

Different Gasoline Prices between Vacation Season and Non-Vacation Season in the Haeundae Beach.

- The seasonality in gasoline prices in Haeundae Beach -

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Abstract

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This project was motivated by the fact that tourist facilities such as hotels, restaurants, gas stations, etc. increased their prices in the tourist season, eventually triggering a government investigation into the market practices of accommodation facilities (e.g., hotels). Following the government's investigation, the accommodation facilities limited the magnitude of seasonal price increases. For my project, I hypothesized that although this government investigation did not probe gas stations near the beach, they too would nonetheless limit their seasonal price increases as a precautionary measure or an indirect effect of the government investigation. My empirical research was based on the difference in differences methodology for my hypothesis. I showed that gasoline prices near the beach during the vacation season decreased after the investigation.

1. Introduction

(1) Motivation

Korea Economics has grown fast over the last 50 years. The nominal GDP per capita of South Korea was 158 USD in the 1960s. At that time, the United States of America's GDP per capita was 3,007 USD. However, today's Korea GDP per capita grows up to 31,363USD.¹ Therefore, until the 1970s, the so-called 'owner-driven car' was the symbol of the wealthy. The car owner was less than 3% of the whole population. After the 1980s, cars came into wide drive in common households. Now, a car is important transportation to ordinary South Korean. The enrolled car rate in government is 23.2%.² One of the main reasons why the enrolled car rate increase is gentrification. It is occurring in many metropolitan areas. Most people cannot buy or rent their houses near downtown or suburban places which have sound public transportation. We can easily find tiny apartments of which rent fee is over than 2000 UDS in the downtown of South Korea. However, many job positions are located at downtown. Therefore, common Korean has to buy a car for commute between their suburban home and downtown. Therefore, Car and gasoline price is close to ordinary Korean household expenditure in today's society.

Above cars distribution change Korean's lifestyle. For instance, 30 years ago, most Korean went to middle-sized markets that are owned by regional unions within walking distance. But now Korean prefer large-sized franchise markets through driving cars one time per week. The change in lifestyle also affects travel for vacation. People usually went vacation places that are close to their home. Now, people prepare far away vacation places than previously. The problem is that Korean vacation diversity is different from the USA. The USA has many international vacation places such as Grand Canyon, Yellowstone, and Yosemite National Park. But the territory size of Korea is one over

¹ World Bank Data.

² Ministry of Land, Infrastructure and Transport Department, Republic of Korea Enrolled car rate in South Korea.

ninety-eight when it is compared to the USA. Korea has limited vacation places. Therefore, during the summer vacation, vacation facilities such as hotels near the beach had market power. 'Haeundae beach' is one of the most crowded vacation places in Korea located in Pusan city. Prices of hotels near 'Haeundae beach' increased unrealistically during the summer vacation. Haeundae beach's many hotels raised fees more than 200% during the summer vacation season. It is excessive prices increase even considering special characteristics in the high demand for vacation spots. Finally, The government started to investigate market power in vacation facilities, especially hotels near Haeundae beach, and strictly prohibit raising fees by excessive market power. For instance, the government implements a policy that hotels are highly recommended to submit their price to the local government and government give the right to people to report excessive hotel price to local government. As a result, the 2016 summer, there was no claim report about hotel fees in Haeundae beach³. But there is still doubt about other Haeundae facilities' market power about price such as retail gasoline price. So, I decide to analyses the indirect effect of the investigation on hotels to gasoline stations before 2016 and after 2016.

(2) Advanced Researches

There are critical advanced researches about retail gasoline price both USA and Korea. Lewis, Matthew S. 2015. "Odd Prices at Retail Gasoline Stations: Focal Point Pricing and Tacit Collusion,"⁴, the paper estimated cause and effect relationship between implicit market power of gasoline stations and gasoline retail price in 31 States. The price of gas stations that sold retail gasoline as an odd number in ending digit (such as XX7 or XX9 dollar) is higher and the price was rarely changed than other stations. Specifically, the author considers median income, median travel time to work, branded Station Share. The author insists that price coordinating used by one of motivation can make market power for the price. The author also studied price coordination mechanisms about a

³ 2016.08.31 Provincial Government Office of Haeundae-Gu, Busan City, Republic of Korea

⁴ Lewis, Matthew S. 2015. "Odd Prices at Retail Gasoline Stations: Focal Point Pricing and Tacit Collusion. *Journal of Economics and Management Strategy*, 24(3)

reader and followers in gasoline markets located in 280 cities in 32 States, 2012. “Price leadership and coordination in retail gasoline markets with price cycles”⁵. After one specific gasoline station reader increased a gasoline price, the others simultaneously raised their gasoline price within 24 hours. The study elucidated a specific reader could coordinate retail gasoline prices in the region. There is another research about retail gasoline prices in South Korea. Kim Donghun. and Song Bogyong. 2012. “A study on retail gasoline market price”,⁶ the paper analyses the variables that can affect retail gasoline price. Among the variables, the number of cars enrolled in local government and payment system significantly affect retail gasoline price.

(3) Contribution.

After the investigation of the market power in Haeundae beach, there are no excessively high hotel fees during the vacation season. However, there are just few empirical analyses about other vacation facilities’ prices near Haeundae beach. Especially, there are no Economics empirical analyses about the effect of the investigation on the retail gasoline market as exemplary punishment. Therefore, I assume a hypothesis if exemplary punishment about hotels affects the retail gasoline market, the retail gasoline price will decrease during vacation season.

⁵ Lewis, Matthew S. 2012. Price leadership and coordination in retail gasoline markets with price cycles. *International Journal of Industrial Organization*

⁶ Kim Donghun. and Song Bogyong. 2012. “A study on retail gasoline market price”,⁶ Ministry of Economy and Finance of South Korea

2. Model and Data

I collected retail gasoline price in Pusan City as daily panel data in Opinet⁷. Unit is Won(Korea current) per liter. Haeundae beach located in Haeundae-Gu (Gu: Korean county unit), Pusan city. Therefore, I separated data by two different standards. First, I divided 2015 retail gasoline data between the non-vacation season (April 15th - June 15th), and vacation season (June 16th – August 15th) and then I also separated data between Haeundae-county and Non-Haeundae-county. I omitted 13 gasoline stations' price information in Pusan City that does not have balanced panel data in 2019. Among 13 omitted gasoline stations, one is located in Haeundae-county. Next, I made regression about this data as the GLS model by Difference in Difference. Second, I analyze 2019 data in the same way as 2015. Finally, I compare 2015's regression results with 2019's regression results. Next, I assume hypothesis that if Pusan City investigation about hotels affects other facilities such as gasoline station, retail gasoline price during vacation season is not significantly different from the non-vacation season.

$$Price_{it} = \alpha + \beta_1 Time_t + \beta_2 Place_i + \beta_3 (did = Time_t * Place_i) + \beta_4 SK_i + \beta_5 Hyun_i + \beta_6 GS_i + \beta_7 Soil_i + \beta_8 NH_i + \beta_9 Selfbrand_i + \beta_{10} Self_i + \beta_{11} Saving_i + v_{it}$$

Price is the retail gasoline price and the dependent variable. The data has independent variables that can influence the retail gasoline price. The four variables “SK”, “Hyun”, “GS”, “Soil” mean gasoline stations' franchise brand like “Exxon Mobile” and “BP”. “NH” is a gasoline station managed by “NongHyup - Korea Agricultural Union”. A variable “Self” means that gasoline station without refuel manager to decrease gas price. “Self Brand” is that the gasoline station has their own brand and does not depend on franchise group. “Time” is a dummy variable. It becomes ‘1’ when each panel date is in vacation season (June 16th – August 15th). “Place” is a also dummy variable. It becomes ‘1’ when the gasoline station is in Haeundae-Gu. “did” is multiple of “time” and “Place”.

⁷ Opinet, Daily Panel Data. Korea National Oil Corporation, KNOOC.

“Saving” means that gasoline stations do not have brands(such as Exxon mobile) to decrease prices. Saving is omitted by Multi-collinearity.

(1) Result of the 2015 year

458 Observation, Won per a Liter

| <i>Variable</i> | Coefficient | P > Z |
|-------------------|-------------|--------|
| <i>Time</i> | 20.94*** | 16.68 |
| <i>Place</i> | -19.97 | -0.50 |
| <i>did</i> | -3.53 | -0.68 |
| <i>SK</i> | 21.53 | 0.64 |
| <i>Hyun</i> | -43.49 | -1.65 |
| <i>GS</i> | -38.98 | -0.97 |
| <i>S-oil</i> | -79.35* | -2.24 |
| <i>NH</i> | -55.04 | -1.77 |
| <i>Self Brand</i> | -9.92 | -1.20 |
| <i>Self</i> | -17.90 | -1.80 |
| <i>Intercept</i> | 1565.62*** | 47.24 |

*** P<0.001, ** P<0.01, * P<0.05 [Table (1)]

Among 458 observation, 41 gasoline stations are in Haeundae beach. The result explains the gasoline retail price before the investigation about hotels in Haeundae beach. “Time” variable is significant in the 99.9% confidence level and the “S-oil” variable is significant in 95% confidence level”. It means that the retail gasoline price in Pusan city increased 20.94 Won(≈ 2 Cent) per one liter during the vacation season. The gasoline retail price in S-oil branches was 79.35(≈ 7.9 Cent) cheaper than other gasoline stations.

(2) Result of the 2019 year

410 Observation, (Won per a Liter)

| <i>Variable</i> | Coefficient | P > Z |
|-------------------|-------------|--------|
| <i>Time</i> | -8.15*** | -10.12 |
| <i>Place</i> | -19.97 | 0.83 |
| <i>did</i> | 3.35 | 1.50 |
| <i>SK</i> | 29.14*** | 3.39 |
| <i>Hyun</i> | 11.34 | 1.27 |
| <i>GS</i> | 8.21 | 0.97 |
| <i>S-oil</i> | 18.47** | 2.75 |
| <i>NH</i> | -19.76 | -1.27 |
| <i>Self Brand</i> | 35.69 | 1.83 |
| <i>Self</i> | -23.55*** | -5.77 |
| <i>Intercept</i> | 1565.62*** | 47.24 |

*** P<0.001, ** P<0.01, * P<0.05 [Table (2)]

Among 410 observations, 39 gasoline stations are in Haeundae beach. The result explains the retail gasoline price after the investigation about hotels in Haeundae beach. “Time” is significant in the 99.9% confidence level. The result explains that the retail gasoline price in Pusan city decreased to 8.15 Won(≈ 0.8 Cent) per one liter during the vacation season. “SK” is significant in the 99.9% confidence level and “S-oil” is significant in the 99% confidence level. It means that the gasoline stations of which brands are “SK” and “S-oil” are 29.14 Won(≈ 29 Cent) and 18.48 Won(≈ 18 Cent) expensive than other gasoline stations. ”Self” is significant in the 99.9% confidence level. It indicated that the gasoline stations that do not have refuel manager have 23.55(≈ 23 Cent) lower price than other gasoline stations.

3. Result and Conclusion

When we compared the gasoline price gap between vacation season and non-vacation season in 2015 and 2019, gasoline price during the 2015 vacation season is certainly more expensive (2 Cent per one liter) than the non-vacation season. But the gasoline price 2019 vacation season is even 0.8 Cent cheaper than the non-vacation season. There are pros and cons about to price change between 2015 and 2019. First, the consumer's utility has increased because of the price decrease during the vacation season. However, when we consider supply and demand, the result of 2019 has probability about the biased market. When the demand increase, the price also increases by the law of supply. Surprisingly, the gasoline price during the vacation season is paradoxically lower than the non-vacation season. The gasoline station owners might carefully set prices during the summer vacation after the investigation of the hotel prices. Of course, excessively high prices by the market power can bring inefficient on the market. But immoderate government involvement can induce side effects too. For instance, we can make compare the number of gasoline stations in 2019 with the number of gasoline stations in 2015. 458 gasoline stations in 2015 decrease up to 423 in 2019, even car distribution rate and energy consumption in Korea have increased between 2015 and 2019. We cannot assure the assertion that local government investigation cause a decline in Pusan City's vacation facility industry. Nevertheless, it is a clear result that residents and travelers in Pusan City have to pay more search costs before the investigation. Moreover, if the increase in search costs overwhelms the profit of the gasoline price decrease, the total utility of consumers will diminish.

Appendix

1. Omitted Gasoline Station Data 2019 in Pusan City

Haneul Gasoline station

Cheon Il Gasoline station (Three Gasoline Stations in Pusan)

Yuseong Gasoline Station. This Gasoline station is located in Haeundae-Gu.

Uri Gasoline Station

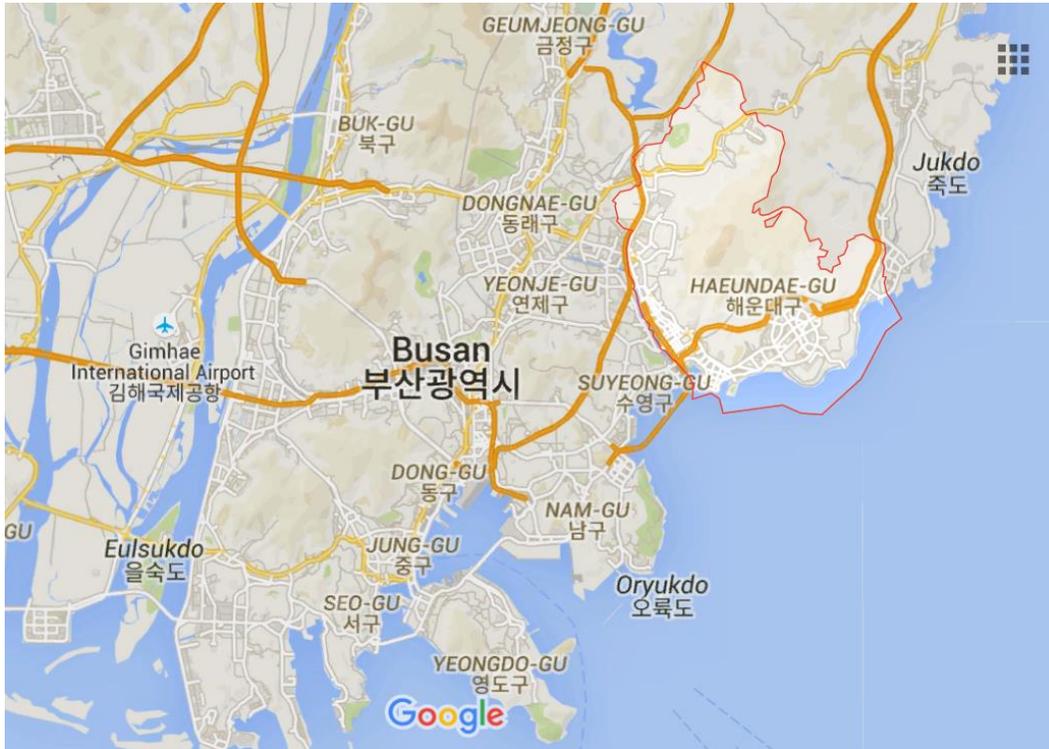
Daeil Gasoline Station (Two Gasoline Stations in Pusan)

Dae Won Gasoline Station (Two Gasoline Stations in Pusan)

Dae Gyeong Gasoline Station

Goryeo Gasoline Station

2. <Figure 1> The location of Haeundae-Gu⁸



⁸ Google Map

Reference

[1] Ministry of Land, Infrastructure and Transport Department, Republic of Korea Enrolled car rate in South Korea. [http://www.index.go.kr/potal/main/EachDtlPageDetail.](http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1257)

[do?idx_cd=1257](http://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1257)

[2] Google Map.

[google.com/maps/place/Haeundaegu,+Busan,+South+Korea/@35.1541718,129.048955,11z/data=!4m5!3m4!1s0x35688d9fdaeda715:0x21c4cd40510865a5!8m2!3d35.1631139!4d129.1635509](https://www.google.com/maps/place/Haeundaegu,+Busan,+South+Korea/@35.1541718,129.048955,11z/data=!4m5!3m4!1s0x35688d9fdaeda715:0x21c4cd40510865a5!8m2!3d35.1631139!4d129.1635509)

[3] 2016.08.31 Provincial Government Office of Haeundae-Gu, Busan City, Republic of Korea. www.nocutnews.co.kr/news/4647734

[4] Lewis, Matthew S. 2015. "Odd Prices at Retail Gasoline Stations: Focal Point Pricing and Tacit Collusion. *Journal of Economics and Management Strategy*, 24(3)

[5] Lewis, Matthew S. 2012. Price leadership and coordination in retail gasoline markets with price cycles. *International Journal of Industrial Organization*

[6] Kim Donghun. and Song Bogyong. 2012. "A study on retail gasoline market price", Ministry of Economy and Finance of South Korea

[7]Opinet, Daily Panel Data. Korea National Oil Corporation, KNOC.

<https://www.opinet.co.kr>