Alcohol Price Regulation in France: Choosing a Reform Scenario to Achieve Public Health and Tax Fairness Objectives

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Online Appendix

S1 – Descriptive Statistics on Households

Table S1-1 – **Households, descriptive statistics, Kantar WorldPanel 2014 data**

Monthly income per UC, in € (SD)		1,591 (932)
Standard of living KWP (%)	High-income	15.7
	Upper-middle income	30.6
	Lower-middle income	41.3
	Low-income	12.3
Number of household members		2.5 (1.4)
Number of children (< 16, SD)		1.5 (0.9)
Household structure (%)	Single man	14.3
	Single woman	15.8
	Couple without children (< 16 years)	38.8
	Couple with child (< 16 years)	31.1
Age of head (%)	< 35 years	9.6
	[35;54] years	43.2
	> 54 years old	47.2
Highest level of education (%)	Primary	5.6
	College	25.8
	≤ Bac	26.0
	≤ Bac+2	21.2
	> Bac+2	21.4
Area of residence (%)	Countryside (< 2,000 inhabitants)	27.0
	Small town (< 10,000 inhabitants)	13.5
	Medium-sized town (< 50,000 inhabitants)	12.3
	Large city (< 200,000 inhabitants)	12.2
	Metropolitan (⩾ 200,000 inhabitants)	35.0
Number of glasses of 10g of pure alcohol per adult per day (%)	≤ 1	67.4
	]1;2]	16.2
	> 2	16.4
Number of households		*6,353*

Notes: Kantar WorldPanel 2014 data; non-abstinent households in the constant panel, consisting of households that were active for at least 10 periods (40 weeks) in 2014 and reported at least one alcohol purchase during the year; average of dichotomous variables reported in %; average of continuous variables reported with standard deviation (SD); statistics adjusted for annual sampling weights provided by Kantar WorldPanel; standard of living categories are given by Kantar WorldPanel according to the categorisation in Table S1-2 below.

Table S1-2 – **Definition of the four standard of living classes**

Number of consumption units	High-income	Upper-middle income	Lower-middle income	Low-income
1.0	≥ 2,191 €	1,476 to 2,190 €	781 to 1,475 €	≤ 780 €
1.5 – 1.7	≥ 3,725 €	2,509 to 3,724 €	1,328 to 2,508 €	≤ 1,327 €
2.0 – 2.4	≥ 4,820 €	3,247 to 4,819 €	1,718 to 3,246 €	≤ 1,717 €
2.5 – 2.9	≥ 5,916 €	3,985 to 5,915 €	2,109 to 3,984 €	≤ 2,108 €
3.0 – 3.4	≥ 7,011 €	4,723 to 7,010 €	2,499 to 4,722 €	≤ 2,498 €
3.5 – 3.9	≥ 8,107 €	5,461 to 8,106 €	2,890 to 5,460 €	≤ 2,889 €
4.0 – 4.4	≥ 9,202 €	6,199 to 9,201 €	3,280 to 6,198 €	≤ 3,279 €
4.5 – 4.9	≥ 10,298 €	6,937 to 10,297 €	3,671 to 6,936 €	≤ 3,670 €
≥ 5	≥ 11,393 €	7,675 to 11,392 €	4,061 to 7,674 €	≤ 4,060 €

Notes: Categorisation based on pre-tax monthly income before tax and after social transfers, as reported by the panellist, and the old equivalence scale (1 for the first adult, 0.7 for other people aged 15 and over and 0.5 for other people aged under 15); for income,

Kantar WorldPanel does not provide us with the raw information declared by the panellist, but a variable indicating the gross monthly income adjusted into 18 brackets, as well as an indicator for the different classes.

Table S1-3 – **Socio-demographic coverage of the 2014 Kantar WorldPanel compared with the 2017 Family Budget survey**

Data	BDF 2017	KWP 2014
Main respondent (MR) age groups		
< 35 years	18.17	17.60
[35; 49] years	26.52	27.33
[50; 64] years	27.41	24.67
> 65 years	27.91	30.40
Number of people in the household × age of MR		
NF1 - < 35 years	6.69	7.38
NF1 - [35; 49] years	5.72	5.42
NF1 - [50; 64] years	8.96	7.40
NF1 - > 65 years	13.97	14.49
NF2 - < 35 years	5.33	4.59
NF2 - [35; 49] years	3.91	4.70
NF2 - [50; 64] years	10.63	10.14
NF2 - > 65 years	12.71	14.41
NF3 - < 35 years	3.19	3.22
NF3 - [35; 49] years	5.08	5.46
NF3 - [50; 64] years	4.41	4.10
NF3 - > 65 years	0.94	1.15
NF4 - < 35 years	2.21	2.00
NF4 - [35; 49] years	7.92	7.33
NF4 - [50; 64] years	2.42	2.15
NF4 - > 65 years	0.20	0.24
NF>=5 - < 35 years	0.74	0.42
NF>=5 - [35; 49] years old	3.87	4.42
NF>=5 - [50; 64] years old	0.99	0.88
NF>=5 - > 65 years	0.08	0.11
HH's PCS		
Not listed	0.34	0.00
Farmers	1.05	1.32
Self-employed.	4.06	4.14
Executives	13.60	10.33
Intermediate occupations	14.73	12.51
Employees	13.41	10.93
Workers	14.29	17.73
Retired and other economically inactive	38.51	43.04
Region x Size of urban unit		
Dom - rural communities	0.07	0.00
Dom – 2,000 to 19,999 hab	0.34	0.00
Dom - 20,000 to 99,999 hab	0.70	0.00
Dom - 100,000 et + hab	1.65	0.00
Paris region - rural communities	0.63	0.58
Paris region - 2,000 to 19,999 inhabitants	0.74	0.71
Paris region - 20,000 to 99,999 inhabitants	0.67	0.55
Paris region - 100,000+ inhabitants	15.61	16.91
Paris Basin - rural communities	5.25	6.31

Paris Basin - 2,000 to 19,999 inhabitants	3.41	3.47
Paris Basin - 20,000 to 99,999 inhabitants	3.74	3.24
Paris Basin - 100,000+ inhabitants	3.63	3.65
North - rural communities	0.90	0.72
North – 2,000 to 19,999 inhabitants	0.62	0.92
North - 20,000 to 99,999 inhabitants	0.57	0.95
North - 100,000+ inhabitants	3.68	3.87
East - rural communities	2.32	2.68
East – 2,000 to 19,999 inhabitants	2.75	1.96
East - 20,000 to 99,999 inhabitants	1.06	1.34
East - 100,000+ inhabitants	2.38	3.22
West - rural communities	4.02	5.24
West – 2,000 to 19,999 inhabitants	3.44	3.34
West - 20,000 to 99,999 inhabitants	2.42	1.72
West - 100,000+ inhabitants	3.60	3.62
South-West - rural communities	4.08	3.71
South-West – 2,000 to 19,999 inhabitants	1.06	2.26
South West - 20,000 to 99,999 inhabitants	1.14	1.59
South-West - 100,000+ inhabitants	4.45	4.08
Centre-East - rural communities	2.22	2.69
Centre-East - 2,000 to 19,999 inhabitants	2.76	1.77
Centre-East - 20,000 to 99,999 inhabitants	1.74	1.78
Centre-East - 100,000+ inhabitants	5.78	4.45
Mediterranean - rural communities	1.49	1.97
Mediterranean – 2,000 to 19,999 inhabitants	2.66	2.60
Mediterranean - 20,000 to 99,999 inhabitants	1.78	1.86
Mediterranean - 100,000+ inhabitants	6.64	6.24
Number of households	16,978	6,565
Number of households covered (weighted)	29,388,176	28,765,888

Notes: Descriptive statistics adjusted for the respective sampling weights of the surveys; comparison of BDF 2017 with KWP 2014 includes non-alcohol drinkers. HH = Household head/reference person.
Sources and fields: *Budget de famille 2017* survey, INSEE; Kantar WorldPanel 2014 data; full samples.

Table S1-4 – **Aggregate household expenditure, Kantar WorldPanel 2014 *vs* Family budget 2017**

	Expenditure (€bn)		Budget share of alcohol expenditure (%)	
Survey	*KWP 2014*	*BDF 2017*	*KWP 2014*	*BDF 2017*
Spirits and liqueurs	3.03	2.93	29.23	25.77
Wines and ciders	4.04	5.08	38.95	44.68
Other wine-based aperitifs, champagne sand other	1.81	1.54	17.46	13.54
Beer and beer-based drinks	1.49	1.82	14.37	16.01
Total alcoholic beverages	10.38	11.37	100.00	100.00

Notes: Market size statistics by value calculated by applying the household sampling weights provided by each survey; for comparison, we have used the COICOP nomenclature from BDF 2017.
Sources and coverage: *Budget de famille 2017* survey, INSEE; Kantar WorldPanel 2014 data; full samples.

S2 – Definition of Varieties

The products are grouped into homogeneous varieties defined according to the alcohol category, the type within the categories, the producer, the brand and the retailer. Table S2-1 shows the number of varieties per beverage category.

Beers are divided into three types according to their degree of alcohol (non-alcoholic, bock and de luxe, special), ciders into two according to whether they are sweet or brut, sparkling wines into two (champagne, other sparkling wines), still wines into three according to their quality label (*Vins de table*, *Vins de pays*, *Appellations*), spirits and aperitifs into five (for the former: rums, whiskies, aniseed-flavoured, creams/liquors, others; for the latter: liqueur wines, vins doux naturels, cocktails/punches, bitters/gentian/vermouth, other wine-based aperitifs). After several attempts, we have not distinguished wines by colour, as this distinction partly overlaps with the distinction by brand.

The products are then manufactured by a number of large companies (possibly cooperatives), as well as by a composite group of small producers, and are distributed *via* 7 retailers: Galec (Leclerc's central purchasing group), Intermarché, Auchan, Carrefour, EMC Distribution (Casino's central purchasing group), a composite group comprising the other hyper- and supermarkets as well as non-retail outlets, and a second composite group comprising all the hard discounters.

Finally, we distinguish between the best-selling brands on each market. In the case of wine, given that many products are unbranded, the brand is replaced by the producer in the definition of varieties. In each beverage category, there is an 'Other' producer selling a single 'Other' brand, which is a grouping of unknown brands or national brands with a small number of purchases. For ciders, beers, aperitifs, spirits and sparkling wines, this other producer represents 9.38%, 5.74%, 20.63%, 8.47% and 24.96% of purchases, respectively. For still wines, this share reaches 49.12% of purchases.

Table S2-1 – **Product varieties, descriptive statistics**

	Types	Producers	Brands	Varieties
	N	*N*	*N*	*N*
Ciders	2	6	8	75
Beers	3	25	52	395
Aperitifs	5	19	32	336
Spirits	5	14	48	404
Still wines	3	12	26	230
Sparkling	2	34	38	222
Total				1,662

Source: Kantar WorldPanel 2014 data.

S3 – Additional Tax Analyses

S3.1 – Heterogeneity of Purchasing Behaviour by Standard of Living

Table S3-1 compares the composition of purchases between alcohol categories for the four standard of living classes. Whatever the standard of living, the two categories of alcohol most consumed in terms of glasses of pure alcohol are wine and spirits. In addition, high-income households drink relatively more wine and less hard liquor than the low-income ones.

Table S3-1 – **Purchase volumes per household per year and breakdown by alcohol category**

	Total	Standard of living class			
		High	Upper-middle	Lower-middle	Low
Total (standard drinks)	690.2	600.2	654.1	741.8	722.8
Breakdown (%)					
Ciders	0.71	0.83	0.69	0.69	0.66
Beers	13.63	11.38	13.64	14.03	14.58
Aperitifs	5.71	4.83	5.98	5.72	5.98
Spirits	27.38	26.57	25.61	27.96	30.16
Still wines	47.39	50.90	48.78	46.31	44.41
Sparkling wines	5.17	5.48	5.30	5.30	4.21

Notes: One standard drink = 10 g of pure alcohol (ethanol); values adjusted for the sampling weights; the 4 standard of living classes (high, upper-middle, lower-middle, low) are defined on the basis of self-reported pre-tax monthly income and the number of consumption units in the household, see Table S1-2; number of standard drinks/adult/day measures the average habitual household consumption, calculated on the basis of average purchases over a 4-week period and after conversion into standard drinks (10 g of pure alcohol).
Source and coverage: Kantar WorldPanel 2014 data; *N*=6,353 non-abstinent households from the constant panel.

S3.2 – Tax Burden, Implicit Rate and Effort Rate

For each household *h* and each category of alcohol *k*, we can calculate an apparent *ad valorem* tax rate t_{hk} reflecting the weight of duties and other taxes excluding VAT. Following Ruiz and Trannoy (2008), taxation is broken down into (1) VAT (τ) and (2) duties d_{hk} (potentially specific to each household due to the existence of numerous exemptions and specific taxes). A household's total net expenditure is written as :

$$D_{hk} = (p_{hk}^0 + d_{hk})(1+\tau)Q_{hk}$$

where p_{hk}^0 is the price before tax and Q_{hk} is the quantity consumed. The implicit tax rate excluding VAT is calculated by using the following equation:

$$D_{hk} = p_{hk}^0(1+t_{hk})(1+\tau)Q_{hk}$$

and is written as :

$$t_{hk} = \frac{d_{hk}}{p_{hk}^0} = \frac{(1+\tau)d_{hk}Q_{hk}}{D_{hk} - (1+\tau)d_{hk}Q_{hk}}$$

An implicit tax rate including VAT can also be calculated as:

$$D_{hk} = p_{hk}^0(1+T_{hk})Q_{hk}$$

or :

$$T_{hk} = \tau + \frac{d_{hk}(1+\tau)}{p_{hk}^0} = \tau + t_{hk}(1+\tau)$$

We note $T_h = \sum_k T_{hk}p_{hk}^0 Q_{hk}$ the household's tax burden *h*. The rate of effort (after VAT) actually paid is estimated for a household representative of the population *P*:

$$t_P = \frac{\sum_{h\in P} T_h}{\sum_{h\in P} R_h}$$

where R_h is the household's disposable income. Alternatively, we could have taken total consumption expenditure excluding constrained expenditure (e.g. housing). We follow Ruiz & Trannoy (2008) in using this formula, rather than the average of household effort rates in the population. This is also in line with Kantar's practice, which tends to treat aggregate expenditure/consumption as if it came from consumers who are representative of segments of the population.

S3.3 – Breakdown of the Tax Charge Differential

We now consider two populations, P_1 and P_2, and we want to describe the factors contributing to the tax differential between these two populations. We note T_s and R_s the empirical averages of the tax burden and disposable income in population P_s.

An initial breakdown separates what is due to a tax burden differential ($T_2 - T_1$) from the mechanical effect of differences in income:

$$\Delta t = t_2 - t_1 = \frac{(T_2 - T_1)}{R_1} + T_2\left(\frac{1}{R_2} - \frac{1}{R_1}\right)$$

If, for example, P_2 = {low-income households} and P_1 = {high-income households}, then the second term of this sum, $T_2\left(\frac{1}{R_2} - \frac{1}{R_1}\right)$ will be positive. It mechanically contributes to the fact that low-income households have a higher effort rate on average than high-income households, for an identical tax burden, which characterises a situation of vertical inequity.

The first term in this decomposition, $\frac{(T_2 - T_1)}{R_1}$ depends on the tax differential. It therefore reflects differences in the composition of purchases (qualities and quantities) and in the implicit tax rates. To better understand the origin of these differences, we can further detail the tax differential. To do this, we adopt the following notations:

$T_s = \mathbf{E}[T_h | h \in P_s]$ average tax burden borne by a household in population P_s.
$T_{sk} = \mathbf{E}[T_{hk} | h \in P_s]$ implicit tax rate on purchases of alcohol of category k for a household in population P_s.
$p_{sk} = \mathbf{E}[p^0_{hk} | h \in P_s]$ price before tax for alcohol category k paid on average by a household in population P_s.
$Q_{sk} = \mathbf{E}[Q_{hk} | h \in P_s]$ average volume of alcohol of category k purchased by a household of population P_s.
$D_{sk} = \mathbf{E}[p^0_{hk} Q_{hk} | h \in P_s]$ average pre-tax expenditure on alcohol purchases in category k for a household in population P_s.

The tax differential can be broken down as follows:

$$\begin{aligned}\Delta T = T_2 - T_1 &= \sum_k \left(\mathbf{E}\left[T_{hk} p^0_{hk} Q_{hk} \middle| h \in P_2\right] - \mathbf{E}\left[T_{hk} p^0_{hk} Q_{hk} \middle| h \in P_1\right]\right) \\ &= \sum_k (T_{2k} D_{2k} - T_{1k} D_{1k}) + \underbrace{\sum_k \left(\rho^{2,k}_{T,D} - \rho^{1,k}_{T,D}\right)}_{Covariance\ T-D}\end{aligned}$$

where $\rho^{s,k}_{T,D}$ is the covariance between the implicit tax rate and the level of net expenditure in population P_s for category k. Furthermore, noting $\Delta_k = T_{2k} D_{2k} - T_{1k} D_{1k}$ we have for all categories k:

$$\begin{aligned}\Delta_k &= T_{2k}D_{2k} - T_{1k}D_{1k}\\ &= T_{2k}(D_{2k} - D_{1k}) + D_{1k}(T_{2k} - T_{1k})\\ &= T_{2k}\left(p_{2k}^0 Q_{2k} - p_{1k}^0 Q_{1k} + \rho_{p,Q}^2 - \rho_{p,Q}^1\right) + D_{1k}(T_{2k} - T_{1k})\\ &= \underbrace{T_{2k}p_{2k}^0(Q_{2k} - Q_{1k})}_{Quantity} + \underbrace{T_{2k}Q_{1k}\left(p_{2k}^0 - p_{1k}^0\right)}_{Quality} + \underbrace{T_{2k}\left(\rho_{p,Q}^2 - \rho_{p,Q}^1\right)}_{Covariance\ p-Q} + \underbrace{D_{1k}(T_{2k} - T_{1k})}_{Implicit\ rates}\end{aligned}$$

where $\rho_{p,Q}^2$ is the covariance between price and quantity consumed in the population P_s.

From the data, we can estimate ΔT and the terms Δ_k. By accounting equality, we can deduce the covariances $\rho_{t,D}^{2,k} - \rho_{t,D}^{1,k}$. The terms can then be decomposed Δ_k by calculating the quantity terms = $T_{2k}p_{2k}^0(Q_{2k} - Q_{1k})$, quality = $T_{2k}Q_{1k}\left(p_{2k}^0 - p_{1k}^0\right)$, and differences in implicit tax rates = $D_{1k}(T_{2k} - T_{1k})$ and then, using the accounting equality, we can derive the effect of the difference in covariance between the pre-tax price and the quantity purchased, $T_{2k}\left(\rho_{p,Q}^2 - \rho_{p,Q}^1\right)$. The latter cannot be interpreted as strictly speaking reflecting a price effect.

We used this breakdown to compare the annual tax burden (in euros) borne by affluent versus low-income households.

On average, low-income households bear a higher tax burden. The term ΔT is equal to +18.65 €/year, to the disadvantage of the poorest households. The tax-expenditure covariance is low, at around €0.11/year. Table S3-2 breaks down the rest of the differential, $\sum_k \Delta_k$ = €18.54/year, by category of alcohol *k*. There are major contributions from the quantity effect (+€40) and the differential in implicit tax rates (+€24): low-income households consume more highly taxed hard liquor, and have slightly higher implicit tax rates. This last point could reflect slight differences in alcohol choices, with high-income households buying relatively more hard liquor that benefits from lower taxation. There was also a significant negative quality effect (−€34), with low-income consumers buying cheaper products ($p_{2k}^0 - p_{1k}^0 < 0$).

Table S3-2 – **Breakdown of tax burden differential (€), Low- *vs.* High-income households, unadjusted**

	Quantity	Quality	Rates implicit	Covariance price-quantity
Total ($\sum_k \Delta_k$)	+39.75	−34.17	+24.31	−11.35
By category (Δ_k)				
Ciders	+0.04	−0.08	+0.00	+0.04
Beers	+7.51	−2.00	−0.62	−1.00
Aperitifs	+4.41	−1.09	+0.54	−0.67
Spirits	+26.94	−22.78	+23.87	−7.06
Still wines	+1.21	−3.32	+0.26	−2.68
Sparkling wines	−0.36	−4.90	+0.26	+0.02

Notes: Values adjusted for sampling weights.
Source and fields: Kantar WorldPanel 2014 data; *N*=6,353 non-abstinent households from the constant panel.

In Table S3-3, we have replicated this analysis by adjusting all the variables (pre-tax prices, quantities, expenditure, implicit rates, tax burden) for socio-demographic differences between categories and especially for differences in usual consumption of pure alcohol measured in standard drinks per adult per day according to three categories (less than one drink, between one and two drinks, two drinks or more). In contrast to the results observed previously, the total tax burden differential is negative (−€10.28/year), to the advantage of low-income households, with a significant tax-expenditure

covariance effect (+€15.38/year, not shown in the Table). This negative differential is explained by the disappearance of the quantity effect (divided by 10, to €3.54) and, to a lesser extent, by the reduced contribution of the implicit tax rate differential (divided by three, to €7.95). By contrast, the quality effect remains strongly negative and virtually unchanged (−€30.96/year *vs.* −€34.17/year).

Table S3-3 – **Breakdown of the tax burden differential (€), Low- *vs.* High-income households, adjusted**

	Quantity	Quality	Rates implicit	Covariance price-quantity
Total ($\sum_k \Delta_k$)	+3.54	−30.26	+7.95	−6.91
By categorie (Δ_k)				
Ciders	−0.19	−0.08	+0.00	+0.05
Beers	+3.03	−1.90	−0.67	−0.87
Aperitifs	+3.19	−0.93	+0.87	−0.72
Spirits	+1.44	−20.08	+7.33	−3.16
Still wines	−1.26	−2.98	+0.24	−2.73
Sparkling wines	−2.67	−4.29	+0.18	+0.52

Notes: Values adjusted for sampling weights and covariates: average habitual consumption of pure alcohol (standard drinks/adult/day: ≤1,]1 ;2] and >2), age and age squared of reference person, region (ZEAT) and type of place of residence (size of urban unit), household structure (single *vs.* couple, with or without children); adjustment regressions are adjusted for sampling weights.
Source and fields: Kantar WorldPanel 2014 data; *N*=6,353 non-abstinent households from the constant panel.

The difference in results depending on whether or not we adjust for usual consumption can be explained by the fact that differences in consumption structure by standard of living reflect trade-offs linked to addiction effects as measured by the total volume of pure alcohol purchased. To demonstrate this, we estimated the associations between the share of each alcohol category in the volume of alcohol consumed (in L) and standard of living, adjusting for the average daily consumption of pure alcohol (less than one standard drink per adult per day, between one and two drinks, two or more drinks), as well as age (and its square), region and size of urban unit of residence, and household structure. The results presented in Table S3-4 show that the relative share of the different categories of alcohol is not directly affected by the standard of living but it is indirectly affected by the usual level of consumption of pure alcohol. The share of spirits and wine in the volume of pure alcohol purchased is higher when consumption of pure alcohol exceeds 2 standard glasses per adult.

Table S3-4 – **Impact of living standards on the share of the different alcohol categories in the total volume of alcohol purchased**

	Ciders	Beers	Aperitifs	Strong spirits	Sparkling wines	Still wines
Standard of living (Kantar WorldPanel standard of living classes), benchmark: high-income						
Upper-middle	−0.546 (0.802)	2.377 (2.029)	−0.356 (1.274)	0.001 (1.192)	−1.880 (1.757)	0.403 (0.966)
Lower-middle	−1.020 (0.782)	−0.053 (1.971)	0.796 (1.160)	1.216 (1.172)	−1.199 (1.773)	0.260 (0.847)
Low	−1.027 (0.950)	−0.433 (2.343)	1.273 (1.318)	0.657 (1.325)	−1.029 (2.158)	0.559 (1.040)
Habitual consumption (number of standard drinks/adult/day), *reference*: ≤ 1 glass						
]1;2]	−4.327 (0.844)***	−7.408 (2.543)***	−4.438 (1.166)***	1.245 (1.666)	14.363 (2.597)***	0.565 (1.257)
> 2	−5.509 (0.702)***	−10.084 (2.356)***	−5.590 (1.144)***	5.321 (1.697)***	16.996 (2.442)***	−1.133 (1.133)

Notes: *Significant at 10%; **significant at 5%; ***significant at 1%; coefficients of Ordinary Least Squares (OLS) regressions of the shares of each alcohol category in the total volume purchased; control variables: age and age squared of the reference person, region (ZEAT) and type of place of residence (size of urban unit), household structure (single *vs.* couple, with or without children); standard of living and usual consumption interactions. couple, with or without children); standard of living and usual consumption interactions; observations are weighted by sampling weights.
Source and fields: Kantar WorldPanel 2014 data; *N*=6,353 non-abstinent households in the constant panel

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S4 – Additional Results

Table S4-1 – Design of the progressive excise tax on ethanol (€/L)

Flat tax	Marginal change	Alcohol content
$x \times d$	$x \times d$	if $d \in [0; 5[$
$x \times d$	$(2\times d\text{-}5) \times x$	if $d \in [5; 10[$
$x \times d$	$(3 \times d\text{-}15) \times x$	if $d \in [10; 15[$
$x \times d$	$(4 \times d\text{-}30) \times x$	if $d \in [15 ; 25[$
$x \times d$	$(5 \times d\text{-}55) \times x$	if $d \in [25; 45[$
$x \times d$	$(6 \times d\text{-}100) \times x$	if $d \in [45; 100]$

Notes: d is the alcoholic strength of the product; x designates a base rate calibrated according to the objective pursued in terms of tax revenue under the assumption of no behavioural reactions from consumers and producers.

Table S4-2 – **Impact on tax revenue by alcohol category and simulated scenario (in € million) and relative change (%)**

	Current taxation	Flat tax		Progressive tax		Minimum price	
		Low rates (S1)	High rate (S2)	Low rate (S3)	High rate (S4)	Current taxes (S5)	Progressive tax (S6)
Ciders	20	34 (+70.0)	50 (+150.0)	27 (+35.0)	33 (+65.0)	20 (0.0)	27 (+35.0)
Beers	477	479 (+0.4)	774 (+62.3)	352 (−26.2)	488 (+2.3)	498 (+4.4)	385 (−19.3)
Aperitifs	216	201 (−6.9)	324 (+50.0)	202 (−6.5)	304 (+40.7)	227 (+5.1)	213 (−1.4)
Spirits	1,949	759 (−61.1)	1,352 (−30.6)	1,254 (−35.7)	2,152 (+10.4)	1,986 (+1.9)	1,378 (−29.3)
Still wines	600	1,569 (+161.5)	2,595 (+332.5)	1,458 (+143.0)	2,208 (+268.0)	837 (+39.5)	1,598 (+166.3)
Sparkling wines	201	300 (+49.3)	412 (+105.0)	288 (+43.3)	369 (+83.6)	205 (+2.0)	289 (+43.8)
Total	3,463	3,342 (−3.5)	5,507 (+59.0)	3,581 (+3.4)	5,554 (+60.4)	3,773 (+9.0)	3,890 (+12.3)

Notes: Tax revenues are calculated at household level from unit prices and quantities purchased, adjusted for sampling weights and extrapolated to the French population; for scenarios S1 and S3 corresponding to low rates, the slight deviations from neutrality (−3.5 for S1 and +3.4 for S3) can be explained by the use of slightly different household samples for tax calibration (the entire representative KWP sample) and simulations (the subset of households observed at least 10 months out of 12); in both cases - calibration and simulation - appropriate adjustment weights are used to obtain a representative sample.

Source and coverage: Kantar WorldPanel 2014 data; *N*=6,353 non-abstinent households from the constant panel.

Table S4-3 – **Impact on the unit price of a litre of wine in €, by quality segment and simulated scenario (relative variation in %)**

	Current taxation	Flat tax		Progressive tax		Minimum price	
		Low rates (S1)	High rate (S2)	Low rates (S3)	High rate (S4)	Current taxes (S5)	Progressive tax (S6)
Vin de table	2.05	3.05 (+48.8)	4.10 (+100.0)	2.93 (+42.9)	3.70 (+80.5)	4.80 (+134.1)	4.80 (+134.1)
Vin de pays	2.64	3.63 (+37.5)	4.69 (+77.7)	3.52 (+33.3)	4.29 (+62.5)	4.80 (+81.8)	4.81 (+82.2)
Appellations	4.85	5.85 (+20.6)	6.91 (+42.5)	5.73 (+18.1)	6.51 (+34.2)	5.15 (+6.2)	5.77 (+19.0)
Price ≤ 3	2.25	3.25 (+44.4)	4.31 (+91.6)	3.14 (+39.6)	3.91 (+73.8)	4.80 (+113.3)	4.80 (+113.3)
3 < Price ≤ 5	4.12	5.12 (+24.3)	6.18 (+50.0)	5.01 (+21.6)	5.78 (+40.3)	4.82 (+17.0)	5.16 (+25.2)
Price > 5	5.60	6.60 (+17.9)	7.67 (+37.0)	6.49 (+15.9)	7.27 (+29.8)	5.60 (0.0)	6.49 (+15.9)
Total	3.49	4.49 (+28.7)	5.54 (+58.7)	4.37 (+25.2)	5.15 (+47.6)	4.95 (+41.8)	5.23 (+49.9)

Notes: Unit prices of varieties are in €/L; statistics are calculated by adjusting the quantities purchased for households and by sampling weights.

Source and coverage: Kantar WorldPanel 2014 data; *N*=1,662 product varieties purchased by *N*=6,353 non-abstinent households in the constant panel.

Table S4-4 – **Impacts on the implicit tax rate per household in %, by simulated scenario (variation in percentage points)**

		Flat tax		Progressive tax		Minimum price	
	Current taxation	O1 (S1)	O2 (S2)	O1 (S3)	O2 (S4)	Current taxes (S5)	Progressive tax (S6)
Average	59.61	54.46 (−8.6)	89.61 (+50.3)	58.39 (−2.0)	90.53 (+51.9)	51.87 (−13.0)	48.75 (−18.2)
By standard of living							
High-income	51.31	49.81 (−2.9)	80.15 (+56.2)	52.38 (+2.1)	79.44 (+54.8)	46.17 (−10.0)	46.12 (−10.1)
Upper-middle	55.91	52.79 (−5.6)	86.19 (+54.2)	55.68 (−0.4)	85.51 (+52.9)	49.93 (−10.7)	47.84 (−14.4)
Lower-middle	62.99	56.31 (−10.6)	93.32 (+48.2)	60.99 (−3.2)	95.28 (+51.3)	54.34 (−13.7)	50.00 (−20.6)
Low-income	67.77	58.26 (−14.0)	97.46 (+43.8)	63.94 (−5.7)	100.86 (+48.8)	55.65 (−17.9)	50.18 (−26.0)
By usual consumption level (standard glass/adult/day)							
≤ 1	55.52	51.45 (−7.3)	83.62 (+50.6)	54.03 (−2.7)	82.60 (+48.8)	49.90 (−10.1)	46.73 (−15.8)
]1; 2]	63.05	57.05 (−9.5)	94.68 (+50.2)	62.15 (−1.4)	97.30 (+54.3)	53.50 (−15.1)	50.80 (−19.4)
> 2	72.36	63.82 (−11.8)	108.25 (+46.9)	71.91 (−0.6)	115.14 (+59.1)	58.05 (−19.8)	54.72 (−24.4)

Notes: Implicit tax rate = tax/expenditure excluding tax; values weighted by sampling weights; the 4 standard of living classes (High, Upper-middle, Lower-middle, Low) are defined on the basis of self-reported pre-tax monthly income and the number of consumption units in the household, see Table S1-2; Conso : categories ≤1,]1 ;2] and >2 measure the habitual consumption of the household in number of standard glasses/adult/day, calculated on the basis of average purchases per 4-week period and after conversion into standard drinks (10 g of pure alcohol).
Source and coverage: Kantar WorldPanel 2014 data; *N*=6,353 non-abstaining households from the constant panel.