Analysis of factors affecting Inbound Tourism from the United States to South Korea - Evidence From 2015 to 2023, analyzed using R

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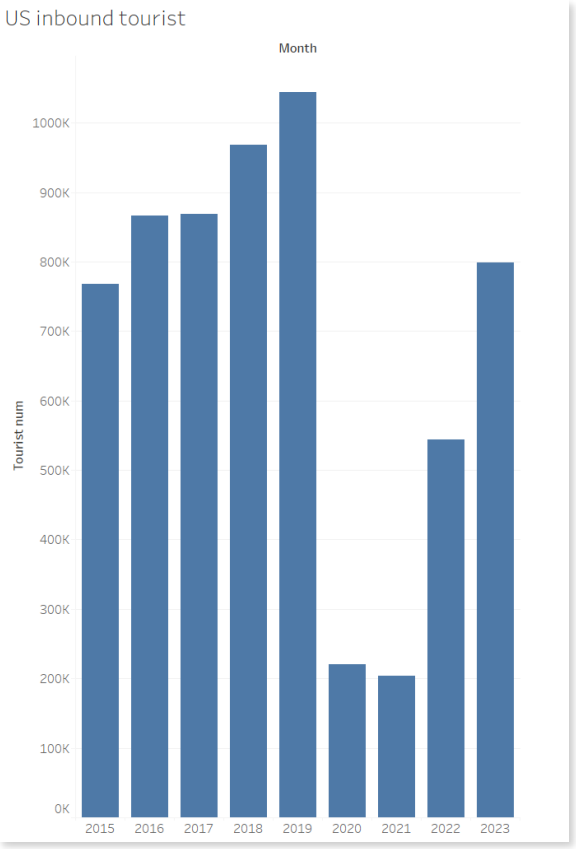
According to the World Economic Outlook report by the International Monetary Fund (IMF) in January 2023, tourism has again been identified as a key driver of economic recovery and growth. Countries with significant travel and tourism sectors are perceived to have strong economic resilience and higher levels of economic activity. Nations where tourism accounts for a high proportion of GDP have recovered more rapidly from the impacts of the pandemic compared to countries where tourism is not a significant sector.

Figure 1. Inbound tourist number from the United States to South Korea (2015-2023)



[Source] datalab.visitkorea, Visualized by Tableau

However, the contribution of the tourism industry to South Korea's GDP was only 2.8% in 2019, ranking it among the lowest of 51 countries with available statistics (Korea Culture and Tourism Institute, 2020). Therefore, it is crucial to identify the factors influencing inbound tourism and implement efforts to increase the number of tourists for the sake of national economic growth.

From 2015 to November 2023, the number of inbound visitors by country reveals that the United States ranks third, accounting for 6.6% of the total, following China and Japan. Notably, the United States is the only non-Asian country among the top five. The tourism industry has been heavily impacted by the COVID-19 pandemic and is still in the process of recovery. Given the relatively rapid recovery trajectory of the United States compared to other countries, it has become a focal point for research.

Figure 1 displays the number of inbound tourists from the United States over the years. Through the graph, we can observe a continuous upward

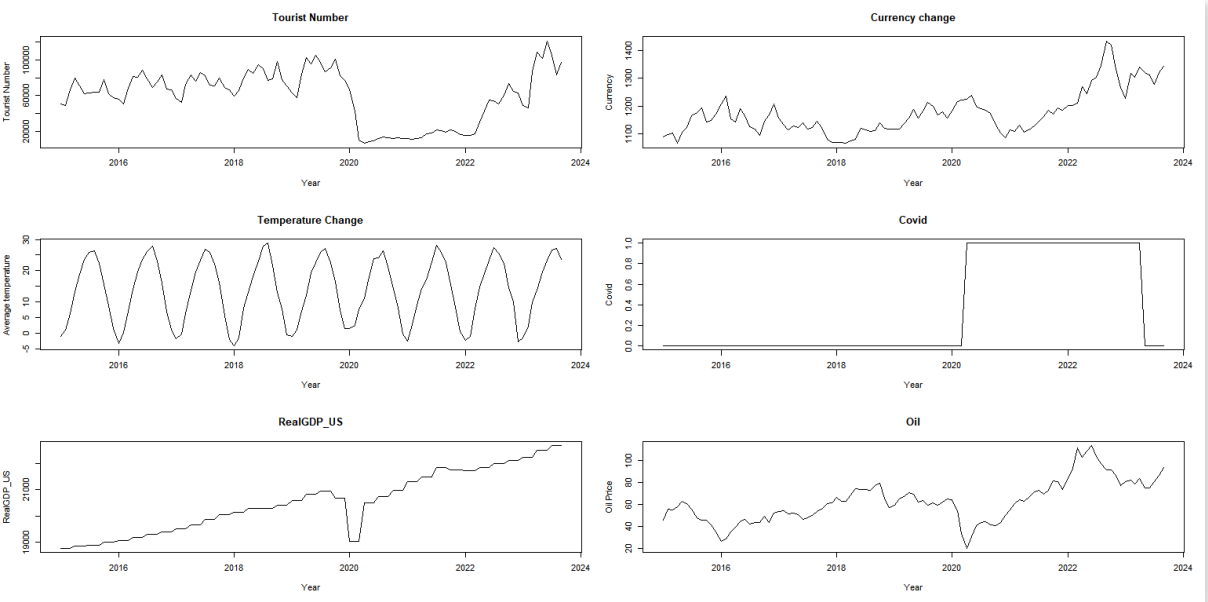
trend in the number of tourists until a sharp decline in 2020, followed by a resurgence from 2022 onwards. This pattern appears to be attributed to the impact of COVID-19. We are going to further investigate the correlation with COVID-19 by setting it as a dependent variable to understand its extent of influence as well.

This report aims to analyze the impact of USD/KRW exchange rates, temperature, COVID-19, US real GDP, and international oil prices on United States tourists from 2015 to 2023. In this analysis, the number of inbound tourists from the United States serves as the dependent variable, while exchange rates, temperature, COVID-19, US real GDP, and international oil prices are considered as dependent variables. Through this time-series data analysis, we seek to understand how each of these factors influences the number of inbound tourists from the United States to South Korea.

Data

I utilized data from the Korea Tourism Organization's Data Lab for Inbound tourist number from the United States to South Korea, exchange rates, and international oil prices. Temperature data was sourced from the Korea Meteorological Administration. Considering the significant impact of the Korean government's mandatory self-quarantine policy for inbound travelers during the COVID-19 period, implemented from April 2020 to April 2023, I assigned a value of 1 for the variable "Covid" during this period, instead of applying the period of the World Health Organization's declaration of a global health emergency (from January 2020 to April 2023). Real Gross Domestic Product (GDP) data for the United States was obtained from FRED. To ensure consistency, quarterly GDP values were adjusted using the Excel INDEX function, ensuring that the values correspond. Statistical analysis was conducted using R and the analysis results were generated via R scripts.

Figure 2. Graph of US tourists, exchange rates, temperature, COVID-19, US real GDP, and international oil prices over time (2015-2023)



OVERALL

To effectively present on a single graph, I standardized the values of the indicators to be roughly similar using R code.

```
78 ts_data$adjusted_Tourist_num <- ts_data$Tourist_num / 1000
79 ts_data$adjusted_RealGDP_US <- ts_data$RealGDP_US / 1000
80 ts_data$adjusted_Currency <- ts_data$Currency / 100
```

The estimation results are presented as follows:

	Coefficients:	t- value	P
(Intercept)	-1.78	-4.22	0.00
Currency	7.15	3.12	0.00
Temperatur e	3.70	2.56	0.01
Covid	-6.53	-15.96	0.00
RealGDP	7.58	3.18	0.00
Oil	2.62	2.36	0.02
Adjusted R-squared:	0.7601		

The adjusted R-squared of this regression model is 0.76, indicating a relatively high explanatory power of approximately 76%. This suggests that the model effectively captures a significant portion of the variability in the dependent variable.

Currency

The exchange rate and US inbound tourist arrivals have a statistically significant correlation. There is a very weak positive correlation between US inbound tourist number and Currency, suggesting that exchange rates have a small impact on tourist arrivals (r=.05, p < .05, t=3.12). While the correlation is statistically significant, the magnitude of theimpact is relatively small compare to other variables. This implies that although changes in the exchange rate influence tourist arrivals, other factors may have a more

Figure 3. Overall graph - exchange rates, temperature, COVID-19, US real GDP, and international oil prices

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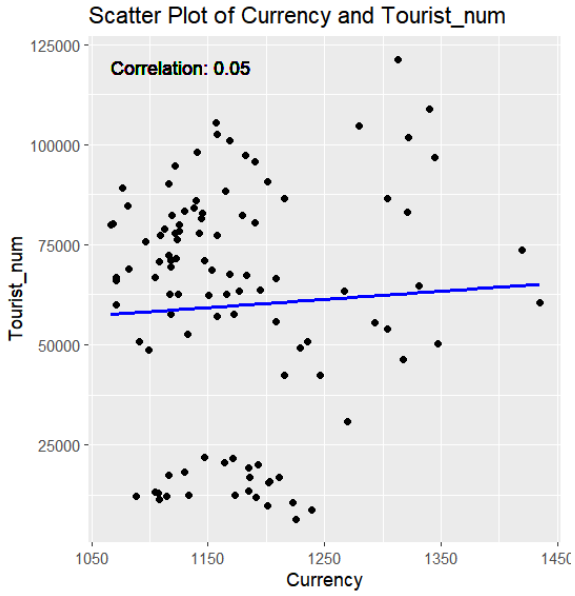
80 ts_data$adjusted_Currency <- ts_data$Currency / 100
```

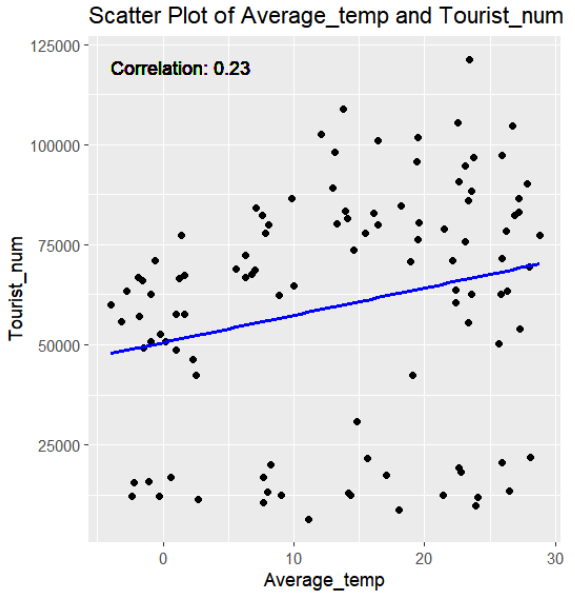
substantial effect on tourism trends.

Figure 4. The Correlation Between Currency, and US tourists (2015-2023)



Temperature

Figure 5. The Correlation Between temperature, and US tourists (2015-2023)

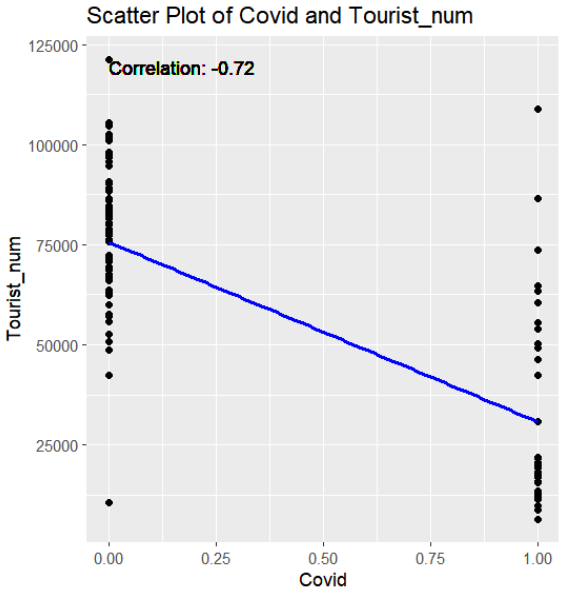


The average temperature and US inbound tourist arrivals have a statistically significant correlation. A moderate positive correlation is observed between US inbound arrivals number and average temperature, implying that higher temperatures may lead to increased tourist numbers (r=.23, p < .05, t=2.58).

This suggests that tourist numbers might be higher during warmer seasons such as summer, spring, and fall compared to winter.

Covid

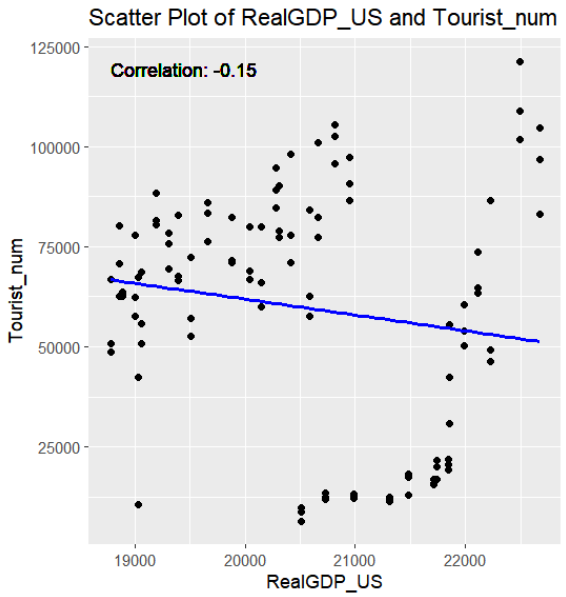
Figure 6. The Correlation Between Covid19, and US tourists (2015-2023)



The covid and US inbound tourist arrivals have a statistically significant correlation as well. A strong negative correlation exists between Tourist_num and Covid, indicating a significant decrease in tourist arrivals during the COVID-19 period(r=-.72). As visually observed in the graph, COVID-19 holds the highest absolute t-value among the dependent variables, signifying its greatest impact on tourist arrivals (p < .05, t=-15.96).

US Real GDP

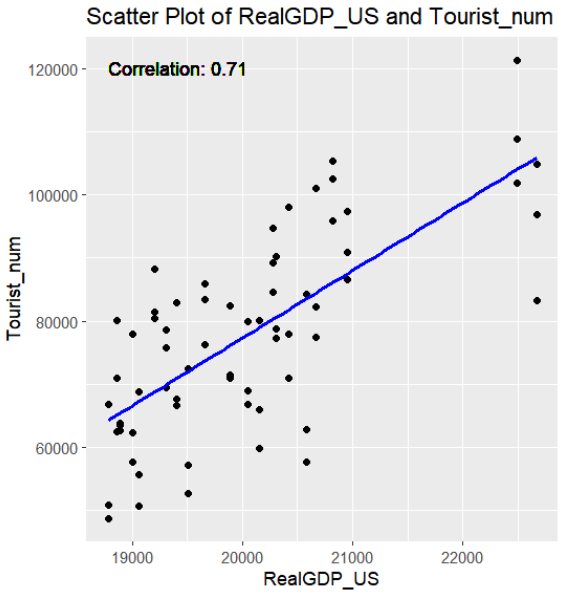
Figure 7. The Correlation Between US real GDP, and US tourists (2015-2023)



US tourist number shows a very weak negative correlation with RealGDP US, suggesting a slight inverse relationship between US real GDP and tourist arrivals(r=-.15). However, according to estimated coefficients, with each unit increase in US real GDP, there is an estimated increase of approximately 7.58 tourists, assuming all other factors remain constant ($p < .05$, $t=3.18$). As direction of these two values (correlation value and coefficients estimate) do not align, I initially suspected multicollinearity with the exchange rate so checked the VIF, which was 3.77, indicating multicollinearity was not significant as it was below 10. I attempted to remove US real GDP, but other coefficient values became abnormally high, so I decided to retain the data.

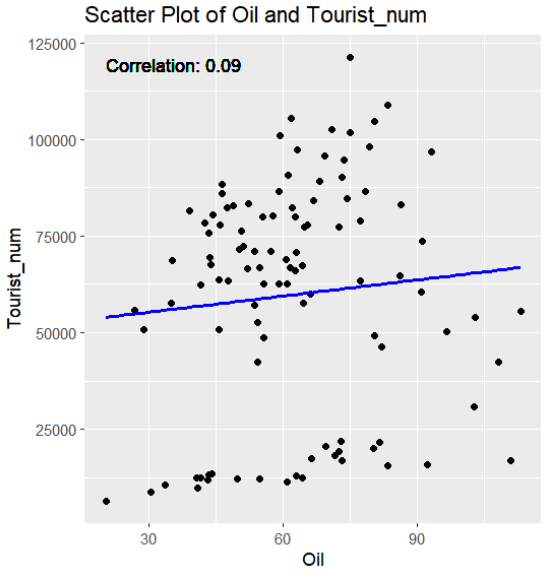
Instead, the presence of outliers in the data, particularly those leading to a negative correlation, raised suspicions of their association with COVID-19. After excluding the COVID-19 period, the analysis revealed a very high positive correlation of 0.71 between RealGDP US and US tourist numbers. This indicates that apart from exceptional circumstances like COVID-19, RealGDP US has a significant impact on the increase in US tourist arrivals. It suggests that economic factors play a crucial role in driving tourism demand, excluding special situations, which means the COVID-19 pandemic.

Figure 8. The Correlation Between US real GDP, and US tourists (2015-2019, 2023.04-)



Oil

Figure 9. The Correlation Between Oil price, and US tourists (2015-2023)



There is a very weak positive correlation between American tourists and Oil, indicating a minimal impact of international oil prices on tourist arrivals(r=.09). But they have a statistically significant correlation as well ($p < .05$, $t=2.36$).

CONCLUSION

Ultimately, I found that all independent variables were correlated. Although the impact of COVID-19 was expected, it is noteworthy that there is a very high negative correlation. Except for the corona period, it was found that there was a significant correlation with the increase in real GDP. Surprisingly, temperature showed a higher correlation coefficient than exchange rates or oil prices, showing significant explanatory power. For American tourists, cold weather and snow may have a impact on their visit. Therefore, it is essential to devise tourism strategies tailored for these seasons to attract more American tourists. It can be interpreted that strategy that enables active marketing and creation of tourist attractions targeting American tourists in off-season, which means winter is need to be provided. K-contents related to winter could be good alternative. Or during the winter, strategies should be developed to attract tourists from other countries such as south-east asia, while exploring tactics to draw more American tourists during spring, summer, and fall.

Of course, there may be other decisive factors such as the K-pop, K-drama, history, and culture. Because it takes time to quantify these factors into quantitative indicators, I plan to explore additional variables in further studies.

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