Impact of Taxes on Economic Growth and SDG Trajectory in Sri Lanka

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Abstract

Taxes play an extraordinary role in a country's policymaking and economic growth. This study investigates the impact of direct and indirect taxes on economic growth in Sri Lanka. The impact of both direct and indirect taxes on economic growth in Sri Lanka was analyzed by employing the autoregressive distributed lag (ARDL) approach using time series data from 1990 to 2022. The results of the analysis suggest a positive and significant impact of indirect taxes on economic growth in the short-run, but a negative impact in the long-run. Direct taxes have a negative and significant impact on growth in the short-run and the long-run. The results of the paper indicate that the tax structure in Sri Lanka does not help enhance the country's economic growth, thereby delaying its progress toward achieving the Sustainable Development Goals (SDGs).

Keywords: *ARDL, Direct taxes, Economic growth, Indirect taxes, Sri Lanka*

1. Introduction

Fostering long-term, inclusive, and sustainable economic growth, ensuring full and productive employment has been recognized as theThe eighth Sustainable Development Goals (SDGs) The SDG-8 emerges as a pivotal and influential component due to its extensive interlinkages with other SDGs. The achievement of most SDGs is contingent upon realization of sustainable economic development and the attainment of full employment. Facilitation of economic growth and creation of employment opportunities necessitate active involvement of governments worldwide. Governments, in their pursuit of participating effectively in development activities, require a substantial revenue stream. Taxes stand out as the primary and most conventional source of government revenues virtually in every country. Both direct and indirect taxes are utilized by governments to generate the required funds. The correlation between taxation (direct and indirect taxes) and economic growth constitutes one of the most critical and extensively researched subjects in economics (Alinaghi, 2017; Baiardi, 2019; Elshani & Pula, 2023; Lich *et al*, 2021; Padovano & Galli, 2001). No research has been conducted on the impact of different taxes on the SDG trajectory through economic growth in the post-COVID-19 and economic crisis in the context of Sri Lanka.

The government of Sri Lanka apparently lacks attention to the fact that altering the tax structure can make a significant impact on key economic indicators such as economic growth, employment rates, inflation, export and import dynamics, balance of payments, budget deficit and trade deficit. In the specific context of Sri Lanka, the present study makes an in-depth analysis of the impact of taxes on economic growth and the trajectory of SDGs. The primary objective is to ascertain whether modifications in both direct and indirect taxes can make a positive or negative influence on the overall economic growth and the path toward achieving SDGs.

This exploration vital for policymakers as it provides a nuanced understanding of how tax-related decisions can shape the country's economic landscape and impact progress towards sustainable development goals. By gaining insights into the intricate relationship between taxation policies and economic growth, policymakers can make well-informed decisions that align with broader objectives of sustainable development.

2. Theory related to taxes and economic growth

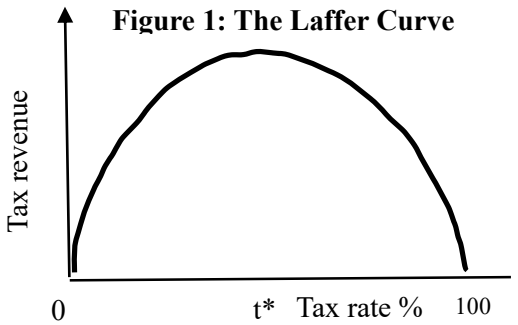
Taxes have been defined in many ways in the literature, reflecting the diverse perspectives (Anyanwu, 1993; Bhartia, 2009; Appah & Oyandonghan, 2011; Angahar & Alfred, 2012; Chigbu *et al.,* 2012; Salami *et al*., 2015). They are compulsory payments (Appah, 2010) and a major source of income for the government (Chigbu *et al*, 2012; Chigbu & Njoku, 2015). Tax revenues play a pivotal role in funding

developmental initiatives (Minh *et al*, 2022; Myles, 200) and addressing socio-economic disparities, acting as a mechanism to narrow the gap between the affluent and the less privileged (Kalas *et al.*, 2018). There are two different types of taxes: direct taxes and indirect taxes. Effects of these two types of taxes vary depending on the economic development of a country and optimal level of tax rates.

There are three main theories to investigate relationship between taxation and economic growth: (i) optimal taxation theory, (ii) neoclassical exogenous theory, and (iii) endogenous growth theory.

Optimal taxation theory revolves around the design of tax rates to maximize societal welfare within specified constraints (Mankiw *et al*., 2009). A pivotal aspect of optimal taxation theory is the consideration of the Laffer curve effect. *Laffer Curve*[1], which shows a theoretical explanation of the relationship between tax rates set by a government and the tax revenue collected at that tax rate, says that there is no tax revenue collection at the two extreme tax rates of 0% and 100%. However, there is one optimal tax rate between both these extremes that maximize tax revenue collection. One of the main assumptions of the theory is that if taxation on a certain activity, such as production, is increased beyond a certain point, less of it is produced. Beyond the optimal tax rate, workers start to believe that their extra efforts are resulting in lower additional income. Thus, they work less and spend more on leisure, income falls, and tax collection decreases. T* is the optimal tax rate that a government should aim to achieve.

Figure 1: The Laffer Curve



The neoclassical growth theory stipulates that capital accumulation and labor are the main drivers of growth in the long run. The Solow model is one of the examples of the neoclassical exogenous growth theory. According to the exogenous growth model, taxes imposed by the government can have an impact on economic growth through savings and investment. Taxes exhibit a positive impact on government capital accumulation but exert a negative influence on private capital accumulation

[1] The idea is credited to economist Dr. Arthur Laffer, although Laffer himself notes that philosopher Ibn Khaldun first introduced the concept as '*Khaldun Curve'*, in The Muqaddimah, a 14th-century text. John Maynard Keynes also wrote about it in his economic works.

and labor (Arnold *et al.* 2011).

Endogenous growth models describe the relationship between taxation and economic growth through the medium of technological progress. According to endogenous growth models, taxes will cause inefficiency and distortion in the product and input markets particularly the labour market and create Deadweight Loss (DWL) to society (Barro, 1990).

Based on the simple macroeconomic model (Y = C + I + G + X – M: Y = income C = private consumption I = private investment G = government spending X = exports and M = imports), economic growth is linked to taxation through economic agents' decision, which is influenced by the changes in tax. Taxation generates revenue for the government, controls economic activity, and promotes economic growth (Minh Ha *et al.*, 2022).

However, theoretically, a negative effect is predictable since the increased tax rates constrain individual taxpayers' ability to contribute to economic progress, while the same holds for business companies, since greater taxes may limit their capacity to release more goods onto the market. Taxes impact household income and economic production. The taxpayer's capacity to labour is significantly reduced when taxation is high. Additionally, because higher taxes will significantly cut their income, many doubt their decision to put in additional hours at the office and spend more hours for leisure. Corporate taxes will reduce producers' surplus and reduce private investment and spending on research and development. Higher corporate income tax rates will reduce real GDP and increase price levels, resulting in less investment and moving aggregate demand curve to the left. According to some research, high tax rates discourage labour, savings, and investment and harm economic development. In line with achieving SDGs, corporate social and sustainability practices such as lowering greenhouse gas emissions, encouraging workplace diversity, and implementing ethical business practices, are discouraged by high corporate tax rates (direct taxes) due to negative effect on profitability, and high VAT (indirect taxes) since higher indirect taxes create inflation which results reducing demand for production and shifts the aggregate demand curve inwards. High direct taxes can restrict the resources available for firms to engage in sustainable practices by reducing their disposable income (Balasouu *et al*. 2023). Individuals and corporations may be compelled to engage in shadow economic activity to avoid paying taxes if direct taxation is high (Davidescu & Schneider 2019, Medina & Schneider, 2018). Investors may move out of the country and settle down their businesses outside the country. Foreign Direct Investments (FDIs) may also move out of the country.

A positive effect can also be anticipated, given the pivotal role the government plays in an economy. Tax revenue serves as a crucial source of funding for essential sectors

such as infrastructure, health, education, and basic information technology investments, with the expectation of generating future gains in economic productivity. These activities lay the groundwork for creating a conducive business environment, wherein businesses are more inclined to increase their investments, and FDI flow into the country, resulting in heightened production and productivity, leading to increased exports. Income disparity may also be addressed through taxes, enhancing social cohesion and minimizing social discontent, resulting in a more stable and prosperous economy. However, the success of this fiscal policy channel hinges on the wisdom and effectiveness with which the government allocates and spends the tax revenue. Wise and strategic investments in these key areas are fundamental to realizing positive economic outcomes envisioned in this theoretical framework.

Therefore, in favour of collecting more taxes, it is argued that raised tax would provide funding for enhancing a conducive competitive business environment and generating future economic productivity gains (Mendoza *et al,* 1997). However, in case of government inefficiency and government failure worse scenarios would be created, resulting in a negative effect on economic growth in long-run.

3. Emperical literature

SDGs comprehensively address issues relating to economic development across three vital dimensions of: (i) economic, (ii) social, and (iii) environmental sustainability. The foundation for heightened sustainable development and the attainment of SDGs lies in robust economic growth. Numerous studies have corroborated the connection between economic growth and the progress toward SDGs. Singh *et al*. (2022) provided evidence that GDP growth fosters certain SDGs, notably due to synergistic effects. Specifically, they noted a beneficial impact on goals such as industrialization (SDG 9) and the promotion of decent work (SDG 8). However, this growth also corresponds with increased greenhouse gas emissions, posing a challenge to climate action (SDG 13). Similarly, Elfaki et al. (2021) study, confirmed that rising GDP rates positively correlate with industrial and employment advancements. On the flip side, economic expansion tends to decrease poverty (SDG 1) and hunger (SDG 2) (Zhu, *et al*., 2022). Additionally, Zhu *et al*. (2022) further explained that economic growth contributes to improved healthcare outcomes, reducing mortality rates (SDG 3), and advances in gender equality (SDG 5). These findings illustrate the multifaceted impact of economic growth on achieving various SDGs. Taxes emerge as pivotal instruments within the economic landscape, serving as a critical component in contemporary business dynamics, with their significance underscored by the principles of stability and predictability (Kalaš *et al*., 2016).

A wealth of empirical studies have examined the optimal level of taxation (Jones *et al.* 1993, Mankiw, et al. 2009) and the impact of taxes on economic growth across a range of countries, including both developed (Balasoiu *et al*, 2023; Helms, 1985;

Padovano & Galli, 2011; Romer & Romer, 2011)) and developing nations (Ibadin & Oladipupo, 2015; Kalaš, *et al*, 2018; Rahul, 2015). However, the present study specifically scrutinizes the effects of taxes on economic growth within a single country. Table 1 summarizes key conclusions of recent empirical studies. The majority of the studies conducted in different countries found a negative impact on the economic growth in the long run.

Table 1: Previous studies on the impact of taxes on economic growth

	Sample	Effect	Key results
Helms (1985),	USA, Time series	Negative	Revenue used to fund transfer payments, & slows growth
Padovano & Galli (2001)	23 OECD countries, panel data	Negative	Effective marginal income tax rates are negatively correlated with GDP growth
Tomljanovich (2004)	USA, Time series	Negative	Higher tax rates negatively affect short-run growth, but not long-run growth
Lee & Gordon (2005)	70 countries, panel data	Negative	Reducing corporate income tax by 1% raises annual growth by 0.1% to 0.2%
Tosun & Abizadeh (2005)	23 OECD countries, panel data	Direct tax: negative Indirect: positive	Shares of personal and property taxes have responded positively to economic growth, while the shares of payroll and goods and services taxes have reflected a relative decline.
Bania, Gray & Stone (2007)	USA, Time series	Negative	Taxes directed towards public investments were first added then subtracted from GDP
Alesina & Ardagna (2010)	23 OECD countries, panel data	Negative	Tax cuts enhance growth more than increased consumption
Romer & Romer (2011)	USA	Negative	Tax increase of 1% GDP leads to a fall in output of 3% after 3 years
Gemmell, Kneller & Sanz, (2011)	17 OECD countries, panel data	Negative	Taxes on income and profit are most damaging to economic growth over the long run.
Arnold, Brys, Heady, Johansson, Schwelnuss & Vartia (2011)	21 OECD countries, panel data (1971-2004)	Negative	Corporate taxes are most harmful, followed by personal income tax, consumption and property tax

Barro & Redlick (2011)	USA (1912-2016), Time series	Negative	Cut in the average marginal tax rate of 1% raises GDP per capita by 0.5% in the next year
Ferede & Dahlby (2012)	Canada (1977-2006), Time series	Negative	Reducing corporate income tax by 1% raises annual growth by 0.1 to 0.2%
Ibadin & Oladipupo (2015)	Nigeria (1981-2014), Time series	Positive	VAT and petroleum profit tax have a positive and significant relationship on GDP
Onakoya Afintinni (2016)	Nigeria (1980-2013), Time series	positive/ negative	There is a significant positive relationship between petroleum profit tax, company income tax and economic growth. Insignificant relationship was perceived between customs, excises and economic growth
Kalaš, Mirović, & Milenković, (2018)	Serbia & Croatia (2007-2016), panel data	No significant impact	Personal income tax and corporate income tax do not have significant impact on GDP.
Ahmad et al. (2018),	Pakistan (1974-2010), Time series data	Negative	1% increase in indirect tax was associated with a 1.68% reduction in economic growth.

Source: Developed by the Authors based on the literature, 2023.

Both empirically and theoretically, research on the relationship between taxes and economic progress is complicated and inconsistent, with contradictory findings being recorded. The need for further investigation arises to comprehensively understand how taxes influence economic development across diverse contexts. A more nuanced exploration is essential to identify the most effective tax policies that can genuinely foster economic growth and development. Some scholars suggested the government prioritizes direct tax, whereas many other scholars recommended the government focus on indirect tax to promote economic growth. For example, Bhattarai (2010) concluded that OECD countries with a high tax-GDP ratio generally have lower growth rates. Arnold *et al*. (2008) propose that economic growth can be increased by gradually shifting the tax base towards consumption and immovable property. Pertaining to the optimal amount of tax rates, Besley and Persson (2014) emphasize that low-income countries collect taxes between 10% and 20 % of GDP, while the average for high-income countries is more like 40%.

Ahmad *et al*. (2018), studying Pakistan data, observed that 1% increase in indirect tax was associated with a 1.68% reduction in economic growth. In the Nigerian

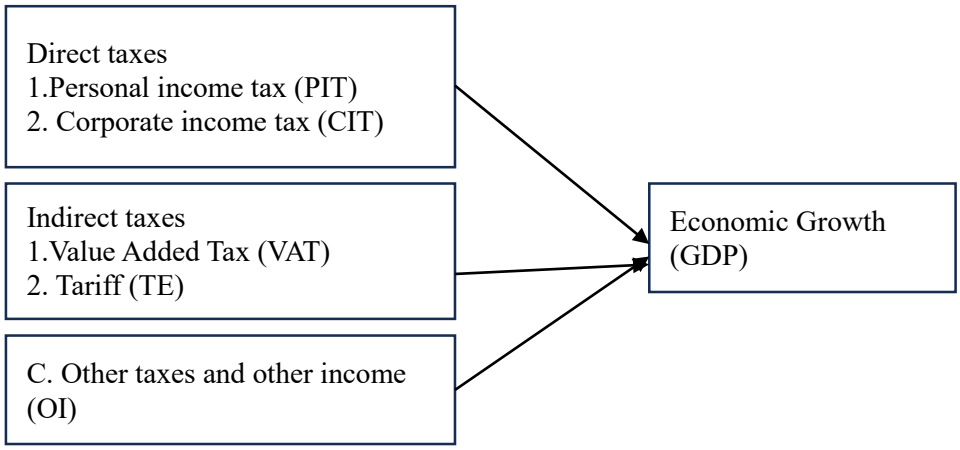
context, Ogundana *et al*. (2017) found an insignificant relationship between direct tax and economic growth, while indirect tax demonstrated a positive and significant impact. These findings were echoed by Owino (2018). Macek (2014), studying OECD countries, proved that the corporate income tax and personal income tax (both direct taxes) had the most negative impact on the economy. Macek (2014) was of the opinion that to promote economic growth, OECD countries needed to lower tax rates of personal income tax and corporate income tax and increase indirect tax to compensate for the losses from reduced income taxes. Nguyen *et al.* (2021) concluded that in the short run, if the average income tax rate was reduced by one percentage point, GDP would increase by 0.78% immediately after the tax change. After four quarters from the shock introduced (income tax reduction), GDP would increase by 1.5%. Mertens & Ravn (2013) found that a one percentage point reduction in the average personal income tax rate led to a rise in real GDP per capita of 1.4% at the impact level and up to 1.8% after three quarters. In terms of the multiplicative effect on the economy, a change in individual income tax rates that results in a 1% drop in tax collections increases GDP by 2.5%. Barro and Redlick (2011) found that 1% decrease in the marginal tax rate leads to an increase of approximately 0.5% in gross domestic product per inhabitant the following year. Ferede and Dahlby (2012) found that cutting the corporate rate by 10% increases the annual per capita growth rate by 1-2%. Mertens and Ravn (2013) who analyzed post-war tax changes in the USA found that 1% cut in the average personal income and corporate tax rate increases real GDP per capita by 1.4% and 0.6% respectively. Hunady and Orviska (2015) found a positive effect of corporate taxes on economic growth and have supported previous studies such as Mutascu *et al*. (2007) and Kotlan *et al*. (2011). Li and Lin (2015), analyzing the effect of sales tax on economic growth in the United States from 1960-2013, found that economic growth responds negatively to sales tax in the long-run, although this tax form has positive effects in the short-run.

The present paper examines three vital tax forms prevalent in Sri Lanka: personal income tax, corporate income tax, and value-added tax (VAT), spanning the temporal scope from 1990 to 2022. An analysis measures the impact of taxes on GDP which is a proxy for economic growth. The following five hypotheses are proposed for further testing.

H1: Personal Income Tax has a negative impact on economic growth in Sri Lanka.
H2: Corporate Income Tax has a negative impact on economic growth in Sri Lanka
H3: Value-added tax (VAT) has a negative impact on economic growth in Sri Lanka.
H4: Direct tax (DT) has a negative impact on economic growth in Sri Lanka.
H5: Indirect Tax (IDT) has a negative impact on economic growth in Sri Lanka.

Figure 2 presents the conceptual framework of this study.

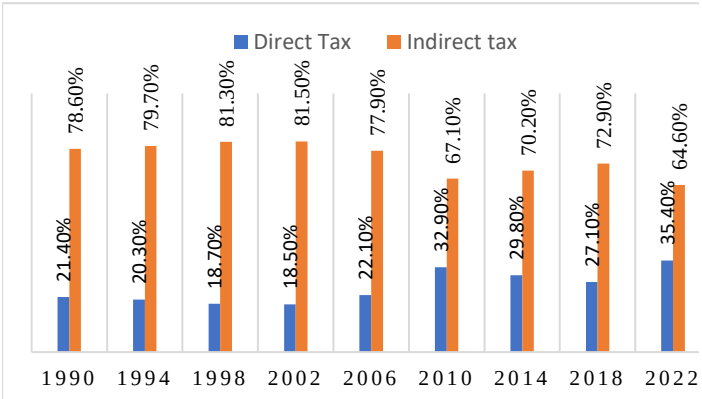
Figure 2: Relationship between economic growth and different types of taxes.



4. Tax Trends and Structure in Sri Lanka

The Sri Lankan government primarily generates its revenues from two main sources: tax income and non-tax income. In 2022, tax income was the dominant contributor, accounting for 85.5% of the total revenue. On the other hand, non-tax income contributed only 11.5% to the total revenue (Central Bank of Sri Lanka, 2023). Non-tax revenues include fees, charges for services provided by the government, profits from state-owned enterprises, and grants. The significant difference between the contributions of tax and non-tax incomes highlights the dependence of the Sri Lankan government on taxation as its primary fiscal resource revenue (Central Bank of Sri Lanka, 2023).

Figure 3: Composition of tax revenue in Sri Lanka – 1990-2022



Source: Prepared by Authors based on CBSL data

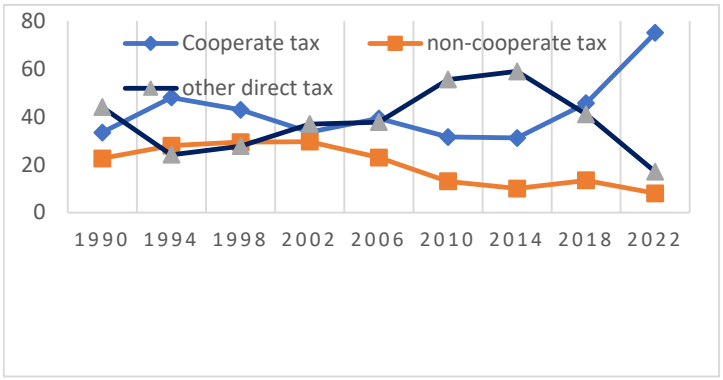
Sri Lanka's tax revenue structure experienced a significant transformation between 1990 and 2022, as depicted in Figure 3. In 2022, indirect taxes constituted a larger portion of Sri Lanka's tax revenue, amounting to LKR

1,131,385 million, while direct taxes contributed a significant but a lesser sum of LKR 619,747 million (Central Bank of Sri Lanka, 2023). Tracing back to 1990, the scenario was notably different. At that time, indirect taxes dominated the tax revenue with a substantial 80% share. Direct taxes only made up a meager 20%. This disparity highlights heavy reliance on indirect taxation three decades ago. However, over the years, there has been a gradual shift in this taxation pattern. The share of indirect taxes consistently decreased from its 80% dominance in 1990 to 65% in 2022. Correspondingly, the contribution of direct taxes saw a steady rise, climbing from 20% in 1990 to 35% in 2022. This shift indicates a strategic rebalancing in the tax structure of Sri Lanka. The increasing prominence of direct taxes could be indicative of a concerted effort to bolster tax fairness. However, a lingering question remains: does this pursuit of tax fairness come at the expense of economic growth?

In Sri Lanka, the framework of direct taxation comprises several key components, crucial for the nation's revenue generation. Sri Lanka's direct tax revenue primarily stems from personal income tax and Pay-As-You-Earn tax (PAYE-Tax), which are levied on individual earnings. Corporate income tax forms a significant part of the tax base, targeting business profits (Thilanka & Ranjith, 2021). Additionally, the government imposes taxes on interests and professional incomes. This includes specific taxes on professionals like doctors, engineers, and accountants, who contribute to the revenue based on their professional earnings.

The total direct tax revenue amounted to LKR 619,747 million, which comprised three main components: corporate tax, non-corporate tax, and other taxes (including tax on interest, capital gains tax, and others). Corporate tax was the leading contributor in this category, accounting to LKR 464,443 million of the total direct tax revenue in 2022. The 'other taxes' category, encompassing various forms of direct taxation such as interest and capital gains, contributed LKR 105,767 million. Meanwhile, non-corporate tax, which includes taxes levied on individuals and entities other than corporations, added up to LKR

Figure 4: Composition of direct tax revenue in Sri Lanka – 1990-2022



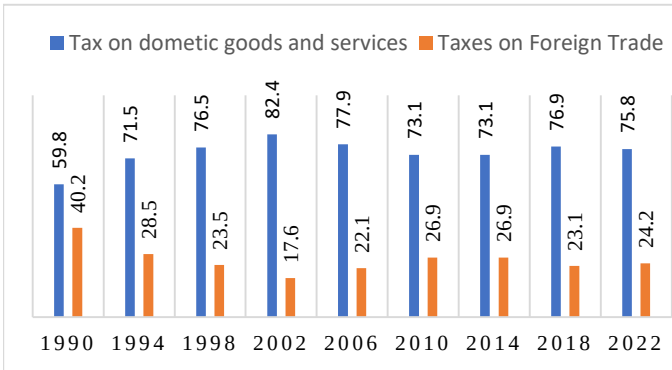
Source: Prepared by Authors based on CBSL data

49,537 million. This distribution marks a significant transformation from the tax structure in 1990. Back then, other direct tax sources were predominant, constituting 44% of the direct tax revenue as depicted in Figure 3. Corporate tax contributed a smaller share of 33%, and non-corporate tax made up 26% of the direct tax revenue. However, by 2022, corporate tax emerged as the dominant source of direct tax revenue, indicating a shift in the economic landscape and tax policy. The increase in corporate tax share reflects the growing significance of corporate entities in Sri Lanka's economy and potentially the government's focus on tapping into corporate earnings for tax revenue.

In 2022, Sri Lanka's indirect tax revenue was recorded at LKR 1,131,385 million, indicating the government's dependence on this tax category. This sum was further broken down into two significant segments: taxes on domestic goods and services, and taxes on foreign trade. A predominant share of LKR 857,459 million came from taxes on domestic goods and services, underscoring the robustness of internal trade and consumption-based tax collection. Taxes on foreign trade contributed LKR 105,767 million, reflecting the country's engagement in international trade and the levies associated with it.

The historical changes in the structure of indirect tax sources in Sri Lanka, as illustrated in Figure 4, are particularly noteworthy. In 1990, the tax on domestic goods and services accounted for 59% of the indirect tax revenue, a significant figure, yet this proportion escalated to an even more dominant 76% by 2022. This considerable growth in the tax share from domestic goods and services is indicative of the expanding internal market and the government's increasing ability to harness revenue from domestic trade activities. Conversely, the share of taxes on foreign trade declined from 41% in 1990 to 24% in 2022. These statistics not only showcase the changing landscape of Sri Lanka's tax revenue sources but also hint at broader economic shifts within the country. The expansion of tax on domestic goods and services as a share of indirect tax revenue indicates the increase of VAT and other

Figure 5: Composition of indirect tax revenue in Sri Lanka – 1990-2022



Source: Prepared by Authors based on CBSL data.

taxes. Conversely, the decrease in the proportion of foreign trade taxes reflects the stagnation of foreign trade.

5. Methodology

The analysis is conducted for the period covering 32 years from 1990 to 2022 in Sri Lanka. Data was collected from annual reports of the Central Bank of Sri Lanka and International Monetary Fund databank. Mean values of selected variables are presented in Table 2.

Table 2: Mean values of selected variables

Variables	Description of the variable	Mean (LKR millions)	Standard Deviation
Gross domestic product (GDP)	GDP at the current market price	6146874	6479766
Personal income tax /Non-cooperate tax	Tax on net income of resident individuals	22056.15	16727.61
Corporate income tax	Tax on the taxable income of resident companies and public cooperations	84939.48	103886
Other direct tax	The sum of tax on interest, tax on capital gains, stamp duty and excess levy	79596.45	81862.16
Tax on goods and services	Value Added Tax (VAT) and Excise tax	341007.7	293928.8
Tax on foreign trade	Import duty	122127.5	109043.5
Direct Tax (DT)	The sum of corporate tax, non-corporate tax.	186592.1	186254.1
Indirect Tax (IDT)	Sum of tax on foreign trade and tax on goods and services	463135.2	400033.2
Non-tax revenue	Sum of current revenue and capital revenue	80466.94	80466.94

Source: Prepared by Authors

The analysis started with the Augmented Dickey-Fuller unit root test to check the stationary nature of the data set. The results of the Augmented Dickey-Fuller unit root are presented in Table 3. Except GDP at the current market price, all other variables are non-stationary at 5% critical values.

Table 3: Results of the augmented dickey-fuller test

Variable (row values)	Calculated t value
Corporate tax revenue	2.775*
Non-corporate tax	-1.064
Other direct taxes	-1.490
Direct tax	0.098
Tax on goods and services	-0.181
Tax on foreign trade	0.127
Indirect tax	0.147
Non-tax revenue	-0.660
GDP at the current market price	4.134**

***Stationary at 5% critical value, *Stationary at 10% critical value*
Source: Prepared by Authors

The effect of the direct tax revenue and indirect tax revenue on the GDP (the fourth and the fifth hypotheses) was tested using equation 01.

$$GDP_t = \beta_0 + \beta_1 DIRECT\ TAX\ REVENUE_t + \beta_2 INDIRECT\ TAX\ REVENUE_t + \beta_3 NON - TAX\ REVEUE_t + \varepsilon_t \ldots\ldots(1)$$

Due to the non-stationary nature of all independent variables in their levels, the stationarity of the dependent variable *(I(0))* selected for equation 01, the ARDL model is employed to test the impact of direct and indirect tax revenue on GDP. The ARDL model is presented in equation 02.

$$GDP_t = \beta_1 \pm \sum_{i=0}^{k} \beta_2 Direct\ Tax\ Revenue_{t-i} \pm \sum_{i=0}^{k} \beta_3\ Indirect\ Tax\ Revnue_{t-i} \pm \sum_{i=0}^{k} \beta_4 Non - Tx\ Revenue_{t-i} \pm \varepsilon_t^C \ldots\ldots (2)$$

The ARDL model, presented in equation 02, is expanded to include the impact of tax on GDP at more disaggregated level (equation 03). Hypotheses 1, 2, and 3 were tested by using equation 03.

$$GDP_t = \beta_1 \pm \sum_{i=0}^{k} \beta_2 Cooperate\ tax\ revenue_{t-i} \pm \sum_{i=0}^{k} \beta_3\ non - cooperate\ tax_{t-i} \pm \sum_{i=0}^{k} \beta_4 other\ Direct\ Tax\ Revenue_{t-i} \pm \sum_{i=0}^{k} \beta_5 Tax\ on\ goods\ and\ services_{t-i} \pm \sum_{i=0}^{k} \beta_6 Tax\ on\ foreign\ trade_{t-i}\ \varepsilon_t^C \ \ldots\ldots (3)$$

The authors conducted a comprehensive analysis of serial correlation and heteroskedasticity in their study. The Durbin Watson statistic was employed to assess serial autocorrelation, revealing a value of 1.89. This result led to the conclusion that there is no significant serial correlation among the selected variables. Additionally, the examination of heteroskedasticity involved the use of Cameron and Trivedi's decomposition of the IM test, with Table 4 presenting the results. The findings from this test indicate the absence of heteroskedasticity issues in the residuals. This rigorous examination enhances the reliability of the study's results and underscores the robustness of the statistical methods employed.

Table 4: Results of the Cameron and Trivedi's decomposition of IM test

$\boldsymbol{Chi^2}$			29
Prob>$\boldsymbol{Chi^2}$			0.4125
Source	Chi^2	df	p
heteroskedasticity	29	28	0.4125
Skewness	10.23	27	0.9985
Kurtosis	-1395.45	1	1.0000
Total	-1356.21	56	1.0000

Source: Prepared by Authors

The long run relationship between the selected variables is tested using the results of the bound test (Table 5). Calculated F and t values are 0.555 and 0.940. As the F stat is less than the critical F value given in the Table 5, selected variables are not cointegrated.

Table 5: Results of the bound test

Bound	L1		L0.05		L0.25		L0.1	
	F	t	F	t	F	t	F	t
I(0)	2.12	-2.58	2.45	-2.86	2.75	-3.13	3.15	-3.43
I(1)	2.23	-4.04	3.61	-4.38	3.99	-4.66	4.43	-4.39

Source: Authors' calculations

The maximum lag length of all the variables was selected using the Akaike information criterion (AIC).

6. Results and discussion

The estimated results of the equation 2, impact of direct and indirect tax on GDP in Sri Lanka, are presented in Table 6 (model 1) and the model is well fitted as the F value is 2096 and according to the R^2, 99 % of the variations in the dependent variable, that is the GDP, is explained by the selected independent variables.

Table 6: Impact of direct and indirect tax revenue on GDP (Model 1)

Variable	Coefficient	t value
Constant	-17551. 66	-0.10
GDP(-1)	1.39**	3.17
GDP(-2)	0.31	0.63
GDP(-3)	-0.89*	-2.01
GDP(-4)	0.50	0.90
Non-tax revenue	8.45*	2.15
Non-tax revenue (-1)	-3.64	-0.46
Non-tax revenue (-2)	-1.86	-0.16
Direct tax revenue	-0.07	-0.03
Direct tax revenue (-1)	-1.0	-0.47
Direct tax revenue (-2)	-7.63**	-2.89
Direct tax revenue (-3)	17.91**	3.62
Direct tax revenue (-4)	-19.15**	-2.97
Indirect tax revenue	5.19**	2.96
Indirect tax revenue (-1)	-11.69**	-3.98
Indirect tax revenue (-2)	7.48	1.70
Indirect tax revenue (-3)	-4.12	-0.71
Indirect tax revenue (-4)	3.19	1.13

Source: Authors' calculations

The current year GDP is positively and significantly affected by the previous GDP (Table 6: Model 1). When the GDP increased by one million in last year, the current GDP increased by LKR 1.39 million. However, the third lag of the GDP affects the current GDP negatively and significantly. When the GDP increased by one million two years ago, GDP in the current year decreased by LKR 0.87 million.

The impact of direct tax revenue on the GDP is long-lasting compared to the indirect tax

revenue and impact of direct tax on GDP shows mixed results (Table 06). Impact of the direct tax revenue of the current period will appear two years later. Tax revenue two years ago will affect GDP in the current year negatively. When direct tax revenue in two years ago increases by one million, the current year GDP decreases by 7.63 million. However, the impact of the third lag of the direct tax revenue on GDP in the current year is considerably high. One million increase in the direct tax revenue in three years ago, will increase the current GDP by LKR 17.91 million. This impact is reversed in the fourth lag. The four years back direct tax revenue negatively affected the current GDP. For example, one million increases in the direct tax revenue at four years back period, will reduce the current GDP by LKR 19.15 million. Various studies conducted in different countries support the findings: Bleaney *et al*. (2001), Mertens & Ravn (2013), Elshani & Pula (2023), Gemmell *et al*. (2011), Mertens & Ravn (2013), Arnold, *et al*. (2011). When the tax rates are high, consumers pay more taxes, hence the purchasing power of consumers falls. Similarly, heightened corporate tax rates result in reduced profits for companies, forcing them to curtail reinvestment and potentially engage in shadow economic activities. These affect the GDP to fall in the long-term.

The effect of the indirect tax revenue on the GDP can be identified as a short-term and mixed effect. One million increase in direct tax revenue in the current period, will increase the current GDP by LKR 5.19 million. However, the previous year's indirect tax revenue affects the current GDP negatively. One million increase in indirect tax revenue, in the previous year, shrinks the GDP by LKR 11. 69 million.

The effect of the non-tax revenue does not hold for a long period of time. One million expands in the non-tax revenue increases the current year GDP by LKR 8.45 million (Table 6). However, it does not have an effect in the future GDP.

This section of the paper tests the first three hypothesis mentioned above (Impact of corporate tax, non-corporate tax, other direct tax, goods and services tax and foreign trade tax on GDP in Sri Lanka). The estimated results of the equation 03 is well fitted as the F value is 4355 and the 1 % of the variations in the dependent variable, that is the GDP, is explained by the selected independent variables. However, the coefficients of the taxes are not statistically significant, suggesting that various tax categories, when considered individually, do not play a significant role in fostering economic growth. Therefore, the detailed results of the model (equation 3) are not presented in the present paper.

The study extended its analysis by employing the GDP growth rate as the dependent variable, while considering both direct and indirect taxes as percentages of GDP (Model 2). Results of the Model 2, the long-run estimation under the ARDL model specification, are presented in Table 7.

Table 7: Model 2-ARDL long-term estimation results (GDP growth and % of indirect and direct taxes on GDP)

Variable	Coefficient	t-value	Model summary
Constant	3.073	2.12	F (4,25) = 7.771
GDP growth rate (-1)	0.038	0.14	Prob > F = 0.0001
GDP growth rate (-2)	0.312	1.50	Adj R-squared= 0.53
Direct tax (% of GDP)	-5.047***	-3.93	AIC = 4.83
Indirect tax (% of GDP)	2.463***	2.99	
Indirect tax (% of GDP) (-1)	-1.335**	-1.92	

****significance at 1% significance level **significance at 5% significance level, *Significance at 10% significance level.*

Source: Authors' calculations

The long-term estimation shows that 1% increase in direct taxes as a % of GDP leads to a 5% decrease in economic growth in the long-term. Additionally, the findings suggest that 1% increase in indirect taxes as a percentage of GDP contributes positively, resulting in 2.5% augmentation in economic growth.

Table 8: ARDL error correction approach estimates (short-term estimation)

Variable	Coefficient	t-value	Model summary
Constant	0.253	0.453	EC = GDP growth – (-6.471*Direct tax + 2.536*Indirect tax +0.253)
D(direct tax) % of GDP	-6.471***	-4.131	
D(indirect tax) % of GDP	2.536**	2.523	
CointEq(-1)	-0.512***	-3.076	

****significance at 1% significance level **significance at 5% significance level, *Significance at 10% significance level.*

Source: Authors' calculations

Table 8 shows the results of the error correction model (ECM). The coefficient of the long-term equilibrium speed of adjustment is significant and negatively associated at the 1% level. This signifies that 51% of any disequilibrium occurring in the preceding year is rectified in the subsequent year. Notably, both indirect taxes and direct taxes exhibit statistical significance. This implies that, in the short term, these variables exert an influence on GDP. The coefficient for short-term indirect taxes suggests that an increase in indirect taxes positively impacts economic growth. Conversely, direct taxes exert a negative impact on economic growth.

Furthermore, we conducted diagnostic tests to assess serial correlation using the Breusch-Godfrey serial correlation LM test and heteroskedasticity using the White test. The diagnostic test results are summarized in Table 9.

Table 9: Diagnostic test results

Test	F-statistics	p-value
Breusch-Godfrey LM Test	0.238	0.790
Heteroskedasticity Test: White test	0.178	0.999

Source: Authors' calculations

The Breusch-Godfrey LM test results (Table 9) revealed the absence of autocorrelation in the model. Additionally, the White test, employed to identify heteroskedasticity, yielded results indicating no significant presence of heteroskedasticity. These findings underscore the robustness and reliability of the model in capturing the dynamics of the analyzed variables.

This study further investigates how taxes impact on growth through government capital formation (Model 3). The government capital formation was used as a meditation variable. The 2SLS regression approach was used for the analysis. Results are given in Table 10.

Table 10: Model 3- Growth Model using government capital formation as the mediator

Variable	Coefficient	t-value	Model summary
Constant	-28.862**	-2.10	F (4,25) = 1297.64
Private sector capital formation	0.32592**	2.13	Prob > F = 0.000
Labour force	2.06483**	2.25	Adj R-squared= 0.9944
Human capital	1.46053*	1.79	Root MSE = 0.09351
Government capital formation	0.43205***	3.47	

****significance at 1% significance level **significance at 5% significance level, *Significance at 10% significance level.*

Source: Authors' calculations

All coefficients in Model 3 (Table 10) demonstrate both positivity and statistical significance, suggesting that taxes, when directed through government capital formation, yield a positive impact on economic growth. The outcomes underscore the positive influence of utilizing tax revenues for infrastructure development and fostering a business-friendly environment. Notably, the results emphasize that the effects of the labor force (2.06483) and human capital (1.46053) on economic growth are more substantial than the impact of government capital formation (0.43205). Policymakers should judiciously incorporate these findings into their strategy development, recognizing the pivotal role of investing in human capital and optimizing labor force dynamics alongside targeted government capital formation for sustained economic growth.

7. Conclusion

The paper has formulated five hypotheses to explore the effects of direct and indirect taxes on economic growth in Sri Lanka. The results of the study reveal that direct taxes have a negative impact economic growth in the long-term whereas indirect taxes exhibit a positive impact in the short run but a negative impact in the long run. These findings corroborate with prior empirical studies conducted in both developed and developing countries, as well as analyses involving penal data and time-series data. A downturn in economic growth can significantly impede a country's advancement towards attaining the SDGs.

Specifically, the study reveals that Personal Income Tax negatively influences economic growth, suggesting that maintaining a low level of this tax could incentivize consumption, savings, and investment in Sri Lanka. On the other hand, the empirical results indicate that Corporate Income Tax does not have a significant impact on economic growth. Similarly, while Value Added Tax (VAT) shows a positive impact on economic growth, which deems insignificant in the Sri Lankan context.

Contrastingly, the study highlights that those taxes, when directed through government capital formation, play a significant and positive role in fostering economic growth in Sri Lanka.

These findings provide valuable insights for policymakers in shaping tax policies to align with the country's economic development goals. It emphasizes that configuration of taxes in an economy should be a deliberate and strategic decision rather than a random one. The study reveals that an increase in non-tax revenue, including grants, positively influences economic growth, while direct taxes, such as personal income taxes and corporate taxes, exhibits a negative impact. Consistent findings across various countries and empirical analyses support these conclusions.

The implications are clear for policymakers, urging them to focus on optimizing the tax structure in Sri Lanka. It should be ensured that taxes are designed and implemented in a manner that fosters the desired economic growth. The paper further proposes an in-depth study to specifically examine and recommend ways to optimize the tax structure in the context of Sri Lanka, providing a roadmap for policymakers to steer sustainable economic development.

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