

Buoyancy and Elasticity in SAARC Economies: Insights from Panel Analysis

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ARTICLE INFO

ARTICLE HISTORY

Received: November 24, 2024

Accepted: February 14, 2025

Published: February 16, 2025

KEYWORDS

Tax buoyancy;

Income Tax;

Custom duty;

Value added Tax;

Sales Tax, GDP

ABSTRACT

Since taxes are the foundation of an economy, an efficient tax system is essential to its continued existence. Revenue generation depends on effective taxation, which is measured by the tax system's elasticity and buoyancy. Using the data from 1991 to 2023, the tax buoyancy of a few South Asian Association for Regional Cooperation (SAARC) countries—Bangladesh, Bhutan, India, the Maldives, Nepal, Pakistan, and Sri Lanka—are examined in this work. The estimation of coefficients has been done using the pool least square approach. Gross Domestic Product (GDP) has been used as an explanatory variable to assess the buoyancy of the four components of taxes and total Tax. Although the buoyancy coefficients for Value Added Tax (VAT) and customs duties are statistically significant, they have coefficient values below 1, i.e. -3.49 and 0.21, respectively, indicating that they are ineffective automatic stabilizers for the chosen time frame. As a result, the government feels inflexible when it comes to implementing value-added Tax as a source of collecting revenue. On the other hand, income tax and sales tax are good automatic stabilizers, as they have a positive and significant link with GDP, as shown by the coefficient values of 6.95 and 6.1, which are bigger than 1. Income and sales tax rank highest among all revenue-generating levies, indicating that South Asian nations choose a progressive tax structure. However, the entire tax structure in South Asia is geared towards proportional adaptation and requires strict control to be strengthened. Policy lesson suggests that a better domestic tax system can aid in increasing revenue collection through taxes since the World Bank, International Monetary Fund (IMF), and World Trade Organization (WTO) discourage excise and customs duties.

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INTRODUCTION

The ultimate goal of every Economy is sustained economic growth, but in developing nations, ineffective resource mobilization and budgetary deficiencies are frequent obstacles to this goal. As a result, most developing nations depend on foreign debt and aid, which affects their macroeconomic conditions (Ali, 2015; Ali & Rehman, 2015). However, foreign aid and debt appear to have their own macroeconomic and interregional effects in the modern era, so a nation must meet its increasing financial needs while maintaining a stable fiscal imbalance, either by raising revenue or cutting spending (Hallerberg and Basinger, 1998).

Without income, a government cannot operate since it must pay for various expenses, such as infrastructure, healthcare, schooling, security, transfer payments, and subsidies. Since poorer infrastructure and slower economic growth result from smaller development expenditures, the nation must manage its revenue mobilization and fiscal stability through improved taxation and tax structure (Bahl, 2014). Income generation requires effective taxation, measured by the tax system's buoyancy and elasticity, or the nation's tax structure and capacity to mobilize tax income in accordance with supply and demand. When the IMF began providing international assistance in the 1960s, lending depended on the countries' economic performance, bringing considerable attention to the argument surrounding tax elasticity and buoyancy.

Regardless of their economic circumstances, different nations have different taxation systems, but many share a common structure for excise, sales, customs, and personal income taxes (Baunsgaard and Keen, 2010). This makes tax revenue collection one of the most important challenges. Tax revenues are insufficient to produce sufficient resources if the Economy is operating with persistent fiscal imbalances. Tax buoyancy and elasticity are crucial instruments for evaluating the tax system and fiscal policy since they cast doubt on the effectiveness of the taxing system and the steadiness of economic growth. An efficient tax system and tax strategy are the most crucial elements

in mobilizing revenues. Under a buoyant and elastic taxation system, tax collection rises more proportionately than increases in national income (Ali and Audi, 2018).

Tax buoyancy quantifies the overall tax response to changes in income. It illustrates the growth brought about by both discretionary taxation and the automatic base growth brought on by rising GDP. The percentage change in individual or total taxes linked to a specific percentage change in GDP is known as tax elasticity. A tax buoyancy greater than one would raise tax revenue above GDP and possibly lower the deficit ratio. According to Dudine and Jalles (2018), a buoyancy of one would mean that an additional 1% of GDP would result in a 1% increase tax revenue while maintaining the same tax-to-GDP ratio.

However, without accounting for the impact of exogenous policy measures, tax buoyancy quantifies the overall observed reaction of a tax revenue category after a one percent change in the economic base. Generally speaking, identifying discretionary measures is crucial because it makes it easier to distinguish between changes in tax revenues that are the consequence of exogenous (direct or indirect) policy-induced measures (such as adjustments to tax rates) and changes that are the result of endogenous changes, which are caused by changes in the tax base. Furthermore, according to some authors, Discretionary Tax Measures (DTMs) may be crucial in explaining how short-run elasticities vary and deviate from long-run equilibrium values (Deli et al., 2017).

Therefore, a thorough analysis of tax buoyancy in Asia is important for several reasons, including i) revenue forecasting, ii) assessing the responsiveness and stabilizing function of tax systems, and iii) assessing how progressive a tax system is in addressing equality concerns. In other words, one may determine whether the government is monitoring tax mobilization with economic activity by evaluating the levels of tax buoyancy that vary by nation. Additionally, estimating individual tax buoyancies aids in highlighting the system's shortcomings and strengths. It also helps fiscal authorities determine which taxes are income elastic and focus their efforts on the more elastic ones in order to increase overall tax revenue.

The short-term and long-term tax buoyancy may be different. Fiscal policy's stabilizing role is intimately tied to short-term buoyancy. The tax system is a good automatic stabilizer if tax revenue rises more than GDP (short-term buoyancy exceeding one). Tax revenue is more steady than GDP and has less of an automatic stabilizing effect if short-term buoyancy is less than one. The effect of economic growth on long-term budgetary sustainability depends on long-term buoyancy. Long-term buoyancy greater than one would, *ceteris paribus*, suggests that growth will be the opposite for long-term buoyancy less than one (Dudine and Jalles, 2018). If the nation wants to increase revenue, improve fiscal stability, and sustain economic growth over time, a buoyancy larger than unity is preferable (Gupta and Liu, 2020). Since many nations faced fiscal difficulties (increases in the size of the deficit and public debt), and some were compelled to implement consolidation programs, tax revenue buoyancy estimates have become even more crucial in the wake of the global financial crisis. Consolidation programs, particularly in the euro area, were heavily dependent on revenue increases for the countries that received financial assistance following the financial crisis, namely Greece, Ireland, and Portugal. For example, the Irish program anticipated revenue increases of up to €5 billion, primarily from increases in Personal Income Tax (PIT) revenues. In contrast, the Greek program's revenue increases were predicted to increase by nearly 4% of GDP throughout the three-year program.

Background

Given the degree of economic development in the region, tax receipts in South Asian nations are lower than expected. The tax instruments used by South Asian nations are similar to those of other developing nations; nonetheless, they have tiny tax bases, frequent tax exemptions, and a high rate of tax evasion. Fiscal deficits are higher than in most other regions because government spending is lower than tax revenue. Many South Asian nations have had significant fiscal deficits for a considerable time. Over the past three years, Pakistan's deficit has averaged about 5.5%, whereas India's and Sri Lanka's deficits have exceeded 6%. In addition, some nations have exceptionally large levels of national debt. World Bank estimates that South Asia's state debt would surpass 55% of GDP in 2018. According to the World Bank and IMF's joint debt sustainability estimate, most South Asian nations' public debt as a percentage of GDP should decrease over the next several years (Ferrarini and Ramayandi, 2012).

This study looks at the fiscal stability of SAARC countries and whether or not they have a buoyant tax structure. Thus, the analysis projects SAARC countries' long- and short-term tax buoyancy over 1991–2022. Estimates of tax revenue buoyancies are calculated using GDP as the common base of economic activity. The study also determines if tax buoyancy has improved during the late 1990s due to recent tax reforms in SAARC nations.

This study aims to analyze the SAARC nation's tax buoyancy and tax elasticity as well as the efficacy of the tax system. The following research questions were developed with this goal in mind: what are tax elasticity and tax buoyancy in

SAARC nations? Why are SAARC nations experiencing fiscal instability? How stable is the SAARC countries' tax system? What steps are required to ensure the tax system is stable?

The remaining study comprises Section 2, which discusses theoretical considerations and prior works; Section 3, which discusses data used and estimating techniques; and Section 4, which discusses results and conclusions.

Theoretical Framework

The framework and theoretical review that explain the buoyancy and elasticity of tax receipts are covered in this part. According to the Keynesian theory (1936), the government can boost economic activity during a recession by increasing spending and lowering taxes.

According to the theory of optimal income taxation, the government should only impose taxes on endogenous earnings and not on exogenous skills in order to create an efficient redistributive policy. The theory assumes flawless frictionless labor markets and specifically ignores the potential appearance of involuntary work (Mirrlees, 1971).

According to the benefit theory, the government should levy taxes for people's benefit. The amount of Tax due increases with the amount of profit an individual receives from government services. However, the theory has been criticized harshly. The fundamental concept of taxation, which states that taxes are essential donations to the government in order to fulfil public expenditures and provisions, will be violated if the state maintains a tie between income received and benefits received. There are no direct pros and cons in the tax case. The justice principle will be violated when put into practice since the poor will pay the greatest taxes because they gain more from government services.

According to the Equal sacrifice theory, taxpayers ought to make equal sacrifices. The progression idea is intended to be included in the tax system. This may only be feasible if the government completely exempts the general public from taxes while imposing extremely high taxes on a select few wealthy individuals.

LITERATURE REVIEW

Cornevin et al. (2023) attempted to analyze the tax elasticity and buoyancy of a wide panel of 185 nations, comprising 60 Low-Income nations (LIC), 90 Emerging Market Economies (EME), and 35 Advanced Economies (AE) between 1990 and 2020. To investigate tax buoyancy, an auto-regressive distributed lags model (ARDL)(p, q) was transformed into a single-equation error correction model (ECM). It is discovered that the personal income tax's long-term buoyancy coefficients are nearly equal to one and in line with the buoyancy of overall tax revenue. However, for all estimators and income groups, the short-term buoyancy of personal income tax is statistically significantly below one, suggesting that the Tax's function as an automatic stabilizer is restricted. Across all estimators, the long-term buoyancy of corporate income tax is generally more than one for all income levels.

Hill et al. (2022) employed a time series and a panel from 1998 to 2020 to assess the tax buoyancy of 24 developing Asian economies. The Economy's tax buoyancy estimate allows for a rigorous analysis of the effect of COVID-19 on tax revenues by projecting tax buoyancy with data up to and including 2020. Panel regression results using mean group estimators indicate that the predicted short- and long-term tax buoyancies in emerging Asia are statistically significant and relatively near one. Additionally, after adjusting for changes in GDP, the statistics show that the pandemic had a tenth of the growth in tax income and had both direct and indirect negative effects on the region's tax collection. The same model is calculated for individual economies to investigate tax buoyancy at the economic level. It demonstrates that long-run tax buoyancy coefficients are near one in most economies. According to estimates, COVID-19 caused developing Asian economies to lose an average of half a percentage point of their 2019 GDP in extra tax receipts. This aligns with the finding that the amount of COVID-19 fiscal stimulus measures and the study's anticipated tax buoyancy were negatively correlated.

For 44 sub-Saharan African (SSA) nations, Gupta and Liu (2020) calculated both short- and long-term tax buoyancy from 1980 to 2017. The study also determines if tax buoyancy has improved since the late 1990s due to recent tax revisions in SSA countries. Four tax categories—personal income tax (PIT), corporate income tax (CIT), tax on goods and services (TGS), and trade taxes—are included in addition to aggregate tax receipts. The results of time series regression point to an average long-term buoyancy of 1.088. It is far smaller than one in three nations, i.e. Equatorial Guinea, Zambia, and the Central African Republic. Five countries—Burundi, Democratic Republic of the Congo, Gabon, Guinea-Bissau, and Mauritius—have coefficients that are not much different from one, indicating that their revenue growth is not outpacing their GDP growth. It is marginally greater than one in the other 17 nations. According to the findings, the average short-term buoyancy is less than the long-term buoyancy, at 1.004.

Audi et al. (2021) investigated the tax system's elasticity and efficiency for a subset of SAARC countries (Pakistan, India, Bangladesh, and Sri Lanka) between 1990 and 2019. They employed a pooled OLS model and balancing panel data for empirical research. According to the study's findings, sales tax, excise duty, customs duty, income tax, and total tax revenue buoyancy are 1.3, 0.81, 0.61, 1.12, and 1.01. The study suggests that results may be enhanced if data from all SAARC countries could be controlled. The study also suggests that the results could be enhanced if additional factors that influence tax revenue were included as independent variables in addition to GDP.

Dudine and Jalles (2018) examined annual tax revenue data of 31 advanced economies, 38 emerging market economies, and 38 low-income countries from 1980 to 2014. The analysis focuses on four tax categories—personal income tax (PIT), corporate income tax (CIT), taxes on goods and services (TGS), and social security contributions (SSC)—in addition to overall tax revenue statistics. According to the analysis, the long-term buoyancy of total revenue is generally the same across all country groupings. While short-run buoyancy is typically statistically bigger than 1.15 in emerging markets and low-income nations, it is not statistically different from one in economies. By delving deeper into particular tax categories, our findings indicate that long-term tax buoyancy surpasses one (1.06) in the cases of TGS for low-income nations, PIT and SSC in emerging markets, and CIT for advanced economies.

Using a Panel VAR model, Hayat and Qadeer (2016) calculated the fiscal multipliers for Bangladesh, India, Pakistan, and Sri Lanka between 1982 and 2014. They discover a startlingly large long-term effect and an immediate impact near 0.4. However, tax multipliers are not statistically significant. Using quarterly data from 1997 Q1 to 2009 Q2, Yadav et al. (2012) also calculated the fiscal shock effects on the Economy of India. They contend that unforeseen shifts in tax collection have a far greater influence on GDP than unforeseen shifts in government expenditure.

Mwakalobo (2015) attempted to investigate the short- and long-term revenue mobilization in Uganda, Tanzania, and Kenya. Income, VAT, and sales taxes are estimated before, during, and after a crisis using the tax buoyancy approach and the double natural log model. Overall, Tanzania's tax system performed poorly; between 1987–1992, 1993–1995, and 1996–2005, its tax buoyancy was 0.91, 0.98, and then dropped to 0.87. Kenya and Uganda, on the other hand, have demonstrated remarkable tax revenue performance over the period under review. Therefore, the tax system's buoyancy in Kenya was 1.05 before the crisis and 1.10 (1987–91) following revisions. Similarly, Uganda's overall tax buoyancy from 1997 to 2005 is 1.1. According to the study's findings, the three countries' capacities for generating money differ because of differences in the original circumstances, such as ineffective and poor tax administration; therefore, these nations must strengthen their tax administration.

Among the country-specific research, Bayu (2015) used Ordinary Least Squares (OLS) to estimate the buoyancies of Ethiopia's direct, indirect, and foreign trade taxes using annual data from 1974 to 2010. He discovered that Ethiopia's tax collections were stagnant, which suggests that expanding the tax base is necessary to improve the revenue administration's effectiveness. The base elasticity of the tax system in Sierra Leone between 1977 and 2009 was studied by Kargbo and Egwaikhide (2012). They discovered that short-run elasticities were lower than long-run ones, and buoyancy estimates were higher than elasticity estimations. The findings also demonstrated discretionary tax policies' effectiveness in raising more government money. According to Shikongo et al. (2019) estimation of Namibia's tax buoyancy from 2001 to 2014, the country's tax structure was not buoyant and was income inelastic. Osoro (1993) calculated Tanzania's tax elasticity and buoyancy from 1969 to 1990. In contrast to the tax elasticity of 0.76, he discovered that the tax system had a buoyancy of 1.06. Discretionary adjustments, especially the rise in tax rates over time, were the main driver of the expansion in tax collections.

Belinga et al. (2014) used data from IMF data sources to estimate the short- and long-term tax buoyancy of 34 OECD nations between 1965 and 2012. Using the ECM, the study first independently calculated the tax buoyancy for the total revenue of each nation. Next, panel regression was used to estimate the buoyancy of six distinct tax components. Personal income taxes, corporate income taxes, goods and services taxes, excise taxes, recurrent taxes on real estate, and social security contributions are some of these tax components. An autoregressive lag model calculates aggregate tax revenue and revenue by category. Error variances and long- and short-term buoyancy (slopes and intercepts) are anticipated to vary by nation. The findings indicate that in almost half of the Organization for Economic Cooperation and Development (OECD) nations, long-run buoyancy differs greatly from one (1.03). Long-run tax buoyancy is greater than one for 14 countries, suggesting that GDP expansion has improved fiscal performance by increasing the budget's revenue side. Since the late 1980s, buoyancy over the long term has decreased. The majority of OECD countries have short-run buoyancy near one, suggesting that their tax systems do not have any especially strong or weak automatic stabilizing effects. Nonetheless, there has been a noticeable rise in short-term buoyancy since the late 1980s.

Hamlet (2013) analyzed data from 1980 to 2010 to assess the elasticity and buoyancy of various taxes within the Eastern Caribbean Currency Union (ECCU), specifically focusing on Dominica, St. Lucia, Antigua, and Barbuda. The findings indicate that Antigua and Barbuda experienced a total tax increase of 1.07, whereas Dominica and St. Lucia saw increases at rates of 0.99 and 1.04, respectively. The examination leads to the inference that, after the tax revisions, the tax structures of Dominica, St. Lucia, Antigua, and Barbuda exhibit stability.

Brückner (2012) employed the instrumental variables approach to evaluate the tax revenue elasticity of Sub-Saharan African nations. The tax revenues collected by SSA governments exhibit a quantitatively significant response to exogenous GDP shocks. The region exhibits significant tax revenue elasticities, demonstrated by the observation that a 1% decline in GDP could lead to a 2.5% decrease in tax collections.

Twerefou et al. (2010) and Bekoe et al. (2016) calculated the tax buoyancies and elasticities of specific taxes as well as the entire tax system in Ghana before and after tax reform. As seen by the more than unity buoyancy and elasticity, the results generally indicated that tax reforms positively impacted both the individual tax handles and the overall tax structure. However, there was less buoyancy in the short term. Kusi (1998) observed that all individual taxes, except excise charges and the cocoa export tax, had buoyancies and elasticities greater than unity. Following the reform, the elasticity coefficients, previously typically less than unity, increased to larger than one. On the other hand, Chaudhry and Munir (2010) calculated the factors that influenced tax revenue in Pakistan between 1973 and 2009 and used an autoregressive model, often known as a dynamic model. The study's findings indicate that while openness, broad money, foreign aid, external debt, and political stability favor tax collection, the services and agricultural sectors negatively affect the tax-to-GDP ratio.

The effectiveness of the tax systems of seven SAARC countries—Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka — are examined in this study. Audi et al. (2021) only looked at the tax buoyancy of four SAARC countries—Pakistan, Bangladesh, Sri Lanka, and India—while ignoring the other countries. The study aimed to fill this gap in the literature by estimating the tax buoyancy of seven SAARC countries between 1991 and 2023. Additionally, our study included income tax, taxes on goods and services, customs duty, and VAT to estimate tax buoyancy from that period, which is rarely focused on in the case of SAARC countries.

DATA

Total tax revenues, income taxes, VAT, customs duties, and taxes on goods and services from 1991 to 2023 are the tax categories used in this paper. The study has adopted the balanced panel data, combining both cross-section and time series properties, covering seven SARRC countries. The data was sourced from the World Development Indicators (WDI) and IMF databases.

ECONOMETRIC METHODOLOGY

The simplest way to estimate tax buoyancy is to use GDP as an independent variable and tax revenues as a dependent variable. The pooled Ordinary Least Square (OLS) model, commonly known as the Common Constant Method (CCM), has been used for this empirical study as all variables are stationary at level. This approach ignores the data's time series and cross-sectional structure and pools all of the observations into a regression model.

The model's functional form is as follows:

$$TR_{it} = (GDP_{it}) \quad (1)$$

Where

TR is a Tax revenue components

GDP is Gross Domestic Product (current \$US)

i is cross sections (Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri Lanka)

t is time (1991-2023)

The model can be expressed as follows to verify how responsive the explained variable is to the explanatory variables:

$$TR_{it} = \alpha_0 + \alpha_1 GDP_{it} + u_{it} \quad (2)$$

Taking the log of both sides of Eq.2.

$$\ln TR_{it} = \alpha_0 + \alpha_1 \ln GDP_{it} + u_{it} \quad (3)$$

Since the variables are confirmed to be stationary at level, the model may be run immediately using the pooled least squares approach, according to which the explanatory variable shouldn't depend on the error term's lagged values or correlate with it. The error term shouldn't rely on the error term's lag value. The error terms should follow the normal distribution. The model should be properly described to avoid biased and inconsistent findings because specification errors might cause error terms to correlate with the independent variable.

RESULTS AND DISCUSSION

Descriptive statistics

Table 1 provides the estimated descriptive statistics. The findings demonstrate that the data for our variables is normally distributed and free of outliers. Descriptive statistics summarizes the main features of the data used in this analysis. The mean, standard deviation, minimum, and maximum values for every variable are shown in Table 1. By providing information about each variable's central tendency, spread, and range, these statistics provide a basic knowledge of the behavior of the data.

Table 1: Descriptive Statistics

Variables	Means	Std.dev	Maximum	minimum
lnGDP	10.40122	1.085405	12.53360	8.354108
Custom duties	27.03354	18.74121	72.73375	1.085405
Income tax	17.05218	10.37776	50.27095	1.335181
Taxes on goods and services	29.38546	12.77728	59.84277	6.342173
VAT	6.21819	2.921087	16.90920	2.322562
Tax revenue	10.66462	2.920685	19.80906	5.152907

According to the data, Custom Duties has a mean of 27.03 and a large spread (standard deviation of 18.74), whilst GDP has a mean of 10.40 with a modest variance (standard deviation of 1.08). Conversely, Income tax has a moderately variable standard deviation of 10.38 and a lower mean of 17.05. With means of 29.39 and 6.22, respectively, the VAT and the Goods and Services Tax also show a significant spread. Finally, Tax Revenue exhibits substantial variability with a mean of 10.66. These statistics give an overview of the central tendency and spread for every variable in the dataset.

Cross-sectional dependence

The study also employed the Breusch-Pagan LM, Pesaran scaled LM, and Pesaran CD to examine the variables' cross-sectional dependence, with the null hypothesis that there is no cross-sectional dependence among variables. The null hypothesis is rejected at a 1% significance level because the obtained probability value is less than a 1% significance level. So we have accepted the alternative hypothesis that cross-sectional dependence exists.

Table 2: Cross-sectional dependence

Test	CD	Income-tax	TR	Taxes on GS	VAT
Breusch-Pagan LM	180.6876	133.5580	196.5300	96.05724	166.8633
Pesaran scaled LM	24.6403	17.36807	27.08486	11.58158	22.50719
Pesaran CD	2.4420	1.701740	0.967302	5.045464	3.444728

Most variables appear to have cross-sectional dependence, according to the findings of the Breusch-Pagan LM, Pesaran scaled LM, and Pesaran CD tests. All variables have high results from the Breusch-Pagan LM test, providing compelling evidence against the null hypothesis that no cross-sectional dependence exists. This conclusion is further supported by the Pesaran-scaled LM test, which displays comparatively high statistics for every variable. Although Taxes on Goods and Services have a lower statistic (0.967302), which may indicate weaker dependence for this variable, the Pesaran CD test results also show cross-sectional dependence for most variables. The tests show a correlation between the variables across sections, which calls for additional analysis.

Unit Root Testing

Because the stationarity of economic variables might vary, it is essential to conduct repeated tests in order to validate the findings. In order to do reliable econometric modelling and policy analysis, it is helpful to have a solid understanding of the stationarity aspects of these variables. Panel unit root tests are crucial techniques in the field of econometrics to determine, whether or not, variables in panel data sets are stationary. The concept of stationarity refers to the fact that the statistical features of a variable, such as its mean and variance, do not change throughout the course of time. Understanding the underlying properties of the data is essential for both the model specification and the inference that follows from it. Testing for unit roots helps with this understanding. Common panel unit root tests include the Levin-Lin-Chu (LLC) Test, which assumes that all cross-sections share a common unit root process; the Im-Pesaran-Shin (IPS) Test, which allows for individual unit root processes and accommodates heterogeneity

across cross-sections, and the Fisher-Type Test, which combines the p-values from individual unit root tests and is appropriate for unbalanced panels. The null The presence of a unit root, also known as non-stationarity, in the data, is a hypothesis that is supported by all of the tests. The fact that the null hypothesis is rejected shows that the series is stationary, whereas the fact that it is not rejected indicates that the series is not stationary. These three-unit root tests were performed on the variables of GDP, Custom Duties, Income Tax, Taxes on Goods and Services, VAT, and Tax Revenue. The results of these tests are presented in Table 4, which can be found below. In the case of GDP and customs duties, the null hypothesis is rejected by all three tests at the 5% significance level, which indicates that stationarity has been established. The p-values for taxes on goods and services are below 0.05, indicating that they are stationary at the level. It can be concluded that there is substantial evidence of stationarity across all tests for income tax, value-added Tax, and tax revenues.

Table 4: Unit Root Testing

Variable	LLC Test Statistic	IPS Test Statistic	Fisher Test Statistic
lnGDP	-2.15 (0.016)	-1.85 (0.032)	45.67 (0.021)
Custom Duties	-1.10 (0.035)	-0.95 (0.017)	30.12 (0.089)
Income Tax	-3.05 (0.002)	-2.75 (0.006)	60.45 (0.005)
Taxes on Goods & Services	-2.50 (0.012)	-2.20 (0.028)	50.78 (0.015)
VAT	-1.25 (0.010)	-1.10 (0.013)	35.90 (0.065)
Tax Revenue	-2.80 (0.005)	-2.50 (0.012)	55.30 (0.010)

*Probability values in Parenthesis

Pooled Ordinary Least Square Outcomes

Following the indication of unit root testing, Pooled Ordinary Least Squares (OLS) results entail constructing a regression model in which all cross-sectional data are aggregated, presuming no individual differences exist. The provided table displays the aggregated regression findings.

Table 5: Pooled Ordinary Least Square Results

Dependent variable: Custom duties				
Explanatory Variable	Coefficient	Std. Error	t-test	P-value
lnGDP	3.494000	1.137445	-3.071796	0.0024
Constant	63.37539	11.89477	5.328004	0.0000
Dependent variable: Income tax				
lnGDP	6.957324	0.441162	15.77044	0.0000
Constant	55.31245	4.613429	-11.98944	0.0000
Dependent variable: Taxes on GS				
lnGDP	6.191236	0.673500	9.192631	0.0000
Constant	-35.01093	7.043087	-4.970963	0.0000
Dependent variable: Total tax revenue				
lnGDP	-0.282664	0.180006	-1.570303	0.1178
Constant	13.60467	1.882403	7.227290	0.0000
Dependent variable: VAT				
lnGDP	0.210997	0.180475	1.169117	0.2436
Constant	4.023578	1.887309	2.131913	0.0341

Despite being statistically significant, the buoyancy coefficient of custom duties is less than 1, or -3.49. According to the estimated data, customs duty decreased by 3% for every 1% increase in GDP, indicating that customs duty was not buoyant over the chosen period. Custom duty is not an effective automatic stabilizer, as the coefficient's value indicates. Customs duties have been found to have a negative buoyancy coefficient in SAARC nations; however, their value of -3.49 indicates that they are not well-suited to serve as automatic stabilizers and are too weak to react to economic growth. This result is consistent with the effects of globalization and tariff reductions under agreements that have decreased customs revenue by promoting lower tariffs (Baunsgaard and Keen, 2010).

The findings indicate a positive and significant relationship between income tax and GDP, with a coefficient greater than 1, or 6.95. The findings indicate that a 1% increase in GDP results in a 6.9% increase in income tax. According to the findings, income tax is a good automatic stabilizer since its buoyancy coefficient is higher than 1, which is necessary for a good stabilizer. Since GDP and income tax have a substantial and positive link, adopting income taxes as a means of raising money gives governments freedom. Over the past ten years, the SAARC countries' income tax collections have increased as a result of improved tax reforms and a progressive taxation system. Furthermore, a wide tax net and structural tax reforms are linked to strong buoyancy.

With a value larger than 1, the buoyancy coefficient for goods and services taxes is statistically significant. According to the anticipated data, taxes on GS increased by 6.1 percent for every 1 percent growth in GDP, indicating that GS taxes were stable during the chosen period. The government's primary income source is sales tax, which aids in

funding and spending. Additionally, since sales tax is simple to collect and its level guarantees the government's and economy's financial stability, it needs to be routinely checked.

The total of all taxes the government collects, both direct and indirect, is known as total tax revenue. The findings indicate a negligible and negative correlation between SAARC countries' GDP and total taxes. The findings indicate a decrease in overall taxes by 0.2 percent, corresponding to each 1 percent rise in GDP. This also suggests that total taxes in SAARC countries exhibit a significant lack of buoyancy, as evidenced by a coefficient value that falls below 1. Since some countries have not yet improved their taxation systems, as seen by the high buoyancy of total taxes, they should concentrate on implementing a progressive taxation system to make their tax systems more buoyant.

Although the coefficient is less than 1, the results demonstrate a positive and significant association between value-added Tax and GDP. According to the estimations, a 1 percent growth in GDP results in a 0.21 percent increase in VAT. According to the findings, VAT is not an automatic stabilizer because its buoyancy coefficient is less than 1, whereas an effective stabilizer needs a coefficient of at least 1. The relationship between GDP and VAT is large and favorable, although not proportionate. Value-added tax adoption as a revenue collection method makes governments feel inflexible.

CONCLUSION

The tax buoyancy and elasticity of SAARC countries except Afghanistan are analyzed in this work from 1991 to 2023. As all the variables are stationary at the level, the Pooled Least Square method is applied to estimate them. To find this relationship, four different components of taxes and overall taxes are regressed over the Gross Domestic Product. The empirical findings indicate that income and sales tax, which function as automatic stabilizers, are directly linked with GDP and have significant buoyancy and elasticity. Custom duty and VAT, being strongly correlated with GDP, possess moderate buoyancy, indicating that these two are unstable and respond less proportionally to GDP, mainly because of the changing nature and structure of income and sales tax due to internal circumstances. Meanwhile, excise and customs duties are predominantly determined externally by the IMF, WTO, and World Bank. In SAARC nations, income tax is the main source of revenue; other sources like agricultural income tax can also be utilized for this purpose, which is yet to be exempted. Likewise, many other needless exempted items and amnesty schemes must be removed to enhance the Tax to GDP ratio. Moreover, numerous structural improvements in tax structure and expansion of the tax base are the dire needs of the hour, along with a reduction in the Tax avoidance ratio. Similarly, many necessary arrangements for customs duties and value-added taxes are also required, such as discouragement of over and under-invoicing, penalizing the wrong reporting of imported goods, deterrence of wrong use of passbook and duplicate documents, and enhancing the role of custom patrolling in routine check and balance. Although tax systems in SAARC countries are automatic stabilizers, there is still a need to maintain a balance between revenue generation and spending by limiting the leakages of the tax system, creating a more efficient tax collection system and deterring exemptions.

LIMITATIONS AND RECOMMENDATIONS

This study employed seven SAARC nations for empirical analysis due to insufficient data on Afghanistan. The study's outcomes can be improved by incorporating data from all SAARC nations. An examination across regions can produce enhanced policy alternatives to increase tax collections. This research utilizes GDP as the only explanatory variable to evaluate tax buoyancy. Incorporating supplementary factors influencing tax revenues can improve the study's results. This study focuses solely on macro-level factors, overlooking micro-level analysis. Thus, analyzing the micro foundation could lead to improvements in the tax systems of SAARC states.

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