

## DOES TEMPERATURE MATTER? CASE STUDY OF INTERNATIONAL TOURIST ARRIVALS IN INDONESIA

Supiandi<sup>1</sup>; Muhamad Zaryl Gapari<sup>2</sup>; Muhammad Azizurrohman<sup>3</sup>;  
Riduan Mas'ud<sup>4</sup>; Putrawan Habibi<sup>5</sup>

<sup>1</sup>Universitas Nahdlatul Ulama Nusa Tenggara Barat; <sup>2</sup>STIT Palapa Nusantara;  
<sup>3,5</sup>Sekolah Tinggi Pariwisata Mataram; <sup>4</sup>Universitas Islam Negeri Mataram  
supiandi156@gmail.com ; zagap205@yahoo.co.id

### Abstract

*Climate is one of several elements that can impact tourist decisions when deciding where to go on vacation. The climate of a country can influence the desirability of a trip in either a favorable or bad way. However, few studies look at the impact of temperature on tourist decisions, particularly in Indonesia. The purpose of this research is to demonstrate the impact of temperature on the arrival of foreign tourists in Indonesia. In the period 2017-2019, the authors used panel data from 168 countries of origin of tourists. To ensure that the research findings were consistent, all models were used, including the Ordinary Least Square, Fixed Effect Model, and Random Effect Model. The findings reveal that the temperature of a tourist's home country has a detrimental impact on their arrival in Indonesia. GDP per capita and the population of the nation of origin have a beneficial effect on foreign tourist arrivals as control factors. Distance, on the other hand, has a detrimental impact.*

**Keywords:** *Climate, Temperature, Tourist Arrivals, Panel Data, Indonesia*

### INTRODUCTION

An Individual will employ tourism services to obtain pleasure and happiness. However, several elements influence contentment, one of which is the temperature. Physical, physiological, and psychological effects of temperature on tourism are all possible. Increased rain or high winds, for example, may force people to postpone their plans to see particular places or participate in certain exciting activities. Ice, snow, severe weather, and air pollution are examples of other things that fall within this group. High air temperatures

and blue skies can influence environmental stress, hyperthermia, and general enjoyment or attractiveness of a site in terms of physiological and psychological aspects of tourist satisfaction.

While a destination's temperature can influence visitor satisfaction, there is no strong evidence that travelers consider this issue while planning their trip. As a result, (Moore, 2010) examines data on future Caribbean climates to determine their impact on tourist arrivals. The findings reveal that, in the worst-case scenario, climate change-related impacts on the Caribbean might reduce arrivals by roughly 1% each year, costing the region an estimated US\$118 million–US\$146 million in lost revenue per year.

Furthermore, (Hamilton & Lau, 2004) explored this issue using a self-administered questionnaire that was provided at German airports, international bus stations, and train stations. According to the survey's findings, the majority of travelers (73 percent) research a destination's climate before booking a trip, with 42 percent doing so before making travel plans. Uyarra et al., (2005) did a similar study for visitors visiting the Caribbean islands of Bonaire and Barbados. The study indicated that mild temperatures, clear water, and low health risks are essential environmental qualities for tourists to these islands, based on a survey of 338 people.

For more than 30 years, scientists have examined the relationship between major climate characteristics and tourism (Scott et al., 2004). Temperature is the most important climate variable for tourism, according to numerous research (eg Bigano et al., 2006; Lise & Tol, 2002; Maddison, 2001). Several studies have attempted to determine the optimum or ideal temperature for tourism. 'Globally, tourists prefer an average daily temperature of 21°C, while the ideal temperature for urban touring in Europe is found to be 20-26°C,' Lise and Tol (2002) conclude (Rutty & Scott, 2010; Wilson et al., 2008). For beach recreation, a daily maximum temperature of roughly 30°C is desirable (Maddison, 2001).

Even though a lot of studies have been published on climate change, there is no research discussing the impact of temperature changes on tourist arrivals, especially in Indonesia. The impact of temperature disparities in tourists' home countries on their decision to vacation in a destination is the topic of this study. The authors also include control factors such as the Gross Domestic Product (GDP) of origin countries, the total population of origin countries, and the distance between origin and destination countries.

## LITERATURE REVIEW

Koenig & Abegg (1997), is one of the early studies in the field, assessed the influence of expected changes in meteorological conditions on the Swiss winter tourism industry. According to Koenig & Abegg (1997), 85 percent of all Swiss ski areas are snow-reliable under current climatic circumstances. However, if the temperature rises by 28 degrees Celsius, this number drops to 63%, which has ramifications for regionally balanced economic growth. There have been several studies that have used a similar approach since this initial study. Using temperature as their major indicator of climate change effects, Lise and Tol (2002) discovered that for tourists from the Organization for Economic Cooperation and Development group of countries, the optimal or desired temperature is around 21C.

The influence of climate change on tourism in the United Kingdom is examined qualitatively by UKCCIRG (1991, 1996). The influence of climate change on outdoor recreation in the United States has been studied by Mendelsohn and Markowski (1999) and Loomis and Crespi (1999). The quantitative influence of weather unpredictability on tourism in the United Kingdom was studied by Agnew (1997). The impact of climate change on skiing in Canada was studied by Wall (1998). Climate change and sea-level rise have had an impact on tourism supply in the Caribbean, according to Gable (1997). Similarly, Bigano et al. (2012) say that tourists from temperate countries, which now dominate international travel, tend to spend more time in their own country or adjacent areas. Meanwhile, international travel to subtropical and tropical countries is expected to fall in relative demand due to rising temperatures in those countries.

## RESEARCH METHOD

The authors utilize quantitative analysis with secondary data to evaluate the effect of the temperature of the country of origin on the arrival of foreign visitors in Indonesia. For three years (2017-2019), we used panel data from 168 countries of origin of tourists. We use the temperature of each tourist's home country as the primary variable. Meanwhile, control factors include GDP per capita and the population of the tourist-originating country, as well as the distance between Indonesia and the tourist-originating country. Based on the description, here is the research equation:

$$\text{LnArrival}_j = f(\text{LnGDPC}_j, \text{LnPopulation}_j, \text{LnDistance}_{ij}, \text{LnTemporigin}_{it}, \varepsilon_{it})$$

Note:

$\text{LnArrival}_j$  : Annual International tourist arrivals in Indonesia

$\text{LnGDPC}_j$  : Annual Gross Domestic Product of origin countries

$\text{LnPopulation}_j$  : Annual Population of origin countries

$\text{LnDistance}_{ij}$  : Distance between the capital city of Indonesia and origin countries

$\text{LnTemporigin}_{it}$  : Annual Average Temperature in the origin countries

$\varepsilon_{it}$  : Standard Error

Because this is a quantitative study using a variety of secondary data, the following are the web sources used by the authors:

**Table 1** Data Sources

<b>Variables</b>	<b>Sources</b>
<b>Tourist arrivals</b>	Indonesian Statistics ( <a href="http://www.bps.go.id">www.bps.go.id</a> )
<b>GDP Capita of Origin</b>	World Bank Data ( <a href="http://www.data.worldbank.org">www.data.worldbank.org</a> )
<b>Population of Origin</b>	World Bank Data ( <a href="http://www.data.worldbank.org">www.data.worldbank.org</a> )
<b>Average Temperature of Origin</b>	Statpedia ( <a href="http://www.statpedia.com">www.statpedia.com</a> )

The authors utilized three models to examine the consistency of the research findings: the Ordinary Least Square (OLS), Fixed Effect Model (FEM), and Random Effect Model (REM). This eliminates the need for additional tests such as the Chow, Hausman, and Lagrange multiplier tests.

## RESULT AND DISCUSSION

The importance and magnitude of the influence that occurs on each model must be evaluated when looking at the consistency of the results. As a result, any model utilized will have no difference in the outcome.

**Table 2** Estimation Results of Panel Data Analysis

Variables	Ordinary Least Square	Fixed Effect	Random Effect
Log Temperature of Origin Countries	-0.424*** (0.099)	Omitted (Omitted)	-0.454*** (0.173)
Log GDP Capita of Origin Countries	1.037*** (0.043)	-1.392** (0.611)	0.996*** (0.074)
Log Population of Origin Countries	0.804*** (0.027)	2.110* (1.086)	0.798*** (0.048)
Log Distance	-1.895*** (0.103)	Omitted (Omitted)	-1.892*** (0.180)
Cons	4.683*** (0.099)	-12.989 (16.443)	5.193** (2.206)
R-Squared	0.801	0.091	0.800
Observation	499	499	499

(\*) Significance at 10% level of testing

(\*\*) Significance at 5% level of testing

(\*\*\*) Significance at 1% level of testing

First, in both the OLS model and the Random Effects Model, the temperature of the home country is negative. In other words, a 1% increase in the temperature of the country of origin will drastically reduce tourist visits to Indonesia by 0.4%. These findings are consistent with the reality on the ground. Based on data on tourist arrivals in Indonesia, it is clear that surrounding nations such as Singapore, Malaysia, and East Timor dominate

visits. As a result, if the temperature in that country rises, their travel patterns will change. Tourists prefer comfortable temperatures, according to Tol and Walsh (2012). Since the temperatures in Indonesia and surrounding countries are nearly identical (27°C-30°C), it can be assumed that an increase in temperature in nearby countries will encourage tourists to flock to areas with more moderate temperatures.

(Moore (2010) adds to this by stating that very high temperatures are extremely risky for tourists. Furthermore, heated temperatures can indicate UV exposure, according to his report. As a result, it will have an impact on a variety of factors, including health, tanned skin, and sunburn (Moore, 2010). On the other hand, pale complexion was once thought to be a social indication of aristocratic lineage and class loyalty in Asia (Shankar & Palaian, 2007). Shankar and Palaian (2007) moreover mentioned that labor and outdoor work in the sun is linked to dark skin. Whites possessed colonial conceptions of supremacy and power. The predilection for 'white' is evident in the South Asian film industry, according to numerous writers. In most movies, the main protagonists are fair and lovely, the heroes are fair and gorgeous, and the villains are dark and sinister. Of course, there are exceptions to this rule. When a result, it is possible to deduce that as the temperature rises, fewer international visitors, particularly from Asian countries, will visit Indonesia.

Second, the three models reveal that GDP per capita has a significant and positive impact on international tourist arrivals in Indonesia (at the 1% level), except fixed effect model. If the GDP per capita of the nation of origin rises by 1%, the number of foreign tourists arriving in Indonesia will rise by roughly 0.9 percent -1 percent. According to Diacon and Maha (2015), individual income (GDP per capita) and spending patterns, are positively correlated. This means that as the GDP per capita in the tourists' home nation rises, so will their purchasing power. As a result, the number of outbound tourists will rise indirectly.

Third, in all models, the population of origin countries delivers a favorable result. An increase of 1% in the population of the nation of origin will result in a 0.7 percent -2 percent rise in tourist visits to Indonesia. Tourist visits to Indonesia are strongly linked to the population of the nation of origin. The bigger the influx of tourists, the larger the country is in terms of population. These findings are consistent with Malykhin's (2017) findings, which show that a rise in the population of the nation of origin stimulates people to travel both within and outside the country.

Lastly, distance has a negative effect on tourist arrivals, implying that 1% longer distance is associated with 1.8% smaller number of tourist arrivals in Indonesia. This has something to do with the expense of transporting products or persons between countries (Muhammad & Andrews, 2008). The culture of a country is also influenced by its distance. The cultures, practices, and values of neighboring countries are often similar. Most tourists want to visit places where the culture is similar to that of their home country. This is in line with Tadesse and White (2010), who found that the further a country is from another, the more diverse its culture is, and that this has an impact on visitor decisions when choosing tourism locations.

## CONCLUSION

The impact of climate change on the tourism industry has piqued the interest of researchers in several countries. Many researchers in many European countries began to discuss the subject. Meanwhile, in Southeast Asia, particularly Indonesia, this case is rarely discussed. The impact of fluctuations in the temperature of travelers' home countries on tourism demand in Indonesia is examined in this study. The temperature condition of the tourists' home country is the major variable in this study, which uses panel data from 168 nations over three years (2017-2019). Several control variables are also used by the authors, such as GDP per capita, total population of the nation of origin, and distance between countries.

One of the paper's flaws is that it covers such a small period. Because variations in temperature in a region can be noticed over time, the results may be more accurate if a longer period is employed.

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