

JAPANESE DEMAND FOR TOURISM IN INDONESIA: AN ECONOMETRIC MODELING AND FORECASTING

D.S. PRIYARSONO

Department of Economic, Bogor Agricultural University

ADI LUMAKSONO¹

BPS - Statistics Indonesia

The contribution of Japanese tourists to the total number of foreign tourists visiting Indonesia has always been very significant. Tourism authorities as well as tourism related enterprises therefore are normally interested in finding the factors affecting Japanese demand for tourism in Indonesia. This study attempts to analyze factors that influence Japanese demand for tourism in Indonesia by utilizing an econometric modeling. The model that results from this analysis is then used to forecast the number of Japanese tourists visiting Indonesia in 2011-2015. The most significant factor that affected the Japanese demand for tourism in Indonesia was Japan's GDP.

Inbound Tourist, Tourist Expenditure, Econometrics

INTRODUCTION

To a national economy, revenue from inbound tourism (foreign tourists' expenditure) can be categorized as revenue from export of service. In Indonesia the share of inbound tourism in the total value of export of service is consistently increasing; in 2006, 2007, and 2008, the percentages are 46.67, 46.91, and 52.84, respectively. In the same years, the ranks of tourism in the list export of commodities also show positive trend, i.e., 6, 5, and 4. (See Table 1).

¹ Address correspondence to Adi Lumaksono : Badan Pusat Statistik - Indonesia

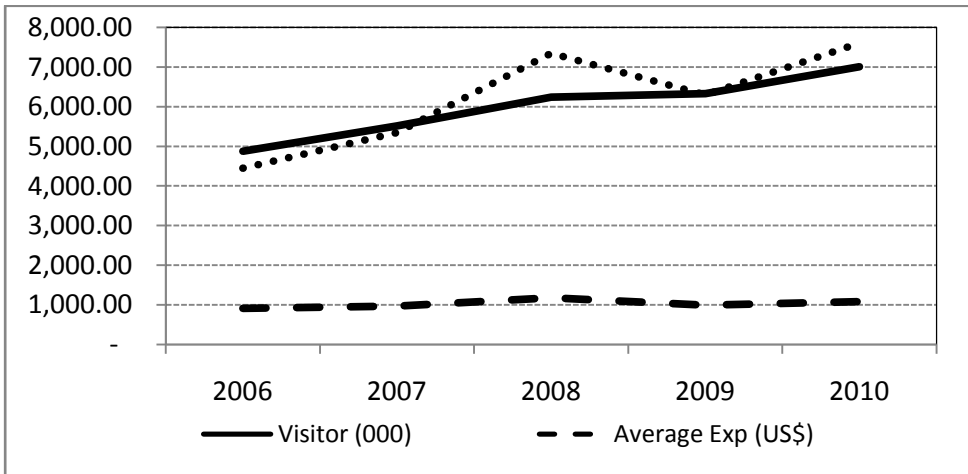
Table 1.
Values of Export Commodities 2006-2008

Rank	2006		2007		2008	
	Kind of Commodity	Value (million US\$)	Kind of Commodity	Value (million US\$)	Kind of Commodity	Value (million US\$)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1	Oil and gas	21 209.50	Oil and gas	22 088.60	Oil and gas	29 126.30
2	Garments	5 608.16	Palm oil	7 868.64	Palm oil	12 375.57
3	Rubber	5 465.14	Rubber	6 179.88	Rubber	7 579.66
4	Palm oil	4 817.64	Garments	5 712.87	Tourism	7 377.00
5	Electrical Apparatus	4 448.74	Tourism	5 345.98	Garments	6 092.06
6	Tourism	4 447.97	Electrical Apparatus	4 835.87	Electrical Apparatus	5 253.74
7	Textile	3 908.76	Textile	4 177.97	Textile	4 127.97
8	Processed Wood	3 324.97	Chemicals	3 402.58	Paper and paper goods	3 796.91
9	Paper and paper goods	2 859.22	Paper and paper goods	3 374.84	Processed Food	2 997.17
10	Chemicals	2 697.38	Processed Wood	3 076.88	Processed Wood	2 821.34
11	Processed Food	1 965.56	Processed Food	2 264.00	Chemicals	2 754.30
	Export of goods	101 081	Export of goods	123 229	Export of goods	147 703
	Export of services	9 530	Export of services	11 397	Export of services	13 962
	Export of goods and services	110 611	Export of goods and services	134 626	Export of goods and services	161 664
	Share of tourism on export of services (%)	46.67	Share of tourism on export of services (%)	46.91	Share of tourism on export of services (%)	52.84
	Share of tourism on export of goods and services (%)	4.02	Share of tourism on export of goods and services (%)	3.97	Share of tourism on export of goods and services (%)	4.56

Source: Processed from Economic Indicators 2009, BPS

In the year of 2010 the number of inbound tourists visiting Indonesia exceeded seven million people (See Figure 1). Their expenditure during their visit in Indonesia reached US\$ 7.6 billion, increased by 20.63% from that of 2009. This was due to the increase in the average of tourist expenditure and not the increase of the number of inbound tourists.

Figure 1.
The Number Tourists' Visits to Indonesia 2006-2010



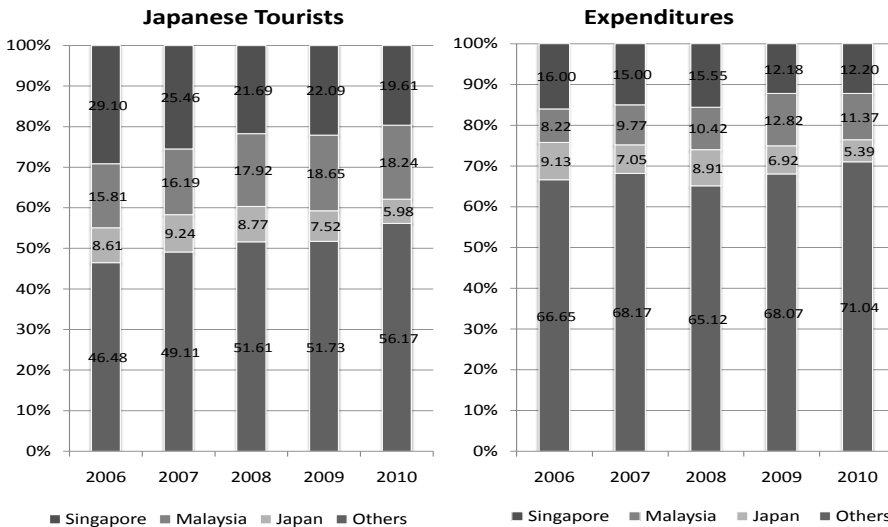
Source: Processed from International Visitor Arrival Statistics 2010, BPS

The contribution of Japanese tourists was the third biggest number of inbound tourists as well as to the total value of inbound tourists' expenditure (See Figure 2). It is therefore important to pay more attention to this particular market segment in order to maintain its contribution and moreover to increase it.

Figure 2.

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Share of Japanese Tourists in the Total Number of Inbound Tourists and Their Expenditures in Indonesia 2006-2010



Source: Processed from International Visitor Arrival Statistics 2010, BPS

From the public as well as private policy maker's point of view, there is always a need to optimally allocate the limited sources to the available public investment options. Ministry of Culture and Tourism, and executives of tourism enterprises, for example, need to allocate their limited budgets to promote inbound tourism; and hence the questions, among others, are "to which market segments?" and "by how much?" To answer these and the related questions, it is important to identify factors influencing inbound tourism and to provide a quantitative tool to forecast the number of inbound tourists from a specific country.

This study attempts to analyze factors that influence the Japanese demand for tourism by utilizing econometric modeling. By using this model the numbers of Japanese inbound tourists are forecasted for the next several years. The results of this study are beneficial not only for public policy makers such as tourism authorities and public works investment planners, but also for tourism related business players like those of the transportation, logistics, hospitality, and leisure sectors.

LITERATURE SURVEY

Most of study on demand of tourism used a single equation where the number of tourist visiting a country is the function of income, tourism price, exchange rate between origin and destination country, transport cost, and dummy variables which affect tourist to travel. Models which are usually used are log linear models where the estimated coefficient of independent variables represent elasticity (Garin-Munoz et.al, 2000, Choyakh, 2008, Poenca and Elias, 2005, Aslam et.al, 2009) or linear models where the estimated coefficient of independent variables represent constant marginal effect (Stabler et.al, 2010). In constructing model, some researchers used panel data to avoid multicollinearity and to increase degrees of freedom (Choyakh, 2008).

Although the models which have been constructed theoretically correct, statistically significant, and econometrically correct with the appropriate sample in those period used but it cannot be used to forecast since structural change among the variables used in the models running fastly (Koutsoyianis, 1978). Based on microeconomic theory that the demand of tourism was defined as a basket of goods and services where consumers (tourists) willing and able to purchase. In this case, demand of tourism is a function of tourists' income, price of goods and services of tourism, price substitution of goods and services of tourism, as well as qualitative variables such as economic crisis and gulf war by using dummy variables (Choyakh, 2008).

Witt, et.al (1995) in Mavri (2009) stated that much of demands on tourism used econometric approach. Other quantitive technics which also seldom be used are gravity models and time series models. Based on those models imply that it is imposible to construct the model only using a single equation for all countries both origin and destination countries of tourists. Particular variable can affects a country but not for other countries, and the estimated coefficients vary among countries. So, in this paper will develop model demand of Japanese tourism in Indonesia by using simultaneous equations to investigate interrelation among variables which affect the arrivals of Japanese tourists in Indonesia.

THE MODEL

The model consists of twelve structural equations and four identities. The number of endogenous variables is sixteen, where as that of exogenous variables is eleven. Formulation of the equations is as follows.

$$TA_t = a_0 + a_1 Y_t + a_2 P_t + a_3 PP_t + a_4 LTA_t + a_5 D1 + \mu_{1t} \dots\dots\dots (1)$$

$$P_t = \frac{CPIINA_t}{CPI_t \times ER_t} \dots\dots\dots (2)$$

$$PP_t = \sum_{i=1}^3 \alpha_i \times \frac{CPI_{it}}{CPI_t \times IER_{it}} \dots\dots\dots (3)$$

$$\alpha_i = \frac{TA_{it}}{TA_{\bullet t}}$$

$$C_t = b_0 + b_1 Y_t + b_2 LC_t + \mu_{2t} \dots\dots\dots (4)$$

$$I_t = c_0 + c_1 Y_t + c_2 LI_t + \mu_{3t} \dots\dots\dots (5)$$

$$G_t = d_0 + d_1 Y_t + d_2 LG_t + \mu_{4t} \dots\dots\dots (6)$$

$$X_t = e_0 + e_1 Y_t + e_2 LX_t + \mu_{5t} \dots\dots\dots (7)$$

$$M_t = f_0 + f_1 Y_t + f_2 LM_t + \mu_{6t} \dots\dots\dots (8)$$

$$POP_t = g_1 LPOP_t + \mu_{7t} \dots\dots\dots (9)$$

$$TE_t = h_0 + h_1 YC_t + h_2 P_t + h_3 LTE_t + h_4 D2 + \mu_{8t} \dots\dots\dots (10)$$

$$YC_t = \frac{Y_t}{POP_t} \dots\dots\dots (11)$$

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$$CPI_t = i_0 + i_1 R_t + i_2 MS_t + \mu_{9t} \dots\dots\dots (12)$$

$$ER_t = j_0 + j_1 Y_t + j_2 CPI_t + \mu_{10t} \dots\dots\dots (13)$$

$$R_t = k_0 + k_1 MS_t + \mu_{11t} \dots\dots\dots (14)$$

$$MS_t = l_0 + l_1 LMS_t + \mu_{12t} \dots\dots\dots (15)$$

$$FET_t = TA_t \times TE_t \dots\dots\dots (16)$$

where TA_t	= Number of Japanese inbound tourists (visit)
LTA_t	= Lagged number of inbound tourists (visit)
Y_t	= Gross Domestic Product (million US\$, constant price of 2000)
LY_t	= Lagged Gross Domestic Product (million US\$, constant price of 2000)
P_t	= Proxy of tourism price service in Indonesia (US\$)
PP_t	= Proxy of tourism price service in competitor countries (Singapore, Malaysia, and Thailand) viewed by Japanese tourists (US\$)
TA_{it}	= Number of Japanese tourists visiting i; i =1 Singapore, i=2 Malaysia, and i=3 Thailand (visit)
$TA_{\bullet t}$	= Total number of Japanese tourists visiting Singapore, Malaysia, or Thailand (visit)
$CPIINA_t$	= Indonesian consumers price index (percent)
CPI_t	= Consumers price index (percent)
CPI_{jt}	= Consumers price index in the country of destination j
CPI_i	= Consumers price index in the country of origin i
IER_{ij}	= Index of Japanese Yen exchange rate (Sin\$/JPY, Mal Ringgit/JPY, Thai Bath/JPY) with value for the index equals 1 in the year of 2000
C_t	= Household consumption (Million US\$)
LC_t	= Lagged household consumption (Million US\$)
I_t	= Investment (Million US\$)
LI_t	= Lagged investment (Million US\$)
G_t	= Government expenditure (Million US\$)
LG_t	= Lagged government expenditure (Million US\$)
R_t	= Bank interest rate (percent/year)
X_t	= Export (Million US\$)
LX_t	= Lagged export (Million US\$)
ER_t	= Exchange rate (IDR/US\$)
M_t	= Import (Million US\$)
LM_t	= Lagged import (Million US\$)
POP_t	= Population size (thousand persons)
$LPOP_t$	= Lagged population size (thousand persons)
YC_t	= Per capita income (US\$)
MS_t	= Supply of money (Million US\$)
LMS_t	= Lagged supply of money (Million US\$)
FET_t	= Revenue from inbound tourists (Million US\$)
D1	= Dummy variable for travel warning, D1=0 No travel warning, D1=1 travel warning
D2	= Dummy variable for economic crisis, D2=0 before the crisis, D2=1 during the crisis
μ_t	= Error term

Assumption of the Model:

1. Zero mean value of μ_t
 $E(\mu_t) = 0$, for each t
2. No serial correlation
 $Cov(\mu_t, \mu_v) = 0$, $t \neq v$
3. Homoscedasticity
 $Var(\mu_t) = \sigma^2$
4. Zero covariance between μ_t and each independent variable.
5. No specification bias, the model is correctly specified.
6. No collinearity between independent variable

EVALUATION OF THE MODEL

The result of the model's parameters estimation is presented in Table 2. The positive or negative signs parameters' estimates are generally consistent with the economic theories. Several of the estimates, however, do not indicate statistically significant effect of the independent variables on the respective dependent variables.

The coefficients of determination (R^2) of the twelve structural equations range from 0.35 to 1.00. The lowest R^2 belongs to the equation of Japanese tourists' average expenditure, where as the highest belongs to that of Japan's population. The F-statistics in the equations in the model generally indicate that the overall independent variables are satisfactorily capable of explaining the variation of the respective dependent variables. They range from 2.59 to 13,682.70 which are sufficiently, and in most cases highly, significant. The following paragraphs describe some equations and variables in the model that imply interesting interpretations.

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Table 2
Estimation of the Parameters in the Equation of Revenue
From Japanese Tourists Expenditures 1984-2008

Variable		Parameter Estimate	Prob T	Significance
TA	Japanese Tourist Visits			
	Intercept	-131178	0.5324	
	Japan's Gross Domestic Product (Y)	71.51254	0.0121	A
	Indonesia's Tourism Price (P)	-48413.4	0.6574	
	Competitors' Tourism Price (PP)	99644.69	0.7076	
	Lagged TA [LTA]	0.582791	0.0015	A
	Dummy (D1)	-133256	0.0434	A
	$R^2=0.88$; F-Stat=26.14			
C	Japan's Consumption			
	Intercept	-94.93650	0.0377	A
	Japan's Gross Domestic Product (Y)	0.531469	<.0001	A
	Lagged C [LC]	0.091551	0.0575	B
	$R^2=0.99$; F-Stat=1663.99			
I	Japan's Investment			
	Intercept	190.3540	0.0226	A
	Japan's Gross Domestic Product (Y)	0.080682	0.0176	A
	Lagged I [LI]	0.533156	0.0002	A
	$R^2=0.86$; F-Stat=67.12			
G	Japan's Government Expenditure			
	Intercept	-81.69150	0.0530	B
	Japan's Gross Domestic Product (Y)	0.104901	<.0001	A
	Lagged G [LG]	0.494486	<.0001	A
	$R^2=0.96$; F-Stat=276.41			
X	Japan's Export			
	Intercept	-308.4900	0.2513	
	Japan's Gross Domestic Product (Y)	0.058536	0.1843	
	Japan's Exchange Rate (ER)	1.171682	0.2900	
	Lagged X [LX]	0.899390	<.0001	A
	$R^2=0.95$; F-Stat=140.50			
M	Japan's Import			
	Intercept	-33.68470	0.4810	
	Japan's Gross Domestic Product (Y)	0.031997	0.0756	B
	Lagged M [LM]	0.798802	<.0001	A
	$R^2=0.91$; F-Stat=102.67			

A = significant at ($\alpha=5\%$). B = significant at ($\alpha=10\%$)

The most important equation in the model is Japanese tourists visits (i.e., where the dependent variable is the number of Japanese tourists' visits to Indonesia). It describes that the number of Japanese tourists visits to Indonesia significantly depends on Japan's GDP. Other significant variables are lagged number of Japanese tourists visits and the dummy variable of "travel warning". On the other hand, it is evident that price variables (price of Indonesian tourism service and price of tourism service in competing countries) do not significantly effect the number of Japanese tourists visits to Indonesia.

An interpretation of the above result may be that the push factor of the number of Japanese tourist visits to Indonesia is stronger than the corresponding pull factor. On the

one hand, Japan's GDP that may represent Japanese tourists' purchasing power positively influences the number of Japanese tourists' visits to Indonesia. On the other, the model reveals that Japanese tourists are not price sensitive.

Table 2 (Continued)
Estimation of the Parameters in the Equation of Revenue
From Japanese Tourists Expenditures 1984-2008

Variable		Parameter Estimate	Prob T	Significance
POP	Japan's Population			
	Lagged POP [LPOP]	1.002484	<.0001	A
$R^2=1.00$; F-Hit=1000000				
TE	Japanese Tourists Expenditure			
	Intercept	637.0313	0.2751	
	Japan's Per Capita Gross Domestic Product (YC)	1.107249	0.9139	
	Indonesia's Tourism Price (P)	-95.76440	0.5638	
	Lagged TE [LTE]	0.549856	0.0105	A
	Dummy (D2)	-95.92710	0.7588	
$R^2=0.35$; F-Hit=2.59				
CPI	Japan's Consumer Price Index			
	Intercept	96.42004	<.0001	A
	Japan's Interest Rate (R)	-1.850400	0.0473	A
	Japan's Money Supply (MS)	0.000897	0.2616	
$R^2=0.45$; F-Hit=8.65				
ER	Japan's Exchange Rate			
	Intercept	204.0354	0.024	A
	Japan's Per Capita Gross Domestic Product (YC)	-3.801070	<.0001	A
	Japan's Consumer Price Index (CPI)	0.436656	0.6856	
$R^2=0.82$; F-Hit=48.88				
R	Japan's Interest Rate			
	Intercept	0.223036	0.5922	
	Japan's Money Supply (MS)	-0.000050	0.6848	
	Lagged R [LR]	0.828223	<.0001	A
$R^2=0.82$; F-Hit=49.02				
MS	Japan's Money Supply			
	Intercept	115.9370	0.2794	
	Lagged MS [LMS]	1.035957	<.0001	A
$R^2=0.96$; F-Hit=549.56				

A = significant at ($\alpha=5\%$). B = significant at ($\alpha=10\%$)

The fact that the dummy variable of "travel warning" significantly effects the dependent variable is self-explainable. The dummy variable has a value of zero when there is no notice of "travel warning" stated by the Government (Indonesian or Japanese), indicating that there is no security problem in the tourist destinations. Otherwise, it is given the value of one, meaning that there is strong indication of security problem.

The variable of lagged number of Japanese tourists visits to Indonesia significantly effects the dependent variable. This fact only reveals that there is, on average, consistent trend of the dependent variable. This last note, however, is not fully supported by the data represented by Figure 1 that shows some fluctuations.

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Another important equation is Japanese Tourists' Expenditure. This dependent variable is significantly affected by its lagged variable. This only reveals that there is a consistent trend in the time series data of the dependent variable. The other independent variables in the equation are not statistically significant. They are Japan's GDP, price of Indonesian tourism service, and the dummy variable of "economic crisis".

It is interesting to note that while Japan's GDP does significantly affect the number Japanese tourists' visits, it does not significantly affect the tourists' expenditure. Furthermore, the dependent variable is not significantly affected by the dummy variable of "economic crisis". It sounds reasonable because Japanese economy was not influenced by the crisis as hard as what was experienced by other parts of the world including Indonesia.

THE FORECASTING

This study attempts to forecast the Japanese demand for tourism in Indonesia in 2011-2015. The number of tourists' visit can be used as a proxy of demand for tourism. Accordingly, the above discussed model can be used as the tool for the forecasting.

Table 3.
FORECASTS OF THE NUMBER OF VISITS OF JAPANESE TOURISTS TO
INDONESIA
AND THEIR EXPENDITURE 2011 – 2015

Variable	Baseline (2008)	Forecasted Value				
		2011	2012	2013	2014	2015
Economic Growth (%)	-1.20	1.50	2.04	1.88	1.75	1.68
Projected Population (Million)	127.69	127.19	126.99	126.75	126.47	126.16
Exchange Rate (JPY/US\$)	103.36	84.21	82.77	81.27	79.92	78.92
Exchange Rate						
IDR/JPY	93.66	108.07	112.76	117.02	121.10	124.98
SGD/JPY	0.0137	0.0163	0.0168	0.0174	0.0180	0.0185
MYR/JPY	0.0322	0.0404	0.0411	0.0418	0.0425	0.0431
THB/JPY	0.3223	0.3777	0.3832	0.3867	0.3896	0.3918
Consumer Price Index (CPI) (Base Year : 2000)						
Indonesia	205.29	242.81	255.82	267.85	278.88	289.24
Japan	99.51	96.86	97.05	97.53	98.31	99.27
Singapore	113.51	120.20	122.68	125.21	127.84	130.40
Malaysia	121.52	127.56	130.49	133.75	137.10	140.53
Thailand	126.28	132.58	135.94	138.65	141.47	144.23
Japanese Tourists (Visit)	546 713	798 490	864 628	924 442	980 285	1 032 747
Average Expenditure (US\$)	1 196.94	1 179.72	1 179.34	1 181.25	1 184.84	1 189.38
Total Expenditure (Million US\$)	654.38	941.99	1 019.69	1 092.00	1 161.48	1 228.33

The exogenized variables are Japan's economic growth, Japanese Yen (JPY) exchange rate, and Japan's population size. The values of these variables are taken from the data

published by the World Economic Outlook (International Monetary Fund, 2010). The forecasted variables are the number of Japanese tourists visits to Indonesia and their expenditures (both the average and the total). The results are presented in Table 3.

CONCLUSION

The result of this study suggests that during the period of the time series data (1984-2008) the most significant factor that affected the Japanese demand for tourism in Indonesia was Japan's GDP. On the other hand, the effects of price variables (tourism service prices in Indonesia, and in competing countries like Singapore, Malaysia, and Thailand) are not significant which mean that Japanese tourists are not price sensitive. Therefore, it can be concluded that the push factor is stronger than the pull factor. It suggests that during the period tourism in Indonesia failed to make the pull factor to be effective to attract inbound tourists. Accordingly, in the future the strategy space that is available for tourism related sectors in Indonesia to manœuvre is widely open.

This study also exemplifies how an econometric model can be utilized for forecasting tool. The model gives the forecast of number of Japanese tourists visits to Indonesia for 2011-2015. The forecasted values should be viewed as pessimistic because during the period of the time series data (1984-2008) the push factor affecting the inbound tourists' visits was stronger than the pull factor (i.e., efforts by tourism authorities and enterprises to attract inbound tourists visits).

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