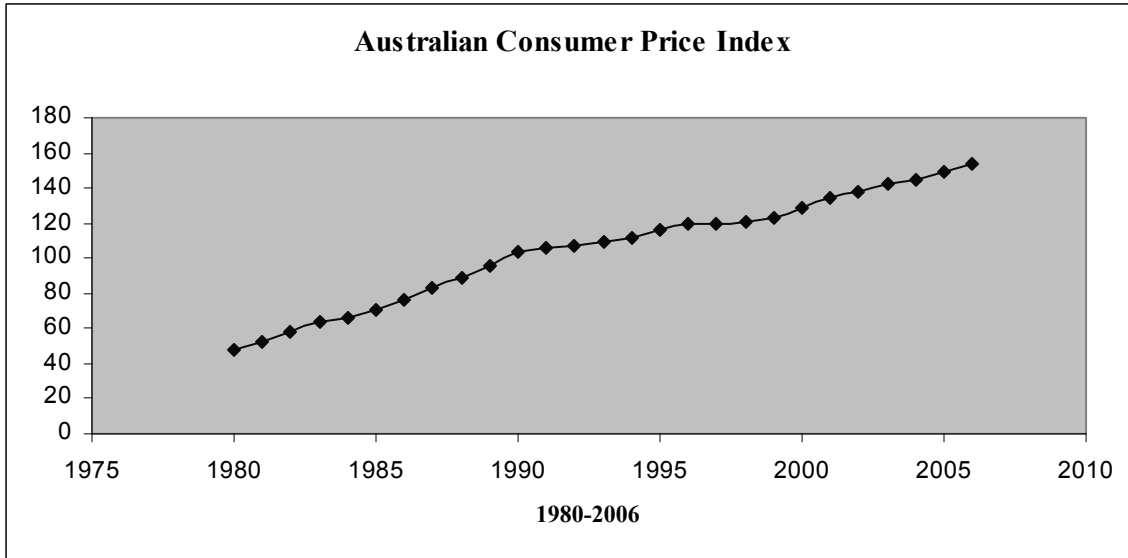
Figure 6. Australian CPI (1980-2006). From *Consumer Price Index, Australia* [Data file], 2007. Australian Bureau of Statistics. Retrieved May 6, 2007, from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

Japan-U.S. Exchange Rate
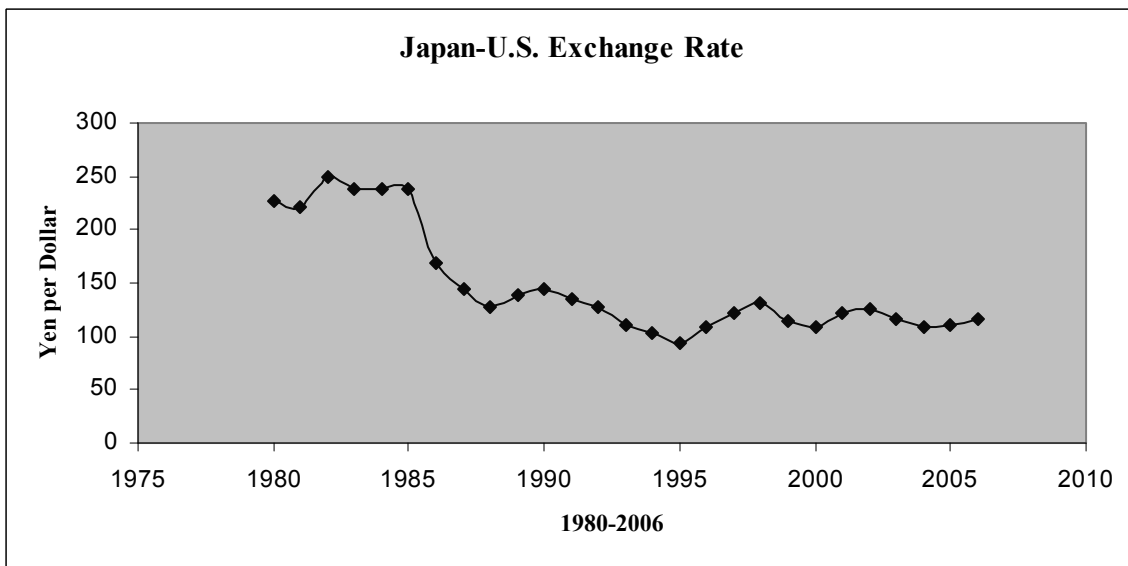
Figure 7. Japan-U.S. exchange rate (1980-2006). From *Yen-Dollar Exchange Rate* [Data file], n.d. Federal Reserve Bank of St. Louis. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Table 4. Japanese Real GDP Descriptive Statistics Summary (1980-2006)

| Year	JRGDP (Thousands)	Marginal Change	Percentage Change
1980	300188	N.A	N.A
1981	309163	8975	2.99%
1982	317761	8598	2.78%
1983	322963	5203	1.64%
1984	332873	9909	3.07%
1985	349747	16874	5.07%
1986	360291	10544	3.01%
1987	373733	13442	3.73%
1988	399238	25505	6.82%
1989	420333	21095	5.28%
1990	442461	22129	5.26%
1991	457213	14752	3.33%
1992	461566	4352	0.95%
1993	462489	924	0.20%
1994	470458	7969	1.72%
1995	479578	9119	1.94%
1996	493109	13532	2.82%
1997	500840	7731	1.57%
1998	490080	-10760	-2.15%
1999	489982	-98	-0.02%
2000	503862	13880	2.83%
2001	504666	804	0.16%
2002	505978	1312	0.26%
2003	513377	7399	1.46%
2004	527340	13964	2.72%
2005	537220	9880	1.87%
2006	548815	11595	2.16%
1980-1997			
Mean	403000	11803	3.07%
Median	409785	9909	2.99%
Maximum	500840	25505	6.82%
Minimum	300188	924	0.20%
Variance	4904038780	43759708	0.03%
Std. Dev.	70029	6615	1.74%
1998-2006			
Mean	513480	5331	1.03%
Median	505978	7399	1.46%
Maximum	548815	13964	2.83%
Minimum	489982	-10760	-2.15%
Variance	416312202	67107220	0.03%
Std. Dev.	20404	8192	1.61%

Note. Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Table 5. Honolulu CPI Descriptive Statistics Summary (1980-2006)

Year	HCPI	Marginal Change	Percentage Change
1980	83.01	8.66	11.65%
1981	91.70	8.69	10.47%
1982	97.22	5.52	6.02%
1983	100.54	3.32	3.41%
1984	103.45	2.91	2.89%
1985	106.85	3.40	3.29%
1986	109.40	2.55	2.39%
1987	114.90	5.50	5.03%
1988	121.75	6.85	5.96%
1989	128.75	7.00	5.75%
1990	138.15	9.40	7.30%
1991	147.95	9.80	7.09%
1992	155.15	7.20	4.87%
1993	160.10	4.95	3.19%
1994	164.55	4.45	2.78%
1995	168.15	3.60	2.19%
1996	170.75	2.60	1.55%
1997	171.95	1.20	0.70%
1998	171.50	-0.45	-0.26%
1999	173.25	1.75	1.02%
2000	176.30	3.05	1.76%
2001	178.40	2.10	1.19%
2002	180.25	1.85	1.04%
2003	184.45	4.20	2.33%
2004	190.55	6.10	3.31%
2005	197.80	7.25	3.80%
2006	209.35	11.55	5.84%
1980-1997			
Mean	129.68	5.42	4.81%
Median	125.25	5.22	4.14%
Maximum	171.95	9.80	11.65%
Minimum	83.01	1.20	0.70%
Variance	916.18	6.89	0.09%
Std. Dev.	30.27	2.63	2.96%
1998-2006			
Mean	184.65	4.16	2.23%
Median	180.25	3.05	1.76%
Maximum	209.35	11.55	5.84%
Minimum	171.50	-0.45	-0.26%
Variance	156.11	13.22	0.03%
Std. Dev.	12.49	3.64	1.84%

*Note*. Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Table 6. Australian CPI Descriptive Statistics Summary (1980-2006)

Year	ACPI	Marginal Change	Percentage Change
1980	47.33	4.38	10.19%
1981	51.88	4.55	9.61%
1982	57.70	5.83	11.23%
1983	63.50	5.80	10.05%
1984	66.00	2.50	3.94%
1985	70.45	4.45	6.74%
1986	76.85	6.40	9.08%
1987	83.38	6.53	8.49%
1988	89.43	6.05	7.26%
1989	96.18	6.75	7.55%
1990	103.18	7.00	7.28%
1991	106.50	3.33	3.22%
1992	107.55	1.05	0.99%
1993	109.50	1.95	1.81%
1994	111.58	2.08	1.89%
1995	116.75	5.18	4.64%
1996	119.80	3.05	2.61%
1997	120.10	0.30	0.25%
1998	121.13	1.03	0.85%
1999	122.90	1.78	1.47%
2000	128.40	5.50	4.48%
2001	134.03	5.63	4.38%
2002	138.05	4.03	3.00%
2003	141.88	3.82	2.77%
2004	145.20	3.32	2.34%
2005	149.08	3.88	2.67%
2006	154.35	5.28	3.54%
1980-1997			
Mean	88.76	4.29	5.94%
Median	92.80	4.50	7.00%
Maximum	120.10	7.00	11.23%
Minimum	47.33	0.30	0.25%
Variance	606.77	4.35	0.13%
Std. Dev.	24.63	2.09	3.55%
1998-2006			
Mean	137.22	3.81	2.83%
Median	138.05	3.88	2.77%
Maximum	154.35	5.63	4.48%
Minimum	121.13	1.03	0.85%
Variance	134.02	2.56	0.01%
Std. Dev.	11.58	1.60	1.21%

Note. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

Table 7. Japan-U.S. Exchange Rate Descriptive Statistics Summary (1980-2006)

Year	JUSER	Marginal Change	Percentage Change
1980	226.6	7.4	3.4%
1981	220.5	-6.1	-2.7%
1982	249.1	28.6	13.0%
1983	237.5	-11.6	-4.7%
1984	237.6	0.1	0.1%
1985	238.5	0.9	0.4%
1986	168.5	-70.0	-29.3%
1987	144.6	-23.9	-14.2%
1988	128.1	-16.5	-11.4%
1989	138.0	9.9	7.7%
1990	144.8	6.8	4.9%
1991	134.5	-10.3	-7.1%
1992	126.8	-7.8	-5.8%
1993	111.2	-15.5	-12.2%
1994	102.2	-9.0	-8.1%
1995	94.1	-8.1	-7.9%
1996	108.8	14.7	15.6%
1997	121.1	12.3	11.3%
1998	130.8	9.7	8.0%
1999	113.7	-17.1	-13.1%
2000	107.8	-5.9	-5.2%
2001	121.5	13.7	12.7%
2002	125.3	3.8	3.1%
2003	115.9	-9.3	-7.5%
2004	108.2	-7.8	-6.7%
2005	110.1	2.0	1.8%
2006	116.4	6.2	5.6%
1980-1997			
Mean	162.9	-5.5	-2.6%
Median	141.3	-6.9	-3.7%
Maximum	249.1	28.6	15.6%
Minimum	94.1	-70.0	-29.3%
Variance	3060.7	430.2	1.2%
Std. Dev.	55.3	20.7	11.1%
1998-2006			
Mean	116.6	-0.5	-0.1%
Median	115.9	2.0	1.8%
Maximum	130.8	13.7	12.7%
Minimum	107.8	-17.1	-13.1%
Variance	62.6	101.4	0.7%
Std. Dev.	7.9	10.1	8.4%

Note. Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. Retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873.

Quantitative Techniques Used in Analyzing Econometric Relationships

Analyzing the correlation, significance, and contribution of the major macroeconomic factors on Japanese tourist arrivals to Hawaii formed the main objectives of this study. Hence, the following section surveyed the most common quantitative methods that are used to analyze the econometric interaction between these factors.

Correlation Analysis

Correlation analysis is one of the most basic econometric methods that is used in determining the relationship between tourist arrivals and its demand determinants. It has also been widely cited within the tourism literature and can be calculated by a number of different techniques.

Within the tourism literature. In 2002, Pettersson utilized correlation analysis to analyze the factors that influenced tourist visitation in northern Sweden. Based on his study, Pettersson (2002) found that tourist arrivals were highly correlated to the three factors of travel offers, prices, and access.

In 2005, Zeng, Carter, De Lacy, and Bauer published their case study on the effects of tourism development on the local poor people in the Taibai region of China. From their research, they concluded that although tourism development was positively correlated to general household income, employment, education, and social security, these benefits were also negatively correlated to the area's poorest inhabitants (Zeng et al., 2005).

Correlation coefficients. Correlation analysis is a simple procedure that basically looks for the linear relationship between two variables. To facilitate this process, the generating of correlation coefficients is necessary. Three of the most common correlation

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coefficients utilized are the Pearson, Spearman, and the partial correlation coefficient (Norusis, 2005, Salvatore, 2002).

The Pearson correlation coefficient is the measure of the linear relationship between two variables (Ghahroudi & Hoshino, 2007; Liao, 2008; Norusis, 2005, Salvatore, 2002; Yuan & Xiao, 2007). Essentially, the Pearson correlation coefficient results in a value that is between −1 and +1 (Ghahroudi & Hoshino, 2007; Liao, 2008; Norusis, 2005, Salvatore, 2002; Yuan & Xiao, 2007). The absolute value of the coefficient reveals as to the strengths of the relationship and the sign reveals whether the relationship is positively or negatively correlated (Ghahroudi & Hoshino, 2007; Liao, 2008; Norusis, 2005, Salvatore, 2002; Yuan & Xiao, 2007).

The Spearman correlation coefficient is calculated by the replacing of data values with ranks (Norusis, 2005, Salvatore, 2002). Essentially, this specific type of correlation coefficient is used when a violation of normality among the studied data is suspected and through which the use of the Pearson correlation coefficient proves to be too sensitive (Chen, 2007; Kristandl & Bontis, 2007; Norusis, 2005, Salvatore, 2002; Zheng & Stangeland, 2007).

Finally, there is the partial correlation coefficient, which reveals the true strength of the linear relationship between two variables by controlling the linear effects of one or more of the other variables being studied (Norusis, 2005, Salvatore, 2002). This correlation technique is very useful in its ability to eliminate spurious correlations and to reveal hidden relationships (Bodla & Verma, 2007; Nelson, Goodmon, & Ceo, 2007; Norusis, 2005, Salvatore, 2002; Woodruff, 2007).

Regression Analysis

Regression analysis is another of the most common analytical tools used in determining the linear relationship, significance, and contribution between one or more independent and one dependent variable(s). It also has a reputable history of use within the tourism literature, can be utilized to determine demand elasticities, and possesses a strong theoretical basis.

Within the tourism literature. Regression analysis has and continues to be an extremely valuable and widely used quantitative tool in tourism research (Chang & Shin, 2004; Coviello, Winklhofer, & Hamilton, 2006; Ibrahim & Gill, 2005; Malai, 2007; Peters, 2005; Runyan, 2006).

For example, in tourism demand determinants research, Richardson (2002) published his dissertation that examined the economic effects of climate change on nature-based tourism. Based on the research, the regression analysis found that population grown and not climate change was the only significant determinant in future park visitation at Colorado's Rocky Mountain National Park (Richardson, 2002).

Also in 2002, Anaman and Ismail published their article that analyzed cross-border tourism from Brunei Darussalam to Eastern Malaysia. Using regression analysis, they were able to find that age of potential visitors, income, destination perception, perception of the quality of the goods and services of the destination, potential visitor's use of alcohol, and family and friends living in the intended destination as being the major factors that influence visitation from Brunei to Malaysia (Anaman & Ismail, 2002).

Finally, regression analysis was utilized to identify the demand determinants of Greece's regional tourism arrivals (Patsouratis, Frangouli, & Anastasopoulos, 2005).

Based on their study, their regression analysis revealed that price indexes of both the host and home countries and the exchange rate were the main determinants for Greece's regional visitors (Patsouratis, Frangouli, & Anastasopoulos, 2005).

Determining demand elasticities. Regression analysis has not only been able to identify the demand determinants of tourist visitation, but also their respective contributions in the form of demand elasticities. Essentially, by transforming the independent and dependent variable(s) into natural logarithms, the unstandardized coefficients from the resulting regression can represent the contribution of the independent variable(s) to the dependent variable in the form of demand elasticities (Salvatore, 2002).

For example, Vogt and Wittayakorn (1998) published their findings on the determinants of the demand for Thailand's exports of tourism. Utilizing natural logarithmic based regression analysis, they were able to identify the short and long-run price (-1.199 and –0.891) and income (1.926 and 2.342) elasticities for Thailand's exports of tourism (Vogt & Wittayakorn, 1998).

In a similar use of natural logarithmic regression, Garin-Munoz and Amaral (2000) were able to calculate the demand determinant elasticities for international tourism flows to Spain. Based on their research, their natural log regression reveled that the elasticities for real per capita income, exchange rates, and real prices for Spanish tourist services were 1.4; 5.0; and -0.30, respectively (Garin-Munoz & Amaral, 2000).

Theoretical underpinnings. The most classical form of multivariate analyses is that of bivariate and multiple regression. In bivariate regression, there is one dependent and one independent variable (Greene, 2003; Norusis, 2005; Salvatore, 2002). Having

plotted all the corresponding points of both variables graphically, the main goal of regression is to calculate the best fitting straight line through those points (Greene, 2003; Norusis, 2005; Salvatore, 2002). The resulting line would be then represented as an equation, which could then be used to calculate future forecasts (Greene, 2003; Norusis, 2005; Salvatore, 2002).

In multiple regression, there is one dependent and at least two or more independent variables (Greene, 2003; Norusis, 2005; Salvatore, 2002). Similar in bivariate regression, multiple regression attempts to fit the best fitting straight line through the graphical plotting of the corresponding points of all the variables (Greene, 2003; Norusis, 2005; Salvatore, 2002). The resulting regression equation, as in the case of bivariate regression, could then be used to calculate future forecasts (Greene, 2003; Norusis, 2005; Salvatore, 2002).

Finally, in both bivariate and multiple regression, the data can be regressed in their original or a transformed form. Regressing the data in a transformed form such as in logarithms, natural logarithms, or square roots is typically done in the event the residuals of a regression of the original data are seen to violate the necessary assumptions of regression analysis (Greene, 2003; Norusis, 2005; Salvatore, 2002).

CHAPTER 3. METHODOLOGY

The following is the research paradigm that was utilized to analyze the role the

selected macroeconomic factors had on Japanese tourist arrivals to Hawaii before and

after its decline in the late 1990's. The chapter will begin by initially going over the data

sources that provided the raw numbers for the subsequent econometric analyses. This

study's selected steps of data preparation will be discussed next. The chapter will then

detail the procedures for the macroeconomic factor: bivariate variability, correlation,

significance, and contribution analyses that allowed this study to reach its main

objectives. Finally, SPSS 14.0 for Windows, Student Version was the statistical package

chosen to facilitate the prescribed econometric analyses.

Data Sources

In order to conduct the requisite analyses, a number of publicly accessible

government and academic sources provided the necessary data. Essentially, data for

Japanese tourist arrivals to Hawaii was acquired from the Hawaii Department of

Business, Economic Development and Tourism (n.d.b); data for the Japanese Real GDP

was acquired from the Economic and Social Research Institute, Cabinet Office, Japan

(n.d.); data for the Honolulu CPI was acquired from the U.S. Department of Labor,

Bureau of Labor Statistics (n.d.); data for the Australian CPI was acquired from the

Australian Bureau of Statistics (2007); and data for the Japan-U.S. exchange rate was

acquired from the Federal Reserve Bank of St. Louis (n.d.).

Data Preparation

Data preparation for this study's purposes was composed of three steps. First, since it is paramount to maintain data consistency (Hu, 2002), all variables for this study were collected uniformly with respect to base year and data frequency. Second, since the study makes use of time series based data, they were inspected for outliers (Hu, 2002). If such outliers existed, those influential points were analyzed and determined whether or not to be deleted from the analysis (Hu, 2002). Third, in order to address the time series characteristic of seasonality, all time series data utilized in this research were deseasonalized by initially determining the seasonal index of each times series and then multiplying each time series value by that index; thereby, deseasonalizing and making the data ready for econometric analysis (Hu, 2002).

Macroeconomic Factor Bivariate Variability Analysis

To assess whether each macroeconomic factor individually has had an effect on Japanese tourist arrivals to Hawaii, a bivariate regression was conducted for the periods before and after its decline in 1998. Once conducted, the resulting R^2 statistic was analyzed to determine the individual effect each macroeconomic factor on Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006.

Conducting Bivariate Regressions

Quarterly time series data for Japanese tourist arrivals to Hawaii (i.e., the dependent variable) and each macroeconomic variable (i.e., the independent variable) were initially paired together and separately grouped for the periods from 1980 to 1997 and 1998 to 2006, respectively. The corresponding time series pairs were then inputted to

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SPSS and the bivariate regression function ran for each combination in both time periods. Upon retrieving the outcome from SPSS, the regression results were analyzed.

Analyzing Individual Macroeconomic Factor Effects

Each bivariate regression's value of R and R^2 were initially inspected to see how well each macroeconomic variable was correlated and able to explain the variance within Japanese tourist arrivals to Hawaii. In addition, the regression equation's resulting significance value was then noted to determine the level of statistical significance of the observed values of R and R^2. Finally, the unstandardized and standardized coefficients, along with the statistical significance of each macroeconomic variable, were inspected to give an initial perspective as to their individual contribution to Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006.

Macroeconomic Factor Correlation Analysis

To econometrically determine the linear relationship between each macroeconomic variable and Japanese tourist arrivals to Hawaii, a correlation analysis was conducted before and after its decline in 1998. Essentially, the calculation of the Pearson correlation coefficient was used in corroboration with the plotting and visual inspection of a pairing of each macroeconomic variable and Japanese tourist arrivals to Hawaii. In addition, to note any changes in the linear relationship, this analysis was conducted and analyzed separately from 1980 to 1997 and 1998 to 2006.

Pearson Correlation Coefficient Generation

Quarterly times series data for the pairing of each macroeconomic factor and Japanese tourist arrivals to Hawaii were initially grouped for the periods from 1980 to

1997 and 1998 to 2006, respectively. Once divided, they were inputted to SPSS and the correlation function ran for both time periods. Once the output was retrieved, the Pearson correlation coefficients calculated for each macroeconomic factor and Japanese tourist arrivals to Hawaii combination were inspected to determine their relative linear relationships.

Scatter Graph Generation

Quarterly times series data for the pairing of each macroeconomic factor and Japanese tourist arrivals to Hawaii were initially grouped for the periods from 1980 to 1997 and 1998 to 2006, respectively. Once divided, they were inputted to SPSS and the scatter graph function ran for both time periods. Once produced, any revealed positive or negative trends were then used to corroborate any linear relationships identified by the Pearson correlation coefficients generated in the preceding procedure.

Macroeconomic Factor Significance Analysis

To ascertain the level of significance each macroeconomic factor possesses with respect to Japanese tourist arrivals to Hawaii, it is important to remember that they all work together in a dynamic process. Hence, in order to encompass their synergetic interactions, a multiple regression of all four macroeconomic factors and Japanese tourist arrivals to Hawaii was conducted before and after its decline in 1998. Once conducted, the inspection of the significance values of each macroeconomic variable allowed for the identification of their relative significance to Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006.

Conducting Multiple Regression

Quarterly time series data for Japanese tourist arrivals to Hawaii (i.e., the dependent variable) and all four macroeconomic factors (i.e., the independent variables) were collectively grouped for the periods from 1980 to 1997 and 1998 to 2006, respectively. Each group was then inputted to SPSS and the multiple regression function ran for both time periods. Upon retrieving the outcome from SPSS, the regression results were analyzed.

Analyzing Macroeconomic Factor Significance

Each multiple regression's R and R^2 were initially inspected to see how well the macroeconomic variables were collectively correlated and able to explain the variance within Japanese tourist arrivals to Hawaii. The regression equation's resulting significance value was then noted to determine the level of statistical significance of the observed values of R and R^2. Finally, the statistical significance of each macroeconomic variable, along with their unstandardized and standardized coefficients, were inspected to identify their relative statistical significance to Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006.

Macroeconomic Factor Contribution Analysis

Similar in ascertaining the level of significance of each macroeconomic factor towards Japanese tourist arrivals to Hawaii, determining the contribution of each factor should be approached with an understanding of their collective synergism. Hence, a natural logarithmic multiple regression of all four macroeconomic factors and Japanese tourist arrivals to Hawaii was conducted before and after its decline in 1998. As

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previously mentioned, the resulting unstandardized coefficients of a regression based on natural logarithms can be interpreted as demand elasticities (Salvatore, 2002). Consequently, the revealed demand elasticities allowed for the identification of each macroeconomic factor's econometric contribution towards Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006.

Conducting Natural Logarithmic Multiple Regression

Quarterly time series data for Japanese tourist arrivals to Hawaii (i.e., the dependent variable) and all four macroeconomic factors (i.e., the independent variables) were initially transformed into natural logarithms and collectively grouped for the periods from 1980 to 1997 and 1998 to 2006, respectively. Each group was then inputted to SPSS and the multiple regression function ran for both time periods. Upon retrieving the outcome from SPSS, the regression results were analyzed.

Analyzing Macroeconomic Factor Contribution

Each multiple regression's R and R² were initially inspected to see how well the macroeconomic variables were collectively correlated and able to explain the variance within Japanese tourist arrivals to Hawaii. The regression equation's resulting significance value was then noted to present the level of statistical significance of the observed values of R and R². Finally, the unstandardized and standardized coefficients, along with the statistical significance of each macroeconomic variable, were inspected to identify their relative demand elasticities (i.e., econometric contribution) towards Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006.

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CHAPTER 4. RESULTS

From 1980 to 1997, Japanese tourist arrivals to Hawaii enjoyed tremendous

growth, which greatly contributed to Hawaii's economy. Beginning in 1998, however,

visitors from Japan began a trend of decline, which has predominately persisted as recent

as 2006. As a result, this study's main aim is to synthesize a better understanding of this

decline of Japanese tourists from a macroeconomic perspective. In order to complete this

task, this study strives to achieve the following two research objectives. The first one is to

determine, whether the macroeconomic factors of income (i.e., Japanese Real GDP),

price (i.e., Honolulu CPI), substitute price (i.e., Australian CPI), and the exchange rate

(i.e., Japan-U.S. exchange rate) individually had any effect on Japanese tourist arrivals to

Hawaii from 1980 to 2006. The second is to analyze the correlation, collective level of

significance, and synergetic contribution of each of those major macroeconomic factors

towards Japanese tourist arrivals to Hawaii before and after its trend of decline that

started in the late 1990's.

The following chapter will present the results of the econometric analyses

conducted to achieve this study's main two objectives. The chapter will initially present

the results of the macroeconomic factor bivariate variability analysis that ascertained

each factor's unique effect towards Japanese tourist arrivals to Hawaii before and after

their decline in 1998. The chapter will then present the results of the macroeconomic

factor correlation, significance, and contribution analysis conducted for both the 1980 to 1997 and 1998 to 2006 periods.

Data for Japanese tourist arrivals to Hawaii was acquired from the Hawaii Department of Business, Economic Development and Tourism (n.d.b); data for the Japanese Real GDP was acquired from the Economic and Social Research Institute, Cabinet Office, Japan (n.d.); data for the Honolulu CPI was acquired from the U.S. Department of Labor, Bureau of Labor Statistics (n.d.); data for the Australian CPI was acquired from the Australian Bureau of Statistics (2007); and data for the Japan-U.S. exchange rate was acquired from the Federal Reserve Bank of St. Louis (n.d.). Finally, all macroeconomic factor analyses were conducted with SPSS 14.0 for Windows, Student Version.

Macroeconomic Factor Bivariate Variability Analysis

The following are the results of the bivariate regressions that were conducted to identify the individual influence of each macroeconomic factor towards Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006. The econometric results of each macroeconomic variable will be presented, including a brief interpretation of its findings. Table 8 presents the data summary of all of the bivariate regressions conducted in this analysis.

Japanese Real Gross Domestic Product

From 1980 to 1997, an R-Value of 0.979 was reported, which indicated a high correlation between the Japanese Real GDP and the log of Japanese tourist arrivals to Hawaii (See Table 8). An R^2 of 0.959 was also revealed, which explained that 95.9% of

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the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the

Japanese Real GDP (See Table 8). Since the ANOVA significance value was 0.000, it was

concluded that both the R-Value and R^2 were both statistically significant from zero at the

0.05 level (See Table 8). Finally, the Japanese Real GDP was statistically significant from

zero at the 0.05 level and had an unstandardized coefficient of 0.00000256 and a

standardized coefficient of 0.979 (See Table 8).

The bivariate variability analysis revealed that the Japanese Real GDP played a

substantial role in the growth of Japanese tourist arrivals to Hawaii from 1980 to 1997.

Consistent with economic logic, the rise in the Japanese Real GDP (See Table 4) resulted

in the expected increase of household discretionary income during this period. Thus, the

rise in household discretionary income had the effect of making travel more affordable

among Japanese travelers (See Table 3). Consequently, this economically sound sequence

of events has suggested that the growth in the Japanese Real GDP (See Table 4) was

directly contributing to the positive trend of Japanese visitors (See Table 3). Moreover,

since the bivariate variability analysis has confirmed the Japanese Real GDP as having

explained a major portion within the variability of Japanese visitation to Hawaii (See

Table 8), it has subsequently quantified econometrically the notion of the Japanese Real

GDP as a valid demand determinant during this period. Hence, *ceteris paribus*, the rise in

Japanese productivity was one of the major reasons for the predominant growth in

Japanese tourist arrivals to Hawaii from 1980 to 1997.

From 1998 to 2006, an R-Value of 0.455 was reported, which indicated a

moderate correlation between the log of the Japanese Real GDP and the log of Japanese

tourist arrivals to Hawaii (See Table 8). An R^2 of 0.207 was also revealed, which

explained that 20.7% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the log of the Japanese Real GDP (See Table 8). Since the ANOVA significance value was 0.005, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 8). Finally, the log of the Japanese Real GDP was statistically significant from zero at the 0.05 level and had an unstandardized coefficient of -2.148 and a standardized coefficient of -0.455 (See Table 8).

The bivariate variability analysis revealed that the Japanese Real GDP did not play a substantial role in the decline of Japanese tourist arrivals to Hawaii from 1998 to 2006. Contrary to economic logic, the rise in the Japanese Real GDP (See Table 4), that increased household discretionary income and made travel to Hawaii more affordable, did not materialize in the expected increase of Japanese travelers (See Table 3). Consequently, this economically unusual sequence of events has suggested that the growth in the Japanese Real GDP (See Table 4) was actually contributing to the negative trend of Japanese visitors during this period (See Table 3). Moreover, since the bivariate variability analysis has confirmed the Japanese Real GDP as having only marginally explained the variability within Japanese visitation to Hawaii (See Table 8), it has not adequately quantified econometrically the notion of the Japanese Real GDP as a valid demand determinant during this period. Hence, *ceteris paribus*, the rise in Japanese productivity was one of the minor reasons for the predominant decline in Japanese tourist arrivals to Hawaii from 1998 to 2006.

Honolulu Consumer Price Index

From 1980 to 1997, an R-Value of 0.971 was reported, which indicated a high correlation between the Honolulu CPI and the log of Japanese tourist arrivals to Hawaii (See Table 8). An R^2 of 0.944 was also revealed, which explained that 94.4% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the Honolulu CPI (See Table 8). Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 8). Finally, the Honolulu CPI was statistically significant from zero at the 0.05 level and had an unstandardized coefficient of 0.006 and a standardized coefficient of 0.971 (See Table 8).

The bivariate variability analysis revealed that the Honolulu CPI played a substantial role in the growth of Japanese tourist arrivals to Hawaii from 1980 to 1997. Contrary to economic logic, the rise in the Honolulu CPI (See Table 5), resulting in higher costs and making travel to Hawaii more expensive, did not result in the expected decrease in number of Japanese travelers (See Table 3). Consequently, this economically unusual sequence of events has suggested that the growth in the Honolulu CPI (See Table 5) was actually contributing to the positive trend of Japanese visitors during this period (See Table 3). Moreover, since the bivariate variability analysis has confirmed the Honolulu CPI as having explained a major portion of the variability within Japanese visitation to Hawaii (See Table 8), it has subsequently quantified econometrically the notion of the Honolulu CPI as a valid demand determinant during this period. Hence, *ceteris paribus*, the inflation of the Honolulu price level was one of the major reasons for the predominant growth in Japanese tourist arrivals to Hawaii from 1980 to 1997.

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From 1998 to 2006, an R-Value of 0.500 was reported, which indicated a moderate correlation between the log of the Honolulu CPI and the log of Japanese tourist arrivals to Hawaii (See Table 8). An R^2 of 0.250 was also revealed, which explained that 25% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the log of the Honolulu CPI (See Table 8). Since the ANOVA significance value was 0.002, it was concluded that both the R-Value and R^2 were both statistically significant at the 0.05 level (See Table 8). Finally, the log of the Honolulu CPI was statistically significant from zero at the 0.05 level and had an unstandardized coefficient of -1.420 and a standardized coefficient of -0.500 (See Table 8).

The bivariate variability analysis revealed that the Honolulu CPI did not play a substantial role in the decline of Japanese tourist arrivals to Hawaii from 1998 to 2006. Consistent with economic logic, the rise in the Honolulu CPI (See Table 5), contributing to higher costs and making travel to Hawaii more expensive, resulted in the expected decrease of Japanese travelers (See Table 3). Consequently, this economically sound sequence of events has suggested that the growth in the Honolulu CPI (See Table 5) was directly contributing to the negative trend of Japanese visitors during this period (See Table 3). Moreover, since the bivariate variability analysis has confirmed the Honolulu CPI as having only marginally explained the variability within Japanese visitation to Hawaii (See Table 8), it has not adequately quantified econometrically the notion of the Honolulu CPI as a valid demand determinant during this period. Hence, *ceteris paribus*, the inflation of the Honolulu price level was one of the minor reasons for the predominant decline in Japanese tourist arrivals to Hawaii from 1998 to 2006.

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Australian Consumer Price Index

From 1980 to 1997, an R-Value of 0.980 was reported, which indicated a high correlation between the Australian CPI and the log of Japanese tourist arrivals to Hawaii (See Table 8). An R^2 of 0.960 was also revealed, which explained that 96% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the Australian CPI (See Table 8). Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 8). Finally, the Australian CPI was statistically significant from zero at the 0.05 level and had an unstandardized coefficient of 0.007 and a standardized coefficient of 0.980 (See Table 8).

The bivariate variability analysis revealed that the Australian CPI played a substantial role in the increase of Japanese tourist arrivals to Hawaii from 1980 to 1997. Consistent with economic logic, the rise in the Australian CPI (See Table 6), contributing to higher costs in traveling to Australia and indirectly making travel to Hawaii more inexpensive, resulted in the expected increase of Japanese travelers (See Table 3). Consequently, this economically sound sequence of events has suggested that the growth in the Australian CPI (See Table 6) was directly contributing to the positive trend of Japanese visitors during this period (See Table 3). Moreover, since the bivariate variability analysis has confirmed the Australian CPI as having explained a major portion within the variability of Japanese visitation to Hawaii (See Table 8), it has subsequently quantified econometrically the notion of the Australian CPI as a valid demand determinant during this period. Hence, *ceteris paribus,* the inflation of the Australian

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price level was one of the major reasons for the predominant growth in Japanese tourist arrivals to Hawaii from 1980 to 1997.

From 1998 to 2006, an R-Value of 0.647 was reported, which indicated a high correlation between the log of the Australian CPI and the log of Japanese tourist arrivals to Hawaii (See Table 8). An R^2 of 0.419 was also revealed, which explained that 41.9% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the log of the Australian CPI (See Table 8). Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 8). Finally, the log of the Australian CPI was statistically significant from zero at the 0.05 level and had an unstandardized coefficient of -1.434 and a standardized coefficient of -0.647 (See Table 8).

The bivariate variability analysis revealed that the Australian CPI played only a moderate role in the decline of Japanese tourist arrivals to Hawaii from 1998 to 2006. Contrary to economic logic, the rise in the Australian CPI (See Table 6), resulting in higher costs in traveling to Australia and indirectly making travel to Hawaii more inexpensive, did not result in the expected increase in number of Japanese travelers (See Table 3). Consequently, this economically unusual sequence of events has suggested that the growth of the Australian CPI (See Table 6) was actually contributing to the negative trend of Japanese visitors during this period (See Table 3). Moreover, since the bivariate variability analysis has confirmed the Australian CPI as having reasonably explained the variability within Japanese visitation to Hawaii (See Table 8), it has moderately quantified econometrically the notion of the Australian CPI as a valid demand determinant during this period. Hence, *ceteris paribus*, the inflation of the Australian

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price level was one of the many reasons for the predominant decline in Japanese tourist arrivals to Hawaii from 1998 to 2006.

Japan-U.S. Exchange Rate

From 1980 to 1997, an R-Value of 0.914 was reported, which indicated a high correlation between the Japan-U.S. exchange rate and the log of Japanese tourist arrivals to Hawaii (See Table 8). An R^2 of 0.836 was also revealed, which explained that 83.6% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the Japan-U.S. exchange rate (See Table 8). Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 8). Finally, the Japan-U.S. exchange rate was statistically significant from zero at the 0.05 level and had an unstandardized coefficient of -0.003 and a standardized coefficient of -0.914 (See Table 8).

The bivariate variability analysis revealed that the Japan-U.S. exchange rate played a substantial role in the growth of Japanese tourist arrivals to Hawaii from 1980 to 1997. Consistent with economic logic, the depreciation of the Japan-U.S. exchange rate (See Table 7) resulted in the expected indirect increase of household discretionary income during this period. Thus, the indirect rise in household discretionary income had the effect of making travel more affordable among Japanese travelers (See Table 3). Consequently, this economically sound sequence of events has suggested that the depreciation of the Japan-U.S. exchange rate (See Table 7) was directly contributing to the positive trend of Japanese visitors (See Table 3). Moreover, since the bivariate variability analysis has confirmed the Japan-U.S. exchange rate as having explained a major portion within the variability of Japanese visitation to Hawaii (See Table 8), it has

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subsequently quantified econometrically the notion of the Japan-U.S. exchange rate as a

valid demand determinant during this period. Hence, *ceteris paribus*, the depreciation of

the Japan-U.S. exchange rate was one of the major reasons for the predominant growth in

Japanese tourist arrivals to Hawaii from 1980 to 1997.

From 1998 to 2006, an R-Value of 0.050 was reported, which indicated a low

correlation between the log of the Japan-U.S. exchange rate and the log of Japanese

tourist arrivals to Hawaii (See Table 8). An R^2 of 0.002 was also revealed, which

explained that 0.2% of the variability in the log of Japanese tourist arrivals to Hawaii was

attributed to the log of the Japan-U.S. exchange rate (See Table 8). Since the ANOVA

significance value was 0.773, it was concluded that both the R-Value and R^2 were both

not statistically significant from zero at the 0.05 level (See Table 8). Finally, the log of the

Japan-U.S. exchange rate was not statistically significant from zero at the 0.05 level and

had an unstandardized coefficient of 0.123 and a standardized coefficient of 0.050 (See

Table 8).

The bivariate variability analysis revealed that the Japan-U.S. exchange rate did

not play any substantial role in the decline of Japanese tourist arrivals to Hawaii from

1998 to 2006. Contrary to economic logic, the decline in the Japan-U.S. exchange rate

(See Table 7), that indirectly increased household discretionary income and made travel

to Hawaii more affordable among Japanese travelers, did not materialize in the expected

increase of Japanese travelers (See Table 3). Consequently, this economically unusual

sequence of events has suggested that the depreciation of the Japan-U.S. exchange rate

(See Table 7) was actually contributing to the negative trend in Japanese visitors (See

Table 3). Moreover, since the bivariate variability analysis was not able to confirm the

Japan-U.S. exchange rate as having any effect in the variability within Japanese visitation to Hawaii (See Table 8), it has not quantified econometrically the notion of the Japan-U.S. exchange rate as a valid demand determinant during this period. Hence, *ceteris paribus*, the depreciation in the Japan-U.S. exchange rate as a reason for the predominant decline in Japanese tourist arrivals to Hawaii from 1998 to 2006 was not able to be determined.

Table 8. Bivariate Variability Analysis Regression Data Summary (1980-2006)

JTAH 1980-1997	JRGDP	HCPI	ACPI	JUSER
R	0.979	0.971	0.980	0.914
R^2	0.959	0.944	0.960	0.836
ANOVA Significance Value	0.000	0.000	0.000	0.000
Unstandardized Coefficient	0.0000026	0.006	0.007	-0.003
Standardized Coefficient	0.979	0.971	0.980	-0.914
Coefficient Significance Value	0.000	0.000	0.000	0.000
JTAH 1998-2006	JRGDP	HCPI	ACPI	JUSER
R	0.455	0.500	0.647	0.050
R^2	0.207	0.250	0.419	0.002
ANOVA Significance Value	0.005	0.002	0.000	0.773
Unstandardized Coefficient	-2.148	-1.420	-1.434	0.123
Standardized Coefficient	-0.455	-0.500	-0.647	0.050
Coefficient Significance Value	0.005	0.002	0.000	0.773

Note. Regression results were generated with SPSS 14.0 for Windows, Student Version. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism; Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan; Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics; and Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. All four sources of data were collectively retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

Macroeconomic Factor Correlation Analysis

The following are the results of the macroeconomic factor correlation analysis conducted to identify and graphically confirm the linear relationship of each macroeconomic factor and Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006. The econometric findings for each macroeconomic factor will be presented, including a brief interpretation of the results. Table 9 presents the Pearson correlation coefficients calculated for this analysis and Figures 8 and 9 present the scatterplots between Japanese tourist arrivals to Hawaii and all four macroeconomic factors from 1980 to 1997 and 1998 to 2006.

Japanese Real Gross Domestic Product

Based on the correlation analysis from 1980 to 1997, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Japanese Real GDP was 0.963 and was statistically significant at the 0.01 level (See Table 9). In essence, this meant that there was a strong positive linear relationship between the Japanese Real GDP and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 8, where as values of the Japanese Real GDP increased, they corresponded with increasing numbers of Japanese visitors. As a result, *ceteris paribus*, the Japanese Real GDP's statistically significant and highly positive Pearson correlation coefficient greatly illustrated a positive influence towards the predominant growth of Japanese tourist arrivals to Hawaii from 1980 to 1997.

However, from 1998 to 2006, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Japanese Real GDP was -0.519 and was statistically significant at the 0.01 level (See Table 9). In essence, this meant that there

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was a moderately negative linear relationship between the Japanese Real GDP and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 9, where as values of the Japanese Real GDP increased, they corresponded with decreasing numbers of Japanese visitors. As a result, *ceteris paribus,* the Japanese Real GDP's statistically significant and moderately negative Pearson correlation coefficient greatly illustrated a negative influence towards the predominant decline of Japanese tourist arrivals to Hawaii from 1998 to 2006.

Honolulu Consumer Price Index

Based on the correlation analysis from 1980 to 1997, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Honolulu CPI was 0.970 and was statistically significant at the 0.01 level (See Table 9). In essence, this meant that there was a strong positive linear relationship between the Honolulu CPI and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 8, where as the Honolulu CPI inflated, they corresponded with increasing numbers of Japanese visitors. As a result, *ceteris paribus,* the Honolulu CPI's statistically significant and highly positive Pearson correlation coefficient greatly illustrated a positive influence towards the predominant growth of Japanese tourist arrivals to Hawaii from 1980 to 1997.

However, from 1998 to 2006, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Honolulu CPI was -0.551 and was statistically significant at the 0.01 level (See Table 9). In essence, this meant that there was a moderately negative linear relationship between the Japanese GDP and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 9, where as

the Honolulu CPI inflated, they corresponded with decreasing numbers of Japanese visitors. As a result, *ceteris paribus,* the Honolulu CPI's statistically significant and moderately negative Pearson correlation coefficient greatly illustrated a negative influence towards the predominant decline of Japanese tourist arrivals to Hawaii from 1998 to 2006.

Australian Consumer Price Index

Based on the correlation analysis from 1980 to 1997, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Australian CPI was 0.955 and was statistically significant at the 0.01 level (See Table 9). In essence, this meant that there was a strong positive linear relationship between the Australian CPI and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 8, where as the Australian CPI inflated, they corresponded with increasing numbers of Japanese visitors. As a result, *ceteris paribus,* the Australian CPI's statistically significant and highly positive Pearson correlation coefficient greatly illustrated a positive influence towards the predominant growth of Japanese tourist arrivals to Hawaii from 1980 to 1997.

However, from 1998 to 2006, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Australian CPI was -0.705 and was statistically significant at the 0.01 level (See Table 9). In essence, this meant that there was a moderately negative linear relationship between the Australian CPI and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 9, where as the Australian CPI inflated, they corresponded with decreasing numbers of Japanese visitors. As a result, *ceteris paribus,* the Australian CPI's statistically significant

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and moderately negative Pearson correlation coefficient greatly illustrated a negative influence towards the predominant decline of Japanese tourist arrivals to Hawaii from 1998 to 2006.

Japan-U.S. Exchange Rate

Based on the correlation analysis from 1980 to 1997, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Japan-U.S. exchange rate was -0.875 and was statistically significant at the 0.01 level (See Table 9). In essence, this meant that there was a strong negative linear relationship between the Japan-U.S. exchange rate and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 8, where as the Japan-U.S. exchange rate depreciated, they corresponded with increasing numbers of Japanese visitors. As a result, *ceteris paribus,* the Japan-U.S. exchange rate's statistically significant and highly negative Pearson correlation coefficient greatly illustrated a negative influence towards the predominant growth of the Japanese tourist arrivals to Hawaii from 1980 to 1997.

However, from 1998 to 2006, the Pearson correlation coefficient between Japanese tourist arrivals to Hawaii and the Japan-U.S. exchange rate was 0.117 and was not statistically significant at the 0.01 level (See Table 9). In essence, this meant that there was a extremely weak positive linear relationship between the Japan-U.S. exchange rate and Japanese tourist arrivals to Hawaii during this period. This was further confirmed by Figure 9, where as the Japan-U.S. exchange rate depreciated, they were not consistently seen to correspond with decreasing numbers of Japanese visitors. As a result, *ceteris paribus,* the Japan-U.S. exchange rate's statistically insignificant and very low

Pearson correlation coefficient greatly illustrated no identifiable influence to the

predominant decline of Japanese tourist arrivals to Hawaii from 1998 to 2006.

Table 9. Correlation Analysis Coefficients Summary Table (1980-2006)

JTAH 1980-1997	JRGDP	HCPI	ACPI	JUSER
Pearson Correlation Coefficient	0.963	0.970	0.955	-0.875
Significance at the 0.01 level	Yes	Yes	Yes	Yes
JTAH 1998-2006	JRGDP	HCPI	ACPI	JUSER
Pearson Correlation Coefficient	-0.519	-0.551	-0.705	0.117
Significance at the 0.01 level	Yes	Yes	Yes	No

Note. Correlation analysis results were generated with SPSS 14.0 for Windows, Student Version. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism; Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan; Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics; and Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. All four sources of data were collectively retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.
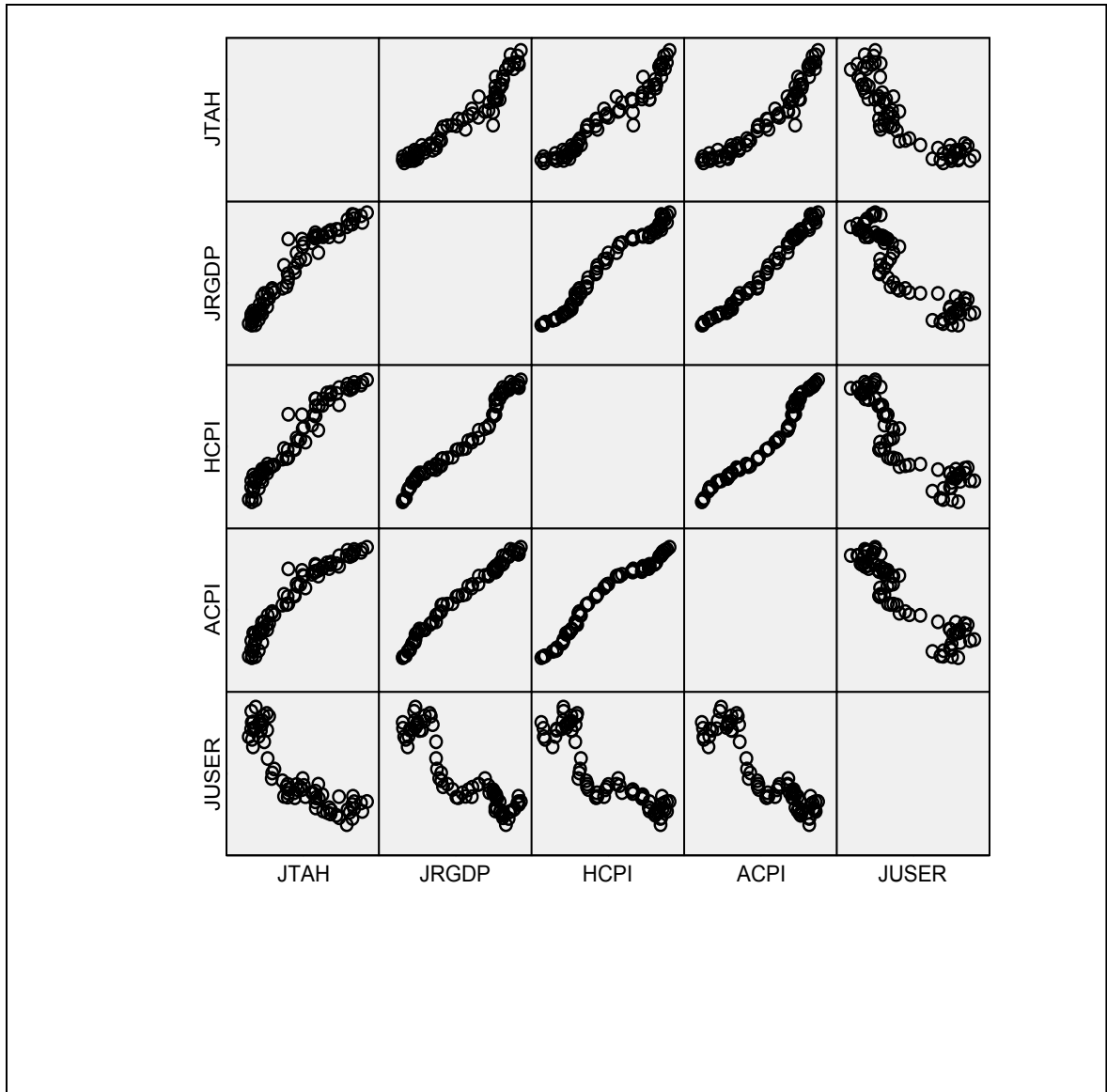
Figure 8. Cross-macroeconomic factor scatterplot (1980-1997). The scatterplot was generated with SPSS 14.0 for Windows, Student Version. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism; Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan; Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics; and Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. All four sources of data were collectively retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from
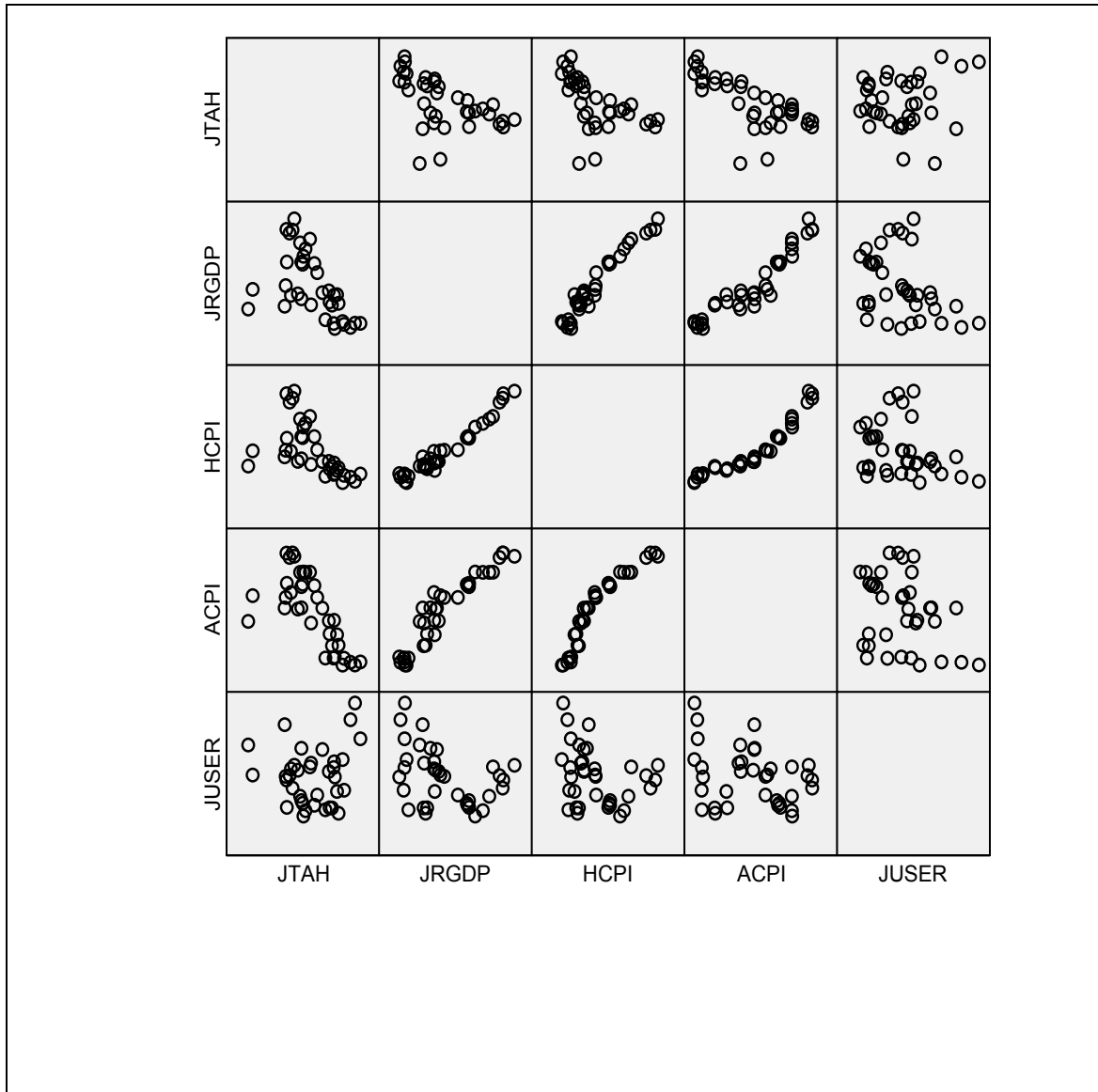http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

Figure 9. Cross-macroeconomic factor scatterplot (1998-2006). The scatterplot was generated with SPSS 14.0 for Windows, Student Version. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism; Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan; Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics; and Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. All four sources of data were collectively retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from
http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

Macroeconomic Factor Significance Analysis

The following are the results of the macroeconomic factor significance analysis conducted to identify the statistical significance of each macroeconomic factor with respect to Japanese tourist arrivals to Hawaii. This section will begin by presenting the econometric findings for each time period and end with a brief interpretation of the results from 1980 to 1997 and 1998 to 2006. Table 10 presents the data summary of the multiple regressions conducted for this analysis.

1980 to 1997

From Table 10, an R-Value of 0.982 was reported, which indicated a high correlation between the log of Japanese tourist arrivals to Hawaii and the log of the macroeconomic variables: the Japanese Real GDP, the Honolulu CPI, the Australian CPI, and the Japan-U.S. exchange rate. Table 10 also revealed an R^2 of 0.964, which explained that 96.4% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the log of the macroeconomic variables under study. Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 10). From Table 10, the most statistically significant macroeconomic variable was the log of the Japan-U.S. exchange rate with a significance value of 0.002, an unstandardized coefficient of -0.235, and a standardized coefficient of -0.187. The least statistically significant macroeconomic variable was the log of the Australian CPI with a significance value of 0.636, an unstandardized coefficient of -0.091, and a standardized coefficient of -0.065 (See Table 10).

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From Table 10, an R-Value of 0.802 was reported, which indicated a high correlation between the log of Japanese tourist arrivals to Hawaii and the log of the macroeconomic variables: the Japanese Real GDP, the Honolulu CPI, the Australian CPI, and the Japan-U.S. exchange rate. Table 10 also revealed an R^2 of 0.642, which explained that 64.2% of the variability in the log of Japanese tourist arrivals to Hawaii was attributed to the log of the macroeconomic variables under study. Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 10). From Table 10, the most statistically significant macroeconomic variable was the log of the Australian CPI with a significance value of 0.000, an unstandardized coefficient of -4.142, and a standardized coefficient of -1.870. The least statistically significant macroeconomic variable was the log of the Japan-U.S. exchange rate with a significance value of 0.867, an unstandardized coefficient of 0.053, and a standardized coefficient of 0.021 (See Table 10).

Interpretation of the Results

Based on the significance analysis, the Japan-U.S. exchange rate was the most statistically significant demand determinant with respect to Japanese tourist arrivals to Hawaii, followed by the Japanese Real GDP, the Honolulu CPI, and the Australian CPI, respectively from 1980 to 1997 (See Table 10). However, only the Japanese Real GDP, the Honolulu CPI, and the Japan-U.S. exchange rate were found as statistically significant during this period. As a result, *ceteris paribus*, the rise of Japanese productivity, the inflation of the Honolulu price level, and the depreciation of the Japan-

U.S. exchange rate were the macroeconomic factors whose statistical significance

corresponded with the predominant growth of Japanese tourist arrivals to Hawaii from

1980 to 1997.

Based on the significance analysis, the Australian CPI was the most statistically

significant demand determinant with respect to Japanese tourist arrivals to Hawaii,

followed by the Japanese Real GDP, the Honolulu CPI, and the Japan-U.S. exchange rate,

respectively from 1998 to 2006 (See Table 10). However, only the Japanese Real GDP

and the Australian CPI were found as statistically significant during this period. As a

result, *ceteris paribus*, the rise of Japanese productivity and the inflation of the Australian

price level were the macroeconomic factors whose statistical significance corresponded

with the predominant decline of Japanese tourist arrivals to Hawaii from 1998 to 2006.

Table 10. Significance Analysis Regression Data Summary (1980-2006)

JTAH 1980-1997	JRGDP	HCPI	ACPI	JUSER
R			0.982	
R²			0.964	
ANOVA Significance Value			0.000	
Unstandardized Coefficient	1.286	0.588	-0.091	-0.235
Standardized Coefficient	0.543	0.332	-0.065	-0.187
Coefficient Significance Value	0.006	0.030	0.636	0.002
JTAH 1998-2006	JRGDP	HCPI	ACPI	JUSER
R			0.802	
R²			0.642	
ANOVA Significance Value			0.000	
Unstandardized Coefficient	8.558	-1.462	-4.142	0.053
Standardized Coefficient	1.815	-0.514	-1.870	0.021
Coefficient Significance Value	0.003	0.319	0.000	0.867

Note. Regression results were generated with SPSS 14.0 for Windows, Student Version. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism; Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan; Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics; and Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. All four sources of data were collectively retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

Macroeconomic Factor Contribution Analysis

The following are the results of the macroeconomic factor contribution analysis conducted to identify the contribution of each macroeconomic factor with respect to Japanese tourist arrivals to Hawaii. This section will begin by presenting the econometric findings and end with a brief interpretation of the results from 1980 to 1997 and 1998 to 2006. Table 11 presents the data summary of the natural logarithmic multiple regressions conducted for this analysis.

1980 to 1997

From Table 11, an R-Value of 0.982 was reported, which indicated a high correlation between the natural log of Japanese tourist arrivals to Hawaii and the natural log of the macroeconomic variables: the Japanese Real GDP, the Honolulu CPI, the Australian CPI, and the Japan-U.S. exchange rate. Table 11 also revealed an R^2 of 0.964, which explained that 96.4% of the variability in the natural log of Japanese tourist arrivals to Hawaii was attributed to the natural log of the macroeconomic variables under study. Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 11). From Table 11, the macroeconomic variable that had the most positive contribution to the natural log of Japanese tourist arrivals to Hawaii was the natural log of the Japanese Real GDP with a significance value of 0.006, an unstandardized coefficient of 1.286, and a standardized coefficient of 0.543. The macroeconomic variable that had the most negative contribution to the natural log of Japanese tourist arrivals to Hawaii was the natural log of the Japan-U.S. exchange rate with a significance value of 0.002, an

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unstandardized coefficient of -0.235, and a standardized coefficient of -0.187 (See Table 11).

1998 to 2006

From Table 11, an R-Value of 0.802 was reported, which indicated a high correlation between the natural log of Japanese tourist arrivals to Hawaii and the natural log of the macroeconomic variables: the Japanese Real GDP, the Honolulu CPI, the Australian CPI, and the Japan-U.S. exchange rate. Table 11 also revealed an R^2 of 0.642, which explained that 64.2% of the variability in the natural log of Japanese tourist arrivals to Hawaii was attributed to the natural log of the macroeconomic variables under study. Since the ANOVA significance value was 0.000, it was concluded that both the R-Value and R^2 were both statistically significant from zero at the 0.05 level (See Table 11). From Table 11, the macroeconomic variable that had the most positive contribution to the natural log of Japanese tourist arrivals to Hawaii was the natural log of the Japanese Real GDP with a significance value of 0.003, an unstandardized coefficient of 8.558, and a standardized coefficient of 1.815. The macroeconomic variable that had the most negative contribution to the natural log of Japanese tourist arrivals to Hawaii was the natural log of the Australian CPI with a significance value of 0.000, an unstandardized coefficient of -4.142, and a standardized coefficient of -1.870 (See Table 11).

Interpretation of the Results

Based on the contribution analysis, increases in the Japanese Real GDP followed by the Honolulu CPI were found to have the most positive contributions, while the Japan-U.S. exchange rate followed by the Australian CPI were found to have the most negative contributions to Japanese tourist arrivals to Hawaii from 1980 to 1997. In essence, a 10%

increase in the Japanese Real GDP, the Honolulu CPI, the Japan-U.S. exchange rate, and the Australian CPI resulted in a 12.86% and 5.88% increase and 2.35% and 0.91% decrease, respectively, in Japanese tourist arrivals to Hawaii during this period (See Table 11). However, only the Japanese Real GDP, the Honolulu CPI, and the Japan-U.S. exchange rate were found statistically significant, according to their respective coefficient significance values (See Table 11). As a result, *ceteris paribus,* the rise of Japanese productivity, the inflation of the Honolulu price level, and the depreciation of the Japan-U.S. exchange rate provided positive statistically valid contributions toward the predominant growth of Japanese tourist arrivals to Hawaii from 1980 to 1997.

In contrast, from 1998 to 2006, increases in the Japanese Real GDP followed by the Japan-U.S. exchange rate were found to have the most positive contributions, while the Australian CPI followed by the Honolulu CPI were found to have the most negative contributions to Japanese tourist arrivals to Hawaii. In essence, a 10% increase in the Japanese Real GDP, the Japan-U.S. exchange rate, the Australian CPI, and the Honolulu CPI resulted in a 85.58% and 0.53% increase and 41.42% and 14.62% decrease, respectively, in Japanese tourist arrivals to Hawaii during this period (See Table 11). However, only the Japanese Real GDP and the Australian CPI were found statistically significant, according to their respective coefficient significance values (See Table 11). As a result, *ceteris paribus,* the rise of Japanese productivity provided positive and the inflation of the Australian price level provided negative statistically valid contributions toward the predominant decline of Japanese tourist arrivals to Hawaii from 1998 to 2006.

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Table 11. Contribution Analysis Regression Data Summary (1980-2006)

JTAH 1980-1997	JRGDP	HCPI	ACPI	JUSER
R			0.982	
R²			0.964	
ANOVA Significance Value			0.000	
Unstandardized Coefficient	1.286	0.588	-0.091	-0.235
Standardized Coefficient	0.543	0.332	-0.065	-0.187
Coefficient Significance Value	0.006	0.030	0.636	0.002
JTAH 1998-2006	JRGDP	HCPI	ACPI	JUSER
R			0.802	
R²			0.642	
ANOVA Significance Value			0.000	
Unstandardized Coefficient	8.558	-1.462	-4.142	0.053
Standardized Coefficient	1.815	-0.514	-1.870	0.021
Coefficient Significance Value	0.003	0.319	0.000	0.867

Note. Regression results were generated with SPSS 14.0 for Windows, Student Version. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism; Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan; Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics; and Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. All four sources of data were collectively retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

CHAPTER 5. CONCLUSIONS AND RECOMMENDATIONS

The following chapter will present the conclusions and recommendations of this study. A brief summary of the study's highlights will be initially presented. The chapter will then present the major conclusions derived from this research. The chapter will end with a discussion of recommended areas of future research that will further increase the knowledge base surrounding the unprecedented decline of Japanese tourist arrivals to Hawaii that began in the late 1990's.

Study Summary

The following is a brief summary of this study's major highlights. Essentially, this section will review its background, main purpose, limitations, assumptions, and major findings.

Background

During 1980 to 1997, Japanese tourist arrivals to Hawaii were marked by near uninterrupted growth (See Figure 2). In essence, the largest single year, marginal, and percentage change increase occurred in 1997, 1987, and 1987, respectively (See Table 3). In contrast, the smallest marginal and percentage change decrease were both in 1991 and the lowest number of arrivals was in 1980 (See Table 3).

During 1998 to 2006, Japanese tourist arrivals to Hawaii were marked by an unprecedented decline (See Figure 3). Its decline began in the aftermath of the Asian

Financial Crisis that occurred in 1997 and continued in the wake of the terrorist attacks

on September 11, 2001 and the SARS epidemic in 2003. The smallest marginal and

percentage change decrease were both in 2001 and the lowest number of arrivals for this

period was in 2003 (See Table 3). In contrast, positive growth occurred in 2004 and 2005

with the largest single year, marginal, and percentage change increase all occurring

respectively in 2004. Despite this brief respite, Japanese tourist arrivals to Hawaii

continued its trend in decline as of 2006 (See Table 3).

Main Purpose

The main purpose of this study was to answer the question: what role did income,

price, substitute price, and the exchange rate play before and after the decline of Japanese

visitation to Hawaii that began in the late 1990's? Hence, in order to answer this question,

this study strived to achieve the following research objectives.

1. Determine, whether the macroeconomic factors of income (i.e., Japanese Real
   GDP), price (i.e., Honolulu CPI), substitute price (i.e., Australian CPI), and the
   exchange rate (i.e., Japan-U.S. exchange rate) individually had any effect on
   Japanese tourist arrivals to Hawaii from 1980 to 2006.

2. Analyze the correlation, collective level of significance, and synergetic
   contribution of each of those major macroeconomic factors towards Japanese
   tourist arrivals to Hawaii before and after its trend of decline that started in the
   late 1990's.

Limitations

One of the major limitations of this study was the choice of explanatory factors.

Other macroeconomic (e.g., interest rates, unemployment, & etc.), microeconomic (e.g.,

average hotel room rate, travel cost / ticket price, & etc.), and qualitative based tourism

determinants (e.g., tourist satisfaction, service quality, crime rates, & etc.) were

noteworthy variables that could have been considered. In addition, the Asian Financial

Crisis of 1997, the Terrorist Attacks on September 11, 2001, and the SARS epidemic of

2003 were all followed with large decreases in Japanese tourist arrivals to Hawaii in their

aftermath. Hence, the determining of the short and long-term effects of those specific

events would also contribute to the understanding of the decline of Japanese tourist

arrivals to Hawaii that began in the late 1990's.

The second major limitation of this study was the unavailability of data. Although

the data utilized in this study came from highly credible and reliable government and

academic sources, an initial inquiry of many of those databases revealed that source data

for the macroeconomic factors sought were not uniformly collected. For example, some

macroeconomic data were collected yearly, quarterly, and monthly (e.g., Japanese Tourist

Arrivals to Hawaii), while others were only collected yearly (e.g., Japanese Real Per

Capita GDP). As a result, finding and selecting the right combination of macroeconomic

proxies with respect to a uniform data frequency was a major key in effectively

conducting the analyses in this study.

Assumptions

The following are the assumptions that were made to assist in facilitating this

study's proposed research:

1. Although Japanese nationals arrive to Hawaii from all over the World, the study
    assumed that all Japanese tourist arrivals were Japanese nationals traveling to
    Hawaii from mainland Japan.

2. The following variables were the selected proxies for the four macroeconomic
    factors analyzed in this research. In essence, the Japanese Real GDP will
    represent income, the Honolulu CPI will represent price, and the Australian CPI
    will represent substitute price, respectively. The Japan-U.S. exchange rate will
    directly represent the exchange rate variable, itself.

The following section will discuss the major findings of this study. Table 12 presents a summary of the major econometric findings of the four econometric analyses that were conducted from 1980 to 1997 and 1998 to 2006. Hence, a review of the results of the four econometric analyses will be presented first. The most dramatic changes with respect to post-1997 macroeconomic factor influence will be discussed next. The section will then end with an appraisal of the most positive, negative, and least influential macroeconomic factors toward Japanese tourist arrivals to Hawaii from 1980 to 1997 and 1998 to 2006.

Review of the econometric results. Based on Table 12, the four analyzed macroeconomic factors were individually found to have played a relatively strong role in the predominant growth of Japanese tourist arrivals to Hawaii during 1980 to 1997. The inflation of the Australian CPI had the strongest influence in the variability within Japanese visitation, followed by the rise in the Japanese Real GDP, the inflation of the Honolulu CPI, and the depreciation of the Japan-U.S. exchange rate, respectively. Looking at their relative linear relationship to Japanese tourist arrivals to Hawaii, all of their respective Pearson correlation coefficients were at or near the absolute value of one, indicating a high degree of correlation and possible influence towards the growth of Japanese tourist arrivals during this period. The Honolulu CPI had the strongest positive linear relationship, followed by the Japanese Real GDP and the Australian CPI, respectively (See Table 12). The Japan-U.S. exchange rate ranked fourth and had a strong negative relationship to Japanese tourist arrivals to Hawaii (See Table 12). When the four macroeconomic factors were collectively analyzed for statistical significance, it was

discovered that the Japanese-U.S. exchange rate was the most significant, followed by the Japanese Real GDP, the Honolulu CPI, and the Australian CPI, respectively (See Table 12). However, only the Japanese Real GDP, the Honolulu CPI, and the Japan-U.S. exchange rate were found statistically significant at the 0.05 level (See Table 12), which meant only those three variables, should be viewed as having played a role in the predominant growth of Japanese tourist arrivals to Hawaii from 1980 to 1997. Finally, in looking at their relative contribution, it was the rise in the Japanese Real GDP followed by the inflation of the Honolulu CPI that provided the most positive; while the depreciation of the Japan-U.S. exchange rate followed by the inflation of the Australian CPI that provided the most negative contribution to Japanese tourist arrivals to Hawaii, respectively (See Table 12). Moreover, since the rise in Japanese productivity, the inflation of the Honolulu price level, and the depreciation of the Japan-U.S. exchange rate were the only macroeconomic factors found statistically significant (See Table 12), only those three variables had econometrically quantifiable contributions toward the predominant growth in Japanese tourist arrivals to Hawaii during this period.

From 1998 to 2006, the four analyzed macroeconomic factors were individually found to have played a relatively weak role in the predominant decline of Japanese tourist arrivals to Hawaii during 1998 to 2006. The inflation of the Australian CPI had the strongest influence in the variability within Japanese visitation, followed by the inflation of the Honolulu CPI, the rise in the Japanese Real GDP, and the depreciation of the Japan-U.S. exchange rate, respectively (See Table 12). Looking at their relative linear relationship to Japanese tourist arrivals to Hawaii, all of their respective Pearson correlation coefficients were much smaller than the absolute value of one, indicating a

low degree of correlation and possible influence towards the decline of Japanese tourist arrivals during this period. The Japan-U.S. exchange rate had a very weak positive linear relationship, while the Australian CPI, followed by the Honolulu CPI and the Japanese Real GDP, respectively, had moderately negative linear relationships to Japanese tourist arrivals to Hawaii (See Table 12). When the four macroeconomic factors were collectively analyzed for statistical significance, it was discovered that the Australian CPI was the most significant, followed by the Japanese Real GDP, the Honolulu CPI, and the Japan-U.S. exchange rate, respectively (See Table 12). However, only the Australian CPI and the Japanese Real GDP were found statistically significant at the 0.05 level (See Table 12), which meant only those two variables, should be viewed as having played a role in the predominant decline of Japanese tourist arrivals to Hawaii from 1998 to 2006. Finally, in looking at their relative contribution, it was the rise in the Japanese Real GDP followed by the depreciation of the Japan-U.S. exchange rate that provided the most positive; while the inflation of the Australian CPI followed by the inflation of the Honolulu CPI that provided the most negative contribution to Japanese tourist arrivals to Hawaii, respectively (See Table 12). Moreover, since the rise in Japanese productivity and the inflation of the Australian price level were the only macroeconomic factors found statistically significant (See Table 12), only those two variables had econometrically quantifiable contributions toward the predominant decline in Japanese tourist arrivals to Hawaii during this period.

Changes in post-1997 macroeconomic factor influence. From 1998 to 2006, the rise of the Japanese Real GDP, the inflation of the Honolulu CPI, the inflation of the Australian CPI, and the depreciation of the Japan-U.S. exchange rate no longer exhibited

the same influence on the growth of Japanese tourist arrivals to Hawaii as they did during 1980 to 1997. Based on a corroboration of the results of the bivariate variability (i.e., lower R^2 statistics) and correlation analyses (i.e., lower Pearson correlation coefficients), it was clear that all four macroeconomic factors no longer econometrically exhibited a significant effect on the variability or very strong linear relationship towards Japanese tourist arrivals to Hawaii after 1997 (See Table 12). The depreciation of the Japan-U.S. exchange rate experienced the most dramatic individual loss of econometrically quantifiable influence towards Japanese tourist arrivals to Hawaii, followed by the rise of the Japanese Real GDP, the inflation of the Honolulu CPI and the Australian CPI, respectively (See Table 12).

Moreover, based on the macroeconomic factor contribution analysis, the signs of the Honolulu CPI and the Japan-U.S. exchange rate during 1998 to 2006 were opposite than they were in the previous period (See Table 12). Unlike during 1980 to 1997, the inflation of the Honolulu price level now coincided with the predominant decline in Japanese tourist arrivals to Hawaii, as economic logic would suggest (See Table 12). In the case of the Japan-U.S. exchange rate, however, unlike in 1980 to 1997, its depreciation defied economic logic with its coinciding with the predominant decline in Japanese tourist arrivals to Hawaii during 1998 to 2006 (See Table 12).

The most positive, negative, and least influential macroeconomic factors. Based on their relative ranking in the bivariate variability (i.e., R^2 statistic), correlation (i.e., Pearson correlation coefficient), significance (i.e., coefficient significance value), and contribution (i.e., unstandardized coefficient); the rise of Japanese productivity was the most positive, the depreciation of the Japan-U.S. exchange rate was the most negative,

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and the inflation of the Australian price level was the least econometrically influential

macroeconomic factor towards the predominant growth of Japanese tourist arrivals to

Hawaii, respectively, during 1980 to 1997, *ceteris paribus* (See Table 12).

During 1998 to 2006, based on their relative ranking in the bivariate variability

(i.e., R^2 statistic), correlation (i.e., Pearson correlation coefficient), significance (i.e.,

coefficient significance value), and contribution (i.e., unstandardized coefficient); the rise

of Japanese productivity was the most positive, the inflation of the Australian price level

was the most negative, and the depreciation of the Japan-U.S. exchange rate was the least

econometrically influential macroeconomic factor towards the predominant decline of

Japanese tourist arrivals to Hawaii, respectively, *ceteris paribus* (See Table 12).

Table 12. Macroeconomic Factor Analyses Summary (1980-2006)

1980-1997	JRGDP	HCPI	ACPI	JUSER
Effects of individual variable on Japanese Tourist Arrivals to Hawaii (i.e., R^2 Statistic from the Bivariate Variability Analysis)	0.959	0.944	0.960	0.836
Strength of Linear Relationship to Japanese Tourist Arrivals to Hawaii (i.e., Pearson Correlation Coefficient from the Correlation Analysis)	0.963	0.970	0.955	-0.875
Statistical Significance to Japanese Tourist Arrivals to Hawaii (i.e., Coefficient Significance Values from the Significance Analysis)	0.006	0.030	0.636	0.002
Contribution to Japanese Tourist Arrivals to Hawaii (i.e., Unstandardized Coefficient from the Contribution Analysis)	1.286	0.588	-0.091	-0.235

1998-2006	JRGDP	HCPI	ACPI	JUSER
Effects of individual variable on Japanese Tourist Arrivals to Hawaii (i.e., R^2 Statistic from the Bivariate Variability Analysis)	0.207	0.250	0.419	0.002
Strength of Linear Relationship to Japanese Tourist Arrivals to Hawaii (i.e., Pearson Correlation Coefficient from the Correlation Analysis)	-0.519	-0.551	-0.705	0.117
Statistical Significance to Japanese Tourist Arrivals to Hawaii (i.e., Coefficient Significance Values from the Significance Analysis)	0.003	0.319	0.000	0.867
Contribution to Japanese Tourist Arrivals to Hawaii (i.e., Unstandardized Coefficient from the Contribution Analysis)	8.558	-1.462	-4.142	0.053

Note. All macroeconomic analyses results were generated with SPSS 14.0 for Windows, Student Version. Japanese tourist arrivals to Hawaii data are from *Visitor Arrival* [Data file], n.d.b, Hawaii Department of Business, Economic Development and Tourism; Japanese Real GDP data are from *Japanese Real Gross Domestic Product* [Data file], n.d., Economic and Social Research Institute, Cabinet Office, Japan; Honolulu CPI data are from *Consumer Price Index* [Data file], n.d., U.S. Department of Labor, Bureau of Labor Statistics; and Japan-U.S. exchange rate data are from *Yen-Dollar Exchange Rate* [Data file], n.d., Federal Reserve Bank of St. Louis. All four sources of data were collectively retrieved May 6, 2007, from http://uhero.prognoz.com/Graph.aspx?serie=4873. Australian CPI data are from *Consumer Price Index, Australia* [Data file], 2007, Australian Bureau of Statistics. Retrieved May 6, 2007, from http://www.abs.gov.au/websitedbs/D3310114.nsf/home/home.

Major Conclusions

The research of this study brings forth three conclusions that could potentially affect future academic and private research regarding Japanese tourist arrivals to Hawaii. As a result, a discussion regarding the possible rise of non-macroeconomic Japanese tourism demand determinants will be initially presented. A discussion of a possible decline of Japanese household discretionary income conducive for Hawaii visitation will be reviewed next. Finally, the section will conclude by highlighting the need for a refocused marketing strategy in an effort to reverse the predominant decline in Japanese tourist arrivals to Hawaii observed from 1998 to 2006.

Rise of Non-Macroeconomic Japanese Tourism Demand Determinants

As discussed in Chapter 4, the rise of the Japanese productivity, the inflation of both the Honolulu and Australian price levels, and the depreciation of the Japan-U.S. exchange rate have played both an historic and significant role in the variability within Japanese tourist arrivals to Hawaii from 1980 to 1997 (See Table 12). However, it was uncovered that those factors no longer carried the same econometric influence in the variability within Japanese tourist arrivals to Hawaii during 1998 to 2006 (See Table 12). Thus, it is very plausible that a factor or factors (e.g., microeconomic, specific events, and qualitative) other than the macroeconomic factors examined in this study have begun to play a larger role in influencing Japanese tourist arrivals to Hawaii. For example, microeconomic factors such as increases in the average hotel room rate or travel cost / ticket price; specific events such as the Asian Financial Crisis in 1997, the terrorist attacks on September 11, 2001, and the SARS epidemic in 2003; and qualitative factors such as lower tourist satisfaction, lower service quality, and/or higher crime rates may

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have individually or collectively taken a larger role in influencing potential Japanese

travelers. As a result, all associated public and private constituencies should begin paying

closer attention to non-macroeconomic tourism demand determinants in their respective

research and/or future strategic Japanese tourist arrivals to Hawaii planning.

Decline of Japanese Household Discretionary Income Conducive for Hawaii Visitation

In this study, both the Japanese Real GDP and the Japan-U.S. exchange rate were

two of the most statistically significant macroeconomic factors that contributed to the

predominant growth of Japanese tourist arrivals to Hawaii during 1980 to 1997 (See

Table 12). Based on the macroeconomic factor contribution analysis, a 10% increase in

the Japanese Real GDP was shown to result in a statistically significant increase of

12.86%, while a 10% increase in the Japan-U.S. exchange rate was shown to result in a

statistically significant decrease of 2.35% in Japanese tourist arrivals to Hawaii,

respectively (See Table 12). Consequently, *ceteris paribus*, the high levels of positive

growth of the Japanese Real GDP (See Table 4) and a steady rate of depreciation in the

Japan-U.S. exchange rate (See Table 7) allowed Japanese travelers a great financial

advantage in their decision to visit Hawaii.

However, based on the macroeconomic factor contribution analysis from 1998 to

2006, a 10% increase in the Japanese Real GDP now resulted in a statistically significant

increase of 85.58%, while a 10% increase in the Japan-U.S. exchange rate now resulted

only in a statistically insignificant increase of 0.53% in Japanese tourist arrivals to

Hawaii (See Table 12). Moreover, the Japanese Real GDP experienced a slower rate of

growth (See Table 4) and the Japan-U.S. exchange rate a much slower rate of

depreciation (See Table 7). Consequently, *ceteris paribus*, the Japan-U.S. exchange rate's

slower pace of depreciation no longer provided the same financial advantage to Japanese visitors, while the Japanese Real GDP's noted increase in contribution to Japanese tourist arrivals to Hawaii from 1998 to 2006 was negated by the fact that the Japanese Real GDP no longer grew at the same rate as it did during 1980 to 1997. As a result, *ceteris paribus*, due to the slower rate of depreciation of the Japan-U.S. exchange rate, slower rate of growth in the Japanese Real GDP, and corroboration with the findings of the macroeconomic factor contribution analysis, the resulting fall of Japanese household discretionary income has made visitation to Hawaii a more financially difficult decision for Japanese travelers from 1998 to 2006.

Refocused Japanese Traveler Marketing Strategy

Having recognized that any loss of household discretionary income can potentially make it more financially difficult for Japanese travelers to visit Hawaii, it becomes more important for Hawaii's tourism planners to begin rethinking their marketing attempts in an effort to reverse the predominant decline in Japanese tourist arrivals to Hawaii observed from 1998 to 2006. Based on the historic trends from 1998 to 2006, the Honolulu price level has experienced continued inflation. In addition, the macroeconomic factor contribution analysis revealed the Honolulu price level as having a greater contributory role during the predominant decline in Japanese tourist arrivals to Hawaii during 1998 to 2006 (See Table 12). During 1980 to 1997, a 10% increase in the Honolulu CPI resulted in a statistically significant though economically counterintuitive increase of 5.88% in Japanese tourist arrivals to Hawaii (See Table 12). During 1998 to 2006, however, a 10% increase in the Honolulu CPI resulted in an economically intuitive

though statistically insignificant decrease of 14.62% in Japanese tourist arrivals to Hawaii (See Table 12).

In response to the possible loss in household discretionary income and potential increased price sensitivity among Japanese travelers, *ceteris paribus*, a marketing strategy that focuses on cost savings may be instrumental in increasing Japanese visitation to Hawaii. For example, increased marketing incentives and discounts would definitely lessen the costs associated with visiting Hawaii and make travel relatively affordable again for Japanese travelers. In addition, massive advertising campaigns that focus on value and cost savings would reinforce this mantra among Japanese travelers and sway them away from competing destinations (e.g., Australia, China, & etc.) and back to Hawaii. Hence, these suggested refocused marketing strategy should be immediately considered and implemented by all associated stakeholders.

Recommended Areas for Future Research

Based on the findings and conclusions of this study, the following recommended areas of future research would definitely assist in increasing the information base regarding the predominant decline in Japanese tourist arrivals to Hawaii from 1998 to 2006. In essence, the conducting of additional economic, specific events, qualitative, and financial impact based Japanese tourism to Hawaii studies would prove very helpful in increasing the academic literature in this area as well as assist in future strategic planning.

Additional Economic Based Studies

One general area of research that would be useful is the undertaking of economic based studies that continually attempt to find the most influential macroeconomic as well

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as microeconomic factors with respect to Japanese tourist arrivals to Hawaii. For example, an analysis on the other macroeconomic (e.g., interest rates, unemployment, & etc.) and microeconomic (e.g., average hotel room rate, travel cost / ticket price, & etc.) would definitely help in identifying other variables that may have increased their econometric impact on Japanese tourist arrivals to Hawaii. Such knowledge would not only add different perspectives to the prevailing academic literature, but also allow tourist industry professionals to draft economically viable destination-specific strategic plans.

Specific Events Studies

Another area of research that would be similarly useful is specific events based studies. Japanese tourist arrivals to Hawaii experienced unique large decreases in numbers in the aftermath of the Asian Financial Crisis in 1997, the terrorist attacks on September 11, 2001, and the SARS epidemic in 2003. Hence, research that focused on measuring the negative impact and recovery rates of those specific events within the context of Japanese tourist arrivals to Hawaii would provide another perspective in the understanding its decline from 1998 to 2006. Moreover, such research would allow for a pairing of Japanese tourist arrivals decline with each type of specific event, which would analytically benefit in the formulation of exogenous shocks contingency plans that could be utilized in the event of future financial, terrorist, or biological catastrophes.

Qualitative Studies

The expanded research of qualitative factors would be another important area in studying the decline of Japanese tourist arrivals to Hawaii. Essentially, this dissertation was quantitatively based and strived to find the most positive/negative and least influential macroeconomic factors towards Japanese tourist arrivals to Hawaii. Although

this study was successful in its objectives, the discovered major findings would be further compelling, if qualitative data (e.g., tourist satisfaction, service quality, crime rates, & etc.) were analyzed to provide a parallel perspective. For example, service quality studies would indirectly work to uncover household discretionary income and price sensitivity insights that could corroborate the major conclusions of this research. Hence, qualitative based Japanese tourist arrivals to Hawaii research would definitely augment the findings of this study, add to the knowledge base in this area, and enhance Japanese consumer-focused marketing.

Japanese Tourism Financial Impact Studies

Finally, studies that analyzed the financial impact on State tax revenues (e.g., visitor expenditures, transient accommodation, & etc.) to Hawaii before and after the decline of Japanese tourist arrivals to Hawaii in 1998 would provide a much-needed monetary perspective on this topic. Not only adding to the academic literature in this area, such studies would be even more valuable in the area of governmental and commercial strategic planning and policy. In the major conclusions section of this chapter, a number of suggestions have been offered in lieu of the predominant decline in Japanese tourist arrivals to Hawaii observed from 1998 to 2006. However, all associated constituencies would take such suggestions more seriously, if the financial costs of not pursuing them were also clearly identified. As a result, Japanese tourist arrivals to Hawaii financial research would serve as a significant complement to the findings and suggestions recommended in this study, substantially add to the tourism literature, and provide policy makers with the sense of urgency and motivation to enact legislation and

directives to increase the volume of one of Hawaii's most generous tourism revenue

generating resources.

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