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Effects of Retail Prices on Cigarette Consumption

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ABSTRACT

Retail price comprising tax is supposed to be one of the measures to reduce tobacco consumption which is one of the most important mortality and morbidity causes at global level. This study aims to investigate the effects of retail prices and affordability in Turkey on decreased cigarette consumption.

In this study, the necessary time to earn one cigarette was estimated as workload of people with minimum wage. Correlation analysis between the necessary time and the amount of cigarette consumption showed a significant negative correlation of 92.1% Our results indicate that, the purchasing power of the target community rather than the price of cigarettes with or without taxes is more effective for tobacco control.

Keywords: Tobacco Consumption, Cigarette Prices, Purchasing Power

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INTRODUCTION

Tobacco consumption is one of the most important public health issues for all countries. According to the data of Global Burden of Diseases Study 2017 conducted by the Institute for Health Metrics and Evaluation (IHME), 14% of the deaths in the world and 21% of the deaths in Turkey are caused by tobacco consumption (IHME, 2020).

Non-communicable diseases are the leading causes of mortality and tobacco consumption is among the first line risk factors for these diseases. Being a preventable cause, there is a worldwide fight against tobacco consumption.

To prevent mortalities caused by tobacco consumption the World Health Organization (WHO) brought the Framework Convention on Tobacco Control to the agenda in 2003, and declared MPOWER measures to draw a global roadmap in 2008. Turkey participated in the Framework Convention on Tobacco Control in April 28, 2004.

The WHO, in 2015, declared that Turkey was the only country that fulfilled the criteria of MPOWER. However, during the same year 41.4% of men and 16.3% of women over 15 years old in Turkey were consuming cigarettes on a daily basis, and these rates were far above the high humanitarian developed country averages (American Cancer Society, 2019).

In order to prevent the negative economic and social effects of tobacco use and to reduce the direct and indirect costs caused by tobacco consumption, several measures for reducing tobacco consumption have been implemented all over the world. Among these, increasing the taxes seems to be the most common practice.

Increasing taxes and therefore increasing prices in tobacco products is supposed to be one of the most effective methods for reducing tobacco use. This method, which is especially effective in reducing the tobacco use of young people, helps to convince smokers to quit.

According to the reports, in only four countries, representing only 2% of the world population, tobacco taxes are more than 75% of the retail price. A 70% increase in cigarette prices is reported to reduce deaths worldwide by 25% (WHO, 2008).

Tax amount in the retail price does not comprise a fixed ratio due to combination of excise and fixed taxes. Thus, more reliable value seems to be the retail price itself. The aim of this study is to analyze the effects of cigarette retail prices influenced by taxes which are applied in our country on cigarette sales.

METHODOLOGY

Cigarette sales and retail revenue data were compiled from data published by the Ministry of Agriculture and Forestry. The average retail price of one cigarette was found by dividing the total retail revenue by the sales amount. Since there are twenty cigarettes in a pack, this number has been multiplied by twenty to reach the retail price of a pack of cigarettes. The pack price had to be calculated, for fixed taxes were implemented per pack. Total retail revenue amounts are expressed in dollars using the annual average exchange rates compiled by the Ministry of Treasury and Finance.

Data on the minimum wage is compiled from the annual minimum wage data published by the Ministry of Family, Labor and Social Services. The minimum wage had been increased twice a year, in the first six and second six months, until 2016. Then it has been increased once a year to be applied from the beginning of the year. In terms of comparability, the first six months minimum wage amount was used for the periods before 2016.

Through the Inflation Calculator which was developed by the Central Bank of the Republic of Turkey (TCMB) inflation-free real amounts of annual data of cigarette sales and the minimum wage were obtained.

In calculating the necessary working time to earn one cigarette, average retail cigarette sale price, net minimum wage and monthly working time to earn the minimum wage are used. Article 63 of the Labor Law No. 4857 stipulates that the weekly working time is 45 hours, and this period is distributed equally over working days unless otherwise specified or otherwise agreed. According to this, in a workplace which operates six days a week, the daily working time will be 7.5 hours. In Social Security Institution procedure, the month is taken into account as 30 days, so the monthly working time is calculated as 30 × 7.5 = 225 hours. This monthly working time of 225 hours was expressed as 810,000 seconds. As a result of dividing the minimum wage by 810,000 seconds, the time to work for 1 Turkish Lira (TL) was calculated as seconds. Starting with the fact that there are 20 cigarette pieces in a pack, the price of cigarette pack is divided by 20 and the price of one cigarette piece was found. Given the retail price of one cigarette, the number of seconds needed to earn enough for one cigarette was calculated by multiplying the price of one cigarette by the time required to work for 1 TL.

T= RP x (225x3,600) / NMW

RP: Retail Price one piece

NMW: Net Minimum Wage

T: Necessary time to afford one cigarette (seconds)

"Cigarette sales amount", "time for one cigarette piece" and "real sale price" variables were analyzed in terms of distribution with Shapiro-Wilk test. It was determined that these variables showed normal distribution ($p>0,05$). As the variables were measured numerically and showed normal distribution, a correlation analysis was made with the Pearson Correlation coefficient.

Actually, the effect of sole tax could not be analyzed as its share in the real pack price was not easy to estimate. There is a fixed tax for each pack additional to proportional excise tax. The analyses were so made using cigarette pack total sale prices which included production costs, marketing costs and benefits together with different types of taxes.

RESULTS

Domestic cigarette sales and retail prices from 2008 to 2018 are seen in Table 1. Table 2 shows the change in the excise tax amount applied to tobacco products within the relevant years. Analyzing the amount of cigarette sales in the domestic market between 2008 and 2018, shows a marked decrease in the first half of the period. However, staring from 2014 it started to increase gradually. We can see continuous increases in nominal cigarette prices by time, but increases in real prices were not so prominent.

Changes of real and nominal retail cigarette sale prices and changes in quantity of sales over the years are shown comparatively in Figure 1. Yearly nominal price increase can easily be seen. However, the real price increase gradient was very low. On the contrary, there was slight decrease in 2015 and more prominent decrease after 2017. As a reflection of this, an increase in the amount of cigarette sales can be observed in the same periods.

Figure 2 shows the real and nominal changes of the net minimum wages throughout the years 2008 and 2019. Although nominal minimum wages increased gradually by years, real minimum wage changes remained flat, except a sharp increase in 2016. The reflection of a 30% increase in minimum wage just after the parliamentary elections can be seen in the Figure.

The working time of a person with minimum wage to afford one cigarette and the sales amount of cigarettes in the same period time are given in Figure 3. The Figure actually compares the time spent to earn money to buy one cigarette and the amount of its sale shown in Figure 1.

Although real cigarette prices increased between 2015 and 2016, the amount of time required to earn one piece decreased during this time. Consequently, a rapid increase shift started in cigarette consumption.

When a correlation analysis was made between the time spent to afford a cigarette and the sales amount -in other words consumption- a significant negative correlation of 92.1% was detected between the two variables ($r = - 0.921$; $p < 0.001$). On the other hand, such significant correlation was not found between pack price and sales amount and ($r = -328$; $p > 0.05$), where different types of taxes played the main role to form the real sales price.

Table 1: Excise Tax Taken from Tobacco Products (2002-2019)

Date	**Proportional (Relative) Excise Tax (%)**	**Minimum Fixed Tax (TL/Package)**	**Fixed Tax (TL/Package)**
29.12.2009	63.00	2.65	
12.10.2011	65.00	2.90	
01.01.2013	65.25	3.15	0.09
03.07.2013	65.25	3.23	0.0922
01.01.2014	65.25	3.75	0.13
01.07.2014	65.25	3.94	0.1366
01.01.2015	65.25	3.99	0.1866
01.07.2015	65.25	4.21	0.1968
01.01.2016	65.25	4.42	0.2468
01.07.2016	65.25	4.56	0.2546
01.12.2016	65.25	4.56	0.3246
01.01.2017	65.25	4.86	0.3246
03.07.2018	63.00	5.60	0.42
01.01.2019	67.00	0	0.42
01.05.2019	67.00	5.35	0.42
03.07.2019	67.00	5.79	0.4539

15.08.2019	67.00	7.79	0.4686

Ref: Çakmaklı et al., Administration of Income Website (Date of Access: 08.12.2019)

Table 2: Domestic Cigarette Sales and Retail Price

Years	**Domestic Sales**				
	Sale Amount (Million Pieces)	**Retail Sales Revenue (TL)**	**Retail Sales Revenue (US$)**	**Nominal Cigarette Sale Price (Package, TL)**	**Real Cigarette Sale Price (Package, TL)**
2008	107,858	18,342,201,352	14,186,758,051	3.40	3.40
2009	107,554	20,402,965,760	13,188,730,291	3.79	3.56
2010	93,354	24,041,960,283	16,024,127,731	5.15	4.54
2011	91,217	24,598,105,744	14,729,404,637	5.39	4.31
2012	99,257	30,588,330,136	17,064,619,323	6.16	4.63
2013	91,659	32,646,104,243	17,170,321,643	7.12	4.99
2014	94,681	34,624,817,147	15,825,883,350	7.31	4.73
2015	103,210	39,648,844,291	14,576,673,808	7.68	4.57
2016	105,488	47,950,493,321	15,871,077,640	9.09	4.99
2017	106,223	55,966,662,596	15,343,065,249	10.54	5.16
2018	118,541	62,676,353,709	13,021,089,134	10.57	4.31

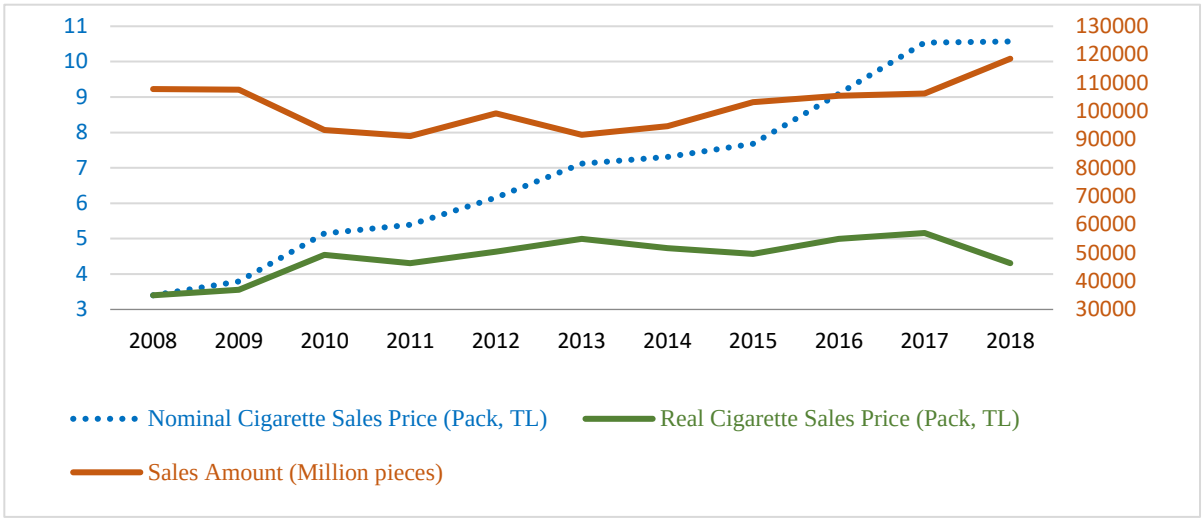

Figure 1: Nominal and Real Cigarette Prices per Package and Change of Cigarette Sales Amount, 2008-2018

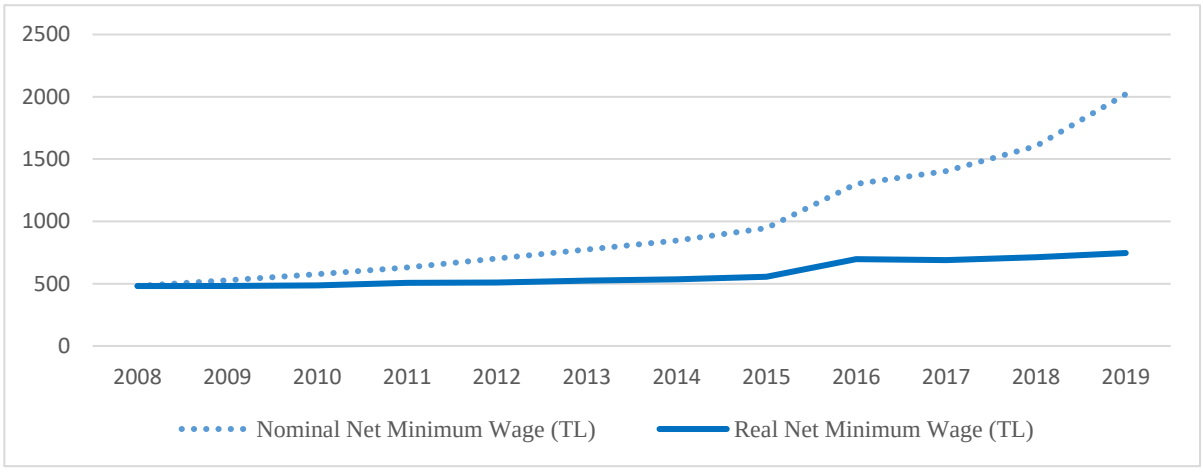

Figure 2: Minimum Wage Changes, 2008-2019.

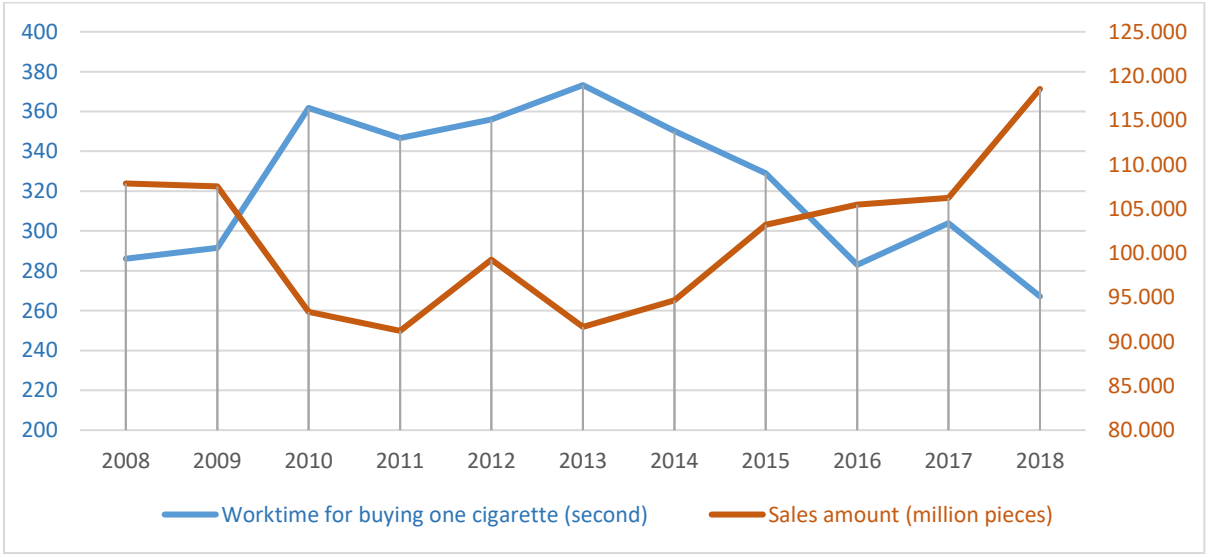

Figure 3: Change of the time (seconds) of a person working with minimum wage to afford one piece of cigarette and the sales amount, 2008-2018.

DISCUSSIONS AND CONCLUSIONS

Tobacco use, which is one of the preventable risk factors of noncommunicable diseases, which ranks first among the causes of death, is accepted as the cause of approximately 15% of all deaths worldwide (IHME, 2020). In order to prevent these deaths and health problems which are caused by tobacco use, the Tobacco Control Framework Agreement was prepared by the WHO and the MPOWER criteria and the anti-tobacco policy bundle were announced.

Turkey is the first country who have completed MPOWER criteria by strictly implementing anti-tobacco policy. One of the most effective policies implemented under these criteria was tobacco taxes.

The WHO regards taxation as a global issue, not just a national issue. Globally, only 32 countries (10% of the world's population) tax cigarettes at the level of WHO recommendation, which is 75% or more of the retail price (Soneji et al., 2019). There is not a uniform policy about the amount of taxes. Actually, what matters is not the tax amount, but the final retail price of cigarettes. Smaller taxes help keep the price of cigarettes lower in low-income countries compared with middle- and high-income countries. For example, mean prices of a pack of cigarettes in low- and middle-income countries in 2016 were virtually identical: $1.94 in low-income countries and $1.95 in high-income countries. However, middle-income countries levied a mean of $2.35 in taxes (55% of pack price), whereas low income countries levied a mean of $1.15 in taxes (37% of pack price) (Soneji et al., 2019).

In our country, besides the value added tax (VAT), excise tax is applied to tobacco products and the tax burden reflected in the retail price in 2018 reached 81.4% (WHO, 2019). In addition to VAT, which is a relative tax, excise tax is applied as a fixed tax expressing both relative and fixed tax. In addition to the relative tax, the fixed tax application prevents the prices from going under a certain level. Excise tax is important to attract the attention of the consumer

directly to the current product. The effects of excise taxes on consumption and health is proportional to their size. Large tax increases signal to consumers that these products are dangerous and lead to large reductions in their use (Chaloupka et al., 2019).

In 2018 the tobacco sales revenue has reached 62,676,353,709 TL. According to the tax rate applied in our country, it is seen that there is a tax income of around 50 billion TL (81.4%). This revenue generates a considerable amount of Turkey's budget income.

As pointed out above, besides the specific effects of tax types, they clearly help to increase the retail price. Experiences show that the more the retail price increases, the more decrease in consumption occurs. The common view is that the increase of tax burden in cigarette prices is expected to decrease tobacco consumption over the years. As we stated earlier, we were unable to analyze the effect of sole tax for its share in the real pack price was not easy to estimate throughout the years. Since taxes show their major effect by increasing the price, we preferred to analyze the effect of total sale price. In this regard parallel with the common view, our hypothesis was that the increase of cigarette pack prices is expected to decrease tobacco consumption over the years.

As shown in Figure 1, there was a significant impact in this direction in 2010 and 2013 in Turkey. However, when all the years within the scope of this study are examined, this effect has not been steady.

It gives the impression that there are some other dominant factors other than the price of cigarettes which affects the cigarette consumption. Also, although a nominal price increase occurs regularly, the inflation-free real price increase is not regular. In other words, real price increases have been realized rarely, at least not every year. Literature indicates that, infrequent increases in tax rates have contributed to continued affordability of cigarettes, especially in low- and middle-income countries, thus do not result in decreased consumption (Soneji et al., 2019).

It can be assumed that consumers with a high income are less effected by the increased price. In our country, the majority of smokers are supposed to be those with less income, who might be easily affected. That is why this study examines the relationship between consumption and price as well as purchasing power.

A major part of the population that consumes cigarettes works for minimum wage, so is affected by the increase of cigarette prices. We used the minimum wage as a measure of purchasing power. To have an objective criterion, using the time that a person who receives the minimum wage had to work to earn a cigarette piece is preferred as a measure.

As shown in Figure 2, the minimum wage has increased nominally over the years. However, the real increase generally draws a horizontal line except in 2016. In 2016, there was a significant minimum wage increase. We know that was a promise during the general election, and the increase was made just after that.

Matching the Figure of changes in the sales amount of cigarettes over the years with the Figure showing the working time of a person on minimum wage to afford one cigarette gives us an interesting view. In other words, the necessary time to be able to buy a cigarette and the consumption amounts are given in the same Figure to see their relation. As seen in Figure 3, these two lines are mirror images of each other. Whenever one increases, the other decreases. Statistical analysis revealed negative correlation of 92.1% between the two variables (r:-0.921).

Therefore, it appears that cigarette consumption has a stronger relationship with purchasing power than sales price itself. That is to say that increased sale amount in 2016 in spite of increased price was due to increased purchasing power. The real minimum wage increase in 2016 caused a marked decrease in working time per cigarette. That implies a relative decrease in price. Thus, it resulted in an increase in consumption. During this period, no tax increase occurred affecting cigarette prices at the same rate. The effect of the price increase in

2017 was manifested by the decrease in the rate of sales amount, but the real cigarette price declined in 2018 to the levels of 2011 and thus the sales amount increased rapidly.

Baum et al. claimed that for every one-dollar increase in cigarette tax per pack country life expectancy increased by 1 year (95% CI 0.60 to 1.40 years) over the long run, with the first 6-month increase in life expectancy taking 10 years to realize (Baum et al., 2019). In light of our findings, we suggest that this statement should be revised, for affordability is more effective than the tax itself. So, for tobacco control, it is better to focus on the purchasing power of the target community rather than the price of cigarettes with or without taxes. To keep tax impact on cigarette sales we need to balance it with the purchasing power of the majority of smokers.

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