IMPACT OF TOBACCO EXCISE ON SECTORAL OUTPUT AND GROSS INCOME OF INDONESIA: AN APPLICATION OF INPUT OUTPUT ANALYSIS

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ABSTRACT
(Excise on Tobacco Products (CHT) as the largest contributor to the Indonesian economy when compared to other excisable goods reaches 96% so it is considered quite effective to improve the country's economy. CHT has increased every year with the aim of controlling the negative impact of cigarette consumption and relaxing the success of the High Risk Excise Control (PBHT) in eradicating illegal cigarettes. This study aims to analyze the impact of the CHT increase on sectoral output and Gross Domestic Product. The method of analysis in this study is Input-Output using the 2010 IO table (updated in 2019). The classification of the Input Output table is 185 sectors and aggregated into 21 sectors. The analysis in this study is multiplier analysis, distribution and linkage. The result is that the increase in CHT on the tobacco product processing industry has no impact on the national economy as a whole, so it is better for the CHT increase regulation to remain in effect. The government must supervise related parties in the production of the cigarette industry so that fraud does not occur if the CHT increase is still in effect.

Keywords: Tobacco Products Excise (CHT), Input-Output Analysis, Tobacco Processing Industry (IHT)
INTRODUCTION

Economic development is essentially a country's effort to improve the quality and equity of development for the welfare of its people (Dasser, 2020). The value of economic growth can be achieved by using extensive and intensive inputs, total output, labor growth rate and productivity (Raisová & Šurčová, 2014). The industry for Tobacco Products (IHT) has a significant role in the country's Gross Domestic Product revenue through taxes Haryono (2015), employment, and protection of farmers in the tobacco sector (John et al., 2009). Ahsan & Setyonaluri (2008) stated that the tobacco products industry is a strategic sector that contributes significantly to the national economy. The largest contribution of the tobacco products industry is seen from employment, state revenue through excise and taxes (H. T. T. Nguyen et al., 2020). Ministry of Finance (2020)

The Ministry of Finance (2020) reported that tobacco excise tax revenue until 2020 reached the revised state budget target of IDR 172.2 trillion. The most revenue from tobacco excise is IDR 130.5 trillion. The role of tobacco excise reaches 96% when compared to other excisable goods which are classified as very small. Tobacco excise as the largest contributor Ge & Lei (2018) and is considered quite effective to improve the Indonesian economy (Rahayu Ningrum & Toiba, 2015). Research by Nguyen et al (2020) provides an opinion that there are two points of view in controlling tobacco. The first group includes social policy makers, activists, health workers believe that tobacco control measures should be strengthened by reducing the amount of consumption.

The second opinion is from the side of cigarette companies and manufacturers. Tobacco control by lowering excise taxes and taxes has the potential to have a negative impact on employment. Policy and regulatory change is the clearest path. towards the resolution of Buana, (2013) as a path of adjustment to production resources and industrial control (Nor et al., 2013). Other studies also state that the increase in tobacco excise has positive and negative impacts. The positive impact of the CHT increase is to increase state revenue and reduce the number of smokers in Indonesia. The negative impact is in the form of losses in the cigarette industry sector (Crosby et al., 2019). shows that there is an increase in the highest CHT trend in 2020 to reach five times the previous year. The Ministry of Finance (2020) emphasizes that the average increase in CHT trends since 2020 is above 20%.
The production of tobacco products throughout 2021 has also decreased by 10 percent Fiscal Policy Agency (2020). noted that the increase in excise tax rates on tobacco products has the aim of controlling the sustainability of the cigarette industry, labor-intensive labor, market conditions and smoking prevalence rates. The increase since 2020 above 10% is considered effective to control the market conditions of the tobacco products industry. Tobacco is a mainstay commodity in providing extensive employment opportunities and income for the community (Shahzad et al., 2018). Tobacco can support national development in the form of taxes and foreign exchange. Tobacco farmers are responsive to price variables in the long run so that an increase in tobacco prices will encourage an increase in domestic tobacco production (Rahayu Ningrum & Toiba, 2015). Research by Nguyen et al (2020) suggests that there are two perspectives on tobacco control. The first group includes social policy makers, activists, health workers believe that tobacco control measures should be strengthened by reducing the amount of consumption. The second opinion is from the side of cigarette companies and manufacturers. Tobacco control by lowering excise taxes and taxes has the potential to have a negative impact on employment. Policy and regulatory change is the clearest path towards the Buana resolution, (2013) as a pathway for adjusting production resources and controlling the industry (Nor et al., 2013). Other research also states that the increase in tobacco excise has both positive and negative impacts. The positive impact of the CHT increase is to increase state revenue and reduce the number of smokers in Indonesia.

The negative impact is in the form of losses in the cigarette industry sector (Crosby et al., 2019). shows that the highest CHT trend increase occurred in 2020, reaching five times the previous year. The Ministry of Finance (2020) emphasizes that the average increase in CHT trends since 2020 is above 20%. The production of tobacco products throughout 2021 has also decreased by 10 percent Fiscal Policy Agency (2020). noted that the increase in excise rates on tobacco products has the aim of controlling the sustainability of the cigarette industry, labor-intensive labor, market conditions and smoking prevalence rates. The increase since 2020 above 10% is considered effective to control the market conditions of the tobacco products industry. Tobacco is a mainstay commodity in providing extensive employment opportunities and income for the community (Shahzad et al., 2018). Tobacco can support national development in the form of taxes and foreign exchange. Tobacco
farmers are responsive to price variables in the long run so that an increase in tobacco prices will encourage an increase in domestic tobacco production (Rahayu Ningrum & Toiba, 2015). Research by Lund et al (2016) in Norway shows that sales restrictions and increases in tax and excise rates are not effective in reducing the circulation of illegal cigarettes and have a negative impact on employment. Strategies to increase support for excise and tax increases should be considered. Policies to increase or decrease tax and excise rates depend on the socioeconomic context of each country (H. T. T. Nguyen et al., 2020). This study is to estimate the impact of an increase in excise tax on tobacco products (CHT) on gross domestic product from household consumption and sectoral output in Indonesia.

LITERATURE REVIEW

1. State Revenue Theory

Indonesia is a developing country, especially in terms of state development activities with funding carried out through the state budget. Indonesia can maximize all development activities, of course, requires a source of funding that can increase the state budget in the long term. One of these funding sources is through state revenue either through taxes or non-taxes (Irama, 2019). State revenue consists of domestic government revenue, as well as grants (Silalahi & Ginting, 2020). There are two aspects of revenue with two main elements, including tax revenue and non-tax state revenue (PNBP). Both aspects of state revenue are regulated in different laws and regulations (Kurniasih, 2016). Prichard et al (2018) argue that an increase in tax and non-tax revenue has a positive impact on state governance. The types of tax revenue include domestic taxes in the form of: Income Tax (PPh), Sales Tax on Luxury Goods (PPnBM), Value Added Tax on Goods and Services (PPN), Land and Building Tax (PBB), Fees on acquisition of rights to land and buildings (BPHTB), other taxes and excise (Silalahi & Ginting, 2020). Non-Tax State Revenue (PNBP) is currently one of the large and very important sources of state revenue in addition to tax revenue. Tax revenue has not reached the target in the last few years. The source of taxation that is not achieved, namely PNBP, is one of the Ministry’s supports to finance services
State Revenue in Government Regulation of the Republic of Indonesia Number 45 of 2013 by the Ministry of Finance (2013) related has a definition as money that enters the state treasury. The concept related to state revenue is very necessary because it has a close relationship with GDP in Indonesia. Revenue is one of the sources for Indonesia's GDP and supports the Indonesian economy. State revenue is reemphasized by the Ministry of Finance (2019) that the realization of state revenue sourced from customs, then excise must also be in line with a better spending policy or result-oriented state spending and can benefit the people.

2. **Excise Theory**

Definition of Excise according to (Directorate General of Customs and Excise, 2020) the definition of excise is a levy for the state on certain goods and has properties or characteristics in accordance with the excise law. Commodities subject to excise are not just state revenues, however, there are negative effects from these commodities.

3. **Input Output Approach Theory**

Every sector in the economy is intertwined and influential so that the progress of each sector cannot be separated from the support provided by other sectors. This causes sectors that contribute a lot to get more attention. Analysis using the input output (IO) model developed by Leontief is a tool to investigate the interdependencies among the linkages of major industries and sectors in the economy. The multi-sectoral multiplier Tis can also be used as an index of industry interdependence. In general, input-output (IO) analysis is a quantitative technique to study the interdependence of production sectors in an economy. The Input Output (IO) method has the objective of identifying the so-called key industries or key sectors that are important for economic growth and development (Hongsakhone et al., 2021)

3.1 **Input Output Table**

The Indonesian Input-Output (I-O) Table assortment functions in providing statistical data inclusively to illustrate the feedback or reciprocal relationship between economic units. Different ways of using input and output data registered in different I-O tables can provide results that are in line with observations in another domestic economic research (Badan Pusat...
Another function of the Input Output (I-O) Table is as a tool to analyze the impact of changes in final consumption made by households, governments, and companies (consumption, investment, and exports) on the economy in Indonesia.

3.2 Classification on input output table

Table 1. Input output table classification

<table>
<thead>
<tr>
<th>Production Sector</th>
<th>Intermediate</th>
<th>Final Demand</th>
<th>Total Output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$X_{11}$</td>
<td>$F_{1}$</td>
<td>$X_{1}$</td>
</tr>
<tr>
<td>2</td>
<td>$X_{21}$</td>
<td>$F_{2}$</td>
<td>$X_{2}$</td>
</tr>
<tr>
<td>3</td>
<td>$X_{31}$</td>
<td>$F_{3}$</td>
<td>$X_{3}$</td>
</tr>
</tbody>
</table>

Source: Central Bureau of Statistics (Processed)

H. T. T. Nguyen et al., (2020) argue that the Input-Output table is generally divided into four main quadrants, namely:

a. Quadrant I or (Intermediate Quadrant)

Intermediate transaction, namely between goods, services in the production process. Quadrant I show the linkages between production sectors in an economy.

Quadrant I also have an important role in the production process due to interdependence between economic sectors.

b. Quadrant II or (Final Demand Quadrant)

The existence of goods and services transactions for economic sectors so as to meet final demand. Final demand is a sector output used by households, government, exports, fixed capital creation, and changes in production stocks.

c. Quadrant III or (Primary Input Quadrant)
Can show the purchase of inputs outside the production system by sectors in the intermediate quadrant. Quadrant III consists of household income (wages and salaries), indirect taxes, business surplus, and depreciation. The total value added in quadrant III can generate gross domestic product in the region.

d) Quadrant IV or (Primary Input-Final Demand Quadrant)

Quadrant for primary input-final demand that shows direct transactions between primary input quadrant and final demand without going through the production system or intermediate quadrant.

4. **Gross Domestic Product**

Gross domestic product expressed (Peterson, 2017) as a percentage change, economic growth equals population growth plus GDP per capita growth. GDP is a measure of economic output and is also an indicator of national income which can be defined as total output net of capital depreciation plus net income from sources abroad. GDP can be used to measure a sector of goods and services produced by a country in a certain period. (Baten, 2018).

**RESEARCH METHOD**

The data in this study uses secondary data derived from the 2010 Indonesia Input-Output Table updating the 2019 input output table with a classification of 185 sectors which are condensed into 21 sectors based on research from (H. T. T. Nguyen et al., 2020). Using the estimation model proposed by van Walbeek (2010) by examining two different excise policy scenarios. Secondary data were obtained from the Central Bureau of Statistics (BPS), the Ministry of Finance (MoF), and several related agencies related to this study. Secondary data in this study were also obtained from other literature studies in the form of theses, theses, journals, and the internet relevant to this study (Suprihanti et al., 2018). The Input Output methodology is used to analyze the impact of tobacco control on output and household consumption in the tobacco industry and the economy. The year 2010 was considered as the base year of estimation (Q. T. Nguyen et al., 2020).
1. **Multiplier Analysis**

Multiplier analysis is an analytical tool that aims to see the incidence between endogenous variables such as sectoral output. There are three types of multipliers, namely output, households, and labor. Multiplier analysis treats households as an endogenous factor in the production sector (Suprihanti et al., 2018). The calculation of the output multiplier number is obtained by the formula:

\[ M_0 = [I - A]^{-1} \]

**Description**

- \( M_0 \) = Matrix multiplier/output multiplier of size n x n
- \( I \) = Identity matrix of size n x n
- \( A \) = Technical coefficient matrix of size n x n
- \([I - A]^{-1}\) = Leontif inverse matrix

The multiplier formula, which is done according to a simple mathematical procedure to derive the income and output multipliers, can be written as follows:

\[
\begin{align*}
X_1 &= X_{11} + X_{12} + \ldots + X_{1n} + Y_1 \\
X_2 &= X_{21} + X_{22} + \ldots + X_{2n} + Y_2 \\
X_3 &= X_{n1} + X_{n2} + \ldots + X_{nn} + Y_3
\end{align*}
\]

**Description:**

- \( X_i \) = Total Gross Output of Sector I (Total of Row 1)
- \( Y_i \) = Total autonomous final demand for sector I products
- \( X_{ij} \) = Sales by sector I to each endogenous sector j

According to the research of (Leontief, 1987) the division of elements in each Input-Output table, in the sum of each column will produce an Input Output coefficient \((a_{ij})\). The coefficient indicates a direct purchase in each intermediate sector if there is an increase in total output by one unit (monetary unit). The equation model for \((a_{ij})\) produces the following formula:
\[
\begin{align*}
X_1 &= a_{11}X_1 + a_{12}X_2 + \ldots + a_{1n}X_n + Y_1 \\
X_2 &= a_{21}X_1 + a_{22}X_2 + \ldots + a_{2n}X_n + Y_2 \\
X_n &= a_{n1}X_1 + a_{n2}X_2 + \ldots + a_{nn}X_n + Y_n
\end{align*}
\]

\(a_{ij} = X_{ij} / X_j\) = Input and Output coefficient matrix

Equation (2) can be expressed in the following form:

\[X = AX + Y\]

Where:
A = \([a_{ij}]\) = Input and Output coefficient matrix

Equation (3) can be expressed in the following form:

\[X - AX = Y\]
\[X - (I-A) = Y\]

Where:

(I-A) = Leontif Matrix
(I-A)-1 = Leontif Inverse Matrix, the solution to the above equation can be express as follow:

\[Z = (I-A) = [Z*_{ij}]\) (Open Input Output Analysis Model)
\[Z^* = (I-A)-1 = [Z^*]\) (Closed Input Output Analysis Model)

The Leontif inverse matrix can cause the multiplier analysis to have impact values that will be described later in the impact analysis.

2. Analysis of Impact

Jensen & West (2010) divide several types of multiple impacts, among others: Initial effect, first round effect or direct effect, industrial support effect or indirect effect and consumption-induced-impact, total impact, and spillover impact.

Table 1. Income and Output Multiplier Formulas for Impact Analysis

<table>
<thead>
<tr>
<th>Impact Type</th>
<th>Output</th>
<th>Pendapatan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Impact</td>
<td>1</td>
<td>hi</td>
</tr>
<tr>
<td>First Round Impact</td>
<td>(\sum a_{ij})</td>
<td>(\sum a_{ij} hi)</td>
</tr>
<tr>
<td>Impact of Industry</td>
<td>(\sum a_{ij} - 1 - \sum a_{ij})</td>
<td>(\sum a_{ij} - h_{ij} - \sum a_{ij} h_{ij})</td>
</tr>
</tbody>
</table>
### Support

<table>
<thead>
<tr>
<th>Consumption Impact</th>
<th>$\Sigma i\alpha*<em>{ij} - 1 - \Sigma i\alpha</em>{ij}$</th>
<th>$\Sigma i\alpha*<em>{ij} - h</em>{ij} - \Sigma i\alpha_{ij}h_{i}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Impact</td>
<td>$\Sigma i\alpha*_{ij}$</td>
<td>$\Sigma i\alpha*<em>{ij} h</em>{i}$</td>
</tr>
</tbody>
</table>

Source: Secondary Data (Processed)

Description:
- $a_{ij}$ = Output Coefficient
- $h_{i}$ = Household Income Coefficient
- $a_{ij}$ = Open model Leontief inverse matrix
- $a^*_{ij}$ = Closed model Leontief inverse matrix

Seeing the impact on the multiplier category, a mathematical model of multipliers can be formulated which is categorized according to the type of multiplier and the type of impact, among others, as Linkage and Multiplier analysis is not sufficient as a consideration and basis for knowing the leading sector.

### 3. Linkage Analysis

Linkage analysis is a statistical method (Cantor, 2019) that deals with the extent to which a sector can be linked to other sectors to create a particular output. A sector will be considered superior if it has forward linkage and backward linkage. Wang et al. (2020) stated that direct output linkages are obtained from input coefficients, while direct and indirect output linkages are obtained from the Open Leontief Inverse Matrix.

#### 3.1 Forward Linkage Analysis

Hoseini (2020) states that forward linkage shows a result in a sector that uses share of sector output directly per unit of total incremental demand. Forward linkage analysis linkage analysis will encourage the growth of sectoral output in a production process. The terms of the value of $f(d + id)$ is greater than 1 (one), then future attachment to a sector has a strong ability to support downstream industries (Processing production of semi-finished goods into finished or consumable goods). Forward Linkage Index ($IKD$), $j$ which is obtained by:

$$IKD_j = \frac{\Sigma_{i=1}^{n} b_{ij}}{\Sigma_{i=1}^{n} \Sigma_{j=1}^{n} b_{ij}} n$$

$IKD_j$ = Total forward linkage index of $j$-sector

$b_{ij}$ = Leontif inverse matrix element of row-i and column-j
\( n \) = Leontif matrix size (IO table sector size)
3.2 Backward Linkage Analysis

The definition of backward linkage analysis shows the effect of sectors that provide intermediate inputs to the sector directly per unit increase in total demand (Suprihanti et al., 2018). Direct Backward Linkage has a measure of the size of a sector's backward linkage indicated by Backward Linkage Index ($IKB_j$), which is obtained by:

$$IKB_j = \frac{\sum_{i=1}^{n} b_{ij}}{\sum_{i=1}^{n} \sum_{j=1}^{m} b_{ij}} n$$

$IKB_j$ = Total backward linkage index of j-sector

$bij$ = Leontif inverse matrix element of row-i and column-j

$n$ = Leontif matrix size (IO table sector size)

The Index of Total Backward Linkage (IKB), also known as backward linkage, is the total sum of the columns of the Leontief inverse matrix $(I-A)^{-1}$.

1. Direct and indirect (total) backward linkage analysis shows the effect of a sector on other sectors.

RESULT AND DISCUSSION

Looking at the linkages between sectors in the tobacco processing industry requires a discussion of the linkages between the tobacco processing sector and other sectors. Van Minh et al. (2016) showed that an increase in tobacco excise by 20 percentage points (from 65% to 85%) would reduce smoking rates from 23.8 percent to 23.2 percent (a reduction of 2.52%). If there is an increase in tobacco excise by 40 percentage points (from 65% to 105%), the smoking rate will decrease from 23.8 percent to 22.6 percent (a reduction of 5.04%). Using the results of the Luong et al., (2014) study, it can be calculated how much the reduction in consumption of processed tobacco will be if the CHT increases by 20 percentage
points (from 65% to 85%) and 40 percentage points (from 65% to 105%). BPS publications show that the number of tobacco users increased from 55,527 thousand in 2015 to 63,414 thousand in 2018. The annual growth rate of tobacco consumed was 4.73 percent. The inflation rate was 5.126 in 2010; 5.289 in 2011; and 4.317 in 2012. Total household consumption of tobacco can be concluded to be 126 trillion rupiah in 2012.

The first simulation allocates a 2.52 percent reduction in smoking prevalence, resulting in a reduction in the level of consumption of processed tobacco by households. Total household expenditure on processed tobacco in 2012 amounted to 126 trillion rupiah with a smoking prevalence rate of 23.8 percent. Smoking prevalence after a 20 percent increase in CHT is 23.2 percent. The assumption used is that the reduction in smoking prevalence is proportional to the reduction in processed tobacco consumption. A reduction in smoking prevalence of 2.52 percent will result in a reduction in household expenditure on processed tobacco of 3.19 trillion rupiah. An increase in CHT will increase the price of processed tobacco, which in turn will reduce the consumption of processed tobacco.

Table 1. Summary of Final Household Consumption Results in Table IO 21 Sectors

<table>
<thead>
<tr>
<th>Sector</th>
<th>Household Consumption (Million Rupiah IDR)</th>
<th>Ratio</th>
<th>Consumption allocation to other sectors (million rupiah)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tobacco Excise Increase of 20% points</td>
</tr>
<tr>
<td>Agriculture, livestock, forestry, and fisheries</td>
<td>278,652,364</td>
<td>8.43</td>
<td>268951.58</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tobacco Excise Increase of 40% points</td>
</tr>
<tr>
<td>Mining and quarrying</td>
<td>-</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Other processing industries</td>
<td>1,079,879,617</td>
<td>32.67</td>
<td>1042285.55</td>
</tr>
<tr>
<td>Tobacco processing industry</td>
<td>104,104,846</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Electricity and gas procurement</td>
<td>86,710,924</td>
<td>2.62</td>
<td>83692.24</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Industry</th>
<th>Value (IDR)</th>
<th>Share</th>
<th>CPT (IDR)</th>
<th>GCP (IDR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water supply, waste management, waste, and recycling</td>
<td>8,084,581</td>
<td>0.24</td>
<td>7803.13</td>
<td>15606.26</td>
</tr>
<tr>
<td>Construction</td>
<td>-</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Wholesale and retail trade, repair of cars and motorcycles</td>
<td>510,602,923</td>
<td>15.45</td>
<td>492827.20</td>
<td>985654.40</td>
</tr>
<tr>
<td>Transportation and warehousing</td>
<td>251,089,966</td>
<td>7.60</td>
<td>242348.72</td>
<td>484697.44</td>
</tr>
<tr>
<td>Provision of accommodation and meals</td>
<td>309,310,347</td>
<td>9.36</td>
<td>298542.26</td>
<td>597084.53</td>
</tr>
<tr>
<td>Information and communication</td>
<td>159,067,117</td>
<td>4.81</td>
<td>153529.48</td>
<td>307058.96</td>
</tr>
<tr>
<td>Finance and insurance</td>
<td>110,110,955</td>
<td>3.33</td>
<td>106277.64</td>
<td>212555.28</td>
</tr>
<tr>
<td>Real estate services</td>
<td>215,070,103</td>
<td>6.51</td>
<td>207582.82</td>
<td>415165.65</td>
</tr>
<tr>
<td>Professional, scientific, and technical services</td>
<td>1,517,452</td>
<td>0.05</td>
<td>1464.62</td>
<td>2929.25</td>
</tr>
<tr>
<td>Rental and business support services</td>
<td>11,583,043</td>
<td>0.35</td>
<td>11179.80</td>
<td>22359.60</td>
</tr>
<tr>
<td>Government administration services</td>
<td>8,413,611</td>
<td>0.25</td>
<td>8120.71</td>
<td>16241.41</td>
</tr>
<tr>
<td>Education Services</td>
<td>120,974,671</td>
<td>3.66</td>
<td>116763.16</td>
<td>233526.31</td>
</tr>
<tr>
<td>Health services and social activities</td>
<td>81,931,946</td>
<td>2.48</td>
<td>79079.63</td>
<td>158159.26</td>
</tr>
<tr>
<td>Arts, entertainment, and recreation services</td>
<td>4,067,629</td>
<td>0.12</td>
<td>3926.02</td>
<td>7852.04</td>
</tr>
<tr>
<td>Repair of other household and personal items</td>
<td>5,052,347</td>
<td>0.15</td>
<td>4876.46</td>
<td>9752.92</td>
</tr>
<tr>
<td>Jasa lainnya</td>
<td>63,151,001</td>
<td>1.91</td>
<td>60952.51</td>
<td>121905.02</td>
</tr>
<tr>
<td>Other services</td>
<td>3,409,375,443</td>
<td>100.00</td>
<td>3190203.54</td>
<td>6380407.07</td>
</tr>
</tbody>
</table>

Source: Central Bureau of Statistics (Processed)

In the second simulation, the same steps are taken as in the first simulation, namely by increasing the CHT by 40 percent, it will reduce household consumption
of processed tobacco by 12.76 trillion rupiah. By 40 percent will reduce household consumption of processed tobacco by 12.76 trillion rupiah. The total money saved from reduced consumption of processed tobacco can be used to consume other goods and services, such as savings. Due to data limitations, the assumption is that households use 50 percent of the money saved to consume other goods and services. The estimation of the impact of exchanging processed tobacco consumption for consumption in other sectors was conducted by allocating the reduction in processed tobacco expenditure to other sector expenditure. The allocation is based on the ratio of household expenditure to sectors other than the tobacco processing industry calculated from household expenditure in the 2010 input output table. The other side of total output in 2010 was 13,109 trillion rupiah. The tobacco processing industry contributed 0.95 percent of total national output. The tobacco processing industry sector is ranked 15th out of 21 sectors in the economy.

Table 2. Output by Sector in Indonesia in 2010

<table>
<thead>
<tr>
<th>Kode</th>
<th>Sektor</th>
<th>Output (million rupiah)</th>
<th>% of total output</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agriculture, livestock, forestry, and fisheries</td>
<td>1187980135</td>
<td>9.06</td>
</tr>
<tr>
<td>2</td>
<td>Mining and quarrying</td>
<td>941316835</td>
<td>7.18</td>
</tr>
<tr>
<td>3</td>
<td>Other processing industries</td>
<td>4246359812</td>
<td>32.39</td>
</tr>
<tr>
<td>4</td>
<td>Tobacco processing industry</td>
<td>124457214</td>
<td>0.95</td>
</tr>
<tr>
<td>5</td>
<td>Electricity and gas procurement</td>
<td>309493126</td>
<td>2.36</td>
</tr>
<tr>
<td>6</td>
<td>Water supply, waste management, waste, and recycling</td>
<td>23812591</td>
<td>0.18</td>
</tr>
<tr>
<td>7</td>
<td>Construction</td>
<td>1724302569</td>
<td>13.15</td>
</tr>
<tr>
<td>8</td>
<td>Wholesale and retail trade, repair of cars and motorcycles</td>
<td>1369971416</td>
<td>10.45</td>
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<td>9</td>
<td>Transportation and warehousing</td>
<td>550887835</td>
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<tr>
<td>10</td>
<td>Provision of accommodation and meals</td>
<td>440129504</td>
<td>3.36</td>
</tr>
<tr>
<td>11</td>
<td>Information and communication</td>
<td>409067568</td>
<td>3.12</td>
</tr>
<tr>
<td>12</td>
<td>Finance and insurance</td>
<td>333056561</td>
<td>2.54</td>
</tr>
</tbody>
</table>
13 Real estate services 246307998 1.88
14 Professional, scientific, and technical services 100958246 0.77
15 Rental and business support services 102013277 0.78
16 Government administration services 421053322 3.21
17 Education Services 311211157 2.37
18 Health services and social activities 149315231 1.14
19 Arts, entertainment, and recreation services 9523761 0.07
20 Repair of other household and personal items 6655013 0.05
21 Other services 101247311 0.77

Total 13109120482

Source: Central Bureau of Statistics (Processed)

1. The aquaculture processing industry has a high contribution to the demand and supply structure in Indonesia. Activity imports and domestic demand for this sector are high. This sector requires more intermediate inputs than primary inputs. The tobacco processing industry tends to be a labor-intensive industry.

The lower the intermediate input ratio, the higher the primary input (labor) and the lower the costs incurred to purchase intermediate inputs (raw materials). Household expenditure on processed tobacco in the year was quite high. The increase in tobacco consumption is estimated by the increase in the number of tobacco users multiplied by the inflation rate (estimated by the consumer price index).

2. The impact analysis on the tobacco processing industry is as follows:
   a. The indirect impact on the tobacco processing industry sector (sector 4) is relatively like other sectors. When demand for the tobacco
processing industry sector increases by Rp 1, it will increase output for other related sectors by 0.193.

b. In the backward linkage value, the Tembaka Processing Industry is the leading sector because it has an index of more than 1. The forward attachment value shows that the tobacco products industry is not a leading sector because it has an index of less than 1.

c. The type I multiplier effect shows that the tobacco processing industry has a high multiplier value in terms of both sectoral output and Indonesia's GDP.

d. This type of multiplier effect shows that the tobacco processing industry has a fairly high multiplier value in terms of both sectoral output and Indonesia's GDP.

CONCLUSION AND SUGGESTION

A. Conclusion

Based on the analysis of the 2010 Input-Output Table for 21 sectors, the following conclusions can be drawn:

1. Tobacco processing industry sector has a high contribution to the structure of demand and supply in Indonesia. Import activities and domestic demand for this sector are quite high. This sector requires more intermediate inputs than primary inputs. The tobacco processing industry tends to be a labor-intensive industry. The lower the intermediate input ratio, the higher the primary input (labor) and the lower the costs incurred to purchase intermediate inputs (raw materials). Household expenditure on processed tobacco in the year was quite high. The increase in tobacco consumption is estimated by the increase in the number of people consuming tobacco multiplied by the inflation rate (estimated by the consumer price index).

2. The impact analysis on the tobacco processing industry is as follows:

   a. The Direct Impact shows that if there is an increase in demand for the tobacco processing industry sector, it will have a large direct
impact on the tobacco processing industry sector (sector 4), agriculture, livestock, forestry, and fisheries (sector 1), other processing industries (sector 3), and wholesale and retail trade, repair of cars and motorcycles (sector 8).

b. The indirect impact on the tobacco processing industry sector (sector 4) is relatively similar to other sectors. When demand for the tobacco processing industry sector increases by Rp 1, it will increase output for other related sectors by 0.193.

c. In the backward linkage value, the Tobacco Processing Industry is a leading sector because it has an index of more than 1. The forward linkage value shows that the Tobacco Processing Industry is not a leading sector because it has an index of less than 1.

d. The type I multiplier effect shows that the tobacco processing industry has a high multiplier value in terms of both sectoral output and Indonesia's GDP.

B. Suggestion

The results of the 2010 Input-Output analysis research on the impact of the increase in excise tax on tobacco products (CHT) on sectoral output and Indonesia's GDP provide several suggestions that can be conveyed, including the following:

1. Household expenditure on processed tobacco each year is high enough to enter Indonesia's GDP in terms of sector units. However, tobacco is not a leading sector when compared to other sectors. The increase in CHT which turns out to have a positive impact on other sectors can remain in effect and has no impact on the national economy, so it is better for the policy to remain in effect. The government must supervise related parties in the production of the cigarette industry so that fraud does not occur if the increase in Tobacco Excise is still in effect.

2. In the presentation of output by sector, if you want to look more deeply, the discussion must be devoted to tobacco. Other processing industries are a combination of many sectors, so it is natural that the value is very large. Data limitations cause the assumption used then more than 50% of the rest is allocated to other sectors in accordance with previous research Nguyen et al
2021. With this figure, we can know that RT can use/allocate 50% of the money saved to consume other goods and services.

REFERENCE


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