Price elasticity of alcohol demand: an analysis using the Australian Alcohol Consumption and Purchasing Survey 2013

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Background

- Reducing alcohol affordability or increasing prices have been considered effective in reducing harmful use of alcohol.
- Understanding alcohol price elasticity of demand can help to formulate and appraise alcohol price-based interventions or policies.
- Studies on estimating price elasticieis of alcohol demand include:
  - --- Aggregage level analysis (time series analysis)
  - --- Beverage-specific analysis (cross-sectional & longitudinal surveys)
- In Australia, no beverage-specific price elasticities of demand at on- and off-premises have previously been estimated at the population level.

Research aims

- This study employs a Tobit model approach to estimate own- and cross-price elasticities of 11 categories of beverage using data from the 2013 Alcohol Consumption and Purchasing Survey, the Australian arm of the International Alcohol Control (IAC) Study
- Price elasticities of alcohol demand are estimated for different subgroups, particularly for different types of drinkers and income levels.

Data and method

A national landline and mobile computer assisted telephone interview collecting data on the experience of alcohol consumption and purchasing from 2020 Australians (age 16 and above).

Respondents were asked how often they consume and purchase alcohol from a range of on- and off-premises, what they usually purchase at each venue type, and how much they consumed.

Log-log Tobit regression models were employed to estimate price elasticities of demand for alcohol in Australia.

- moderate drinkers (≤14 ASDs per week for men and women),
- hazardous drinkers (>14-42 ASDs for men and >14-35 ASDs for women),
- harmful drinkers (>42 ASDs for men and >35 ASDs for women)
- lower income drinker (<$61k)
- middle income drinker ($61-114k)
- higher income drinker (>$114k)

Demographic factors that can affect demand were considered in the models – age, gender, income, and education levels. One Australian Standard Drink (ASD) = 10 grams pure alcohol

Tobit model

The observable variable Q_i is defined to be equal to the latent variable whenever the latent variable is above zero, and to be zero otherwise.

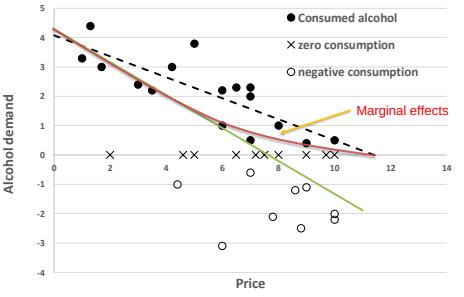
$$\log(Q_i^*) = C_i + \sum_{j=1}^{11} \alpha_{i,j} \log(p_j) + \beta_i X + \gamma_i Y + \delta_i Z \ldots + \varepsilon_i$$

$$Q_i = \begin{cases} Q_i^* & if\ Q_i^* > 0 \\ 0 & if\ Q_i^* \le 0 \end{cases}$$

where Q_i^* is demand or consumption of beverage *i*, p_j are prices of the different types of beverages (in total 11 categories in our analysis). *X, Y, Z* are demographic factors, including age, gender, income and education levels, which can affect alcohol demand.

Price elasticities of alcohol demand were computed based on the marginal effects of people's willingness to buy alcohol.

Tobit model



Results (1/5)

Table 1a Weighted average number of standard drinks purchased and average price per standard drink at on- and off-license premises in Australia

(n)	Quantity of purchasing (ASDs)		Price ($) (n=1823)	
	Mean	95% CIs	Mean	95% CIs
On-premises (2020)				
Regular beer	245.3	213-278	4.41	4.24-4.58
Mid-strength beer	41.2	33-50	5.99	5.62-6.37
Bottle wine	229.8	199-260	6.25	5.80-6.71
Spirits	135.5	101-170	5.34	4.76-5.91
RTDs	25.3	16-35	6.35	5.90-6.79
Off-premises (2020)				
Regular beer	346.1	190-502	1.57	1.51-1.63
Low- & Mid-strength beer	48.1	33-64	2.31	2.01-2.62
Bottle wine	273.4	231-316	1.96	1.78-2.13
Cask wine	39.3	24-55	0.65	0.47-0.83
Spirits	122.4	89-156	1.67	1.52-1.83
RTDs	17.3	12-23	2.79	2.46-3.12

Results (2/5)

Table 1b Table 1a Weighted average number of standard drinks purchased and average price per standard drink at on- and off-license premises in Australia

(n)	Quantity of purchasing (ASDs)		Price ($) [a]	
	Mean	95% CIs	Mean	95% CIs
Types of drinkers				
Moderate (1071)	500.2	427-572	1.66	1.54-1.78
Hazardous (576)	2360.8	2215-2507	1.35	1.23-1.46
Harmful (373)	8377.5	6749-10005	1.16	1.03-1.28
Consumer's income levels				
Low income (555)	1209.2	964-1455	1.35	1.19-1.52
Middle income (636)	1882.2	1285-2480	1.52	1.39-1.64
High income (606)	1937.6	1672-2203	1.76	1.58-1.94

Results (3/5)

Table 2 Alcohol beverages own- and cross-prices elasticities calculated at mean values of marginal effects

N=2020	On-premises					Off-premises					
	Regbeer	Low& Mid beer	Botwine	Spirits	RTDs	Regbeer	Low& Mid beer	Botwine	Caskwine	Spirits	RTDs
P(on-regbeer)	-0.43					0.34					
P(on-midbeer)		-0.57					0.08				
P(on-botwine)			-0.22					0.45			
P(on-spirits)				0.00							
P(on-RTDs)					-0.10						0.01
P(off-regbeer)	1.01					-1.24	-0.28				
P(off-midbeer)		0.71				-0.01	-0.55				
P(off-botwine)	-0.30		0.61	-0.32		-0.21		-0.89		-0.26	
P(off-caskwine)			-1.13						-1.55	-0.82	
P(off-spirits)				0.76						-0.29	
P(off-RTDs)					1.00						-0.19

Note: the significant results are highlighted as red in the table, dark cells are own price elasticities

Results (4/5)

Table 3 Own-price elasticities of demand for alcohol beverages by drinker types

N=2020	On-premises				Off-premises			
	on-beer	on-wine	on-spirits	on-RTDs	off-beer	off-wine	off-spirits	off-RTDs
Moderate drinker	0.11	-0.07	0.09	-0.21	-0.95	-0.62	-0.15	-0.11
Hazardous drinker	-0.30	-0.36	-0.06	-0.59	-0.90	-0.49	-0.32	-0.23
Harmful drinker	-0.59	-0.59	-0.22	-0.16	-1.18	-1.00	-0.48	-0.04

Note: the significant results were highlighted as red in the table

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Results (5/5)

Table 4 Own-price elasticities of demand for alcohol beverages by income types

N=2020	On-premises				Off-premises			
	on-beer	on-wine	on-spirits	on-RTDs	off-beer	off-wine	off-spirits	off-RTDs
Low income	-0.55	-0.63	0.03	-0.32	-1.16	-0.95	-0.42	-0.26
Middle income	-0.42	-0.49	0.02	-0.14	-1.08	-1.02	-0.23	-0.15
High income	-0.32	-0.50	0.01	-0.05	-0.87	-0.71	-0.33	0.01

Note: the significant results were highlighted as red in the table

Conclusions

1) Our survey results show off-premise purchases are generally a cheaper source of alcohol, and cheapest by far, because of the current model of taxation, is off-premise cask wine ($0.65 per ASD).

2) The own- and cross-price elasticities estimated in this study can be utilised to examine the effects of price-based interventions on alcohol consumption and related harms in Australia, which allows detailed examination of change in beverage-specific demand in response to change in prices at on- and off-premise sectors.

3) Results of own-price elasticities suggests that an increase in alcohol price or tax will effectively reduce demand for alcohol for more price-elastic categories of beverage, particularly for off-premise cask wine, bottle wine and regular-beer compared with on-premise regular beer and on-premise bottle wine. In contrast, demand for on-premises spirits and RTDs will not be significantly affected by its own price change.

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Conclusions

4) Cross-price elasticities show complex substitution and complementary relationships among different categories of beverage, suggesting that alcohol price policies should not be focused on particular types of beverage but rather on a uniform price/or tax policy, such as a minimum price per standard drink or a volumetric taxation system based on alcohol content

5) Harmful drinkers are more price responsive than hazardous and moderate drinkers, suggesting an increase in alcohol price or tax will achieve a greater reduction in alcohol consumption for harmful drinkers and a considerably smaller reduction in hazardous and moderate drinkers.

6) Lower income drinkers are generally more price elastic than middle and higher income drinkers. Therefore, an increase in alcohol price or tax, or introducing a minimum unit price, can have a greater effect in reducing alcohol consumption on lower income drinkers than on middle and higher income drinkers.

Limitations: Self-report data; no temporal variations in the cross-sectional data; doubling 6-month data to calculate annual rates without considering seasonality.

Thank you !

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