Etikonomi
Volume 23(2), 2024: 397 - 414
P-ISSN: 1412-8969; E-ISSN: 2461-0771
https://doi.org/10.15408/etk.v23i2.32352

Taxation and Income Inequality in ASEAN Countries

Angga Alexander[1], Beta Yulianita Gitaharie[2*]
[1,2]**Faculty of Economics and Business, Department of Economics, University of Indonesia, Indonesia**
E-mail: [1]anggalexander@gmail.com, [2]beta.ylaksono@gmail.com
[*)]**Corresponding Author**

JEL Classification:
D63
H20
H23

Received: 20 May 2023

Revised: 25 March 2024

Accepted: 04 April 2024

Available online: September 2024

Published regularly: September 2024

Abstract

Research Originality: This study contributes to literature by investigating the impact of taxation on income inequality, with a specific focus on Southeast Asian countries.

Research Objectives: To investigate the impact of taxation on income inequality in Association of Southeast Asian Nations (ASEAN) countries.

Research Methods: A panel data model focusing on ASEAN from 1998 to 2021 was used, and a two-stage least squares (2SLS) estimation method, incorporating fixed effects and instrumental variables was used. Tax instrument comprised two components, namely tax ratio, reflecting volume of tax; and tax structure, representing direct, indirect, and income taxes.

Empirical Results: The results showed that tax ratio, direct tax, and income tax reduced income inequality in Southeast Asia. However, the magnitude of the impact should be more significant. Prioritizing education and improving the quality of workforce could effectively reduce income inequality, as shown by Singapore's success in this area.

Implications: This study had significant implications for ASEAN policymakers, as it offered valuable insights into designing and implementing taxation policies to reduce income inequality and promote economic development across the region.

Keywords:
inequality; income inequality; tax; tax ratio, tax policy

How to Cite:
Alexander, A., Gitaharie, B. Y. (2024). Taxation and Income Inequality in ASEAN Countries. *Etikonomi, 23*(1), 397 – 414. https://doi.org/10.15408/etk.v23i2.32352.

INTRODUCTION

Income inequality is a widespread economic issue affecting countries globally, and it arises from the ineffective distribution of income, a phenomenon that has persisted for many years. In 1936, Keynes observed that income inequality originated from economic policies that failed to address unfair income distribution. It is currently recognized as a growing global concern by the United Nations Development Program (UNDP) and a crucial focus of the Sustainable Development Goals (SDGs). Specifically, the UN's SDG 10 aims to reduce inequality by 2030. Addressing this could foster economic growth, promote job creation, and decrease unemployment rates. Several studies (Cingano, 2014; Mo, 2000; Ostry et al., 2014) showed a positive relationship between decreased income inequality and economic performance.

Fiscal policy significantly impacts economic performance. Taxation is considered a policy tool for reducing income inequality, increasing state revenue, incentivizing investment, and correcting market failures. With appropriate tax policy, the government can distribute income through tax collections. This concept corresponds with Mirrlees' optimal income taxation theory, explaining how tax collections and transfers can address income distribution issues (Mirrlees, 1971). The tax ratio, which measures the proportion or percentage of tax revenue to gross domestic product (GDP), is an indicator for assessing tax revenue performance. It also shows the government's ability to collect tax from the total economy, as measured by GDP, while tax percentage reflects its efficiency in meeting fiscal requirements. Studies have shown the importance of investigating taxation's influence on income inequality to promote social justice, equity, economic stability, and growth. Exploring the impact of tax policies on income distribution contributed to the continuous pursuit of fairness, addressed challenges related to economic stability, and facilitated sustainable growth.

Studies examining the impact of taxation on income inequality adopted various tax instruments, methods, and observation samples. Two taxation instruments were used, namely, tax volume and tax structure. Tax volume represents the ratio of tax revenue to a country's GDP, commonly referred to as tax ratio, as shown by Cevik & Correa-Caro (2020), Khan and Khan (2023), Messy & Ndjokou (2021), Martorano (2018), Nantob (2016), and Karakotsios et al. (2020). There were differences in empirical results, as some studies showed that government revenue from taxation could reduce income inequality (Cevik & Correa-Caro, 2020; Khan & Padda, 2021; Martorano, 2018; Messy & Ndjokou, 2021; Nantob, 2016). Karakotsios et al. (2020) showed that tax had a negative impact on income inequality in the long term but a positive causal impact in the short term. Khan and Khan (2023) found that tax positively correlated with income inequality. The influence of taxation on income inequality and policy design, specifically in developing countries, was challenging due to the substantial informal sector and the necessity for appropriate administrative structures (Mahon, 2004; Focanti et al., 2016).

Tax structure instruments are typically depicted with the ratio of direct and indirect taxes, tax rates, and progressivity levels. This current study focused on the ratio of direct or indirect tax revenue contributions to GDP, in line with Alves & Afonso

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

(2019), Martinez-Vazquez et al. (2012), Martorano (2018), Messy & Ndjokou (2021), Mourfou & Ouedraogo (2021), and Nantob (2016). Martorano (2018) showed that direct and indirect taxes negatively impacted income inequality, contradicting Messy Jessy & Ndjokou (2021). Khan & Padda (2021) and Mourfou & Ouedraogo (2021) showed that direct tax had a negative impact, while indirect tax was statistically insignificant. Tax structure instruments also consider the ratio of specific tax types, such as direct and indirect taxes, to total tax revenue or GDP. Due to data limitations, this current study exclusively used the ratio of general income tax to GDP, exemplified by Messy & Ndjokou (2021), Martorano (2018), Nantob (2016), and Parro (2024). Martorano (2018) and Parro (2024) found a negative correlation between income tax and income inequality, while Nantob (2016) identified a positive correlation, and Messy & Ndjokou (2021) found no correlation.

Issues related to income inequality are prevalent in the Southeast Asian region, particularly in countries in the Association of Southeast Asian Nations (ASEAN). According to a report by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), Southeast Asia is the only sub-region in Asia Pacific that has failed to reduce inequality (The ASEAN Post, 2018). In Indonesia, the top 10% controlled 26.6% of the total wealth in 1999, while the bottom 20% possessed only 9.2%. In 2018, the wealth of the top 10% had increased to 29.3%, while the wealth of the bottom 20% decreased to 6.9% (World Bank, 2021). Similarly, in Thailand, the top 1% owns 58% of the country's total wealth, and the top 10% earns 35 times more than the bottom 10%. Though with varying figures, related issues also persist in Vietnam, Malaysia, and the Philippines.

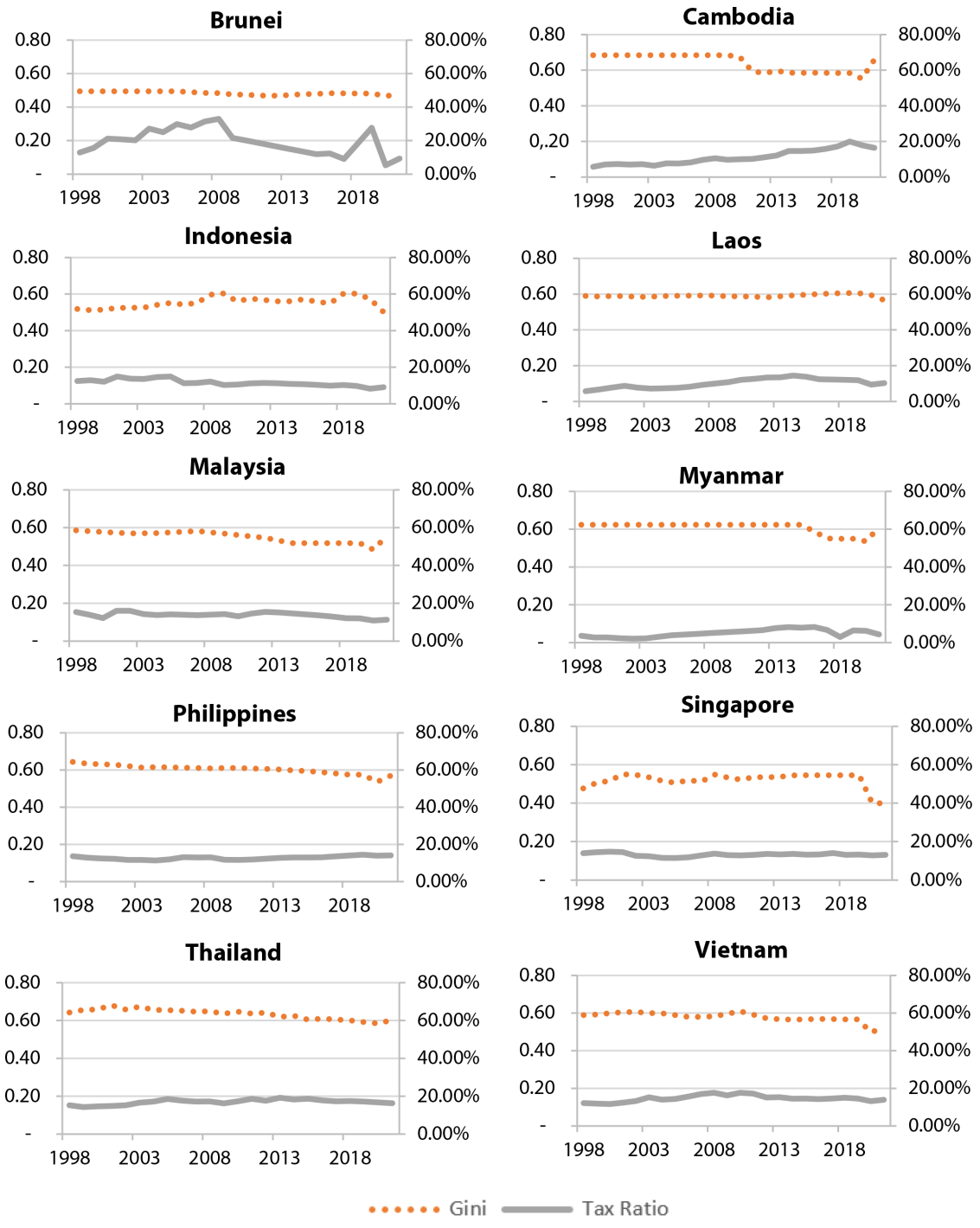
The problem of income inequality in ASEAN significantly contrasts with impressive economic performance. Southeast Asia has been one of the regions with the highest economic growth, averaging 5.3% from 1997 to 2015. Furthermore, the ASEAN region is the sixth-largest economy globally and the 3rd largest in Asia (ASEAN, 2017). According to the IMF (2019), the ASEAN economy is projected to grow more than 5.5% yearly. It could surpass the European Union and Japan to become the fourth-largest economy globally in 2050, trailing only China, India, and the United States (ASEAN, 2019). This projected growth can be attributed to the favorable demographics of over 380 million people under age 35, representing approximately 58% of the population (US-ASEAN Business Council, 2019).

Figure 1 shows distinct trends in tax ratio and income inequality for ASEAN. For instance, countries that have managed to reduce income inequality, as evidenced by a decrease in the Gini index, include Cambodia, Malaysia, Myanmar, the Philippines, and Thailand. These countries have a concurrent trend of increasing tax ratios and decreasing income inequality. Despite efforts to reduce income inequality, Malaysia presents a contrasting scenario where the tax ratio decreased from 15.4% in 1998 to 11.24% in 2021.

Increasing trends in income inequality are evident in Indonesia and Singapore, although tax ratio trends differ. Indonesia shows a declining trend in tax ratio, and

Singapore maintained a relatively stable tax ratio of approximately 13%. On the other hand, income inequality in Brunei, Laos, and Vietnam tends to undergo insignificant changes, with the three countries showing an increasing trend in tax ratio. Interpreting the influence of tax on income inequality solely based on the analysis of tax ratio and Gini index trends, as presented in Figure 1, can be challenging. Therefore, empirical studies and comprehensive testing are necessary to obtain more valid analytical results.

Figure 1. Gini Index and Tax Ratio



Source: Compiled from World Inequality Database & UNU-WIDER

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

Previous studies used samples from various countries, including developed (Nantob, 2016), both developed and developing (Clark & Lawson, 2008; Karakotsios et al., 2020; Martinez-Vazquez et al., 2012), OECD (Akgun et al., 2017; Alves & Afonso, 2019; Iosifidi & Mylonidis, 2017), Latin American (Martorano, 2018), Sub-Saharan African (Messy & Ndjokou, 2021), West African (Mourfou & Ouedraogo, 2021), Central Asian (Khan & Khan, 2023), and South Asian countries (Khan & Padda, 2021).

While Karakotsios et al. (2020) focused on the Philippines and Vietnam only, the results might be generalizable to only certain ASEAN members. This current study, the first of its kind, aimed to bridge the gap by comprehensively investigating the impact of taxation on income inequality in the Southeast Asian region, specifically ASEAN, spanning from 1998 to 2021 using a panel data model. A two-stage least squares (2SLS) estimation method with fixed effects and instrumental variables was adopted. The tax instrument was divided into two components, namely tax volume, represented by tax ratio, and tax structure, defined by direct, indirect, and income taxes.

This study had two primary objectives: first, to investigate how taxation affected income inequality in Southeast Asia and the effectiveness of tax policies in reducing disparities in income distribution. Second, it aimed to fill a gap in existing literature by providing empirical evidence on the impact of taxation on income inequality in the region. The results could provide valuable insights to policymakers and practitioners about potential strategies for achieving more equitable economic outcomes.

METHODS

This empirical study model was based on the frameworks proposed by Martorano (2018) and Messy & Ndjokou (2021). It used a panel data approach and focused on a sample of ten Southeast Asian countries that became ASEAN members between 1998 and 2021. The specifications of the empirical model are as follows:

$$Gini_{it} = \alpha_i + \beta\ F_{it} + \gamma\ X_{it} + e_{it}$$

Where $Gini_{it}$ is the dependent variable, which measures the level of income inequality in country i during year t using Gini index. F_{it} is taxation variable comprising: (1) the ratio of tax revenues to GDP or tax ratio, (2) the ratio of direct tax to total GDP, (3) the ratio of indirect tax to GDP, (4) the ratio of income tax to GDP. X_{it} is a control variable consisting of GDP per capita, real effective exchange rate (REER), debt ratio, terms of trade, foreign direct investment (FDI), human capital (HC), social expenditure, inflation rate, and population density. Meanwhile, α_i represents a country fixed effect, and e_{it} denotes error terms.

The empirical model could be categorized into four, distinguished based on the tax variables used, while the dependent and control variables remain the same. Model (1) had a variable tax ratio with a sample of 10 countries from 1998 to 2021. Models (2), (3), and (4) focused on tax structure with a sample of 9 countries for the period 1998-2021, respectively addressing direct, indirect, and income taxes. Brunei Darussalam

was excluded from the samples for Models (2), (3), and (4) due to lack of tax on consumption and individual income.

Model (1) Tax Ratio

$$Gini_{it} = \alpha_i + \beta_1 TaxRatio_{it} + \gamma_{11} GDP\_perCapita_{it} + \gamma_{21} REER_{it} + \gamma_{31} Debt\_ratio_{it} + \gamma_{41} Terms\_ofTrade_{it} + \gamma_{51} FDI_{it} + \gamma_{61} HC_{it} + \gamma_{71} Social\_expenditure_{it} + \gamma_{81} Inflation + \gamma_{91} Popdensity_{it} + \varepsilon_{it}$$

Model (2) Direct Tax

$$Gini_{it} = \alpha_i + \beta_2 DirectTax_{it} + \gamma_{12} GDP\_perCapita_{it} + \gamma_{22} REER_{it} + \gamma_{32} Debt\_ratio_{it} + \gamma_{42} Terms\_ofTrade_{it} + \gamma_{52} FDI_{it} + \gamma_{62} HC_{it} + \gamma_{72} Social\_expenditure_{it} + \gamma_{82} Inflation + \gamma_{92} Popdensity_{it} + \epsilon_{it}$$

Model (3) Indirect Tax

$$Gini_{it} = \alpha_i + \beta_3 IndirectTax_{it} + \gamma_{13} GDP_{perCapita_{it}} + \gamma_{23} REER_{it} + \gamma_{33} Debt_{ratio_{it}} + \gamma_{43} Terms_{ofTrade_{it}} + \gamma_{53} FDI_{it} + \gamma_{63} HC_{it} + \gamma_{73} Social_{expenditure_{it}} + \gamma_{83} Inflation + \gamma_{93} Popdensity_{it} + \omega_{it}$$

Model (4) Income Tax

$$Gini_{it} = \alpha_i + \beta_4 IncomeTax_{it} + \gamma_{14} GDP_{perCapita_{it}} + \gamma_{24} REER_{it} + \gamma_{34} Debt_{ratio_{it}} + \gamma_{44} Terms_{ofTrade_{it}} + \gamma_{54} FDI_{it} + \gamma_{64} HC_{it} + \gamma_{74} Social_{expenditure_{it}} + \gamma_{84} Inflation + \gamma_{94} Popdensity_{it} + \varphi_{it}$$

Table 1 shows the relationship between the main variables, control variables, and income inequality. Gini index data were sourced from the World Inequality Database (WID, 2021, 2023). The Gini index ranges from 0 to 1, where 0 represents perfect income distribution, and 1 signifies perfect or greater inequality. The taxation variable was measured as a percentage (%) of GDP. Data for this variable were obtained from various sources, including the Government Revenue Dataset (GRD) by the United Nations University World Institute for Development Economics Research (UNU-WIDER, 2021, 2023), World Development Indicators (World Bank, 2021, 2024) by the World Bank, OECD stats by OECD (2021, 2023), and Government Financial Statistics (GFS) by the International Monetary Fund (IMF, 2021, 2023). Other data related to control variables were sourced from WDI (World Bank, 2021, 2024), Bruegel Datasets (Bruegel Datasets, 2021, 2023), United Nations Conference on Trade and Development (UNCTAD, 2021, 2023), and IMF (IMF, 2021, 2023).

A minimum of two issues necessitated an appropriate empirical strategy in the current study, namely the missing values in the data and the existence of endogeneity issues between taxation and income inequality (Dao & Godbout, 2014). A practical method to address missing values included interpolating and extrapolating the data to create a balanced panel. Missing values can compromise the quality of panel data by reducing the number of observations used in the model, thereby weakening the statistical power of a test. When data contains numerous missing values, the possibility of estimation

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

inefficiency significantly increases. In addition, when missing data are non-random, panel data estimation may be biased, complicating the validity of exogenous assumptions.

Table 1. Hypothesis

Variable	Parameter	Hypothesis (expected) sign)
Tax Ratio	β_1	$\beta_1 < 0$
Direct Tax	β_2	$\beta_2 < 0$
Indirect Tax	β_3	$\beta_3 < 0$
Income Tax	β_4	$\beta_4 < 0$
GDP per Capita	$\gamma_{11}, \gamma_{12}, \gamma_{13}, \gamma_{14}$	$\gamma_{11}, \gamma_{12}, \gamma_{13}, \gamma_{14} < 0$
REER	$\gamma_{21}, \gamma_{22}, \gamma_{23}, \gamma_{24}$	$\gamma_{21}, \gamma_{22}, \gamma_{23}, \gamma_{24} < 0$
Debt Ratio	$\gamma_{31}, \gamma_{32}, \gamma_{33}, \gamma_{34}$	$\gamma_{31}, \gamma_{32}, \gamma_{33}, \gamma_{34} > 0$
Terms of Trade	$\gamma_{41}, \gamma_{42}, \gamma_{43}, \gamma_{44}$	$\gamma_{41}, \gamma_{42}, \gamma_{43}, \gamma_{44} < 0$
FDI	$\gamma_{51}, \gamma_{52}, \gamma_{53}, \gamma_{54}$	$\gamma_{51}, \gamma_{52}, \gamma_{53}, \gamma_{54} < 0$
HC	$\gamma_{61}, \gamma_{62}, \gamma_{63}, \gamma_{64}$	$\gamma_{61}, \gamma_{62}, \gamma_{63}, \gamma_{64} < 0$
Social Expenditure	$\gamma_{71}, \gamma_{72}, \gamma_{73}, \gamma_{74}$	$\gamma_{71}, \gamma_{72}, \gamma_{73}, \gamma_{74} < 0$
Inflation	$\gamma_{81}, \gamma_{82}, \gamma_{83}, \gamma_{84}$	$\gamma_{81}, \gamma_{82}, \gamma_{83}, \gamma_{84} > 0$
Population Density	$\gamma_{91}, \gamma_{92}, \gamma_{93}, \gamma_{94}$	$\gamma_{91}, \gamma_{92}, \gamma_{93}, \gamma_{94} > 0$

Table 2. Missing Value Data

Country	Missing Value	Total	Data
Brunei	2010-2014, 2019	6	Tax Ratio
Laos	2018-2019	2	Tax Ratio
Myanmar	2006-2011	6	Tax Ratio
Total		**14**	**Tax Ratio**
Myanmar	2006-2011	6	Direct Tax
Myanmar	2006-2011	6	Indirect Tax
Myanmar	2006-2011	6	Income Tax
Brunei	1998-2000	3	Debt Ratio
Brunei	2019	1	Social Expenditure
Cambodia	1999	1	Social Expenditure
Laos	1998-1999, 2019	3	Social Expenditure
Myanmar	1998-1999	2	Social Expenditure
Philippines	1999	1	Social Expenditure
Vietnam	1998-1999	2	Social Expenditure
Total		**10**	**Social Expenditure**
Missing Value Total		**45**	

Source: Data processing

Regarding the endogeneity problem, governments could alter tax structure in response to pre-existing income inequality (Messy & Ndjokou, 2021). This correlates with the two regressors and the error terms (Martinez-Vazquez et al., 2012). Given

the heterogeneity between countries, ordinary least squares (OLS) cannot effectively address endogeneity, as it may produce biased and inconsistent estimation coefficients. Two estimation methods can be used to address endogeneity, namely two-stage least squares with instrumental variables (2SLS-IV) and the generalized method of moments (GMM) estimator. However, with a relatively small N, both the cluster-robust standard errors test and the Arellano-Bond autocorrelation test were unreliable (Martinez-Vazquez et al., 2012), making the use of GMM unsuitable for this study. The consideration of the structure of the panel data model, 2SLS-IV with a fixed effect, could be the most suitable method to address endogeneity.

RESULTS AND DISCUSSION

Table 3 shows a statistical summary of each study variable. The level of income inequality in ASEAN was relatively high, with an average Gini index value of 0.576. Singapore had the lowest Gini index value in 2020, while Cambodia recorded the highest value of 0.684 in 1999-2009. The average tax ratio for ASEAN was 12.86%, which was lower compared to countries in the Asia Pacific region, which had 21%, and OECD countries, which had 33%. Furthermore, the ASEAN average tax ratio was below the African continent's average of 16.6% in 2018 (OECD, 2019). Myanmar had the lowest value of 2.14% in 2002, while Brunei had the highest value of 32.94% in 2008. The average direct tax ratio was 5.17%, with Cambodia recording the lowest value of 0.47% in 1998 and Malaysia having the highest score of 10.98% in 2012. The average indirect tax ratio was 6.78%, with Myanmar recording the lowest value of 1.03% in 2003 and Cambodia having the highest value of 15.35% in 2019. For the average income tax ratio of 4.97%, Cambodia had the lowest value of 0.43% in 1998, while Malaysia recorded the highest value of 11.14% in 2012.

Table 3. Descriptive Statistics

Variable	Symbol	Observation	Mean	Standard Deviation	Minimum	Maximum
Gini Index	$Gini_{it}$	240	57.5569	5.591	39.9698	68.446
Tax Ratio	$TaxRatio_{it}$	240	12.858	4.791	2.143	32.938
Direct Tax	$DirectTax_{it}$	216	5.169	2.587	0.474	10.984
Indirect Tax	$IndirectTax_{it}$	216	6.777	2.833	1.030	15.350
Income Tax	$IncomeTax_{it}$	216	4.968	2.570	0.432	11.140
PDB per Capita	$GDP\_perCapita_{it}$	240	10,438	15,826	260	67,176
REER	$REER_{it}$	240	108.502	17.079	51.094	159.587
Debt Ratio	$Debt\_ratio_{it}$	240	50.696	37.318	0.288	252.784
Terms of Trade	$Terms\_ofTrade_{it}$	240	105.876	29.043	66.288	256.131
FDI	FDI_{it}	240	5.549	6.128	-2.315	32.691
HC	HC_{it}	240	7.210	2.290	2.900	11.930
Social Expenditure	$Social\_expenditure_{it}$	240	6.004	2.952	0.041	16.249
Inflation	$Inflation_{it}$	240	5.957	12.431	-2.315	125.272
Population Density	$Popdensity_{it}$	240	798.996	2087.249	22.290	8044.526

Source: Data processing

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

There was a significant gap in GDP per capita in ASEAN, as evidenced by the minimum value of GDP per capita of 260 USD for Myanmar in 1998 and the highest value of 67,176 USD for Singapore in 2021. Real Effective Exchange Rate (REER) represents the currency value with an index of 100, with 2007 as the base year. Indonesia recorded the lowest value of 51.09 in 1998, while Laos had the highest value of 159.69 in 2016. The average debt ratio in ASEAN was 49.8%, with Brunei recording the lowest value of 0.28% in 2005 and Myanmar having the highest value of 252.78% in 2001. The average term of trade in ASEAN was 105.876 with an index of 100, where Cambodia had the lowest value of 66.33 in 2021, and the highest score of 256.13 was recorded by Brunei in 2008. Foreign Direct Investment (FDI) in ASEAN averaged 5.549%, with Indonesia recording the lowest value of -2.75 in 2000 and Singapore having the highest value of 32.69 in 2021.

Table 4. Estimation Result

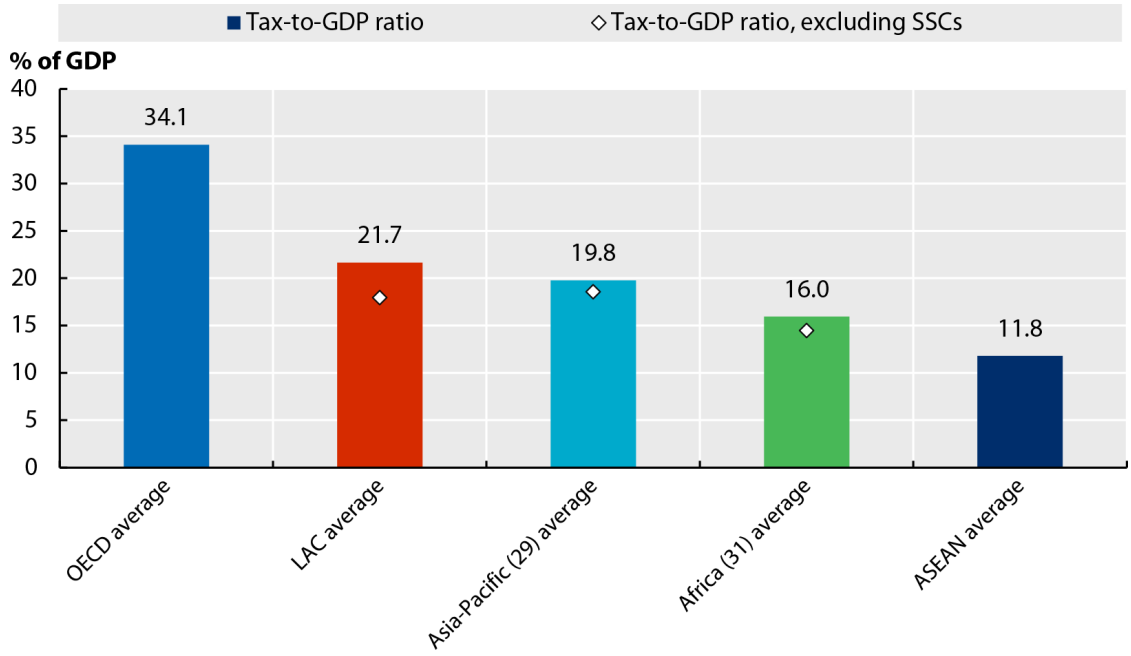
VARIABLE	(1)	(2)	(3)	(4)
Tax Ratio	-0.181**			
	[0.092]			
Direct Tax		-0.510**		
		[0.236]		
Indirect Tax			-0.181	
			[0.226]	
Income Tax				-0.504**
				[0.236]
GDP per Capita	-0.000	-0.001***	-0.001***	-0.001***
	[0.000]	[0.000]	[0.000]	[0.000]
REER	0.008	-0.029*	-0.023	-0.026
	[0.017]	[0.016]	[0.016]	[0.016]
Debt Ratio	-0.031***	-0.030***	-0.031***	-0.031***
	[0.011]	[0.011]	[0.011]	[0.011]
Terms of Trade	0.017**	0.084***	0.093***	0.084***
	[0.008]	[0.017]	[0.018]	[0.017]
FDI	-0.065	0.029	0.029	0.038
	[0.062]	[0.074]	[0.086]	[0.076]
HC	-2.216***	-1.440***	-1.734***	-1.641***
	[0.339]	[0.382]	[0.341]	[0.331]
Social Expenditure	-0.029	-0.092	-0.072	-0.082
	[0.101]	[0.097]	[0.102]	[0.097]
Inflation	-0.003	-0.008	-0.013	-0.008
	[0.016]	[0.020]	[0.018]	[0.020]
Population Density	0.005**	0.009***	0.009***	0.010***
	[0.002]	[0.002]	[0.002]	[0.002]
Constant	75.100***	66.827***	65.471***	67.549***
	[2.377]	[2.384]	[2.612]	[2.534]
Observation	230	207	207	207
R-squared	0.824	0.782	0.782	0.784

Robust standard errors in brackets
Significant at ***α=1%, **α=5%, *α=10%
Source: Data processing

Human Capital, measured by the average number of education years, had the lowest value of 2.9 in Myanmar in 1998, while Singapore recorded the highest value of 11.9 in 2020 and 2021. The average social spending in ASEAN was 6%, with Cambodia recording the lowest value of 0.04% in 2019 and Malaysia having the highest value of 16.25% in 2020. Brunei recorded the lowest inflation rate of -2.31% in 2002, and Laos had the highest rate of 90.98% in 1998. The average inflation rate of ASEAN was 5.96%, and the average population density was 799 people per km2. Singapore was the most populous country, with 8,045 people per km2 in 2019, while Laos recorded the lowest with 22 people per km2 in 1998. The regression results for the relationship between taxation and income inequality are presented in Table 4.

The results showed a negative correlation between tax ratio and income inequality, which was statistically significant at a 5% level. Specifically, a 1% increase in total tax revenue to GDP decreased 0.00181 in the Gini index. For instance, a 1% increase in the Indonesian tax ratio could cause a decline in the Gini index from 0.603 to 0.602. The result was in line with the initial hypothesis of this study based on Mirrlees's (1971) theory that tax and transfers could help reduce inequality. It was also consistent with Cevik & Correa-Caro (2020), Khan & Padda (2021), Martorano (2018), Messy & Ndjokou (2021), Mourfou & Ouedraogo (2021), and Nantob (2016).

Figure 2. Average Tax Ratio Comparison



Notes: 2021
Source: Compiled from Revenue Statistics in Asia and the Pacific 2023 (2023) & UNU-WIDER (2023)

The estimation results reveal that the tax ratio, while not sufficiently effective in reducing income inequality, holds significant potential for impact. The average tax ratio for ASEAN in 2021 was 11.8%, a figure that falls below the average tax ratio

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

of countries in the Asia-Pacific region at 19.8% and OECD countries at 34.1%, and even below African countries at 16.6% in 2018 (OECD, 2023), as depicted in Figure 2. The formulation of an ideal tax ratio is therefore of paramount importance. UNDP has observed that a minimum tax ratio of 20% is necessary to achieve the Millennium Development Goals (MDGs), particularly in reducing income inequality (UNDP, 2010). However, Hang et al. (2020) found that the optimal tax ratio for ASEAN countries was 15.33%, suggesting that a higher tax ratio could potentially impede economic growth.

Regarding direct tax, the estimation results showed a negative and statistically significant correlation with income inequality at 5% and a coefficient value of -0.51. This result showed a 1% increase in direct tax revenue to GDP, reducing the Gini index by 0.0051. For example, a 1% increase in the Indonesian direct tax ratio to GDP could decrease the Gini index by 0.0051 from 0.603 to 0.602. Therefore, the application of direct tax tended to reduce the level of income inequality and increase income distribution. The impact of reducing inequality should be substantial, as evidenced by the coefficient value. The result aligned with Mirrlees's (1971) theory, which stated that direct tax ensured more significant fiscal mobilization and was essential for implementing transfers. It also corresponded with Khan and Padda (2021), Martorano (2018), and Mourfou and Ouedraogo (2021).

Based on the estimation results in Table 4, indirect tax had a statistically insignificant correlation with income inequality. This result contradicted the initial hypothesis, as shown by Khan and Padda (2021) and Mourfou and Ouedraogo (2021). Moreover, the results did not align with Martorano (2018), which found a negative correlation, and Messy & Ndjokou (2021), reporting a positive correlation with income inequality.

This current study had limitations, as only indirect tax data were available, and specific taxes on the consumption of goods and services, such as VAT and sales taxes, were not included. Tax on the consumption of goods and services had an objective characteristic, showing that tax imposition did not consider the subject. Taxpayers could belong to various income groups, both rich and poor, making income redistribution for reducing income inequality ineffective. While some taxes were classified as indirect, targeting certain goods, such as a tax on the sale of luxury goods, and tax on international trade, such as import and excise duties, each had unique characteristics. Therefore, the effect of these tax attributes on income inequality was somewhat uniform.

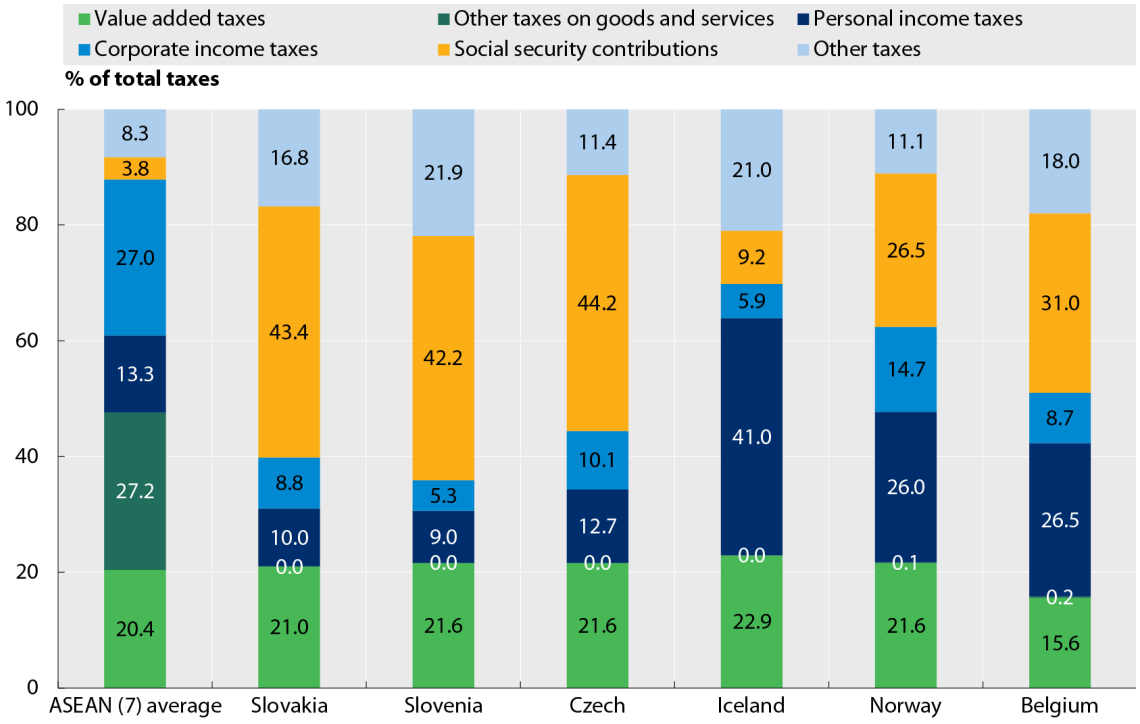
The estimation results in Table 4 showed that income tax negatively correlated with income inequality, as evidenced by the coefficient value of -0.504, statistically significant at a 5% level. Therefore, a 1% increase in government revenue from income tax on GDP decreased the Gini index by 0.00504. The result supported the initial hypothesis based on Mirrlees's (1971) theory, stating that income tax is negatively related to income inequality. It was also consistent with Caminada et al. (2019), Martorano (2018), and Parro (2024). The interpretation of the estimation results showed that the imposition of income tax on high-skilled individuals could impact income redistribution through government-provided transfers to low-skilled groups, thereby reducing income inequality.

However, the redistribution effect remained relatively small, at 0.00504 on a 0-1 scale of the Gini index.

A limitation of the data available in this study was the need for more distinction between income taxes levied on individuals and corporations. This result was essential because the redistributive effect of income tax was generally more significant for individuals than corporations. Akgun et al. (2017) explained that personal income tax was the most crucial instrument in redistributing income through the progressive design. Furthermore, the Gini index, which measured income inequality, was calculated based on the accumulated income of individuals rather than companies, comparing specific income groups on the Lorenz curve.

Further analysis could be conducted by comparing the composition of tax revenues between ASEAN and countries with low-income inequality, as shown in Figure 3. This comparison included six OECD countries with the lowest income inequality in 2020: Slovakia, Slovenia, Czech Republic, Iceland, Norway, and Belgium. The composition of income tax receipts from the countries showed that receipts from individual income tax exceeded corporate income tax, though with varying figures.

Figure 3. Tax Structure Comparison



Source: Compiled from OECD (2021)

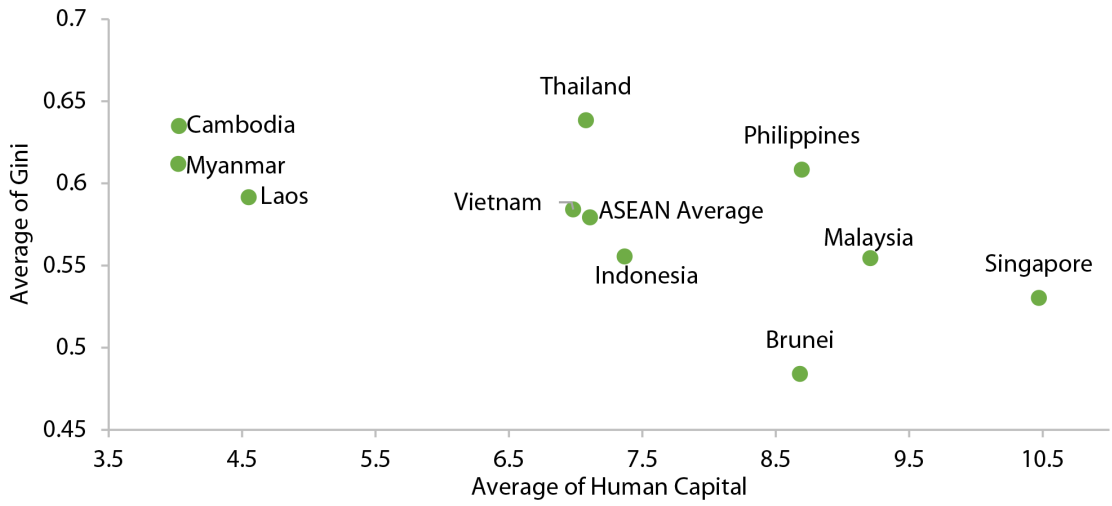
In Slovakia, which had the lowest income inequality among OECD countries, individual income tax accounted for 10%, while corporate income tax comprised only 8.8%. Iceland, ranking fourth among OECD countries with a Gini index of 0.25, showed that the contribution of individual income tax was seven times greater than

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

corporate income tax, at 41%. For ASEAN, the contribution of individual income tax was only 13%, while corporate income tax was double at 27%. This analysis showed that focusing on individual income tax could effectively improve income distribution and reduce income inequality. However, the effectiveness of personal income tax in reducing inequality tends to be more significant when all members of society contribute through tax.

The control variables that were statistically significant and corresponded with the hypothesis were human capital and population density, where human capital showed a negative correlation and population density was positively related. The results indicate that GDP per capita is negatively correlated with income inequality but only statistically significant in models (2), (3), and (4). Debt ratio and terms of trade were statistically significant in all models but did not correspond with the hypothesis. The debt ratio specifically showed a negative correlation, and terms of trade were positively related. The estimation results for FDI, social expenditure, and the inflation rate were insignificant in all models, while REER was only significant in model (2).

Figure 4. Income Inequality and Human Capital



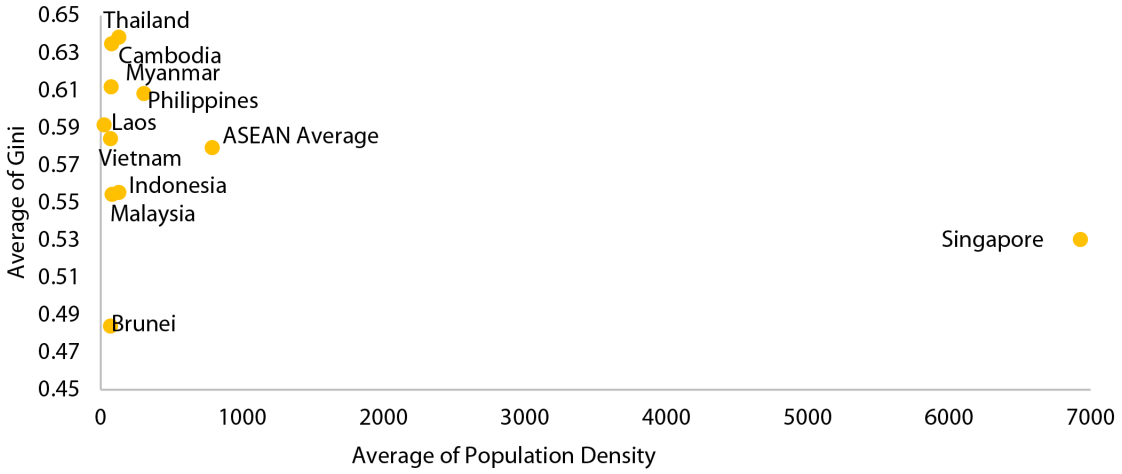
Source: Data processing

The results showed a significant relationship between human capital and population density variables, although the issue of labor and population was not the primary focus of this study. A country with a higher level of education tended to experience lower income inequality, while a country with higher population density tended to experience higher income inequality. ASEAN was classified based on the average years of schooling as an indicator of HC in Figure 4 and the average population density in Figure 5.

Singapore had the highest education in ASEAN, and the average inequality index was lower than the ASEAN average. Conversely, Laos, with education levels below

average, had higher inequality than the ASEAN average. Despite the high population density, Singapore ranked second lowest in income inequality due to the high-quality education system. Despite a low population density, Laos still struggled with above-average income inequality, as the average years of schooling were below the average ASEAN average. This result showed that population density was not a significant factor in determining income inequality in a country, provided the population had access to high-quality education.

Figure 5. Income Inequality and Population Density



Source: Data processing

The instrumental variables included the first lag of the endogenous variables in each model, namely the first lag of tax ratio, direct tax ratio, indirect tax ratio, and income tax ratio. The results from the first-stage testing showed that all the instrumental variables were statistically significant. Several tests were required to determine whether the variables were appropriate and correctly identified. The tests included under-identification, overidentification, weak identification, orthogonality conditions, and endogeneity. The results of the instrumental variable tests for all empirical models are shown in Table 5.

The underidentification test showed that all instrumental variables in the four study models were appropriately identified, as evidenced by the values of the Kleibergen-Paap rk LM statistic and the p-value. The overidentification test had similar results, observed through the p-value of the Hansen J statistic. The weak identification test, assessed by the Cragg-Donald Wald F statistic and Kleibergen-Paap rk Wald F statistic, showed that none of the variables were weak, as shown by values exceeding the critical values of the Stock-Yogo weak ID test.

The orthogonality conditions test examined whether instrumental variables correlated with endogenous variables while remaining uncorrelated with other independent variables. This result was assessed through the p-value of the Anderson-Rubin Wald test F statistic, Anderson-Rubin Wald test, and Stock-Wright LM S statistic. The results showed

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

Table 5. First-Stage Result and Instrumental Variable Test

Variables	**(1)**	**(2)**	**(3)**	**(4)**
L1. *TaxRatio*	0.668***			
	[0.138]			
L1.*DirectTax*		0.757***		
		[0.065]		
L1.*IndirectTax*			0.718***	
			[0.063]	
L1.*IncomeTax*				0.724***
				[0.074]
GDP_perCapita	-0.000	-0.000	-0.000**	-0.000*
	[0.000]	[0.000]	[0.000]	[0.000]
REER	0.008	-0.003	0.000	0.001
	[0.017]	[0.004]	[0.006]	[0.005]
Debt_ratio	-0.031***	-0.003*	-0.003	-0.003*
	[0.011]	[0.002]	[0.002]	[0.002]
Terms_ofTrade	0.017**	-0.007	-0.007	-0.008
	[0.008]	[0.005]	[0.005]	[0.005]
FDI	-0.065	0.030	0.081***	0.034
	[0.062]	[0.025]	[0.022]	[0.024]
HC	-2.216***	0.127	0.271**	0.037
	[0.339]	[0.097]	[0.111]	[0.095]
Social_expenditure	-0.029	-0.037*	-0.053	-0.028
	[0.101]	[0.021]	[0.036]	[0.025]
Inflation	-0.003	0.005	0.002	0.005
	[0.016]	[0.003]	[0.004]	[0.004]
Popdensity	0.005**	0.000	0.001**	0.001*
	[0.002]	[0.000]	[0.000]	[0.000]
Constant	6.036***	2.143**	1.700**	2.428**
	[2.056]	[0.828]	[0.833]	[0.938]
Robust standard errors in brackets Significant at ***α=1%, **α=5%, *α=10%				
F-statistics	23.45	135.1	128.53	96.03
F-statistics - pvalue	0.0000	0.0000	0.0000	0.0000
Underidentification Test:				
Kleibergen-Paap rk LM statistic	17.71	43.37	42.22	36.60
Kleibergen-Paap rk LM statistic - p-value	0.0000	0.0000	0.0000	0.0000
Overidentification Test:				
Hansen J statistic - p-value	0.0000	0.0000	0.0000	0.0000
Weak Identification Test:				
Cragg-Donald Wald F statistic	165.51	266.10	220.54	232.74
Kleibergen-Paap Wald rk F statistic	23.45	135.10	128.53	96.03
Orthogonality Conditions Test:				
Anderson-Rubin Wald test, F – p-value	0.0511	0.0411	0.4407	0.0430
Anderson-Rubin Wald test, Chi-sq - value	0.0400	0.0310	0.4175	0.0325
Stock-Wright LM S statistic, Chi-sq – value	0.0118	0.0218	0.3666	0.0235
Endogeneity Test – p-value	0.0205	0.0261	0.3716	0.0477
Observations	230	207	207	207

Source: Data processing

significant correlations for models (1) and (2), with varying significances for model (4) and no correlation for model (3) due to orthogonal conditions. The endogeneity test examined whether instrumental variables were closely correlated with the endogenous variables.

CONCLUSION

This study showed the potential of tax policies in addressing income inequality in Southeast Asia, particularly tax ratio, direct tax, and income tax. However, the current impact of these measures requires reinforcement to address the issue effectively. ASEAN governments were recommended to prioritize increasing tax revenues, targeting a tax ratio of approximately 15.33% while also considering factors related to economic growth. To achieve significant reductions in income inequality, the derivation of tax revenue primarily from individual income taxes should be prioritized. Furthermore, careful consideration was required in setting optimal tax rates for the highest income bracket, as shown by the Indonesian recent implementation of a new income bracket at 35% in 2022.

The results showed the importance of education and workforce development in addressing income inequality, drawing insights from successful models in Singapore. It was also crucial to acknowledge the limitations of this study, including the need for additional values and more detailed tax-related data. Specifically, a deeper understanding of corporate and individual tax ratios in income tax was crucial for refining study methods, analysis methods, and subsequent discussions. This study offered valuable insights for ASEAN policymakers, providing guidance in crafting and implementing taxation policies to reduce income inequality and foster robust economic development in the region.

REFERENCES

Akgun, O., Cournède, B., & Fournier, J.-M. (2017). The Effects of The Tax Mix on Inequality and Growth. *OECD Economic Department Working Papers, No. 1447*. OECD Publishing.

Alves, J., & Afonso, A. (2019). Tax Structure for Consumption and Income Inequality: An Empirical assessment. *SERIEs*, *10*, 337–364.

Caminada, K., Goudswaard, K., Wang, C., & Wang, J. (2019). Income Inequality and Fiscal Redistribution in 31 Countries After the Crisis. *Comparative Economic Studies*, *61*(1), 119–148. https://doi.org/10.1057/s41294-018-0079-z

Cevik, S., & Correa-Caro, C. (2020). Growing (un)equal: fiscal policy and income inequality in China and BRIC+. *Journal of the Asia Pacific Economy*, *25*(4), 634–653.

Cingano, F. (2014). Trends in Income Inequality and its Impact on Economic Growth. *OECD Social, Employment and Migration Working Papers, 163*. OECD Publishing, Paris.

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352

Clark, J. R., & Lawson, R. A. (2008). The Impact of Tax and Expenditure Policies on Income Distribution. *The Journal of Private Enterprise*, *24*(1), 23–31.

Dao, H., & Godbout, L. (2014). Le rôle de la fiscalité dans la réduction des inégalités : doit-on se soucier de la structure fiscale servant à prélever les recettes? *L'Actualité économique*, *90*(4), 303–327. https://doi.org/https://doi.org/10.7202/1035111ar

Focanti, D., Hallerberg, M., & Scartascini, C. (2016). Tax Reforms in Latin America in an Era of Democracy. *Latin American Research Review, 51*(1), 132-158.

Hang, N. P. T., Nguyen, M-L. T., Thai, T. D., & Bui, T. N. (2020). The Optimal Threshold of Tax Revenue for Economic Growth: An Investigation into the ASEAN 5+1 Countries. *International Journal of Economics and Business Administration, 8*(4), 422-434.

IMF. (2019). *Regional Economic Outlook, October 2019, Asia Pacific*. New York: International Monetary Fund.

Iosifidi, M., & Mylonidis, N. (2017). Relative effective taxation and income inequality: Evidence from OECD countries. *Journal of European Social Policy*, *27*(1), 57–76.

Karakotsios, A., Katrakilidis, C., Dimitriadis, D., & Christoforidis, T. (2020). Examining the relationship between income inequality, taxation and economic freedom: A panel cointegration approach. *Economics and Business Letters*, *9*(3), 206–215.

Khan, S., & Padda, I. U. haq. (2021). The Impact of Tax and Social Expenditure Policies on Income Distribution: Evidence from South Asia. *Etikonomi*, *20*(2), 369–384.

Khan, Z., & Khan, M. A. (2023). The Effect of Monetary Policy on Income Inequality: Empirical Evidence from Asian and African Developing Economies. *Journal of Central Banking Theory and Practice, 3,* 133-158.

Mahon, J. E. (2004). Causes of Tax Reform in Latin America, 1977-95. *Latin American Research Review, 39*(1), 3-30.

Martinez-Vazquez, J., Moreno-Dodson, B., & Vulovic, V. (2012). The Impact of Tax and Expenditure Policies on Income Distribution: Evidence from a Large Panel of Countries. *Hacienda Publica Espanola*, *200*(4), 95–130.

Martorano, B. (2018). Taxation and Inequality in Developing Countries: Lessons from the Recent Experience of Latin America. *Journal of International Development*, *30*(2), 256–273.

Messy, M., & Ndjokou, I. (2021). Taxation and Income Inequality in Sub-Saharan Africa. *Economics Bulletin*, *41*(3), 1153–1164.

Mirrlees, J. A. (1971). An Exploration in the Theory of Optimum Income Taxation. *The Review of Economic Studies*, *38*(2), 175–208.

Mo, P. H. (2000). Income Inequality and Economic Growth. *Kyklos*, *53*(3), 293–315.

Mourfou, A., & Mohamed Ouedraogo, I. (2021). Effect of Tax Revenue Mobilization on Income Inequalities in West African Economic and Monetary Union Countries (WAEMU). *American Journal of Theoretical and Applied Business*, *7*(1), 8-20.

Nantob, N. (2016). Taxation and Income Inequality in Developing Countries: An Empirical Investigation. *Economics Bulletin*, *36*(3), 1508–1522.

Ostry, J. D., Berg, A., & Tsangarides, C. G. (2014). Redistribution, Inequality, and Growth. *IMF Staff Discussion Note SDN/14/02.*

Parro, F. (2024). Unveiling the Impact of Income Taxes on Inequality in a HACT Model. *Journal of Macroeconomics*, *79*, 103581.

https://journal.uinjkt.ac.id/index.php/etikonomi
DOI: https://doi.org/10.15408/etk.v23i2.32352