

Exploring the Relationship of the Aggregate Impact of the Factors Affecting Tourist Arrivals through Panel Data Analysis

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Abstract: This study employs a two-way random effects panel data analysis to explore the relationship between the factors affecting tourist arrivals across 22 Asian countries from 2017 to 2022. The investigation focuses on three key independent variables: Consumer Price of Tourism (CPT), which is proxied by consumer price index, Political Stability and Absence of Violence/Terrorism (PS), and Air Pollution (AP), with tourist arrivals as the dependent variable. The research assesses the hypotheses that consumer price of tourism is inversely related to tourist arrivals, political stability and absence of violence/terrorism has a positive relationship with tourist arrivals, and air pollution has a negative relationship with tourist arrivals. The results reveal a statistically significant model fit ($P\text{-value}(F) = 7.97e-41$), with an overall decrease in tourist arrivals when holding CPT, PS, and AP constant. Specifically, an increase in CPT, PS, AP positively influences tourist arrivals. Notably, certain countries exhibit no significant impact from changes in these variables. Policy recommendations are tailored to address the unique relationship uncovered by the study, offering insights for governments and stakeholders to optimize the tourism sector in the selected Asian countries.

Keywords: panel data, two-way random effects model, tourist arrivals, tourism, consumer price index, political stability, absence of violence/terrorism, air pollution.

1. Introduction

According to Mordor Intelligence (2028), Modern global tourism industry is one of the most versatile and significant drivers of economic growth, societal development and culture exchange. Tourism is one of the main pillars of modern world's communication processes since it provides an opportunity for economic growth, fosters cultural exchanges, and facilitates job creation. The industry is a comprehensive one that involves hospitality, transport, cultural heritage conservation, and environment protection. Currently, as a result of the growth in globalization and increasing connectivity, the world of tourism has experienced major changes leading to a number of opportunities yet also numerous constraints.

In this research, a panel data analysis method was used to comprehensively explore the complex relations of the factors affecting tourist arrivals. This research will employ panel data that spans between 2017 to 2022 and 22 Asian countries in

order to grasp the temporal and cross-country fluctuations in tourism inflows of Asia. Using panel data analysis, improves our findings in terms of accuracy as we seek to delve deeper into the intricate linkages in tourism.

In order to identify the factors behind the arrivals of tourists and their subsequent implications for economic progress in that country, this study employed a two-way random effects model. The main intent is to examine how consumer prices of tourism, politically stable atmosphere and lack of tourism along with air pollution influence tourists' arrivals.

2. Review of Related Literature

A. Factors Affecting Tourist Arrivals

1) Consumer Prices of Tourism

The concept of consumer prices of tourism plays a crucial role in understanding the dynamics of the tourism industry, influencing economic performance and shaping the patterns of tourist arrivals (Centeno, Marquez, 2020).

At its core, consumer prices of tourism refer to the affordability and competitiveness of a destination in comparison to alternative choices available to tourists (Peralta, 2019). It includes the prices of accommodation, transportation, attractions, and other related expenses that visitors might incur during their stay.

The relationship between consumer prices and tourist arrivals is negatively associated (Mayo, Maglasang, Moridpour, Taboada, 2021). On one hand, lower relative prices make a destination more attractive and affordable to tourists, potentially leading to an influx of visitors. Another study from Deluna and Jeon (2014), added that demand theory suggests that the demand for tourism exhibits an inverse relationship with prices. In simpler terms, when the cost of living in the destination is lower compared to the origin country, there is a higher demand for tourism, and conversely, if the cost of living is higher, the tourism demand tends to decrease. This phenomenon is particularly evident in countries where the cost of living and travel expenses is relatively lower compared to other destinations (Ballester, 2020). In the case of the world, offering competitive prices for accommodation, food, and

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activities could position the country as an appealing and cost-effective choice for international travelers (Cordero, 2021).

Conversely, higher relative prices might deter potential tourists, especially those seeking budget-friendly options. If the cost of tourism-related services is perceived as high compared to alternative destinations, it may lead to a decline in tourist arrivals. Affordability is a key consideration for many travelers, and an unfavorable price structure can hinder the growth of the tourism industry (Torii, Masaaki, Mizuho, Lizada, 2011).

The impact of consumer prices on the economy of the tourism industry is substantial (Alejandria-Gonzalez, 2016). A well-managed pricing strategy can contribute to the industry's growth by attracting a diverse range of tourists, from budget-conscious travelers to those seeking luxury experiences. Each country, with its varied offerings, has the opportunity to cater to different market segments by strategically adjusting relative prices (Reyes, Albert, Quimba, Ortiz, Asis, 2018).

Competitive pricing not only influences the decision-making process of individual tourists but also contributes to the overall competitiveness of the tourism sector on a global scale (Llanes, 2021). A destination that offers a favorable balance between quality and cost is likely to establish itself as a preferred choice, enhancing its global market position. For each country this means striking the right balance to ensure that the tourism industry remains competitive while providing value for money.

The relationship between relative prices and tourist arrivals is not strictly linear, and it is influenced by various factors, including destination image, marketing strategies, and the perceived value of the travel experience (Andaluna, Calijan, Albina, 2021). A destination's ability to align its pricing with the expectations and preferences of its target audience is critical for sustained success.

In the context of each country, the prevailing economic conditions, government policies, and global economic trends contribute to the determination of relative prices (Cruz, 2014). Economic stability and favorable exchange rates can positively influence the affordability of the destination, attracting a diverse range of international visitors.

Consumer prices of tourism are often studied using various types of data, with researchers employing both primary and secondary sources to gather relevant information. One common type of data used in studying consumer prices is price indices, such as the Consumer Price Index (CPI) like the studies done by Deluna and Jeon (2014), Cordero (2021) and Ballester (2020), which measures the average change over time in the prices paid by consumers for a market basket of consumer goods and services. Researchers may also utilize surveys to collect data on specific tourism-related expenditures and pricing structures (Libre, Manalo, Laksito (2022).

In some cases, due to the complex nature of tourism expenditures and the lack of direct data on consumer prices, researchers may resort to proxies or substitute variables to study the impact of pricing on tourism. For instance, they might use exchange rates (Llanes, 2021), inflation rates (Mayo, Maglasang, Moridpour, Taboada, 2021), or cost-of-living indices (Peralta, 2019) as substitutes for consumer prices, assuming that these factors influence the overall cost of tourism

and, consequently, tourist behavior.

Research methods employed in studying consumer prices of tourism vary, with some studies adopting econometric models and statistical analyses to identify patterns and relationships (Dupeyras, 2020). Panel data analysis, time-series analysis, and cross-sectional studies are commonly used to explore the dynamics between consumer prices and tourism demand. Comparative studies, on the other hand, involve analyzing differences and similarities across different regions, countries, or time periods.

While findings may converge on the general idea that consumer prices influence tourism demand, differences in methodologies, data sources, and specific variables considered can lead to varied results (Aburumman, 2020). Some studies may emphasize the role of exchange rates, while others focus on inflation or cost-of-living adjustments (Zafra, 2021). The choice of proxies and the specific tourism sectors under examination also contribute to divergent findings.

Recommendations stemming from these studies similarly differ based on the nuanced understanding of the factors affecting consumer prices and their impact on tourism. For instance, a study from Llanes (2021) focusing on exchange rates suggests that governments should manage currency stability to support tourism, while a study by Peralta (2019) emphasizing on cost-of-living recommends policies to control inflation. In essence, the recommendations are context-dependent, aligning with the specific factors considered in each study.

In conclusion, the consumer prices of tourism serve as a negatively associated pivotal factor influencing the performance of the tourism industry. Striking the right balance in pricing strategies is essential to attract a diverse range of tourists, contribute to economic growth, and position the country competitively on the global tourism stage (Mustafa, Omar, Mukhiar, 2019). The interplay between relative prices and tourist arrivals is nuanced, and a comprehensive understanding of this relationship is imperative for crafting effective policies and strategies that drive the sustainable development and economic growth of the tourism sector (Fercol, 2019).

H1: Consumer prices of tourism is inversely related to tourist arrivals

2) Political Stability and Absence of Violence/Terrorism

Political stability and the absence of violence/terrorism are pivotal factors influencing a country's tourism industry. As defined by the World Bank, "this measure assesses perceptions of the likelihood of political instability and/or politically-motivated violence, including terrorism. The estimate provides a standardized score, ranging from approximately -2.5 to 2.5, reflecting a country's standing in terms of political stability and safety."

Understanding the components of this measure is crucial. Political stability pertains to the sustainability and continuity of a country's political system, while the absence of violence/terrorism evaluates the level of safety from violent incidents and terrorist activities. The World Bank's indicator captures the subjective views of individuals, offering a

comparative analysis of these critical aspects across countries.

According to Gossling, Hall and Scott (2020), the impact of political stability and the absence of violence/terrorism on the tourism industry is substantial. Countries perceived as politically stable and secure tend to attract more tourists due to enhanced safety perceptions. A positive destination image, improved infrastructure, and effective tourism policies are byproducts of political stability, contributing to a favorable environment for tourism growth.

Conversely, the presence of violence or terrorism has a detrimental effect on the tourism industry. Instances of unrest erode tourist confidence, resulting in canceled trips and travel advisories. Economic losses, damage to tourism infrastructure, and a decline in arrivals are common consequences, requiring lengthy recovery processes (Nicola, 2020).

Research on political stability and the absence of violence/terrorism relies on various types of data to assess the impact on tourism and economic growth (Benaraba, Bulaon, Escosio, Narvaez, Suinan, Roma, 2021). Scholars often use perception-based indices, like the World Bank's measure, which gauges the subjective views of individuals regarding the likelihood of political instability and violence. These indices provide a comparative analysis of countries' standing in terms of political stability. Researchers may also utilize quantitative data on incidents of violence or terrorism, such as the Global Terrorism Database, to quantify the level of security in a given destination (Gantalao, Ocampo and Yamagishi, 2021).

However, due to the subjective nature of perception-based indices and potential challenges in obtaining reliable data on incidents, researchers sometimes substitute qualitative analyses for quantitative rigor. Qualitative methods may include case studies, interviews, and content analysis of media reports to understand the nuances of political stability and violence in a specific context (Yu, Aviso, Santos, Tan, 2020). This qualitative approach allows researchers to capture the depth of the impact beyond numerical metrics.

The similarities in research methods often revolve around assessing the impact on tourism and economic growth. Researchers commonly explore the relationship between political stability, safety, and tourist arrivals, employing econometric models like regression analyses. These models aim to quantify the causal relationship and identify key factors influencing the tourism sector.

In terms of findings, studies generally align on the positive correlation between political stability, absence of violence/terrorism, and increased tourist arrivals. Destinations perceived as safe and politically stable tend to attract more visitors, leading to economic benefits (Khazai, Mahdavian, Platt, 2018). Conversely, findings also highlight the negative impact of violence or political instability on tourism, resulting in reduced arrivals and economic setbacks.

While the studies share commonalities in methodology and findings, differences may arise based on the specific contexts and timeframes considered. The impact of political instability can vary across regions and is influenced by geopolitical factors, making it essential to account for these nuances in the analyses (Abocejo, 2015).

Recommendations from studies emphasize the importance of political stability and safety in destination management. Governments and policymakers are often advised to prioritize measures that enhance security, build trust, and promote a positive image to boost tourist confidence. Additionally, fostering international cooperation to address global security challenges is a recurring theme in the recommendations (Andaluna, Calijan, Albina, 2021).

It's crucial to note that there is limited research on this variable in the context of econometric models. The subjective nature of perception-based indices and challenges in obtaining consistent incident data contribute to the scarcity of studies incorporating this variable into quantitative analyses. As a result, there is a need for more research to deepen our understanding of how political stability and the absence of violence/terrorism contribute to the dynamics of tourism and economic growth.

In terms of economic growth, political stability and safety contribute significantly to revenue generation. Increased tourist spending on accommodation, transportation, and local services bolsters the national economy (Fercol, 2019). Moreover, a thriving tourism industry creates job opportunities, fosters investment, and promotes infrastructure development.

The absence of political instability and violence supports economic diversification, reducing reliance on traditional sectors and enhancing a country's resilience to economic shocks (Llanes, 2021). Governments and stakeholders in the tourism industry must prioritize measures to maintain political stability, ensure safety, and foster sustained growth.

In conclusion, political stability and the absence of violence/terrorism are integral to a flourishing tourism industry. They create an environment conducive to tourism growth, economic development, and job creation. Conversely, instability poses significant challenges, underscoring the importance of proactive measures to safeguard the tourism sector's resilience and long-term success.

H2: Political Stability and Absence of Violence/Terrorism has a positive relationship with tourist arrivals

3) Air Pollution

Air pollution, characterized by the presence of harmful substances in the Earth's atmosphere, poses multifaceted challenges to the tourism industry, impacting both the environment and the economic aspects of tourist destinations. Defined by the World Health Organization (WHO) as "the introduction of contaminants into the air that cause adverse effects, air pollution results from various sources, including industrial activities, vehicular emissions, and natural phenomena". This complex issue is intricately linked to tourism, influencing visitor experiences, destination attractiveness, and the overall economic health of tourism-dependent regions (Osewe, 2020).

According to Dupeyras (2020), the consequences of air pollution on the tourism industry are predominantly negative, affecting both natural and built environments. Tourists, seeking destinations with pristine air quality and scenic landscapes, are deterred by areas marked by pollution, resulting in decreased tourist arrivals. The negative impact is particularly pronounced

in regions where air pollution is visibly noticeable, leading to compromised aesthetics and diminished appeal. Additionally, air pollution can harm ecosystems, cultural heritage sites, and public health, further diminishing a destination's attractiveness (Ong, Storey, Minnery, 2020).

The economic implications of reduced tourist arrivals due to air pollution are significant. Tourism is a vital sector for many economies, contributing to employment, revenue generation, and local development. Diminished tourist arrivals lead to a decline in revenue for businesses involved in accommodation, dining, transportation, and recreational activities, thereby affecting the livelihoods of those dependent on the tourism industry (Parks, 2020). The economic repercussions extend beyond the immediate tourism sector, influencing related industries and the overall economic stability of the destination.

The relationship between air pollution and tourist arrivals is inherently negative, as potential visitors are inclined to choose destinations with cleaner air and healthier environments. (Aburumman, 2020). High levels of air pollution are associated with adverse health effects, creating concerns among tourists about their well-being during a visit (Zafra, 2021). Perception plays a crucial role, with destinations perceived as having poor air quality facing challenges in attracting and retaining visitors (Tamayo, Anticamara, Acosta-Michlik, 2017). Studies consistently show a strong negative correlation between air pollution levels and tourism demand, reinforcing the notion that cleaner, healthier environments are more appealing to tourists.

Research studies on the impact of air pollution on the tourism industry employ various types of data to comprehensively assess the complex relationship between environmental quality, tourist behavior, and economic outcomes (Lim, 2020). These studies typically utilize quantitative data, including air quality indices, pollution concentration levels, and tourist arrival statistics (Moreno, Lara, Torres, 2019). Air quality indices, such as the Air Quality Index (AQI), provide a numerical representation of pollution levels, incorporating data on various pollutants like particulate matter (PM), nitrogen dioxide (NO₂), sulfur dioxide (SO₂), and ozone (O₃). These indices serve as key indicators to gauge the severity of air pollution in a given location.

Tourist arrival data, sourced from tourism boards, government agencies, and relevant institutions, form an integral part of these studies (Moreno, Lara, Torres, 2019). Researchers analyze the correlation between air quality metrics and fluctuations in tourist arrivals, seeking to identify patterns and trends (Rodríguez-Antón, Alonso-Almeida, 2020). This quantitative approach allows for the establishment of empirical relationships between air pollution levels and tourism demand, offering insights into the economic consequences of environmental degradation.

To substitute for potential data limitations or gaps, researchers may employ advanced statistical methods and modeling techniques. Geographic Information System (GIS) technology is frequently used to spatially analyze pollution data and tourist arrivals, allowing researchers to visualize patterns and hotspots (Brauer, Harvey, McIlwain, Hobbs, Jompa, Burton, 2017). Additionally, econometric models, such as

regression analyses, are applied to estimate the quantitative impact of air pollution on tourist behavior and economic variables. These models often control for other factors influencing tourism demand, such as income levels, travel costs, and destination-specific attributes.

The similarities among research methods lie in the shared focus on quantitative analyses, leveraging statistical tools to uncover relationships and draw conclusions about the impact of air pollution on tourism and the economy. However, differences may arise in the specific variables considered, the geographical scope of the studies, and the methodologies employed to measure air pollution and tourist behavior. Studies conducted in various regions may encounter variations in pollution sources, contributing to divergent findings and recommendations (Roxas, Rivera, Gutierrez, 2021).

In terms of findings, research consistently demonstrates a negative correlation between air pollution and tourist arrivals, emphasizing the adverse effects of environmental degradation on destination attractiveness. High levels of air pollution are associated with reduced tourism demand, leading to economic losses for affected regions (Roxas, Rivera, Gutierrez, 2021). Studies also highlight the importance of proactive environmental management and sustainable tourism practices in mitigating these negative impacts (George Assaf, Tsionas, 2017).

Recommendations across studies converge on the need for stringent environmental policies, sustainable tourism development, and public-private collaborations. Efforts to reduce air pollution through regulatory measures, investment in green technologies, and community engagement are widely endorsed (Sokhanvar, Çiftçioğlu, Javid, 2018). Sustainable tourism practices, including eco-friendly transportation, waste management, and energy conservation, are recommended to minimize the industry's ecological footprint. Additionally, public awareness campaigns and education initiatives aim to foster responsible tourism behavior and encourage environmentally conscious travel choices.

Despite the variations in methodologies and regional contexts, the consensus among studies underscores the urgency of addressing air pollution to safeguard the tourism industry and promote sustainable economic growth (Libre, Manalo, Laksito (2022)). The multidisciplinary nature of these studies reflects a holistic approach to understanding and mitigating the complex interplay between environmental quality, tourism, and economic outcomes.

Moreover, the contribution of air pollution to economic growth is paradoxical, as pollution-related damages offset potential gains from tourism. While tourism is a driver of economic growth, contributing to GDP and employment, the negative impacts of air pollution can erode these benefits. Healthcare costs rise due to pollution-related illnesses, and environmental degradation may necessitate costly restoration efforts. Consequently, any short-term economic gains from tourism are outweighed by long-term costs associated with mitigating the effects of air pollution (Cordero, 2021).

Addressing air pollution in the context of tourism involves adopting sustainable practices, promoting eco-friendly

transportation, and implementing stringent environmental regulations. Sustainable tourism initiatives that prioritize environmental conservation and reduced carbon footprints contribute to cleaner air and enhanced destination appeal (Centeno, Marquez, 2020). Collaboration between the public and private sectors is crucial to implementing effective policies, fostering a balance between economic interests and environmental sustainability.

In conclusion, air pollution significantly impacts the tourism industry by influencing visitor perceptions, reducing arrivals, and compromising destination attractiveness. The negative relationship between air pollution and tourist demand underscores the importance of sustainable practices and environmental stewardship in preserving the economic benefits of tourism. As a critical sector for many economies, tourism's growth should be pursued in harmony with efforts to mitigate air pollution, ensuring a balance between economic prosperity and environmental sustainability.

H3: Air Pollution has a negative relationship with tourist arrivals

B. Synthesis

This relationship between consumer price of tourism, political stability as well as absence of violence/terrorism and air pollution all go to make up a complex picture. This research overview concisely outlines the relationships and implications of these variables.

One of the important factor affecting tourist arrivals is consumer prices, which represent the living expenses at a destination. Under demand theory, consumer price and tourist demand have an inverse relationship. This transformation changes what determines travel, from price of destination to cost restraint. As prices in a given country's consumer market fall below the level in its origin nation, people will often head toward that location as tourists. But high consumer prices may put off potential tourists due to economic constraints.

Tourist arrivals greatly stimulate the local economy of a destination. More visitors bring stimulus to a number of sectors, from accommodation and food through transportation and entertainment. They help build visitor arrivals. Thus, the pillar that destination prices can bring more tourists and attract greater economic gains shows its necessity.

In summary, the complex trade-off between consumer prices and political stability and absence of violence/terrorism, as well as air pollution all influences tourist arrivals for destination countries. The understanding the nature of these relationships is key to policymakers, destination managers and industry stakeholders who want maximum economic benefit from their tourism strategies. Correct policy interventions, skillful marketing and acceptable infrastructure development integrate to build a sustainable tourism- based economic change.

C. Research Simulacrum

H1: Consumer Prices of Tourism is inversely related to tourist arrivals

H2: Political Stability and Absence of Violence/Terrorism has a positive relationship with tourist arrivals

H3: Air Pollution has a negative relationship with tourist arrivals

To study the relationships of the factors affecting tourist arrivals, the framework was developed based on Gil S. Epstein's (1998) study. A two-way random effects model shows that on the right side, tourist arrivals represents the number of tourists visiting the selected countries, representing the dependent variable. On the left side, consumer prices of tourism, which is proxied with consumer prices indeces, tells us the cost of tourism-related goods and services in the selected countries relative to other countries. Political stability and absence of violence/terrorism represents the soundness of the political and safety of the country. And lastly, air pollution represent the amount of air pollution that a country is exposed to. Figure 1 summarizes the behavioral relationship.

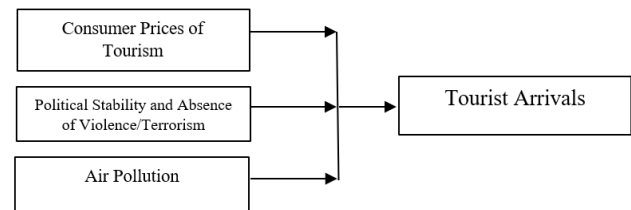


Fig. 1. Proposed model and hypothesis

3. Research Method

A. Data and Sources

This research primarily utilizes secondary data to examine key indicators related to the tourism industry and economic indicators for the selected countries. The selected variables for analysis include the consumer price of tourism, which will be proxied by consumer price indeces, political stability and absence of violence/terrorism, air pollution, and tourist arrivals of the selected countries. Secondary data, obtained from authoritative sources, offers valuable insights into the dynamics of the tourism sector. The research relies on data collected by reputable and official institutions in the World Bank. The main sources include:

1) World Bank (WB):

The World Bank serves as a primary data source for comprehensive and reliable information on consumer price index, political stability and absence of violence/terrorism, providing a robust foundation for the research's analytical framework.

2) UN World Tourism Organization (UNWTO)

The UNWTO serves as a primary data source for tourist arrivals providing an accurate information for the research's analytical framework.

3) IQAir

A Swiss-based air quality technology company annually reports world air quality information, which serves as the primary data source for air pollution.

The list of countries to include in the study is presented in Table 1.

Out of the 48 Asian countries, 22 has complete data on the explanatory variables that affect tourist arrivals.

Table 1
List of countries included as a sample of the study

Armenia	Indonesia	Oman	Sri Lanka
Bahrain	Israel	Philippines	Turkey
Cambodia	Japan	Qatar	Uzbekistan
China	Kyrgyzstan	Saudi Arabia	Viet Nam
Georgia	Mongolia	Singapore	
India	Nepal	South Korea	

B. Instrumentation/Data Measures

The data collection process involves the systematic extraction of relevant information mainly quantity of consumer price indices, political stability and absence of violence/terrorism, air pollution, and tourist arrivals from official reports, publications, and statistical databases provided by the World Bank, UNWTO and IQAir. The research author accesses these sources online, ensuring the accuracy and reliability of the data. A comprehensive review of existing literature was conducted to identify relevant variables and trends in the tourism industry and economic performance in the selected countries. Relevant datasets was extracted from the official websites and databases of the World Bank, UNWTO and IQAir. The collected data covers a specified period from 2017-2022, allowing for a temporal analysis of the identified variables.

C. Ethical Considerations

All data used in this research is publicly available and obtained from reputable government agencies. The research adheres to ethical guidelines, ensuring proper citation and acknowledgment of the data sources. No confidential or sensitive information was used without appropriate permissions. The utilization of secondary data ensures the reliability and consistency of the information, allowing for an in-depth exploration of the interplay of the factors affecting tourism in the selected countries.

D. Research Model

The research model employed in this study is inspired by the work of Preciados (2018), who identified and analyzed quantitative and factors impacting tourism demand using panel data analysis. In adapting their model, the research focuses on one key dependent variable: tourist arrivals. This variable is chosen based on its significance in capturing the multifaceted dynamics of the tourism sector.

This research employs a two-way random effects model regression analysis to highlight the factors influencing tourist arrivals. Independent variables are consumer prices of tourism, which is proxied by consumer price indices, political stability and absence of violence/terrorism, and air pollution.

The two-way random effects regression model used to represent the variables in the study is shown as:

$$Y_{it} = \beta_0 + \beta_1 X_{1it} + \beta_2 X_{2it} + \beta_3 X_{3it} + \dots + \mu_i + \lambda_t + \epsilon_{it}$$

Where,

Y_i = dependent variable which is tourist arrivals;

β_1 = Intercept value or constant

$\beta_2, \beta_3, \beta_4$ etc. = slopes/coefficients of different regressors or

independent variables

X_1, X_2, X_3 etc. = Independent variables or determinants or regressors of the dependent variable which is tourist arrivals

i = unit or group index variable which is "Country"

t = time index variable which is annual year between 2017-2022

μ_i = captures any unobservable individual-specific effects

λ_t = captures any unobservable time-specific effects

ϵ = residuals or error terms

Based on the model above, the specific model used in this study can be written as:

$$TA_{it} = \beta_0 + \beta_1 CPT_{it} + \beta_2 PS_{it} + \beta_3 AP_{it} + \mu_i + \lambda_t + \epsilon_{it}$$

The abbreviation TA, which stands for Tourist Arrivals, is the dependent variable used in representing the number of inbound tourists visiting the selected countries

Consumer Price of Tourism (CPT), which is proxied by the consumer price indeces, refers to the cost of goods and services of the selected countries, this was measured in current dollars. The coefficient (β_1) assess the impact of destination affordability on tourist arrivals.

Political stability and absence of terrorism (PS) represent a value of how politically stable and safe a country is, this was measured by an estimate that the World Bank defined as "gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e. ranging from approximately -2.5 to 2.5". The coefficient (β_2) examines how the changing stability affects tourist arrivals.

Air Pollution (AP), represent the per cubic meter exposure of air pollution of a country, this was measured in annual average PM2.5 concentration ($\mu\text{g}/\text{m}^3$), weighted by population. The coefficient (β_3) measures the baseline impact of air pollution quantities fluctuations on tourist arrivals.

4. Results and Discussion

A. Multicollinearity Test

According to Park (2011), a multicollinearity test assesses the degree of correlation among independent variables in a regression analysis. The purpose is to identify the presence of high correlations between predictor variables, which can lead to issues such as unreliable coefficient estimates and inflated standard errors. If the coefficients between the three explanatory variables are high, the study may exhibit signs of multicollinearity.

Table 2

Correlation matrix of consumer price of tourism proxied by consumer price index, political stability and absence of violence/terrorism, and air pollution

Consumer Price Index	Political Stability and Absence	Air Pollution	
1.0000	-0.2628	0.0483	Consumer Price Index Political Stability and Absence Air Pollution
	1.0000	-0.0613	
		1.0000	

Correlation coefficients, using the observations 1:1 - 22:6
5% critical value (two-tailed) = 0.1710 for n = 132

Table 3

Belsley-Kuh-Welsch collinearity test of consumer price of tourism proxied by consumer price index, political stability and absence of violence/terrorism, and air pollution

Belsley-Kuh-Welsch collinearity diagnostics:

variance proportions

lambda	cond	const	Consumer~	Politica~	AirPollu~
2.874	1.000	0.010	0.014	0.015	0.021
0.908	1.779	0.003	0.001	0.920	0.005
0.162	4.214	0.018	0.281	0.016	0.742
0.057	7.130	0.970	0.705	0.049	0.232

lambda = eigenvalues of inverse covariance matrix (smallest is 0.0565391)
cond = condition index
note: variance proportions columns sum to 1.0

According to BKW, cond >= 30 indicates "strong" near linear dependence, and cond between 10 and 30 "moderately strong". Parameter estimates whose variance is mostly associated with problematic cond values may themselves be considered problematic.

Count of condition indices >= 30: 0
Count of condition indices >= 10: 0

No evidence of excessive collinearity

According to the results of the multicollinearity test in table 2 and table 3, there is no correlation value more than 0.90, indicating that there is no problem with multicollinearity in the study variables.

B. Poolability Test

According to Yadav (2020), A poolability test is designed to assess whether the data collected from different entities (individuals, countries, regions) in a panel dataset can be pooled together for analysis or if the data should be treated as separate entities. The test evaluates the homogeneity of the coefficients across the entities.

If the coefficients for the individual entities are found to be the same, the data is deemed poolable, and a pooled model can be used. On the other hand, if the coefficients significantly differ among entities, indicating entity-specific effects, a fixed-effects model is more appropriate.

Table 4

Poolability test results

	Coefficient	Std. Error	t-ratio	p-value
const	-1192.94	10186.6	-0.1171	0.9070
Consumer Price Index	-4.86215	43.9767	-0.1106	0.9122
Political Stability and Absence	21865.1	10557.0	2.071	0.0407 **
Air Pollution	527.847	200.093	2.638	0.0096 ***
Mean dependent var	11821.70	S.D. dependent var		24614.41
Sum squared resid	2.75e+10	S.E. of regression		16032.74
LSDV R-squared	0.653463	Within R-squared		0.089130
LSDV F(24, 107)	8.407069	P-value(F)		2.02e-15
Log-likelihood	-1451.517	Akaike criterion		2953.034
Schwarz criterion	3025.104	Hannan-Quinn		2982.320
rho	0.532582	Durbin-Watson		1.831423

Test for differing group intercepts -
Null hypothesis: The groups have a common intercept
Test statistic: F(21, 107) = 9.41666
with p-value = P(F(21, 107) > 9.41666) = 4.85235e-16

Model 1: Fixed-effects, using 132 observations
Included 22 cross-sectional units
Time-series length = 6
Dependent variable: Tourist Arrivals

According to the poolability test based on the test for differing group intercepts, the null hypothesis; the groups have a common intercept has a corresponding p-value of 4.85235e-16 which is less than 0.05 that's why the null hypothesis is

rejected and this is interpreted as the group has no common intercept or data is not poolable hence pooled method of panel cannot be applied in this dataset. Further testing for individual-specific and time effects will be needed.

C. Individual-Specific Effect or Time Effect Test

According to Yadav (2020), individual-specific effect or time effect test is designed to assess whether individual entities (cross-sectional units) or time periods exhibit specific effects that are not captured by the overall model. These effects could be due to unobserved factors unique to each entity or time period. The test helps researchers decide whether including fixed effects for individual entities or time periods is necessary to improve the model's explanatory power.

Cross-sectional (Individual) effect test results.

Pesaran CD test for cross-sectional dependence -

Null hypothesis: No cross-sectional dependence

Asymptotic test statistic: z = 6.98725

with p-value = 2.80334e-12

According to the cross-sectional effect test based on the Pesaran CD test for cross-sectional dependence, the null hypothesis; no cross-sectional dependence has a corresponding p-value of 2,80334e-12 which is less than 0.05 that's why the null hypothesis is rejected and this is interpreted as there is cross-sectional dependence or there is cross-sectional effect or there is individual-specific effect in this data set.

Table 5

Time effect results

	Coefficient	Std. Error	t-ratio	p-value
const	3309.35	9987.87	0.3313	0.7411
Consumer Price Index	72.1067	48.2929	1.493	0.1385
Political Stability and Absence	17267.3	9904.17	1.743	0.0843 *
Air Pollution	190.275	202.051	0.9417	0.3486
dt_2	1002.28	4516.12	0.2219	0.8248
dt_3	1292.80	4545.72	0.2844	0.7767
dt_4	-13198.8	4759.83	-2.773	0.0066 ***
dt_5	-14226.6	4790.04	-2.970	0.0037 ***
dt_6	-11761.5	5304.10	-2.217	0.0288 **
Mean dependent var	11821.70	S.D. dependent var		24614.41
Sum squared resid	2.28e+10	S.E. of regression		14945.74
LSDV R-squared	0.712932	Within R-squared		0.245443
LSDV F(29, 102)	8.735045	P-value(F)		7.51e-17
Log-likelihood	-1439.091	Akaike criterion		2938.182
Schwarz criterion	3024.666	Hannan-Quinn		2973.325
rho	0.569707	Durbin-Watson		1.752216

Test for differing group intercepts -

Null hypothesis: The groups have a common intercept

Test statistic: F(21, 102) = 10.5958

with p-value = P(F(21, 102) > 10.5958) = 2.59114e-17

Wald joint test on time dummies -

Null hypothesis: No time effects

Asymptotic test statistic: Chi-square(5) = 21.1301

with p-value = 0.00076546

Model 2: Fixed-effects, using 132 observations

Included 22 cross-sectional units

Time-series length = 6

Dependent variable: Tourist Arrivals

According to the time effect test based on the Wald joint test on time dummies, the null hypothesis; no time effects has a

corresponding p-value of 0.00076546 which is less than 0.05 that's why the null hypothesis is rejected and this is interpreted as there is time effect in this data set. With these results, it can be concluded that the study will use a two-way model.

D. Hausman Test

According to Park (2011), the Hausman test is used to assess whether the differences between fixed effects and random effects models are statistically significant. The test helps researchers decide which model (fixed effects or random effects) is more appropriate for their panel data analysis.

Table 6

Hausman test results				
	Coefficient	Std. Error	z	p-value
const	560.133	9601.27	0.05834	0.9535
Consumer Price Index	3.20793	39.4187	0.08138	0.9351
Political Stability and Absence	2767.68	5554.58	0.4983	0.6183
Air Pollution	342.442	169.209	2.024	0.0430 **
Mean dependent var	11821.70	S.D. dependent var	24614.41	
Sum squared resid	8.36e+10	S.E. of regression	25456.75	
Log-likelihood	-1524.888	Akaike criterion	3057.776	
Schwarz criterion	3069.307	Hannan-Quinn	3062.461	
rho	0.532582	Durbin-Watson	1.831423	

Hausman test -
Null hypothesis: GLS estimates are consistent
Asymptotic test statistic: Chi-square(3) = 7.02772
with p-value = 0.0710196

Model 3: Random-effects (GLS), using 132 observations
Included 22 cross-sectional units
Time-series length = 6
Dependent variable: Tourist Arrivals

According to the Hausman test, our null hypothesis; GLS estimates are consistent has a corresponding p-value of 0.0710196 which is more than 0.05 that's why the null hypothesis is not rejected and this is interpreted as the GLS estimates are consistent or random effect model is suitable. With these results, it can be concluded that the study will use a two-way random effects model.

E. Two-way Random Effects Model

According to Eric (2021), one of the more accurate ways to estimate a two-way random effects model is by using weighted least squares regression analysis.

As illustrated in table 7, the two-way random effects regression equation can be explained as follows:

$$TA_{it} = -13030.4 + 85.8974CPT_{it} + 9027.57PS_{it} + 121.845AP_{it}$$

From the regression above, the results of the research can be interpreted as follows:

1. Given that the value of the R-squared is 0.91 and the Adjusted R-squared is 0.88, consumer price index, political stability and absence of violence/terrorism and air pollution explains tourist arrivals by 88% to 91%.
2. Given that the P-value(F) is 7.97e-41, the test returns a value of 7.97e-41 which is less than 0.05 indicating that the results are statistically significant or the model is fit.

Table 7
Weighted least squares regression analysis results

	Coefficient	Std. Error	t-ratio	p-value	
const	-13030.4	3441.09	-3.787	0.0003	***
Consumer Price Index	85.8974	17.5216	4.902	<0.0001	***
Political Stability and Absence	9027.57	2270.28	3.976	0.0001	***
Air Pollution	121.845	47.2256	2.580	0.0113	**
du_1	6255.58	2997.57	2.087	0.0394	**
du_2	6160.43	2598.24	2.371	0.0196	**
du_3	-955.077	2617.59	-0.3649	0.7160	
du_4	88914.2	22114.1	4.021	0.0001	***
du_5	3124.07	1975.39	1.581	0.1169	
du_6	5837.36	2764.57	2.111	0.0372	**
du_7	4954.83	1623.21	3.052	0.0029	***
du_8	8903.95	3998.12	2.227	0.0281	**
du_9	5605.61	3811.64	1.471	0.1445	
du_10	-765.899	2169.66	-0.3530	0.7248	
du_11	-20085.7	3684.32	-5.452	<0.0001	***
du_12	-9473.12	2049.20	-4.623	<0.0001	***
du_13	-9503.44	3423.93	-2.776	0.0066	***
du_14	8538.88	2667.53	3.201	0.0018	***
du_15	-13459.8	4243.91	-3.172	0.0020	***
du_16	13739.9	1924.84	7.138	<0.0001	***
du_17	-5694.60	3561.42	-1.599	0.1129	
du_18	-232.900	1736.44	-0.1341	0.8936	
du_19	-5281.43	3047.48	-1.733	0.0861	*
du_20	31940.2	5307.27	6.018	<0.0001	***
du_21	-15090.9	2928.44	-5.153	<0.0001	***
dt_1	9299.85	915.326	10.16	<0.0001	***
dt_2	10324.1	867.549	11.90	<0.0001	***
dt_3	11029.2	863.224	12.78	<0.0001	***
dt_4	-1492.06	798.843	-1.868	0.0647	*
dt_5	-3564.18	777.177	-4.586	<0.0001	***

Statistics based on the weighted data:

Sum squared resid	93.40705	S.E. of regression	0.956951
R-squared	0.908647	Adjusted R-squared	0.882674
F(29, 102)	34.98451	P-value(F)	7.97e-41
Log-likelihood	-164.4748	Akaike criterion	388.9495
Schwarz criterion	475.4336	Hannan-Quinn	424.0927

Statistics based on the original data:

Mean dependent var	11821.70	S.D. dependent var	24614.41
Sum squared resid	2.32e+10	S.E. of regression	15086.22

3. Given that the constant-coefficient value is -13030.4, if the variables Consumer Price of Tourism (CPT), Political stability and absence of violence/terrorism (PS) and Air Pollution (AP) are held constant, the number of tourist arrivals will decrease by 13030.4 inbound tourists.
4. Given that the coefficient of CPT is 85.8974 and the p-value is 0.0001, whenever consumer prices increases by one unit, the number of tourist arrivals increases by 85.8974 inbound tourists.
5. Given that the coefficient of PS is 9027.57 and the p-value is 0.0001, whenever the score of a country's stability and absence of violence/terrorism increases by one unit, the number of tourist arrivals increases by 9027.57 inbound tourists.
6. Given that the coefficient of AP is 121.845 and the p-value is 0.0113, whenever the per cubic meter of exposure to air pollution of a country increases by one unit, the number of tourist arrivals increases by 121.845
7. Given that the p-value of dummy unit variable 3, 5, 9, 10, 17 and 18 is not statistically significant, changes in consumer price of tourism, political stability and absence of violence/terrorism, and air pollution does not significantly impact the tourist arrivals in

Cambodia, China, Japan, Kyrgyzstan, Singapore and South Korea.

5. Summary and Conclusion

This study employed a two-way random effects model to explore the impact of consumer prices of tourism (CPT), political stability and absence of violence/terrorism (PS), and air pollution (AP) on tourist arrivals in 22 Asian countries from 2017 to 2022. Hypotheses testing the relationships between these variables were evaluated. The statistical significance of the model, indicated by a P-value(F) of $7.97e-41$, affirmed its suitability for assessing the interplay between the variables.

In examining the impact of independent variables, unexpected results were revealed. Contrary to expectations of the first hypothesis (H1), the positive relationship between CPT and tourist arrivals, reflected by the coefficient of 85.8974 and a p-value of 0.0001, the unexpected finding that an increase in consumer prices of tourism (CPT) is associated with higher tourist arrivals contradicts common sense, where one might expect lower prices to attract more visitors. However, this counterintuitive result can be explained by considering various factors influencing tourist behavior. According to Fernando (2023), in some cases, an increase in consumer prices may signal higher quality services, improved infrastructure, or enhanced experiences at a destination. Tourists may be willing to pay more for perceived added value, such as better accommodations, upgraded facilities, or unique and exclusive offerings. Moreover, destinations with higher consumer prices may be positioned as luxury or niche markets, attracting a specific segment of tourists seeking premium experiences. These travelers may be less price-sensitive and more interested in the exclusivity and sophistication associated with destinations that command higher prices. Additionally, according to Trading Economics (2018), an increase in consumer prices may coincide with economic development and improved overall conditions, making a destination more appealing to a broader range of tourists. The relationship between consumer prices and tourist arrivals underscores the complexity of travel decision-making. It suggests that tourists are not solely driven by cost considerations but are influenced by a combination of factors, including the perceived value, quality, and unique offerings of a destination. This finding encourages a more nuanced understanding of the factors shaping tourist preferences and emphasizes the need for a holistic approach when analyzing the impact of consumer prices on tourist arrivals.

Based on reports made by World Economic Forum (2019), rather than adhering to the conventional notion that lower prices attract more visitors, certain destinations may capitalize on premium offerings and elevated consumer prices to attract a specific segment of tourists seeking luxury or niche experiences. In light of this, policymakers and destination managers should consider strategic measures to leverage this phenomenon. According to Maizland from Council Foreign Relations (2020), one potential avenue is the promotion of premium offerings, emphasizing the unique and superior experiences associated with higher consumer prices.

Collaborations with local businesses to enhance the quality of services and facilities could be instrumental in creating a distinctive allure for visitors. Additionally, based from Snyder's article (2023) targeted marketing campaigns focusing on niche markets and luxury tourism, along with partnerships with relevant travel agencies, can help tailor promotional efforts to the identified segment. Investing in infrastructure and overall quality is another key recommendation. Destinations should channel resources into upgrading accommodation options, improving cultural and recreational facilities, and ensuring high standards of cleanliness and safety (Goodman, 2022). Economic development initiatives that contribute to an improved standard of living and conditions in the destination can also play a pivotal role in justifying higher consumer prices. Continuous monitoring of the tourism landscape, visitor preferences, and global trends is very important. According to McBride (2020), policymakers should remain adaptable and responsive, adjusting strategies based on evolving consumer behaviors, economic conditions, and the competitive tourism market. By aligning policies with the factors contributing to increased tourist arrivals in the context of higher consumer prices, destinations can strategically position themselves to thrive in the dynamic and competitive global tourism industry.

In support of the second hypothesis (H2), the positive relationship between PS and tourist arrivals (coefficient: 9027.57, p-value: 0.0001) findings indicating that an increase in the score of political stability and the absence of violence/terrorism (PS) positively correlates with higher tourist arrivals align with established theories in tourism research (Atkinson, Georgieva, Posen, Zoellick, 2022). Tourists are inherently risk-averse, and perceptions of political stability and safety are critical determinants in destination choices. In this context, the positive relationship suggests that destinations with higher political stability scores are perceived as safer and more attractive to potential visitors. According to Gensler (2021), the stability and safety of a destination are often reflected in tourism promotional efforts. Countries or regions with positive political stability may have more effective destination marketing campaigns, emphasizing safety and security as key selling points. Moreover, positive political stability may lead to increased international confidence, resulting in favorable media coverage and positive word-of-mouth recommendations from previous visitors (O'Neil, 2018).

Policy recommendations based on these findings would involve reinforcing and enhancing political stability. According to Kwon (2022), governments and local authorities should prioritize measures to maintain and improve political stability, fostering an environment that is conducive to tourism growth. Collaborative efforts between government agencies, law enforcement, and tourism boards can contribute to effective security measures and crisis management strategies. While Liu (2021) suggests that destination managers should actively engage in diplomatic efforts to improve international perceptions of political stability. This could involve partnerships with international organizations, participation in global initiatives, and strategic communication to address any misconceptions or negative stereotypes. Furthermore,

Mashkooor (2019) adds investments in infrastructure, public services, and community development can contribute to overall stability, positively impacting the tourism sector. Continuous monitoring of geopolitical conditions, early identification of potential risks, and swift responses to crises are essential components of effective policymaking. By addressing factors contributing to increased political stability and absence of violence/terrorism, destinations can create a favorable environment for sustained tourism growth and enhance their global competitiveness.

The unexpected positive relationship between AP and tourist arrivals (coefficient: 121.845, p-value: 0.0113) indicating that an increase in air pollution also increases tourist arrivals contradicts the third hypothesis (H3), and can be attributed to several factors and indirect causes. According to McMahon (2018), contrary to the conventional assumption that tourists prefer destinations with clean air, there are instances where heightened air pollution might paradoxically attract visitors. Regions undergoing rapid economic growth and industrial development, often associated with increased pollution, may draw business travelers and investors, contributing to an overall rise in tourist arrivals. Robbins (2019) adds many tourist destinations, typically urban centers with vibrant cultural scenes and historical landmarks, coincide with higher air pollution levels due to industrial and vehicular activities. Tourists may be enticed by the unique experiences these areas offer, even in the face of environmental challenges. Additionally, according to Manak (2022), tourists might lack attractive alternatives, choosing destinations despite air pollution issues due to specific business requirements, family ties, or special events. Alden (2020) points out that in certain cases, destinations dealing with air pollution may offer more affordable travel options due to lower demand, appealing to budget-conscious travelers. Regions with high air pollution levels might also host sites of significant cultural or historical importance, influencing tourists to endure environmental challenges for the sake of the destination's cultural richness. These varied factors highlights the complexity of elements influencing tourist decisions and emphasize the need for a comprehensive understanding of the complex nature of tourism preferences. It emphasizes the importance of considering economic, cultural, and unique experiential factors that may override conventional expectations regarding environmental conditions when analyzing the relationship between air pollution and tourist arrivals.

The unexpected finding that an increase in air pollution positively correlates with higher tourist arrivals requires careful consideration in formulating policy recommendations. While this result may seem counterintuitive, it could be influenced by various factors, including the complex nature of tourists' decision-making processes, the types of attractions offered by destinations, and the perceived trade-offs between environmental quality and other factors. In light of this finding, Sierra (2019) suggests that policymakers should adopt a strategic approach that addresses both the potential negative impacts of air pollution on the environment and the factors that may attract tourists despite these conditions. Here are some

policy recommendations; (1) environmental management and sustainable practices; implement and enforce strict environmental regulations to control and reduce air pollution levels. (2) Promote sustainable practices in tourism-related industries, emphasizing eco-friendly technologies, waste reduction, and energy efficiency. (3) Public awareness and perception management; launch public awareness campaigns to educate tourists about the environmental challenges and air quality issues in specific destinations. (4) Implement communication strategies to highlight ongoing efforts to address and improve air quality. (5) Collaboration and partnerships; collaborate with local communities, environmental organizations, and businesses to implement joint initiatives aimed at improving air quality. (6) Monitoring and data transparency; implement real-time air quality monitoring systems in tourist-heavy areas to provide accurate and timely information to visitors. (7) Policy flexibility and adaptability: develop policies that can adapt to changing environmental conditions, ensuring that regulations remain effective as air quality improvements are achieved. Continuously evaluate and update policies based on emerging research and changing tourism trends. By fostering sustainable practices and improving environmental quality, destinations can attract conscientious tourists and promote long-term tourism growth.

In conclusion, this study contributes nuanced insights into the relationships shaping tourist arrivals in Asian countries. Policymakers are urged to consider these complexities when formulating strategies for sustainable tourism development.

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