

**The impact of increased cigarette prices
on cigarette consumption**

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Executive Summary

The objective of this study examines whether the way to raise cigarette prices drastically and discontinuously is effective in reducing cigarette consumption. We use monthly data for cigarette consumption to measure the price elasticity of cigarettes' demand and adopt real cigarette prices, real individual income, education level, and unemployment rate as independent variables. We consider how consumers adjust their consumption practices in response to the increased prices. After examining the result of regression, we conclude that cigarette real price has a significant association with the reduction in cigarette consumption. If we divide the last twelve years into periods when prices remained stable and periods characterized by a sharp price increase, we will see a statistically significant effect in the last period with a steep price increase. The results show that in reducing the cigarette consumption, the sharp price increase in cigarette prices at a drastic tax rate is a good alternative to the gradual price increase at an appropriate rate.

1. Introduction

The WHO (World Health Organization) reported that smoking cigarettes is one of the biggest risk factors for early death; approximately 5 million people worldwide are presumed to die of the conditions/diseases related to or caused by smoking every year (2013). This is the reason why many countries attempt to strengthen existing legislation or adopt new tobacco control policies.

According to KASH (Korean Association on Smoking or Health), Korea is struggling with the same issues: in 2013, about 21% of all deaths in Korea were ascribed to smoking cigarettes. In September 2014, the Korean government announced comprehensive smoking cessation policy that included tax increases on cigarettes to improve person's health. Accordingly, the price of cigarettes upsurged in January 2015: the price of most popular cigarette brand was raised from 2,500 won to 4,500 won per pack.

The WHO stressed that "the smoking regulation by raising the price of cigarettes was the most effective and cost-efficient to curb the smoking" (2013). Additionally, Tobacco Control Legal Consortium said that "the price of cigarettes has a significant relationship with people's consumption. When cigarette prices go up, people are inclined to smoke less or quit" (2011). Thus, increasing cigarette price is considered a reasonable measure to restrain smokers from cigarette consumption.

Many countries have increased taxes on cigarettes, presumably, to make cigarettes so costly that people will quit smoking to avoid a higher level of social costs. It is generally known that setting higher prices on cigarettes is effective in decreasing the smoking rate (Jha and Chaloupka, 2000).

Another purpose of increased tax on cigarettes is to secure tax revenues. Most previous studies of advanced countries showed that the price elasticity of cigarettes' demand was inelastic, $-0.25 \sim -0.5$. (Chaloupka, et. al., 2010). Also, cigarettes become object of taxation in that they are not easily replaced by any other product, so tax revenues can be obtained more easily. This is the reason why many countries impose heavy tax on cigarettes.

In Korea, cigarette prices contain sales tax, local education tax, health promotion levy, waste disposal levy, value added tax in addition to a sales margin. In case of most popular brands, tax and levy take up more than 62% of the sales price before cigarette prices have increased from 2,500 to 4,500 won.

However, according to WHO study on cigarettes, among 34 members of Organization for Economic Cooperation and Development (OECD) "Korea had the cheapest cost at 2,500 won (\$2.2) per pack, which was only 35 percent of average price (\$6.4) of OECD countries, while the smoking rate of adult males was the highest level" (2013).

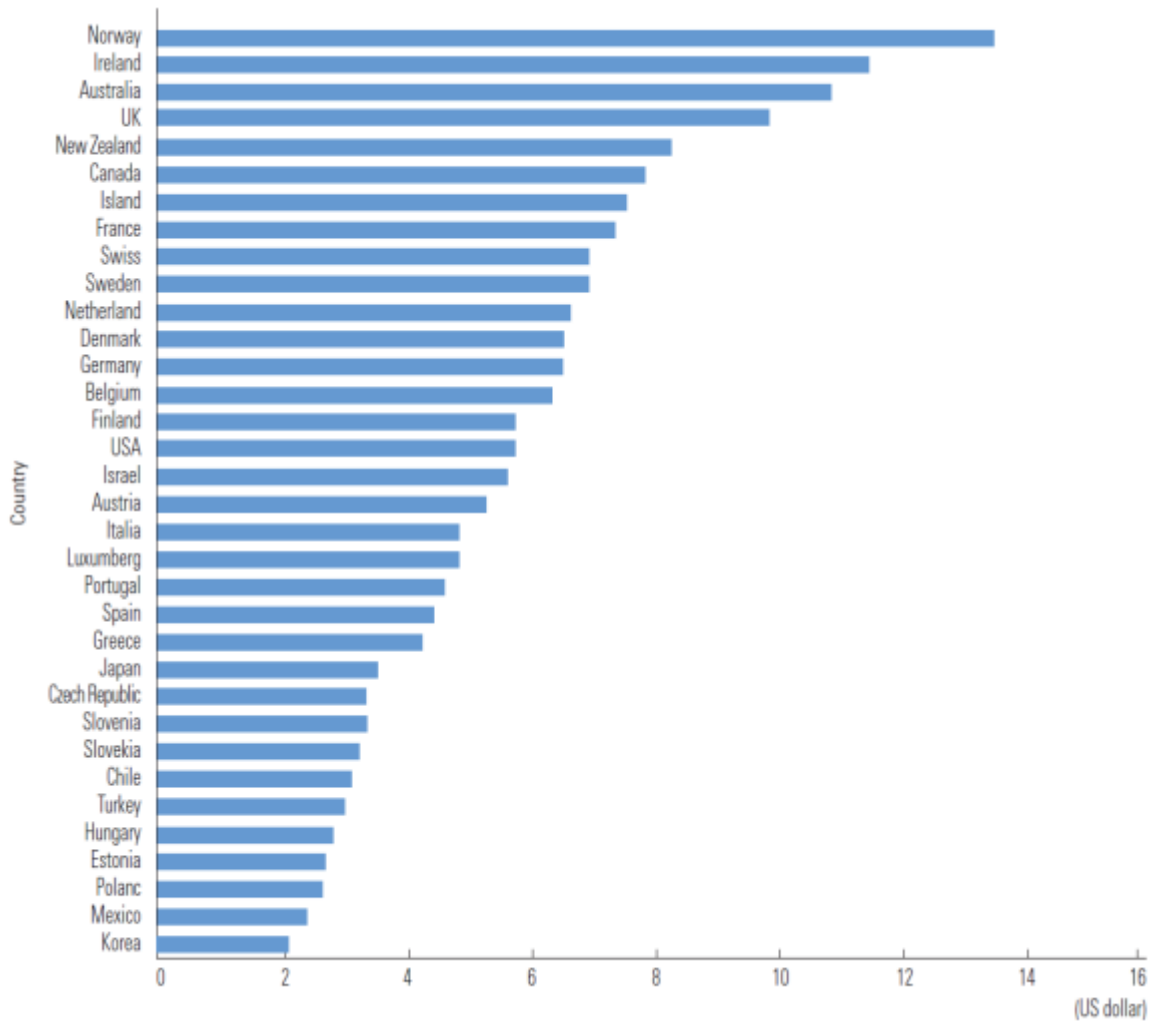
The fact that the smoking rate of an average Korean adult man is the highest among OECD countries is partially related to the cigarette prices (WHO, 2010). In addition to prices, taxation raises concerns that all taxes and levies except VAT are paid based upon the quantity of sold packs rather than the prices.

The Korean government used to display a different attitude on cigarette tax. At first, the cigarette tax had been raised by small percentage at relatively regular intervals, but then it experienced a considerable upsurge in 2015 when the Korean government increased the tax by 114 %. When the Korean government announced the steep increase in cigarette prices, this policy raised a controversial response from the public. People questioned how adequate this price

rise was, which led to a continued dispute on the heavy cigarette tax burden because the policy seemed to focus exclusively on increasing tax revenue instead of reducing the smoking rates.

Therefore, this study focuses on two major goals: first, it analyzes how effective the Korean policy of increased cigarette prices was in reducing consumption; second, it explores how much cigarette consumption reflected the change in the percentage of price increases. Based upon this, I provide the desirable way for increasing cigarette prices.

Figure 1. Comparison of cigarette prices among OECD countries



Source: WHO Global health observatory data repository (2013)
: Prices of a pack of the most sold and cheapest brands of cigarettes in international dollars

2. Cigarette regulation policy in Korea

2.1. Cigarette tax policy

The current cigarette tax system, also known as the specific excise tax system, was introduced in 1989. The cigarette-related taxes, sales tax, education tax, resale payment, and value added tax were unified into cigarette tax.

The cigarette tax is largely divided into two components: national tax and local tax. National tax consists of health promotion levy, individual consumption tax, VAT, etc. From 1997 to 2001, health promotion levy was 2 won per pack. It jumped to 150 won in 2002 and then sharply increased to 841 won in 2015. Waste disposal levy was introduced in 1996, and it increased from 4 won to 7 won per pack in 2004. Individual consumption tax was created in 2015. As for local tax, it consists of cigarette sales tax and local education tax. Cigarette sales tax increased from 360 won to 1,007 won in 2015. National education tax was introduced in 1996, but it was converted into local education tax in 2001.

As shown in Table 1(see the next page), cigarette prices have been gradually increasing for about 15 years. Since 2000, there were 3 upsurges in cigarette prices: 2001, 2002, and 2005; however, since then there have been no changes up to 2015, except the abolishment of farm-support fund, which imposed 15 won per pack.

Up to 2014, when the price of single cigarette pack was 2,500 won, a total tax of 1,550 won (62%) included sales tax of 641 won, local education tax of 321 won, waste disposal levy of 7 won, health promotion of levy 354 won, and 10% value added tax. Through 2014 policy, total tax increased to 3,318 won, which took up about 74% for increased price (4,500 won): sales tax

of 1,007 won, local education tax of 443 won, health promotion levy of 841 won, 10% value added tax of 433 won, and new individual consumption tax of 594 won.

Table 1. The changes of cigarette prices

(unit : KW)

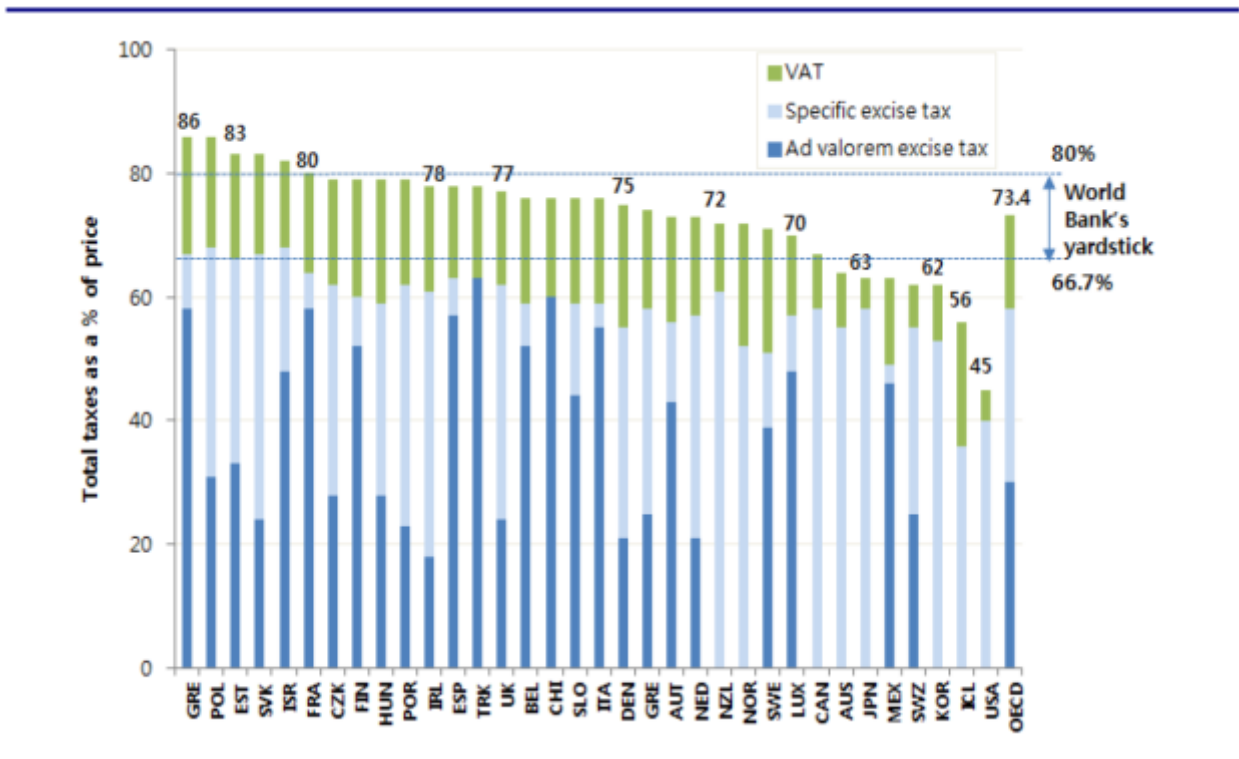
year		2000	2001	2002	2005	2015	
Factory Price and Retail Margin		350 (31.8%)	411 (31.6%)	890 (44.5%)	950 (38.0%)	1,182 (26.3%)	
Tax	Total	750 (68.2%)	889 (68.4%)	1,110 (55.5%)	1,550 (62.0%)	3,318 (73.7%)	
	Local Tax	Subtotal	648 (58.9%)	769 (89.1%)	769 (38.5%)	961.5 (38.5%)	1,449.5 (32.2%)
		Cigarette Sales Tax	464	514	514	641	1,007
		Local Education Tax	184	255	255	320.5	442.5
	National Tax	Subtotal	102 (9.3%)	120 (9.2%)	341 (17.1%)	588 (23.5%)	1,868 (41.5%)
		Health Promotion Levy	2	2	150	354	841
		Individual Consumption Tax	-			-	594
		VAT	100	118	191	234	433
Sales Price		1,100 (100%)	1,300 (100%)	2,000 (100%)	2,500 (100%)	4,500 (100%)	

Source: Ministry of Health and Welfare

The World Bank advised countries to abide by World Bank's yardstick, a standardized evaluation scale, if they wanted to systemically implement smoking cessation policy. It also recommended that the tax portion for cigarette prices would stay between 66.7% and 80% (World Bank, 1999). From 2005 to 2014, Korea had the cigarette tax portion (62%) of total prices lower than World Bank's standard. As for cigarette tax burden of other OECD countries

demonstrated in Figure 2¹ (see the next page), Greece was the country with the highest tax portion for prices (86%), while the United States was the country with the lowest tax portion for prices (45%)

Figure 2. Tax portion for cigarette prices among OECD countries

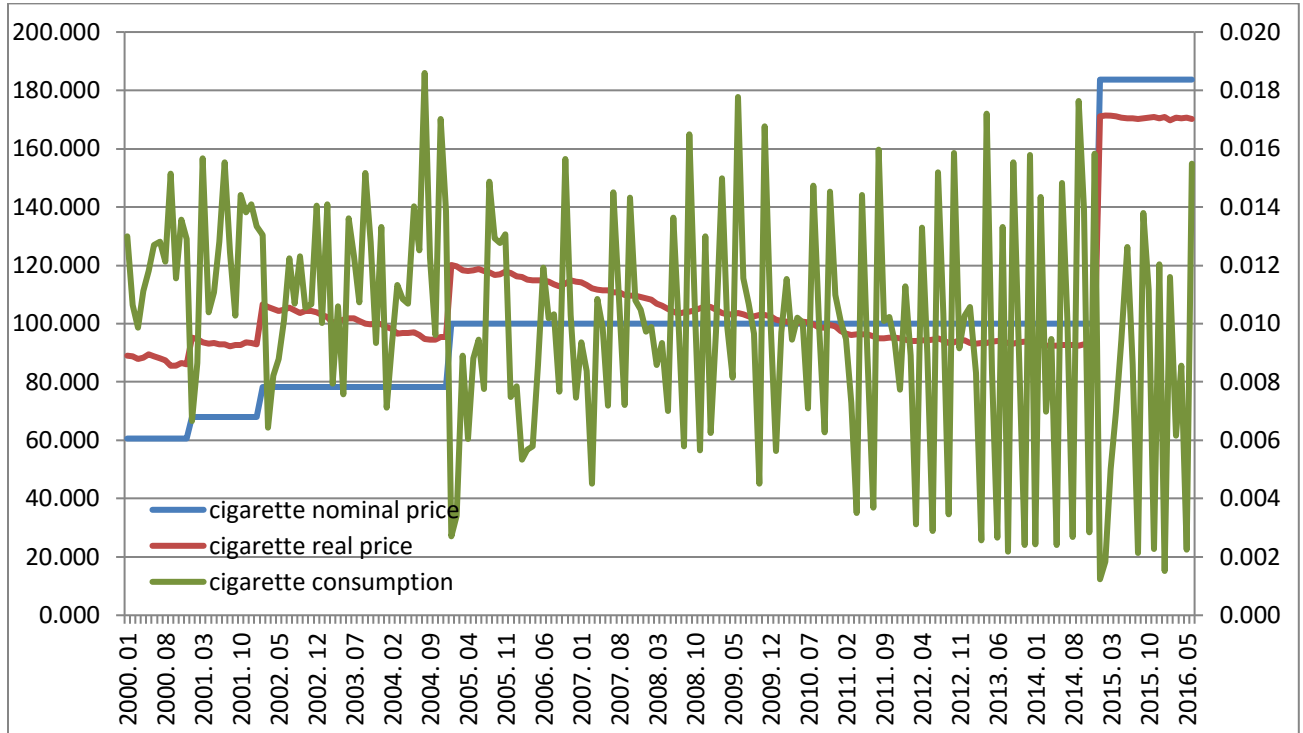


Source: WHO (2010), Most popular cigarettes

Prior to the 2014 policy, the Korean government adhered to an excise tax system. Under this system, the government raised cigarette prices by increasing the cigarette tax irregularly and discontinuously. It seems that the fixed tax rate caused the effect of price reduction, if we assume that the sales prices stayed the same because the real prices fell down due to the inflation.

¹ Tax portion and cigarette prices were by Most popular price Category (MPPC)

Figure 3. Trends in Cigarette Price Index and Sales Volume (2000. 1- 2016. 6)²



Source: KOSIS (2016)

In 2015, cigarette tax increased from 1,550 won to 3,318 won (114%). At the same time, national tax increased by 218%, while local tax increased by 51%, which incited the controversy over tax distribution between central and local government. However, the focus of controversy was the increased gap between the taxes. In comparison with the United Kingdom, the Korean government has sharply increased the cigarette tax. The U.K has increased cigarette tax extremely fast in the past few years: in the last 8years, the tax has been raised by 57% (2005~2013).

² Real Cigarette Price Index (2010 = 100), Sales volume unit: 1,000 pack per capita over the age of 19

2.2. Cigarette non-pricing policy

Since the cigarette tax was first introduced in 1989, it has increased four times, including the time of smoking cessation policy in 2014. However, the non-pricing policy has been steadily implemented throughout the years. As shown in Table 3, initially, the government preferred passive measures to decrease the smoking rate such as advertisement restrictions, NO smoking campaign, etc. Gradually, the government introduced various active ways such as warning signs on the cigarette pack, the abolishment of duty-free cigarettes for the military, the expansion of non-smoking areas, etc. This shows that the Korean government used to prioritize non-pricing policy over tax policy.

Table 2. Non-Pricing Policy Changes

Year	Legal and Institutional Regulation	Antismoking Campaign
1986	Tobacco packaging warning labels reinforced and tobacco advertising limited (Tobacco Business Act)	
1995	National Health Promotion Act established	
1998		National antismoking campaign
2000		Public antismoking advertising begun
2002	Tar and nicotine disclosure to the public	
2003	WHO Framework Convention on Tobacco Control signed, extensive smoking bans in public places enforced, adult certification device in vending machines installed	
2005	WHO Framework Convention on Tobacco Control ratified, free counseling at public health centers and care services provided	Smoking, a behavior that the world bids farewell.

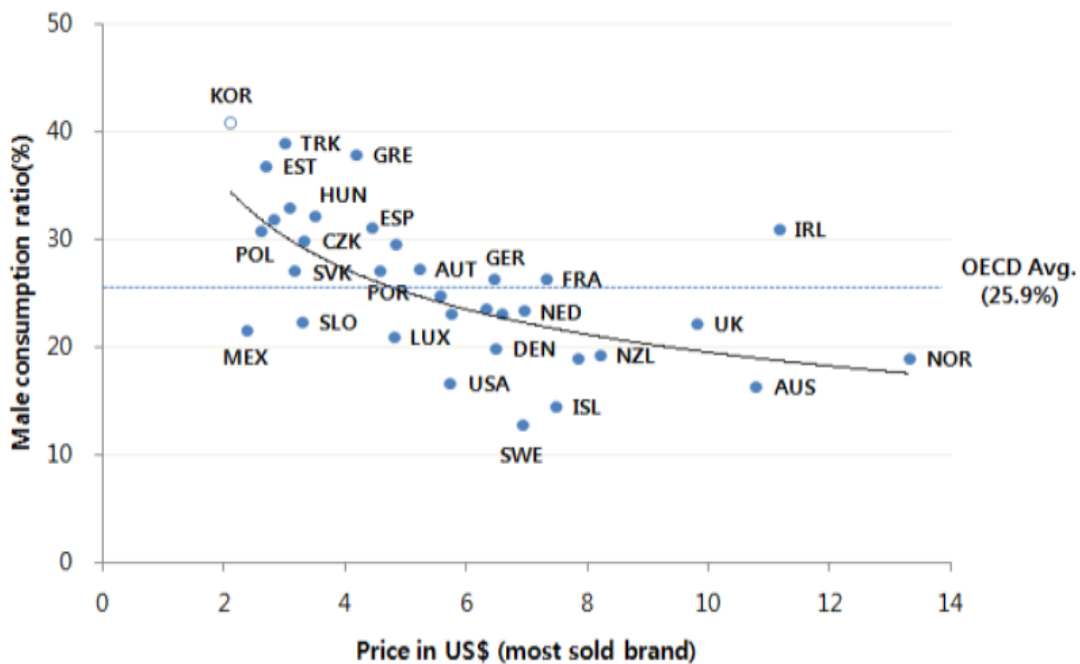
Year	Legal and Institutional Regulation	Antismoking Campaign
2006	Hot line service for smoking cessation begun	Tell us the truth.
2007	Warning messages for carcinogenic substance mandated	Cigarette smoking is invisible violence.
2008		A campaign for saying No
2009	Sales of duty-free cigarettes in the military abolished	
2010	Local governments' authority to enact an ordinance for smoking bans zoning empowered	Do not help Yourself, but get Help.
2011	Ad restricted, warning messages reinforced, designation of public use facilities as non-smoking areas permitted	No smoking sign
2012	Additional warning messages, non-smoking areas designated, WHO FCTC 5th conference of parties hosted	
2013	Protocol to eliminate illicit trade signed, counselor system adopted, messages such as "mild", "low tar", etc prohibited	You can contribute to expanding Korea's health zone.
2014	Warning messages for E-cigarettes reenforced	A place of gathering is a place of nonsmoking.

Source: KT&G.

3. Literature Review

As the cigarette tax burden varies across countries, cigarette prices differ at the country level. The study by OECD showed the strongly negative relationship between cigarette prices and the proportion of smokers over the age of 15 (2012). In case when the smoking rate was over the OECD average like it was in Korea, cigarette prices were relatively cheaper than other countries' prices. The cigarette prices per pack in Estonia, Poland, Hungary were less than \$3 and prices in Korea were the cheapest, \$2.2, before the price increased in 2015.

Figure 4. Cigarette prices per pack in OECD countries and man smoking rate³ (2010)



Source: OECD (2012)

³ The portion of males over the age of 15 smoke everyday

After studying price elasticity of cigarettes' demand, the People's health institute came to conclusion that the hike of cigarette prices reduces the smoking rate (2014). Price elasticity of cigarettes' demand estimates the percentage change in quantity demanded when the price of cigarette increases by 1 percent. In other words, if the price elasticity of cigarettes' demand is equal to 0.3, it means that when the price of cigarette rises by 1 percent, the quantity demanded decreases by 0.3 percent. According to Google "when the price elasticity of demand for a good is relatively inelastic ($-1 < E_d < 0$), the percentage change in quantity demanded is smaller than that in price."

As reported by the People's health institute, when cigarette prices increase by 10% cigarette consumption decreases by 1.3~7% in the short run. This research also shows that the price elasticity of cigarettes' demand for people over the age of 19 and the total population was -0.41 and -0.49, respectively. When looking at the price effect from the point of view of consumer's income, mostly low-income households are affected while high-income households are influenced relatively little. However, blue-collar workers are less likely to be affected by price increases. Based upon this result, the People's health institute argues that government should consider implementing pricing and non-pricing policy simultaneously to decrease the smoking rate of the whole population, regardless of people's income and age.

Local and international scholars have researched the price elasticity of cigarettes' demand. Even though the numbers vary across the countries, the existing body of research points to the conclusion that the price elasticity of cigarettes' demand is inelastic.

According to World Bank (1999), price elasticity of cigarette demand of each country is between -0.14 and -1.23. The price and tax adjustment is the efficient anti-smoking policy which helps reduce the smoking rates.

Gallet and List (2003) analyzed 86 scholar papers on price elasticity of cigarette demand which were presented from 1960 to 2000. As a result, they announced that the average price elasticity of cigarette demand was -0.48. Furthermore, Chaloupka, et. al. (2010) presumed that the price elasticity of cigarette demand varied from -0.25 to -0.5 after analyzing more than 100 Precedent studies.

Since 2000, about 20 new studies have been presented in Korea. Table 3 demonstrates data, variables, and the estimated price elasticity of cigarette demand. Studies based upon time series usually used monthly data, which considered price, income, and time as explanatory variables. Survey studies took household or consumer's characteristics into account. The estimates of price elasticity of cigarette demand were less than -0.6.

Table 3. Price Elasticity of Cigarettes' Demand estimated by previous studies

Researcher	Elasticity	Source and Variables
Choi, S.E.(2014)	Total: -0.425 Income quintile: -0.425 ~ -0.812	Demand=f(real income, income, gender, age, education, occupation, smoking duration); 1998~2011; micro data
Shin, Y. I. and Seo, J. H.(2013)	-0.38 ~ -0.49	Consumption=f(income, price, electricity consumption); 1989~2012; macro data
Choe, B. and Lee, K.(2013)	-0.487	Consumption=f(price, income, population, employment rate); 2005~2013; state/city data
KIHASA (2009)	Total: -0.658; Males: -0.780; Females: -0.483	Telephone survey of smokers (Males 504, Females 295)
Lee, Y. and Na, S. L.(2007)	1965-2005: -0.20 1988-2005: -0.50 ~ -0.43	Consumption=f(price, time, time ² , electricity consumption); 1965~2005; time-series data
Kim, Y. J. (2006)	-0.427 ~ -0.631	
Jeong, W. J. (2006)	Macro data: -0.26 ~ -0.43 Micro data: -1.17 ~ -1.58	
Kim, W. N. and Kim, Y. J. (2006)	Smoker: Jan -0.69, Mar -0.62, June -0.55 Total: Jan -0.39, Mar	$\Delta Q=f(\Delta P, Y, A, E, C, D)$ Q Consumption, P price, Y income, A age, E education C cross effect D smoker dummy;

Researcher	Elasticity	Source and Variables
	-0.37, June -0.35	phone survey of 1,000 people
Kim, W. N.(2005)	Smoker: -0.55 ~ -0.69	Survey
Kim, W. N. et al.(2005)	-0.28~-0.53, -0.3418	Survey
Kim, W. N and Seo, J. H.(2005)	-0.3976	AIDS demand system; 1998~2003; household Survey
Kim, W. N(2004)	All households -0.5206	Expenditure=f(price, income, household characteristics); 1998~2003; urban household, monthly data
Kim, J. H. (2004)	Converges to 0	Consumption, tobacco price index; 1975~2002; time-series data
Kim, Y. I. et. (2003)	-0.18 ~ -0.30	Consumption per capita=f(GDP per capita, tobacco CPI, electricity consumption, year dummies); 1980~1999; time-series data
Lee, M. H. and Seong, M. J. (2002)	-0.058	Time-series model, Linear expenditure system
Kim, W. N. and Lee, C. R. (2002)	Aggregate data Total: -0.19; Adult: -0.177 Micro data: -0.7085	Consumption per capita=f(GDP per capita, tobacco CPI, beverage factory price per capita, Y-1); Aggregate data:1980~1999 Micro data:1991~1999
Kim, S. J. (2002)	Short-run: -0.27; Long-run: -0.36	Consumption per capita=f(electricity consumption, average price, disposable income per capita, warning message dummy); 1960~1997; time series data
Kim, W. M. (2001)	Adult: 0.4; Teens: -1.4	
Kim, J. S. (1996)	Short-run: -0.4553; Long-run: -0.3322	Consumption=(GNP, price, electricity price); 1972~1995; quarterly data

Source: This table is made by modifying Shin and Seo (2013)'s data.

4. Research Design

4.1. Analysis model

By conducting time series model, this study examines how the increase of cigarette prices affects the cigarette consumption and how consumers adjust their consumption practices in response to the increased prices. A time series model is useful for identifying patterns in the series of data at equal time intervals.

This study uses monthly data to compare the price elasticity of demand according to the change of increased price because cigarette consumption varies on a monthly basis. Cigarette consumption is determined by various factors; however, it is difficult to quantify such factors as smoking regulation, gender and age structure, smoking culture, and interest in health. In addition to cigarette prices, previous research demonstrates that such factors as income, education, and unemployment also influence the consumption. Therefore, this paper assumes that cigarette consumption is basically influenced by cigarette prices, individual income, education level, and unemployment rate.

The numerical values are estimated by OLS (Ordinary Least Square) and represented by double logarithm function. The function is as follows:

$$\ln C_t = \alpha + \beta_1 \ln P_t + \beta_2 \ln I_t + \beta_3 E_t + \beta_4 U_t + \varepsilon_t \dots\dots\dots (1),$$

where, C_t is cigarette consumption of people over the age of 19 during time period t , P_t is cigarette real price per pack during time period t , E_t is college graduation rate during time period

t , U_t is an unemployment rate during time period t , ε_t is an error term during time period t and t represents a time variable, a month.

As previously stated, cigarette prices have been increased four times since 2000, and an amount by which the price increased was different at each time. So it is necessary to testify how cigarette consumption differs depending on the percent increase. To analyze this relationship, two time periods⁴ are divided according to the time of cigarette price increases. This division results into 2 dummy variables: first, the period after 2005, and second, the period after 2015. Then we will multiply cigarette real prices by both the dummy variables.

$$\ln C_t = \alpha + \beta_1 interaction1 + \beta_2 interaction2 + \beta_3 \ln I_t + \beta_4 E_t + \beta_5 U_t + \varepsilon_t \dots\dots\dots (2)$$

4.2. Data collection

(1) Dependent variable

Average per capita consumption of cigarette per month is used as the dependent variable. This data is determined by dividing the total number of cigarettes consumed by the number of people over the age of 19. The source of data is KOSIS (Korean Statistical Information Service).

(2) Independent variables

Real cigarette prices, real individual income, education level, and unemployment rate are used as the independent variables. Firstly, real cigarette prices are obtained by dividing nominal

⁴ period 1 (2005.1~2014.12), period 2(2015.1~2016. 6). The change of price before 2005 is not expected to affect significantly because the amount by which the price increased is so small.

cigarette price index by consumer price index, which is based upon the index of 2010 (2010 = 100). Secondly, real individual income is determined by dividing the average ordinary income by the average number of households; the obtained number is divided by consumer price index of 2010. Thirdly, education level refers to college graduation rate which is provided by the survey of KOSTAT for population of age between 25 and 64. This data cannot be collected monthly, so it is assumed that the year data is the same throughout the month. Lastly, an unemployment rate is defined as “a percentage by dividing the number of unemployed individuals by all individuals currently in the labor force (Google definition).”

Table 4. The description of variables

	Variable	Measurement
Dependent variable	consumption of cigarette	Total consumption ÷ people over 19 years
Independent variable	real cigarette Price	Nominal cigarette prices ÷ CPI (2010 = 100)
	real income	Average ordinary income ÷ average number of households ÷ CPI (2010 = 100)
	education level rate	People graduated from college ÷ the number of people between 25 and 64
	unemployment rate	The number of unemployed ÷ the number of all individuals in the labor force
	interaction1 (Dummy)	Cigarette real prices * dummy (time from 2005.01 to 2004.12)
	interaction2 (Dummy)	Cigarette real prices * dummy (time from 2015.01 to 2016.06)

* Data source: KOSIS (Korean Statistical Information Service, <http://kosis.kr/>)

The number of observations was 198 from January, 2001 to June, 2016, and Summary statistics of variables are as follows.

Table 5. Summary statistics of variables

Variable	Obs	Mean	Std. Dev.	Min	Max
ln cigarette consumption	198	-4.710	0.530	-6.697	-3.985
ln cigarette real price	198	4.657	0.172	4.449	5.143
ln real income	198	13.781	0.875	13.571	13.927
unemployment rate	198	0.036	0.005	0.027	0.057
college graduation rate	198	0.349	0.062	0.241	0.431

Figure 5. The trend of Real individual income (2000.1~2016.6, unit: KW)

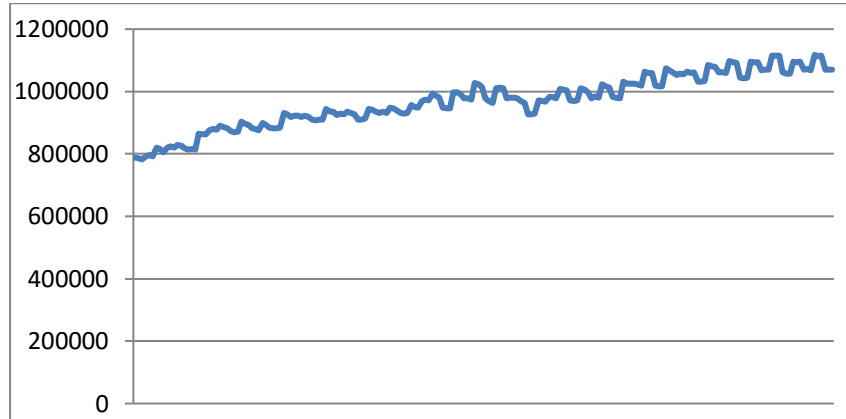


Figure 6. The trend of Education level (2000.1~2016.6, unit: %)

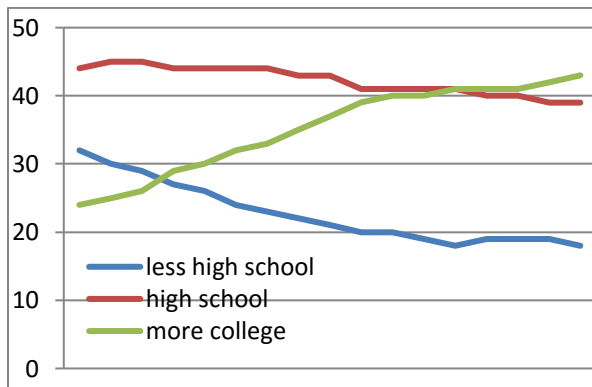
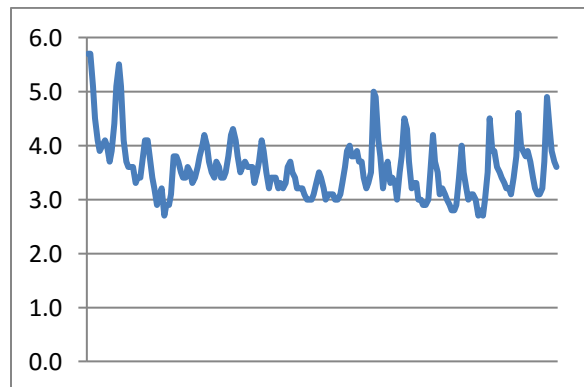


Figure 7. The trend of Unemployment rate (2000.1~2016.6, unit: %)



5. Analysis and findings

First, Table 7 reports the estimated results during the overall period of 198 months. Examining the result of regression, we see that cigarette real price has a significant association with the reduction in cigarette consumption at the 99 percent confidence level. Additionally, there is another factor that affects cigarette consumption: the data prove that there is a negative causation between the level of education and smoking rate and it is statistically significant at 95 percent level. However, other variables (income and unemployment rate) do not affect cigarette consumption. There is no evidence to suggest that these variables are relevant.

Table 6. The result of the robust regression with differenced variables (1)

Variable	Coefficient	Robust Std. Err.	t	P> t
ln cigarette real price	-4.432	0.506	-8.77	0.000***
ln real income	-2.588	3.067	-0.84	0.400
unemployment rate	24.227	19.876	1.22	0.224
college graduation rate	-33.322	12.679	-2.63	0.009**
Constant	0.542	0.055	0.98	0.326

*** $P \leq 0.01$, ** $P \leq 0.05$, * $P \leq 0.1$

Second, Table 8 indicates how much cigarette consumption reflects the change in percentage of price increases. Interaction 1 is the change of cigarette consumption when cigarette prices increased by 25%, from 2,000 won to 2,500 won (2005.1 ~ 2014.12). Interaction 2 demonstrates the change of cigarette consumption when cigarette prices increased by 80% from 2,500 to 4,500 (2015.1 ~ 2016.6). If we divide the estimation of cigarette consumption by the earlier and later periods respectively, we will see a statistically significant effect in the last period. The large increase in price, which occurred at the end of the second time period is statistically significant

to reduce the cigarette consumption at 99 percent level. The regression result also shows that college graduation rates cause the decrease of cigarette consumption at 95 percent level.

Table 7. The result of the robust regression with differenced variables (2)

Variable	Coefficient	Robust Std. Err.	t	P> t
interacton1 ⁵	-2.149	2.026	-1.06	0.290
interacton2 ⁶	-5.041	0.431	-11.72	0.000***
real income	-2.175	3.068	-0.71	0.479
unemployment	25.398	19.785	1.28	0.201
college graduation rate	-39.211	15.844	-2.47	0.014**
constant	0.061	0.556	1.09	0.279

*** $P \leq 0.01$, ** $P \leq 0.05$, * $P \leq 0.1$

⁵ Cigarette real prices * 1 (dummy value : time from 2005.01 to 2004.12)

⁶ Cigarette real prices * 1 (dummy value : time from 2015.01 to 2016.06)

6. Conclusion and recommendations

Consistent with previous research, this study shows that increases in cigarette prices cause the reduction in cigarette consumption. Therefore, many policymakers suggest that the increase in cigarette prices is the best option to decrease the smoking rate. However, it is necessary to contemplate the price elasticity of cigarettes' demand, dividing the time periods by with and without a sharp price increase.

As shown in Table 8, the steep and steady increases in cigarette prices affect cigarette consumption differentially. Especially, when the cigarette prices increase sharply, people are more likely to quit smoking. This result implies that the sharp increase in cigarette prices at a heavy tax rate can help reduce the smoking rate.

The Korean government has increased cigarette prices a few times, but the sharp hike by 80 percent in 2015 was the first radical attempt to reduce the smoking rate. In the past, the government merely raised cigarette prices by a small percentage at relatively regular intervals. The cigarette policy in 2015 was different from all previous increases because the cigarette prices and tax were increased very sharply - by 80, 114%. This led to conflict over the adequacy of price raise and tax burden.

However, after considering how previous policies failed to significantly affect the smoking rates, this study shows that sharp increases in cigarette prices are necessary and justified. This study found that the steep increase in cigarette prices is more effective in reducing the smoking rates.

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