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by Wasiaturrahma Wasiaturrahma

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Analysis of International Tourism Demand in Indonesia: An Ordinary Least Square (OLS) Approach

Wasiaturrahma[1]✉, Hilda Rohmawati[2]

[1,2]Department of Economics, Faculty of Economics and Business, Airlangga University

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Abstract

The demand for tourism in Indonesia which continues to increase every year is actually still not able to reach the predetermined target. In the Other hand there is still no research comparing proxies for calculating tourism prices (exchange rates and relative prices) in one study. The calculation of substitution prices for each of the countries studied tends to be the same. But each country has different characteristics and different tastes, so the country of substitution must be distinguished for each country. This study analyzes the demand for international tourism in Indonesia with 106 countries visiting Indonesia the most. The data used in this study is cross section data in 2018. The analytical technique used in this study is OLS. This study uses two models, namely model 1 using relative prices as a proxy for tourism prices and model 2 using exchange rates with cross exchange rate calculations as proxies for calculating tourism prices. Relative price is considered a suitable variable to be used as a proxy for calculating tourism prices because it takes into account the CPI for each country. The model that includes the relative price variable also has a higher goodness of fit, so the relative price can be used as a proxy for tourism prices.

✉ Correspondence :
The 1st Floor of the FEB Uniar Airlangga Street N0.4
Airlangga, Gubeng, Surabaya City
E-mail: rahma@feb.unair.ac.id

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INTRODUCTION

Since 2014, the world tourism organization UNWTO has projected that the world tourism sector will grow at around 4% per year. In January 2020 UNWTO reported that international tourist arrivals grew 4% in 2019 to reach 1.5 billion visits worldwide. UNWTO projects based on trends, economic prospects, and the UNWTO confidence index that tourist arrivals will grow 3-4% in 2020. (UNWTO, 2020)

The tourism sector has become a major player in the economy, for developing countries, especially Indonesia. Indonesia is experiencing a significant increase in international tourism demand. Demand for international tourism over the last five years has always increased, namely in 2013 by 8.8 million visits, in 2014 by 9.4 million visits, in 2015 by 10.23 million visits, in 2016 by 11.52 million visits, and in 2017. of 14.04 million visits (Central Bureau of Statistics, 2018). The demand for tourism which continues to increase every year is actually still not able to reach the predetermined target.

The target of international tourism demand in 2019 is 20 million visits with 1.5 million visits every month, the realization in the first semester was only 1.3 million visits per month, so this target was revised to 18 million visits in 2019 (Ministry of Tourism of the Republic of Indonesia, 2019). The non-achievement of the target for international tourism demand has become the motivation and background for conducting this research.

Research on international tourism demand has been widely carried out (Crouch, 1994; Witt & Witt, 1995; Covington, Thunbeg, & Jauregui, 1995; Narayan, 2004; Lim, 1997; Croes & Sr., 2005; Naude & Saayman, 2005; Salleh , Siong-Hook, Ramachandran, Shuib, & Noor, 2008; Sr., 2009; Tavares & Leitao, 2016; Chen, Wu, & Shen, 2017; Assaf, Li, Song, & Tsionas, 2018; Song, Wen, & Liu, 2019). The calculation of tourism prices can be done by proxying the exchange rate (Tavares & Leitao, 2016) or by proxying the ratio of the Consumer Price Index (CPI) to the Exchange Rate which is called relative price (Song, Li, Witt, & Fei, 2010). Many previous studies have combined these two variables in one study (Vita, 2014; Martins, Gan, & Ferreira-Lopes, 2017; Liu, Liu, & Li, 2018). Lim (2006: 60) states that the exchange rate and the ratio of the exchange rate to the CPI (relative price) are the same proxy for the calculation of tourism prices, so the unification of these two variables in one model can lead to bias in the data to be studied. Chaisumpunsakul & Pholphirul (2017) only use the ratio between the CPI and the exchange rate (relative price) as a proxy for tourism prices. Other studies use tourism price proxies with exchange rates only (Tavares & Leitao, 2016). However, there is still no research comparing proxies for calculating tourism prices (exchange rates and relative prices) in one study.

The calculation of substitution prices for each of the countries studied tends to be the same. Tourism substitution countries equated to tourism demand for all countries studied (Song, Li, Witt, & Fei, 2010; Qiong & Chen, 2018). Each country has different characteristics and different tastes, so the country of substitution must be distinguished for each country. Differentiation of substitution countries will also differentiate substitution prices for each of the countries studied.

The purpose of this study is to analyze the determinants of international tourism demand in Indonesia. The dependent variable used is tourism demand with foreign tourist visits as a proxy for the calculation. The independent variables used are income, exchange rates, relative prices, substitution prices, the dummy of ASEAN member countries, and the dummy of developed countries. This study has a research contribution, namely comparing two proxies for calculating tourism prices, namely exchange rates and relative prices and distinguishing substitution countries for each country so that tourism substitution prices are also different for each country studied.

RESEARCH METHODS

This study analyzes the demand for international tourism in Indonesia with 106 countries visiting Indonesia the most. This study uses an inferential quantitative approach. The data used in this study is cross section data in 2018. The analytical technique used in this study is OLS (Ordinary Least Square) to see the effect of

the independent variables (income, relative prices, substitution prices, exchange rates, ASEAN (member countries and non-member countries), and countries (developed and developing countries) on the dependent variable (tourism demand).

The model used in this study is as follows:

Model 1

$$lnTA_i = \beta_0 + \beta_1 lnY_i + \beta_2 lnP_i + \beta_3 lnPS_i + \beta_4 dASEAN_i + \beta_5 dCOUNTRY_i$$

Model 2

$$lnTA_i = \beta_0 + \beta_1 lnY_i + \beta_2 lnER_i + \beta_3 lnPS_i + \beta_4 dASEAN_i + \beta_5 dCOUNTRY_i$$

where TA is tourism demand, Y is income, P is relative price, ER is exchange rate, PS is price of substitution, dASEAN is dummy of ASEAN member countries, and dCOUNTRY is dumy of developed countries.

Table 1. Definition of Variable and Source of Data

Variable	Definition	Source
TA	Foreign tourist visits are foreign tourist visits by nationality	Central Bureau of Statistics
Y	Income is real GDP per capita with the base year 2010 adjusted for Purchasing Power Parity (PPP).	World Development Indicators
ER	The exchange rate used is the cross exchange rate. The cross exchange rate is used to measure the exchange rate between the destination country and the country of origin of tourists in the same unit, namely the US Dollar. The calculation of the exchange rate is as follows: $Exchange\ Rate\ (ER) = \frac{Dollar/_{Rupiah}}{Dollar/_{Currency\ of\ Origin\ Country}}$	International Financial Statistics
P	The relative price is the consumer price index of the destination country relative to the country of origin adjusted for the exchange rate of the two countries. The calculation of the relative price of tourism in this study is as follows: $P = \frac{CPI}{CPI_{Origin\ Country}/Exchange\ Rate_{Origin\ Country}}$	International Financial Statistics
PS	Substitution prices are prices for alternative destinations for each country. Alternative destination countries are countries in the Southeast Asia region. Alternative destination countries are selected through visitors from the country of origin who visit the most alternative destination countries. The substitution price is calculated as follows: $PS = \frac{CPI_{OSubstitution\ Country}/ER_{Substitution\ Country}}{CPI_{Origin\ Country}/ER_{Origin\ Country}}$	International Financial Statistics
dASEAN	Has a value of 1 if the country of origin of the tourist is an ASEAN member country. Has a value of 0 if the country of origin of the tourist is a non-ASEAN member country. The ASEAN member countries in question are the 10 main ASEAN countries, namely Indonesia, Singapore, Malaysia, Thailand, Cambodia, Laos, Brunei Darussalam, the Philippines, Vietnam, and Myanmar plus the expansion of	ASEAN Statistics

Variable	Definition	Source
	members consisting of 5 countries namely Bangladesh, Palau, Papua New Guinea, Taiwan and Timor Leste.	
dCOUNTRY	Has a value of 1 if the country of origin of tourists is a developed country according to the IMF, and is worth 0 if the country of origin of tourists is a developing or poor country according to the IMF.	International Monetary Fund

The estimation technique used in this study is the Ordinary Least Square estimation technique to see the effect of the independent variable on the dependent variable. After the OLS regression is carried out, it will be continued with the classical assumption test, namely the normality, multicollinearity, and heteroscedasticity tests of the model. The autocorrelation test was not carried out because autocorrelation was used for time series data that tested whether there was a relationship between errors at different time intervals. Furthermore, the goodness of the model is seen through the size of the goodness of fit, namely R Square.

Suppose the population regression function is formulated as follows:

$$Y_i = \beta_1 + \beta_2 x_1 + u_i$$

So, the estimation model is:

$$\widehat{Y_i} = \widehat{\beta_1} + \widehat{\beta_2} x_1 + \widehat{u_i}$$

If changed, then the residual is the difference between the actual Y and the estimated Y:

$$\widehat{u_i} = Y_i - \widehat{Y_i}$$
$$\widehat{u_i} = Y_i \widehat{\beta_1} - \widehat{\beta_2} x_i$$

OLS is the minimum number of least squares residuals, so:

$$\sum \widehat{u_i^2} = \sum \left(Y_i - \widehat{Y_i}\right)^2$$
$$\sum \widehat{u_i^2} = \sum \left(Y_i - \widehat{\beta_1} - \widehat{\beta_2} x_i\right)^2$$

OLS is expected to be BLUE. Best (B) is the best in a statistical sense, namely the variance (a measure of the distribution of data) where how far the data from the average is expected to be smaller, which means more efficient (statistical efficiency). Linear (L) is a straight line without exponents in the estimator and variable. Unbiased (U) is the population and sample are not different (normally distributed). The OLS estimator is expected to have the best, linear, and unbiased properties.

Classical assumptions underlying OLS:

1) The regression model is linear.
   The model of the OLS regression must be linear in its parameters.
   $$Y_i = \beta_1 + \beta_2 x_1 + u_i$$
2) The value of X is always fixed.
   The value of X is independent of the error factor. The value of the regressor X is always assumed to be fixed in repeated sampling (the regressor is always fixed) or sampling in line with the collection of the Y variable (stochastic regressors).
   $$cov(X_i, u_i) = 0$$
3) The mean value of the conditional error for a given X is zero.
   This assumption implies that there is no specification bias (specification error) in the model.
   $$E(u_i|X_i) = 0$$
4) Homoscedasticity.
   The value of the variance of the error is the same or uniform.
   $$var(u_i) = E[u_i - E(u_i|X_i)]^2$$
   $$var(u_i) = (u_i^2|X_i)$$
   $$var(u_i) = \sigma^2$$
5) There is no autocorrelation.
   For every two X values, such as X_i and X_j, the correlation between the error values u_i and u_j is zero. Where i and j are two different observations.
   $$covarians(u_i, u_j|X_i, X_j) = 0$$
6) The number of observations n must be greater than the number of parameters to be estimated.
7) The basic criteria on the variable X.

The X value of a particular sample does not always have to be the same. Technically the variance of X should be a positive number. Furthermore, there are no outliers from the value of the X variable, namely the value that states the relationship is too large at the end of the observation. The residuals of the variables are also normally distributed.

A model is said to be good when it has a high goodness of fit measure. The goodness of fit measure for OLS is seen from the R2 value. The coefficient of determination or R2 is a concise measure that informs how well a sample regression line fits the data. The value of R2 which is getting closer to 1 indicates the goodness that can be explained by the model.

$$r^2 = \frac{\left[\sum(Y_i - \bar{Y})\left(\hat{Y}_i - \bar{Y}\right)\right]^2}{\sum(Y_i - \bar{Y})^2 \sum\left(\hat{Y}_i - \bar{Y}\right)^2}$$

$$r^2 = \frac{(\sum y_i \hat{y}_i)^2}{(\sum y_i^2)(\sum \hat{y}_i^2)}$$

$$0 \leq R^2 \leq 1$$

Research Hypothesis

1. F Test (Simultaneous)

This study examines the effect of the independent variable on the dependent variable simultaneously using the F test. The hypothesis is as follows:

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 \rightarrow$ there is no significant effect of all independent variables on the dependent variable.

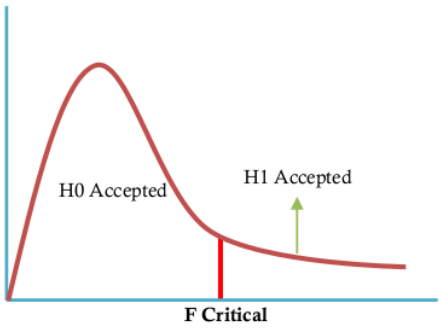
H_1=There is at least one beta that is not equal to zero→ at least one independent variable has an effect on the dependent variable.

The conditions are as follows:

H_0 is accepted if the calculated F value < critical F value

H_1 is accepted if the calculated F value > the critical F value

The critical F value is obtained from N-k, where N is the number of observations, and k is the number of independent variables used in the study. N is the denumerator and k is the numerator.



Source: Gujarati & Porter (2009)

Figure 1. Provisions for Acceptance of Hypotheses with F Test

Provisions for acceptance of the hypothesis can also be done using p-value. For example, the significance value is determined at 5% (α=0.05). Then the conditions for accepting the hypothesis are as follows:

H_0 is accepted if p.value > alpha

H_1 is accepted if p.value < alpha

2. t Test (Partial)

This study also tested the effect of the independent variable on the dependent variable partially by using the t test. The hypothesis is as follows:

Income

$H_0 = \beta_1 = 0 \rightarrow$ income variable has no significant effect on tourism demand.

$H_1 = \beta_1 \neq 0 \rightarrow$ income variable has a significant effect on tourism demand.

Relative Price

$H_0 = \beta_2 = 0 \rightarrow$ relative price variable has no significant effect on tourism demand.

$H_2 = \beta_2 = 0 \rightarrow$ relative price variables have a significant effect on tourism demand.

Exchange Rate (For Model 2 Replaces Relative Price)

$H_0 = \beta_2 = 0 \rightarrow$the exchange rate variable has no significant effect on tourism demand.

$H_1 = \beta_2 \neq 0 \rightarrow$ the exchange rate variable has a significant effect on tourism demand.

Substitution Price

$H_0 = \beta_3 = 0 \rightarrow$ substitution price variable has no significant effect on tourism demand.

$H_1 = \beta_3 \neq 0$ →the substitution price variable has a significant effect on tourism demand.

ASEAN Member Dummy

$H_0 = \beta_4 = 0$ → ASEAN member dummy variable has no significant effect on tourism demand.

$H_1 = \beta_4 \neq 0$ → the ASEAN member dummy variable has a significant effect on tourism demand.

Developed Country Dummy

$H_0 = \beta_5 = 0$ → Developed country dummy variable has no significant effect on tourism demand.

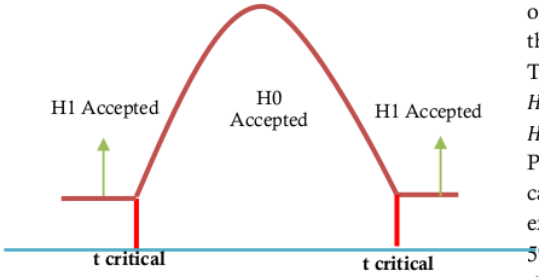
$H_1 = \beta_5 \neq 0$ → Developed country dummy variable has a significant effect on tourism demand.

The conditions are as follows:

H_0 accepted if the value of t count < critical t value

H_1 accepted if the value of t count > critical t value

The critical t value is obtained from N-k, where N is the number of observations, and k is the number of independent variables used in the study.



Source: Gujarati & Porter (2009)

Figure 3.1. Provisions for Acceptance of Hypotheses with t Test

Provisions for acceptance of the hypothesis can also be done using p-value. For example, the significance value is determined at 5% (α=0.05). Then the conditions for accepting the hypothesis are as follows:

H_0 accepted if p.value> alpha

H_1 accepted if p.value<alpha

3. Classic Assumption Test

Normality Test

Normality test is used to test whether a model uses normally distributed residuals. Here is the hypothesis:

H_0=normally distributed residual

H_1=residual not normally distributed

Provisions for acceptance of the hypothesis are carried out using the chi-square probability. For example, the significance value is determined at 5% (α=0.05). Then the conditions for accepting the hypothesis are as follows:

H_0 is accepted if the value of prob chi square > alpha

H_0 is accepted if the value of prob chi square < alpha

Multicollinearity Test

Multicollinearity test is used to ensure that there is no relationship between independent variables in a model. The conditions are as follows:

VIF value > 10 → there is a multicollinearity problem

VIF value < 10 → no multicollinearity problem

Heteroscedasticity Test

Heteroscedasticity test is used to see the variance of the residuals. It is expected that the variance of the residuals is stable/uniform (homoscedasticity). The hypothesis is as follows:

H_0=variance of the residual is homoscedasticity

H_0=variance of residual t is heteroscedasticity

Provisions for acceptance of the hypothesis are carried out using the chi-square probability. For example, the significance value is determined at 5% (α=0.05). Then the conditions for accepting the hypothesis are as follows:

H_0 is accepted if the value of prob chi square > alpha

H_0 is accepted if the value of prob chi square < alpha

RESULTS AND DISCUSSION

1. Relative Price as a Proxy of Tourism Prices in the Tourism Demand Model

Simultaneous test results show that:

H_1 accepted → 0.0000 < 0.05

Reject the null hypothesis and accept the alternative hypothesis which means that there is at least one independent variable that affects the

dependent variable. Simultaneously the independent variable affects the dependent variable with a significance level of 5%. The independent variable also has a simultaneous effect on the dependent variable with a significance level of 1% and 10%.

Table 2. Model 1 Regression Results

Variable	Coefficient	t	p-value
lnY	0.99613	4.30	0.000***
lnP	-0.01161	-0.16	0.870
lnPS	0.46981	2.76	0.007***
dASEAN	3.58169	6.18	0.000*
dCOUNTRY	0.85634	1.60	0.113
Konstanta	-4.98751	-2.17	0.000***
F(5,100)	22.39		
Prob. F	0.0000***		
R^2	0.5282		
Adj. R^2	0.5046		

Note ***=significant 1%; **=significant 5%; *= significant 10%

Partial test results show that:

1. Income

   H_1 accepted → 0.0000 < 0.05

   Reject the null hypothesis and accept the alternative hypothesis. This means that the income variable has a significant effect on tourism demand with a significance level of 5%. Income variable also affects tourism demand with a significance level of 1% and 10%.

2. *Relative* Price

   H_0 accepted → 0.870 > 0.05

   Accept the ull hypothesis and reject the alternative hypothesis. This means that the relative price variable has no significant effect on tourism demand with a significance level of 5%. The relative price variable also has no effect on tourism demand with a significance level of 10% or 15%.

3. *Substitution Price*

   H_1 accepted → 0.007 < 0.05

   Reject the null hypothesis and accept the alternative hypothesis. This means that the substitution price variable has a significant effect on tourism demand with a significance level of 5%. The substitution price variable also affects tourism demand with a significance level of 1% and 10%.

4. *ASEAN Member Dummy*

   H_1 accepted → 0.000 < 0.05

   Reject the null hypothesis and accept the alternative hypothesis. This means that the ASEAN member dummy variable has a significant effect on tourism demand with a significance level of 5%. The ASEAN member dummy variable also has a significant effect on tourism demand with a significance level of 1% and 10%.

5. *Developed Country Dummy*

   H_0 accepted → 0.113 > 0.05

   Accept the null hypothesis and reject the alternative hypothesis. This means that the dummy variable in developed countries has no significant effect on tourism demand with a significance level of 5%. The dummy variable of developed countries will have a significant effect on tourism demand with a significance level of 15%.

The results of the classical assumption test show that:

1. *Normality Test*

   H_0 accepted → 0.0629 > 0.05

   Accept the null hypothesis and reject the alternative hypothesis. This means that the residuals in model 1 are normally distributed with a significance level of 5%. The residuals are also normally distributed when using a significance level of 1% and are not normally distributed when using a significance level of 10%.

2. *Multicollinearity Test*

   The results of the multicollinearity test showed that all independent variables showed a vif value of less than 10. The average VIF value of the independent variables was 1.51. This indicates that there is no multicollinearity problem in model 1.

3. *Heteroscedasticity Test*

   H_0 accepted → 0.4908 > 0.05

   Accept the null hypothesis and reject the alternative hypothesis. This means that there is no heteroscedasticity problem in model 1. Model 1 has a constant residual variance (distribution) or is homoscedasticity that meets the classical assumptions.

Residual variance is still homoscedasticity using either 1% or 10% significance level.

Based on the results of the regression, it is obtained:

$$lnTA_i = -4.98751 + 0.99613lnY_i - 0.01161lnP_i + 0.46981lnPS_i + 3.58169dASEAN_i + 0.85634dCOUNTRY_i$$

An increase in income of 1% will increase the demand for international tourism in Indonesia by 0.99% assuming other variables are held constant. There is a positive and significant relationship between income and demand for international tourism in Indonesia. The higher the income of foreign tourists, the more it will encourage someone to make a tourist visit to Indonesia. This result is supported by empirical research conducted by Crouch G. (1994); Crouch G. I. (1992); Syriopoulos (1995); Lim & McAleer (2002); Algieri (2006); Munoz, (2007); Ourfelli (2008); Hanafiah & Harun (2010); Leitao (2010); Eugenio-Martin & Campos-Sorla (2011).

Relative prices do not show significant results in this study, so the increase in relative prices has no effect on the decline in international tourism demand in Indonesia. However, relative prices still show the expected sign in this study. Several other empirical studies also show that relative prices have no significant effect on tourism demand. (Crouch G. I., 1992; Lyssiotou, 2000; Aguilo, Riera, & Rosello, 2005).

An increase in substitution prices by 1% will increase the demand for international tourism in Indonesia by 0.46% with the assumption that other variables are held constant. There is a positive and significant relationship between substitution prices and tourism demand. The higher the price in other alternative destinations, namely Malaysia, Singapore, and Thailand, the more foreign tourist visits to Indonesia will increase because of the cheaper price factor compared to alternative destinations. These results are supported by empirical research conducted by White (1985); Martin & Witt (1988); Lathiras & Siriopoulos (1998); Song, Romilly, & Liu (2000); Webber (2001); Patsauratis, Frangouli, & Anastasopoulos (2005); Salleh, Othman, & Ramachandran (2007).

The average international tourism demand in Indonesia for tourists from ASEAN member countries is 3.5% higher than tourists from non-ASEAN member countries assuming other variables are held constant. This variable produces the expected and significant sign. This indicates that the closer a country is, the more its international tourism demand will be. The results of this study are supported by empirical research conducted by Ghimre (2001); Chang & McAleer (2011); Martins, Gan, & Ferreira-Lopes (2017)

The average demand for international tourism in Indonesia for tourists from developed countries is 0.85% higher than those from developing and poor countries assuming other variables are held constant. This variable produces the expected sign with a significance level of 15%. This indicates that the more developed a country is, the more it will want to fulfill its tertiary needs for traveling abroad. The results of this study are supported by empirical research conducted by Crouch G. (1994); Eugenio-Martin, Morales, & Scarpa (2004); Naude & Saayaman (2005).

The regression results show that the R2 value is 0.5282, meaning that 52.82% of international tourism demand in Indonesia can be explained by income variables, relative prices, substitution prices, ASEAN member countries dummy, and developed country dummy, the remaining 47.17% is explained by other independent variables. outside the model. This result is still above 50% so that model 1 can be said to be quite good in estimating international tourism demand in Indonesia.

2. Exchange Rate as a Proxy of Tourism Prices in the Tourism Demand Model

Table 3. Model 2 Regression Results

Variable	Coefficient	t	p-value
lnY	0.98470	4.25	0.000****
lnP	0.00369	0.05	0.959
lnPS	0.47297	2.77	0.007****
dASEAN	3.58678	6.18	0.000****
dCOUNTRY	0.84886	1.59	0.115*
Konstanta	-4.95961	-2.16	0.033***
F(5,100)	22.38		
Prob. F	0.0000****		

R^2	0.5281
Adj. R^2	0.5045

Note ***=significant 1%; **=significant 5%; *= significant 10%

Simultaneous test results show that:

H_1 accepted → 0.0000 < 0.05

Reject the null hypothesis and accept the alternative hypothesis which means that there is at least one independent variable that affects the dependent variable. Simultaneously the independent variable affects the dependent variable with a significance level of 5%. The independent variable also has a simultaneous effect on the dependent variable with a significance level of 1% and 10%.

Partial test results show that:

1. Income

   H_1 accepted → 0.0000 < 0.05

   Reject the null hypothesis and accept the alternative hypothesis. This means that the income variable has a significant effect on tourism demand with a significance level of 1%. Income variable also affects tourism demand with a significance level of 1% and 10%.
2. Exchange Rate

   H_0 accepted → 0.959 < 0.05

   Accept the null hypothesis and reject the alternative hypothesis. This means that the exchange rate variable has no significant effect on tourism demand with a significance level of 5%, if tested using a significance level of 1% or 10%, the results are still not significant.
3. Substitution Price

   H_1 accepted → 0.007 < 0.05

   Reject the null hypothesis and accept the alternative hypothesis. This means that the substitution price variable has a significant effect on tourism demand with a significance level of 5%. The substitution price variable also affects tourism demand with a significance level of 1% and 10%.
4. ASEAN Member Dummy

   H_1 accepted → 0.000 < 0.05

   Reject the null hypothesis and accept the alternative hypothesis. This means that the ASEAN member dummy variable has a significant effect on tourism demand with a significance level of 1%. The dummy variable of ASEAN member countries also affects tourism demand with a significance level of 1% and 10%.
5. Developed Country Dummy

   H_0 accepted → 0.115 < 0.05

   Accept the null hypothesis and reject the alternative hypothesis. This means that the dummy variable in developed countries has no significant effect on tourism demand with a significance level of 5%. This variable is not significant at the significance level of 1% and 10%. This variable will only be significant at the 15% significance level.

The results of the classical assumption test show that:

1. Normality Test

   H_0 accepted → 0.06 < 0.05

   Accept the null hypothesis and reject the alternative hypothesis. This means that the residuals in model 2 are normally distributed with a significance level of 5%. The residuals are also normally distributed when using the 1% significance level and are not normally distributed when using the 10% significance level.
2. Multicollinearity Test

   The results of the multicollinearity test showed that all independent variables showed a vif value of less than 10. The average VIF value of the independent variables was 1.50. This indicates that there is no multicollinearity problem in model 2.
3. Heteroscedasticity Test

   H_0 accepted → 0.4966 < 0.01

   Accept the null hypothesis and reject the alternative hypothesis. This means that there is no heteroscedasticity problem in model 2. Model 2 has a constant residual variance (distribution) or is homoscedasticity that meets the classical assumptions. Residual variance is still homoscedasticity using a significance level of 5%, 10%, or 15%.

   Based on the results of the regression, it is obtained:

$$lnTA_i = -4.95961 + 0.98470lnY_i - 0.00369lnER_i + 0.47297lnPS_i + 3.58678dASEAN_i + 0.84886dCOUNTRY_i$$

An increase in income of 1% will increase the demand for international tourism in Indonesia by 0.98% with the assumption that other variables are held constant. There is a positive and significant relationship between income and demand for international tourism in Indonesia. The higher the income of foreign tourists, the more it will encourage someone to make a tourist visit to Indonesia. This result is supported by empirical research conducted by Crouch G. (1994); Crouch G. I. (1992); Syriopoulos (1995); Lim & McAleer (2002); Algieri (2006); Munoz, (2007); Ourfelli (2008); Hanafiah & Harun (2010); Leitao (2010); Eugenio-Martin & Campos-Sorla (2011).

The exchange rate did not show significant results in this study, so the increase in the exchange rate (depreciate) did not affect the increase in international tourism demand in Indonesia. However, the exchange rate still shows the expected sign in this study. Several other empirical studies have also shown that exchange rates do not significantly affect tourism demand (Chadeeand & Mieczkowski, 1987; Dritsakis & Athanasiadis, 2000; Payne & Mervar, 2002; Luzzi & Fluckiger, 2003; Toh, Khan, & Goh, 2006) .

An increase in substitution prices by 1% will increase the demand for international tourism in Indonesia by 0.47% with the assumption that other variables are held constant. There is a positive and significant relationship between substitution prices and tourism demand. The higher the prices in other alternative destinations, namely Malaysia, Singapore, and Thailand, the more foreign tourist visits to Indonesia will increase because of the cheaper price factor compared to alternative destinations. These results are supported by empirical research conducted by White (1985); Martin & Witt (1988); Lathiras & Siriopoulos (1998); Song, Romilly, & Liu (2000); Webber (2001); Patsauratis, Frangouli, & Anastasopoulos (2005); Salleh, Othman, & Ramachandran (2007).

The average demand for international tourism in Indonesia for tourists from ASEAN member countries is 3.5% higher than tourists from non-ASEAN member countries assuming other variables are held constant. This variable produces the expected and significant sign. This indicates that the closer a country is, the more its international tourism demand will be. The results of this study are supported by empirical research conducted by Ghimre (2001); Chang & McAleer (2011); Martins, Gan, & Ferreira-Lopes (2017)

The average demand for international tourism in Indonesia for tourists from developed countries is 0.84% higher compared to tourists from developing and poor countries assuming other variables are held constant. This variable produces the expected sign with a significance level of 15%. This indicates that the more developed a country is, the more it will want to fulfill its tertiary needs for traveling abroad. The results of this study are supported by empirical research conducted by Crouch G. (1994); Eugenio-Martin, Morales, & Scarpa (2004); Naude & Saayaman (2005).

The regression results show that the R2 value is 0.5281, meaning that 52.81% of international tourism demand in Indonesia can be explained by income variables, exchange rates, substitution prices, ASEAN member countries dummy, and developed country dummy, the remaining 47.19% is explained by other independent variables. outside the model. This result is still above 50% so that model 2 can be said to be quite good in estimating international tourism demand in Indonesia.

CONCLUSION

This study analyzes the demand for international tourism in Indonesia with 106 countries visiting Indonesia the most. The data used in this study is cross section data in 2018. The analytical technique used in this study is OLS (Ordinary Least Square). This study uses two models, namely model 1 using relative prices as a proxy for tourism prices and model 2 using exchange rates with cross exchange rate calculations as proxies for calculating tourism prices. The results of the regression model 1 show

the expected sign agreement for all independent variables. The relative price variable is not significant in influencing the demand for international tourism in Indonesia. Model 1 meets the classical assumptions of normality, multicollinearity, and heteroscedasticity tests. The R2 value of model 1 is 0.5282. The results of the regression model 2 show the expected sign agreement for all independent variables. The exchange rate variable as a proxy for tourism prices does not significantly affect the demand for international tourism in Indonesia. Model 2 fulfills the classical assumptions of normality, multicollinearity, and heteroscedasticity tests. The R2 value of model 2 is 0.5281. Relative price is considered a suitable variable to be used as a proxy for calculating tourism prices because it takes into account the CPI for each country. The model that includes the relative price variable also has a higher goodness of fit, so the relative price can be used as a proxy for tourism prices.

This study has limitations in the form of a model that is still not perfect. Further research can add longer data or variables to improve the model, such as transportation costs, government spending on branding and promotion to various countries, concessions on visa policies, or ticket prices. Another limitation is the limited data on tourist arrivals, especially in the Southeast Asia region, so it is not possible to use a more complex substitute price proxy.

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