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The Role of Value Added Tax (VAT) in the Economic Growth of Pakistan

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Abstract
In Pakistan, General Sale Tax (GST) is essentially a Value Added Tax (VAT) and is an important source of revenue for balancing the government budgets. This study examines the extensive literature, concentrating on theory and empirical studies, on the relationship between VAT revenue and economic growth. It also evaluates critically the revenue performance of VAT in Pakistan during the period 1991-92 to 2011-12 with a larger focus on empirically estimating the role of VAT revenue in the economic growth (GDP) of Pakistan. Using Ordinary Least Square (OLS) Regression technique, the key outcome from this econometric study shows strong and positive impact of VAT revenue on the economic growth (GDP) of Pakistan. One per cent increase in the growth of net VAT revenue causes 0.24% increase in the growth of nominal GDP. The results of Granger Causality also confirm the existence of short run relationship between the growth of VAT revenue and economic growth (GDP) of Pakistan.
Key words: Value Added Tax, Economic Growth, Pakistan

1. Introduction

1.1. Background

Value Added Tax (VAT) is a widely accepted indirect taxation system across the globe. It has now been implemented in more than 150 countries (Brown & Gale, 2012). The dramatic acceptance and rise of VAT across the globe is due to the reason that VAT is a good way to raise resources and modernize the overall tax system (Ebrill *et al*, 2001). At present, VAT is the third important source of tax revenue for the governments in the world, behind social security contributions and personal income taxes (Charlet & Buydens, 2012).

In Pakistan, General Sales Tax (GST) in VAT[25] format was introduced in 1990-91[26] as a way of generating more tax revenue to balance the government budgets. This tax levy has the essential characteristics of a destination-based VAT (Sarker & Hassan, 2012). It is levied on all sales of commodities at every stage of production and taxes paid by enterprises on their material inputs are adjusted against the taxes they must levy on their own sales.

VAT on goods is preserved to the federation and that of services to the provinces as per constitution of Pakistan. The standard VAT rate on goods is 17% with exports are zero-rated. However, there are goods which subject to multiple VAT rates. VAT registration threshold for manufactures is taxable turnover equal to or greater than PKR 5 million and also utility bill equal to or greater than PKR 0.7 million during the last twelve months. Every retailer having turnover equal to or greater than PKR 5 million also requires to be registered under VAT law. There is no registration threshold for other persons engaged in taxable supplies.

A number of goods were exempted from VAT in the past and present. Important ones were pharmaceutical (excluding life saving drugs), tractors and other agriculture machinery, fertilizers and others goods (e.g. agriculture seeds, cattle feed). These exemptions resulted in loss of VAT revenue to the tone of PKR 17.6 billion in 2007-08, PKR 27.4 billion in 2009-10 and PKR 33.8 billion in 2010-11, respectively. Some other key characteristics of VAT in Pakistan are as under:

a) It covers manufactured goods, imported goods, services, and stages such as distribution, wholesale and retail. Previously it was being charged at the manufacturing and import stage, but its scope has been extended now to remaining sectors,
b) It is chargeable on all locally produced and imported goods except computer software, poultry feeds, medicines and unprocessed agricultural produce of Pakistan and other goods specified in Sixth Schedule to the Sales Tax Act, 1990,
c) It is charged where value is added,
d) It avoids the cascading effect of a tax,
e) The input tax is claimable immediately after offsetting from the output tax,
f) Its base is narrow in the sense that about 89% of the total VAT revenue is being collected from top 15 commodities, including POL products, telecommunication, natural gas, services, power, cigarettes, sugar, beverages, tea, cement, scraps of iron and steel, iron and steel products, food products, motor cars and auto parts.

[25] The terms VAT and GST or General Sales Tax have been used interchangeably in this paper implying the same meaning.
[26] In Pakistan, fiscal year begins from July 1 and ends on June 30 in the following calendar year.

1.2. Statement of the Problem

The budget deficits in Pakistan are growing in the recent past, which are greatly criticized within the country and by the financial institutions. The State Bank of Pakistan (SBP) in its third quarterly report-2013 observed that given the pace of budget deficits and resulting rise in public debt, Pakistan is growing the risk of public debt spiral unless the government take a drastic action to cut the deficits (The News, June 14, 2013). Likewise, the International Monetary Fund (IMF) agreed to provide financial support with the stringent condition of reducing budget deficit from about 8% of GDP in 2012-13 to 5.8% of GDP for 2013-14 (Financial Services, September 12, 2013). The growing financial needs in the backdrop of rising debt and debt servicing charges could cause serious consequences for the economy. The International Monetary Fund (IMF) reported that the gross financial needs of Pakistan has reached about 35% of GDP in 2012-13, which are the highest among the emerging economies after Egypt (40%) as well as among the advanced economies after Japan (54%) (Fiscal Monitor, 2013). Thus in view of large budget deficits and subsequently growing financial needs of Pakistan, it is reasonably pertinent to mobilize revenues, in particular tax revenues from the domestic sources. The least harmful way of raising more revenue is through new economic growth (Hodge, 2012). So this study attempts to investigate the contribution of VAT revenue in promoting the economic growth of Pakistan. If VAT revenue has positive impact on economic growth, the government could raise more VAT revenue to balance its budgets and vice versa.

1.3. Objective of the Study

This study sets out to evaluate the revenue performance of VAT in Pakistan during the period 1991-92 to 2011-12 with a larger focus on empirically investing the contribution of VAT in the economic growth of Pakistan.

1.4. Organization of the Paper

The rest of the paper is organized as follows: Section 2 provides theoretical framework. Section 3 presents literature review. Section 4 critically analysis the revenue performance of VAT in Pakistan with a focus on efficiency ratios. Section 5 provides data sources and methodology. Section 6 empirically investigates the contribution of VAT revenue to economic growth of Pakistan and the last section concludes.

2. Theoretical Framework

The most documented principles that are used as a tax policy guide include adequacy, simplicity, neutrality, equity and exportability[27]. These principles are discussed as under:

a) Adequacy - An adequate tax system provides funds sufficient and on sustainable basis to balance the government budgets. A tax is said to be adequate if it is stable as well as elastic. The policy makers want to know whether growth of a specific tax keeps up with the pace of economic growth in the long run (elasticity).
b) Simplicity - A simple tax system requires clear and easily understandable rules. It ensures that cost of tax administration and collection must not exceed the actual tax revenue raised. A tax system becomes complex with excessive exemptions such as special schemes, concessions, credits and too many rates, among others.
c) Neutrality and Efficiency- A tax system is said to be neutral and production efficient if it leaves production undistorted as suggested by the production efficiency theorem (Diamond & Mirrlees, 1971). In other words, it does not interfere with the investment and spending decisions of the individuals and the businesses.
d) Equity - There are two measures of equity. Horizontal equity requires that the taxpayers with equal level of income pay the same amount of tax and thus bears equal tax burden. On the other, vertical equity requires that taxpayers with different level of income should pay different amount of tax and thus bear unequal tax burden. In other words, the taxpayers with high income level should pay higher taxes as a percentage of their income than those taxpayers having comparatively less income. Accordingly, a tax becomes proportional if all the taxpayers pay the same percentage of their income in the form of tax; regressive if the taxpayers with higher income level pay tax as a small percentage of their income; and progressive if the taxpayers with higher income pay a greater percentage of their income in the form of tax (Appendix Table 1).
e) Exportability -An exportable tax is one that is at least partially paid by the non-residents who use a state's transportation infrastructure. There are broadly three ways in which taxes can be exported: by having non-residents pay the tax directly; by levying taxes on businesses which are then passed on to non-residents; and through interaction with the federal income tax.

2.1. Arguments in Favour of VAT

[27] Inferred from the ITEP Guide to Fairs State and Local Taxes

VAT is non-distortionary (Alan, 1990) and is reported as one of the best ways of, not only promoting neutrality and uniformity of tax burden, but also as a way of providing incentives for increasing productivity and industrialization through few exemptions, for example on exports and targeted zero rating. A VAT with a constant tax rate over time would not distort household saving choices, nor would it distort business's choices regarding new investments, financing instruments, or organizational form (Brown & Gale, 2012). The production efficiency theorem (Diamond & Mirrlees, 1971) also permits taxes on consumption, wages and profits, but precludes taxes on intermediate inputs, turnover and trade.

A broad-based VAT ensures revenue mobilization throughout the production chain. So it could be a stable source of revenue and also could generate revenue on sustainable basis if it is well designed and fully implemented.

If VAT is levied uniformly on all goods and services with a constant tax rate, it becomes a simple tax levy. Since it is a self-assessment tax levy, it facilitates VAT administration with relatively less cost of collection as compared to income taxes.

VAT is easily exportable tax because non-residents have to pay VAT on items purchased by them.

2.2. Arguments against VAT

VAT is considered as a regressive tax. It implies the poor pay more tax as a percentage of their income compared to the rich. This is the major criticism of VAT. The governments, therefore, explore various ways such as targeted exemptions and zero rating on essential items such as food and social necessities for reducing the regressivity of this tax, especially on the low-income earners. Other measures include employing low rates for goods and services purchased primarily by the poor, special taxes or high rates on luxury consumption items purchased mostly by the rich such as wines, cars, etc., and consideration of government expenditure on safety nets such as transfers to people with special needs, the marginalized and the elderly.

3. Literature Review

Emmanuel (2013) investigated the effects of Value Added Tax (VAT) on economic growth (GDP) of Nigeria using time series data from 1994-2010 and found one per cent increase in VAT revenue causes 1.47% increase in economic growth (GDP).

Canavire-Bacarreza *et al.* (2013) estimated the effects on growth of the most important taxes for Latin American countries, namely personal income tax, corporate income tax, general taxes on goods and services, including value added and other sales taxes, and revenues from natural resource. They evaluated the effect of these tax instruments on growth for Argentina, Brazil, Mexico, and Chile using vector autoregressive techniques, and for close to the entire region and a worldwide sample of developing and developed countries using panel data estimation. They found that for the most part, personal income tax does not have the expected negative effect on economic growth in Latin America, which is largely explained by the small collections in the region. For corporate income tax, the results suggest reducing tax evasion and greater reliance on collection may boost economic growth in the region as a whole and especially for natural resource exporting countries. However, they found small negative effects of corporate income tax on growth for individual countries, specifically Argentina, Mexico, and Chile. Finally, the study results suggest that greater reliance on consumption taxes has significant positive effects on growth in Latin American in general, although found slight negative effects in some of the selected countries. On the other hand, natural resource revenues do not seem to contribute to growth.

Asogwa & Nkolika (2013) examined the impact of value added tax on investment growth in Nigeria using multiple regression analysis. The results show that Value Added Tax has significant effect on investment growth in Nigeria.

Ebeke & Ehrhart (2011) examined whether or not the adoption of value-added tax (VAT) in developing countries is an effective way of stabilizing tax revenues. Using a large panel of 103 developing countries observed over 1980-2008, they found robust evidence that the presence of VAT leads to significantly lower tax revenue instability. On average, countries with VAT experience 40-50% less tax revenue instability than countries which do not have a VAT system. These effects decrease with the level of economic development and the openness of trade.

Miki (2011) used panel data covering 14 developed countries and quarter periods from the second quarter in 1980 (1980 Q2) to the third quarter in 2010 (2010 Q3) and picking up 53 cases of the change of the VAT rate and empirically found three kind of trends of aggregate consumption and economic growth when the VAT rate is changed. The first trend is that aggregate consumption and economic growth increases [or decreases] just before the rise [or reduction] of the VAT rate. The second trend is that they decrease [or increase] relatively dramatically as soon as the rise [or reduction] is implemented. The third trend is that after the dramatic decrease [or increase] they increase [or decrease] gradually.

Unegbu & Irefin (2011) studied the impact of value added tax (VAT) on economic and human developments of Adamawa State of Nigeria from 2001 to 2009. They collected data from both primary and

secondary sources. They found that the facts obtained via secondary data attest to a very significant VAT impact on economic and human development of the State but data obtained from primary sources suggest minimum VAT impacts.

Keen & Lockwood (2007) estimated, on a panel of 143 countries for 25 years, of a system of equations describing both the probability of VAT adoption and the revenue impact of the VAT and found that the effect of the VAT proves to be significantly positive but fairly modest: adoption of the VAT is associated with a long run increase in the overall revenue-to-GDP ratio of about 4.5%.

Ebrill *et al.* (2002) concluded that the VAT can be a good way to raise resources and modernize the overall tax system—but this requires that the tax be well designed and implemented.

Adereti et. al (2001) empirically investigated the contribution of Value Added Tax (VAT) to GDP in Nigeria for the period 1994-2008. They used time series data of GDP and VAT revenue for the period and did simple regression analysis and descriptive statistical method. Their findings show a positive and significant correlation between VAT revenue and GDP. They further concluded that no causality exist between GDP and VAT revenue.

Ruebling (1973) noted in contrast to some widely alleged consequences, a VAT need not be followed by inflation or greater inequality of income distribution.

4. Revenue Performance of VAT in Pakistan

The share of VAT in total federal tax revenues has significantly increased since its introduction in 1990-91. In absolute terms, VAT collection has increased from PKR 20.8 billion in 1991-92 to PKR 804.9 billion in 2011-12 (Appendix Table 3). The share of VAT in the federal tax receipts of Pakistan has increased from about 15% in 1991-92 to around 43% in 2011-12, with average share of 32% (Hassan, 2013). Average growth of VAT revenue was about 21% during the study period with the highest figure of 62% in 1999-00 and the lowest figure of -3% in 1997-98.

4.1. VAT-to-GDP Ratio

VAT-to-GDP ratio during the study period 1991-92 to 2011-12 is presented in Appendix Table 1. First, VAT collection increased from about 1.5% of GDP in 1991-92 to 4% in 2002-03 and then declined to 3.5% in 2009-10 before again mounting to 3.9% in 2011-12. Average VAT-to-GDP ratio stood at 2.9% during the study period. If 40% of the GDP is supposed to be exempted during the period, the VAT-to-GDP ratio works out to be 4.9%.

4.2. VAT efficiency Ratio

The VAT efficiency ratio is the ratio of VAT revenue to GDP, divided by the standard VAT rate (IMF, 2002). It indicates the percentage of GDP collected by each percentage point of the standard VAT rate. In general, the higher the ratio, the better the performance of VAT. The average VAT efficiency ratio for Pakistan in the years from 1991-9 to 2011-12 was about 19%. First the efficiency ratio increased from 11.4% in 1991-92 to 26.7% in 2002-03 but declined after that to 22.9% in 2011-12 (Appendix Table 3). According to International Monetary Fund (2002), the VAT efficiency ratio was 27% in Sub-Saharan Africa, 35% in Asia and Pacific, 37% in Americas, 38% in EU and 37% in North Africa and Middle East. Now suppose 40% of the GDP was not taxable due to exemptions, the average VAT efficiency works out to be around 32%, lower than international standards.

4.3. C-efficiency

The C-efficiency ratio is the ratio of VAT revenue to total consumption (private and general government consumption), divided by the standard VAT rate (IMF, 2002). A uniform tax on all consumption results in a C-efficiency ratio of 100%. Since GST is a tax on final consumption, not on GDP, thus the C-efficiency ratio is a more reliable indicator of the comparative VAT performance than the VAT-efficiency ratio. The C-efficiency ratio for Pakistan increased from 17.3% in 1991-92 to 31.1% in 2002-03 but decreased to 25.3% in 2011-12 after that (Appendix Table 3). The average C-efficiency ratio was about 25% during the period 1991-92 to 2011-12 with the highest figure of 31.1% in 2002-03 and the lowest figure of 15.2% in 1995-96. According to International Monetary Fund (2002), the C-efficiency ratio was 38% in Sub-Saharan Africa, 58% in Asia and Pacific, 57% in Americas, 64% in EU and 57% in North Africa and Middle East. Supposing 30% of the total consumption was exempted during the period, the average C-efficiency ratio works out to be 32%, which is again less than set by international standards.

4.4. Gross Compliance Ratio

An important measure for assessing the revenue performance of VAT is the Gross Compliance Ratio (GCR), also called Gross Collection Ratio. The GCR is the ratio of actual VAT collection to the potential VAT Collection (Gallagher, 2005). Potential VAT collection is the collection of VAT in the absence of evasion or

exemptions. The international benchmark value for GCR is 69% for advanced countries and, for Central America, the GCR value is 46% (Gallagher, 2005). By contrast, the value of the GCR for Pakistan is low as the average ratio was around 22% during the period. GCR increased from about 17% in 1991-92 to 31% in 2002-03 but the ratio declined to about 22% in 2009-10 (Appendix Table 3). However, GCR is computed taking into account all final consumption (private as well as general government). Suppose 30% of consumption is exempted from VAT during the period, the average GCR works out to be 32%, which is also low as compared to international standards. The primary reason for low GCR includes weak compliance and enforcement of VAT law.

5. Data Source and Methodology

5.1. Data Sources

The study is based on time series data covering the period from 1991-92 to 2011-12. Relevant macro data for the study are obtained from the Strategic Planning and Research Statistics (SP & RS) wing and Year Book 2011-12 of the Federal Board of Revenue (FBR), Economic Surveys of Pakistan and Hand Book of Statistics on Pakistan Economy, State Bank of Pakistan. The data are presented in Appendix 2. Ordinary Least Square (OLS) technique is used to investigate the relationship between dependent variable and independent variables.

5.2. Model Specifications

The study has used the following specifications in order to investigate the role of VAT in the economic growth. The following mathematical model is used for analysis.

$$GDP = f\ (IT, VAT, CD) \quad (1)$$

Where

GDP = the percentage growth of Gross Domestic Product
IT = the percentage growth of Income Tax Revenue
VAT = the percentage growth of Value Added Tax Revenue
CD = the percentage growth of Customs Duty Collection

The estimated models are of the following forms.

$$GDPt = \beta 1 + \beta 2\ ITt + \beta 3\ VATt + \beta 4\ CDt + \varepsilon i \quad (2)$$

Where $\beta 1$ is the intercept in the model and $\beta 2, \beta 3$ and $\beta 4$ stand for the regression coefficients. ε is the error term.

6. Empirical Analysis

6.1. Testing Unit Roots

First time series data is tested for unit roots to investigate the integration among the variables. The study has used Augmented Dickey Fuller Test (ADF). It is because a time series data usually show trend with the time. It is, therefore, necessary to check the stationary of the data for an appropriate technique. H_0 (Null) presence of unit root (series is non-stationary) and H_1 (Alternative) absence of unit root (series is stationary). The results of ADF test are given in Appendix Table 4. All variables became stationary at first difference since the ADF test statistic values are less than the critical values at 1% and 5% levels of significance, respectively. So Ordinary Least Squares method can be used to check the relationship among the variables.

6.2. OLS Results

The regression results for the equation (2) are presented in Appendix Table 5.

The regression equation is GDP = 9.452097 + 0.03558 IT + 0.240777 ST+ 0.039877 CD

t-Statistic (3.611479) (0.438592) (3.265175) (0.642084)

The above regression equation measure the contribution of growth in Income Tax Revenue, Value Added Tax Revenue and Customs Duty Collection on nominal GDP growth during the period 1991-92 to 2011-12. The coefficient C has positive sign and is significant at 5%. It implies nominal GDP is determined endogenously as well as exogenously. The variable growth of Income Tax (IT) revenue has positive but insignificant relation with dependent variable nominal GDP. The variable growth of Value Added Tax (VAT) revenue has positive and statistically significant relation with dependent variable nominal GDP. One percent increase in the growth of Value Added Tax (VAT) revenue will raise nominal GDP growth by 0.24%. The variable growth of Customs Duty (CD) collection has positive but insignificant relation with dependent variable nominal GDP. Durbin-Watson statistic (1.88) is greater than the lower critical value (dL = 1.026) and upper critical value (uL = 1.669). It implies absence of autocorrelation in the model. The values of Variance Inflation Factors (VIF) are presented in Appendix Table 6. The values of VIFs are less than 2, which implies there is no multicollinearity among the independent variables.

Subject to the OLS results, the strong and positive impact of VAT revenue on the economic growth follows the production efficiency theorem (Diamond & Mirrlees, 1971). It implies VAT is a non-distortionary tax. The

findings attest the outcome of many recent studies including those of Emmanuel (2013) and Adereti *et al.* (2011). Figure 1 shows the growth of VAT is keeping up with the pace of economic growth since 1991-92. So VAT also satisfies the principle of "adequacy".

6.3. Short Run Relationship

Granger Causality Test is sued to check the direction of the variables. The results of Granger Causality test with lag 2 and lag 3 are presented in Appendix Table 7. The results show that Income Tax (IT) does not Granger Cause GDP and GDP does not Granger Cause Income Tax (IT) with both lag values. So it shows the absence of any short run relationship between these two variables. VAT does Granger causes GDP and GDP does not Granger Causes VAT with lag 2. Null hypothesis is rejected at 10% level of significance. VAT does Granger cause GDP as probability is 0.0064. There is unidirectional causality running from VAT to GDP with lag 2. So it shows the presence of short run relationship between VAT and GDP. There is bidirectional causality running from VAT to GDP and GDP to VAT with lag 3. Similarly, Customs Duty (CD) does not Granger Cause GDP and GDP does not Granger Cause Customs Duty (CD) with lag 2 but there is unidirectional causality running from GDP to Customs Duty (CD) with lag 3. The results also show that there is no causality between Income Tax (IT) and VAT and Income Tax (IT) and Customs Duty (CD) with both lag values. However, Customs Duty (CD) does Granger Causes VAT at 10% level of significance. Keeping in view the Granger Causality results, the OLS results could be interpreted as existence of short run relationship between growth of VAT revenue and economic growth (GDP).

7. Conclusion

This study empirically found a strong and positive relationship between the growth of VAT revenue and the economic growth (GDP) using time series macro data for the period 1991-92 to 2011-12. This suggests increasing VAT revenue in Pakistan is unlikely to distort consumption and investment decisions of the economic agents. The study, therefore, recommends for measures to enhance VAT revenue to balance the government budgets and to reduce budget deficits. As discussed supra (3), revenue performance of the current VAT has not been satisfactory in the sense that not only the absolute levels of benchmarks such as VAT efficiency and C-efficiency ratios are low, but also these levels are declining in trend. This is mainly due to the defects in the existing VAT law itself such as a wide range of exemptions, zero rating, and reduced rates. Other factors are VAT evasion and underreporting due to weak enforcement of VAT law and low level of taxpayer compliance. In order to improve VAT revenue performance, therefore, policy change is needed to refine the existing VAT system. At the same time, it is crucial to strengthen the current enforcement mechanism by enhancing administrative efficiency and capability as well as improving taxpayer compliance through taxpayer services and tax educations.

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Appendix Table 1: Measuring Equity in Taxation

	Proportional Tax		Regressive Tax		Progressive Tax	
Income (PKR)	Amount of Tax (PKR)	Tax as % of Income	Amount of Tax (PKR)	Tax as % of Income	Amount of Tax (PKR)	Tax as % of Income
20,000	5,000	25	6,000	30	4,000	20
40,000	10,000	25	10,000	25	10,000	25
60,000	15,000	25	12,000	20	18,000	30

Source: A Citizen's Handbook on Taxation in Keynya

Appendix Table 2: Data used in Regression Analysis (PKR million)

	Income Tax Revenue (net)	VAT Revenue (net)	Customs Duty Collection (net)	Income Tax Growth (%)	VAT Growth (%)	Customs Duty Growth (%)
1990/91	19079	17008	50528	-	-	-
1991/92	27913	20799	61821	46.30222	22.28951	22.34998
1992/93	35018	23521	61400	25.45409	13.08717	-0.681
1993/94	41467	30379	64240	18.41624	29.15692	4.625407
1994/95	59064	43574	77653	42.43615	43.43461	20.87951
1995/96	75036	49841	88916	27.04185	14.38243	14.50427
1996/97	80400	55668	86094	7.148569	11.69118	-3.17378
1997/98	97135	53942	74496	20.81468	-3.10052	-13.4713
1998/99	103189	72105	65292	6.232563	33.67135	-12.355
1999/00	105337	116711	61659	2.081617	61.86256	-5.56423
2000/01	117462	153565	65047	11.51068	31.57714	5.494737
2001/02	136542	166561	47818	16.24355	8.462866	-26.487
2002/03	145366	195139	68836	6.46248	17.15768	43.95416
2003/04	157448	219167	91045	8.311435	12.31327	32.26364
2004/05	173768	238537	115374	10.36533	8.838009	26.72195
2005/06	209735	294798	138384	20.69829	23.58586	19.94383
2006/07	315152	309396	132299	50.262	4.951865	-4.39718
2007/08	367959	377430	150663	16.75604	21.9893	13.88068
2008/09	422441	451744	148403	14.80654	19.68948	-1.50004
2009/10	496632	516348	160273	17.56245	14.30102	7.998491
2010/11	582424	684192	184380	17.27476	32.50598	15.04121
2011/12	711017	804899	216906	22.07893	17.64227	17.64074

Source: SP& SR Wing of Federal Board of Revenue.

Appendix Table 3: Revenue Performance of VAT in Pakistan (PKR Billion)

Fiscal Year	GDP	TTR	VAT	VAT/ GDP (%)	VAT/ TTR	VAT Rate (%)	VAT-Efficiency Ratio (%)	Total Consumption	C-efficiency (%)	GCR (%)
1991/92	1465.2	139.78	20.80	1.42	14.88	12.5	11.36	962.6	17.29	17.29
1992/93	1620.6	153.24	23.52	1.45	15.35	12.5	11.61	1110	16.95	16.95
1993/94	1897.9	172.59	30.38	1.60	17.60	12.5	12.81	1351.4	17.98	17.98
1994/95	2268.5	226.58	43.57	1.92	19.23	18	10.67	1545.2	15.67	15.67
1995/96	2577.6	268.04	49.84	1.93	18.59	18	10.74	1818.2	15.23	15.23
1996/97	2952.2	282.09	55.67	1.89	19.73	18	10.48	1929.7	16.03	16.03
1997/98	3255.3	293.63	53.94	1.66	18.37	15	11.05	2224	16.17	16.17
1998/99	3572.3	308.51	72.11	2.02	23.37	15	13.46	2884	16.67	16.67
1999/00	3826.1	347.10	116.71	3.05	33.62	15	20.34	3211.1	24.23	24.23
2000/01	4209.9	392.28	153.57	3.65	39.15	15	24.32	3329.9	30.74	30.74
2001/02	4452.7	404.07	166.56	3.74	41.22	15	24.94	3601	30.84	30.84
2002/03	4875.7	460.63	195.14	4.00	42.36	15	26.68	4184.7	31.09	31.09
2003/04	5640.6	520.84	219.17	3.89	42.08	15	25.90	5001.5	29.21	29.21
2004/05	6499.9	590.39	238.54	3.67	40.40	15	24.47	6379.5	24.93	24.93
2005/06	7623.2	713.44	294.80	3.87	41.32	15	25.78	7197.8	27.30	27.30
2006/07	8673	847.24	309.40	3.57	36.52	15	23.78	8709.6	23.68	23.68
2007/08	10242.8	1008.09	377.43	3.68	37.44	15	24.57	10455.7	24.07	24.07
2008/09	12724	1161.15	451.74	3.55	38.90	16	22.19	11851.3	23.82	23.82
2009/10	14836.5	1327.38	516.35	3.48	38.90	16	21.75	14839.6	21.75	21.75
2010/11	18062.9	1608.42	684.19	3.79	42.54	17	22.28	16584.8	24.27	24.27
2011/12	20653	1882.73	804.90	3.90	42.75	17	22.92	18687.3	25.34	25.34
Average	6758.57	624.20	232.30	2.94	31.64	15.36	19.15	6088.52	24.84	24.84

VAT = Value Added Tax
TTR = Total Tax Revenue
Source: 1) Strategic Planning and Research Statistics (SP & RS) wing of Federal Board of Revenue, 2) Year Book 2011-12 of the Federal Board of Revenue (FBR), 3) Economic Surveys of Pakistan and 4) Hand Book of Statistics on Pakistan Economy, State Bank of Pakistan.

Appendix Table 4: Results of Augmented Dickey Fuller Test

Variables	Level (lag=0)		First Difference (lag=0)	
	Constant	Constant & Trend	Constant	Constant & Trend
GDP	-4.415269 (0.0027)	-4.593625 (0.0083)	-6.539750 (0.0000)	-6.297413 (-0.0003)
IT	-3.794272 (-0.0103)	-3.551935 (-0.0607)	-5.667359 (0.0002)	-5.551421 (-0.0014)
VAT	-3.527901 (-0.018)	-3.478448 (-0.0693)	-4.866308 (-0.0012)	-4.703905 (0.0072)
CD	-3.546963 (-0.0173)	-3.628179 (-0.0529)	-6.660908 (0.000)	-6.46167 (0.0003)

Note- Brackets show MacKinnon (1996) one-sided p- values.

Appendix Table 5: OLS Results Equation (2)

Dependent Variable: GDP
Method: Least Squares
Sample: 1992- 2012
Included observations: 21

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.452097	2.617237	3.611479	0.0022
IT	0.03558	0.081122	0.438592	0.6665
VAT	0.240777	0.073741	3.265175	0.0046
CD	0.039877	0.062105	0.642084	0.5294

R-squared	0.400683		
Adjusted R-squared	0.294921	Mean dependent var	15.52018
S.E. of regression	4.665024	S.D. dependent var	5.555653
Sum squared resid	369.9616	Akaike info criterion	6.087706
Log likelihood	-59.9209	Schwarz criterion	6.286663
F-statistic	3.788545	Hannan-Quinn criter.	6.130885
Prob(F-statistic)	0.030066	Durbin-Watson stat	1.878774

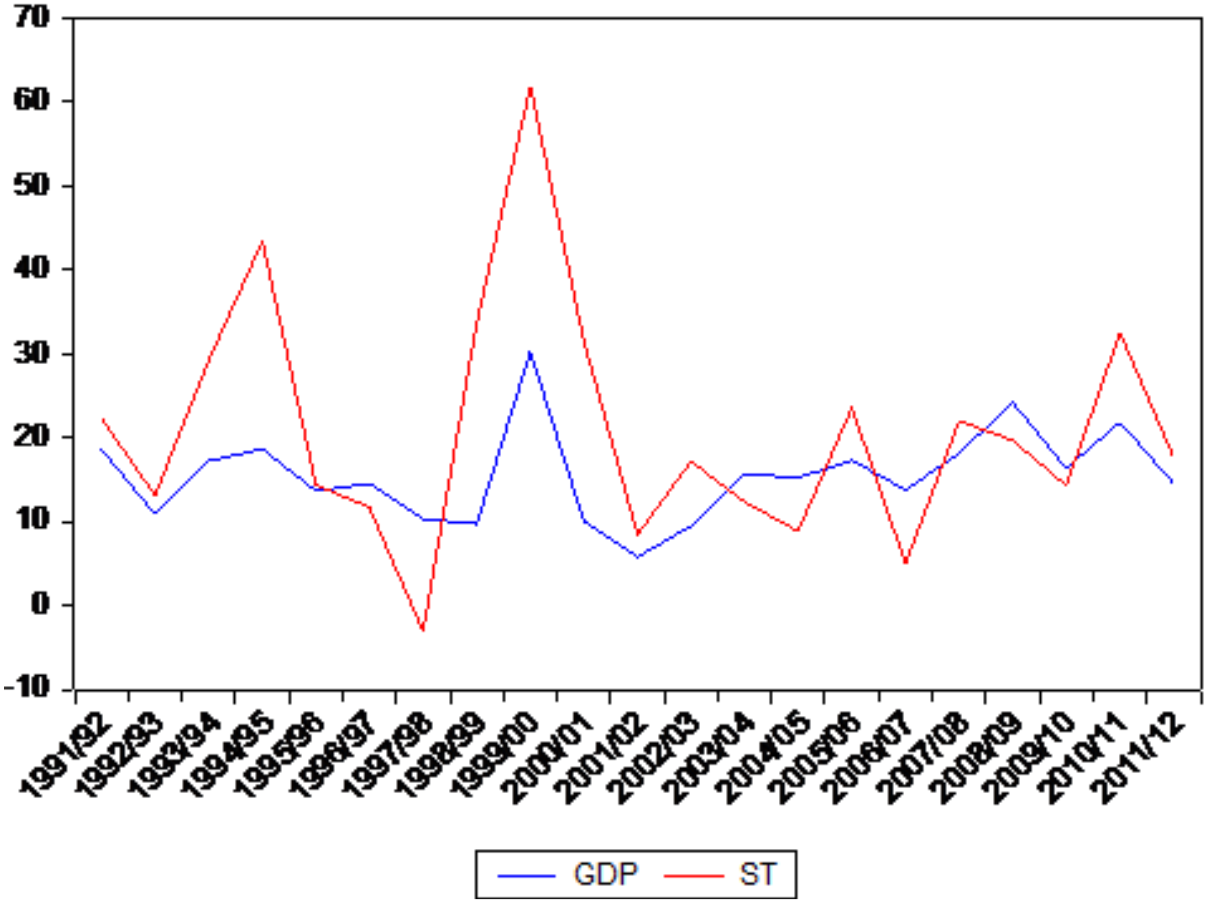
Appendix Table 6: Variance Inflation Factors for Equation (2)

Variance Inflation Factors Date: 12/24/13 Time: 15:29 Sample: 1992 2012			
Included observations: 21			
	Coefficient	Uncentered	Centered
Variable	Variance	VIF	VIF
C	6.849932	6.609945	NA
IT	0.006581	3.433457	1.033359
VAT	0.005438	3.33222	1.034018
CD	0.003857	1.271671	1.005258

Appendix Table 7: Results of Granger-Causality Test

Lags: 2			
Null Hypothesis:	Obs	F-Statistic	Prob.
IT does not Granger Cause GDP	19	1.79243	0.2027
GDP does not Granger Cause IT		0.95550	0.4083
VAT does not Granger Cause GDP	19	7.40046	0.0064
GDP does not Granger Cause VAT		0.91688	0.4225
CD does not Granger Cause GDP	19	0.09155	0.9131
GDP does not Granger Cause CD		2.69770	0.1021
VAT does not Granger Cause IT	19	1.02022	0.3858
IT does not Granger Cause VAT		0.02898	0.9715
CD does not Granger Cause IT	19	0.82573	0.4582
IT does not Granger Cause CD		0.17755	0.8392
CD does not Granger Cause VAT	19	3.29310	0.0673
VAT does not Granger Cause CD		0.27589	0.7629
Lags: 3			
Null Hypothesis:	Obs	F-Statistic	Prob.
IT does not Granger Cause GDP	18	1.41893	0.2896
GDP does not Granger Cause IT		0.34514	0.7934
VAT does not Granger Cause GDP	18	4.53489	0.0265
GDP does not Granger Cause VAT		2.68225	0.0983
CD does not Granger Cause GDP	18	0.35061	0.7896
GDP does not Granger Cause CD		2.87106	0.0848
VAT does not Granger Cause VAT	18	0.76264	0.5383
IT does not Granger Cause ST		0.06774	0.9759
CD does not Granger Cause IT	18	2.03622	0.1672
IT does not Granger Cause CD		0.11509	0.9494
CD does not Granger Cause VAT	18	2.88526	0.0839
VAT does not Granger Cause CD		0.69279	0.5753

Figure 5: Trends in Growth of VAT Revenue and GDP



ST = VAT

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