

Household consumption expenditures and the performance of provincial VAT revenue

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Abstract

This study examines the relationship between household consumption expenditures and the performance of VAT revenue at the provincial level in Indonesia during 2011-2019. Household consumption is divided into food and non-food contests. The PPN performance indicator is shown by the PPN C-efficiency ratio which is calculated from the VAT revenue for each province divided by the VAT rate multiplied by the Consumption GRDP. The results of the regression using the fixed-effect panel data estimation model show a positive and significant relationship between household consumption and VAT revenue in the province. This means that increasing aggregate household consumption, both food and non-food consumption, will increase the VAT-C efficiency ratio. The results also show that an increase in the consumer price index that is not followed by an increase in income will decrease VAT performance. Furthermore, the increase in the share of the tertiary sector as a direction of structural transformation will weaken the performance of VAT receipts. This is possible because the tertiary sector is still dominated by the service sector which is not subject to VAT and the trade sector in which there is a high level of informality.

Keywords: Tax revenue; household consumption expenditure; VAT revenue performance; VAT C-efficiency ratio; service sector

1. Introduction

The structure of tax revenue refers to each part of the type of tax in the total tax revenue. According to (OECD, 2020) data, consumption taxes are the main source of income for the government. However, this did not happen in Indonesia, the highest share of tax revenue in Indonesia in 2019 came from Corporate Income Tax (PPh) of 32%, followed by Value Added Tax (VAT) of 28%.

Several ways have been taken by the government to increase tax revenue, one of which is the expansion of fiscal space in Law Number 7 of 2021 concerning Harmonization of Tax Regulations which will begin to be implemented in 2022. The regulation adds several articles regarding VAT, namely increasing tariffs, regulating goods and/or services that are exempted and not subject to VAT, as well as the provision of VAT facilities which result in a low VAT performance ratio which is shown in the form of the VAT C-efficiency ratio.

Thus, the government needs to continue to evaluate and measure the performance of VAT revenues. The purpose of evaluation and measurement is to review whether or not the VAT policy and administration is optimal for revenue (Ebrill et al., 2010). Quantitative measurement is very useful as a consideration in designing reforms in the VAT sector.

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According to Kotlinska et.al (2020), VAT revenues in a country mostly come from household consumption, which is understood as an expenditure to buy goods and services that occur in the economy. In Indonesia, the growth of Indonesian household consumption has a large enough role in Indonesia's economic growth. The largest contribution to GDP is contributed by household consumption, so if there is a change in consumption spending patterns, it will have an impact on economic fluctuations in Indonesia.

In line with the research of Alm & El-Ganainy (2013), the government must consider the impact arising from household consumption on VAT planning. In addition, consumption taxes have broader implications than income taxes, because they have an impact on national savings which leads to economic growth.

The dynamics of changing consumption patterns can have a significant impact on income collection, because basic goods are not subject to tax rates (Sancak et al., 2010). Likewise, according to Tagkalakis (2014), there is a negative correlation between the portion of food and non-alcoholic beverages in total household consumption and real GDP growth. This is consistent with Ueda (2017), finding that behavioral changes through final consumption arise from shifts in the ratio of final taxable consumption to total final consumption.

Furthermore, Sarralde & Miguez (2017) reveals that there are 3 dimensions that affect the achievement of a country's VAT collection: its economic characteristics (economic size and structure, especially consumption); dimensions of tax law (tax rate and taxable income threshold); and level of compliance (level of avoidance and efficiency in management).

To date, not many quantitative studies have been conducted to analyze the performance of VAT revenues in Indonesia, especially from a regional perspective. As many empirical studies have been conducted cross-country (Aizenman & Jinjarak, 2008; Arrachman & Qibthiyah, 2018; Cevik et al., 2019; Cnossen, 2015; Tagkalakis, 2014), this study uses a unit of analysis at the provincial level in Indonesia (cross-sub-national). Although the policy regarding VAT which is the central tax applies the same, the amount of tax in each region varies depending on the size of the economy and the characteristics of the region. Likewise, the dynamics of household consumption expenditure and demographics also influence revenue performance in each region. Therefore,

This study aims to examine the relationship between the performance of VAT revenues and household consumption by the province in Indonesia, as well as to identify factors other than consumption that is related to the performance of VAT in Indonesia. The results of the study are expected to provide empirical evidence on the performance of VAT revenues with the provincial analysis unit in Indonesia and can be used as a reference for policymakers in identifying problems and formulating VAT reform policies. However, this study only focuses on the discussion of the performance of VAT revenues as seen from household consumption expenditures in Indonesia, as well as other determinants that influence changes in public consumption.

2. Literature review

Theoretical basis

Household consumption can change as income increases and changes over time. This causes an increase in nominal VAT revenues due to an increase in aggregate public consumption. However, it must be known how much the increase in household consumption as well as different socioeconomic factors in various provinces in Indonesia can improve the performance of VAT revenues.

Thomas Hobbes, in *Leviathan's* theory (1651) stated "It is fairer to tax people on what they consume than on what they produce as measured by income. The theory is believed to show that consumption behavior can be used to measure the amount of tax.

The theory of tax incidence explains the concept of tax burden allocation in each income group. In contrast to income tax which is progressive, when viewed from the theory of tax events, Value Added Tax is regressive. This means that taxes are charged equally to each income group, except for luxury goods which are regulated separately by the PPnBM (Value Added Tax on Luxury Goods) rules.

By definition, taxes are official levies regulated by the government that are mandatory and coercive for citizens. Taxes have several important functions in the life of the state which have the main goal of the welfare and prosperity of the people. There are four main functions of taxes, namely the first, the function of the budget (budget-air) as a source of revenue to finance state expenditures. Second, the function of regulating (regular) is where the government regulates economic growth to achieve the goal of public welfare. Third, the stability function, namely tax policy related to pricing stability so that inflation can be controlled properly. Finally, the income redistribution function.

Relationship of household consumption on VAT revenue

According to Gendron & Bird (2020), one of the right types of taxes to answer the challenge of income mobilization is Value Added Tax (VAT). According to OECD data, VAT is the mainstay of the income system in many countries, especially the least developed countries, and an important source of income in more than 160 countries worldwide. Furthermore, according to IMF data (2022), VAT revenues have increased in recent decades and are more adaptive to globalization.

Sarralde & Miguez (2017) reveals that the VAT collection that can be achieved in a country is determined by at least three dimensions: its economic characteristics (economic size and structure, especially consumption); dimensions of tax law (tax rates and restrictions on a taxable basis); and level of compliance (level of avoidance and efficiency in management).

When consumption is considered a more stable source of income than other tax bases, VAT revenue should generally grow at more or less the same rate as the rest of the economy, unlike other taxes and especially business income, whose income typically expands more rapidly as the economy grows but tends to contract rapidly when growth slows down.

Furthermore, how households spend their income is caused by changes between time and income class. Along with the increase in income, there is a tendency to change consumption from primary, to secondary and tertiary needs. This causes an increase in nominal VAT revenues due to an increase in aggregate public consumption.

Research conducted by Kotlińska et al. (2020) stated that household consumption which consists of expenditures for the purchase of goods and services is the main source of state revenue in terms of VAT. However, a country's VAT revenue depends on the pattern of household consumption in it which is very diverse.

The Central Bureau of Statistics defines households as final consumers for the use of goods and services, as well as owners of production factors in the form of labor, land, and capital. These production factors are processed in such a way by households to obtain rewards that can be used as a component of household income. The total expenditure made by households to meet their needs in the form of food, clothing, and other goods and services, in the aggregate, is called public consumption expenditure.

Of the various types of expenditure, there are several goods that are exempt from the imposition of VAT, some of which are basic necessities, food and beverages served in hotels, restaurants, and restaurants as well as several services such as health services, education, banking, and others as stipulated in goods/services that are exempted or not collected under the VAT Law.

VAT collection system in Indonesia

Value Added Tax (VAT) is a type of indirect tax imposed on added value from the circulation of goods and/or services from producers to consumers. It is referred to as indirect tax because the person in charge does not deposit the tax directly, but the tax contribution is paid by the tax guarantor, but is deposited through another party or the seller. In some countries, VAT is also known as Value Added Tax (VAT) or Goods and Service Tax (GST).

In practice, VAT as well as consumption taxes on other goods and services are regressive. The burden of VAT between groups of people's income is not differentiated, depending on the consumption of goods carried out and has a single rate. Therefore, the regressive impact of VAT is that the higher the community's ability, the lighter the burden will be, even low-income groups will feel a heavier tax burden. To reduce the regressivity of VAT, the government implements a list of Taxable Goods classified as a

luxury which are subject to additional tax, namely PPnBM (VAT on Luxury Goods). In addition, there are provisions regarding goods/services that are not subject to and/or exempt from VAT collection for staple foods, as well as several types of health and education consumption expenditures.

Regular assessment of the efficiency of the tax system is essential for the identification of risks, non-compliance, tax evasion, and leakage of tax revenues in order to guide the formulation of effective fiscal policy (Mohanty, Kumar, & Patra, 2017). Therefore, the measurement of revenue performance, especially VAT, can be done through various indicators. The majority of these indicators use the realization of VAT revenues as the numerator and economic activity that reflects the potential for VAT as the denominator. One of the tools to measure the performance of VAT revenues is the C-efficiency ratio, which is calculated by dividing the realization of VAT revenues by the total national consumption multiplied by the tax rate.

Indonesia's C-efficiency ratio of 49.72% is slightly higher than the average C-efficiency ratio of Asia Pacific countries of 49.35%. However, the VAT performance of other Southeast Asian countries such as Thailand, Vietnam, Singapore, and Malaysia is still superior to Indonesia. Indonesia's C-efficiency ratio is below 50%, indicating that the realization of total VAT revenues is still lower than the dividing factor, namely the VAT rate multiplied by total consumption.

The C efficiency ratio that stated below 50%, indicating that the VAT revenue collected is still lower than it should be, namely the multiplication of the VAT rate and total consumption. The efficiency ratio C is used to measure the effectiveness of VAT revenue collection, particularly about the VAT taxation system. This ratio compares VAT revenue that is collected with the amount that should be collected based on the VAT rate and total consumption in the economy. In the case of Indonesia, an efficiency ratio C below 50% indicates a gap between the expected and actually collected VAT revenues. This gap can be caused by a variety of factors, such as tax evasion, non-compliance, or difficulties in enforcing tax laws.

VAT rates are imposed on goods and services consumed, and are expected to make an important contribution to government revenues. However, if the efficiency ratio C is low, it indicates that the tax authorities face challenges in collecting VAT revenues effectively from taxpayers. To increase the efficiency ratio C and improve VAT revenue collection, the government needs to focus on improving tax compliance, implementing stricter enforcement measures, and improving the tax administration system. This could involve measures such as better outreach to taxpayers, increased vetting and investigations, and the use of technology to simplify the taxation process.

In a more recent study by Cnossen (2015), it is stated that VAT C-efficiency reflects VAT revenue which is calculated by applying standard tax rates to aggregate consumption. Furthermore, (Ueda, 2017) also considers VAT C-efficiency as the indicator that best reflects reliability and feasibility when compared to VAT gross collection ratio and VAT Gap in terms of data availability and estimates. Therefore, this study uses the C-efficiency ratio model developed by (Keen, 2013) to evaluate the efficiency of VAT.

Empirical research

The performance of VAT revenue is measured to review how optimal the VAT policy is on state revenues (Ebrill et al., 2010). The government is committed to reforming the VAT sector to increase the effectiveness of VAT performance. A study in African countries, Aizenman & Jinjark (2008) stated that the expansion of the VAT base will increase income and reduce economic distortions. This opinion is reinforced by Cnossen (2015) who argues that VAT reform needs to be carried out with the aim of increasing income and obtaining efficient VAT implementation practices.

Another research by Jenkins & Kuo (2000), stated that in a developing country, tax policies that may appear highly realistic and politically uncontroversial are likely to result in a limited tax base. If a government of a developing country intends to increasingly rely on the Value Added Tax (VAT) in the long run, they must take proactive measures to expand the tax base and improve tax compliance. It can be concluded that in developing countries, seemingly sensible and politically noncontroversial tax policies tend to generate limited tax revenues. To rely more on the Value Added Tax (VAT) over time, developing country governments need to actively work on expanding the range of taxable activities and improving tax compliance. This means finding ways to include more sectors and individuals in the tax system and

encouraging people to accurately report their taxable income. By doing so, the government can increase its revenue base and effectively utilize the VAT as a source of income for public services and development projects.

Most of the tax revenue comes from income and consumption taxes raised by the central government. The single largest source of income is a value-added tax (VAT) (Lewis, 2019). Taxes on labor (personal income tax and social security contributions) account for about a quarter of tax revenue in Indonesia and other developing countries, while OECD countries rely more on these taxes.

Research on the performance of VAT using the household consumption approach was conducted by Ueda (2017) who analyzed the VAT C-efficiency ratio in the European Union and Japan caused by changes in government consumption and the composition of household consumption. Furthermore, according to Sancak et al. (2010), the rise and fall of the VAT C-Efficiency Ratio are driven by consumption patterns and also efforts to avoid taxes when the economy is experiencing expansion.

According to Gesualdo et al. (2019), in research conducted in Italy, an increase in household consumption can indicate an increase in indirect taxes, such as VAT. Meanwhile, the research by Tagkalakis (2014) states that there is a negative correlation between the portion of food and non-alcoholic beverages in total household consumption and VAT revenues. Caro & Sacchi (2020) in a study conducted in Italy argued that the performance of VAT revenues was mainly due to the increase in public consumption, but this revenue could decrease along with the informality of the workforce. In line with research Arrachman & Qibthiyyah (2018) regarding the high informality of a country will reduce the flexibility of VAT revenues through the determination of tax rates.

Moreover, structural transformation factors also affect the performance of VAT revenues. The negative impact occurs along with increasing the tertiary sector, because often there are service sectors that are not subject to VAT (Cevik et al., 2019). However, structural transformation is needed for development while evaluating taxes to expand the tax base and increase the effectiveness of VAT revenues.

3. Method

Unit of analysis

In an effort to examine the effect of household consumption on the performance of VAT revenues, this study uses 34 provinces in Indonesia as the unit of analysis. The research year was chosen from 2011 to 2019 with a total of 306 observations. The selection of the research year follows the availability of Susenas consumption module data which is published annually starting in 2011, while 2020 is not included in the research period because it is feared that it will bias due to the onset of the Covid-19 pandemic.

Model specification

The specification of the model in this study adopts the regression model of research by Tagkalakis (2014) and Cevik et al. (2019). Panel data estimation is carried out using the static panel regression method with a fixed effect model approach, with the following equation:

$$VATCR_{it} = \beta_0 + \beta_1 CONS_{it} + \Sigma \beta_1 X_{it} + \varepsilon_{i,t} \dots (1)$$

Where:

$VATCR_{it}$: Performance of VAT Revenue (VAT C-Efficiency Ratio) in province i year t

$CONS_{it}$: Household Consumption Expenditure in province i year t

I : Independent variable control in province i year t

i,t : Component error

Dependent variable

VAT revenue performance

The VAT Performance Indicator in this study is measured by the VAT C-efficiency Ratio proxy. This ratio data measures the effectiveness of VAT revenue performance by comparing VAT rates with government and household final consumption, which is multiplied by the VAT rate of 10%. This proxy

was developed by Keen (2013) and used by Tagkalakis (2014), Cnossen (2015), Ueda (2017) and Cevik et al. (2019) to measure the performance of VAT revenues.

$$VATCR_{i,t} = \frac{VAT\ revenue}{VAT\ rates \times Reg\ GDP\ Consumpt} \dots (2)$$

Where:

- $VATCR_{it}$: Performance of VAT revenue (VAT C-efficiency ratio) in province i year t
VAT revenue : Total revenue from the VAT
VAT rates : The ratio of VAT
Reg GDP Consumpt : Regional gross domestic product consumption

Data on VAT revenue are obtained from the Directorate General of Taxes, Ministry of Finance, which is the realization value of VAT and LST which is segregated into Provinces based on the Work Areas of Tax Service Offices throughout Indonesia. These taxes include Domestic VAT, Import VAT, Domestic LST, Import LST, Other VAT, Other LST, and DN DTP VAT.

For data from the DGT Regional Office for Large Taxpayers and the Special DGT Regional Office in charge of Foreign Investment Tax Offices, Exchange Listed Companies whose working area includes Taxpayers domiciled throughout Indonesia, the revenue data from each Taxpayer at this Regional Office is aggregated based on the province of residence. the taxpayer. Meanwhile, data on GRDP for Household Consumption and Government Consumption were obtained from the Central Statistics Agency.

Independent variables

Household consumption

Household consumption, refers to the expenditure made by individuals or households in purchasing goods and services to meet their daily needs. This includes purchases such as food, clothing, housing, transportation, education, health, recreation and other services used by individuals or households. Household consumption expenditure data is divided into food expenditure and non-food expenditure. Food consumption consists of expenditure on foodstuffs, processed foods, beverages, to tobacco. Meanwhile, non-food consumption includes expenditure on housing and household facilities, goods and services, clothing, durable goods, taxes, and insurance, as well as party and feast expenses. This proxy refers to research by Aizenman & Jinjarak (2008), Alm & El-Ganainy (2013), Omondi (2020), Tagkalakis (2014) which uses changes in household consumption to measure the performance of VAT revenues.

The type of household consumption expenditure in the SUSENAS Consumption Module is defined by the types of food and non-food expenditures. Food expenditure includes grains; tubers; fish/shrimp/squid/shellfish; meat; eggs and milk; vegetables; nuts; fruits; oil and coconut; beverage ingredients; spices; prepared food and beverages; cigarettes and tobacco; and other consumption. Meanwhile, non-food expenditure includes housing and household facilities; various goods and services; clothing, footwear, and headgear; durable goods; taxes, levies, and insurance, as well as party and ceremonial/festival purposes.

Control variables

In measuring changes in household consumption on the performance of VAT revenues, there are various factors that can be considered. These factors are considered to be able to influence home consumption behavior in Indonesia. The independent control variable in this study consisted of six variables based on conditions in Indonesia and several previous studies which were used as the theoretical basis in this study.

Economic characteristics factors are described from population density, consumer price index, as well as structural transformation development factors such as the added value of the manufacturing sector and the tertiary sector.

Table 3.2 Definition and data sources of control variables

Control variable	Description	Reference	Explanation
Consumer Price Index	The Consumer Price Index (CPI) is based on a survey of the cost of living in 82 cities. CPI as a proxy for prices that affect purchasing power.	Gesualdo et al. (2019), Omondi (2020)	An increase in the price of commodity goods that is not accompanied by an increase in income will have an impact on a decrease in welfare and also a decrease in state income (Omondi, 2020)
Population Density	The area is divided by the total population. Population variables show differences in the size of an area.	Omondi (2020), Caro & Sacchi, (2020)	The higher the population, the higher the amount of household consumption expenditure which increases the VAT performance (Caro & Sacchi, 2020)
Manufacturing Sector	The share of the Manufacturing Sector to GDP (Applicable Prices). A proxy that shows the development of the manufacturing sector.	Cevik et al. (2019), Omondi (2020)	The manufacturing sector is known as the formal sector, so it is easier to be taxed (Omondi, 2020)
Tertiary Sector	The size of the share of the Tertiary Sector to GDP (Applicable Prices). The tertiary sector includes the trade, transportation and communication, finance and services sectors. A proxy showing the structural transformation of the tertiary sector.	Cevik et al. (2019), Arrachman & Qibthiyyah (2018)	Structural transformation factors affect the performance of VAT revenues. The negative impact occurs along with increasing the tertiary sector, because there are often service sectors that are not subject to VAT (Cevik et al., 2019).

4. Result and discussion

Figure 4.1 shows that the movement of VAT revenues will follow the development of public consumption, although not all consumer goods, such as basic necessities, are subject to VAT. In general, household consumption expenditures in Indonesia show an upward trend in the past eight years, from Rp1,679 trillion in 2011 to Rp3,729 trillion in 2019. The average increase is 15.26% or Rp256 trillion annually. Expenditures for food (food) and non-food (non-food) consumption are relatively the same. Household Consumption Expenditure was followed by an increase in VAT revenues from Rp277 trillion in 2011 to Rp531 trillion in 2019. The average increase was Rp31 trillion per year or 11.41%. Thus, VAT revenues are a reflection of public consumption.

DKI Jakarta Province has data on the average C-efficiency ratio of VAT above 100%. VAT revenues in the DKI Jakarta Province are much larger because there are rules for centralizing VAT, Taxpayers registered with the DGT Regional Office for Large Taxpayers and DGT Regional Offices for

Special Taxpayers, pay VAT to the KPP where the Head Office is registered, most of which are located in Jakarta.

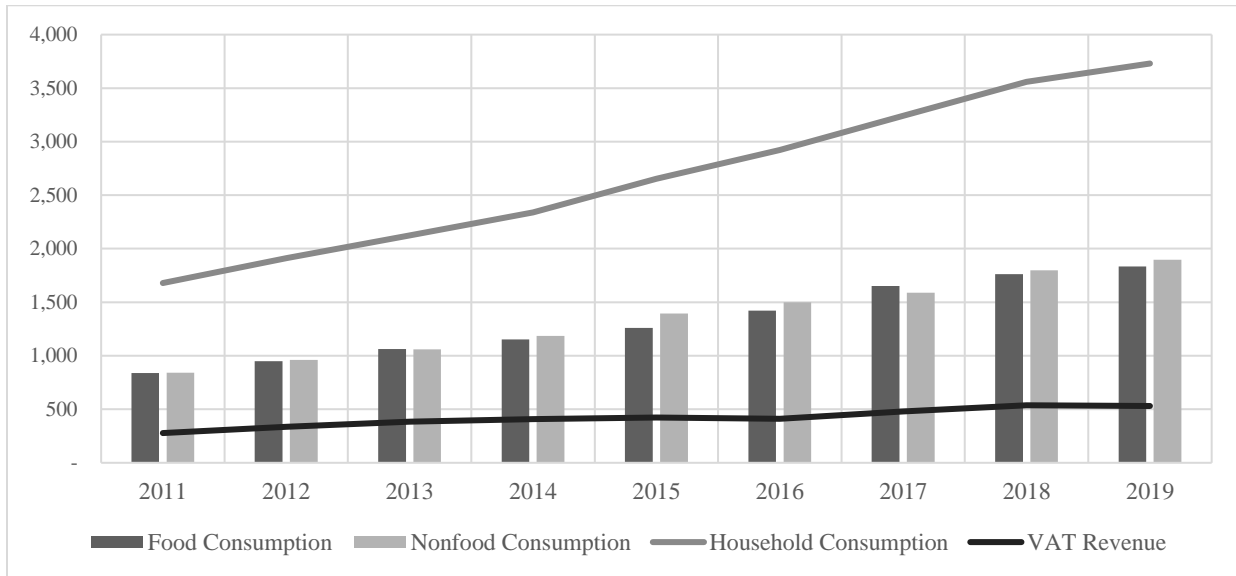


Figure 4.1. Comparison of Household Consumption to VAT Revenue

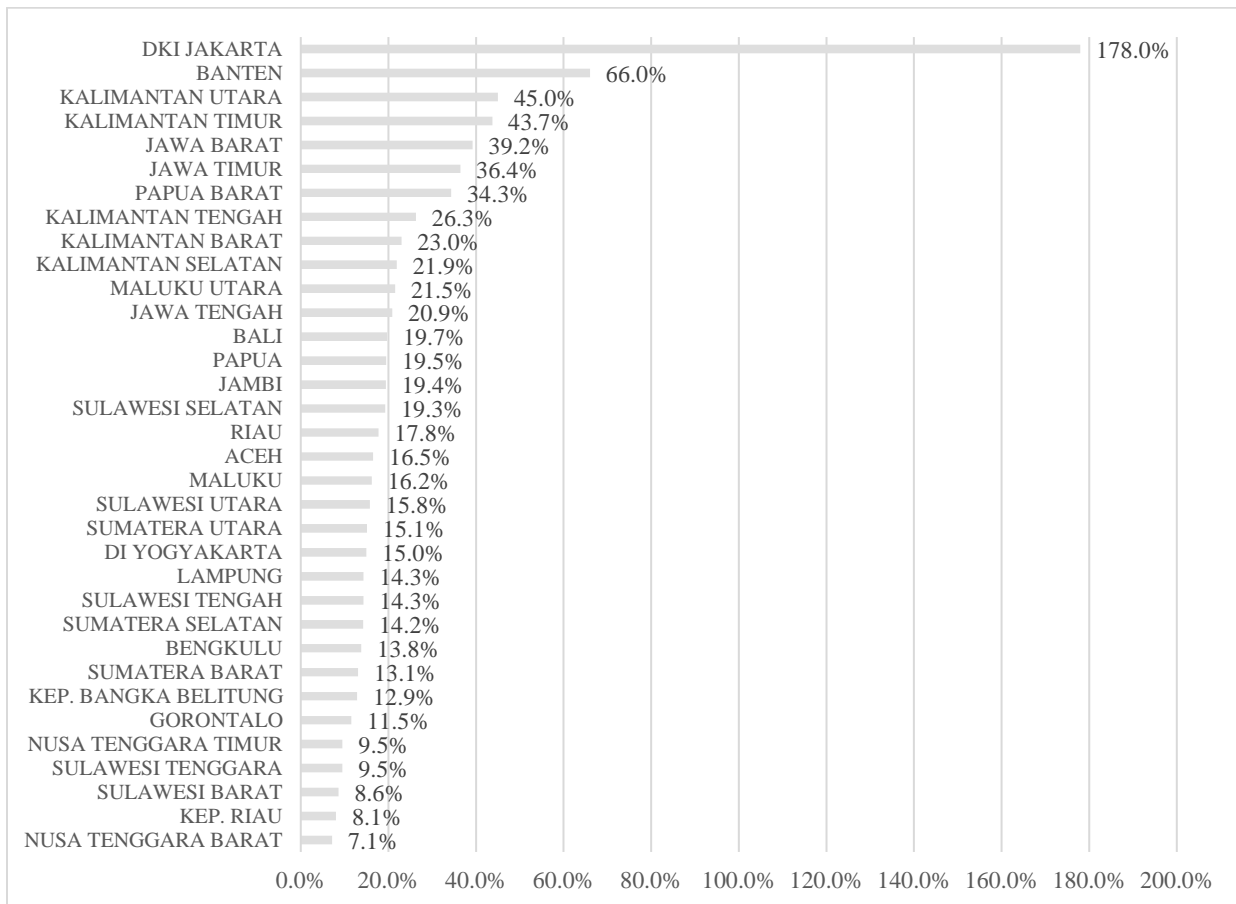


Figure 4.2 Average VAT revenue performance ratio 2011-2019 (%)

Overview of household consumption expenditure in Indonesia

As a country with a population of 270 million people (BPS, 2019), household consumption makes a very large contribution to the economy. Various socio-economic conditions, geography, and demographics cause variations in household consumption between regions in Indonesia. Furthermore, each household has various ways of spending income and the composition of the type of expenditure (Kotlińska et al., 2020) so that it affects the differences in household consumption between regions.

Furthermore, Figure 4.3 shows an overview of the distribution of household consumption expenditures for food and non-food expenditure types in various regions in 2019. The figure shows a fairly large difference between the provinces on Java Island where the population is high, while other areas are quite low, and below Indonesia's average consumption expenditure. This shows that household consumption expenditure is still concentrated in the Java Island area.

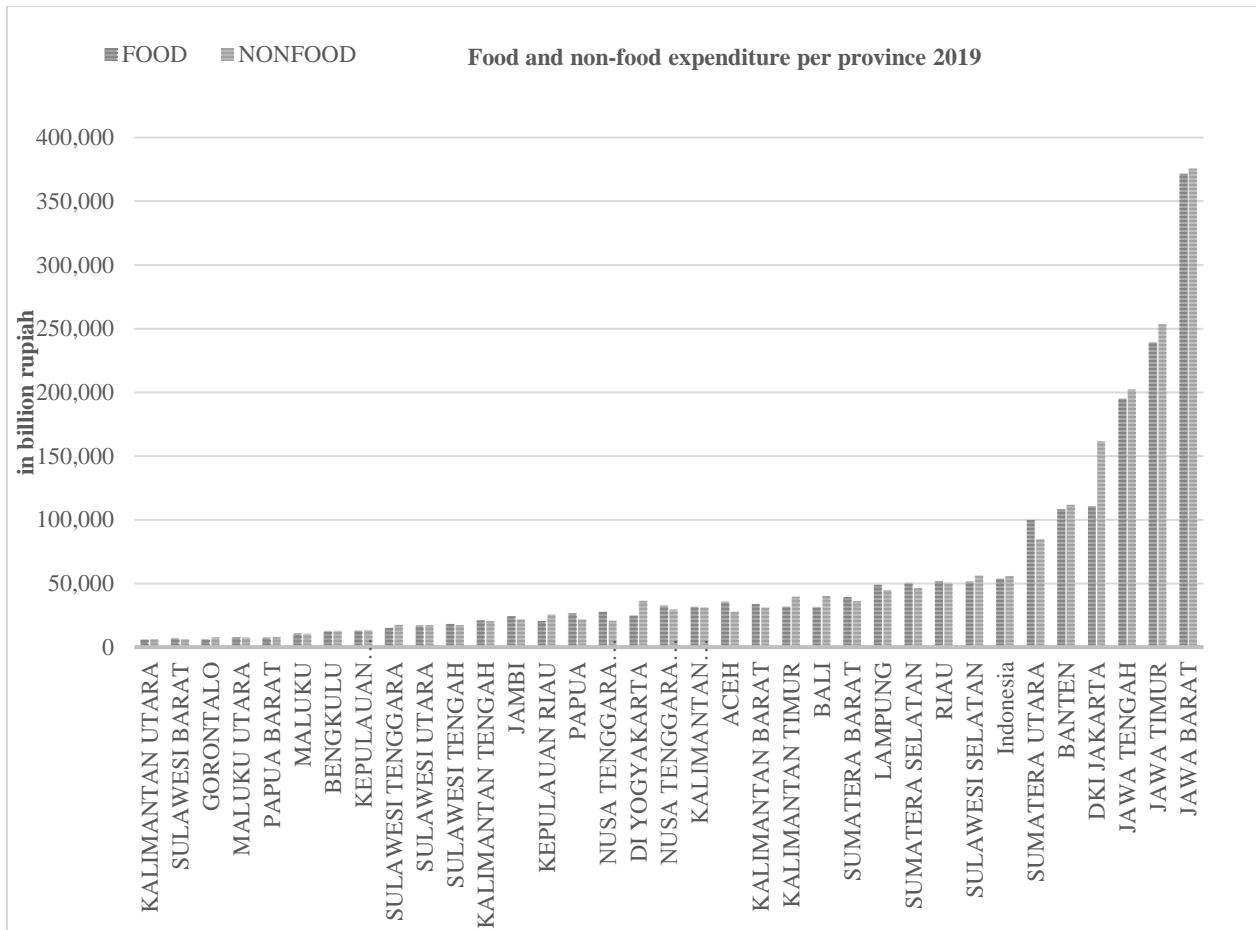


Figure 4.3. Food and non-food expenditure per province 2019

Descriptive analysis

Table 4.1 shows summary statistics of all data used as independent variables in the study for all years and for each province. It can be seen where the number of observations for each variable is 306. The dependent variable VAR has a mean of 26.4 156, a standard deviation of 30.1552, and a maximum value of 219.63. Meanwhile, the independent variable CONSUMP has a mean of 78944.19, a standard deviation of 114622.6 and a maximum value of 146697.4.

Table 4.1 Descriptive statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
VATCR	306	26.4156	30.1552	3.04	219.63
CONSUMP	306	78944.19	114622.6	6091.2	746697.4
FOOD	306	38997.09	55911.19	3135.18	371171
NON-FOOD	306	39947.03	59130.32	2812.2	375526.4
POP_DENSITY	306	713.2026	2586,498	0	16140
IHK	306	128.4824	9.6863	107.22	156.07
MANUFACTURE	306	14.9933	10,4126	1.23	43.90
TERTIARY	306	21.3535	5.7082	7.14	35.67

Table 4.2 Column (1) is the baseline model of the regression that analyzes household consumption expenditure on the performance of VAT revenues. This model estimates the change in the main independent variable of household consumption expenditure on the performance of VAT revenues calculated from the VAT C-efficiency Ratio provinces fixed effect.

Table 4.2. Regression result: the effect of household consumption expenditure on VAT revenue performance

	(1)	(2)	(3)	(4)	(5)
CONSUMP	0.162* (2.45)	0.197** (2.98)	0.178* (2.42)	0.187** (2.76)	0.319*** (4.92)
IHK		-0.369** (-3.09)	-0.331** (-2.74)	-0.345** (-2.75)	-0.315* (-2.41)
POP_DENSITY			0.200 (0.91)	0.170 (0.82)	0.254 (1.22)
MANUFACTURE				0.0138 (0.078)	0.00581 (0.40)
TERTIARY					-0.0464*** (-4.43)
CONSTANT	1.2680 (1.80)	2,685 (3.04)	3.100 (2.83)	2,810 (3.00)	2,540 (2.75)
Observations	306	306	297	297	297
R-squared	0.048	0.065	0.080	0.090	0.129
Number of ID	34	34	34	34	34

Robust standard error in parentheses: *** p<0.01, **p<0.05, *p<0.1

This study aims to see the relationship between household consumption and the performance of VAT revenues. The results of the regression in table 4.2 show that the direction of the correlation is positive and significant for the main independent variable of household consumption expenditure, and the coefficient changes with the addition of the covariate. Total household consumption expenditures, both food and non-food expenditures have a positive and significant correlation with the performance of VAT revenues. A 1% increase in household consumption in a province will increase the VAT C-efficiency ratio by 0.319%.

The results of this study are not in line with the research in Greece in 2000-2012 conducted by Tagkalakis (2014) which stated that food consumption expenditure had a negative effect on the effectiveness of VAT revenues. The difference in results is possible due to differences in economic conditions in the scope of the research period, as well as differences in the grouping of types of food expenditures subject to tax.

Furthermore, based on table 4.2, it can be seen that in addition to changes in household consumption expenditures, there are other factors that affect the performance of VAT revenues. These factors include factors of economic and demographic characteristics, as well as factors of structural transformation. Economic characteristic factors include the Consumer Price Index (CPI) and Population Density. Meanwhile, the factors of changes in the structural transformation of the economy include the added value of the manufacturing sector and the tertiary sector.

In this case, the performance of VAT revenues shows different sensitivity to any changes in these factors. In terms of economic characteristics, the CPI showed negative and significant results. An increase in the price of commodity goods that is not accompanied by an increase in income will have an impact on a decrease in welfare and also a decrease in state income. This is in line with Omondi's (2020) research on changes in household consumption in Kenya, that an increase in commodity prices consumed by households without an increase in income will have a negative impact on welfare and also VAT revenues.

Population variables show differences in the size of an area. The regression results show that population density will positively increase the performance of VAT revenues. These results are in line with Caro & Sacchi (2020) research in several states in Italy. This is possible because the population level has a heterogeneous effect due to the large variety of informal workers which will reduce the effectiveness of VAT revenues. In Indonesia, the secondary sector includes the GRDP of the electricity, water and gas sector, industry, and construction. The manufacturing sector is included in the secondary sector. The regression results show that the larger the share of the manufacturing industry sector has a positive but not significant impact on the performance of VAT revenues. This is possible because the provisions on the centralization of VAT that mostly apply to large companies, including manufacturing industry players. Omondi (2020) states that the manufacturing sector reflects the formal sector, where tax authorities are easier to identify and impose taxes.

The manufacturing sector generally represents the formal sector of the economy, which means that businesses operating in this sector are more easily identified by tax authorities, thereby facilitating tax collection. The formal sector involves businesses registered, licensed, and operating within the legal framework established by the government. The manufacturing sector, which consists of industries involved in producing and manufacturing goods, falls under this category of the formal sector. The advantage of the manufacturing sector being part of the formal economy is that the tax authorities can easily identify these businesses. Tax authorities can implement effective tax enforcement measures and ensure business compliance with their tax obligations. With easy identification, it is possible to monitor better manufacturing activity, track production, and assess taxable values at each process stage.

Tax authorities can use various methods to levy taxes on the manufacturing sector. For example, they may use direct taxes such as the corporate income tax, where manufacturing companies are taxed on their profits. In addition, indirect taxes such as Value Added Tax (VAT) or sales tax can be applied to the sale of manufactured goods. Thus, the tax authorities can collect taxes at various stages of production and distribution, thereby broadening the tax base and increasing tax revenues. The presence of the manufacturing sector in the formal economy also facilitates the implementation of tax compliance measures.

Manufacturing businesses are generally more inclined to comply with tax regulations, maintain complete financial records, and report required information according to requirements. Thus, the tax authorities can check the accuracy of tax reports, carry out audits if necessary, and ensure that these businesses comply with tax regulations. Overall, the existence of the manufacturing sector in the formal sector provides advantages for the tax authorities in carrying out tax collection. Tax authorities can more easily identify taxable activities, enforce tax regulations, and effectively collect taxes, contributing to a better revenue collection system.

The increase in the added value of the tertiary sector based on the percentage of GRDP will reduce the performance of VAT revenue by 0.0464. Based on cross-country research conducted by Cevik et al. (2019), structural transformation in developed and developing countries will increase the share of the service sector, so that the transformation process has broad implications, including tax efficiency. In the future, the tertiary sector will be the direction of structural transformation, but the estimation results for the

tertiary sector are negative and significant. This is possible because, First, the tertiary sector in Indonesia includes the trade, transportation and telecommunications, finance, and services sectors. The dominance of the tertiary sector is in the trade sector, where the trade sector has a high informality side, and the high threshold for registration of Taxable Entrepreneurs subject to VAT is IDR 4.8 billion. Besley & Persson (2014) mentions that countries with large informal sectors have many small-scale companies, this creates a narrower tax base, resulting in lower tax collection rates.

In countries with large informal sectors, there is a significant presence of small-scale businesses that operate outside the formal economy. These businesses often evade tax obligations or go unregistered, leading to a narrower tax base for the government. As a result, the government's ability to collect taxes is hindered, and tax collection rates tend to be lower. The informal sector typically consists of small businesses, self-employed individuals, and informal workers operating outside government regulation and oversight. These businesses may engage in activities such as street vending, small-scale manufacturing, or providing services on an informal basis. Due to their informal nature, these businesses often do not maintain proper records or comply with tax regulations.

The presence of a large informal sector poses challenges for tax collection. The government relies heavily on tax revenues to fund public services, infrastructure development, and social welfare programs. However, the government's revenue base is constrained when a significant portion of economic activity goes unreported or untaxed. The narrower tax base resulting from the informal sector means that a smaller portion of the overall economic activity is subject to taxation. This limits the government's ability to generate sufficient tax revenue, impacting its capacity to fund essential services and invest in development projects. To address this issue, governments of countries with large informal sectors often face the task of formalizing these businesses and encouraging tax compliance. This involves implementing measures such as simplifying tax processes, providing incentives for formalization, and raising awareness about the benefits of participating in the formal economy. By expanding the tax base to include informal sector businesses and improving tax collection rates, governments can enhance revenue generation capabilities and support sustainable economic growth.

Second, the financial and service sectors are sectors that are mostly not subject to VAT. As the results of research by Cevik et al. (2019) which states that the application of VAT exemption for financial services in particular may have a considerable impact on VAT performance. The importance of the exemption of VAT on financial services is also recognized by the (OECD, 2019), because the sector economy is very important for the country. Financial services that are included in the category of services that are not subject to VAT, among others: collection of funds from the public in the form of savings in the form of savings, demand deposits, time deposits, and lending.

According to the BPS definition, the trade and service sector is included in the tertiary sector. The 2016 BPS Economic Census stated that the trade sector controlled around 46.6% of the market share. In nominal terms, there are 12.10 million trading business actors in the Small Medium Enterprise (UMK) category with a turnover of under IDR 2.5 billion per year. The UMK classification according to BPS is far below the threshold provisions for Taxable Entrepreneurs who are subject to VAT of IDR 4.8 billion per year. The World Bank (2020) recommendation encourages Indonesia to lower the threshold for Taxable Entrepreneurs in order to expand the tax base. Lewis (2019) states that efforts to expand the VAT base can be done by lowering the VAT registration threshold. This is in line with Acosta-Ormaechea & Morozumi (2021) stated that the increase in the VAT C-efficiency ratio reflects the size of the VAT base and the least VAT exemptions.

Heterogeneity and robustness checks

To see the effect of changes in consumption composition on the performance of VAT revenues, a test was conducted to see the differences between each island, namely Java, Sumatra, Kalimantan, Sulawesi, Bali, and Nusa Tenggara, as well as Maluku and Papua.

Table 4.3. Robustness checks: breakdown to Indonesian islands

	(1)	(2)	(3)	(4)	(5)	(6)
	Java	Sumatra	Borneo	Sulawesi	Bali Nusra	Maluku Papua
CONSUMP	0.4831***	0.2137	0.1570	-0.0051	-0.1824	-0.3437
	(0.1323)	(0.2385)	(0.1017)	(0.2675)	(0.2429)	(0.2863)
CONSTANT	8.6671	3.5804	3.3709	9.9502	8.9334	9.0038
	(1.6975)	(3.9901)	(1.4062)	(3.7425)	(4.3748)	(3.1461)
<i>Control Variables</i>						
IHK	YES	YES	YES	YES	YES	YES
POP_DENSITY	YES	YES	YES	YES	YES	YES
MANUFACTURE	YES	YES	YES	YES	YES	YES
TERTIARY	YES	YES	YES	YES	YES	YES
Obs.	54	90	45	54	27	27
R-squared	0.6773	0.1318	0.1549	0.3161	0.5114	0.4604
N	6	10	5	6	3	3

Robust standard error in parentheses: *** p<0.01, **p<0.05, *p<0.1

Based on the regression results in table 4.3, the regression results for each island show that household consumption has a positive direction on VAT performance in Java, Sumatra, and Kalimantan. Meanwhile, the islands of Sulawesi, Bali, and Nusa Tenggara, as well as Maluku and Papua were found to be in a negative direction and not statistically significant. This is possible because consumption activities are more concentrated on islands that have a large population.

Based on the final results of the regression in table 4.4, shown in columns (1) to (2), it can be concluded that both the influence of household consumption expenditure and expenditure on food and non-food consumption, both have a positive and significant effect on the performance of VAT revenues.

The results of this study are not in line with the research of Tagkalakis (2014) which states that food consumption expenditure has a negative effect on the effectiveness of VAT revenues. This is possible because, in the type of food expenditure, there are sub-expenditures on prepared food and beverages, as well as expenditures on cigarette and tobacco consumption, which in these types of expenditures are subject to VAT, so that both food and non-food consumption expenditures have a positive and significant effect on VAT revenue performance.

Another meaning is that when a significant portion of household spending is allocated toward food consumption, it can hinder the VAT's ability to generate substantial tax revenue. VAT is typically applied to the sale of goods and services at each stage of production and distribution. It is designed to be a broad-based tax that captures consumption across various sectors of the economy. However, as a basic necessity, food is often subject to reduced VAT rates or exempted altogether in many countries. This is done to ensure affordability and protect vulnerable populations. When a significant portion of household expenditure is directed towards food consumption, the lower VAT rates or exemptions on food purchases result in reduced tax revenue collection. As a result, the overall effectiveness of VAT as a revenue-generating mechanism is compromised.

The negative effect of food consumption expenditure on VAT revenues can be attributed to the essential nature of food and the need for affordability. Governments aim to ensure that essential food items remain accessible to all segments of society, especially those with lower incomes. By applying reduced VAT rates or exempting food items, the tax burden on consumers is alleviated, leading to decreased VAT revenue. It is important to note that the negative impact of food consumption expenditure on VAT revenues needs to be balanced to promote social welfare and ensure food security.

Governments must balance providing tax relief for essential goods like food and generating sufficient revenue to finance public services and development initiatives. To mitigate the negative effect, governments may explore alternative revenue sources or consider compensatory measures, such as

implementing targeted social assistance programs or adjusting VAT rates in other sectors to compensate for the shortfall in revenue caused by reduced rates on food items.

Table 4.4. Robustness checks: consumption and non-food

	<i>CONSUMP</i>		<i>NON-FOOD</i>			
	(1)	(2)	(3)	(4)	(5)	(6)
FOOD	0.3168*** (0.0674)					
NON-FOOD		0.3006*** (0.0618)				
HOUSING			-0.0995*** (0.0306)			
GOODS & SERVICES				0.1335*** (0.0324)		
DURABLE GOODS					0.0989*** (0.0182)	
CLOTHING						0.1069*** (0.0206)
<i>Control Variables</i>						
IHK	YES	YES	YES	YES	YES	YES
POP_DENSITY	YES	YES	YES	YES	YES	YES
MANUFACTURE	YES	YES	YES	YES	YES	YES
TERTIARY	YES	YES	YES	YES	YES	YES
Obs.	306	306	306	306	306	306
N	34	34	34	34	34	34
R-squared	0.1194	0.1368	0.1429	0.1458	0.1085	0.1039

Robust standard error in parentheses: *** p<0.01, **p<0.05, *p<0.1

Whereas in column (3) to (6) which extracts non-food expenditures into Housing and Household Facilities Expenditure, Miscellaneous Goods and Services Expenditure, Clothing Expenditure, and Durable Goods Expenditure shows that housing and household expenditures have a negative and significant impact on VAT performance. This is in line with Lewis (2019) opinion on research on VAT in Indonesia, triggered by the low level of income from property taxes. This shows that there is quite a lot of untapped potential to increase tax revenue.

5. Conclusion

The consumption growth of the Indonesian people contributes a sizeable portion to Indonesia's economic growth. The largest contribution to GDP is contributed by household consumption, so if there is a change in consumption spending patterns, it will have an impact on economic fluctuations in Indonesia. The results of the estimation analysis in this study are as follows: First, household consumption expenditure has a positive and significant effect on the performance of VAT revenues.

This means that household consumption growth contributes to the performance of tax revenues, especially VAT, both food and non-food consumption expenditures; Second, several other important factors that affect the performance of VAT are the Consumer Price Index and the share of the tertiary sector, both of which have a negative and significant effect on the performance of VAT revenues. While the share of the manufacturing sector and population density are not significant in influencing the performance of VAT

revenues; Third, the comparison of inter-island estimates shows that household consumption expenditure has a positive effect on VAT performance in Java, while other regions have no significant impact on VAT performance.

Based on the results of this study, the suggestions that we can give to policymakers in the Central Government include: First, optimizing VAT revenues, especially for regions that have low VAT revenue performance by looking at the potential and characteristics of the region; Second, assessing the reduction in the threshold of Taxable Entrepreneurs who are subject to VAT (Rp 4.8 billion) which is expected to reduce the informality of the tertiary sector which is the direction of Indonesia's structural transformation; Third, regional economic strengthening activities are needed to increase purchasing power so that demand is created and there are opportunities that can contribute to increasing income.

This study has several limitations, including the selection of a VAT revenue performance proxy using the VAT C-Efficiency Ratio expressed in regional amounts, not in national amounts. Furthermore, the policy of centralizing VAT for taxpayers causes VAT collection to be centralized at the Taxpayer's Head Office, so there are provinces that have very large VAT revenue performance.

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