

Investigating Influence of North Korea Threat Events on Attractiveness of South Korea for Foreign Visitors through Big Data Analysis

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Abstract— Although South Korea (SK) is recognized as one of the most popular destinations for global tourism, concerns occur due to the ongoing threat of North Korea (NK). To investigate its influence on the SK tourist industry, we leverage big data of inbound tourists and scale it against NK nuclear and missile test events over the past 11 years. Our analysis did not just arrive at seasonal patterns, but observed their variations depending on NK event occurrence, and made valuable implications.

Keywords— North Korea nuclear test; North Korea missile test; tourism, big data analysis

I. INTRODUCTION

Over last decade North Korea has conducted series of nuclear and missile tests that contributed to the establishment of crises of various kinds in the Korean Peninsula. Although these tests were conducted for multiple purposes and targeted towards not just Republic of Korea, but Japan and the US, they were not just able to shake regional security and balance of power, but place and effect on non-security issues.

According to the financial surveys [1], provocations conducted by North Korea have been one of the most influential factors in establishing various uncertainties on the long-term basis that greatly affect Republic of Korea and its market. As over the past few years Republic of Korea has become one of the attractive destinations for global tourism, with 17 million tourists that visited the country in 2016 [2], tourist and hospitality industry becomes one of the important one as it has great contribution to the South Korean economy.

Thus, we can assume that such provoking events of nuclear and missile tests conducted by North Korea can possibly pose great variations in the number of inbound tourists in the Republic of Korea. Therefore, in the frame of this research we try to understand it by measuring number of tourist inflow against critical events of nuclear and missile tests conducted by North Korea.

Despite it obvious influences, there are few to no existing research made that investigates effects of North Korean nuclear and missile tests on the inflow of foreign visitors into South Korea. With an exception of the recent study conducted by Huang and Woo [3], there is no other work that examines critical role of North Korea to hospitality industry. And even then, researcher make inconclusive results, as there are events that pose significant influence. Although there are related studies on terrorism and political tensions, that emphasize role of similar occurrences to the economical, tourism and other sectors [4], [5], no empirical evidence have been came across that events of nuclear and missile tests decrease number of inbound visitors. Thus, or study can fill in this gap and produce valuable results, as it collects the tourist data for about 11 years and investigates weather number of inbound tourists in South Korea is decreasing due to the threats posed by North Korea such as missile and nuclear tests.

II. RESEARCH AND METHOD

To conduct our analysis, we used data accessed through Korea tourism organization that primarily concerned number of inbound foreign visitors to Republic of Korea from 2006 to 2017 on monthly basis. In other words, we used longitudinal data of inbound tourists to Republic of Korea as dependent variable. We were able to observe that main inflow of tourists is mainly observed in March, August and October. Furthermore, it decreases in the time frame of June to September, as well as during period of November to January (e.g. Figure 1).

In the frame of this study, we chose two constantly reoccurring events of nuclear and missile tests conducted by North Korea, which have been recognized to be influential to South Korean tourist industry. Although there is constant political tension between both countries, tests of nuclear weapons and missiles are one of the most critical, as they potentially can lead to the war outbreak and mass destruction. Thus, we used international news publications that regard

missile and nuclear tests as independent variable.

In addition, we primarily concern time span of 2006 to 2017 for several reasons – first, within these years Republic of Korea have witnessed great inflow of foreign visitors; second – 2006 was the year of first nuclear test conducted by North Korea. Timeline of nuclear tests conducted by North Korea are as follows: October 2006, May 2009, February 2013, January and September 2016, September 2017. As for the missile tests, timeline is as follows: July 2006, April and July 2009, April and December 2012, May 2013, March 2014, May 2015, February, April, August and October 2016, February, March, April, May, June, July, and August 2017.

In the next section we present series of graphs that demonstrate relationship between nuclear and missile tests and their influences on number of tourist inflow into South Korea. To conduct graphs, we used following methodology: python for the programming language, pandas' data frame module for data preprocessing, and matplotlib. pyplot module for graphing.

III. RESULTS AND DISCUSSION

Figure 1 below displays variations in the tourist inflow, and symbols of circle and triangle emphasize occurrence of missile and nuclear tests respectfully. Interesting observations can be made, as in some years it can be concluded that events of nuclear and missile tests determine decrease in number of inbound tourists.

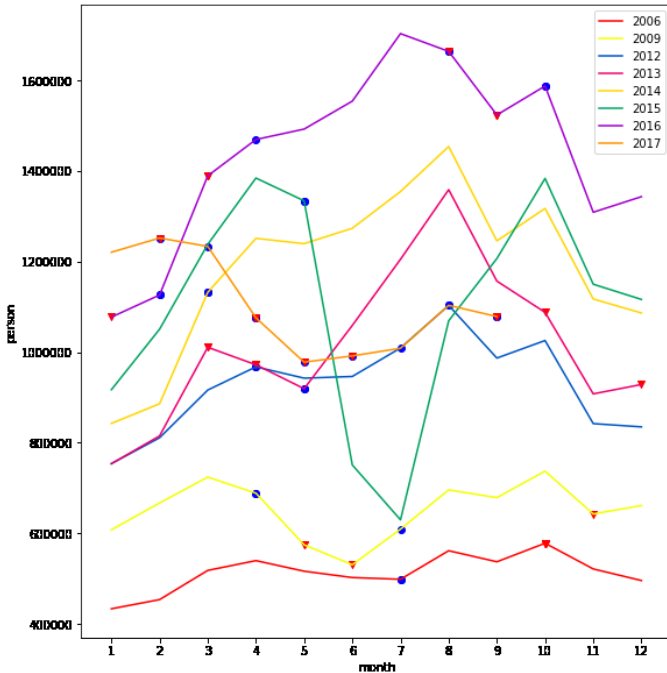


Fig. 1. Number of inbound foreign visitors to South Korea and event of nuclear and missile threats conducted by North Korea from 2006-2017.

Although it can be evident that in some years due to the nuclear and missile tests tourist inflow greatly decreases (e.g. April-June 2009, March-May/October-December 2013, August-October 2016, March-July 2017), there are certain variations that occur due to other reasons. For instance, taking into perspective year of 2015 we can understand that great

decrease of tourists occurred not due to the missile test in the month of May, but due to the Middle Eastern Respiratory Syndrome.

Moreover, in the following year of 2016, we can see that even after nuclear test in March and follow up missile test in April, number of tourists continued to increase. In fact, in 2016 South Korea witnessed greatest number of tourists: total of almost 17 million people arrived in the country for tourism purposes [2]. To investigate closely such inconsistencies in variations, we decided to take a closer look at China, Japan, and Taiwan– top three countries from which largest number of tourists has been coming to South Korea within the past 4 years [6].

A. China

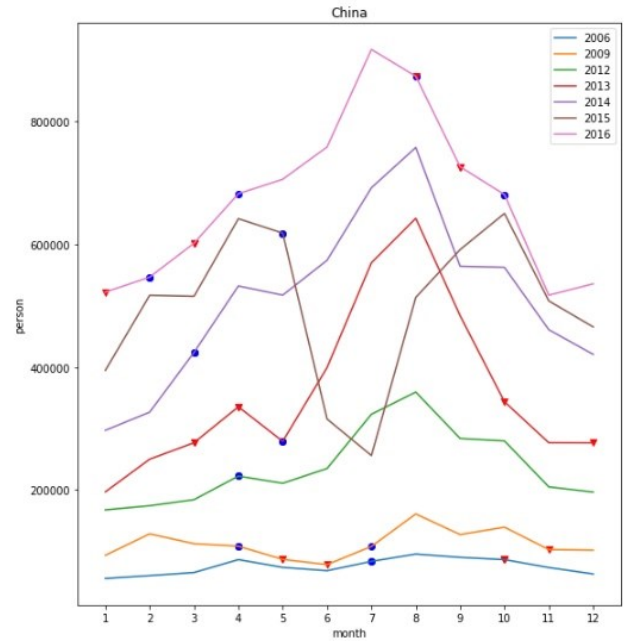


Fig. 2. Number of inbound tourists from China and event of nuclear and missile threats conducted by North Korea from 2006-2016.

Figure 2 above presents variations in the inbound number of Chinese tourists to South Korea in proportion to the event of nuclear and missile tests. According to the graph above we can stipulate that threat activities conducted by North Korea have definite impact on the number of Chinese tourists.

For example, if we take into perspective years of 2009 and 2015 in the period of October and November we can observe increase in the tourist inflow from China. Especially within those periods there were no nuclear or missile tests occurrence. On the other hand, within the same period in the years of 2006, 2013 and 2016, decrease in inbound Chinese visitors is observed, and it might be concluded that such instance occurs right after conduction of nuclear and missile tests by North Korea.

B. Japan

Unlike China, in which case graph displays several inconsistencies, such as increase in tourists right after missile test conducted in the month of April 2016, in the case of

Japanese tourists we can observe that after almost every nuclear of missile test there is a decrease in number of tourists. We can also stipulate, that such trend occurs predominantly after conduction of nuclear tests.

Figure 3 below displays variations in number of Japanese tourists in proportion to nuclear and missile tests conducted by North Korea.

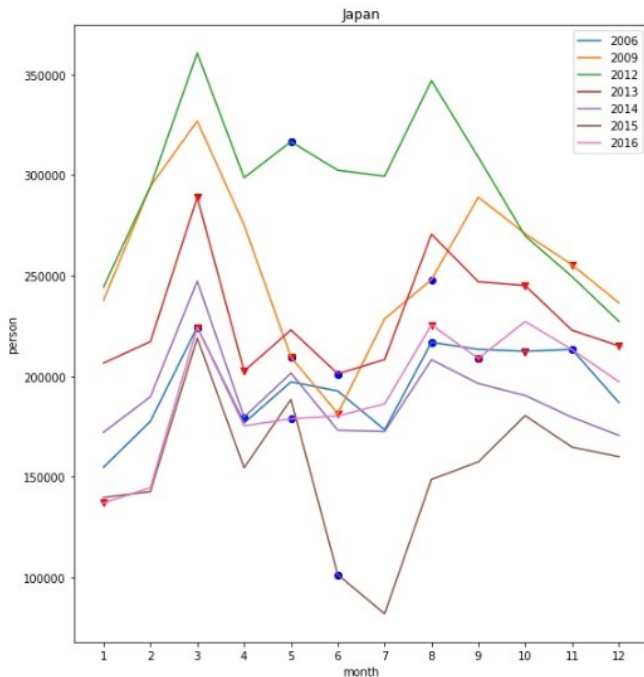


Fig. 3. Number of inbound tourists from Japan and event of nuclear and missile threats conducted by North Korea from 2006-2016.

C. Taiwan

In the case of Taiwan, we can observe similar pattern: in the instances of North Korean nuclear missile tests decrease in number of inbound tourists can be observed, especially in the years of 2006, 2009, and 2016. Figure 4 presents relevant analysis.

D. Discussion

As we tried to investigate whether events of nuclear and missile tests have an influence on the tourist inflow to South Korea, we came across interesting patterns and several inconsistencies, that we were able to observe through our graphs.

For instance, in some years we could conclude that such threatening events contribute to the decrease in incoming tourists. By looking at how number of tourists greatly decrease from May till July in the years of 2009 and 2015, we could conclude that such occurs due to the nuclear or missile tests as they either occur right before or during the decrease. However, after careful investigation, we came across the fact that such decrease overlaps with swine flu and MERS pandemics that occurred in South Korea in 2009 and 2015 with the same period in which decrease of tourists can be observed.

Furthermore, in the case of China, that used to the largest tourism source for South Korea for years, due to the Terminal High Altitude Area Defense system deployment in April 2017 [7], inflow of Chinese tourists decreased by more than 60%, which can contribute to the decrease in the overall tourist number in 2017 shown in the Figure 1 above. Although in 2017 there were numerous missile tests and a nuclear test conducted by North Korea, there is an overlap of the THAAD deployment, missile test conduct and tourist inflow decrease as it started to occur over the same period (March-April). Thus, it becomes hard to distinguish what caused greater influence on the number of inbound tourists.

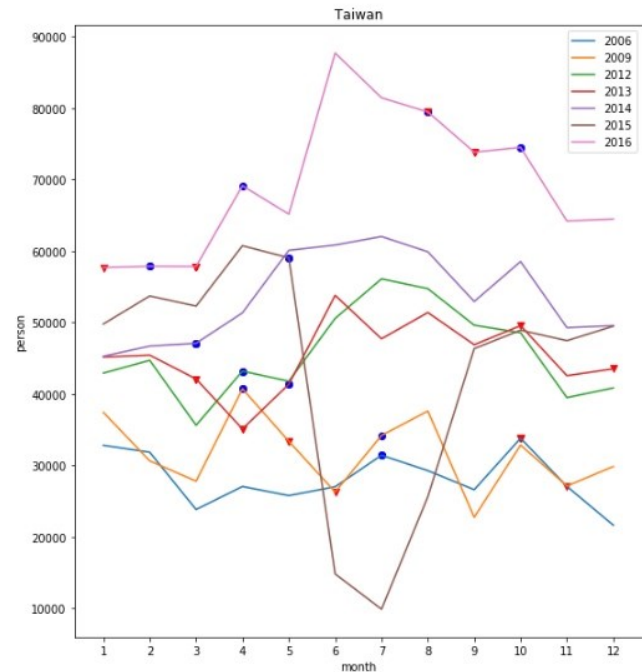


Fig. 4. Number of inbound tourists from Taiwan and event of nuclear and missile threats conducted by North Korea from 2006-2016.

Although in overall, we can conclude that North Korean nuclear and missile tests contribute to the hesitance and as a result decrease in the inbound foreign visitors to South Korea, as we investigate tourist industry, our research becomes limited as other events such as politics, pandemics and economic issues can overlap, thus distinctions are harder to make. Also, although nuclear and missile tests of North Korea are typically covered by the global media, news coverage might vary from country to country, thus some people might not be fully aware of the current situation in Korean Peninsula.

Although with the current situation it appears hard to make solid predictions of whether there will be definite decrease in tourist inflow in the case of nuclear or missile tests by North Korea, we stipulate that as there very few to none papers that investigate such influences, our research, although in need of further empirical investigations, bridges the existing gap and starts the new wave of North Korea threat related research.

IV. CONCLUSION

Process of understanding influences of North Korea provoking actions of nuclear and missile tests has led us to various results that need further empirical investigation. First, as there is not a lot of literature that analyzes North Korea related threats and its influences, except for the research by [3], our paper fills an existing gap and contributes to South-North Korea related body of research. Also, although our research has yield at interesting observations some of the insights were surprising, thus there is definite need to the further investigations. For instance, for the future research agenda we will revise our analytical model. In addition to provide deeper insights we plan analyze data from other countries and see whether North Korea threats have influenced their tourists to come to South Korea. It could be also helpful to look into countries under investigation and see whether their tourist industries were affected as well.

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