

Gender Differences in Smoking Behaviour: Analysing the Changes for the 2008-2014 Period in Turkey

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Sigara İçme Davranışında Cinsiyet Farklılıkları: Türkiye’de 2008-2014 Dönemi Değişimlerinin Analizi

Abstract

The motivations and reasons for smoking initiation, continuation, and cessation for women are different from men. This paper investigates the differences in smoking rate and intensity by gender in Turkey from 2008 to 2014. The results indicate significant differences in the decision to smoke and how much to smoke by gender. Results further indicate that the positive effects of the anti-smoking policies are fading away over time. Especially for women, the smoking and consumption levels are higher in 2014 than in 2008. This study argues that policies designed to combat the initialization and the intensity of smoking should account for the behavioural differences observed across genders.

Keywords : Cigarette Smoking Behaviour, Gender Difference, GATS, Turkey.

JEL Classification Codes : I12, I18.

Öz

Kadınlar için sigara içmeye başlama, devam etme ve bırakma nedenleri erkeklerden farklıdır. Bu çalışma, Türkiye’de 2008 yılından 2014 yılına kadar, sigara içme oranı ve yoğunluğunda cinsiyete göre ortaya çıkan değişiklikleri araştırmayı amaçlamaktadır. Sonuçlar, sigara içme kararında ve sigara içme miktarındaki önemli farklılıkları göstermektedir. Çalışma sonuçları, ayrıca, sigara içme yaşağının etkilerinin zamanla azaldığını ve özellikle kadınlar için sigara içme oranı ve tüketim düzeyinin 2014 yılında 2008 seviyelerinden daha yüksek olduğunu göstermektedir. Bu çalışma sigaraya başlama ve sigara tüketim yoğunluğu için kadın ve erkekler nezdinde farklı politikalar tasarlanmasına ihtiyaç olduğunu önermektedir.

Anahtar Sözcükler : Sigara Tüketim Davranışı, Cinsiyet Farklılıkları, GATS, Türkiye.

1. Introduction

It is a well-accepted fact that the motivations and reasons for smoking initiation, continuation and cessation for women are different from men. There are several studies investigating the initiation of smoking by race, gender etc. (Amin & Lhila, 2016; Herzfeld et al., 2014; Pieroni & Salmasi, 2016). It is essential to draw attention to the fact that for women, socio-economic status (SES), pregnancy, smoking history of their close families, internal (stress, life-dissatisfaction, social pressure/images/prejudice, self-control, health concern, lack of knowledge, misperception of health risk) and external mediators (advertisement, policy interventions, tax, smoking ban, negative campaign, educational program) are going to impact on smoking initiation and intensity. In order to design effective tobacco reduction and cessation (TRC) policies and programs, women specific factors should be taken into account. The objective of this study is to identify how gender influences smoking initiation and intensity in Turkey using the Global Adult Tobacco Survey (GATS) 2008 and 2012 data and Health Survey 2014 data conducted by Turkish Statistical Institute.

Smoking prevalence in Turkey has been decreasing over time from 33.6% in 1993 to 27% in 2012, while male smoking rate was 57.8% and 41.4% in 1993 and 2012, respectively; the female smoking rate was 13.5% in 1993 and 13.1% in 2012. While the male smoking rate has been consistently decreasing, the female rate has peaked at 19.5% in 2004 and has been declining since then (Herzfeld et al., 2014). While the world average smoking rate by women aged 15 and over is reported 6.97 % in 2012 while it was 10.97% in 2000 according to the WHO (World Health Organization), the range of the prevalence is very wide, the lowest being 0.2% (Niger) and the highest being 39.8% (Serbia), 42.6% (Kiribati) in 2012. There are also significant regional differences. The rate is low in lower and middle-income countries in East Asia/Pacific (2.73%) and Sub-Saharan Africa (2.81%) and it is high in the countries in the European Union (24.77%). North American average rate is 15.25% while it is 9.79% for Latin American countries. There is a clear picture of significantly lower smoking prevalence among women in lower and middle-income countries.

In addition, cultural and religious factors have strong effects on female smoking prevalence as well. The composition of Middle East in terms of female smoking is fairly mixed. Out of nine countries with 2012, female smoking prevalence rate reported by WHO, four countries have the rate lower than 3% (Egypt, Iran, Saudi Arabia and Oman), two countries (Jordan, Israel) have the rate greater than 20%. Turkey (13.5%) and Jordan (10%), on the other hand, are in the middle. If we observe the tendency in Islamic countries, the female smoking rate is amazingly low for the countries where more than 90% of the population report being Muslim. The lowest is Niger (0.2%) and the second highest is Pakistan (3.6%), while the highest is found in Turkey (13.5%). Therefore, as a country with 97.5% of population being Muslim, Turkey displays the clear contrast with other countries with large Muslim population.

Out of 129 countries including both developed and developing countries, which are included in the WHO statistics, the smoking rates among women have declined in 120 countries if compared the rates between 2000 and 2012. The largest decline was observed in

Nepal (-20.4%) while the average decline was 4 %. In all regions, the female smoking rate has been decreasing in developing countries. In the developing countries in East Asia and Pacific, it was 4.48% in 2000 and became 2.73% in 2012. In Europe and Central Asia, it changed from 17.04% to 12.97%. In Middle East and North Africa, it was 4.24% in 2000 and became 2.81% in 2012. In Latin American countries, it changed from 15.31% to 9.79%. The smoking prevalence rate for women in Turkey in 2012 is 13.5% while it was 19.7% in 2000.

In this context, many studies conducted both in developed and developing countries confirm that women's smoking tend to be a revealed symbol of social problems (Greaves 2015; Bottorff et al., 2014). The studies conducted in developed countries confirmed the high smoking rate among women with low income/socio-economic status in order to tackle poverty and stress as well as to cope with negative emotions resulting from trauma, sexual and physical abuse, and domestic violence (Greaves, 2015; Kilic & Ozturk, 2014; Nichter et al., 2010; US Department of Health and Human Services, 2001; Moore et al., 2009; Barbeau et al., 2004; Novotny et al., 1988). In developing countries, while women's smoking rate has been significantly lower than the one in the developed world due to unfavourable views of female smoking based on traditional, cultural, social and family norms, such views have been gradually changing due to the composite effects of campaigns by tobacco industry, globalization, modernization and empowerment of women. Meanwhile, the studies conducted in developing countries indicate an increasing trend in smoking rate among "empowered" women with relatively high socio-economic status since female smoking plays a role of signalling the emancipation from such traditional constraints (Bottorff et al., 2014; Kilic & Ozturk, 2014; Block & Webb, 2009). Considering the contrast observed among women in developed and developing countries, it is critical to identify the target population correctly and understand the background situation in order to design the effective policies and cessation programs to smokers with specific SES.

As for the Tobacco Control Policies in Turkey, followed by Law No. 4207 on Preventing Harms of Tobacco Products in 1996 which banned smoking in some public places and any kind of advertisement of tobacco products, Bill No. 5727, the Tobacco Control and Prevention of Hazards Caused by Tobacco Products Law adopted in January 2008 expanded the range of smoking bans in public places. Actual enforcement of the Law at hospitality workplaces (restaurants and cafes) was started in July 2009 in order to give the industry time to adjust their venues to the new law (Bilir et al., 2012). Given these changes, while GATS 2008 could be capturing the partial impact of Bill No. 5727, we expect GATS 2012 reveal the impact of the Bill more comprehensively. The total excise tax rate has been increasing from 49.5% in 2002 to 65% in 2011. Together with 15.25% value added tax, the total tax rate per pack of cigarette accounts for more than 80% of the retail price (Bilir et al., 2012). Although the tax policy is not a gender specific policy, it is obvious that there are gender and SES specific impacts (Greaves & Hemsing, 2009). The burden of an increase in cigarette tax is significant especially for low-income, lone-parent mothers. It is important to provide sufficient support for cessation especially for these low SES group of women since an increased expenditure on tobacco directly crowd out the expenditures for health, nutrition and in some cases education (Bilir et al., 2012; John, 2008; John et al., 2012; John et al.,

2011). Further, including 2014 data provides further comparison opportunities and analysis of the policy affect form the smoking ban in the longer run.

Since gender differences in cigarette consumption, especially female tobacco use, has become a hot debate issue in constructing anti-smoking policies, the developments on this issue is important in order to reveal the recent patterns of the cigarette consumption of men and women. In this context, this study aims to explore what has changed in smoking behaviour of men and women in Turkey over time.

The next section provides data and methodology used in the empirical analysis while the "Results" section summarizes the main findings. The main findings and related policy implications, the shortcomings of the analysis and potential directions for future research are discussed in the "Discussion" section and the final section concludes.

2. Data and Methodology

This study employs data obtained from Turkish Statistical Institute, which contain information regarding smoking behaviour of individuals. Global Adult Tobacco Survey (GATS) is a country representative survey conducted by Turkish Statistical Institute in conjunction with CDC Foundation. Data are available for 2008 and 2012. For 2014, data are obtained from the Health Survey conducted by Turkish Statistical Institute. The Health Surveys are conducted every two years since 2008, however only 2014 data contains information regarding smoking. Therefore, in order to achieve a larger time span and to take into account lagged effects of policy changes, 2014 data is also included in this study.

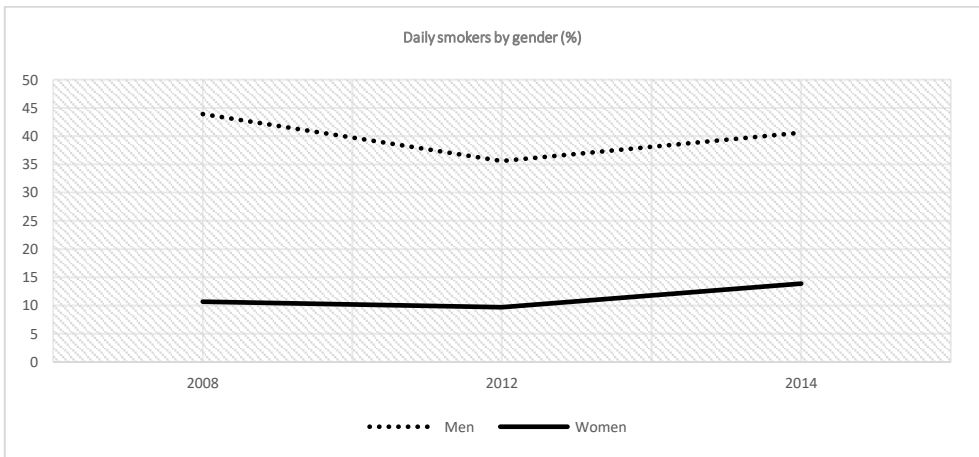
Since the dependent variable, the number of cigarettes smoked per day, consists of nonnegative integer values, count data models are used as an estimation methodology. The results of the Likelihood Ratio (LR) and Vuong tests indicate the Zero-inflated Negative Binomial (ZINB) model to be the preferred method. For count data models, the Poisson regression model is generally treated as a starting point. Poisson distribution assumes equidispersion, which refers to equal mean and variance for the dependent variable. Since equidispersion is a strong assumption and most distributions are overdispersed, i.e., the variance exceeding the mean, negative binomial (NB) models are offered to deal with overdispersion. Zero inflated (ZI) count data models add extra weight to the probability of observing a zero by a mixing specification by assuming the zeros can arise from both abstention (i.e., non-smokers) and corner solution (i.e., potential smokers).

In essence, zero inflated models estimate two equations. The first equation is used for the count model and the second one is used for excess zeros. In count data models two different type of zeros are observed. "True zeros" are the zeros originates from a current smoker not smoking any cigarettes for a given day, whereas "excess zeros" originate from non-smokers. Therefore, it is essential to differentiate between true and excess zeros in count data estimations. The model estimated for excess zeros (the inflation model) is basically a logit model and it predicts whether or not the number of cigarettes smoked per day is a certain zero. The general form of ZINB models are as follows:

$$y_i \sim \begin{cases} 0 & \text{with probability } \varphi_i \\ g(y_i|x_i) & \text{with probability } 1 - \varphi_i \end{cases} \quad (1)$$

When the prevalence rates from the 2008, 2012 GATS and 2014 Health Survey (Table 1 and 2) are compared, a u-shaped trend stands out. Daily smoking rate have initially decreased from 43.9% to 35.66% and further increased to 40.63% for men. For women, there is also a u-shaped trend. However, particularly for women, there is only a slight (one-point) initial decrease is observed. Further contrast between genders is observed in the prevalence rates for daily women smokers, and it have reached above the 2008 level. The increasing trend is more prominent in women from 2012 to 2014 (Figure 1).

Figure: 1
Prevalence Rate of Daily Smokers by Gender



In other words, the situation became worse than the initial rate of smoking prevalence in 2014 for women. Contrary to the U-shaped rebound to prevalence rate, the average number of cigarettes smoked per day, i.e. smoking intensity, has increased for both genders from 2008 to 2012 and decreased in 2014, presenting an inverse u-shape relationship. Furthermore, this increase from 2008 to 2012 is more pronounced for women as compared to men since it has increased from 11.7 to 15.1 cigarettes per day for women while it has increased from 19.1 to 20.2 cigarettes per day for men. When 2012 and 2014 are compared, smoking intensity for men has decreased from 20.2 to 18.14 while for women decreased from 15.1 to 12.35. The net change from 2008 to 2014 reveals that smoking intensity has decreased for men but increased for women. In addition, the number of cigarettes smoked per day shows a declining pattern as the years of education increases for men. In terms of the relationship between women and educational level, Turkey exhibits an unexpected pattern. Smoking intensity increases with the years of education. Therefore, in Turkey the more educated the women are, the more cigarettes consumed.

Table: 1
Prevalence Rates of Smoking by Selected Socio-Demographic Characteristics for Men and Women

Characteristics	Smoking Status																		
	Daily (%)						Occasional (%)						Current non-smoker (%)						
	2008		2012		2014		2008		2012		2014		2008		2012		2014		
Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men	Women		
Sex	43.9	10.7	35.6	9.7	40.63	13.88	3.8	3.3	4.2	2	5.46	4.97	52.3	86.0	60.2	88.3	53.92	81.15	
Age (years)																			
15-24	35.4	10.4	29.4	4.6	30.45	6.33	4.5	2.8	3.9	2.6	6.05	3.94	60.1	86.8	66.7	92.8	63.49	89.73	
25-44	54.4	14.6	46.4	15.3	50.48	20.10	4.6	4.8	5.2	3.2	6.56	6.94	41.0	80.6	48.4	81.5	42.96	72.96	
45-64	42.5	8.9	34	9.2	43.31	14.89	2.4	2.3	4.1	1.4	4.33	4.30	55.1	88.8	61.9	89.4	52.36	80.81	
65 and over	18.7	1.2	14.3	1.9	17.50	3.03	3.1	0.7	2.1	0.2	4.04	1.95	78.2	98.1	83.6	97.9	78.46	95.02	
Education																			
Primary or less	45.0	7.7	35.9	19.5	42.23	13.17	3.2	3.0	4.1	2.8	5.02	4.94	51.8	89.3	60	77.7	52.75	81.89	
Secondary	41.1	14.1	39.1	29.1	43.91	21.72	5.7	2.5	4.9	4.4	6.14	6.18	53.2	83.4	56	66.5	49.95	72.11	
Higher	43.5	21.6	29.3	23.6	32.54	18.70	3.7	5.1	4	3	6.41	6.43	52.8	73.3	66.7	73.4	61.05	74.87	
Employment																			
Not working	31.8	9.3	23.6	12.4	29.90	12.08	3.4	3.0	3.9	2.4	4.24	4.57	64.8	87.7	72.5	85.2	65.86	83.35	
Employed	49.7	22.5	43.9	38.4	44.56	23.16	4.4	5.0	4.6	4.2	5.61	6.73	45.9	72.5	51.5	57.4	49.83	70.11	
Self-employed	50.0	14.5	41.4	34.6	40.31	16.49	3.2	5.1	4.1	4	5.27	5.84	46.8	80.4	54.5	61.4	54.42	77.66	
Residence																			
Urban	43.9	15.8	38	25.2	N/A		3.8	4.4	4.3	3.3	N/A		52.3	79.8	57.7	71.5	N/A		
Rural	44.0		33.3	17.7			3.7		4.2	2.8			52.3		62.5	79.5			

Source: Global Adult Tobacco Survey, 2008, 2012. Health Survey by Turkish Statistical Institute (TUIK), 2014.

Note: *Average number of cigarettes smoked per day is reported by daily smokers and average values are calculated by only including individuals who have positive cigarette consumption.

Curious pattern emerges when we observe the changes in daily smoking rate for each category of the major socio-demographic characteristics, age (Figure 2) and education (Figure 3).

Figure: 2a
Prevalence Rates for Daily Smokers by Age for Men

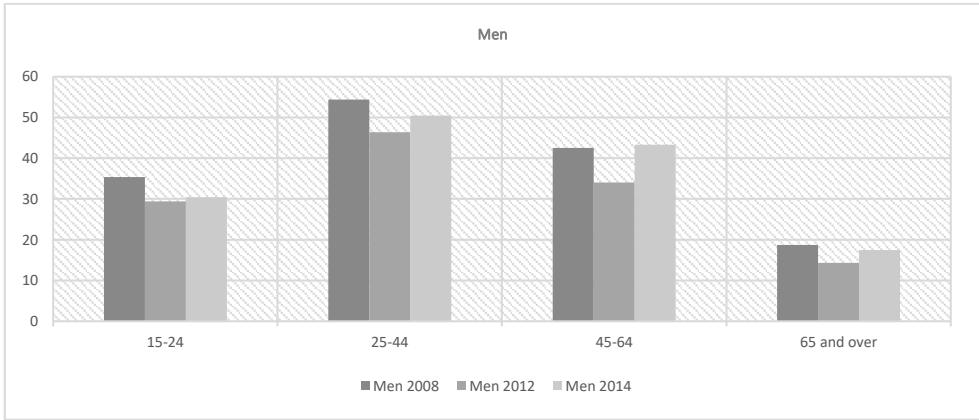
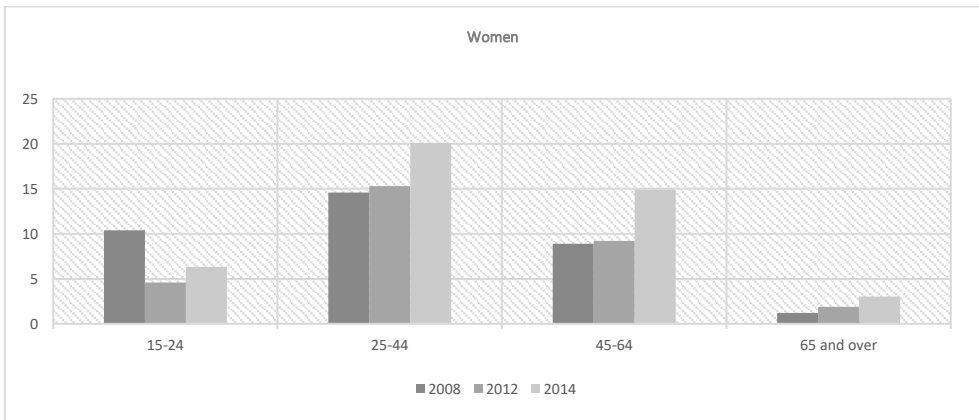


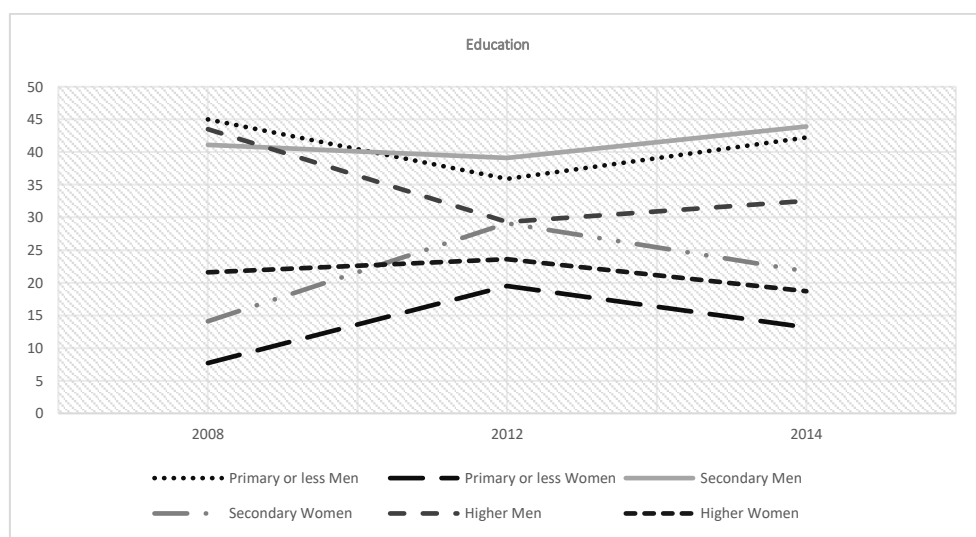
Figure: 2b
Prevalence Rates for Daily Smokers by Age for Women



For example, the daily smoking rate by age group shows that the rate over 2008-2012-2014 period displays the U-shaped patterns for both genders. However, the shares in 2014 are less than the share in 2008 for males (except for age 45-64) while the rates are greater in 2014 compared to 2008 for females (except for age 15-24). As for education, while the pattern is U-shaped for males over the years, it is an inverse-U shaped for females. Although it is difficult to determine the reason behind these contrasts, we can conclude that the implemented smoking policies had different impacts for people with different levels of

education. In particular, the smoking ban seems more effective to males with higher level of education (decreased from 43.5% to 32.54%) while the overall policy impacts for males with lower level of education is not promising (the rates have changed from 45% to 42.23% for primary or less, from 41.1% to 43.91% for secondary between 2008 and 2014). The similar observation is true for females (more effective impact of policy on people with higher level of education) although the rates once increased in 2012 and then decreased in 2014. While the smoking rate for females with higher education has dropped from 21.6 to 18.70 percent, during the same period, the rates have increased by 5 to 7 percent for the lower educated subgroups.

Figure: 3
Prevalence of Daily Smokers by Education and Gender (%)



Identical patterns are recognized for the shifts in smoking rates based on employment status. For both genders, the employed population has the highest share of smoking. Although the rate has decreased by 5 percent for employed males between 2008 and 2014, the rate is still high and marking 44.56%. The smoking rate is the lowest for unemployed subgroup for both genders. Hence, there is a clear picture that the working population is significantly more likely to be daily smokers.

When we compare the changes in the average number of cigarettes smoked per day between 2008 and 2014, we do not observe any significant changes between these two years (Table 2). For most of the categories, the cigarette consumption has slightly decreased. However, particularly for lower educated, unemployed and self-employed female subgroups, the number has been increasing over time. Curiously, for almost all the categories, the consumption of cigarettes has increased in 2012.

Table: 2
Average Number of Cigarettes Smoked per Day by Selected Socio-Demographic Characteristics for Men and Female

Characteristics	Average number of cigarettes smoked per day*					
	2008		2012		2014	
	Men	Women	Men	Women	Men	Women
Sex	19.1	11.7	20.2	15.1	18.14	12.35
Age (years)						
15-24	16.9	9.7	17.5	15.1	15.62	9.50
25-44	18.8	11.1	20.5	14.2	17.75	11.82
45-64	20.5	14.2	21.4	17	19.66	13.98
65 and over	18.5	13.8	17.1	15.3	18.56	13.40
Education						
Primary or less	20.0	10.9	20.9	15.2	18.90	12.28
Secondary	17.8	12.3	19.3	14.3	17	12.59
Higher	17.9	12.6	17.8	15.6	16.48	12.07
Employment						
Not working	19.4	11.3	18.3	15.2	18.09	12.08
Employed	18.2	12.7	20.3	14.6	17.82	12.71
Self-employed	20.1	14.9	22.1	16.5	20.68	16.25
Residence						
Urban	18.3	12.0	16	14.8	N/A	
Rural	19.9		20	16		

Source: *Global Adult Tobacco Survey, 2008, 2012. Health Survey by Turkish Statistical Institute (TUIK), 2014.*

The descriptions regarding the independent variables used in this study are presented in Table 3. Apart from the standard individual co-variates such as age, education, income, price, place of residence and employment, this study also uses further interesting characteristics such as the presence of other smokers in the household, media and smoking attitude.

Table: 3
Variable Information

Category	Name	Description	Share		
			2008	2012	2014
Age groups	<i>Age 15-24</i>	Base category	13.95	13.2	13.48
	<i>Age 25-44</i>		30.05	28.33	29.39
	<i>Age 45-64</i>		19.58	21.09	22.07
	<i>Age 65 +</i>		7.47	8.90	8.94
Education	<i>Years of education</i>	The highest educational attainment of the individual aggregated into years of schooling			
		Primary School (%)	28.08	26.8	26.08
		Secondary School (%)	11.27	12.81	14.39
		High School (%)	11.91	11.29	13.00
		University + (%)	6.21	7.37	8.88
Employment status	<i>Not employed</i> <i>Employed</i> <i>Self employed</i>	Base category	26.54	36.29	37.23
Price	<i>Ln(price)</i>	The logarithmic transformation of the price of one cigarette.			
Income	<i>Quintile 1</i>	In order to proxy for household income asset index quintiles are calculated following [18]. Quintile 1 represents the poorest and omitted as the base category.	29.89	19.21	9.43
	<i>Quintile 2</i>		21.38	22.00	13.10
	<i>Quintile 3</i>		20.36	20.46	24.89
	<i>Quintile 4</i>		16.07	18.94	22.08
	<i>Quintile 5</i>		11.32	18.44	29.3
Social interaction	<i>Other smokers</i>	The presence of other smokers in the household.			60.02
Advertisement effect	<i>Media</i>	Whether the individual have seen pro-cigarette marketing in the mass media during the last 30 days.			0.12
Knowledge about health effects of smoking	<i>Smoking attitude</i>	Individuals answer to the question "To your knowledge and in your opinion, does tobacco use cause serious diseases?" is used to understand the individual's attitude towards smoking.			-
Place of residence	<i>Urban</i>	Base category			
	<i>Rural</i>				

Table: 4
Estimation Results for the Zero-Inflated Negative Binomial Model for Women

Variables	Logit <i>Decision not to smoke¹</i>			Negative Binomial <i>Number of cigarettes smoked per day</i>			Marginal Effects		
	2008	2012	2014	2008	2012	2014	2008	2012	2014
Age 25-44	-0.590 *** (0.157)	-1.549 *** (0.209)	-2.377 *** (0.107)	0.143 (0.095)	-0.044 (0.134)	0.174 ** (0.068)	0.657 *** (0.212)	0.469 *** (0.409)	3.068 *** (0.235)
Age 45-64	-0.379 ** (0.182)	-1.461 *** (0.227)	-2.336 *** (0.112)	0.407 *** (0.108)	0.156 (0.144)	0.365 *** (0.073)	0.965 *** (0.309)	1.952 *** (0.546)	3.965 *** (0.314)
Age 65 and over	0.774 * (0.427)	-0.515 (0.337)	-1.603 *** (0.206)	0.396 (0.280)	0.019 (0.222)	0.244 * (0.134)	-0.165 (0.447)	0.574 (0.585)	2.847 *** (0.562)
Years of education	-0.111 *** (0.015)	-0.094 *** (0.015)	-0.076 *** (0.008)	0.027 *** (0.009)	0.016 * (0.009)	0.000 (0.004)	0.123 *** (0.017)	0.112 *** (0.019)	0.073 *** (0.009)
Employed	-0.408 ** (0.160)	-0.436 *** (0.148)	-0.94 *** (0.075)	0.115 (0.084)	-0.025 (0.079)	0.117 *** (0.040)9	0.527 ** (0.215)	0.398 * (0.210)	1.182 *** (0.109)
Self-employed	-0.709 ** (0.319)	-0.417 (0.276)	-0.64 *** (0.190)	0.287 * (0.173)	0.082 (0.164)	0.405 *** (0.103)	1.268 ** (0.611)	0.582 (0.464)	1.754 *** (0.393)
Ln(price)	4.367 *** (0.433)	4.062 *** (0.440)	-	-0.344 (0.132)	-0.087 (0.120)	-	-3.923 * (0.377)	-3.909 *** (0.434)	-
Quintile 2	-0.101 (0.211)	-0.213 (0.152)	-0.086 (0.097)	0.059 (0.129)	0.061 (0.092)	-0.083 (0.056)	0.159 (0.251)	0.298 (0.218)	-0.043 (0.101)
Quintile 3	-0.189 (0.216)	-0.285 * (0.163)	0.080 (0.103)	-0.186 (0.136)	0.089 (0.097)	0.025 (0.059)	-0.076 (0.222)	0.424 * (0.247)	-0.039 (0.110)
Quintile 4	-0.238 (0.222)	0.093 (0.172)	0.0126 (0.100)	-0.098 (0.134)	0.22 ** (0.105)	0.022 (0.056)	0.068 (0.246)	0.232 (0.247)	0.047 (0.110)
Quintile 5	-0.382 * (0.207)	0.554 ** (0.247)	0.348 *** (0.113)	-0.035 (0.128)	0.316 ** (0.157)	0.014 (0.062)	0.270 (0.253)0	-0.091 (0.311)	-0.300 *** (0.104)
Other smokers	-2.269 *** (0.130)	-2.278 *** (0.114)	-2.283 *** (0.083)	0.321 *** (0.086)	0.284 *** (0.069)	0.326 *** (0.053)0	2.221 *** (0.224)	3.403 *** (0.306)	2.439 *** (0.131)
Media	0.246 (0.255)	0.008 (0.213)	-6.145 *** (0.139)	0.034 (0.150)	-0.166 (0.129)	0.386 (0.392)	-0.150 (0.247)	-0.224 (0.227)	13.31 ** (5.657)
Smoking attitude	-0.109 (0.381)	-0.452 (0.354)	-	-0.118 (0.222)	0.150 (0.220)	-	-0.057 (0.406)	0.524 (0.447)	-
Urban	-0.872 *** (0.127)	-0.836 *** (0.129)	-	0.098 (0.079)	-0.097 (0.077)	-	0.779 *** (0.166)	0.641 *** (0.183)	-
Likelihood-ratio test of $\alpha=0$: chibar2(01)	1238.84 ***	2740.4 ***	95.23 ***						
Vuong test of ZINB versus standard NB: z =				13.92 ***	15.09 ***	24.48 ***			
N	4761	5379	11593						

Table: 5
Estimation Results for the Zero-Inflated Negative Binomial Model for Men

Variables	Logit <i>Decision not to smoke</i>			Negative Binomial <i>Number of cigarettes smoked per day</i>			Marginal Effects		
	2008	2012	2014	2008	2012	2014	2008	2012	2014
Age 25-44	-1.237 *** (0.133)	-0.627 *** (0.128)	-1.321 *** (0.094)	0.123 *** (0.046)	0.114 ** (0.049)	0.098 *** (0.031)	4.77 *** (0.661)	2.841 *** (0.626)	3.884 *** (0.340)
Age 45-64	-0.850 *** (0.135)	-0.32 ** (0.129)	-1.023 *** (0.097)	0.182 *** (0.049)	0.154 *** (0.052)	0.167 *** (0.033)	4.166 *** (0.703)	2.166 *** (0.643)	3.495 *** (0.351)
Age 65 and over	0.253 (0.182)	0.424 ** (0.174)	-0.025 (0.131)	0.025 (0.074)	-0.07 (0.080)	0.119 ** (0.051)	-0.541 (0.784)	-1.667 *** (0.631)	0.767 * (0.423)
Years of education	0.024 ** (0.011)	0.027 *** (0.010)	-0.029 *** (0.007)	-0.006 (0.024)	-0.02 *** (0.004)	-0.012 *** (0.002)	-0.123 *** (0.047)	-0.200 *** (0.045)	-0.01 (0.019)
Employed	-0.458 *** (0.105)	-0.73 *** (0.102)	-2.928 *** (0.108)	-0.024 * (0.036)	0.106 *** (0.040)	0.09 ** (0.041)	1.135 ** (0.446)	3.117 ** (0.504)	7.686 *** (0.438)
Self-employed	-0.463 *** (0.106)	-0.659 *** (0.112)	-2.893 *** (0.126)	0.004 (0.036)	0.168 *** (0.045)	0.0192 *** (0.047)	1.402 *** (0.461)	3.584 *** (0.618)	9.174 *** (0.632)
Ln(price)	0.973 *** (0.218)	0.791 *** (0.208)	-	-0.030 (0.051)	-0.04 (0.051)	-	-3.080 *** (0.755)	-2.797 *** (0.745)	-
Quintile 2	-0.154 (0.130)	-0.07 (0.107)	0.131 * (0.077)	-0.045 (0.043)	-0.06 (0.040)	-0.05 * (0.027)	0.077 (0.514)	-0.187 (0.430)	-0.555 *** (0.198)
Quintile 3	-0.405 *** (0.132)	-0.022 *** (0.121)	0.037 (0.082)	-0.031 (0.044)	-0.11 ** (0.050)	-0.041 (0.029)	0.918 * (0.548)	-0.638 (0.460)	-0.308 (0.214)
Quintile 4	-0.325 ** (0.138)	0.027 ** (0.116)	0.177 ** (0.083)	-0.085 * (0.047)	-0.11 ** (0.050)	-0.023 (0.029)	0.224 (0.548)	-0.813 * (0.440)	-0.508 ** (0.214)
Quintile 5	-0.109 (0.128)	0.464 *** (0.133)	0.58 *** (0.092)	-0.034 (0.045)	0.027 (0.050)	-0.01 (0.033)	0.034 (0.519)	-1.268 ** (0.496)	-1.28 *** (0.221)
Other smokers	-2.527 *** (0.082)	-2.194 *** (0.081)	-2.339 *** (0.059)	0.246 *** (0.027)	0.135 *** (0.029)	0.162 *** (0.022)	11.683 *** (0.456)	10.095 *** (0.488)	6.626 *** (0.207)
Media	-0.050 (0.161)	0.357 *** (0.137)	-1.105 ** (0.528)	0.112 ** (0.054)	-0.04 (0.055)	-0.117 (0.142)	1.128 (0.728)	-1.304 *** (0.494)	1.670 (1.433)
Smoking attitude	0.201 (0.241)	0.108 (0.189)	-	-0.205 *** (0.075)	0.063 (0.072)	-	-2.569 *** (0.926)	0.085 (0.776)	-
Urban	0.057 (0.083)	-0.017 (0.080)	-	-0.038 (0.028)	0.062 ** (0.031)	-	-0.481 (0.327)	0.474 (0.342)	-
Likelihood-ratio test of $\alpha=0$: $\chi^2(2)$	5134.5 ***	6147.88 ***	172.68 ***	34.53 ***	26.67 ***	45.51 ***			
Vuong test of ZINB versus standard NB: $z =$									
N	4269	9849	11368						

3. Results

The results of the ZINB model are presented in Table 4 and 5 for women and men, respectively. The logit model provides the probabilities for the "excess zeros". Positive coefficients indicate the probability of not to initiate smoking. For example, females in 5th Quintile is less likely to initiate smoking comparing to the ones in 1st Quintile in 2014. On the other hand, negative coefficients mean the probability of initiating smoking. For instance, if there are one or more smokers in the households (other smokers), people are more likely to initiate smoking compared to those who do not have anyone in the household smoking. The negative binomial models report essentially the result of the count data model, explaining the determinants for the number of cigarettes consumed per day, including the "true zeros".

3.1. Findings for Smoking Initiation

Our variables include smokers' socio-economic characteristics (age, education, working status, income level, and urban), smokers' attitudes and perceptions (other smokers and smoking attitude) and policy variables (price, media). In this section, the major findings regarding these three types of variables are discussed.

Compared to age 18-24 subgroup, the older population are more likely to initiate smoking for all age groups (except for age 65+ in 2008 for females, and in 2008, 2012 for males). However, the likelihood became greater in 2014. The years of education has a negative and statistically significant impact on smoking initiation for females for all three years. Interestingly, there is a positive association between smoking propensity and education for men for 2012 whereas the sign of the coefficient turns to a negative for 2014. In other words, in 2014, the more educated the individual is, the more likely to start smoking for both genders. Thus, our result does not support the positive effect of education on smoking initiation, especially for females. Interestingly, the sign switched from positive to negative for males in 2014.

Working population (employed and self-employed) are more likely to initiate smoking for both genders, and the likelihood is greater for male population. On the contrary, we find that an individual in the higher income group is less likely to initiate smoking, compared to the lowest income group. This result implies that the cigarette expenses potentially become the greater burden to the low-income households and could result in the lack of household budgets for necessities. In other words, the price policy could harm household budgets significantly more for lower income households.

One of the policy variables, price, plays a significant role in preventing people from initiating smoking, especially for females. Although it is proven that the higher cigarette price prevents people from smoking, regressive nature of such policy should be carefully investigated by policy makers. If cigarette prices are to be increased, an extra policy of smoking cessation should be implemented by targeting especially for low income smokers. On the other hand, the results confirm that pro-cigarette advertisement has strong impacts on smoking initiation for both genders in 2014. Especially for females, the impacts are the

greatest among other variables. Considering this together with the fact that it is more likely that working women tend to initiate smoking, socio-economic status, media and smokers in the household play significant roles for women to start smoking. Considering the indirect adverse impacts of female smoking especially during pregnancy and childcares, together with the direct health effects for females, media has to be effectively controlled by the government.

Other smoker variable examines the influence of other smokers in the households. This variable is consistently statistically significant for both genders over the study years. This finding implies that if smoking cessation policy successfully make one smoker stop smoking, the policy is at the same time preventing one or more person from start smoking in the household. This finding indicates that the policy must target parents through effective education, risk communication and negative campaign against smoking initiation. It is also important to educate adolescents on the risk of first and second-hand smoking and prevent them from initiating smoking regardless of the smoking status of their parents.

In summary, although price control is effective policy for preventing smoking initiation, it potentially has regressive impacts on lower income smokers. Pro-cigarette advertisement should be strictly controlled since it has both adverse impacts on smoking initiation for both genders. Negative advertisement targeting adults in households is critical to prevent other members of the households (especially children) from starting smoking.

3.2. Findings regarding Marginal Effects of Cigarette Consumption

When we turn our attention to the marginal effects of the number of cigarettes consumed each day, we find that smokers in age 25-44, followed by 45-64 age group smoked significantly more than the younger population. While the cigarette consumption drops meaningfully for senior group for males, it is not the case for females, indicating the need for a policy targeting all age groups especially for females. Working population smoke more than non-working group. While working women consume 1-2 extra cigarette per day, the excess amount is very high for working men (8-9 extra per day) compared to non-working population. An interesting gender contract is observed for the relationship between education and cigarette consumption levels. While it is negative and statistically significant (the higher the education level is, the less cigarette smoked) for males in 2008 and 2012 (there is no statistically significant effect of education observed in 2014), it has been consistently positive for females, though the magnitude is relatively small. This observation is quite striking since the existing studies typically demonstrate the positive impact of education on smoking cessation. For females in Turkey, it is not the case, indicating education is not sufficiently playing the role of raising health awareness and risk perceptions, and rather the positive effect is overwritten by the image of "social status" of smoking women. This observation is confirmed by the estimated coefficient for media variable. The women who have encountered pro-cigarette media smoke 13 cigarettes more each day than those who have not. The existing positive social image of smoking women should be targeted first in the effort of reducing cigarette consumption among women. Media does not show any positive impact for male smokers.

An interesting observation regarding income levels is the general negative marginal effects for the higher level of income, meaning that the higher the income level is, the less cigarettes smokers consume, *ceteris paribus*. The smokers in the lowest income level tend to smoke the most compared to the smokers in other income groups. This finding further reinforces our conclusion regarding the relationship between cigarette expenses and its burden to household income. For the existing smokers, the share of cigarette expenses is greater in the household budgets for the lower income households.

Over the six years, major changes observed for males are (1) the changes in the signs and statistical significance for education and media variables, (2) increased marginal effects based on working status and (3) decreased cigarette consumptions by the wealthier households. For females, the impact of media recorded the major change, together with the increased consumption levels for older population. The positive relationship between education and smoking exists consistently, however its magnitude is declining.

4. Discussion

Our estimated results deliver a set of implications toward Tobacco Reduction and Cessation (TRC) policies. In addition to the gender dimension, since the results of the logit and NB parts of the ZINB model indicate that the differences between smoking propensity and intensity should also be taken into account while constructing anti-smoking policies. The common and distinctive factors in gender and initiation/intensity dimensions are listed in Table 6. The types of determinants which prevent/promote initiation and intensity are very similar although the impacts of education and media play different roles in each case. While the factors influencing initiation are mostly common regardless of gender, the magnitudes of effects are especially different for working population for men and media for women. As for intensity, the gender gap is more clearly pictured and the distinctive determinants include education, working status and media.

Table: 6
Determinants for Tobacco Reduction and Cessation Policies

	Male	Female
Initialization	Common Factors	
	<Preventing>	<Promoting>
	- Young (Age 24 or less)	+ Higher Education
	- Higher Price	+ Working (Employed + Self-Employed)
	- Higher Income	+ Other Smokers in the Household
		+ Media (Pro-Cigarette)
	Distinctive Factors	
	- Age 65 + less likely to initiate	+ Age 65 + also likely to initiate
	+ Greater likelihood for working male	+ Media (greatest trigger for women)
	Intensity	Common Factors
<Preventing>		<Promoting>
- Young (Age 24 or less)		+ Working (Employed + Self-Employed)
- Higher Price		+ Other Smokers in the Household
- Higher Income		
Distinctive Factors		
- Intensity drops for Age 65+		+ Intensity does not drop for Age 65 +
- Negative (2012). No effect of Education (2014)		+ Education (Higher Education, Greater Consumption)
+Working (extra 7-9 per day)		+ Media (extra 13 per day)
+Other Smokers (extra 6 per day)		

Several important changes are observed over time. More specifically, the marginal effect of the highest educational attainment variable decreased for women in 2014 as compared to the results of 2008 and 2012, which can be seen as a signal that the positive association between education and smoking behaviour of women has weakened over time. However, female smoking profile in Turkey is still different from the developed countries as women with higher levels of education, employed women and those living in urban area are more likely to smoke. For males, though price has a consistent impact both on initiation and intensity over the study years, the undesirable changes are spotted in terms of education, media, working status and for the age group of 65 and above. Meanwhile, a desirable change is observed for high income group.

In this context, education level, income and the working status of women are key socioeconomic factors to explain smoking prevalence among women. Palipudi (2012), for example, reports the negative relationship between education and smoking prevalence for five (Bangladesh, Egypt, India, Philippines and Thailand) out of 13 low and middle income countries (LMIC) based on GATS conducted between 2008 and 2010, while it found the positive relationship for Turkey, and statistically insignificant result for the rest of the countries. Bosdriesz (2014) also found that the higher education groups have a lower smoking rate in low and lower middle-income countries for women although their analysis does not include data from Turkey. On the other hand, we found, in Turkey, the higher the education level is, the higher the likelihood of smoking initiation and the higher the consumption of cigarette among women. This indicates that having higher level of education cannot always be directly translated into the better understanding of the smoking risks. Furthermore, having better knowledge of the various health risks is not a sufficient condition for an individual to quit smoking since there are often discrepancies between risk perceptions and actions/behaviour. Yet, it is also true that intention to stop smoking is observed greater for the smokers with good knowledge of smoking and its risks (Paliupdi et al., 2012; Manaf & Sahmsuddin, 2008). Therefore, it is critical to design TRC programs which not only provide better knowledge of health and economic risks, but also to change actual behaviour by incorporating psychology and behavioural science and insights (Matjasko et al., 2016). Gender specific TRC program is critical since there are gender differences in risk preferences (women are more risk-averse) (Borghans et al., 2009), time preference/discount rate (Soytas & Kose, 2014), price elasticity of demand (Hersch, 2000) as economic factors as well as well-observed various psychological and physical components.

According to the tobacco epidemic model proposed by Lopez (Lopez et al., 1994) the smoking prevalence in Turkey is in Stage 3 "men's prevalence rates level off and drop sharply to resemble women's rate. Women's rates increase moderately and then decreasing". The factors which are expected to increase female smoking are (i) women's empowerment, (ii) "westernization" "modernization" or collapse of traditional values, (iii) increased stress and anxiety from different sources (i.e. workloads, meeting social expectations, playing an ideal mother/woman role). On the other hand, the attributes that could contribute in reduction of female smoking rate are (i) public policies for TRC, (ii) gender-specific TRC programs, (iii) increased risk perceptions and attainment of correct knowledge of smoking risks on own and fetus/children's health, (iv) traditional/cultural/religious values against female smoking.

Although the objective of TRC policies are to reduce smoking rate, it should be aligned with women's empowerment and enhancement of gender equality in any country as well. It is, therefore, very important especially in developing countries to suggest TRC policies which could both enhance women's social status without increasing their smoking rate. As Thun et al. (2012) suggests, Borghans et al. (Borghans et al., 2009) model is not applicable to women in developing countries since it cannot predict whether the future of smoking prevalence among women will eventually increase. Islami et al. (2015) also warns health authorities in low- and middle-income countries to closely monitor the female tobacco epidemic pattern in order to avoid a surge experienced in developed countries.

Gender Inequality Index (GII) reported in Human Development Report by UNDP (United Nations Development Programme) is one of the indicators of gender inequality and women's empowerment. It is measured in terms of three dimensions, (i) reproductive health, (ii) empowerment and (iii) economic activity. Reproductive health includes maternal mortality ratio and adolescent birth rates, while empowerment is composed of the proportion of parliamentary seats occupied by women and female attainment at secondary and higher education. Economic activity is measured with labour market participation rate for each gender. The higher the GII value is, the more inequality observed among male and women within the country. GII for Turkey has been declining over time. In 2005, 2010 and 2012, GIIs are 0.52, 0.42 and 0.37, respectively. This indicates that "empowerment of women" has been realized between 2005 and 2012. In this regard, the study by Hitchman and Fong (2011) links women's empowerment and smoking prevalence.

The general education levels of women in 2012 in Turkey were 67.4% with primary education or less, 25.4% with secondary education (secondary and vocational secondary, regular high school and vocational or technical high school) and 7.3% with higher education or above. While the 69% of women with higher education are in labour force, significantly less share of women are in labour force if they have less education, ranging between 16% (illiterate) and 38% (vocational or technical high school). Overall female labour participation rate in Turkey in 2012 was 29.5%, the lowest in OECD countries, and it has been increasing since 2005 (Inan & Asik, 2015). If the women's smoking prevalence is closely connected to women's empowerment, the dynamics of women's SES should be closely monitored to project the future smoking prevalence.

Although smoking rate is higher among women with high SES, we should note that the absolute number of smokers for women in-labour-force and not-in-labour-force are approximately the same. In other words, although the workers tend to smoke more, the sizes of the targeted population in each category (not working vs. working) are very similar. This implies that separate TRC policies should be designed and applied to subgroups of women smoking population.

Although tobacco taxation, education programs, creating smoke-free environments are still important policies for both genders in order to decrease both the number of smokers and the number of cigarettes smoked per day, it is apparent that the impacts of smoking ban and other TRC policies are diminishing over time, and new set of policies which specifically

target the identified hot spots (senior, educated and working population, smoking members in the household and media) are necessary to be designed for the future.

In a similar vein, it can be argued that the implemented anti-smoking policies in Turkey were more effective for men as compared to women since the decrease in the rate of smoking is more pronounced for men. This implies that the policy makers should focus on female smoking in order to obtain a sharp decrease in both the general level of smoking and female smoking. It is especially important to break the positive image associated with smoking for women in Turkey through negative advertisement, media control and educational program especially for highly educated working women. It is also confirmed that tobacco taxation can be the most effective policy to decrease smoking. In addition, creating smoke-free environments to reduce the effect of social interaction on smoking has still a great importance.

5. Conclusion

This study has attempted to explore what has changed in smoking behaviour in Turkey over time from a gender perspective by comparing 2008 and 2012 GATS data and 2014 Health Survey data. Overall, we can conclude that there is a significant difference in smoking behaviour for men and women in Turkey. For women, education, employment status, price, social interaction and place of residence are found to be important indicators of decision not to smoke. However, education has found to have adverse effects on women in Turkey in cigarette consumption. When it comes to smoking intensity for women, income and social interaction is found to be relevant, whereas these factors do not have significant effects on decision not to smoke. Men's decision not to smoke depend on education, employment, price, social interaction, income and media effects. Smoking intensity for men further depends on education, employment, social interaction and only for 2008, media. This result indicates that regardless of the policy change such as banning cigarette advertisement from TV's and newspapers as being implemented since 2008, women are still influenced by such advertisement, potentially from other types of media.

The findings highlight the importance of positive association of smoking and SES for women through the positive relationship between price and the employment status variables. In this regard, a significant challenge in battling women's smoking in developing countries is that empowering women could result in an increase in smoking prevalence since currently low smoking rate for women is mainly due to the cultural taboo in the society. While a policy which attempts to empower the currently disadvantaged women in developed countries could hit two birds (an increase in socioeconomic status of women and a decrease in smoking prevalence) with one stone by dealing with the root of the smoking problems among women, the same kind of policy will not result in a favourable result in terms of women's smoking in Turkey, at least in a short run.

One variable stands out in terms of affecting both men and women in the same direction is "social interaction". Presence of other smokers within the household increases the possibility of starting smoking for both men and women and increases the number of

daily cigarettes smoked. Therefore, designing policies on a household basis will clearly have important effects to achieve anti-smoking policy goals.

Furthermore, the results indicate that the smoking bans cause different impacts on daily smoking rate and the smoking intensity. Furthermore, the effects change and rebound over time. We could safely conclude that the smoking ban resulted in the reduction of initiation and increased cessation initially. However, we clearly observe the rebound effects over time, and especially for those who have decided to continue smoking, the cigarette consumption has increased. Especially for women smokers, both daily smoking rate and smoking intensity overshoot the initial 2008 levels. This fact indicates a need for a follow-up policy to reinforce the effect of initial ban as well as the importance of the gender-specific policy assessment. Although we have to analyse the background causation carefully, the smoking ban seems not to be sufficient to attain the lasting positive effects on the smoking cessation and cigarette consumption.

When it is considered that this aims to reveal the improvements or deteriorations in the associations between smoking behaviour and selected factors separately for men and women in time, it is important for future studies to follow the changes over time for this issue when longitudinal data is available to construct more effective anti-smoking policies.

Finally, this study is not without limitations. First, the employed data is not in a panel format, therefore the years 2008, 2012 and 2014 are analysed separately and this paper is lacking a dynamic analysis. Furthermore, since the smoking bans are applied at the national level and at the same time, it is impossible to generate a control group and hence measure the specific effects of the policy change. Notwithstanding the limitations, this paper is among the rare attempts to analyse the changes in individual behaviour in terms of smoking and hence adds important insights to the literature.

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