

# Effect of Tax Structure on Income Inequality in Sri Lanka

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## ARTICLE INFORMATION

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## ABSTRACT

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*Keywords:*

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Tax Structure  
ARDL Model  
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Growing income inequality is seen as one of the most important global concerns in this decade. Hence, the Sustainable Development Goals (SDGs) 2030 aims at reducing income inequality within and among countries. IMF emphasizes that income inequality emerged as one of the critical concerns for economic policy in both developed and developing countries. However, as shown by the UN, Sri Lanka is far lower than the South Asian regional income distribution standards owing to its high inequality. At the same time, tax revenue has become one of the major concerns in the country due to its broadened internal deficit. In this background, this study examines the short-run and long-run effects of tax structure on income inequality in Sri Lanka utilizing annual statistics from 1980 to 2019 by employing the ARDL model. Findings revealed that in the long run, value-added and excise taxes have a significant association with income inequality in Sri Lanka. However, the association between personal income tax and income inequality was positive but insignificant. In contrast, corporate income tax and import duty have a statistically significant negative association with income inequality in Sri Lanka. Further, in the short run, at the overall level taxes are not significantly associated with income inequality except the personal income tax which has a significant negative association with income inequality.

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## 1. Introduction

Growing income inequality is recognized as a global problem of humanity worldwide and has become an inevitable characteristic of contemporary society. Income inequality, also known as “economic inequality”, “wealth inequality”, or “wealth gap”, refers to disparities in money earned and overall well-being among different groups of people, such as entire countries, or to populations within local, national, or regional populations, or even individuals within these populations (Atkinson, 2015).

In today’s world, reducing income inequality is recognized as a crucial goal of sustainable development (Dianov et al., 2022). Even though South Asian economies have recorded impressive economic progress in recent decades, this has brought with it several problems. One of the region’s most serious problems is the rise in income inequality (Korkut Pata et al., 2022).

According to the published report of the United Nations Development Programme 2022, the Gini coefficients for South Asian countries are India 35.7, Pakistan 29.6, Nepal 32.8, Bangladesh 32.4, Maldives 29.3, and Bhutan 37.4, whereas Sri Lanka 39.3, far from South Asian regional income distribution standards. In Sri Lanka, income inequality is a significant issue that needs immediate attention because high and increasing inequality makes inclusive progress more challenging (Ranjith, 2021). The Gini coefficient value in Figure 1 shows that income inequality in Sri Lanka has stayed in the high-level undesirable category since 1980.

A range of factors have contributed to income gaps. According to (Lee & Lee, 1980), the main reason that has driven income inequality is increased inequality in wages and salaries, particularly between high and low-skilled labour, as well as between developed and developing nations. Furthermore, literature shows that income disparities are created because of ethnic, gender, and other forms of discrimination identified in local, national, regional, and even international contexts. Among them, tax is identified as one of the most significant factors determining income distribution is tax (Joumard et al., 2012). Conventional wisdom holds that taxes can be used when redistributing wealth and combating

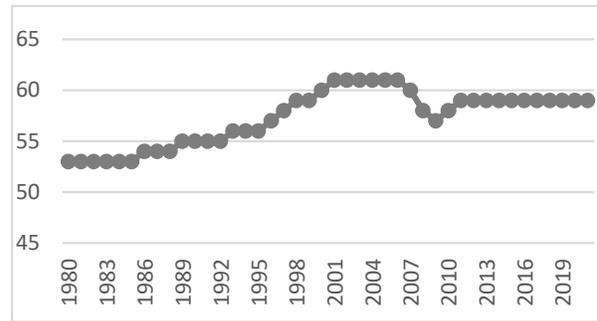


Figure 1: Income Inequality in Sri Lanka  
Source: *World Income Inequality Database (WIID, 2022)*

inequality (Thilanka & Ranjith, 2021). As a result, to achieve desired fiscal policy objectives as efficiently as possible by limiting undesirable distortions in the tax system must be appropriately designed.

Fiscal policy has received significant attention among the economic policies that aim to increase growth and improve income distribution. However, the taxpayer perceives it differently as a tax burden depending on the nature of the tax. Indirect taxes are generally regarded as regressive, while direct taxes are deemed to be progressive; both types of taxes may result in changes in income distribution. The progressive nature of taxation implies that as the tax rate rises, so does the taxable amount or that the tax rate rises from a lower level to a high level. However, in a regressive tax, on the other hand, the tax rate decreases as the taxable amount increases and when the average tax rate exceeds the marginal tax rate, negatively affecting low-income cohorts of a population.

The personal income tax burden is unevenly distributed among taxpayers in Sri Lanka. Vijayakumaran & Vijayakumaran (2014) found that about 88 percent of resident individual tax revenue in Sri Lanka is collected from only 11 percent of taxpayers and about 99 percent of corporate income tax revenue is collected from 13 percent of corporate taxpayers. Hence, it can be observed that the tax system in Sri Lanka is highly regressive. Given that essential goods consume a larger share of the budgets of low-income groups, this situation can income inequality.

An economy’s tax system impacts net inequality in two ways: initially, taxes vary in their progressiveness, and thus tax structure partly

contributes to inequality. Second, tax structure influences economic incentives such as labor market incentives, savings, and investment, which in turn influences net inequality indirectly (Drucker, et al., 2017). As a result, it is envisaged that the tax system will play a crucial role in reducing income inequality.

Value-added tax, excise tax, income tax, import duty and other tax revenue are the major tax categories in Sri Lanka (Kesavarajah, 2016). Income taxes are levied on personal household income, known as the personal income tax, and company profits, which indicate corporate income tax.

Business Turnover Tax (BTT) was the first form of value-added tax. Goods and Services Tax (GST) and the National Security Levy (NSL) were introduced in 1996 to replace the BTT. In 2002, these two taxes were combined and were named VAT (Hettiarachchi et al., 2022). In this study, BTT, NSL, and GST are all considered VAT.

Excise taxes are specific consumption taxes imposed on goods to control and direct consumption. In this study, selective sales taxes were considered excise taxes in the early periods from 1980 to 1990. Import duties are taxes levied on international trade, mainly affecting a country's direct economic imports. Other taxes are balanced taxes that do not fall into the above categories (Hettiarachchi et al., 2022).

What is alarming and saddening is that in Sri Lanka, tax revenue has not kept pace with growing incomes due to an over-reliance on indirect taxes (Figure 2) and insufficient revenue collection from income tax, suggesting a severe concern about the composition of Sri Lanka's tax revenue.

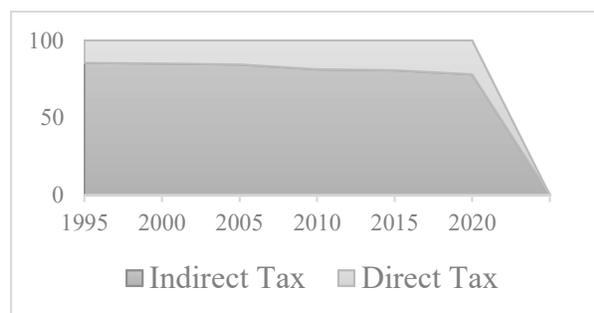


Figure 2: Tax Structure in Sri Lanka  
Source: Central Bank of Sri Lanka

Sri Lanka has one of the weakest tax implementation systems, with numerous taxes and frequent changes in tax policies as governments change. According to the International Monetary Fund (IMF), in 2018, Sri Lanka's total tax revenue as a percentage of GDP declined to 11.9%, lagging all its developing country peers in tax to GDP and it is lower than in sub-Saharan Africa.

Even after that, at the end of 2019, a considerable reduction in tax rates and the exemption of various taxes were imposed. This tax reform resulted in a significant loss in tax income in 2020. According to the Ministry of Finance, the tax revenue fell by more than LKR 500 billion, recording the largest drop in tax revenue recorded in Sri Lankan history. As a result, this caused Sri Lanka to have the lowest government revenue-to-GDP ratio (9.2% of GDP) since independence. The low tax revenue and the lack of equity in the tax structure are the most alarming issue that has been discussed frequently (Moramudali, 2021).

In Sri Lanka, a country that has been a pioneer in economic liberalization in South Asia, persistently high levels of income inequality and declining tax revenue have been considerable concerns for the Sri Lankan government weakening fiscal operation and performance. Moreover, significant unknowns exist about the evolution of income distribution and its underlying causes following economic liberalization. Therefore, there is a need to examine these issues empirically. Furthermore, although taxation is widely discussed and debated, systematic research has yet to produce clear insights into the magnitude of tax structure's effect on income inequality. Tax policy reforms are urgently needed to make Sri Lanka's tax system more equitable. Therefore, by considering all these facts, this study is designed to examine the effects of tax structure on income inequality in Sri Lanka in both the long and short run.

## 2. Objectives of the Study

We can see that Sri Lanka's situation is on a treacherous path. The country is experiencing its fourth crisis event within five years (Constitutional crisis, 2018, Easter Attacks, 2019, Covid-19 Crisis, 2020 and Economic Crisis, 2022). This research will primarily focus on examining the impact of the country's tax structure on income inequality in both the long term and the short term in the

Sri Lankan context. Thus, the main objective of this study is to examine the impact of tax structure on income inequality in Sri Lanka. Specifically, the study focuses on examining both the short and long-run impacts of value-added tax, excise tax, corporate income tax, personal income tax, and import duty on income inequality in Sri Lanka.

### 3. Significance of the Study

The study is significant as increasing income inequality is identified as a significant challenge confronting nations globally in the 21<sup>st</sup> century, and research interest in this field has grown widely among policymakers and academic researchers since the 2008-2009 global recession (Thilanka & Ranjith, 2021; Drucker et al., 2017).

In the Sri Lankan context, the current tax system has faced challenges, notably in ensuring equitable income distribution due to low levels of tax collection. To provide clear policy directions to lower the degree of income inequality through sound tax policies, it is necessary to investigate the empirical link between tax structure and income inequality in Sri Lanka. This study is needed because most existing studies focused on the link between tax structure, economic growth, and economic development and analyzed the determinants of income inequality at the regional or country levels.

Furthermore, according to the Sri Lankan literature only a few studies focused on analyzing the effects of tax structure on income inequality in Sri Lanka (Thilanka & Ranjith, 2021). In addition to that, there were no studies done analyzing the impact of the segregation of major tax income tax into personal income tax and corporate income tax in the Sri Lankan context. However, instead, they focused on income tax as a whole and another major contributor to tax revenue; excise tax was also excluded from the study.

In terms of practical significance, this study will help to understand the nature of the effect on income inequality by various tax components. As a result, the study's findings would significantly contribute to Sri Lanka's favorable fiscal policy to reduce income inequality. Further, this study will enable people to comprehend the implications of their spending decisions for the country. In addition to assisting policymakers and development practitioners in the country, this study

will ensure that the nation's limited public resources are utilized efficiently and effectively. Finally, this research will be helpful to future researchers studying the Sri Lankan economy in this field.

### 4. Literature Review

Economic inequality is a multifaceted concept. IMF identifies concepts such as lifetime inequality, inequality of wealth, and inequality of opportunity as related concepts of income inequality. Income inequality refers to the extent to which income is distributed within a population. In literature, income inequality is measured by the Gini index or the percentile ratios of income. The Gini index measures the degree of deviation of income from the perfectly equal distribution using the area between the Lorenz curve and the equality line. Income inequality of a country is caused by various socio-economic factors. Among them level and the structure of taxes take the attention of the policymakers as it is related to fiscal policy operations. According to Martinez-Vazquez et al. (2012), choosing the direct and indirect tax mix significantly influences income distribution. The government imposes direct taxes such as personal income tax and corporate income tax. These add a large share of tax revenue to the government that finances the government expenditure and improves the income distribution of a country. Personal income taxes are levied on various sources of income such as work earned by individuals. Corporate income tax is imposed on business profits.

The indirect taxes imposed by governments such as value-added tax; excise tax import duty also add a considerable percentage of revenue to the government revenue. Value-added taxes are imposed on the additional value produced in goods and services while excise taxes are imposed on domestically produced goods and services. Import duties are imposed in various forms such as customs duty, tariff, and import taxes on imported goods.

The theory of tax incidence explains that the distribution of after-tax income is determined by the tax structure and the level of tax in a country. The theoretical underpinning of most of the literature related to tax effect on inequality is based on the theory of tax incidence. Similarly, the theory

of optimum tax of Stiglitz shows that the ability of the tax system to redistribute income is determined by the tax design.

Empirical literature shows that personal income taxes lower the disposable income of households. This can lower the income of high-income earners reducing income inequality. As found by Martinez-Vazquez et al. (2012), personal income taxes lower income inequality by improving income distribution. Similarly, Drucker et al., (2017) show that personal income taxes are inversely associated with income inequality and hence improve the income distribution of an economy. (Engel et al., 1999)

However, in studies examining the effect of personal income taxes on income distribution in Chile, Engel et al. (1999) found that the income tax has a neutral association with income distribution. Immanuel et al. (2012) confirm this by showing that income taxes do not affect income inequality. Different from the literature on the association between personal income tax and income inequality, the literature on corporate income tax shows mixed evidence Anyaduba & Otulugbu (2019) and Claus et al. (2012) show that the effect of corporate income tax on income inequality was negative for other countries but positive for Asia.

In contrast to this, Martinez-Vazquez et al. (2012), show that corporate income taxes reduce income inequality in both developed and developing countries. However, they show that the effect diminishes with the degree of openness. Similarly, Immanuel et.al. (2021) found that corporate income tax has made a negative impact on inequality. However, Drucker et al. (2017) and Israel & Ebimobowei (2021) have found that the effect of corporate tax on income inequality is unclear or not significant. Literature provides mixed evidence on the association of indirect taxes such as Value Added Tax (VAT), excise tax, and import duty with income inequality. As shown in the literature, the value-added tax has a significant effect on the income inequality of a country. VAT increases the prices of goods and services limiting the consumption of households, which can worsen the income distribution. On the other hand, the government revenue collected by VAT can be used to finance various services that enhance the welfare of the country. Examining the distributional impact of twelve various taxes in Norway,

Aasness et al. (2002) found that the value-added tax is positively associated with income inequality. They show that low VAT on food and electricity has reduced the inequality in the country. Low VAT is lowering the prices of commodities which lowers the inequality of an economy. Drucker et al. (2017) found that taxes on consumption increase inequality in developed countries. Examining the case of Sri Lanka, Thilanka & Ranjith (2021) found that VAT in Sri Lanka has increased income inequality in the long term.

However, a reduction in VAT can lower the tax revenue of the government, reducing government involvement in welfare activities. Examining the implications of value-added tax in South Africa, Erero (2015) found that a slight increase in government revenue can be used for the reduction of poverty. This can lower income inequality by empowering low-income earners. However, Anyaduba & Otulugbu (2019); Israel & Ebimobowei (2021); Sameti & Rafie (2010) shows that the effect of VAT on income inequality was insignificant.

Literature provides mixed evidence about the association between excise taxes and income inequality in an economy. Examining the effect of excise taxes, Jellema et al. (2017) have found that the lower excise tax on tobacco has lowered the income inequality in Indonesia. Examining the effect of excise tax and government spending policies on income distribution, Martinez-Vazquez et al. (2012) found that an increase in excise tax has made an adverse impact on income redistribution lowering inequality.

However, the findings of Anyaduba & Otulugbu (2019) found that excise tax does not make a significant impact on income inequality. Mixed evidence can be found in the literature related to the association between import duty and income inequality.

An increase in import duty increases the prices of imported commodities. If the country depends on imports, then an increase in the general price level can worsen income inequality. According to Martinez-Vazquez et al. (2012), customs duties have a detrimental impact on income redistribution.

On the other hand, Cicowiez et al. (2009) have found that the trade reforms in Argentina, which

increased import duties and eliminated export taxes have reduced income inequality and poverty of the country. In the case of Asia, custom duties make a regressive impact on income inequality (Claus et al., 2012). However, in the Sri Lankan context, Thilanka & Ranjith (2021) found that import duty has not made a significant impact on income inequality from 1985 to 2018.

The income inequality is influenced by various socio-economic variables. Literature shows economic growth as one of the significant variables that affect income inequality. According to the absolute income hypothesis of Keynes, economic growth and the increase in per capita income as a result, may not necessarily lead to a decrease in inequality, as the increased income may be accompanied by a decrease in the marginal propensity to consume, that can lower the level of consumption.

Foreign remittances increase the household income empowering low- and medium-income earning households. Hence, literature shows that remittances lower income inequality (Tung & Thang, 2023). On the other hand, neoclassical theory postulates that high unemployment is a natural price for lower income inequality. Sheng (2011) found that unemployment is positively correlated with income inequality. Examining the association between trade openness and income inequality Dorn et al. (2021) found that trade openness has a positive effect on income inequality in advanced economies.

## 5. Methodology

Based on the literature following conceptual framework was developed to illustrate the association between different types of taxes and the income inequality of an economy.

As shown in the figure 3, income inequality is affected by the tax structure that consists with four types of taxes as well as control variables. Control variables include economic growth, unemployment, foreign remittances, and trade openness.

Table 1 shows the operationalization of variables. It presents the list of variables used in the quantitative analysis; the indicators used to

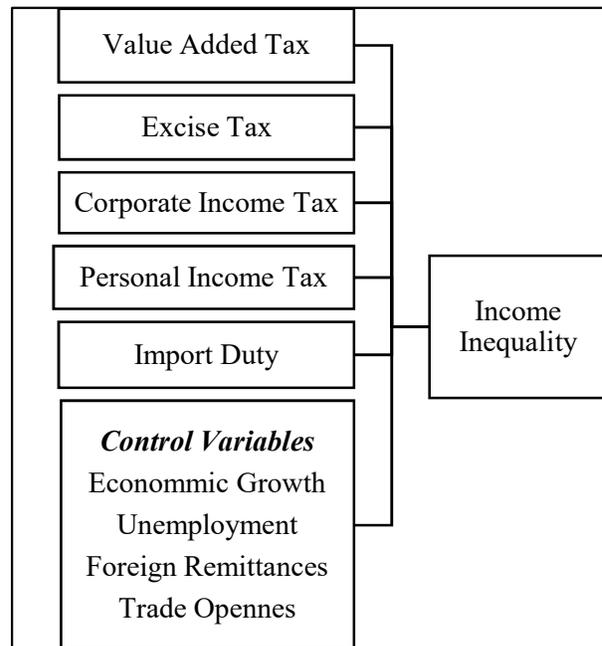


Figure 3: Conceptual Framework

measure each of these variables, and the sources of data.

The study aims to examine the impact of value-added tax, excise tax, corporate income tax, personal income tax, and import duty on income inequality in the economy. Based on the literature, economic growth, unemployment, foreign remittances, and trade openness were also included as independent variables considering their impact on income inequality. As shown in the above table, income inequality, which is the main variable of interest, was measured using the pre-tax national income based on individual adults. From the individualistic- adult series and equal-split-adults' series, the equal-split-adults' series was selected as it split income and wealth equally between adults in the same household. The equal-split adults series reflects the actual situation (Alvarendo et al., 2018).

Each type of tax was measured by the tax revenue collected from each type as a percentage of total tax revenue. Other than the main variables of interest, four control variables were included in the model, i.e., economic growth, unemployment, foreign remittances, and trade openness based on the literature. The economic growth was measured using real GDP per capita, while unemployment

**Table 1**  
**Operationalization of Variables**

Variable	Abbreviation	Indicator	Source
Value added tax	VAT	Value-added tax revenue as a percentage of total tax revenue	Central Bank of Sri Lanka
Excise Tax	ET	Excise tax revenue as a percentage of total tax revenue	Central Bank of Sri Lanka
Import Duty	ID	Import duty revenue as a percentage of total tax revenue	Central Bank of Sri Lanka
Corporate income Tax	CIT	Corporate income tax revenue as a percentage of total tax revenue	Central Bank of Sri Lanka
Personal Income Tax	PIT	Personal income tax revenue as a percentage of total tax revenue	Central Bank of Sri Lanka
Economic Growth	LNPER	Log of real GDP per capita	Central Bank of Sri Lanka
Unemployment Rate	UNEM	Unemployment, total (% of total labor force) (modeled ILO estimate)	World Bank
Foreign remittance	RE	Remittance Inflows to GDP for Sri Lanka, Percent, Annual, Not Seasonally Adjusted	World Bank
Trade Openness	LNTR	Log of summation of imports and exports	Central Bank of Sri Lanka
Income inequality	GINI	Gini coefficient estimated based in pre-tax national income based on individual adults (equal-split series)	World Income Inequality Database

was measured by the unemployment rate. The foreign remittance flow was measured by the emittance inflow as a percentage of GDP and the trade openness was measured by the sum of imports and exports.

Secondary data derived from annual reports published by the Central Bank of Sri Lank, World Development Indicators and the inequality data collected from the World Income Inequality Database were used in the analysis. Time-series data from 1980 to 2019 were used in the study covering 40 years. Parameters were estimated using the ARDL model to capture both the long-

run and short-run impacts of each specified tax on income inequality in Sri Lanka.

## 6. Model Specification

Various techniques for detecting the relationship between variables have been proposed in the literature. Recently, Autoregressive Distributed Lag (ARDL) models have been used to investigate the short-run and long-run effects of macroeconomic variables (Pokhrel & Khadka, 2019). Therefore, the Autoregressive Distributed Lag (ARDL) model will examine the tax structure's short-run and long-run effects on

income inequality in Sri Lanka, to investigate the short-run and long-run effects of tax structure on income inequality Error Correction Model (ECM) Bound Test is applied (Shafiq et al., 2021).

Before running any time series data analysis, check for the stationary of the data to prevent generating a spurious regression model (Ahmed, 2019). To check for stationary, the most widely used Augmented Dickey-Fuller (ADF) Test is applied (Cheung & Lai, 1995). This test was performed to check the stationarity of the variables. To incorporate an ARDL model, the stationarity of the considered variables should be at the level or first difference.

Since all datasets are stationary in the order of 1, variables can be further analysed. For an accurate analysis, the considered explanatory variables should be free from multicollinearity when there is a strong correlation between the explanatory

Factor (VIF) test was performed to confirm the absence of multicollinearity (Table 3). Since the Uncentered VIF values of all variables are less than 5, it confirms that variables are not correlated.

In specifying the ARDL model, it is vital to identify dynamic and fixed regressors. For dynamic regressors, the model will consider the impact of lagged values on the dependent variable, which is, in fact, the long-run relationship between the two variables, while for fixed regressors, the model will not consider any lagged values.

Variables such as value-added tax, excise tax, corporate income tax, personal income tax and import duty, economic growth, unemployment rate, foreign remittance, and trade openness are considered dynamic regressors where changes in those variables would affect the income inequality in the long run while there were no fixed regressors used in the analysis. Accordingly, the ARDL model specification consisted of the, Dynamic

**Table 2**  
**Unit Root Test**

Variable	Variable Name	Des Stat Mean (Var)	P value of ADF Test Statistic		Order of Integration
			Level	1 <sup>st</sup> Diff	
VAT	Value-added tax	31.433 (7.38)	0.2112	0.0000***	I (1)
ET	Excise Tax	19.52 (5.76)	0.0907*	0.0000***	I (1)
CIT	Corporate Income Tax	10.015 (2.23)	0.3666	0.0000***	I (1)
PIT	Personal Income Tax	4.438 (1.25)	0.1783	0.0000***	I (1)
ID	Import Duty	17.36 (8.09)	0.5520	0.0049***	I (1)
LNPER	Economic Growth	2.107 (0.238)	0.7385	0.0020***	I (1)
UNEM	Unemployment	8.81 (4.15)	0.6528	0.0023***	I (1)
RE	Remittance	7.06 (1.24)	0.1431	0.0000***	I (1)
LNTR	Trade Openness	9.43 (0.76)	0.3247	0.0000***	I (1)
GINI	Income Inequality	57.275 (2.77)	0.7796	0.0068***	I (1)

\*\*\*, \*\*, and \* implies the rejection of the null hypothesis of the presence of Unit Root at the significance level of 1%, 5%, and 10%, respectively.

variables within a multiple regression model (Suraneni et al., 2017). Hence, Variance Inflation

regressors in order: VAT, ET, CIT, PIT, ID, LNPER, UNEM, RE and LNTR.

**Table 3**  
**Testing for Multicollinearity**

Variable	Uncentered VIF
D(VAT)	2.435429
D(ET)	1.348293
D(CIT)	2.816808
D(PIT)	1.447185
D(ID)	2.101019
D(LNPER)	2.143679
D(UNEM)	3.776583
D(RE)	1.700453
D(LNTR)	2.410996

Accordingly, the mathematical model specification will be as follows:

$$\Delta GINI_t = \alpha_0 + \sum_{j=1}^4 \alpha_1 \Delta GINI_{t-1} + \sum_{j=1}^4 \alpha_2 \Delta VAT_{t-1} + \sum_{j=1}^4 \alpha_3 \Delta ET_{t-1} + \sum_{j=1}^4 \alpha_4 \Delta CIT_{t-1} + \sum_{j=1}^4 \alpha_5 \Delta PIT_{t-1} + \sum_{j=1}^4 \alpha_6 \Delta ID_{t-1} + \sum_{j=1}^4 \alpha_7 \Delta X_t + \gamma_1 GINI_{t-1} + \gamma_2 VAT_{t-1} + \gamma_3 ET_{t-1} + \gamma_4 CIT_{t-1} + \gamma_5 PIT_{t-1} + \gamma_6 ID_{t-1} + \gamma_7 X_t + \epsilon_t \tag{1}$$

Here the short run coefficients to be estimated are  $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$  and  $\alpha_7$ , while long run coefficients would be  $\gamma_1, \gamma_2, \gamma_3, \gamma_4, \gamma_5, \gamma_6$  and  $\gamma_7$ . Other independent variables are shown as  $X_t$ . The error term of the model will be  $\epsilon_t$ .

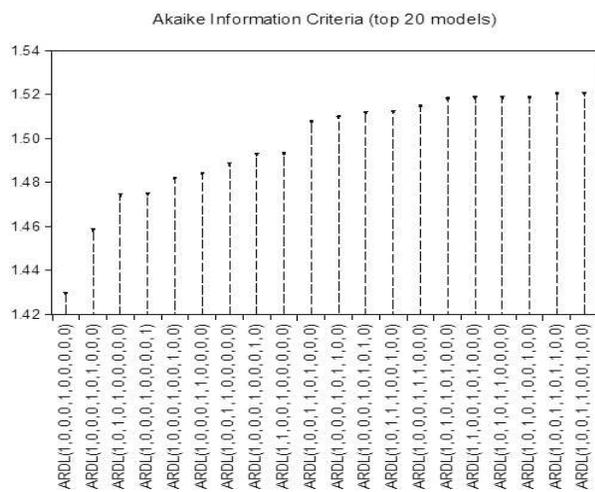


Figure 4: Lag Length Selection Criteria Graph

### 7. Analysis And Findings

In estimating the specified ARDL model, optimal lag length was determined through the Akaike Information Criteria. Accordingly, the model that resulted in the lowest AIC value was selected from among 20 models, and the ARDL (1, 0, 0, 0, 1, 0, 0, 0, 0, 0) model was estimated.

Subsequently, a Bounds test was conducted to analyse the long-run dynamics among the dynamic regressors specified.

**Table 4**  
**Bounds Test Results**

Test statistic	Value	Significance	I (0)	I (1)
F-statistic	5.460678	10%	1.8	2.8
k	9	5%	2.04	2.08
		2.5%	2.24	3.35
		1%	2.5	3.68

The estimated bound test statistic of 5.460678 was sufficiently large even at a 1% significance level, which strongly suggests a long run cointegrating relationship between the considered dynamic regressors. The extent of the relationship can be identified through the level's equation (Table 5). Value-added tax has a significant positive relationship with income inequality in Sri Lanka in the long run, which means a 1 percent increase in value-added tax leads 0.11 percent rise in income inequality. Excise tax has a significant positive relationship with income inequality in the long run; this implies that when excise tax increases by 1%, income inequality will rise by 0.18%.

Next, corporate income tax significantly negatively impacts income inequality in Sri Lanka, which means that when corporate income tax increases by 1%, income inequality will reduce by 0.23%. However, personal income tax has a statistically insignificant positive relationship with income inequality in Sri Lanka in the long run. However, import duty is significantly negatively associated with income inequality, where a 1 percent rise in

**Table 5**  
**Levels Equation**

Variable	Coefficient	Prob.
VAT	0.113646	0.0184**
ET	0.185228	0.0004***
CIT	-0.236061	0.0590*
PIT	0.397362	0.2324
ID	-0.089409	0.0848*
LNPER	-0.579244	0.7833
UNEM	0.024522	0.8786
RE	0.184109	0.6429
LNTR	0.846485	0.3069
C	44.19795	0.0082***

\*\*\*, \*\*, and \* implies the rejection of the null hypothesis of no long-run relationship at a significance level of 1%, 5% and 10%, respectively.

import duty will reduce income inequality by 0.08%.

Suppose we analyse the error correction equation for the short-run dynamics. In that case, the significant and negative coefficient for the cointegrating equation error correction term implies that the adjustment speed to long-run equilibrium is 0.65% (Refer to Table 4.3).

While most variables (VAT, ET, CIT, and ID) do not impact income inequality in the short run, personal income tax tends to affect income inequality in Sri Lanka negatively. The coefficient of the first difference of personal income tax implies that short-run elasticity, which says a 1%

**Table 6**  
**Error Correction form**

Variable	Coefficient	Prob.
D(PIT)	-0.153951	0.0421**
CointEq (-1) *	-0.651844	0.0000***

\*\*\*, \*\*, and \* imply the rejection of the null hypothesis of no relationship at a significance level of 1%, 5%, and 10%, respectively.

rise in personal income tax, reduces income inequality by 0.15%.

## 7.1 Stability Diagnostics

In this study, Cumulative Squares (CUSUM) and Cumulative Sum of Square (CUSUM of Squares) tests (Figure 5) were analysed to confirm the stability of the estimated model. Since the recursive residuals lie between the 5% significance level critical boundaries, the selected ARDL model is concluded to be stable.

## 7.2 Residual Diagnostics

### 7.2.1 Normality of errors

The normality of the residuals was confirmed through the Jarque-Bera normality test (Figure 6). The Jarque-Bera statistic was 0.655701 with a probability value of 0.720471.

As the probability value exceeds 0.05, the null hypothesis of a normal distribution of errors is accepted, confirming the normality of errors.

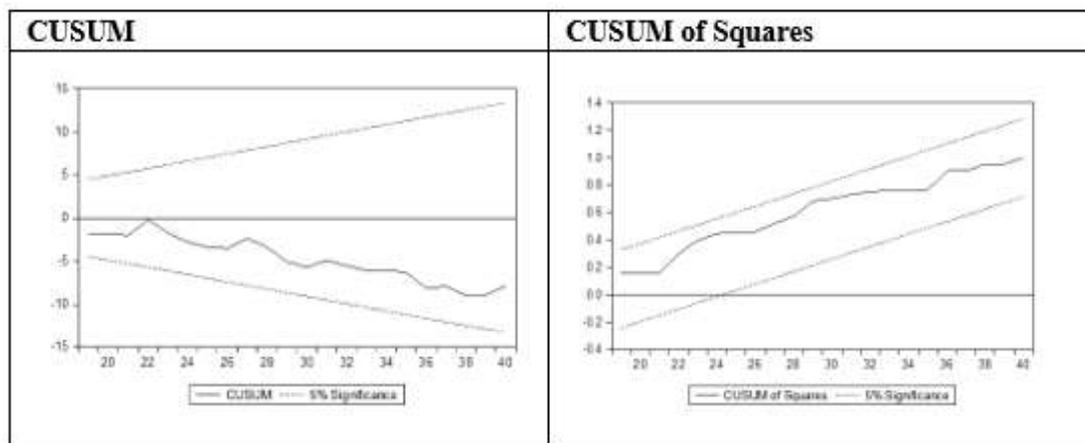


Figure 5: CUSUM and CUSUM of Squares test

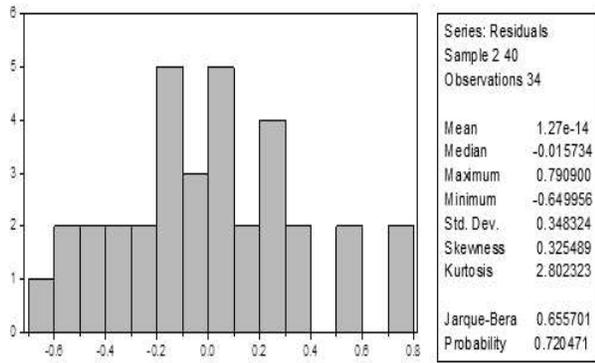


Figure 6: Jarque-Bera Normality Test

**7.2.2 Serial correlation of error terms**

Breusch-Godfrey LM test was conducted to confirm the absence of serial correlation among error terms (Table 7).

Since the probability value of the observed R<sup>2</sup> statistic (0.6245) is greater than 0.05, we accept the null hypothesis of no serial correlation among the error terms.

**Table 7**  
**Breusch-Godfrey Serial Correlation LM Test**

F-statistic	0.1490	Prob. F (1,21)	0.703
Obs*R-squared	0.2396	Prob.Chi-Square (1)	0.625

**Table 8**  
**Heteroskedasticity Test**

F-statistic	0.9141	Prob. F (11,22)	0.544
Obs*R-squared	10.665	Prob.Chi-Square (11)	0.472
Scaled explained SS	4.0240	Prob.Chi-Square (11)	0.969

**7.2.3 Heteroskedasticity**

The Breusch-Pagan-Godfrey test was used to identify if the assumption of homoscedasticity of error terms is violated (Table 8).

Since the probability value of the observed R<sup>2</sup> statistic (0.4717) is greater than 0.05, we can accept the null hypothesis of homoscedasticity and conclude that the model is homoscedastic.

**7.2.4 Ramsey RESET Test**

Ramsey RESET Test was used to validate that we have enough variables in the model. The null hypothesis states that for the model to be free from omitted variables bias, the probability value should be greater than 0.05. Since the probability value (0.8404) of the test is greater than 0.05 (Table 9), it is confirmed that there is no need to add additional variables to the model.

**8. Discussion of the Results**

The result from the estimated model is mainly in support of the existing literature. While the theory of tax incidence shows that the level and the structure of tax affect the income distribution of a county, the optimum tax theory postulates that a mix of direct and indirect taxes affects income redistribution.

Confirming this, the results of the study show that four out of five taxes make a significant impact on income inequality in Sri Lanka in the long run.

**Table 9**  
**Ramsey REST Test**

	Value	df	Probability
t-statistic	0.2039	21	0.8404
F-statistic	0.0416	(1, 21)	0.8404

According to the results, VAT has a significant positive association with income inequality in Sri Lanka in the long run. This result implies that VAT has increased the income inequality in the long run. This derived result is in line with Aasness et al. (2002); Drucker et al. (2017); and Thilanka & Ranjith (2021). However, the result contrasts with Erero (2015) which shows a negative association between VAT and income inequality.

On the other hand, the result of the study reveals that excise duty has a significant positive impact on income inequality in the country. This contradicted the results of Martinez-Vazquez et al. (2012) who identified a strong negative association between excise duty and income inequality. Import duty on the other hand is negatively associated with income inequality of the country. Results are in line with

Cicowiez et al. (2009); Claus et al. (2012); and Martinez-Vazquez et al. (2012) who found a positive association between import duty and income inequality.

Compared to indirect taxes both direct taxes taken into the analysis do not make a significant impact on the income inequality of the country. Personal income tax makes a positive but not significant impact on income inequality. This confirms the results found by Engel et al., (1999); Immanuel et al, (2012). However, (Drucker et al., (2017); and Martinez-Vazquez et al. (2012) have shown that personal income taxes are negatively associated with income inequality.

On the other hand, the association between corporate income tax and income inequality was found to be negative. However, the effect was found not significant. This result is in line with Drucker et al. (2017); and Israel & Ebimobwei (2021). However, studies by Anyaduba & Otulugbu (2019); and Claus et al. (2012) have shown that the corporate income tax makes a significant positive impact on income inequality in an economy. Other than the main variables of interest, control variables such as economic growth, unemployment, remittances, and openness of the economy are shown to be insignificant. They do not have a strong association with the income inequality of the country. However, in the short run all taxes except personal income tax, do not make a significant impact on the income inequality of the country. Personal income tax has a significant negative impact on income inequality. An increase in the personal income taxes lowers income inequality improving the income distribution in the short run. However, as discussed above it does not make any significant impact on income inequality in the long run.

## 9. Conclusion

The study examined the impact of tax structure on income inequality in Sri Lanka in both the long run and short run. The results related to the long run show a mixed result about tax structure on income inequality, where value-added tax and excise tax have a statistically significant positive association with income inequality in the long run. While

personal income tax has a positive but insignificant association with income inequality in the long run. On the other hand, corporate income tax and import duty have a statistically significantly negative association with income inequality in Sri Lanka in the long run. But, in the short run, except for personal income tax, all other taxes do not affect income inequality, whereas personal income tax is significantly negatively associated with income inequality in the short run.

Therefore, focusing more on rising corporate income tax and import duty is recommended to reduce income inequality in Sri Lanka. However, personal income tax increases income inequality. As per the literature, it was identified that positive sign arises mainly due to weak law and order, increasing the chances of tax evasion. Therefore, tax authorities in Sri Lanka need to implement relevant laws and monitor tax payments thereby reducing tax evasion and improving income distribution. Since the value-added tax has a positive relationship, it can be recommended that a reduction of VAT on essential consumption commodities usually consumed by low-income families can enhance the welfare of households by reducing poverty.

The result of this study is important as it focused on an underexplored area related to the Sri Lankan context. The effect of tax structure on income inequality in Sri Lanka has not been examined sufficiently in the literature (Thilanka and Ranjith, 2021). Few studies available focus on the effect of the income tax. On the other hand, most studies on the association between tax and income inequality, have not examined both short- and long-term effects of taxes. The results of this study are significant as this study has found both short- and long-term impacts of tax structure on income inequality.

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