FOUNDATION FOR A
SMOKE-FREE WORLD

Watching Briefs

Issues 1 & 2

E-cigarette Excise Taxes and Public Health

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Looking Towards a Smoke-Free Hungary

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April 2020
Issue: 1

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Tax policy on tobacco harm-reduction products (THRPs) and illicit trade

In January of 2017, the Hungarian government began levying excise taxes on all ENDS — Ft. 55 (€0.1781) per milliliter. In January of 2020, it slashed these taxes by 63% — to Ft. 20 (€0.06) per milliliter (Vapor Product Tax, 2020) — to match excise rates in neighboring countries (Serbia, €0.037/ml; Romania, €0.11/ml; Ukraine, UHF 3/ml (beginning in 2021); Croatia, no tax (as of 2019)) and to curb the risk of illicit trade (Vapor Product Tax 2020). HTPs officially entered the Hungarian market in April of 2019. But before this, the government had imposed excise taxes on HTPs at Ft. 10 per stick in 2016; this rate remained unchanged as of March 2020. The HTP market value in Hungary will likely reach $75.6 million in 2020 (ECigIntelligence, 2020). Although it is early to examine the HTP market and potential for illicit trade, evidence indicates that 0.3% of adult Hungarians (18+) used HTPs between January and February of 2015, and this increased to 3.6% between January and February of 2017 (Tabuachi et al., 2018).
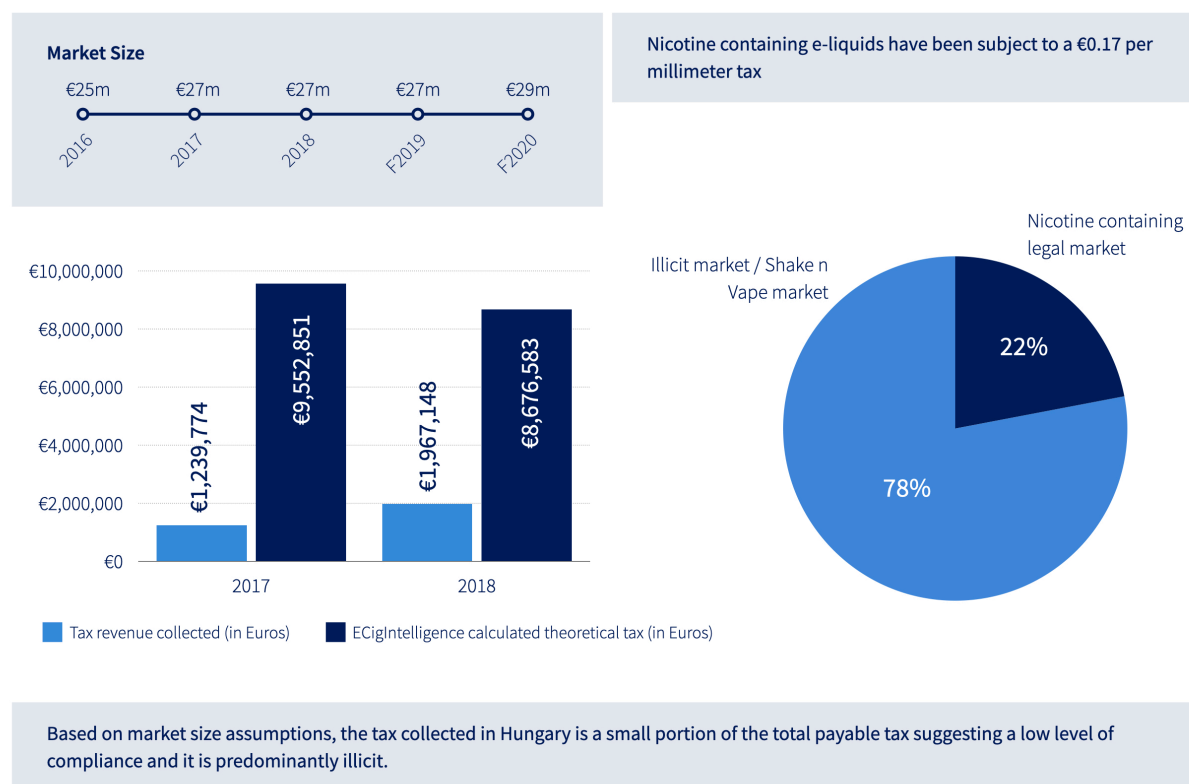
Illicit market on ENDS

Hungary banned ENDS from the tobacco market until 2017, but smokers could still buy these products online. Between 2012 and 2016, the ENDS market value stayed around $13.7 to $12.5 million. After the government lifted the ban in response to the European Union's Tobacco Product Directive, cross border and online sales were banned. In consequence, the market value of ENDS dropped significantly, to $7.7 million, and continued falling in 2018 to $7.6 million (Euromonitor, 2020). According to ECigIntelligence, about 78% of the ENDS market was illicit in 2018, costing the Hungarian government €6.7 million in revenue.

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[1]Exchange rate as of January 1, 2017 was HUF 1=EUR 0.0032385

Figure 1: E-cigarette tax collection in Hungary.

Market Size

€25m	€27m	€27m	€27m	€29m
2016	2017	2018	F2019	F2020

Nicotine containing e-liquids have been subject to a €0.17 per millimeter tax

Bar chart:
- 2017: Tax revenue collected €1,239,774; ECigIntelligence calculated theoretical tax €9,552,851
- 2018: Tax revenue collected €1,967,148; ECigIntelligence calculated theoretical tax €8,676,583

■ Tax revenue collected (in Euros)   ■ ECigIntelligence calculated theoretical tax (in Euros)

Pie chart:
- Illicit market / Shake n Vape market: 78%
- Nicotine containing legal market: 22%

Based on market size assumptions, the tax collected in Hungary is a small portion of the total payable tax suggesting a low level of compliance and it is predominantly illicit.

Source: ECigIntelligence, April 2019, Hungarian National Tax and Customs Administration.

From a public health perspective, what does the 2020 ENDS tax reduction mean?

Proponents of ENDS argue in favor of differential tax treatment for THRPs — specifically for ENDS (Chaloupka et al 2015, Saffer et al, 2019, Fruits, 2018), as they are found to be significantly less risky alternative to cigarettes (Polosa et al, 2011, Farsalinos, 2014). These studies suggest that such differential taxation would help smokers quit and reduce tobacco-attributable deaths and diseases. It is difficult to compare the excise components between cigarettes and ENDS but, based on the Cheng et al, 2019 study, we equate 3.55 ml of e-liquid for a pack of 20 cigarettes. Based on our analysis on Annex A, the excise share on ENDS prices is estimated at 35.5% in 2017 and is expected to reduce to 17% in 2020 (Table 1). The excise share on the price of a pack of combustible cigarettes, on the other hand, was 54.6% in 2017 and 56.3% in 2019[2].

Table 1: Differential excise between ENDS and cigarettes

	ENDS					Cigarettes		
	Mean price per ml	Excise per ml	Excise share as percent of price	Excise equivalence for a pack of cigarettes	Percent difference excise tax per pack	Mean price (WAP) per pack	Excise per pack	Excise share as percent of price
	[A]	[B]	[C]=[B/A]	[D]=[B] x 3.55	[E]=[D−G]/[G]	[F]	[G]	[H]=[G/F]
2017	155	55	35.5%	195.25	−67%	1095	597.8	54.6%
2019/20*	119	20	17%	71.0	−89%	1119	632.5	56.3%

[2]Tax data for 2020 have not been released by the European Commission.

As illustrated on Table 1, excise tax on ENDS comparable to a pack of cigarettes is estimated as Ft 195.5 in 2017 and Ft. 71 in 2020. This reveals that ENDS have been taxed at a rate 67% and 89% lower than that of a pack of cigarettes in 2017 and 2019–2020[3]. These results suggest that ENDS have:

- A lower tax share on price compared with the tax share on price of combustible cigarettes.

- Been taxed significantly lower than combustible cigarettes. Consequently, smokers may be more likely to switch from combustible cigarettes to ENDS, ceteris paripus. Furthermore, these results also confirm the efficacy the government's tax reduction in 2020 and intention to reduce illicit trade in Hungary.

In the following section we will examine the impact of reduced tax-induced price of ENDS for public health from two perspective. We will first examine the impact of reduced tax on ENDS retail price, then the potential impact of estimated price change in ENDS and cigarette demand.

Tax-induced ENDS price and demand

Tax and price differences are part of the factors that influence smokers' behaviors.
Based on evidence from the United States, demand for ENDS is price sensitive, where price elasticity ranges from –0.78 to –2.1; this suggests that 10% increases in ENDS prices would reduce demand for these products from 7.8% to 21%. We applied this evidence to the current tax reduction (–63%) in a Hungarian setting (please see the Annex A for the calculation of the new retail price). We estimated that retail price will reduce by 23.2%, from Ft. 155 to Ft. 119. Under the range of price elasticity, keeping all things constant, the demand for ENDS is expected to increase by 18%, to 48%.

Recent evidence in the United States has found cigarettes and ENDS to be economic substitutes when cross price elasticity of ENDS on cigarette demand is estimated in the range of 0.004 , and 0.97. This suggests that a 10% decrease in ENDS prices will decrease demand for cigarettes by 0.04%, to 9.7%. Applying these results to Hungary's tax-induced price reduction of 23.2% suggests that the demand for cigarettes may decline from less than a percent to 23%.

Recent tax-reduction on ENDS may not be enough to promote public health goals in Hungary

Tax policies on combustible cigarettes and ENDS suggest that, by imposing differential taxes and increasing the tax gap between these two products, the government can encourage current smokers to quit smoking, encourage stubborn smokers to switch to ENDS, and prevent a 'gateway' effect among non-smoker youth who try ENDS and then switch to cigarettes. Data suggest that Hungary applies differential tax policy between combustible and e-cigarettes and the tax gap between these two products has widened in 2020. It is too early to assess the public health and revenue consequences of 2020 tax reduction on ENDS. That is, high risk perceptions of ENDS by Hungarian

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[3]We compared the tax level of combustible cigarettes in 2019 with the ENDS' excise tax equivalence in 2020 given the lack of tax data on combustible cigarettes in 2020.

smokers may offset the expected positive impact of 2020 tax reduction on ENDS demand. Furthermore, Hungarian smokers have another substitutable product -heated tobacco- in the market where future research needs to examine economic substitutability of these products and also address sex specific responses to tax changes, to THR uptake and the probability of successful quitting or switching.

Annex A:

For this analysis, we use the mean retail price Ft. 155 of 1 ml of e-liquid in the fourth quarter of 2019 by ECigIntelligence data, and the value added tax (VAT) as 21.26% of retail price.

1. Estimation of new retail price level

$$R_p = P_p + V_T + E_x + R_m \quad \dots\dots\dots\dots\dots\dots\dots [1]$$

$$R_m = 10\% \; x \; P_p \quad \dots\dots\dots\dots\dots\dots\dots\dots\dots [2]$$

$$V_T = \gamma_t * R_p \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots [3]$$

Placing [3] and [2] in the equation [1] gives

$$R_p(1 - \gamma_t) = P_p(1 + 10\%) + \; E_x \dots\dots\dots\dots [4]$$

Leaving producer price alone

$$P_p = \frac{R_p((1 - \gamma_t) - E_x}{(1 + 10\%)} \dots\dots\dots\dots\dots\dots [5]$$

$$P_p = \frac{155 \, (1 - 21.26\%) - 55}{(1 + 10\%)} = 61$$

Under the post-tax reduction period, we assume that producers decide to increase their own

$$P_p^N = P_p(1 + 10\%) = 67 \dots\dots\dots\dots\dots [6]$$

price by 10%. That is
Placing equations [6], [2] and [3] into [1], we get the new retail price as

$$R_p^n = \frac{P_p^N(1 + 10\%) + E_x}{(1 - \gamma_t)} = \frac{67(1 + 10\%) + 20}{1 + 21.26\%} = 119$$

Please note: Producers may choose not to increase their own price under the low tax regime. In that case, retailers' margin would not change, and, in consequence, the retail price could fall even further to Ft. 110. Price reduction would thus be higher (28.6%) than the previous estimate.

Looking Towards a Smoke-Free Hungary

April 2020
Issue: 2

Hungary recently achieved a 9-percentage-point reduction in smoking prevalence — from 36% in 2005 to 27% in 2017 and may set a target rate for being smoke-free in the near future. However, Hungary faces a number of challenges, including the smokers' unwillingness to quit smoking in recent years. In consequence, Hungary had the second lowest percentage of ex-smokers (14%) among European Union member states in 2017 (European Commission, 2017). Can Hungary work to increase successful quit attempts? In this second Watching Brief on Hungary, we focus on Hungarian smokers' risk perception and analyze potential successful quits by ENDS.

Can Hungary set up a target rate and date for being smoke free?

In recent years, countries with rapid declines in smoking prevalence have developed an 'end-game' strategy to phase out smoking prevalence significantly or entirely by strengthening existing tobacco control measures and by including tobacco harm reduction products in tobacco control programs (Beagelhole *et al.*, 2015 and Smith *et al.*, 2019). Hungary can be one of these countries to set up a target rate for being smoke free given its impressive reduction in smoking prevalence rates between 2005 and 2017 (Table 1).

Table 1: Smoking prevalence and number of smokers in Hungary, 2006–2017

Smoking prevalence rate, 15+ age Group	2005	2009	2012	2014	2017
Female	29%	32%	28%	23%	23%
Male	44%	46%	38%	38%	31%
Total	36%	38%	32%	30%	27%

| Number of smokers (000)	2005	2009	2012	2014	2017	Percent change 2005–2017	Number of fewer smokers 2005–2017
Female	1,315	1,452	1,262	1,031	1,023	−22.2	−291.7
Male	1,751	1,833	1,507	1,503	1,219	−30.4%	−532.1
Total	3,065	3,238	2,711	2,532	2,263	−26.2%	−802.2

Source: European Commission (EC) 2006–2017. Estimated by multiplying prevalence rates (Table 1) with the 15+ population using the World Bank Health Nutrition and Population database.and electronic cigarettes

Fewer smokers have tried to quit in Hungary

In spite of reduced smoking prevalence rates, one of the challenges that the Hungarian government faces is that smokers increasingly stopped trying to quit between 2014 and 2017 (Figure 1). Within 3 years, quit attempts decreased by 14 percentage points — from 55% in 2014 to 40% in 2017. The majority of smokers who tried to quit didn't seek help — 70% in 2014, 80% in 2017 (Figure 2). Data like these could explain why Hungary had the second-lowest proportion of ex-smokers in 2017 among EU Member States (European Commission, 2017).
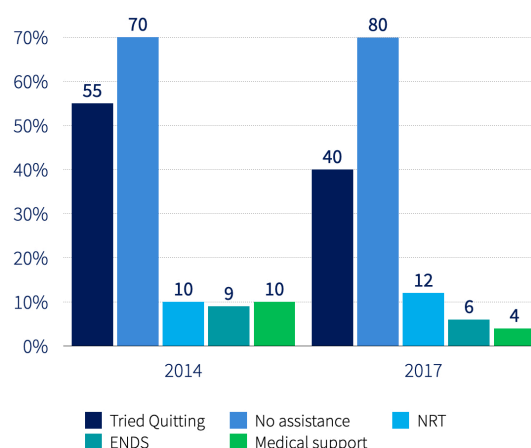
Figure 1

Q: Have you ever tried to quit smoking?
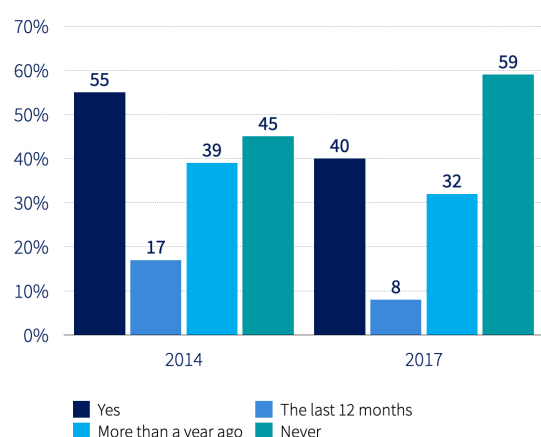
Figure 2

Smokers who had quit attempts and means of quit attempts

Source: European Commission 2014—2017, Special Eurobarometer surveys, "Attitudes of Europeans towards tobacco and electronic cigarettes."

Smokers' harm perception and ENDS prevalence

Evidence reveal the perceive harm of e-cigarettes is a significant predictor of smoking behaviors (Viscussi 2016, Pericot-Valverde et al 2017, Amrock et al 2015, Brose et al 2015, Dave et al 2020)). Evidence suggest that Hungarian smokers greatly overestimate e-cigarettes' risk and the risk perception has been worsening. In 2014, 30% of Hungarian smokers thought ENDS were harmful to health; this had increased to 46% by 2017 (European Commission, 2014 and 2017). This evidence clearly explains low prevalence of e-cigarette usage in Hungary- only 2% of Hungarian smokers used ENDS in 2012; that increased to 4% in in 2013[4] (ECigIntelligence, 2020), but fell and stayed at 1% in 2014 and 2017 (European Commission, 2014 and 2017). In fact, 90% of Hungarian smokers said they'd never tried ENDS in 2014 and 2017, and the fraction of smokers who attempted to quit by turning to tools like ENDS (Figure 2).

Hypothetical analysis of smokers who quit

We carried out a simulation based on the 2014 survey in Hungary. In 2014, 55% of Hungarian smokers said that they tried quitting. We assumed that 55% of smokers who made quit attempts also used

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[4]Official Hungarian survey under the General Agreement on Trade in Services (GATS) (ECigIntelligence, 2020).

ENDS, and that 7% of these quit smoking successfully each year because of ENDS use. We have displayed our calculation in Annex B. The results showed that in 2017 there were 10.6% (or 280 thousand) fewer smokers than there were in 2014. An annual successful quit rate of 7% for those who attempted to quit would yield 12.6% (or 320 thousand) fewer smokers in 2017. That would be 19% more quitters than what was actually achieved in 2017.

Can Hungary utilize ENDS as tools to reduce smoking?

Currently, the Hungarian government does not consider ENDS to be part of its comprehensive tobacco control program. Hungary can hasten the decline of its tobacco epidemic by encouraging smokers who aren't looking to quit to switch to ENDS. Evidence clearly suggests that market (information) failure is worsening in Hungary, and that the government could intervene in this by providing unbiased information about ENDS risk.

References:

1. Beaglehole R, Bonita R, Yach D, Mackay J, Reddy SK. 2015. Tobacco-free world: a call to action to phase out the sale of tobacco products by 2040. Lancet 2015. Vol 385, issue 9972, pp.1011-18. https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(15)60133-7/fulltext

2. Smith EA, Malone RE. 2019. An argument for phasing out sales of cigarettes. Special communication. Tobacco Control 2019; 0:1-6. Doi:10.1136/tobaccocontrol-2019-055079.

3. ECigIntelligence www.ecigintelligence.com (Last accessed on April 2020)

4. World Bank HNP, Health Nutrition and Population data 2019. www.worldbank/data (Last accessed on Jan 2020)

5. European Commission 2005-2018, Special Eurobarometer surveys "Attitudes of Europeans towards tobacco and electronic cigarettes can be accessed https://ec.europa.eu/health/tobacco/eurobarometers_en

Annex A: 2014 Quit Estimates

In 2014, there were a total of 2.5 million adult smokers in Hungary, and no ENDS users. However, among smokers:
- 2% (or 50.6 thousand) smokers said that they used ENDS in the past but had stopped.
- 5% (or 126.6 thousand) smokers said that they tried ENDS but were no longer using them.

A total of 177.2 thousand smokers had some history of ENDS use in 2014. Among these, 7% (or 12,405) smokers said that ENDS helped them quit smoking in 2014.

Annex B: Simulation Analysis

Table 1: Simulation of successful quitters between 2014 and 2017.

	Column letters	2014	2015	2016	2017	
Row numbers		**1**	**2**	**3**	**4**	
Population 15+	**A**	8,438,444	8,420,846	8,403,648	8,381,214	
Prevalence rate	**B**	30%	29%	28%	27%	
						C_4-C_1
Number of smokers	**C = B x A**	$C_1 = 2{,}531{,}533$	$C_2 = 2{,}442{,}045$	$C_3 = 2{,}353{,}021$	$C_4 = 2{,}262{,}928$	268,605
Percent of quit attempts	**D**	55%	50%	45%	40%	
Number of quitters	$E = C_1-D_1$		89,488	89,024	90,094	268,605
SIMULATION ANALYSIS						
Number who tried quitting	**F= C x D**	$F_1= C_1 \times D_1$ 1,392,343	$F_2=H_1 \times D_2$ 1,217,034	$F_3=H_2 \times D_3$ 1,056,995	$F_4=H_3 \times D_4$ 909,955	
7%	**G= 7%x F**	97,464	85,192	73,990	63,697	
New smokers	**H**	$H_1=C_1-G_1$ 2,434,069	$H_2=H_1-G_2$ 2,348,877	$H_3=H_2-G_3$ 2,274,887	$H_4=H_3-G_4$ 2,211,190	$H=H_4-C_1$ 320,343

Please note:

1. We assume that prevalence rates and percentages of quit attempts declined linearly from 2014 to 2017.

2. We assume that the 7% successful quit rate continued each year between 2014 and 2017.

3. New smokers are estimated according to the following calculations. First, we calculated quit attempts in 2014 by multiplying the number of smokers in 2014 with the corresponding year's quit attempts rate (percent). Next, we estimated the number of successful quitters by multiplying 7% with the number of those who tried quitting. Finally, we subtracted those who quit from the number of smokers in 2014 to find the new number of smokers in 2014. For the following years, we used the new smokers to determine the number of quit attempts, and then we deducted the number of successful quit attempts from the previous year's number of new smokers.