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Audi, Marc and Ali, Amjad and Roussel, Yannick

European School of Administration and Management (ESAM)-France. University Paris 1 Pantheon Sorbonne-France, European School of Administration and Management (ESAM)-France. Lahore School of Accountancy and Finance, University of Lahore., European School of Administration and Management (ESAM)-France.

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MEASURING THE TAX BUOYANCY: EMPIRICS FROM SOUTH ASIAN ASSOCIATION FOR REGIONAL COOPERATION (SAARC)

Marc Audi[1]
European School of Administration and Management (ESAM)-France.
University Paris 1 Pantheon Sorbonne-France
Amjad Ali[2]
European School of Administration and Management (ESAM)-France.
Lahore School of Accountancy and Finance, University of Lahore, Pakistan.
Yannick Roussel[3]
European School of Administration and Management (ESAM)-France.

ABSTRACT

Taxes are the backbone of an economy, therefore, an effective tax system is very necessary for the survival of an economy. All the modern and developed economies have a higher rate of taxes as a percentage of GDP e.g. UK 33%, the USA 24.5%, Germany 38.8%, and France 45.4% (OECD, 2019). So, it is always important to measure the tax buoyancy among and within countries. This article has examined the buoyancy of taxes among the selected South Asian Association for Regional Cooperation (SAARC) countries from 1990 to 2019. Pooled regression has been applied for measuring the tax buoyancy coefficients for sales tax, income tax, customs duty, excise duty, and total tax revenue. The findings show that sales tax, income tax, and total tax revenue are significant with the buoyancy coefficient of 1.30, 1.12, and 1.01, respectively. Whereas the excise and customs, duties show a positive but insignificant buoyancy coefficient of 0.81 and 0.62, respectively. Among all revenue generation taxes, income tax and sales tax are leading; this indicates that South Asian countries prefer a

[1] Provost/ Director of Academic Affairs at European School of Administration and Management (ESAM)-France. University Paris 1 Pantheon Sorbonne-France.
[2] Associate Researcher; European School of Administration and Management (ESAM)-France. Assistant Professor at Lahore School of Accountancy and Finance, University of Lahore, Pakistan.
*Corresponding Author: chanamjadali@yahoo.com
[3] Rector; European School of Administration and Management (ESAM)-France.

progressive tax system. But the overall tax system in South Asia is inclined towards proportional response and needs strict checks for the improvement of the tax system. Finally, the revenue collection through taxation can be further enhanced with the help of an improved domestic tax system, as customs duties and excise duties are discouraged by the World Bank, IMF, and WTO.
Keywords: tax buoyancy; income tax; customs duty; excise duty
JEL Codes: H2

I. INTRODUCTION

Higher and stable economic growth is the ultimate objective of all economies (Ali, 2015; Ali and Rehman, 2015). In the case of developing countries, inefficient resource mobilization and fiscal imbalance are the common factors to hinder higher and stable economic growth. Under such circumstances, developing countries used to rely on foreign aid and foreign debt, which was very famous during the 1970s and 1980s. But in this present era, foreign debt and foreign aid seem to have their own macroeconomic and inter-regional impacts. A country needs to meet its growing needs of finance while keeping fiscal imbalance stable either by reducing its expenditures or by more revenue collection (Hallerberg and Basinger, 1998). Previously, many developing countries used to reduce their development expenditures to a minimum level i.e. infrastructure, health, and education. But the reduction in development expenditures means low infrastructure and lower economic growth, so a country needs to manage its revenue mobilization and fiscal stability with feasible alternatives. The most important instrument through which the revenues are mobilized is the tax policy and structure of taxation (Bahl et al. 1984). The tax revenue collection is one of the most significant issues, as different countries have different taxation structures regardless of their economic conditions, but many countries have a similar structure for personal income taxes, sales taxes, customs duties, and excise duties (Baunsgaard and Keen, 2010). If the economy is working under a continuous fiscal deficit, the tax revenues fail to generate enough resources. Both the efficiency of the taxation system and stable economic growth become doubtful, which makes tax buoyancy and elasticity important tools to review the taxation system and fiscal policy. A buoyant and elastic taxation system implies that the tax revenue increases more proportionately

than an increase in the level of national income (Mansfield, 1972). Such a type of taxation system is desirable for developing economies to maintain the balance between revenues and expenditures to avoid fiscal imbalance (Indraratna, 2003). Thus, it is important to examine the tax elasticity to balance between tax revenues and government expenditures in the path of stable economic growth.

The tax buoyancy and elasticity measure the responsiveness of tax receipt of the national income with the help of an effective system of taxation. A tax is considered buoyant when a change of one percent in national income generates more than one percent change in the tax receipt. While measuring the tax buoyancy, no control has been made to discretionary changes in the tax system or administration (Andre and Girouard, 2005). Consequently, tax buoyancy reflects both discretionary changes and automatic growth. The tax elasticity measures the responsiveness of tax receipt of the national income at ceteris paribus (Upender, 2008). A tax is considered to be elastic when a one percent change in the level of national income results in more than one percent change in the tax revenue after controlling exogenous factors, i.e. discretionary changes in the tax policy (Krushna, 2015).

Tax buoyancy is considered more effective as compared to tax elasticity, as it is hard to get information regarding changes in tax policy, rates, bases, or regulations. This information belongs to the ministry of finance, but sometimes ministry does not report the information regarding the discretionary changes. Various studies examine the importance of tax buoyancy for different countries and regions i.e. Hamlet (1998) examines the relationship between GDP and tax buoyancy in the case of African countries. Some other studies examine the same type of relationship e.g. Ghura (1998) studies Sub-Saharan countries, Tanzi and Howell (2000) study East Asian countries, Andre and Girouard (2005) study the OECD nations, Belinga et al. (2014) study OECD nations, Bayu (2015) studies Ethiopia, Akram and Sahin (2015) study Turkey. But the tax buoyancy of South Asian Association for Regional Cooperation (SAARC) countries has been ignored by the researchers. This study aims to examine the effectiveness of the tax system in South Asian Association for Regional Cooperation (SAARC) Countries. Almost 2 billion people are residing in this part of the world. Being the emerging part of the world, SAARC has special importance in the world's socioeconomic and political sphere. Thus, the tax buoyancy of SAARC

nations needs special attention, this study has tried to fill the literature gap. The remaining paper is comprised of a literature review, the model, econometric methodology, empirical discussion conclusions and limitations of the study, and future directions.

II. LITERATURE REVIEW

All governments whether democratic or non-democratic impose taxes, to finance their development and non-development expenditures (Bahl et al., 1984). To ensure a healthy and sound financial position, a proper check on the balance between expenditures and revenues must be done regularly. Revenue generation usually follows an income pattern and higher national income is attached to higher taxes, which may be proportional or non-proportional. If the tax collection system is proportional, the taxation system is considered a good automatic stabilizer and a buoyant one. But, if the tax collection system is non-proportional, then the taxation system is considered as non-buoyant or not a good automatic economic stabilizer. Several studies examined the taxation system of developing and developed countries. In this section, the most relevant studies have been selected as a literature review.

Ahmed (1994) estimates the determinants of tax buoyancy in the case of 35 developing countries for 10 years by using the OLS method. The study reveals that growth in imports, as in the industrial sector and money supply has a positive impact on growth in taxes while the services sector and agriculture sector hurt growth in taxes. Ghura (1998) analyzes the changes in tax revenue to GDP ratio in the case of 39 sub-Saharan countries from 1985 to 1996. This study mainly focuses on economic policies and corruption in tax revenues. The results show that the tax revenue to GDP ratio increases with income, trade openness and decreases with the share of the agriculture sector. The expansionary fiscal policy and the corruption cause a reduction in the ratio of tax revenue to GDP. Moreover, structural reforms play a significant role in enhancing the tax ratio. The public services provided by the government affect the tax ratio to GDP positively while the external grants affect it negatively.

Mukarram (2001) examines the government revenue creation in Pakistan after different tax reforms from 1980 to 2001. The study concludes that the elasticity and buoyancy of direct taxes to be 1.13 and 1.61 respectively. It shows that an increase in income generates a more proportional change in tax revenues. The custom duties have elasticity and buoyancy coefficients

0.32 and 0.55 respectively, which shows that the change in revenues proportion was much lower than the change in income. For excise duties the coefficients are 0.47 and 0.76, this indicates a slow growth in revenue through excise duties. For sales tax, the elasticity and buoyancy are 1.0 and 1.51 respectively, which reveals that revenue generation is proportional to tax elasticity coefficients however, by tax buoyancy it shows to be more than proportional. Indraratna (2003) explores the short-run and long-run elasticity of taxes in the case of Sri Lanka from 1960 to 1994. Pre-reform and post-reform periods have been used for reviewing the income tax, turnover tax, excise tax, import tax, and total taxes. The results of the study show that the elasticity of most of the taxes is below unity; this means that the tax system is inelastic during the study period. Income tax seems to have modest elasticity i.e. 0.70, whereas the excise tax seems to have low elasticity i.e. 0.20. Turnover taxes had relatively high elasticity i.e. 0.80 during the studied period. The study recommends that tax buoyancy is the best option for better comparison, but it is neglected in the case of Sir Lanka.

Bilquess (2004) estimates the elasticity and buoyancy of the tax system in the case of Pakistan from 1974 to 2002. The divisia index method has been used for this purpose. The study shows that sales tax is the main source of revenue generation in Pakistan, which is accounted for 64% of the total indirect taxes, and excise duties have accounted for 18% of revenue generated by indirect taxes. Whereas the share of income tax indirect taxes is inclusive of withholding tax which amounts to 70% and otherwise it is very low. The study shows that tax policy changes did not affect the revenue generation of Pakistan during the selected period.

Abhijit (2007) has investigated the main sources of resource mobilization for 105 developing countries for 25 years. The study uses structural variables (per capita GDP, the share of agriculture in GDP, the ratio of imports to GDP, share of aid and debt in GDP) and institutional variables (corruption, law and order, government stability, political stability, and economic stability) as the source of resource mobilization. The study finds that agricultural share harms tax revenue performance. Moreover, openness and revenue performance seem to be positively related. Foreign aid has positive impacts whereas foreign debt harms revenue performance in the case of selected developing countries. Timsina (2007) examines the buoyancy and elasticity of the tax system in the case of Nepal from 1975 to 2005. The study

finds that a major part of revenue collection is not from the automatic responses but discretionary changes. The study concludes that the overall tax system of Nepal is inelastic but relatively buoyant for the period under study. Upender (2008) estimates the tax buoyancies in the case of India for post-tax reforms of 1992 and compared them to the pre-tax reform period from 1950 to 2005. The study uses the double log model and interaction variables to capture the combined effect of changes in revenue and tax policy. The results show that constant gross taxes are more than unity during the pre-tax reform period and this means that gross taxes are relatively elastic. Whereas the estimates show that gross tax revenue is less than unity in the post-tax reform period which means that the gross tax was relatively inelastic. Wolswijk (2009) explores the short-run and long-run tax elasticity in the case of the Netherland from 1971 to 2005. The study uses the error correction model and DOLS to examine the short-run as well as long-run tax elasticity. When revenues are below the equilibrium, the long-run elasticity of VAT is 0.92 whereas, in the short-run, it is 0.64. On the other hand, when revenues are above the equilibrium the elasticity is 1.10. The overall long-run elasticity for PIT to wages is 1.57 and in the short-run, it is 5.1 besides, no asymmetry has been observed.

Chaudhry and Munir (2010) estimate the determinants of tax revenue in the case of Pakistan for the period of 1973 to 2009. The study uses an autoregressive model (dynamic model) to capture the dynamic effects on the tax revenues in Pakistan. The results of the study show that the services sector and the agriculture sector harm tax to GDP ratio, whereas openness, broad money, foreign aid, external debt, and political stability have a positive impact on tax revenue. Twerefou et al., (2010) estimate the buoyancy and elasticity of the tax system in Ghana for the period of 1970 to 2007. The results show that the overall tax system is buoyant as well as income elastic in the long run, whereas it is less buoyant and inelastic in the short run. The overall tax elasticity is greater than unity, this shows that an increase in income is proportional to tax revenue.

Addison and Levin (2011) analyze the determinants of overall tax revenue and tax structure of 39 countries from 1980 to 2005. For the empirical analysis, two-step GMM regression has been used. The results of the study show that the agriculture sector affects the total tax revenue-GDP ratio adversely and openness and peacetime affect it positively. Per capita GDP

and urbanization are positively related to the total tax revenue-to-GDP ratio in the case of indirect tax revenue whereas, the size of foreign aid affects the direct tax-GDP ratio adversely. Milwood (2011) estimates the extent to which the discretionary changes affect the elasticity and buoyancy in the Jamaican tax system from March 1998 to December 2010. The results of the study show that overall tax growth is 3.39 of which 1.20 is due to discretionary measures and 2.19 is automatic growth. Okech and Mburu (2011) estimate the tax elasticity and buoyancy of the tax system of Kenya from 1986 to 2009. The results of the study show that the overall tax system is less buoyant. The income tax and excise duty are nominal buoyant and their elasticity is less than unity. The sales tax is also less buoyant but the import duties are highly buoyant. The major tax components are found to be inelastic with elasticity less than unity except for excise duty and VAT.

Kargbo and Egwaikhide (2012) evaluate the performance of the overall tax system in Sierra Leone from 1977 to 2009. The study finds that buoyancy estimates are higher than elasticity estimates and the discretionary measures to create more tax revenue for Sierra Leone during the study period. The study also finds that short-run elasticity is lower than the long-run elasticity and the tax system of Sierra Leone is inelastic during the studied period. Samwel and Isaac (2012) estimate the tax elasticity and tax buoyancy and different components of tax revenue in Kenya from 1986 to 2010. The results show that elasticity and buoyancy for whole taxes in growth in GDP to be proportionally higher than in tax revenues. Moreover, the buoyancy for excise duties, import duties, and income terms are more than unity. The findings suggest that the overall tax system of Kenya is neither buoyant nor elastic during the studied period.

Hamlet (2013) estimates the buoyancy as well as elasticity of different taxes for the Eastern Caribbean Currency Union (ECCU) especially, for Dominic, St. Lucia, Antigua, and Barbuda from 1980 to 2010. The results show that the total tax for Dominica and St. Lucia grew at the rate of 0.99 to 1.04, respectively, whereas for Antigua and Barbuda the rate is 1.07. The study concludes that the taxes for Dominica, St. Lucia, Antigua, and Barbuda are buoyant after the tax reforms. Karagoz (2013) finds the determinants of tax buoyancy in Turkey by using the time series data from 1970 to 2010. The study shows that revenues in Turkey to be significantly affected by agricultural and industrial sector shares in GDP, foreign debt stock,

monetization rates of the economy, and urbanization but the agricultural sector seems to harm GDP. The results suggest that the openness of trade has no significant impact on tax revenues in the Turkish economy.

Belinga et al. (2014) estimate the long-run and short-run tax buoyancy for 34 OCED countries from 1965 to 2012. The results show that the average long-run buoyancy is 1.06, and it is significantly smaller than unity in four countries. So, it is concluded that long-sun buoyancy for the countries is either closer to one or exceeds unity by a smaller degree. The study also suggests that short-term buoyancy has relatively more variations than long-run buoyancy. Akram and Sahin (2015) analyze the buoyancy of the tax system in Turkey for the period of January 2005 to June 2014. The results show that the tax system is less buoyant during the study period in the short-run, but in the long run, buoyancy estimates show that the tax system has a positive relationship with the income level of Turkey, this show that increases in GDP cause a direct increase in the tax revenue.

Dudine and Jalles (2018) examine the long-run and short-run tax buoyancy in the case of 107 countries for 1980–2014. For empirical analysis fully modified ordinary least square has been used. The results show that in the case of developed countries, both long-run and short-run buoyancies are not different from 1, in the long run, tax buoyancy exceeds 1 in the case of corporate income tax. But in the case of emerging countries, personal income tax and social security contribute a major share in total revenues. In the case of developing countries taxes on goods and services play important role in revenue collection. In the complete sample case both trade openness and human capital increase buoyancy, while inflation and output volatility decrease it.

Tanchev and Todorov (2019) examine the tax buoyancy in the case of Bulgaria from 1999 t0 2017. and their relationship with Bulgaria's economic growth. The results show that the buoyancies of aggregate tax revenue, personal income tax, and social security contributions significantly differ from one another in the long run. The buoyancies of the value-added tax and the corporate tax are greater than one in the long run. In the short run, the buoyancy of the aggregate tax revenues, the corporate tax, the income tax, and the social security contributions are different from one. The short-run buoyancy of VAT exceeds one, hence the dynamics of VAT revenues are sustainable. The collectability of the aggregate tax revenue, personal income

tax, and social security contributions has increased neither in the long run nor in the short run. It is therefore recommended that inefficient taxes, whose collectability does not increase, be reformed.

III. THE MODEL

A government is unable to function without revenues because it has to make different expenditures i.e. expenditures on defense, health, education, infrastructure, transfer payments, and subsidies. Efficient taxation is essential for the creation of revenues, the efficiency of the taxation system can be judged by its tax buoyancy and elasticity i.e. the tax system of the country and its ability to mobilize the tax revenue, according to demand and supply. The debate of tax elasticity and buoyancy got much attention during the 1960s when IMF started to assist on an international level thus, lending based on the economic performance of the countries. Tax elasticity refers to the measurement of responsiveness of the tax system with changes in the level of national income under different discretionary changes. Whereas, tax buoyancy measures the responsiveness of the tax revenue changes with the level of national income under changes of tax policy, rates, bases, and regulation (Lotz and Morss, 1967; Chelliah, 1971). Mitchell and Andrew (1991) mention that the precise information about elasticity and buoyancy provides the opportunity for the government to speculate revenues and expenditures under different economic situations. Moreover, with the help of tax elasticity and buoyancy policymakers conduct a comparative analysis of different economies' budgeting, revenue, and expenditure structure. Following (Chelliah, 1971; Tanzi and Zee, 2000; Karagoz, 2013; Ali and Audi, 2018; Dudine and Jalles, 2018; Roussel et al., 2021), the functional form of the model become as:

$$TR_{it} = F(GDP_{it}) \qquad (1)$$

TR=Tax revenue components

GDP=Gross Domestic Product (current $US)

i= cross sections (Bangladesh, India, Pakistan, Sri Lanka)

t= time period (1990-2019)

For checking the responsiveness of the dependent variable to the independent variable, the model can be written as:

$$TR_{it} = \alpha_0 GDP_{it}^{\alpha_1} e^{u_{it}} \qquad (2)$$

where

e is the base of the natural logarithm and *u* is the white noise error term.

Taking the log of both sides of eq.2.

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

Aggregate tax revenue, income tax, sales tax, customs duty, and excise duty are some of the main taxes in the selected sample countries. Balance panel data for four SAARC members' countries i.e. Bangladesh, Pakistan, Sri Lanka, and India have been collected for the period from 1990 to 2019. We have used the data of all available years of SAARC nations, the reasons for using a long period, i.e. it provides the best linear unbiased estimator. The data has been taken from different sources e.g. Ministry of Finance of each country, and World Development Indicators (WDI) a database maintained by the World Bank.

IV. ECONOMETRIC METHODOLOGY

This study has adopted the panel analysis method, which is considered an effective analytical method to handle econometric analysis. This study has used the balance panel data, which is the combination of cross-sectional and time-series data. The pooled OLS model has been applied for empirical analysis, it is also called the Common Constant Method (CCM). In this method, all the observations are pooled altogether and the regression model is run by neglecting the time-series and cross-sectional nature of the data. The method denies the individual and heterogeneity across the cross-sectional and assumes that all the cross-sections are the same and there are a common constant and same coefficient for all the cross-sections. The estimated equation follows as:

$$\hat{Y}_{it} = \hat{\alpha}_0 + \hat{\alpha}_1 X_{it} + U_{it} \quad (4)$$

Y=dependent variable

X=independent variable

t= time period (1990-2019)

i=cross sections (Bangladesh, Pakistan, Sri Lanka, and India)

$\hat{\alpha}_0$= common intercept

$\hat{\alpha}_0$= common slope coefficient

U_{it}= white noise error term

In the pooled regression method, the level difference can be removed by mean centering the data across the observation by subtracting the mean of each group from the observation of each group. The model can be directly run by using the least-squares method. The pooled least squares method assumes that the independent variable should not be correlated with the error

term and should not depend upon the lagged values of the error term. The error term and should not depend upon the lagged value of the error term. The error terms should follow the normal distribution. The model should be correctly specified due to a specification error, error terms can be correlated with the independent variable which makes the results biased and inconsistent.

Hausman (1978) proposes a test that is used to select the appropriate model between the fixed effects and random effect model. Following the equation of the Hausman specification the model can be used as follows:

$$H = \left(\hat{\beta}^{FE} - \hat{\beta}^{RE}\right)[(Var\hat{\alpha}^{FE} - Var\hat{\alpha}^{RE})]\left(\hat{\beta}^{FE} - \hat{\beta}^{RE}\right)\tilde{}\mathcal{X}^2(K) \qquad (5)$$

The null hypothesis of this model is that the random effect model is appropriate and the alternative hypothesis is that the fixed effect model is appropriate.

V. EMPIRICAL DISCUSSION

This part of the paper is comprised of estimated results and discussion. This study has tried to measure the tax buoyancy and tax elasticity in the case of SAARC nations from 1990 to 2019. Different tax collections, i.e. excise duty, customs duty, sales tax, income tax, and total taxes are taken as the dependent variables separately along with the independent variable GDP. The estimated descriptive statistic has been given in table 1. These estimates show the normality, outliers, and other properties of the data. The results show that our variables have normally distributed data, with no outliers.

Table 1: Descriptive Statistics

Variables	Means	Std. Dev.	Maximum	Minimum	Observations
lnGDP	30.60021	1.115913	33.54126	26.47547	124
Lnexdty	25.58774	2.027839	29.20326	20.03075	124
Lncstdty	24.47557	1.041941	28.91606	22.51872	124
Lnsaltax	26.86811	1.389275	30.35664	21.89175	124
Lninctax	24.49511	1.349038	30.65447	22.01327	124
Lntotax	26.97963	1.162816	29.85005	23.92672	124

This study has used Breusch-Pagan LM, Pesaran scaled LM, Bias-corrected scaled LM, and Pesaran CD for checking the cross-section dependence of the variables. Based on estimated results the null of “no cross-sectional dependence” is rejected at a 1% level of significance. This situation is best

for applying the pooled least squares, moreover, the Hausman test would decide the random effect or fixed effect least squares.

Table 2: Cross-Section Dependence Test

Test	ST	ED	CD	IT	TT	GDP
Breusch-Pagan LM	20455.5*	3873.8*	17845.3*	3873.8*	7300.8*	6761.1*
Pesaran scaled LM	326.00*	37.616*	280.60*	37.616*	97.218*	87.83*
Bias-corrected scaled LM	324.07*	35.683*	278.67*	35.683*	95.285*	85.898*
Pesaran CD	140.34*	13.679*	130.04*	13.679*	16.764*	26.935*
* for 1 percent level of significance: ST=Sales tax, ED=Excise Duty, CD=Custom Duty, IT=Income Tax, TT=Total Taxes, GDP=Gross Domestic Product						

This study has used balance panel data for empirical analysis in addition to the Hausman test which has been applied to check which method is more appropriate from the random effect model and the fixed effect model for further analysis. Moreover, the Hausman test decides which panel/pooled ordinary least squares method would be used for examining the responsiveness of dependent variables (different components of taxes) toward independent variables (GDP). Hausman's specification follows the chi-square distribution. The null hypothesis, i.e. the random effect model is appropriate, whereas the alternative hypothesis i.e. the fixed effect model is appropriate. In the first model, we have sales tax as the dependent variable and GDP as the independent variable. In the second model, we have an excise duty as the dependent variable and GDP as the independent variable. In the third model, we have customs duty as the dependent variable and GDP as the independent variable. In the fourth model, we have an income tax as a dependent variable and GDP as the independent variable. In the fifth model, we have a total tax as a dependent variable and GDP as the independent variable. The results of the Hausman test have been presented in table 3. The estimated results of the Hausman test show that the null hypothesis is accepted. Thus, we can conclude that the pooled random effect model is more appropriate for empirical analysis of all models.

Table 3

Hausman Specification Test: Sales Tax	
Chi- Square Stat	P-value
1.70	0.1919
Hausman Specification Test: Excise Duty	
Chi- Square Stat	P-value
0.97	0.3242
Hausman Specification Test: Customs Duty	
Chi- Square Stat	P-value
1.08	0.2241
Hausman Specification Test: Income Tax	
Chi- Square Stat	P-value
0.03	0.8724
Hausman Specification Test: Total Tax	
Chi- Square Stat	P-value
2.32	0.1274

The results of pooled regression have been presented in table 4. The buoyancy coefficient for sales tax is statistically significant and has a value greater than 1 i.e. 1.31. The estimated results show that for every 1 percent increase in GDP, a 1.31 percent increase has occurred in sales tax, this indicates that sales tax is buoyant during the selected period. These findings are consistent with Tanzi and Zee (2000), Upender (2008), and Lagravinese et al., (2020). The value of the coefficient shows that sales tax is a good automatic stabilizer. Sales tax is the major source of revenue and helps the government to make expenditures and financing. Moreover, sales tax is easy to collect and its amount ensures the financial position of the economy and government therefore, it must be monitored regularly. Recent sales tax reforms in Pakistan and India bring a substantial rise in tax collection. The high buoyancy of sales tax indicates that these taxes are major contributors towards the revenue collection in SAARC nations.

The results show that excise duty has a positive and significant relationship with GDP, but the coefficient is less than 1. These findings are consistent with Wolswijk (2009), Hamlet (2013), and Lagravinese et al., (2020). The estimates show that a 1 percent increase in GDP, causes the excise duty to rise by 0.81 percent. The results explain that excise duty is not an automatic stabilizer, as it has a buoyancy coefficient less than 1, for a good stabilizer

coefficient must be equal to or greater than 1. Although there is a positive and significant relationship between GDP and excise duty, it is non-proportional. Governments feel rigid in the adoption process of excise duty as revenue collection. Several international institutions discourage the rise of excise duty. So, low excise tax rates, leakages, and less efficient excise bodies in SAARC nations make the excise duty of a less buoyant nature as revenue collection.

The results show that GDP has a positive and significant relationship with customs duty, the outcomes show that a 1 percent increase in GDP brings a 0.62 percent increase in custom duty collections. These findings are consistent with Timsina (2007), Karagoz (2013), Hamlet (2013), and Lagravinese et al., (2020). The estimates show that customs duty has less buoyancy coefficient, it is less than 1, this means that customs duty is not a good automatic stabilizer. The less buoyancy or non-buoyancy of customs duty indicates that despite any rise in imports in SAARC nations, the tax collection from customs duty is not the best source of revenue in these countries. There are several reasons for the non - buoyancy of customs duty, i.e. rely on direct taxes, trade liberalization, globalization, fewer exports, and structural adjustment of SAARC nations. But still, there is room to enhance the revenue collection through customs duty by rationalizing the tariff structure and modernizing the rules and regulations of customs duty.

Income tax is one of the main sources of the government's revenue; the government directly charges the income tax from individuals, firms, and businesses based on income and profits. The estimated results show that GDP has a positive and significant impact on income tax, the outcomes show that a 1 percent increase in GDP, a 1.12 percent increase has occurred in income tax collection in the case of SAARC nations. These findings are consistent with Tanzi and Zee (2000), Belinga et al. (2014), Dudine and Jalles (2018), and Lagravinese et al. (2020). The results reveal that income tax is highly buoyant, as the estimated coefficient is higher than 1. This shows that income tax changes are proportional to changes in GDP in addition to being a good automatic stabilizer. The collection of income tax in SAARC nations has been increased during the last decade due to the improvement of reforms in taxation structure and progressive taxation system. Moreover, high buoyancy is attached with structural reforms of taxation and a broad tax net.

Total tax revenue is the sum of all direct and indirect taxes collected by the government. The results show that GDP has a positive and significant relationship with total taxes in SAARC nations. The outcomes reveal that a 1 percent increase in GDP brings a 1.02 percent increase in total taxes. This reveals that total taxes in SAARC nations are highly buoyant as coefficient value is greater than 1 in addition to being a good automatic stabilizer. The high buoyancy of total taxes shows that selected nations have improved their taxation system and focus on a progressive taxation system.

Table 4: Pooled Ordinary Least Square Outcomes

Explained Variable: Sales Tax				
Explanatory Variable	Coefficient	Std. Error	Z-stat	P-value
GDP	1.305411	0.0293386	44.49	0.000
Constant	-12.77234	0.8762604	-14.58	0.000
Dependent variable: Excise Duty				
GDP	0.8109319	0.0649817	12.48	0.000
Constant	0.5837339	2.087248	0.28	0.780
Dependent variable: Customs Duty				
GDP	0.6158462	0.1377411	4.47	0.021
Constant	7.246391	4.077166	1.78	0.174
Dependent variable: Income Tax				
GDP	1.124341	0.0589846	19.06	0.000
Constant	-7.78561	1.749564	-4.45	0.000
Dependent variable: Total Taxes				
GDP	1.019747	0.031845	32.02	0.000
Constant	-3.205078	0.9435714	-3.40	0.000

VI. CONCLUSIONS

This article has analyzed the tax buoyancy of selected SAARC nations (Bangladesh, India, Pakistan, and Sri Lanka) from 1990 to 2019. Based on the outcomes of the random effect model, the pooled least squares method has been applied for the estimation of coefficients. The buoyancy of four components of taxes and total taxes has been analyzed by using GDP as an explanatory variable. The outcomes show that income tax and sales tax have high buoyancy and are considered the main pillars of government revenues, both income tax and sales tax seem to be an automatic stabilizer and directly proportional to the gross domestic product in SAARC nations. Although custom duty and excise duty have a significant relationship with the gross

domestic product with low buoyancy, it indicates that custom duty and excise duty are not automatically stabilized and non-proportional to the gross domestic product in the case of SAARC nations. This also highlights that structural reforms of income tax and sales are improved in these countries because these are internally decided, whereas excise duty and customs duty are imposed by following the instructions of IFM, World Bank, and WTO. The outcomes of the study suggest that although income tax is the biggest source of revenue, there is still room for more revenue i.e. agricultural income which is not taxed, whereas it is a big source of GDP in SAARC nations. There are several unnecessary exemptions and amnesty schemes that need to be abolished for increasing the share of taxes to GDP. Some structural changes must be performed i.e. tax administration should control leakages of tax evasion and broaden the tax bases, which in turn would make the income tax more responsive. Customs duty and excise duty are the major sources of revenue in many countries. Excise duty is buoyant due to restrictions imposed by WTO and IMF, but the developing countries e.g. SAARC nations can adopt ad-valorem tax rather than the specific tax rate for increasing tax revenues. Customs duty valuation should be improved, over-invoicing and under-invoicing should be discouraged, the wrong declaration of imported goods should be penalized, miss-utilization of pass-book facilities at custom points should be checked regularly, use of duplicate documents should also be checked, and the activities of the customs patrolling group should be enhanced. These are the major measures that should be taken to increase the customs duty as a revenue collection tool. The overall taxation system of SAARC nations is an automatic stabilizer but there is a dire need to check and balance between revenues and expenditures, the leakages in the taxation system should be controlled, the efficiency of the tax collection bodies should be enhanced and unnecessary exemptions should be withdrawn.

VII. LIMITATIONS AND FUTURE DIRECTIONS

This study has used four major SAARC nations for empirical analysis, due to the unavailability of data of other member nations. The outcomes of the study can be improved by managing the data of all SAARC nations. A cross-regional analysis can also provide better policy options to enhance tax revenues. This study is using the only GDP as an explanatory variable to measure the tax buoyancy. By including other determinants of tax revenues,

the outcomes of the study can be improved. This study is only focusing on macro foundations, whereas micro-level analysis has been ignored. Thus, by studying the micro foundation, the tax system of SAARC nations can be improved.

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