

APPENDIX A:*Table A1 – Unit value averages by statistical regions (used as prices in s-regions)*

region	sample size	median price	mean price	sample size	median price	mean price
East Vojvodina	74	2.31	2.39	16	1.77	2.44
West Vojvodina	112	2.35	2.46	20	0.92	1.10
Beograd	119	2.35	2.47	11	0.84	1.25
West Serbia	122	2.27	2.31	7	0.36	1.53
Central Serbia	121	2.27	2.28	8	2.10	1.99
South-East Serbia	104	2.18	2.23	10	0.72	0.98
North Albania	48	2.10	2.18	15	0.74	0.89
Central Albania	84	2.03	2.27	17	0.98	1.80
South Albania	48	2.03	2.18	20	0.69	0.94
Skopje	126	1.46	1.75	16	1.67	1.82
Eastern NM	140	1.38	1.49	12	0.36	1.29
Western NM	162	1.46	1.55	16	0.92	1.45
Vardar	28	1.38	1.48	5	0.36	0.40
Center MNE	167	1.50	1.87	5	1.00	1.00
North MNE	116	1.50	1.80	14	0.92	1.83
South MNE	111	2.20	2.14	3	1.00	1.22
Brcko	9	1.82	2.03	0	-	-
NorthEast RS	58	2.55	2.58	11	0.73	0.96
West RS	79	2.82	2.90	4	0.57	0.67
North FBIH	107	2.55	2.59	18	0.73	0.98
South FBIH	94	2.66	2.72	20	1.37	1.69
West Kosovo	120	2.00	2.16	3	0.75	0.73
East Kosovo	179	2.00	2.19	7	1.71	2.02

Table A2 – Descriptive statistics of the variables used in regression estimates

Variable	Obs	Mean	Std. Dev.	Min	Max
MC prevalence	7,006	0.36	0.48	0	1
RYO prevalence	7,006	0.05	0.21	0	1
MC intensity	2,527	2.48	0.91	-1.25	4.38
RYO intensity	325	2.28	1.09	-1.95	4.38
log price (MC, mean)	7,006	0.77	0.16	0.39	1.07
log price (RYO, mean)	7,006	0.70	0.20	0.32	1.04
log price (MC, median)	7,006	0.36	0.26	-0.12	0.89
log price (RYO, median)	7,006	-0.04	0.35	-1.03	0.74
Age	7,006	45.18	17.08	18	85
Female	7,006	0.54	0.50	0	1
Education – Primary (base category)					
Secondary	6,978	0.54	0.50	0	1
Teritary	6,978	0.24	0.43	0	1
Labour market status – Employed (base category)					
Unemployed	6,925	0.13	0.34	0	1
Inactive	6,925	0.36	0.48	0	1
Household size	7,006	3.60	1.80	1	15
Personal income category - 1 (base category)					
Personal income category = 2	6,981	0.44	0.50	0	1
Personal income category = 3	6,981	0.19	0.39	0	1
Supports price increase (regional average)	7,006	2.00	0.19	1.69	2.32
Smoking not allowed at home (regional average)	7,006	0.56	0.19	0.29	0.91

Table A3 –Own- and cross-price elasticity of MC and RYO prevalence – Bivariate probit estimate

VARIABLES	Model 1 - Mean prices				Model 1 - Median prices				Model 2 - Mean prices				Model 2 - Median prices			
	MC		RYO		MC		RYO		MC		RYO		MC		RYO	
log price (MC, mean)	-0.438**	(0.229)	0.429*	(0.280)					-0.537**	(0.235)	0.531**	(0.252)				
log price (RYO, mean)	0.219	(0.197)	-0.081	(0.235)					0.176	(0.168)	-0.038	(0.234)				
log price (MC, median)					-0.393**	(0.173)	0.322	(0.288)					-0.451**	(0.203)	0.395*	(0.261)
log price (RYO, median)					0.053	(0.124)	0.054	(0.187)					0.027	(0.115)	0.077	(0.178)
Age	0.045***	(0.008)	0.097***	(0.013)	0.045***	(0.008)	0.097***	(0.013)	0.044***	(0.009)	0.098***	(0.013)	0.044***	(0.009)	0.098***	(0.013)
Age squared	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)	-0.001***	(0.000)
Female	-0.159*	(0.085)	-0.430***	(0.101)	-0.159*	(0.084)	-0.432***	(0.100)	-0.171*	(0.091)	-0.424***	(0.101)	-0.172*	(0.090)	-0.425***	(0.101)
Education, Primary, omitted																
Education, Secondary	0.058	(0.051)	-0.165**	(0.065)	0.055	(0.052)	-0.165***	(0.063)	0.038	(0.051)	-0.149**	(0.068)	0.034	(0.051)	-0.148**	(0.067)
Education Tertiary	-0.118*	(0.065)	-0.361***	(0.120)	-0.118*	(0.064)	-0.367***	(0.116)	-0.109	(0.066)	-0.365***	(0.116)	-0.109*	(0.065)	-0.370***	(0.112)
Employed, omitted																
Unemployed	-0.125	(0.078)	0.392***	(0.109)	-0.121	(0.079)	0.388***	(0.114)	-0.132*	(0.077)	0.396***	(0.110)	-0.129*	(0.077)	0.393***	(0.114)
Inactive	-0.264***	(0.054)	0.124	(0.142)	-0.260***	(0.056)	0.119	(0.145)	-0.273***	(0.052)	0.137	(0.144)	-0.270***	(0.052)	0.135	(0.146)
Household size	-0.034***	(0.012)	-0.044*	(0.024)	-0.031**	(0.013)	-0.045*	(0.024)	-0.030**	(0.012)	-0.046*	(0.024)	-0.027**	(0.013)	-0.047*	(0.024)
Pers inc cat = 1, omitted																
Personal income category = 2	0.132**	(0.064)	-0.056	(0.098)	0.139**	(0.067)	-0.066	(0.100)	0.107*	(0.059)	-0.036	(0.095)	0.112*	(0.061)	-0.043	(0.096)
Personal income category = 3	0.207**	(0.086)	-0.163	(0.108)	0.214**	(0.090)	-0.169	(0.111)	0.168**	(0.078)	-0.131	(0.102)	0.171**	(0.079)	-0.134	(0.103)
Supports price increase	-0.483**	(0.204)	-0.541*	(0.288)	-0.474**	(0.215)	-0.539*	(0.287)	-0.482**	(0.202)	-0.569**	(0.279)	-0.485**	(0.219)	-0.556**	(0.276)
Smoking not allowed at home									-0.344	(0.217)	0.289	(0.233)	-0.361	(0.244)	0.313	(0.228)
Constant	0.313	(0.497)	-2.867***	(0.538)	0.301	(0.552)	-2.775***	(0.634)	0.627	(0.619)	-3.097***	(0.593)	0.598	(0.668)	-3.002***	(0.670)
rho	-0.202***	(0.047)			-0.204***	(0.046)			-0.200***	(0.047)			-0.202***	(0.046)		
Observations	6,910				6,910				6,910				6,910			

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A4 – Own- and cross-price elasticity of a choice model and conditional RYO prevalence model

VARIABLES	Choice model - Smokes RYO (vs. Smoking MC)				Conditional RYO prevalence model - Smokes RYO (vs. Non-smoking)			
	Mean prices		Median prices		Mean prices		Median prices	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
log price (MC, mean)	1.481** (0.672)	1.814*** (0.665)			0.632 (0.704)	0.791 (0.618)		
log price (RYO, mean)	-0.355 (0.653)	-0.261 (0.606)			0.032 (0.534)	0.108 (0.552)		
log price (MC, median)			1.197* (0.644)	1.479** (0.634)			0.363 (0.756)	0.461 (0.697)
log price (RYO, median)			0.064 (0.388)	0.110 (0.347)			0.130 (0.447)	0.168 (0.450)
Age	0.202*** (0.034)	0.209*** (0.036)	0.199*** (0.033)	0.207*** (0.035)	0.286*** (0.036)	0.286*** (0.036)	0.285*** (0.036)	0.285*** (0.036)
Age squared	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)
Female	-0.882*** (0.194)	-0.818*** (0.202)	-0.886*** (0.192)	-0.819*** (0.199)	-1.324*** (0.296)	-1.325*** (0.298)	-1.323*** (0.295)	-1.324*** (0.297)
Education, Primary, omitted								
Education, Secondary	-0.513*** (0.181)	-0.461** (0.195)	-0.509*** (0.177)	-0.455** (0.192)	-0.503*** (0.136)	-0.480*** (0.151)	-0.501*** (0.133)	-0.478*** (0.148)
Education Tertiary	-0.538 (0.349)	-0.543* (0.328)	-0.554* (0.334)	-0.554* (0.320)	-0.855** (0.373)	-0.855** (0.370)	-0.863** (0.362)	-0.861** (0.359)
Employed, omitted								
Unemployed	0.737*** (0.237)	0.738*** (0.232)	0.728*** (0.246)	0.729*** (0.240)	0.717** (0.278)	0.722*** (0.279)	0.721** (0.291)	0.729** (0.292)
Inactive	0.474 (0.370)	0.526 (0.366)	0.464 (0.383)	0.519 (0.374)	0.178 (0.368)	0.195 (0.366)	0.179 (0.362)	0.198 (0.362)
Household size	-0.131** (0.052)	-0.142*** (0.053)	-0.136** (0.053)	-0.146*** (0.055)	-0.194*** (0.040)	-0.197*** (0.042)	-0.197*** (0.041)	-0.200*** (0.042)
Pers inc cat = 1, omitted								
Personal income category = 2	-0.259 (0.220)	-0.206 (0.204)	-0.278 (0.228)	-0.226 (0.212)	-0.093 (0.234)	-0.061 (0.226)	-0.097 (0.237)	-0.065 (0.228)
Personal income category = 3	-0.924*** (0.280)	-0.844*** (0.262)	-0.927*** (0.287)	-0.848*** (0.264)	-0.701** (0.297)	-0.655** (0.279)	-0.698** (0.305)	-0.650** (0.282)
Supports price increase	-0.430 (0.827)	-0.493 (0.824)	-0.425 (0.852)	-0.456 (0.852)	-1.449** (0.703)	-1.508** (0.704)	-1.425** (0.711)	-1.458** (0.703)
Smoking not allowed at home		0.981 (0.640)		1.043 (0.694)		0.435 (0.497)		0.416 (0.489)
Constant	-6.676*** (1.804)	-7.594*** (2.114)	-6.408*** (2.052)	-7.349*** (2.320)	-5.607*** (1.453)	-5.910*** (1.510)	-5.376*** (1.634)	-5.640*** (1.655)
Observations	2,667	2,667	2,667	2,667	4,425	4,425	4,425	4,425

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table A5 – Own- and cross-price elasticity of MC intensity and RYO intensity models

VARIABLES	MC intensity model								RYO intensity model							
	Mean prices				Median prices				Mean prices				Median prices			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
log price (MC, mean)	0.062	(0.205)	0.117	(0.170)					0.048	(0.437)	-0.121	(0.357)				
log price (RYO, mean)	-0.138	(0.124)	-0.126	(0.116)					-0.355**	(0.157)	-0.415**	(0.183)				
log price (MC, median)					0.139	(0.194)	0.178	(0.164)					0.302	(0.398)	0.189	(0.339)
log price (RYO, median)					-0.129	(0.086)	-0.098	(0.082)					-0.375**	(0.169)	-0.407**	(0.173)
Age	0.021***	(0.006)	0.018***	(0.007)	0.021***	(0.006)	0.018***	(0.006)	0.005	(0.003)	0.005*	(0.003)	0.005	(0.003)	0.006*	(0.003)
Age squared	-0.000***	(0.000)	-0.000***	(0.000)	-0.000***	(0.000)	-0.000***	(0.000)								
Female	-0.267***	(0.036)	-0.288***	(0.035)	-0.264***	(0.037)	-0.284***	(0.034)	-0.225*	(0.125)	-0.254*	(0.137)	-0.222*	(0.120)	-0.247*	(0.128)
Education, Primary, omitted																
Education, Secondary	-0.022	(0.043)	-0.043	(0.043)	-0.013	(0.040)	-0.035	(0.039)	0.013	(0.120)	-0.003	(0.124)	0.010	(0.127)	-0.006	(0.129)
Education Tertiary	-0.127	(0.089)	-0.131	(0.087)	-0.116	(0.078)	-0.122	(0.077)	-0.027	(0.250)	-0.046	(0.245)	0.016	(0.225)	0.002	(0.221)
Employed, omitted																
Unemployed	0.026	(0.050)	0.028	(0.050)	0.024	(0.051)	0.027	(0.051)	0.069	(0.127)	0.069	(0.121)	0.061	(0.125)	0.062	(0.119)
Inactive	-0.005	(0.050)	-0.007	(0.050)	-0.006	(0.050)	-0.008	(0.050)	0.078	(0.141)	0.029	(0.116)	0.063	(0.138)	0.014	(0.119)
Household size	0.045***	(0.014)	0.045***	(0.014)	0.044***	(0.013)	0.044***	(0.013)	0.029	(0.041)	0.027	(0.038)	0.024	(0.040)	0.022	(0.037)
Log hh income per capita	0.149**	(0.061)	0.123**	(0.053)	0.143**	(0.059)	0.119**	(0.050)	0.102	(0.122)	0.079	(0.113)	0.094	(0.115)	0.074	(0.107)
Supports price increase	0.033	(0.152)	-0.029	(0.125)	0.024	(0.137)	-0.038	(0.114)	-0.348**	(0.166)	-0.367**	(0.181)	-0.363**	(0.150)	-0.384**	(0.164)
Smoking not allowed at home			-1.642***	(0.620)			-1.561**	(0.636)			-0.501	(0.380)			-0.460	(0.333)
Constant	1.480***	(0.482)	1.929***	(0.362)	1.430***	(0.497)	1.881***	(0.361)	2.858***	(0.746)	3.461***	(0.813)	2.626***	(0.707)	3.126***	(0.733)
Observations	2,481		2,481		2,481		2,481		322		322		322		322	

Robust standard errors in parentheses

** p<0.01, * p<0.05, * p<0.1

*

APPENDIX B Imputation procedure for the income variable

The master questionnaire includes a scale of 12 income categories and is expressed in euros. During the data collection process these intervals were transformed to local currencies, and the respondents chose based on local currency intervals.

Out of 7,000 respondents, income data was missing for 2,054. In order to avoid sample attrition, we have implemented the imputation procedure. Given there was only one variable for which the imputation is necessary, and given that this variable is a covariate rather than the main variable in the model, we opted to use a simple imputation procedure based on the regression prediction. Given the large number of categories, imputation procedure was implemented on the basis of a OLS model. Although income variable is measured on a Likert type scale (11 categories), which produces ordinal type variable, measurement literature (e.g., Norman, 2010; Brown, 2011) suggests that OLS does not differ in results or conclusions when compared to Oprobit model. Table B1 below shows the comparison results between the two models.

We use the predictors that have proven to be significant: age, gender, education level, labour market status, household size, number of adults in the household and the set of s-regional dummy variables. The OLS model indicated R square values of about 0.45 indicating a high prediction power of the set of variables used. After a linear prediction of income variable we round the prediction result to a nearest integer.

References

- Brown, J.D., 2011. Likert items and scales of measurement. *Shiken* 15 (1), 10–14 .
- Norman, G., 2010. Likert scales, levels of measurement and the “laws ”of statistics. *Adv. Health Sci. Educ.* 15 (5), 625–632 .

Table B1 Results from the income prediction procedure

VARIABLES	Oprobit	se	OLS	se
Age	-0.004**	(0.001)	-0.007**	(0.003)
Female	-0.020	(0.032)	-0.079	(0.069)
<i>Labour market status:</i>				
Employee in the public sector (omitted)				
Employee in the private sector	-0.174***	(0.052)	-0.386***	(0.113)
Self Employed / Agriculture workers	-0.470***	(0.084)	-1.062***	(0.181)
Occasional/ part-time worker	-0.811***	(0.110)	-1.698***	(0.235)
Student	-0.577***	(0.089)	-1.176***	(0.191)
Houseworker	-0.944***	(0.075)	-2.010***	(0.158)
Retired	-0.847***	(0.066)	-1.762***	(0.139)
Unemployed, able to work	-1.269***	(0.067)	-2.538***	(0.140)
Unemployed, unable to work	-1.432***	(0.133)	-2.550***	(0.267)
Refused	-0.681**	(0.291)	-1.158*	(0.618)
<i>Level of education:</i>				
No education (omitted)				
Incomplete primary school	0.324*	(0.181)	0.412	(0.359)
Primary school completed	0.596***	(0.165)	0.790**	(0.326)
Incomplete secondary school	0.669***	(0.184)	0.775**	(0.368)
Three-year professional school	0.769***	(0.169)	0.778**	(0.334)
Four-year professional school	1.064***	(0.167)	1.452***	(0.329)
Gymnasium	1.135***	(0.169)	1.620***	(0.335)
Higher school/College	1.341***	(0.176)	2.080***	(0.351)

University	1.629***	(0.170)	2.764***	(0.335)
Post Graduate (Magistracy, Doctorate)	2.112***	(0.200)	4.091***	(0.407)
<i>Statistical region (s-region)</i>				
Belgrade (omitted)				
Central and West Srbija	-0.533***	(0.094)	-1.175***	(0.203)
South and East Serbia	-0.609***	(0.112)	-1.362***	(0.241)
Vojvodina	-0.249***	(0.095)	-0.454**	(0.205)
Berat	-1.541***	(0.176)	-2.898***	(0.360)
Diber	-1.703***	(0.187)	-3.380***	(0.385)
Durres	-0.946***	(0.137)	-2.000***	(0.290)
Elbasan	-1.680***	(0.137)	-3.239***	(0.281)
Fier	-1.374***	(0.136)	-2.697***	(0.285)
Gjrokaster	-1.040***	(0.222)	-2.330***	(0.472)
Korce	-1.224***	(0.143)	-2.687***	(0.302)
Kukes	-0.943***	(0.209)	-2.164***	(0.445)
Lezhe	-1.912***	(0.174)	-3.764***	(0.357)
Shkoder	-1.592***	(0.146)	-3.189***	(0.302)
Tirane	-0.897***	(0.106)	-2.024***	(0.226)
Vlore	-1.204***	(0.180)	-2.473***	(0.374)
Vardar	-0.615***	(0.139)	-1.491***	(0.299)
Eastern MAC	-0.670***	(0.132)	-1.642***	(0.285)
Southwestern MAC	-1.090***	(0.134)	-2.479***	(0.285)
Southeastern MAC	-0.337**	(0.169)	-0.795**	(0.364)
Pelagonia	-0.826***	(0.134)	-1.899***	(0.287)
Polog	-0.838***	(0.124)	-2.056***	(0.267)
Northeastern MAC	-1.527***	(0.155)	-2.887***	(0.317)
Skopje	-0.953***	(0.107)	-2.237***	(0.229)
Center MNE	-0.127	(0.092)	-0.254	(0.199)
North MNE	-0.843***	(0.099)	-1.689***	(0.212)
South MNE	0.327***	(0.103)	0.896***	(0.223)
Federacija BiH	-0.104	(0.097)	-0.119	(0.210)
Republika Srpska	-0.520***	(0.109)	-1.199***	(0.235)
Br?ko Distrikt	-0.016	(0.257)	-0.263	(0.557)
Urosevac	-0.801***	(0.162)	-1.839***	(0.347)
Djakovica	-0.432**	(0.169)	-1.257***	(0.365)
Gnjilane	-0.364*	(0.192)	-0.840**	(0.415)
Mitrovica	-0.781***	(0.120)	-1.426***	(0.257)
Pec	-1.396***	(0.129)	-2.883***	(0.273)
Pristina	-0.711***	(0.108)	-1.605***	(0.232)
Prizren	-0.349***	(0.113)	-0.894***	(0.243)
Household size	0.051***	(0.016)	0.088**	(0.034)
Number of adult (15+)	0.214***	(0.020)	0.439***	(0.043)

Table B2 (: Own- and cross-price elasticity of MC and RYO prevalence (biprobit model)

With imputed income (n = 6,910), results presented in the paper in table 4									
		Model 1				Model 2			
		Mean price model		Median price model		Mean price model		Median price model	
Probability of smoking MC (outcome 2)	MC price	-0.492**	(0.243)	-0.437**	(0.182)	-0.605**	(0.254)	-0.504**	(0.215)
	RYO price	0.237	(0.210)	0.052	(0.129)	0.190	(0.176)	0.024	(0.116)
Probability of smoking RYO (outcome 3)	MC price	1.102*	(0.598)	0.850	(0.602)	1.365**	(0.540)	1.034*	(0.541)
	RYO price	-0.260	(0.509)	0.098	(0.399)	-0.150	(0.496)	0.159	(0.367)
Without imputed income (n=4,929)									
		Model 1				Model 2			
		Mean price model		Median price model		Mean price model		Median price model	
Probability of smoking MC (outcome 2)	MC price	-0.520**	(0.251)	-0.470**	(0.192)	-0.640**	(0.257)	-0.532**	(0.227)
	RYO price	0.332	(0.227)	0.056	(0.153)	0.265	(0.183)	0.018	(0.130)
Probability of smoking RYO (outcome 3)	MC price	1.147**	(0.578)	0.672	(0.597)	1.508***	(0.502)	0.883*	(0.533)
	RYO price	-0.015	(0.558)	0.311	(0.409)	0.164	(0.526)	0.397	(0.378)