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The Effect of Value-Added Tax Policy on Per Capita Income and Inequality in Indonesia

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A R T I C L E I N F O

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A B S T R A C T

The implementation of value-added tax (VAT) policy holds significant sway over state revenue. This study delves into the impact of value-added tax on economic growth and inequality within Indonesia. Panel data spanning from 2017 to 2021, encompassing 34 provinces, was scrutinized using the panel vector error correction model alongside the Sobel test. The study's findings reveal that while VAT directly affects per capita income, it exerts no discernible influence on inequality, either directly or indirectly. When subjected to the PVECM test, VAT shows no long-term impact on income. In contrast, domestic investment and the democracy index exhibit a positive and noteworthy effect on income levels. Notably, VAT and foreign investment do not demonstrably impact inequality. In the long run, it is per capita income, the democracy index, and domestic investment that bear influence. In the short term, however, none of these variables significantly affect inequality. It is worth mentioning that per capita income experiences a positive and substantial influence from the democracy index and domestic investment. This research furnishes policymakers with valuable insights to guide revenue management and allocation, thereby advancing economic development and addressing prevailing social challenges.

A B S T R A C T

Implementasi kebijakan pajak pertambahan nilai (PPN) memiliki pengaruh yang signifikan terhadap penerimaan negara. Studi ini menyelidiki dampak pajak pertambahan nilai terhadap pertumbuhan ekonomi dan ketimpangan di Indonesia. Data panel yang mencakup 34 provinsi dari tahun 2017 hingga 2021 diteliti dengan menggunakan model koreksi kesalahan vektor panel bersama dengan uji Sobel. Temuan studi ini mengungkapkan bahwa meskipun PPN secara langsung memengaruhi pendapatan per kapita, PPN tidak memiliki pengaruh yang nyata terhadap ketimpangan, baik secara langsung maupun tidak langsung. Ketika dilakukan uji PVECM, PPN tidak menunjukkan dampak jangka panjang terhadap pendapatan. Sebaliknya, investasi domestik dan indeks demokrasi menunjukkan pengaruh yang positif dan penting terhadap tingkat pendapatan. Khususnya, PPN dan investasi asing tidak menunjukkan dampak terhadap ketimpangan. Dalam jangka panjang, pendapatan per kapita, indeks demokrasi, dan investasi domestiklah yang memiliki pengaruh. Namun, dalam jangka pendek, tidak satu pun dari variabel-variabel ini yang secara signifikan memengaruhi ketimpangan. Perlu disebutkan bahwa pendapatan per kapita mengalami pengaruh positif dan substansial dari indeks demokrasi dan investasi domestik. Penelitian ini memberikan masukan berharga bagi para pembuat kebijakan untuk memandu pengelolaan dan alokasi pendapatan, sehingga dapat memajukan pembangunan ekonomi dan mengatasi tantangan-tantangan sosial yang ada.

1. INTRODUCTION

The tax sector constitutes the primary revenue stream for Indonesia. Taxation can be defined as a compulsory form of payment, mandated by law and collected by the state or a public entity to fulfill predetermined public

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needs (Hajdúchová et al., 2015). The pivotal role of taxation for the state is evident in its function as the principal instrument of fiscal policy. Beyond serving as the primary source of state income, taxes play a strategic role in underpinning government fiscal operations, acting as a regulatory tool, and overseeing private sector activities in the economy. According to the Central Statistics Agency (2022a), tax revenue contributed approximately 83 percent of the total state revenue in Indonesia for the year 2020, amounting to a total of IDR 1.699 trillion. In 2021, taxation maintained the same percentage share as the previous year, with a nominal value of IDR 1.743 trillion. The substantial revenue generated from the tax sector underscores the reliance of developing countries on tax income as their primary source of state revenue.

The majority of tax revenue is derived from the value-added tax (VAT), making it a significant contributor to domestic taxes. According to Mgammal et al. (2023), when managed effectively by the state administration, value-added tax (VAT) stands as one of the most influential and cost-effective taxes for generating state revenue. Approximately 160 countries have adopted value-added tax policies, and their implementation has undergone modernization. As this decade draws to a close, the tax system centered around value-added goods has evolved into a pivotal tax model, assuming a crucial role in numerous developed and developing nations (Lim, 2020). The VAT policy proves to be one of the most productive sales taxes implemented in developing countries. Its application within a country is often likened to a "Money Machine," aiding in the augmentation of state revenue when compared to an income system devoid of a value-added tax policy. The implementation of value-added tax policy sparks considerable debate across various strata of society, including academia. Fisher and Caldor contend that there exists a necessity to focus taxation on consumption, achieved by imposing a final cost tax on purchased goods (Güriş et al., 2016). Caldor argues that a consumption tax, introduced through progressive rates and incorporating tax exemptions and allowances for specific types of goods (such as everyday essentials), is more equitable for individuals with lower incomes. Furthermore, in contrast to income taxes, consumption taxes do not impinge on savings earmarked for future investments, thereby fostering economic growth.

Arthur Laffer is a prominent figure in the realm of taxation theory, renowned for his substantial contributions. Laffer established a quantitative correlation between budgetary income and progressive taxation, culminating in his seminal findings encapsulated in the "Laffer curve." According to Laffer, an upswing in the tax burden leads to augmented revenues, but only up to a certain point, beyond which they begin to dwindle (Altunoz, 2017). Empirical research conducted by Ahlerup et al. (2015) concluded that VAT exerts no discernible impact on overall revenue in Africa, both in the short and long term. In contrast, Bogari (2021) found that the implementation of a value-added tax policy in Saudi Arabia has the potential to bolster domestic financial resources. Hassan's study (2015) conducted in Pakistan suggests that value-added tax exerts a positive influence on economic growth. In essence, the upswing in revenue attributed to VAT serves as a catalyst for economic expansion, underscored by heightened state earnings.

Upon reviewing the gathered data, it becomes evident that there exists a discrepancy among several conducted studies. It is noteworthy that an augmentation in VAT receipts per capita Gross Regional Domestic Product (GRDP) in certain Indonesian provinces does not consistently align with an increase in revenue. Conversely, a decline in value-added tax revenue does not uniformly correspond with a decrease in regional per capita income. Data sourced from the Central Statistics Agency (2022b) and the Directorate General of Taxes (2022) reveals intriguing anomalies between VAT income and per capita revenue. For instance, in 2017, West Papua Province recorded a value-added tax revenue of IDR 1.20 billion, which saw an increase to IDR 1.320 billion in 2021. However, the per capita GRDP of West Papua Province experienced a continuous decline from 2019 to 2021, despite a prior increase of IDR 2 thousand from 2017 to 2018. Meanwhile, Bengkulu Province's VAT revenue exhibited a downward trend, decreasing from IDR 930 billion in 2017 to IDR 731 billion in 2020. In contrast, its per capita GRDP showed an increase. In 2017, Bengkulu's per capita GRDP amounted to IDR 21 thousand. The Central Statistics Agency (2022b) further indicates that South Sumatra, West Kalimantan, and South Kalimantan provinces experienced an upswing in realized value-added tax from 2017-2021, accompanied by a simultaneous increase in per capita GRDP revenue. On the flip side, provinces like Gorontalo and West Papua saw a rise in value-added tax revenue but concurrently witnessed a decrease in per capita GRDP. This observable disparity between research findings and on-ground conditions necessitates further investigation into the impact of value-added tax on income.

The research conducted by Kolahi and Noor (2015), as well as Mukolu & Ogodor (2021), indicates an inverse correlation between economic growth and VAT. Similarly, findings from Urîţescu's study (2018) suggest no discernible relationship between value-added tax and the augmentation of the gross domestic

product in Bulgaria. However, in Romania, there appears to be a unidirectional connection between value-added tax and economic advancement. Moreover, studies by Ayoub & Mukherjee (2019), Sabina et al. (2017), and Chigbu (2014) reveal a positive association between value-added tax and economic growth, as evidenced by the gross domestic product. Idris (2017) demonstrates that VAT exerts a positive influence on state income, contributing significantly to economic growth and development in Nigeria.

If the implementation of value-added tax in Indonesia serves as a revenue booster, it could play a pivotal role in funding the budgetary process and providing essential public services, thereby mitigating economic issues like inequality. Inequality, a widespread concern worldwide, has the potential to impede societal functioning and performance. Kuznets' Inverted-U Curve theory posits an initial negative correlation between a country's economic growth and income inequality, transitioning to a positive relationship in the long run (Huynh, 2022). However, as civilization has progressed, this theory has undergone some variations. Research by Fawaz et al. (2014) asserts a negative link between economic growth and inequality. Conversely, Sehrawat & Giri (2015) and Alamanda (2021) observe a positive correlation between inequality and economic growth. According to Ciminelli et al. (2019), targeted fiscal policies can potentially mitigate the trade-off between economic growth and income inequality. An effective income redistribution strategy, particularly through the value-added tax system, is deemed highly impactful in narrowing the gap between low and high-income individuals.

Based on data from the Central Statistics Agency (2022b), Indonesia's inequality level remained stable at 0.38 from 2018 to 2021. Various efforts have been undertaken to narrow the income gap, with a focus on tax policies, particularly the value-added tax. Adequate VAT revenue is believed to have the potential to alleviate inequality. Alavuotunki et al.'s (2019) research suggests that implementing VAT has not led to increased inequality. Conversely, Fu's study (2016) indicates a negative impact of VAT on inequality. However, Naderi & Salatin's research (2019), which examined VAT's effect on inequality, yielded different results, showing a positive relationship. Given these varying findings, a comprehensive analysis of the impact of implementing value-added tax in Indonesia is warranted.

This study stands out from previous research by assessing the impact of value-added tax on income and inequality using key indicators such as value-added tax, foreign investment, domestic investment, democracy index, inequality, and per capita gross regional domestic product. Additionally, this research explores both the direct and indirect relationships between the dependent and independent variables, employing the Sobel test. It conducts a thorough analysis of both short-term and long-term effects using the vector error correction model. Research specifically focused on the effect of value-added tax in Indonesia is relatively scarce. Hence, gaining insights into potential future economic conditions is of paramount importance.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

John Rawls became one of the leading figures who put forward the theory of justice. In his book Theory of Justice, Rawls believes that justice is not fair, so to create satisfactory justice, there needs to be a cooperation scheme with profit sharing where the cooperation involves all parties, including those less fortunate (Ali, 2022). Rawls states two principles, one of which is that social and economic inequality must be regulated in such a way that it is expected to be sufficient to benefit each individual. Thus, according to Rawls, the principle of equality in the future can be carried out by redistributing income and wealth by imposing taxes on strong economic groups and diverting the results to weak groups.

Value-Added Tax, Investment, Democracy Index, and Economic Growth

Taxes are one of the largest sources of state revenue. Besides, taxes function as a source of state finance and a regulator. Another tax function is revenue, where taxes are a source for funding various government needs. With the tax function as revenue, taxes become a source of state revenue used to finance development expenditures. In this case, the government seeks to maximize state revenues. This effort can be pursued by extending or intensifying tax collection through regulations.

Value-added tax (VAT) is a type of tax that is included as an indirect tax because the parties who have to pay taxes with the parties responsible for collecting and depositing taxes are different, in which the public or consumers of goods or services are the parties who have to pay taxes while collecting and depositing tax to the state is the seller. According to Mgammal et al. (2023), VAT is one of the most influential and economical taxes to attract state revenue as long as the state administration manages VAT adequately.

That is, the government that continues to experience development, the more comprehensive the VAT set in a country and the greater the potential for state revenue originating from VAT.

The neoclassical theory, advanced by Arthur Laffer, investigates the quantitative connection between progressive taxation and budgetary income. Laffer posits that an increase in the tax burden leads to a rise in state revenue (Altunoz, 2017). Ayoub & Mukherjee (2019) employ the Auto-regressive Distributed Lag (ARDL) approach to scrutinize the relationship between VAT variables and economic growth, along with assessing VAT's contribution to growth. The findings of their study indicate a substantial positive correlation between VAT and economic growth. Furthermore, in a study spanning 22 years from 1994 to 2015 in Nigeria, Folajimi Festus et al. (2016) employ linear regression analysis and find a positive relationship between VAT and GDP. Kalas Milenkovic (2017), using descriptive statistics and regression analysis, examines the relationship between value-added tax and economic growth. This study uncovers a positive and noteworthy connection between value-added tax and total revenue. Studies by Sabina et al. (2017) and Chigbu (2014) probe into the impact of value-added tax on Nigeria's economic growth, with both concluding that value-added tax exhibits a positive association with economic growth. Consequently, researchers are inclined to view value-added tax as a prominent policy strategy for fostering economic growth.

In addition, other factors that are thought to affect economic growth include investment and democracy. Based on the Harrod-Domar theory, which analyzes the requirements a country needs to grow and develop in the long term, investment has a vital role in a country's economic growth. Investment is considered an essential factor because it has two characters or roles in influencing the economy; namely, investment plays a role as a factor that can create income. Saghir (2012) found that investment has a central and significant role in macroeconomic theory to increase the productive capabilities of countries by encouraging new production techniques.

An empirical investigation conducted by Sezer & Abasiz (2017) uncovered a noteworthy positive correlation between domestic investment, incoming foreign investment, and income, thus indicating their potential to stimulate economic growth. In a separate study, Acquah & Ibrahim (2020), employing the generalized method of moments, unveiled the nuanced impact of foreign investment on economic growth. Contrarily, Adams & Opoku (2015) and Agbloyor et al. (2016) discovered that foreign direct investment did not exert a significant influence on growth. Similarly, Kambono & Marpaung (2020) observed that domestic investment did not demonstrate a substantial effect on economic growth.

On the other hand, in the development of the study of international relations, there has been a debate about the link between political democratization and economic development (Gjerløw et al., 2021). Coleman (1986), a figure in modernization theory, emphasized a positive correlation between development's political-democratic, social, and economic aspects. Likewise, Acemoglu & Robinson (2006) argue that countries can achieve prosperity only in an inclusive political system. Countries with extractive political and economic institutions tend to be poor, while countries with inclusive political and economic institutions tend to be rich. An inclusive political institution is defined as one that benefits only a handful of ruling elites and allows people to participate in the political process actively. In other words, political institutions that can create prosperity are plural political institutions.

Economic Growth, Value-Added Tax, Investment, the Democracy Index, and Income Inequality

Topuz (2022) elucidates an inverted U-shaped relationship between income inequality and economic growth. This implies a positive association between per capita income growth and income inequality in the short term, but a negative one in the long term. In the study conducted by Siami-Namini & Hudson (2017), the relationship adheres to the Kuznets hypothesis, where there is a positive correlation between inequality and real GDP per capita. In developing countries, high economic growth tends to elevate income inequality.

Amri & Nizamuddin (2018) scrutinize the impact of economic growth on income inequality by analyzing panel datasets from 26 provinces in Indonesia spanning from 2005 to 2015, employing the Pedroni Cointegration Test, Panel Vector Error Correction Model, and Granger Causality Test methods. This research uncovers that economic growth significantly and negatively influences income inequality. Similarly, Fawaz et al. (2014) and Sabir et al. (2015) demonstrate a negative relationship between economic growth and inequality, signifying that as economic growth surges, income inequality diminishes. However, Alamanda (2021) and Hidayat (2018) establish a positive correlation between economic growth and income inequality.

Investment, in essence, involves acquiring stocks, bonds, and capital assets with the anticipation of future profits. Given its pivotal role in supporting economic growth, the nexus between investment and income inequality presents a compelling area of exploration in the realm of economics. Empirical studies

have underscored that foreign direct investment fosters economic growth (Appiah et al., 2019; Kurniasih, 2019). Additionally, Mansyur et al. (2021) discovered that investment exerts a negative influence on income inequality. Correspondingly, Ucal et al. (2016) and Kaulihowa & Adjasi (2018) observed a negative correlation between foreign investment and income inequality. Conversely, Rosmeli (2015) noted that domestic investment exhibited a negative and statistically insignificant impact on development inequality. On a different note, research findings by Wahyuni et al. (2014) revealed that investment exerts a positive and significant effect on the income gap. Moreover, Herzer et al. (2014) and McLaren & Yoo (2017) assert that foreign investment demonstrates a positive relationship with inequality.

The economic system and political or democratic institutions are intrinsically linked. According to Gugushvili & Reeves (2021), individuals in democracies are more likely to grasp how inequality escalates. However, it's worth noting that advancements in the democratic process do not invariably translate into reductions in income inequality. A study by Zulkarnaen (2017) ascertained that democracy exerts no significant impact on income inequality.

The interplay between value-added tax, investment, democracy, per capita income, and income inequality is elucidated in the conceptual framework depicted in Figure 1. The focus of investment in this study is bifurcated into two categories: domestic investment and foreign investment. Based on the literature review, research questions, and theoretical framework, the hypotheses in this study are as follows:

H_1: VAT positively influences the GRDP per capita.
H_2: Democracy positively influences the GRDP per capita.
H_3: Domestic investment positively influences the GRDP per capita.
H_4: Foreign investment positively influences the GRDP per capita
H_5: VAT negatively influences the inequality
H_6: Democracy index negatively influences the inequality
H_7: Domestic investment negatively influences the inequality
H_8: Foreign investment negatively influences the inequality
H_9: GRDP negatively influences the inequality

3. RESEARCH METHOD

This research aims to assess the impact of the value-added tax policy on per capita income and inequality in Indonesia. The authors have utilized secondary data from 2017 to 2021 sourced from the Central Statistics Agency and the Directorate General of Taxes. The Sobel Test has been employed as the primary method. This test serves to ascertain the indirect influence of the independent variable on the dependent variable. For examining both the long-term and short-term relationships, researchers have adopted the Panel Vector Error Correction Model (PVECM). The advantages of using the PVECM method encompass its ability to address non-stationary variable issues, assess the empirical model's consistency with existing theories, and offer robust forecasts with less than 10 percent average absolute percentage error for medium-term trends

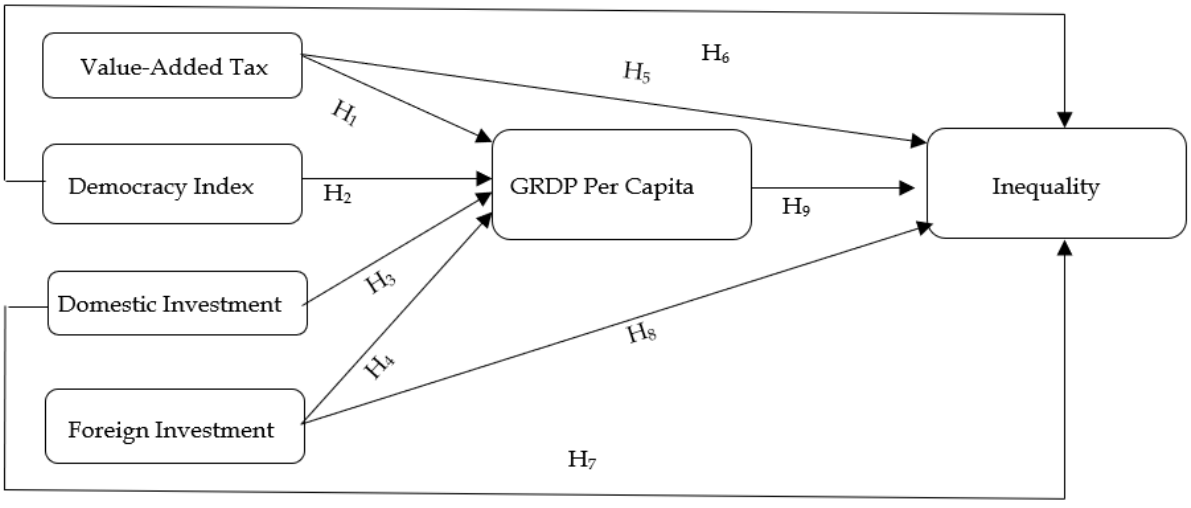


Figure 1. Theoretical Framework

(Jiang & Liu, 2014). The subjects of scrutiny in this study encompass all provinces in Indonesia. The dependent variables under consideration include per capita economic growth of the population, delineated by GRDP per capita, and social strata inequality, described by the Gini Index for each province in Indonesia. Concurrently, the independent variables encompass value-added tax, democracy index, foreign investment, and domestic investment. The operational definitions of these variables are provided in Table 1.

They are related to the theory put forward by Artur Laffer regarding an increase in the tax burden causing an increase in revenue (Altunoz, 2017) and the Kuznets theory, which suggests that in the short term, there is a positive relationship between income growth and income inequality (Huynh, 2022). However, the empirical tests that have been carried out before show that the theory is not valid. Under these problems, the researcher uses a dynamic analysis model, namely the cointegration test, to determine whether there is a long-term balance relationship.

The data management process includes several stages: selecting the best models, assumption classic test, regression test, and Sobel test, which is discontinuous, followed by unit root test, data differentiation, cointegration test, and Panel VECM.

Testing the indirect relationship between variables uses the Sobel test, in which the data calculation formula is as follows:

$$\frac{ab}{\sqrt{(b^2SEa^2)-(a^2SEb^2)}} \quad (1)$$

Where a is the coefficient value of the dependent variable on the intervening variable, b is the coefficient value of the intervening variable on the dependent variable, and SE is the standard error.

To find empirical evidence of the impact of VAT revenue on economic growth in the short term, this study uses the following specifications:

$$PRKPTit = \beta_0 + \beta_1 VATit + \beta_2 FDIit + \beta_3 DIit + \beta_4 DMKit + Eit \quad (2)$$

The empirical model to determine the impact of variables on inequality in Indonesia in the short term uses the following specifications:

$$GIit = \beta_0 + \beta_i\ PRKPTit + \beta_2 VATit + \beta_3 FDIit + \beta_4 DIit + \beta_5 DMKit + Eit \quad (3)$$

The estimated model estimates in the long term to determine the effect on PRKPT are as follows:

$$\Delta PRKPTit = \beta_0 + \beta_{1i} \Delta VATit + \beta_{2i} \Delta FDIit + \beta_{3i} \Delta DIit + \beta_{4i} \Delta DMKit + Eit \quad (4)$$

Meanwhile, to determine the relationship to long-term GI, the estimated model is as follows:

Table 1. Variable Definition

No	Variable	Symbol	Definition	Source
1	GRDP Per Capita	PRKPT	the average income of the population obtained from the quotient of GRDP with the number of population in a particular area	Central Agency on Statistics, 2022
2	Gini Index	GI	A measure of the level of inequality that exists in the region	Central Agency on Statistics, 2022
3	Value-added tax	VAT	Fees imposed on sale and purchase transactions of goods and services carried out by individual taxpayers or corporate taxpayers	Directorate General of Taxes, 2022
4	Domestic investment	DI	the amount of capital invested comes from within the country	Central Agency on Statistics, 2022
5	Foreign investment	FDI	The level of incoming capital from foreign investors.	Central Agency on Statistics, 2022
6	Democracy index	DMK	a measure of the high level of democratic participation in society	Central Agency on Statistics, 2022

$$\Delta GIit = \beta_0 + \beta_{1i}\ \Delta PRKPTit + \beta_{2i} \Delta VATt + \beta_{3i} \Delta FDIt + \beta_{4i} \Delta DIt + \beta_{5i} \Delta DMKt + Eit \quad (5)$$

4. DATA ANALYSIS AND DISCUSSION

The state plays a crucial strategic role in overseeing various governmental functions within the economy. Theoretically, sustained progress necessitates robust support from effective fiscal policies. Fiscal policy, a key facet of government action, holds the potential to impact economic growth significantly. At its core, a country's fiscal policy is embodied in the state budget, which serves as the repository for government revenue and allocates funds for public expenditure. This budget is pivotal in financing public goods and serves as a vital instrument wielded by the state. Taxes constitute one of the most substantial contributors to the state's revenue or APBN.

For every nation, implementing tax policies is imperative to bolster competitiveness on the global stage. Given the rapid shifts in capital conditions, a competitive tax policy is essential to attract and channel capital for maximal economic growth (Sihaloho, 2020). As per Law No. 6 of 2021 pertaining to the state budget of income and expenditure, tax revenues, or income generated from domestic taxes and international trade tax revenues, constitute a pivotal component of state financial income. International trade tax revenues encompass import and export duties, while domestic tax revenues stem from Income Tax, Value-Added Tax (VAT), Land and Building Tax, among others. Considering the substantial contribution of value-added tax to overall tax revenue, there is an expectation that it will be instrumental in covering the requisites of state expenditures, thereby fostering economic growth and facilitating the provision of public services.

Sobel Test

To test the indirect relationship of the independent variable to income inequality through the intervening variable, it is necessary to carry out the Sobel test. In testing, the Fixed Effect Model (FEM) is chosen for the first equation model because the probability value on the Chow and Hausman test is less than alpha (0.05). The results of the second equation through the Hausman test show a probability greater than alpha. The calculated LM value is more significant than the squared Table on the Lagrange Multiplier test, so the Random Effect Model (REM) is the best model.

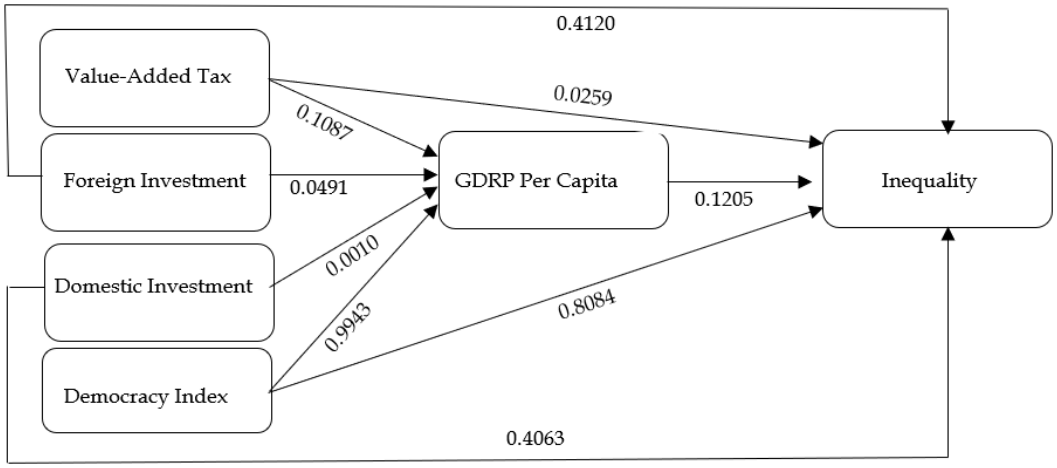
If the selected model is FEM, then it only needs to be tested for multicollinearity and heteroscedasticity, whereas the REM model only needs to be tested for normality and multicollinearity. After going through the classic assumption test, both models passed the classic assumption test. The next step is to test the hypothesis, including the t-test, F-test, and R-square, to determine the long-term relationship.

The results of the hypothesis test (see Table 2), namely the t-test in PRKPT, show that Value-Added Tax (VAT) and Democracy Indeks (DMK) directly influence the per capita income of the population due to the probability value. VAT and DMK variables are more significant than the standard error of 5% or 0.05, while Domestic Investment (DI) and Foreign Investment (FI) have no direct relationship to GRDP Per Capita (PRKPT). The F-test results show the probability value (0.0000) is smaller than the significance level (0.0500) in the sense that all variables jointly affect the PRKPT variable with an R-square value of 0.9931 which means that 99 percent of the per capita income variable can be explained by the independent variables used.

Table 2. Result of data panel regression

Dependent Variable	Independent Variable	Coefficient	Std. Error	Prob.	Prob. (F-statistic)	Adjusted R-squared
PRKPT	C	38434.2200	4951.6370	0.0000	0.0000	0.9931
	PPN	0.0604	0.0374	0.1087		
	PMDN	0.1871	0.0555	0.0010		
	PMA	1.2339	0.6214	0.0491		
	DMK	-0.4759	66.4380	0.9943		
GI	C	0.4578	0.1117	0.0001	0.1067	0.0244
	LOG(PRKPT)	-0.0175	0.0112	0.1205		
	LOG(PPN)	0.0113	0.0050	0.0259		
	LOG(PMDN)	-0.0025	0.0030	0.4063		
	LOG(PMA)	0.0026	0.0032	0.4120		
	DMK	-0.0001	0.0006	0.8084		

Source: data processed, 2022



Source: Data Processed, 2022

Figure 2. T-test result, direct effect

Meanwhile, the results of hypothesis testing (t-test) in GI show that the VAT variable does not affect GI. On the other hand, PRKPT, DI, FI, and DMK affect income inequality due to the probability value. Higher than the standard error value of 0.05. The results of the f-test show that the probability (F-stat) value of 0.1067 is greater than the significance level of 0.05, so the variables do not affect GI. While the R-square value is 0.0244, 2.4 percent of the GI variable can be explained by the selected independent variables, while variables outside the model explain 97.6 percent. For more convenience, it can be seen in Figure 2.

The next step is the Sobel test. Sobel test to determine the indirect relationship through PRKPT as an intervening variable. The processing step uses the coefficient value and is calculated using the Sobel formula. The results of testing the data are presented in Table 3. The indirect effect of the independent variable through the intervening variable (PRKPT) can be seen through the value of the t-test or the results of the Sobel test compared to the t-table value. If the t-stat value < t-Table, then there is no effect on the dependent variable through intervening as well conversely. If the t-stat > t-Table, then there is an influence on the dependent variable through the intervening variable. With a sample size of 170, a standard error of 5 percent, and three variables used, a t-Table of 1.9743 is found. The results of the Sobel test presented in the Table show that the t-stat for each variable is lower than the t-table value. This indicates no indirect effect of the VAT, DI, FI, and DMK variables on GI through PRKPT as an intervening variable.

Panel Vector Error Correction Model

This study uses an individual unit root, namely the Phillips-Perron (PP) test, to determine whether the data has a unit root. The PP method estimates the non-augmented DF test equation. It modifies the t-ratio of the coefficient so that the serial correlation does not affect the asymptotic distribution of the test statistic. If the data passes the test at the level, it will use the PVECM model estimation, but if it passes at the first different level, it will use the VECM model estimate. Stationarity test results for each variable at the level Appendix 2 show that the data used does not pass the test. This is because the probability value exceeds the standard error value (5 percent or 0.05). Variables that are not stationary at the level need to be tested at the first different level.

Testing model one and model two stationarity at the first difference level in Appendix 3 shows that all variables have passed the stationarity test. This is indicated by the probability value smaller than the

Table 3. Sobel test

Relationship	Sobel results (t-test)	t-Table	Information
VAT on GI through PRKPT	-1.1222	1.9743	It has no indirect effect.
PMDN to GI through PRKPT	-1.4161	1.9743	It has no indirect effect.
FDI against GIs through PRKPT	-1.2271	1.9743	It has no indirect effect.
DMK against GIs through PRKPT	0.0072	1.9743	It has no indirect effect.

Source: data processed, 2022

standard error of 5 percent or 0.05.

The next step is to perform optimum lag testing. The optimum lag test determines the lag length used in the next step. The optimum lag test in this study uses the AIC or Akaike-Quin Information Criteria parameters with other criteria as consideration. The results of testing models one and two in Appendix 4 show the optimum lag at lag 2 with the lowest AIC value.

The stability PVECM test is used to estimate whether the optimal lag that has been found (lag 2) is stable. The stability test of the PVECM model can be done by looking at the graph showing the points in a circle or by looking at the modulus value of less than one. Stability test results on models one and two are in Appendix 4, showing a score whose modulus is not greater than one that the point is inside the circle. The modulus value of model 3 supports this in Appendix 4, which is in the range of 0.1037 to 0.7904, and for the second model, in the range of 0.2138 to 0.7959 or less than 1. So, it can be said that the PVECM estimate at optimum lag 2 is stationary. The next test step is the Granger causality test, which is used to determine the two-way relationship between variables in the short term. The result is presented in Table 4.

The relationship between the two variables can be seen from the probability value. If the probability value is below 0.05, then the variable has an influence. Conversely, they do not influence if the probability value is above 0.05. Based on the test results in Table 4, no two-way relationship between variables is found, but a unidirectional relationship is indicated by the number marked with an asterisk. There is a unidirectional relationship between DI and DMK variables on GI, or it can be interpreted that domestic investment and the democracy index affect the Gini index. However, the GI variable does not affect DI and DMK. Likewise, with the relationship between the DMK and PRKPT variables, with the probability value of 0.04, DMK influences PRKPT in the short term.

The next stage is to conduct a Panel Cointegration Test to determine whether the dependent and independent variables have a long-term relationship. This study uses the Kao test based on Engle & Granger (2012), using a two-step residual-based cointegration test. From the statistical value of the Kao panel data cointegration test (ADF) it is compared with the t-statistic value at a significance level of 5 percent. Suppose the statistical value is greater than the critical value or significance level. If the observed variables are cointegrated or have a long-term relationship, and vice versa, then the observed variables are not cointegrated. The probability value test results in model one and model two in Appendix 5 show 0.00, which is smaller than 0.05 or an alpha of 5 percent. This indicates that there is a cointegration or long-term relationship between all variables.

Based on the requirements test that has been done previously, this research can use the VECM model. Through the unit root test, the data simultaneously showed that it was stationary at the first difference level, and cointegration was found in the variables. The next step is to find out the short-term and long-term balance. The panel vector error autoregression is a test to see the relationship between variables and the parameters used to see whether the variables used have an influence or are not determined by the magnitude of the t-statistical value > t-Table value. The t-table value in this study was 1.9745 based on the crisis value of 5 percent with the number of observations from 34 provinces. The results of panel vector error autoregression are shown in Table 5.

Testing on model 3 shows that the DI and DMK variables have a positive and significant effect on the PRKPT variable. The magnitude of the resulting coefficient of 0.5163 means that if every DI increases by 1 percent, PRKPT will increase by 0.52 percent. The DMK variable with a prop value of 0.037 indicates that every 1 percent increase in the democracy index will increase per capita GRDP by 0.07 percent. This finding is supported by Sezer & Abasiz (2017), who examine the impact of investment on income per capita. His research found that domestic investment has a positive influence on economic growth.

Table 4. Granger causality

	GI	PRKPT	VAT	FDI	DI	DMK
GI		0.5251	0.0909	0.9419	**0.0022***	**0.0405***
PRKPT	0.0814		0.3085	0.4301	0.0690	**0.0241***
VAT	0.1074	0.4894		0.8348	0.4075	0.9007
FDI	0.3464	0.8530	0.6597		0.2051	0.7630
DI	0.5197	**0.0293***	**0.0009***	**0.0006***		0.7026
DMK	0.1265	0.2260	0.6597	0.2384	**0.0003***	

Source: Data Processed, 2022

Table 5. The long-term effect on the Gini Index

Variable	Coefficient	t-Statistics	Conclusion

Model 4	**Long Term (T-Table 1.9745)**			
	GI(-1)	1.0000		
	PRKPT(-1)	0.8680	**[2.6094]**	significant
	VAT(-1)	0.0603	[0.5011]	not significant
	FDI(-1)	-0.0509	[-1.4158]	not significant
	DI(-1)	0.3219	**[13.4375]**	significant
	DMK(-1)	0.0231	**[6.2555]**	significant
Model 3	**Long Term (T-Table 2.0452)**			
	PRKPT(-1)	1.0000		
	VAT(-1)	0.2003	[1.0933]	not significant
	DI(-1)	0.5163	**[13.7735]**	significant
	FDI(-1)	-0.0832	[-1.4516]	not significant
	DMK(-1)	0.0370	**[6.3997]**	significant

Source: Data Processed, 2022

Likewise, the effect of the democracy index on economic development analyzed by Gjerløw et al. (2021), the positive influence between the democracy index and domestic investment on economic growth indicates a long-term attachment. With stable political conditions, it will attract domestic investors to invest so that revenue will experience growth.

The test results on model 2 show that variables have a significant long-term influence on the Gini index, including GRDP per capita, PMDN, and DMK. This finding is supported by Wahyuni et al. (2014), which examined the relationship between investment and inequality. The analysis found that Investment positively and significantly affects the income gap.

Table 6 shows a short-term relationship with t-Table 1.9745. variables with a short-term relationship have a t-statistic value more significant than the t-Table (t-stat > t-Table). The results of the short-term relationship of model 3 or its effect on GI in this study concluded that all variables, PRKPT, VAT, DI, FDI, and DMK, did not affect GI. This means that the increase in the independent variable in the past did not result in a change in the dependent variable. The results of model 4 testing show that the DI and DMK variables have an effect in the short term on the PRKPT variable.

Overall, the results of this study found that value-added tax had no effect directly or indirectly on the Gini index and GRDP per capita. This indicates that any increase in VAT revenue will not impact reducing inequality in Indonesia. The same thing happens in the short term. Value-added tax has no effect on GRDP per capita, while the function of tax collection is to maintain economic stability, including economic growth. Quality economic growth can reduce social problems such as inequality and poverty.

The results contradict Arthur Laffer's theory, which suggests that an increase in the tax burden initially boosts revenue, only to decline thereafter. This aligns with the findings of Ahlerup et al. (2015) who observed that VAT had no significant impact on total revenue in Africa, both in the short and long term.

Table 6. The short-term effect on the Gini Index and GRDP per capita

Short-term	**Model 2** D(GI,2)	**Model 1** D(PRKPT,2)
D(GI(-1),2)	-0.8375 [-2.4114]	0.0973 [0.3421]
D(GI(-2),2)	-0.4708 **[-2.5954]**	0.0367 [0.2471]
D(PRKPT(-1),2)	0.0073 [0.0430]	-0.6558 **[-4.6990]**
D(PRKPT(-2),2)	-0.1815 [-0.9710]	-0.9614 **[-6.2802]**
D(VAT(-1),2)	-0.0231 [-0.5778]	0.0348 [1.0645]
D(VAT(-2),2)	-0.0389 [-0.8951]	0.0344 [0.9657]
D(DI(-1),2)	-0.0043 [-0.2465]	0.0280 [1.9375]
D(DI(-2),2)	-0.0007 [-0.0902]	0.0154 **[2.2785]**
D(FDI(-1),2)	-0.0075 [-0.6555]	-0.0066 [-0.7026]
D(FDI(-2),2)	0.0019 [0.2322]	0.0007 [0.1056]
D(DMK(-1),2)	-0.0005 [-0.3858]	0.0020 [1.8006]
D(DMK(-2),2)	-0.0001 [-0.1466]	0.0013 **[2.1322]**

Source: Data Processed, 2022

Note: In the bracket is t-statistics

Similarly, Urîţescu (2018) noted a lack of correlation between value-added tax and an increase in gross domestic product. Hence, it is imperative to delve deeper into the influence of taxes on economic growth and its interplay with inequality, employing more precise indicators.

In this study, the significance of value-added tax in propelling economic development is twofold. Not only does it elevate national income, subsequently affecting per capita income, but it also addresses societal challenges like inequality. Additionally, it caters to regional infrastructure needs and enhances public services encompassing essentials like clean water, sanitation, and nutritional requirements. Robust infrastructure stimulates heightened production activities, which in turn, spurs investment and bolsters income, ultimately driving economic growth. There must be heightened attention from both central and regional governments towards allocating revenue funds to support economic growth and mitigate inequality in each region. Moreover, direct community assistance in the form of subsidies can be a valuable tool for the government.

Furthermore, the study reveals a positive and significant correlation between GRDP per capita and Indonesia's Gini index. This signifies that with every upswing in GDP per capita, the Gini index also experiences an increase. Conversely, when per capita GRDP diminishes, the Gini index follows suit. This discovery is reinforced by Alamanda's (2021) research, which emphasizes the substantial impact of economic growth on income inequality. Additionally, Rubin & Segal (2015) affirm that as economic growth intensifies, income inequality tends to rise. Kuznets' Theory of the Inverted-U Curve further supports this, positing a positive short-term relationship between a country's economic growth and income inequality, which then transitions to a detrimental long-term effect. Given these premises, it is estimated that over a decade, GRDP per capita has not been sufficiently effective in positively mitigating inequality in Indonesia.

5. CONCLUSION, IMPLICATION, SUGGESTION, AND LIMITATIONS

This paper examines the consequences of implementing a value-added tax on income and inequality in the Indonesian government. Several previous studies have shown that VAT has a good function in increasing state revenues. However, it still has an alleged negative effect on the unequal income distribution in developing countries. The Sobel test to determine the indirect relationship shows no indirect effect of value-added tax, domestic investment, foreign investment, and the democracy index on income inequality through per capita income variables. In comparison, the VAT variable has a direct effect on inequality. Meanwhile, the VECM Panel method results show that value-added tax does not affect the Gini index in the long and short term.

This research aims to optimize tax revenue managers to reduce social problems. The government has an essential role in controlling political and economic stability, so it is necessary for more attention from the central and regional governments to allocate funds to trigger economic growth and reduce inequality in each region. Efforts that can be made are in the form of allocating tax revenues to improve infrastructure, which can attract inflows of investment, ultimately boosting economic growth and, in addition, providing direct assistance to the community through subsidies, direct cash assistance, effective affirmation programs, or by reviewing the assistance provided so that the distribution is more targeted to reduce inequality.

The findings of this study need to be continued by comparing with other developing countries for a more extended period. It is also essential to further investigate what factors cause value-added tax not to affect per capita income. These results can be used as input for related parties to fix problems in the tax sector, significantly increasing economic growth.

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APPENDICES

Following the Sobel and Panel Vector Error Correction Model test, the result of the PVECM models test are as follow:

Appendix 1. Result of unit root test

Variable	Standard Error	Prob	Description
GI	5%	0.0000	Stationary
PRKPT	5%	1.0000	Not Stationary
VAT	5%	0.5528	Not Stationary
FDI	5%	0.0001	Stationary
DI	5%	1.0000	Not Stationary
DMK	5%	0.9832	Not Stationary

Appendix 2. Result of the deference test

Variable	Standard Error	Prob	Description
GI	5%	0.0000	Stationary
PRKPT	5%	0.0000	Stationary
VAT	5%	0.0000	Stationary
FDI	5%	0.0000	Stationary
DI	5%	0.0000	Stationary
DMK	5%	0.0000	Stationary

Appendix 3. Result of lag optimum test

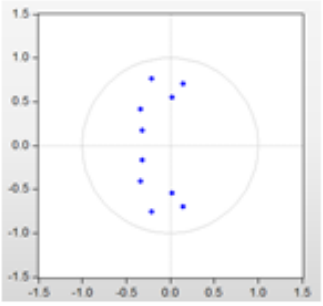
	Lag	LogL	LR	FPE	AIC	SC	HQ
Model 3	1	11.28791	NA	1.03e-06	0.403297	1.219292*	0.726619
	2	49.16092	64.60690*	7.13e-07*	0.024679*	1.656670	0.671324*
Model 4	0	104.0196	NA	1.26e-10	-5.76586	-5.496502*	-5.674001*
	1	134.2226	47.96946	1.84e-10	-5.42486	-3.539355	-4.781849
	2	167.2368	40.78223	2.70e-10	**-5.249223**	-1.747573	-4.05506
	3	227.5953	53.25751*	1.20e-10*	-6.682077*	-1.56428	-4.936762

Appendix 4. Result of stability PVECM test

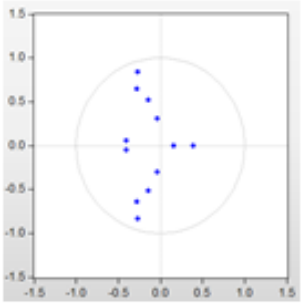
	Root	Modulus
Model 3	-0.214533 - 0.760799i	0.790468
	-0.214533 + 0.760799i	0.790468
	0.169830 - 0.738306i	0.757587
	0.169830 + 0.738306i	0.757587
	-0.68987	0.689870
	0.003201 - 0.522547i	0.522557
	0.003201 + 0.522547i	0.522557
	-0.332312 - 0.393129i	0.514763
	-0.332312 + 0.393129i	0.514763
	0.103716	0.103716
Model 4	-0.205765 - 0.768854i	0.795912
	-0.205765 + 0.768854i	0.795912
	0.109396 - 0.642549i	0.651795
	0.109396 + 0.642549i	0.651795
	0.000212 - 0.538356i	0.538356
	0.000212 + 0.538356i	0.538356
	-0.334150 - 0.412619i	0.530953
	-0.334150 + 0.412619i	0.530953
	-0.384899	0.384899
	0.077661 - 0.327521i	0.336603
	0.077661 + 0.327521i	0.336603
	-0.213843	0.213843

Result of stability test in graph

Model 1



Model 2



Appendix 5. Result of the cointegration test

	t-Statistic	Prob.
ADF	-18.97080	0.0000
Residual variance	0.005931	
HAC variance	0.003573	