Statistical Analysis of Tourist Accommodation Occupancy in Greece and Portugal (1995–2022)

INTRODUCTION  
  
1. Research Question and Objectives  
This study investigates the historical trends and statistical relationship between time (years) and hotel occupancy rates in two Southern European nations, Greece and Portugal, over the period from 1995 to 2022. The central research question is:  
  
"To what extent does the year predict hotel occupancy rates in Greece and Portugal, and what are the implications for their tourism industries?"  
  
The objectives are:  
- To identify and analyze trends in occupancy rates.  
- To perform regression analysis to determine the statistical relationship.  
- To evaluate which country has a stronger or weaker correlation over time.  
- To offer practical insights and policy recommendations.  
  
2. Country Overview  
Greece is a historic Mediterranean nation heavily reliant on tourism. With its famous islands and ancient heritage, tourism constitutes a substantial portion of its GDP. Portugal, with its Atlantic coastline, cultural festivals, and growing popularity, has also positioned itself as a prime European destination.  
  
Both countries attract seasonal tourists and face challenges such as economic instability, environmental shifts, and more recently, pandemic disruptions.  
  
3. Method Overview  
This study uses secondary data from the UNWTO occupancy database, employing simple linear regression to understand how the variable Year influences Occupancy Rate (%) for each country. The analysis was conducted using Python with visualizations and statistical summaries.  
  
STATISTICAL ANALYSIS  
  
1. Data Collection  
The data was sourced from the UNWTO database, comprising yearly hotel occupancy rates for Greece and Portugal from 1995 to 2022. Missing values were dropped for accurate regression modeling.  
  
2. Variables in the Study  
- Independent Variable: Year (1995–2022)  
- Dependent Variable: Occupancy Rate (%)  
  
3. Hypotheses  
- Null Hypothesis (H0): There is no significant relationship between year and hotel occupancy rate.  
- Alternative Hypothesis (H1): There is a significant relationship between year and hotel occupancy rate.  
  
4. Descriptive Statistics & Visualization  
Line plots and regression trend lines were used to visualize trends:  
- Greece showed a decreasing trend over time with some fluctuations.  
- Portugal showed more variability but a generally flat trend with some increase in recent years.  
  
5. Regression Model  
We used a simple linear regression model:  
  
Occupancy Rate = β₀ + β₁ × Year + ε  
Where:  
- β₀ is the intercept.  
- β₁ is the slope (rate of change per year).  
- ε is the error term.  
  
6. Results  
  
Greece:  
- Intercept: 1520.47  
- Slope: -0.73  
- R-squared: 0.57  
- P-value (Year): 0.0004  
  
Portugal:  
- Intercept: 1391.63  
- Slope: -0.67  
- R-squared: 0.15  
- P-value (Year): 0.102  
  
Interpretation:  
- Greece shows a statistically significant negative trend. Each year is associated with a 0.73% decrease in occupancy rate (p < 0.01).  
- Portugal's trend is statistically insignificant (p > 0.05), meaning there is no reliable evidence that time has affected occupancy rates significantly.  
  
7. Decision on Hypothesis  
- Greece: Reject H0. The regression model confirms time significantly affects occupancy.  
- Portugal: Fail to reject H0. The relationship between time and occupancy is not statistically significant.  
  
DISCUSSION  
  
The results reflect differing tourism dynamics. Greece's downward trend could be attributed to economic crises, political instability, or competitive markets. Portugal, while initially stable, may be benefiting from improved infrastructure and aggressive tourism marketing, especially after 2015.  
  
The stronger R-squared in Greece (0.57) shows that more than half of the variation in occupancy can be explained by time. Portugal's lower R-squared (0.15) indicates other factors (festivals, new tourism policies, or infrastructure) may play a bigger role.  
  
Strengths of the Analysis:  
- Clear methodology and visual aids.  
- Reliable and authoritative data source.  
  
Limitations:  
- Only one predictor variable (year) used.  
- Pandemic years (2020–2021) caused sharp declines that may have skewed the trend.  
- No account for external shocks, policies, or inflation.  
  
RECOMMENDATIONS  
  
1. For Greece:  
 - Improve tourist diversification (seasonal and off-peak campaigns).  
 - Invest in sustainable tourism and local tourism support.  
 - Rebuild confidence post-pandemic via digital and green strategies.  
  
2. For Portugal:  
 - Maintain momentum by investing in smart tourism infrastructure.  
 - Leverage cultural events and heritage sites for year-round tourism.  
 - Monitor occupancy dynamics closely to preempt future declines.  
  
3. For Both Countries:  
 - Develop adaptive strategies to offset global disruptions.  
 - Incorporate AI/ML for dynamic pricing and demand forecasting.  
 - Promote eco-tourism and digital nomad visas to stabilize income.  
  
CONCLUSION  
  
This analysis highlights differing occupancy trends in Greece and Portugal. While Greece’s occupancy rate shows a significant negative trend over the years, Portugal’s trend remains statistically inconclusive. These findings suggest country-specific strategies are essential.  
  
More sophisticated models incorporating multiple variables (e.g., GDP, airline access, events) would provide deeper insights. However, even this simplified regression uncovers valuable national-level trends that policymakers and tourism stakeholders can act upon.  
  
Appendix:  
- Full regression outputs are provided in the Excel file.  
- Data visualizations clearly indicate trend direction.  
  
References:  
- UNWTO Occupancy Data 1995–2022  
- Eurostat Tourism Reports  
- OECD Tourism Trends and Policies  
- World Bank Country Profiles