Economic Impact of Imposing Excise Tax on Plastic Bottles of Drinks ☆

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Abstract

This research simulates the effect of imposing excise tax on plastic container of drinks towards economic performance of beverage industry in Indonesia and government's tax revenue. The results showed that by imposing excise tax on plastic cups and plastic bottles the government would lose tax revenue from value added tax (PPN) and corporate income tax (PPh badan) more than they gain additional revenue from excise tax. Hence, imposing excise tax on drink containers should serve a clear purpose and an undeniable reason. This paper recommends the government to develop proper excise infrastructure to extend the goods or services to be taxed. This paper also recommends the required stages for extending the excise tax.
Keywords: excise tax; elasticity; demand; government budget; regression

Abstrak

Penelitian ini mensimulasikan pengaruh pemungutan cukai pada kemasan plastik minuman terhadap kinerja ekonomi industri minuman dan penerimaan pajak pemerintah di Indonesia. Hasil penelitian menunjukkan bahwa dengan mengenakan pajak cukai pada gelas plastik dan botol plastik, pemerintah akan kehilangan pendapatan dari pajak pertambahan nilai (PPN) dan pajak penghasilan badan (PPh badan) lebih dari tambahan pendapatan dari cukai. Oleh karena itu, pengenaan pajak cukai pada kemasan plastik minuman harus didasari pada tujuan dan alasan yang kuat. Studi ini merekomendasikan pemerintah untuk mengembangkan infrastruktur cukai yang tepat untuk memperluas jenis barang atau jasa untuk dikenakan pajak. Tulisan ini juga merekomendasikan tahapan yang diperlukan untuk meningkatkan penghasilan cukai.
Kata kunci: *pajak cukai; elastisitas; permintaan; anggaran pemerintah; regresi*

JEL classifications: C10; E62; H21; H27; H60

1. Background

The Ministry of Finance (*Kementerian Keuangan/Kemenkeu*) planned to collect excise tax duty of all products utilizing plastic container. This has been discussed in the state budget (*Anggaran Pendapatan dan Belanja Negara Perubahan*/APBN-P) of 2016. A lot of beverage products utilize plastic container. The Indonesian government has published government regulation plan (*Rencana Peraturan Pemerintah*/RPP) of 2016 about addition of beverage products utilizing plastic container to goods on which excise is levied.

The planned regulation acknowledges that plastic container of beverage products can cause negative impact for the society or the environment. In Article 1 of the planned regulation, plastic is defined as organic macro-molecule that is produced by polymerization, polycondensation, polyaddition or other similar process of monomer, oligomer or chemical changes of natural macromolecules. Below is a summary of several important chapters of the government regulation plan.

Article 3 mentioned that the excise tax duty on plastic container of beverage products would be imposed on (a) products made in Indonesia when plastic container is filled with beverage with intent of using it, and (b) products being imported where plastic container filled with beverage is being imported to customs area in accordance with the provisions of the law on customs.

Article 4 arranged the tax responsibility to be carried out by manufactures for drink products made in Indonesia, and by importers or other related parties in accordance to customs laws for imported drink products.

Article 6 point 2 arranged that the tax is not levied on plastic container on drinks that (a) contain more than 5 liters per package, (b) is produced directly on the point of sale to consumers, or (c) is produced by home industry as arranged in laws of food products.

Article 9 arranged the regulations to be in force 90 days after its enactment.

The current law of customs, Act No. 39 of 2007, Article 2 point 1 stated that excise tax would be levied on certain goods which (a) consumption should be regulated, (b) circulation need to be monitored, (c) usage can cause negative impact on the society or the environment, or (d) usage should see tax being levied for the sake of justice and balance.

Tax being levied would increase price that consumers would pay. Like other types of tax, excise tax of any kind on any kind of product would lower disposable income of the society and also lower their purchasing power. A lower purchasing power would lower sales revenue of producers, which would in turn lower government tax revenue from other taxes, such as value added tax and corporate income tax.

Price increase caused by increase of excise is larger than the excise tariff the government enact, as usually the government does not levy excise on consumers. Excise is being levied to the producers, distributors, wholesalers and retailers. Excise being levied further downstream would inflict larger price increase that the consumers would pay.

This report includes research objectives, overview of tax policies across country, method, data and assumptions used, analysis result, conclusions, and policy recommendations. Estimation result, conclusion, and policy recommendation is the result of individual research and academic reasoning conducted by the author on June 2016.

This research aims to estimate the cost and benefit for the government in imposing tax on beverages' plastic container. Specifically, this research aims to:

1. Estimate decrease in demand due to rise in price of beverage products packaged in plastic bottles and cups.
2. Estimate increase of product price due to excise tax on plastic bottles and cups.
3. Estimate decrease of demand due to price increase.
4. Estimate decrease in sales of the industry.
5. Estimate decrease in VAT and corporate income tax revenue.
6. Estimate change in government revenue.

2. Excise tax policy in several countries

Only a few countries levy excise tax on plastic container. One of it is the state of Chicago, United States (City of Chicago, n.d.). The excise tariff for plastic container was USD0.05 (about Rp650 per bottle) since January 2008. The excise tax was collected on retailers, such that there are no opportunities for distributors and wholesalers to increase the price of tax to consumers. The excise was limited to drinks in bottles for human consumption excluding soda, health drinks, mineral water, distilled water,

et cetera. Therefore, the excise was only levied on drinks such as juice, tea and coffee in plastic bottle container. Home industry and mineral water directly delivered to consumers (not being sold in stores) is also excluded from the excise tax. The International Bottled Water Association (IBWA), the association dedicated to provide quality safe and convenient bottled drinks for consumers rejected the excise tax on bottled drinks. IBWA claim that the policy discourages creation of job opportunities, business investment and innovation in creating environmentally friendly plastic bottle container. Several efforts have been undertaken by the local communities so that the Chicago state government would repeal the policy.

The state of Philadelphia has just announced on June 17, 2016 that the government would levy excise tax on soda. The tariff levied is USD0.15 (about Rp1,950) per-ounce on carbonated drinks. This tax is start to be levied on January 1st, 2017. Previously, proposal of the excise tax has failed to pass in 30 cities, twice in Philadelphia. Excise tax on soda is deemed to burden poor population that consume more of the drink. Consumers would decrease purchase of the product after the excise tax. The reason for the excise tax was to encourage healthier living to Philadelphia residents, where more than 68% adults and 41% children are overweight or obese. The excise tax is levied on distributors, such that the price consumers pay for is higher than other types of tax.

Thailand is a neighboring country of Indonesia that levied the most types of excise tax. Around 20 goods in Thailand has excise tax. Goods with excise tax in Thailand includes (1) fuel; (2) drinks: (a) mineral water, (b) soda and (c) juice; (3) electronic goods such as air conditioning; (4) glass and goods made from glass; (5) cars; (6) yacht and boat used for leisure purpose; (7) perfume and cosmetics; (8) Other goods, such as carpets and the like, sport motorcycle, marble and granite, battery

and other goods that damages the ozone layer; (9) leisure activities such as night clubs and discotic, sauna and Turkish massage, revenue from sauna and massage services; (10) gambling: horse racing and lottery; (11) activities that damage the environment: golf sports; (12) business activities that require license or concession from the government: land line and cellular phone service provider; (13) alcoholic beverage: beer, wine and the like; (14) cigarette and pipe; (15) card game: poker and the like. The government of Thailand levies excise tax on leisure activities due to being convinced that the people who use yacht and luxury ships would not incur welfare if they must pay excise tax. The tax revenue can be used to aid the impoverished member of society. Such also applies to consumers of massage and Turkish sauna services.

The purpose of excise tax in the three countries above is basically identical to what currently applies in Indonesia, which in accordance to Article 2 of Act No. 39 of 2007, where excise tax is levied on goods which consumption should be regulated, circulation need to be monitored, usage can cause negative impact on the society or the environment or usage should see tax being levied for the sake of justice and balance. The main purpose of excise tax is to change the behaviour of the society to become better, without reducing welfare.

3. Method and data

3.1. Method

This research employ linear regression to estimate the amount of decrease in demand due to price increase. Linear regression (ordinary least square) is a method to estimate the magnitude of price elasticity of demand of drinks packaged in containers. Drinks in plastic container consist of (1) water, (2) soda, (3) tea and (4) juice. Plastic containers

consist of plastic glass and bottles. This research conduct estimation of elasticity of the four types of drink and two types of plastic container packaging, resulting in 8 equations. However, soda and juice is not packaged in cups. Therefore, in this research, six elasticities would be estimated.

The quantity of demand is measured by the amount of containers (bottle or cups), as the government's plan is to levy excise tax on plastic container of drink products, instead of the drink itself. The price of beverage is obtained by dividing the selling price with the volume of the drink being sold, so the price obtained is price per liter of drink. The complete explanation can be read in Table 1 below. The quantity demanded is calculated based on liter, thus the result should be converted to amount of cups or bottle, which would simplify the estimation of change in government tax revenue. The data being used is reported monthly, hence the change in demand is for one month. To obtain calculation of one year, the estimate is multiplied by 12. After estimating the decrease of demand due to increase in price, the decrease of government revenue of VAT and corporate income tax due to the price increase can be estimated. VAT is as much as 10%. The ratio of corporate income tax to VAT is calculated based on data of tax payment of companies producing drinks sold in in containers.

This research accounts for the tendency of consumers to stop purchases of all types of beverage if the price of water sold in containers increase. Therefore, the quantity used to explain the decrease in demand due to increase of price of water is the quantity of all types of beverage.

3.2. Data and Assumption

Data used in this research is provided by Indonesian packaged drinking water producers association (*asosiasi perusahaan air kemasan Indonesia*

- ASPADIN) and Indonesian soft drink association (*asosiasi industri minuman ringan Indonesia* (AS-RIM). The definition and triad count statistics (mean, maximum, and minimum) is presented in Table 1 below. Period of data is from January 2013 through January 2016 (37 points of data observation).

Packaged drink used in this research consist of (1) packaged water, (2) carbonated drinks, (3) packaged tea, and (4) juice. Carbonated drinks and juice is not available in cups. Cups have the same volume across products which is 240 milliliters, while volume of bottle varies, starting from 300 milliliters to 1500 milliliters. In this research, a middle value of 600 milliliters is used.

Excise tax levied is assumed to be Rp50 for cup containers and Rp200 for bottle containers. This assumption is based on information obtained from mass media. Listed below are several citation obtained from mass media:

1. "It is planned to be included in APBN-P 2016 and should it be approved, would be in force this year. But the value would be smaller (than Rp 200). While the potency of revenue is still being calculated, sure to be promising," said Ministry of Finance Bambang Brodjonegoro (Liputan6.com, April 12th 2016);
2. Jakarta, CNN Indonesia, Wednesday, April 15th, 2016 15:07 WIB — Fiscal Policy Agency (*Badan Kebijakan Fiskal* - BKF) Ministry of Finance estimated that the excise tax on plastic drink container can only be levied on the second half of the year, with a specific tariff of Rp. 200 maximum per bottle. "The purpose is to decrease consumption of plastic bottles, not revenue. This is due to the potency of revenue is not large, less than Rp5 trillion," said Nasrudin Joko Suryono, head of duty and excise tax BKF (CNNIndonesia.com, April 13th 2016).

Levying excise tax would increase end price that consumers must pay. The amount of price depends

Table 1: Descriptive Statistics of Packaged Drink Monthly Data
Period of January 2013–January 2016

No	Variable	Remarks	Unit	Mean	Max	Min
1	P_water_PET	Price of water in bottle	rupiah per liter	1,531	1,965	1,252
2	P_water_CUP	Price of water in cup	rupiah per liter	2,380	2,930	1,904
3	Number_water_PET	Amount of plastic bottles for water	bottle	619,698,108	728,181,000	456,363,000
4	Number_water_CUP	Amount of plastic cups for water	cup	574,799,203	649,208,000	504,034,000
5	P_SSD_PET	Price of water in bottle	rupiah per liter	8,490	9,243	7,869
6	Number_SSD_PET	Amount of plastic bottles for water	bottle	55,341,177	78,704,590	31,151,516
7	P_tea_PET	Price of water in bottle	rupiah per liter	6,181	6,770	5,664
8	P_tea_CUP	Price of water in cup	rupiah per liter	4,818	5,118	4,536
9	Number_tea_PET	Amount of plastic bottles for water	bottle	50,344,679	73,532,416	32,799,810
10	Number_CUP_tea	Amount of plastic cups for water	cup	305,417,015	336,580,822	263,196,081
11	P_Juice_PET	Price of water in bottle	rupiah per liter	9,155	9,910	8,392
12	Number_Juice_PET	Amount of plastic bottles for juice	bottle	51,392,424	69,707,550	36,772,911
13	Total_Num_PET	Total amount of plastic bottles	bottle	776,776,388	932,373,560	601,970,536
14	Total_Num_CUP	Total amount of plastic cups	cup	880,216,218	958,680,068	802,934,905

Source: ASPADIN & ASRIM, author's calculation
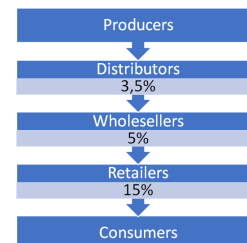
Table 2: Assumption of Excise Tax Applied

No	Package	Excise Value (Rp)	Excise Value per liter (Rp)
1	Cup	50	208
2	Bottle	200	333

Source: Various Media, author's calculation

Figure 1: Profit Margin of Each Step of Drink Packaged in Plastic Containers
Source: Interview with ASPADIN & ASRIM

on two factors; firstly, how much excise tax is collected; secondly, how the excise is collected. A higher amount of excise being collected would cause end selling price to consumers to be higher. If the excise is levied to producers, consumers would incur price increase several times of the excise being levied. Meanwhile, if the excise is levied on retailers, the amount of price increase consumers need to pay equals the amount of excise tax being levied. This is due to the distribution channel and profit margin the sellers take on each part of the supply chain.

The distribution from producers to consumers and average amount of profit margin being taken is summarized as follows (Figure 1).

Therefore, if the excise tax is levied on producers, consumers would incur a price increase of about 23.5% of the excise tax being applied. Table 3 below presents a simulation of price increase in consumer price if the excise is collected from producers and retailers.

The price increase that consumers would pay would be larger than what is stated in Table 3 above. There are various additional costs, such as transportation cost that companies would incur if the mechanism of excise is applied using excise band sticker from excise and customs office. Producers would also need to purchase machine to stick excise band to the plastic packaging.

Rounding that retailers charge on the consumers would also increase the selling price of packaged drink significantly. For instance, if water in cup container sells for Rp500 has an excise of Rp50 levied on producers, retailers are not likely to sell it only as much as Rp561.75 to consumers. At least, consumers' price would increase to Rp600, which is an increase of twice of the original excise the government charged. In day to day practice, water cups

Table 3: Simulation of Price Increase Consumers Would Incur

No	Container	Amount of excise (Rp)	Amount of excise per liter (Rp)	Price increase consumers pay per liter	
				Collected from producers	Collected from retailers
1	Cup	50	208	257	208
2	Bottle	200	333	412	333

Source: Data Analysis from various media source

that food stalls and vendors usually sell for Rp500 would then sell for Rp1,000.

In the Indonesian Government Regulation Plan of 2016 about addition of beverage products utilizing plastic container to goods on which excise is levied, it is mentioned that the excise would not be levied on home industries producing drinks in plastic containers. This research assumes that about 20% of drinks in plastic packaging is produced by home industry, such that the government revenue would be 80% of excise should the excise be charged on the whole industry's produce.

Companies pay off VAT and corporate income tax proportionate to sales. VAT tariff is at 10%, while corporate income tax is calculated using a ratio based on the data of tax payment of packaged drinking water producers who joined ASPADIN as stated in Table 4 below. The average ratio for three years is 1.403. The ratio would then be used to estimate the corporate income tax payment.

Table 3 above shows that the amount of drinking water cups and bottes being sold is the largest amongst other types of drinks, while the price per liter is the lowest. Therefore, drinking water would suffer the greatest impact. Consumers might stop purchasing all types of packaged drinks if they felt the price increase of drinking water cups and bottles. To accommodate this, the research employed the assumption that increase of drinking water would lower the demand for all types of packaged drink products.

4. Result

Excise on plastic bottle packaging would be levied from all drink producers consisting of (1) water, (2) carbonated beverages, (3) tea, and (4) juice. Because all types of drinks would experience price increase, demand for all types of drinks would decrease. However, the respond of consumers towards price increase of each types of drink is different. Subsection 5.1 presents how decrease of quantity demanded due to price increase for each types of drinks. The decreased demand would also cause VAT and corporate income tax revenue to decrease. Subsection 4.2 would present analysis of change in government revenue due to levying excise tax on plastic containers used by the drink industry.

4.1. Decrease of demand due to price increase

The mathematical equation used in analyzing process of decrease in quantity demand due to price increase is summarized as follows:

A. Water packaged in bottle

$$\log(\text{total\_num\_pet}) = 17.44 - 0.72 \cdot \log(\text{p\_water\_pet})$$
$$+ 0.0052 \cdot \text{trend}$$
$$+ 0.462 \cdot \log(\text{number\_tea\_pet})$$
$$(1)$$

Table 4: Corporate Income Tax and VAT Paid by Drinking Water Producers

ITEM	2013	2014	2015
Corporate Income Tax (Billions Rp)	1,200	1,300	1,600
VAT (Billions Rp)	786	971	1,190
Ratio of Corporate Income Tax to VAT	1.53	1.34	1.34

Source: ASPADIN

B. Water packaged in cup

$$\log(\text{total\_num\_cup}) = 11.39 - 0.46 * \log(\text{p\_water\_cup})$$
$$+ 0.65 * \log(\text{number\_cup\_tea})$$
$$(2)$$

C. Soft drink packaged in bottle

$$\log(\text{number\_ssd\_pet}) = 5.92 - 1.60 * \log(\text{p\_ssd\_pet})$$
$$+ 0.82 * \log(\text{number\_cup\_tea}(-1))$$
$$+ 0.58 * \log(\text{number\_ssd\_pet}(-1))$$
$$(3)$$

D. Tea packaged in bottle

$$\log(\text{number\_tea\_pet}) = 1.85 - 0.48 * \log(\text{p\_tea\_pet})$$
$$+ 0.015 * \text{trend}$$
$$+ 1.01 * \log(\text{number\_cup\_tea})$$
$$(4)$$

E. Tea packaged in cup

$$\log(\text{number\_cup\_tea}) = 23.30 - 0.996 * \log(\text{p\_tea\_cup})$$
$$+ 0.413 * \log(\text{number\_tea\_pet})$$
$$- 0.15 * \log(\text{number\_juice\_pet})$$
$$(5)$$

F. Juice packaged in bottle

$$\log(\text{number\_juice\_pet}) = 6.25 - 0.58 * \log(\text{p\_juice\_pet})$$
$$- 0.0105 * \text{trend}$$
$$- 0.068 * \log(\text{number\_ssd\_pet})$$
$$+ 1.03 * \log(\text{number\_tea\_pet})$$
$$(6)$$

The equations are obtained by estimating the demand function of drinks packaged in plastic bottle and cup containers. The estimation is conducting using ordinary least square (OLS) regression using EVIEWS 8 econometric software. The output of estimation result can be observed in **Appendix**.

The purpose to conduct the above estimation is to obtain value of **price elasticity of demand**. The value of elasticity can be interpreted as the percentage of change in quantity demand if the price is increased by 1%. The summary of elasticity value and its interpretation can be observed in the below Table 5.

All types of drinks packaged in plastic bottle or cup are normal goods, which demand would decrease if the price increase. Soda is the type of drink that exhibit elastic demand, where decrease in quantity is larger than the increase in price. Meanwhile, tea packaged in cup is unitarily elastic, which percentage of decrease in quantity demanded equals the change in percentage of price decrease. Other types of drink exhibit inelastic demand, which decrease in quantity demanded is less than the increase in price.

Table 5: Interpretation of Price Elasticity of Demand Coefficient

No	Type of drink	Coefficient of Elasticity	Economic Interpretation	Property
1	Water packaged in bottle	-0.716	A 1% percent increase in price of water packaged in bottle will reduce quantity demanded by 0.72%	inelastic
2	Water packaged in cup	-0.458	A 1% percent increase in price of water packaged in cup will reduce quantity demanded by 0.46%	inelastic
3	Soft drink packaged in bottle	-1.602	A 1% percent increase in price of soft drink packaged in bottle will reduce quantity demanded by 1.6%	elastic
4	Tea packaged in bottle	-0.479	A 1% percent increase in price of tea packaged in bottle will reduce quantity demanded by 0.4%	inelastic
5	Tea packaged in cup	-0.996	A 1% percent increase in price of tea packaged in cup will reduce quantity demanded by 1%	unitarily elastic
6	Juice packaged in bottle	-0.578	A 1% percent increase in price of juice packaged in bottle will reduce quantity demanded by 0.57%	Inelastic

4.2. Change in government revenue

Table 6 shows the potential government revenue if cup container is charged Rp50 per cup and bottle container is charged Rp200 per bottle. In 1 year, the government is estimate to gain revenue of Rp1.9 trillion, as the number of bottle containers per year is estimated to be as much as 9,321,316,661 bottles and the number of cup containers is estimated to be 10,562,594,615 cups.

Table 7 presents the potential decrease of consumers' demand or sales of drinks packaged in plastic bottles and cups. The increase of price due to excise tax would decrease demand by a certain number. 1% of price increase would decrease quantity demanded as much as the coefficient of elasticity (Column E) times 1%. Column F is the result of multiplication of column C and column E.

Column I presents the average volume of demand per year that is the result of multiplying column H and 0.24 for glass and 0.6 for bottle. Column J is the result of multiplying column F with column I. Column K is the result of multiplying column J and column A. The total of decrease in sales that the drink industry face is estimated to be as much as Rp10.2 trillion per year. The decrease in sales would decrease government revenue from VAT and

corporate income tax that the companies pay based on the sales value. VAT is charged as much as 10% from sales, while corporate income tax is calculated from data of tax payments.

Table 8 presents the simulation of lost government revenue from VAT and corporate income tax due to decrease in plastic drinks. In a period of 1 year, the government is estimated to incur lost revenue of Rp528 trillion.

The above value has not taken into account the cost that the government would incur in order to collect excise tax. This still cannot be estimated, since up until this article is written (June 19th, 2016) the government has not announced technical detail of plastic container excise collection. However, for reference, if excise of the plastic container is collected by employing excise bands, the government would incur a large cost to provide the excise bands. The cost to procure excise bands for cigarettes in 2016 is as much as Rp693.219.544.750. This cost is the result of auction that is won by Peruri.

Table 6: Potential Revenue of Excise Tax on Plastic Containers with a tariff of
Rp50 per cup and Rp200 per bottle

No	A	B	D	E	F
	Type of drink	Average number of containers per month	Average number of containers per year Column [B] x 12	Unit	Excise Revenue (Rp): Bottle x Rp. 200, Cups x Rp. 50
1	Water in bottle	619,698,108.11	7,436,377,297.30	bottle	1,487,275,459,459
2	Water in cup	574,799,202.70	6,897,590,432.43	cup	344,879,521,622
3	Soft drink in bottle	55,341,177.00	664,094,123.98	bottle	132,818,824,796
4	Tea in bottle	50,344,679.01	604,136,148.12	bottle	120,827,229,624
5	Tea in cup	305,417,015.22	3,665,004,182.61	cup	183,250,209,131
6	Juice in bottle	51,392,424.27	616,709,091.30	bottle	123,341,818,260
			TOTAL before subtracted by home industry		2,392,393,062,892
			After subtracted by home industry (80%*TOTAL)		1,913,914,450,313

Source: Aspadin & Asrim, author's calculation

5. Conclusion and Recommendation

In many country, plans to levy plastic containers has always triggered debates. Therefore, the government Indonesia should have a precise purpose and planning and clear reason backed by adequate research should it want to levy excise on a certain product. An easily rebuttable argument would delay the implementation of excise tax. In Thailand, every person can read the mechanism through a bilingual website clearly. Starting from types of goods on which excise is collected, tariff, procedure up to awards to most compliant excise payer. In United States where the tax system is very much established, announcement regarding promulgation of excise is held one year prior. The technical procedure of excise collection largely determines the consumer selling price of excised goods. The increase in price that consumers would incur would be higher than the tariff of excise the government has set. The difference of excise tariff and increase in price that the consumers would incur depends on the technical procedure of excise collection. The government should consider a simple and cheap mechanism such that consumers need not incur a large price increase.

This study showed that Levying excise tax on plastic containers in Indonesia filled with drinks would result in increase of product price. For the economy, the increased price would lower the purchasing power of society, or welfare level, as in the end, consumers would incur the burden of price increase. The government can obtain additional revenue from excise, but a lower demand of the product on which excise is levied would occur. On the other hand, plastic excise for drink would still lower the demand. The lower demand would lower sales, which would lower the performance of the industry. Due to the lower performance in the industry, the government would incur loss of revenue from value added tax/VAT (*pajak pertambahan nilai* – PPn) and corporate income tax (*pajak penghasilan badan* – PPh Badan). Moreover, in the long term, labor force problem might occur if the performance of the producers keeps on decreasing. The increased price would decrease competitiveness of the product. A sizable amount of drinks produced by Indonesia is being exported.

A complicated and expensive mechanism would pose various risk to the government. One of the examples would be counterfeited excise. In cigarette industry, counterfeited excise is still a primary problem that cost the government trillions of rupiah annually (Mardanugraha et al., 2009). Smaller drink producers would see further decline if they must bear the cost of excise tax. Small, micro and medium

Table 7: Simulated Calculation of Potential Sales Decline

No	A Type of drink	B Average price per liter (Rp)	C Increase of price per liter (Rp)	D Percentage of price increase	E Elasticity coefficient	F Percentage of decrease in demand
1	Water in bottle	1,531	412	27%	-0.72	-19%
2	Water in cup	2,38	257	11%	-0.46	-5%
3	Soft drink in bottle	8,49	412	5%	-1.60	-8%
4	Tea in bottle	6,181	412	7%	-0.48	-3%
5	Tea in cup	4,818	257	5%	-1.00	-5%
6	Juice in bottle	9,155	412	4%	-0.58	-3%

No	G Type of drink	H Average amount per year		I Average volume of demand per year (liter)	J Decrease of demand (liter)	K Decrease of demand (Rp)
1	Water in bottle	12,382,184,695	bottle	7,429,310,817	-1,429,861,166	-9,064,025,265,229
2	Water in cup	10,562,594,615	cup	2,535,022,708	-125,545,920	-451,852,405,018
3	Soft drink in bottle	664,094,124	bottle	398,456,474	-30,954,548	-262,789,378,451
4	Tea in bottle	604,136,148	bottle	362,481,689	-11,555,817	-71,423,742,580
5	Tea in cup	3,665,004,183	cup	879,601,004	-46,767,860	-225,326,600,258
6	Juice in bottle	616,709,091	bottle	370,025,455	-9,613,366	-88,013,552,579
					TOTAL	-10,163,430,944,115

Source: Author's calculation

Table 8: Simulation of potential government revenue lost

Remarks	Value (Rp)
Decrease of 10% VAT	-1,016,343,094,411
Decrease of corporate income tax 1.403*VAT	-1,426,295,693,860
TOTAL	-2,442,638,788,271
Excise tax revenue	1,913,914,450,313
Government lost	-528,724,337,957

enterprises (*usaha mikro kecil dan menengah – UMKM*) do not have production plan, such that it would be difficult for them to determine the amount of excise bands to purchase before production is executed, such as in cigarette. The current government regulation plan (RPP) does not clearly specify the definition of home industry which would be exempt from excise tax. The excise policy discourages UMKM to expand in scale to become large enterprise. ASPADIN noted that in Indonesia, there are about 700 enterprises in drink industry, and only 53 of it are large enterprise.

The government should meticulously consider cost and benefit of levying excise. If the cost is greater than benefit, the excise is best be postponed until the government is ready to face every consequence that take place. Government should announce the excise tariff and collection mechanism far before the excise is being levied, that the enterprise can conduct proper planning in its business, and consumers can find alternatives to substitute for the excised goods or stop its consumption.

Before all instruments are ready to collect excise, government cannot promulgate a regulation. This would create confusion in the society. For instance, if the excise is collected in the same manner as cigarettes, which is purchasing excise bands, enterprises would be confused where to obtain the excise bands, how to stick the excise on the product, et cetera. An adequate time is necessary to conduct socialization on the instruments to collect the excise itself.

Extension of excise objects by levying excise on

personal cars with certain cylinder volume such as in Thailand would currently be more realistic to be implemented in Indonesia. The higher the cylinder volume a car has, the higher the excise tariff becomes. The collection can be conducted by cooperating with Jasa Marga as manager of toll road, by giving additional ticket as a proof that the diver pays the excise. The calculation of excise tariff per kilometer or cylinder volume of a car is also easier to conduct. Of course, there will be expense the government need to pay to collect excise, such as incentive for officers in toll road gates or installing detectors for the types of car on which excise would be levied. Levying excise on personal cars poses disincentive for its users, reducing usage of oil consumption and traffic congestion. The result of excise revenue can be used to construct public transportation infrastructure.

Branded bag and leather goods that only the very rich members of the society can purchase can also be an object of excise extension. The behavior of the purchaser of such goods is very rich, such that levying excise would not reduce their tendency to keep purchasing. The government would continue to obtain excise revenue. The behavior to live simpler and use domestic products would be the purpose of levying excise to branded bags, bought inside or outside the country. The resulting excise revenue can be used to increase the capacity of SMEs to produce products of leather with quality competing with that of the branded bags, creating a national brand that would be the pride of Indonesian people. SMEs should be given training regarding this. Such training should be supported by the

government and large enterprises, so that plastic usage can be reduced together. Business and business startups on innovation of packaging should be encouraged such that an environmentally friendly alternative to plastic bottle and cup for drinking containers can be invented while costing the same or cheaper than plastic product. This research does not recommend enterprises to use non-plastic containers with higher cost.

Imposing excise tax on drink containers should serve a clear purpose and an undeniable reason. The government needs to develop proper excise infrastructure to extend the goods or services to be taxed. This paper recommends the stages for extending the excise tax as follows: (1) Accommodate the public opinion on what behavior to be reduced, (2) Conduct a study to: establish new excise objects, document public opinion on new excise objects, determine optimal tariff and appropriate polling mechanism, (3) Establish tariffs, collection mechanisms, and timing of polling, (4) Conducting trials, (5) Evaluation of trial results, (6) Revising tariffs and collection mechanisms, and (7) Collect the excise tax collection for a certain period of time until the purpose to reduce the behavior is reached.

This research has a lot of limitation, especially the employment of a lot of assumption, although the assumption is backed by current data and facts. Therefore, an empirical study that employ primary data or surveys to enterprises and consumers should be conducted to obtain a more precise and accurate analysis. This research should also be supported with research from other disciplines, such as research about the environment.

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Appendix

Table A1: Estimation of Equation 1

Dependent Variable: LOG(TOTAL_NUM_PET)
Method: Least Squares
Date: 06/19/16 Time: 19:07
Sample: 2013M01 2016M01
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	17.43590	1.154440	15.10334	0.0000
LOG(P_WATER_PET)	-0.715661	0.077753	-9.204322	0.0000
TREND	0.005160	0.001410	3.658216	0.0009
LOG(NUMBER_TEA_PET)	0.461542	0.078338	5.891701	0.0000
R-squared	0.928059	Mean dependent var		20.46363
Adjusted R-squared	0.921519	S.D. dependent var		0.120770
S.E. of regression	0.033833	Akaike info criterion		-3.832949
Sum squared resid	0.037774	Schwarz criterion		-3.658796
Log likelihood	74.90955	Hannan-Quinn criter.		-3.771552
F-statistic	141.9029	Durbin-Watson stat		1.154331
Prob(F-statistic)	0.000000			

Table A2: Estimation of Equation 2

Dependent Variable: LOG(TOTAL_NUM_CUP)
Method: Least Squares
Date: 06/19/16 Time: 19:18
Sample: 2013M01 2016M01
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	11.38788	1.771152	6.429647	0.0000
LOG(P_WATER_CUP)	-0.458155	0.062310	-7.352832	0.0000
LOG(NUMBER_CUP_TEA)	0.653504	0.103239	6.329996	0.0000
R-squared	0.638025	Mean dependent var		20.59449
Adjusted R-squared	0.616732	S.D. dependent var		0.049328
S.E. of regression	0.030539	Akaike info criterion		-4.062047
Sum squared resid	0.031709	Schwarz criterion		-3.931432
Log likelihood	78.14787	Hannan-Quinn criter.		-4.015999
F-statistic	29.96451	Durbin-Watson stat		1.251889
Prob(F-statistic)	0.000000			

Table A3: Estimation of Equation 3

Dependent Variable: LOG(NUMBER_SSD_PET)
Method: Least Squares
Date: 06/11/16 Time: 18:02
Sample (adjusted): 2013M02 2016M01
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.923355	7.092708	0.835133	0.4098
LOG(P_SSD_PET)	-1.602069	0.550362	-2.910935	0.0065
LOG(NUMBER_CUP_TEA(-1))	0.823211	0.444123	1.853564	0.0730
LOG(NUMBER_SSD_PET(-1))	0.578215	0.172640	3.349242	0.0021
R-squared	0.458264	Mean dependent var		17.82141
Adjusted R-squared	0.407476	S.D. dependent var		0.169605
S.E. of regression	0.130555	Akaike info criterion		-1.129612
Sum squared resid	0.545424	Schwarz criterion		-0.953665
Log likelihood	2.433.301	Hannan-Quinn criter.		-1.068202
F-statistic	9.023120	Durbin-Watson stat		2.055909
Prob(F-statistic)	0.000178			

Table A4: Estimation of Equation 4

Dependent Variable: LOG(NUMBER_TEA_PET)
Method: Least Squares
Date: 06/11/16 Time: 08:52
Sample: 2013M01 2016M01
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.849107	4.389056	0.421299	0.6763
LOG(P_TEA_PET)	-0.478642	0.267805	-1.787279	0.0831
TREND	0.015081	0.001558	9.682682	0.0000
LOG(NUMBER_CUP_TEA)	1.01062	0.222422	4.545690	0.0001
R-squared	0.911806	Mean dependent var		17.70968
Adjusted R-squared	0.903789	S.D. dependent var		0.225429
S.E. of regression	0.069924	Akaike info criterion		-2.381021
Sum squared resid	0.161347	Schwarz criterion		-2.206867
Log likelihood	48.04888	Hannan-Quinn criter.		-2.319624
F-statistic	113.7252	Durbin-Watson stat		1.053881
Prob(F-statistic)	0.000000			

Table A5: Estimation of Equation 5

Dependent Variable: LOG(NUMBER_CUP_TEA)
Method: Least Squares
Date: 06/11/16 Time: 16:15
Sample: 2013M01 2016M01
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	23.30334	3.820577	6.099430	0.0000
LOG(P_TEA_CUP)	-0.995637	0.562069	-1.771379	0.0857
LOG(NUMBER_TEA_PET)	0.412959	0.144299	2.861836	0.0073
LOG(NUMBER_JUICE_PET)	-0.148720	0.133052	-1.117763	0.2717
R-squared	0.452804	Mean dependent var		19.53537
Adjusted R-squared	0.403058	S.D. dependent var		0.061428
S.E. of regression	0.047461	Akaike info criterion		-3.156022
Sum squared resid	0.074333	Schwarz criterion		-2.981868
Log likelihood	62.38640	Hannan-Quinn criter.		-3.094625
F-statistic	9.102471	Durbin-Watson stat		1.066631
Prob(F-statistic)	0.000156			

Table A6: Estimation of Equation 6

Dependent Variable: LOG(NUMBER_JUICE_PET)
Method: Least Squares
Date: 06/11/16   Time: 09:09
Sample: 2013M01 2016M01
Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.247446	3.347020	1.866570	0.0711
LOG(P_JUICE_PET)	-0.577793	0.322927	-1.789239	0.0830
TREND	-0.010500	0.003106	-3.380397	0.0019
LOG(NUMBER_SSD_PET)	-0.068300	0.073284	-0.931990	0.3583
LOG(NUMBER_TEA_PET)	1.026758	0.144396	7.110720	0.0000
R-squared	0.857855	Mean dependent var		17.74436
Adjusted R-squared	0.840087	S.D. dependent var		0.146649
S.E. of regression	0.058644	Akaike info criterion		-2.709584
Sum squared resid	0.110051	Schwarz criterion		-2.491892
Log likelihood	55.12730	Hannan-Quinn criter.		-2.632837
F-statistic	48.28063	Durbin-Watson stat		1.629575
Prob(F-statistic)	0.000000			