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## PAKISTAN ECONOMIC AND SOCIAL REVIEW



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## BUDGET SPILLOVERS AND SPATIAL INTERDEPENDENCE AT THE SUB-NATIONAL LEVEL: EVIDENCE FROM PAKISTAN

#### UMAIMA ARIF, FARZANA NAHEED KHAN AND ASMA ARIF\*

**Abstract**. In this study we investigate the notion that provincial governments, in making their choices of public spending, consider the policy choices of neighboring province. The study is based on annual data of all the four provinces of Pakistan over the period of 1981 to 2018. The empirical evidence shows that expenditure choices of provincial governments are influenced by the level of expenditures of its neighboring province. Moreover, provincial spending on law and order, health and education are also influenced by the spending of neighboring province. Further, the results show that variation in interprovincial spillover effects may necessitate a different structure of federal grants to provinces that, along with the standard criteria, also consider uncompensated spillover benefits to neighboring regions as an indicator for the distribution of financial resources.

# **Keywords**: Public policy, budget spillovers, fiscal interactions, seemingly unrelated regression

JEL Classification: H7, H4, H5

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#### I. INTRODUCTION

Expenditure spillovers and public policy interdependence among the subnational governments has attained considerable importance in theoretical and empirical literature related to public finance. Interdependence in provincial and local fiscal policies arises if public choices in nearby region have an essential role in the public decisions of domestic region. Fiscal policy interdependence among provincial or local governments can be provoked by positive or negative spillover effects that influence consumption of residents in neighboring region. Therefore, positive or negative interdependence among neighbor's public expenditure may be observed depending upon the complementarity or substitutability with neighbor's expenditure. Public policy interdependence may also arise for fiscal competition between regions to attract residents/businesses and for cooperation and coordination between provincial and local governments. Further, interdependence can be due to yardstick competition as voters if imperfectly informed evaluate the performance of their government by taking the policies of neighboring region as yardstick. Imperfectly informed provincial or local authorities also tend to follow policies of neighboring region.

In recent times, fiscal policy interdependence was usually investigated for taxation policy and tax competition (Allers & Elhorst, 2005; Hayashi & Robin, 2001; Revelli, 2002; Sol'e-Oll'e, 2007; Bordignon et al., 2003). In developing countries provincial and local governments are not properly equipped with tax competencies. Consequently, the literature has been widened to public expenditure since lower levels of government interact mainly through public expenditures (Foucalt et al., 2008; Sol'e-Oll'e, 2006; Revelli, 2005; Lundberg, 2006; Brueckner, 1998; Case et al., 1993).

Generally, the empirical literature on fiscal interdependence among the sub-national governments is comprised of three groups involving benefit spillovers, yardstick competition and tax competition. The literature on benefit spillovers examines whether public spending of a region creates negative or positive effects on the welfare of citizens in neighboring regions.

The models of yardstick competition are generally considered within the framework of benefit spillover where voters with asymmetric information use neighboring regions' public policies to evaluate the performance of their own government (Salmon, 1987). The taxcompetition literature explores the strategic imposition of taxes by the governments on a mobile tax base along with the strategic policy choices of sub-national governments concerning welfare benefits. All the above categories of literature investigate whether decisions of a sub-national government are determined by the policies choice elsewhere.

There is both theoretical and empirical work that explores whether or not sub-national governments take their decisions about spending by considering the spending decisions of their neighboring jurisdiction. In this conceptual framework, expenditure decisions would depend not only on the economic, social, political, demographic and geographical characteristics of sub-national government but also on the spending decisions of neighboring sub-national governments. Most of the empirical studies investigate fiscal interactions for the tax side of the subnational budget and only few studies focus on public expenditures (Foucault et al., 2008; Revelli, 2002b, 2003; Baicker, 2005, Costa et al., 2015; Case et al., 1993; Figlio, Kolpin, & Reid, 1999). However, in existing literature we cannot find any study that investigates policy interactions by using comprehensive dataset on the provinces of Pakistan. In the current study, we attempt to fill up this gap by exploring the presence of spatial effects that influence provincial spending decisions.

The current study is based on annual data for the 4 provinces of Pakistan over the period 1981-2018. We investigate the notion that provincial governments, in making their choices of public spending, consider the policy choices of neighboring province by employing spatial lag/durbin model within seemingly unrelated regression framework. Further, four alternative criteria to determine neighborliness is used to test the robustness of results. The study contributes to the empirical literature based on budget spillover as the objective of study is to investigate whether or not provincial public expenditure is affected by the expenditures in neighboring provinces. The study investigates the prevalence of spatial interdependence in provincial public spending by using annual data on the four provinces of Pakistan. We focus on total spending and also on different categories of public spending including law and order, education and health.

Generally, the study is based on budget spillovers and policy interdependence and attempts to explore whether or not the decisions of provincial governments' spending affect each other. This issue is important to comprehend the allocation of expenditures across provinces along with the effects of decentralized policies on expenditure side. The decentralization reforms that Pakistan is pursuing, after the 18th amendment 2010 and 7th National Finance Commission (NFC) Award, renders further importance to this issue. The 18th Amendment to the constitution assigned greater fiscal autonomy to the provincial governments by eliminating the concurrent list along with other associated provisions. Further, for the distribution of financial resources among the provinces, multiple indicators have been incorporated as the criterion in 7<sup>th</sup> NFC Award 2010. The 7<sup>th</sup> NFC Award revised the ratio of division of revenues to the federating units which is a major step towards fiscal federalism as it broadened the criterion for the NFC Award. reduced the share of Punjab and almost doubles the share of Baluchistan.

It is expected that the multiple criteria used in 7<sup>th</sup> NFC award will play a key role in tackling the problem of regional disparities and fiscal equalization. It is expected that the ordinary citizens in federating units would gain from the reassignment of the resources from the federal to the provincial government as the provinces would now be able to spend most of their money on education, health, infrastructural facilities, drinking water, energy, agriculture and irrigation.

Now federal government is not the only influential force for fiscal affairs as legislation autonomy has also been transferred to the provinces. The share of provinces in the divisible pool of funds has risen from 47 percent to 57.5 percent that can be further increased with grants, straight transfers and development loans, etc. Accordingly, sound fiscal policy with prudent management of public expenditure is essential for synchronization of revenue receipts and expenditures to avoid high deficits. The current study based on budget spillovers and policy interdependence attempts to explore whether or not the decisions of provincial governments' spending affect each other. It is imperative to attain fresh insights into the decisions of public policy, at the sub-national level, for greater fiscal consolidation.

The rest of the study is arranged as follows. Section II discusses empirical literature on benefit spillover and interdependence of public policy whereas methodology and data/sample are presented in section III. The empirical findings are discussed in section IV and the study is concluded in the last section.

#### **II. REVIEW OF LITERATURE**

Strategic interaction among the sub-national governments is a well debated issue in the literature of regional science and public finance. The presence of strategic interactions among sub-national governments is theoretically expressed by a number of models like spillover effects, yardstick competition, political trends, welfare and tax competition. In the yardstick competition model, voters compare taxes and expenditures in their jurisdiction with taxes and expenditures in neighboring jurisdictions (Salmon, 1987) and therefore, voters penalize the serving politician if spending/tax decisions do not match with their neighbors.

Starting with the work of Besley and Case (1995), several studies in literature have empirically tested yardstick competition (e.g., Revelli, 2002a; Bordignon, Cerniglia, & Revelli, 2003; Solé-Ollé, 2003; Padovano & Petrarca, 2014; Allers & Elhrost, 2005). Another source of policy interaction arises due to tax competition where mobile tax base depends on its own and neighbors' tax policies that results in tax competition (Kanbur & Keen, 1993; Rizzo, 2008; Devereux, Lockwood, & Redoano, 2008; Rizzo, 2010).

In the spillover model, public spending of a jurisdiction may lead to positive/negative spillover effects that influence the welfare of citizens in neighboring jurisdiction. Therefore, sub-national governments may decide their own spending strategically by considering the spending decision of their neighbors (Case et al., 1993; Revelli, 2003, 2002b; Baicker, 2005; Solé-Ollé, 2006; Werck, Heyndels, & Geys, 2008; Costa, Veiga, & Portela, 2015).

The empirical research on the interdependence of public spending was originated with the pioneering work of Case et al. (1993), who empirically explored the interaction in public spending of the 48 states in the US and provided evidence that states' spending is affected by the public spending of neighboring states. Brueckner (1998) analyzes the municipalities of California with growth-control measures and explored the evidence of strategic interaction of policies.

Hanes (2002) analyzes local rescue services for the Swedish economy and finds negative response of municipalities to spillover benefits from neighboring region. Neighborhood influence in the provision of social services for the UK local governments has been investigated for spatial interdependence and results confirm that spatial autocorrelation in social expenditures is endogenous and determined by neighboring regions (Revelli, 2002b).

The case of Spanish local government has also been analyzed by estimating the expenditure reaction function for interaction between local government and the results reveal that spillovers are more pronounced in urban areas relative to the rest of the country (Sol'e-Oll'e, 2005). Expenditure spillover effects are also analyzed for the states of the US via exogenous shocks to medical outlays and empirical findings supports the hypothesis that state spending are mostly effected by the states to which the domestic residents are expected to move (Baicker, 2005).

The cultural and recreational spending by Swedish municipalities has also been tested for spatial interdependence and the empirical findings depict that municipalities with similar outlays are geographically clumped (Lundberg, 2006). Further, positive interdependence has been observed, in German communities, for the public spending that create facilitating environment for business development and general administration (Borck et al., 2006).

For Italian jurisdictions, Ermini and Santolini (2007) examined public spending interdependence and get considerable spatial interaction among the regions for aggregate and different categories of spending. Werck et al. (2008) finds for Flemish municipalities that their cultural expenditures are absolutely influenced by the cultural spending of neighboring municipality. Redoano (2007) investigated fiscal policy interdependence, involving both taxes and expenditures for European countries. Foucalt et al. (2008) examined public policy interactions among French municipalities regarding different categories of local public spending. Ermini and Santolini (2010) finds spatial interdependence in local councils' spending in Italy, hence suggested that local council spending may possibly be impelled by spillover effects.

The empirical literature on interdependence of public policy shows that public spending in neighboring region can positively/negatively affect the welfare of citizens in nearby regions that leads to policy interdependence at the sub-national level. With reference to developing countries, particularly Pakistan, we cannot find any relevant theoretical or empirical literature for budget spillovers and spatial interdependence at the sub-national level. Hence, it necessitates probing this matter for fresh insights on expenditure policy and prudent fiscal management at the subnational in Pakistan.

#### III. EMPIRICAL MODEL, DATA AND ESTIMATION PROCEDURE

#### **EMPIRICAL MODEL**

Our theoretical framework implies that province *i* spending in year *t*,  $E_{it}$ , depends on the spending of its neighbor,  $E_{jt}$ , and its own attributes  $(Z_{it})$ . Following Elhorst (2014), Baicker (2005) and Case et al. (1993), our estimation equation with only one neighbor is given by

$$E_{it} = \lambda Z_{it} + \gamma E_{jt} + u_{it} \tag{1}$$

where  $E_{it}$  is province *i* spending in year *t*,  $E_{jt}$  is province *j* spending in year *t*,  $Z_{it}$  is a vector of control variables  $\lambda$  and  $\gamma$  are the parameters and  $u_{it}$  is a random error term.

The possibility of multiple neighbors has been incorporated by replacing  $E_{it}$  in equation (1) by

$$\sum_{j=1}^{n} w_{ij} E_{jt} \text{ for all } i \neq j.$$
<sup>(2)</sup>

where  $\sum_{j=1}^{n} w_{ij} = 1$  and  $w_{ij}$  are the weights assigned to the neighbors.

We use four different weighting specifications to measure which provinces are close or distant neighbors. Each specification is used to generate composite values of neighbor's spending for each of the four provinces. In considering geographical proximity to measure neighborliness, we make it both dichotomous and continuous variable. In specifying geographical proximity as a dichotomous variable, we denote  $w_{ij} = \frac{\omega_{ij}}{\delta}$  where  $\delta = \sum \omega_{ij}$ . For each of the four provinces  $\omega_{ij}$  is assigned a value of 1 if  $i^{th}$  and  $j^{th}$  province have a common border and equal to zero otherwise. We also specify geographic contiguity as a continuous variable by setting  $\omega_{ij} = \frac{1}{d_{ij}}$ , where  $d_{ij}$  is the distance connecting the capitals of  $i^{th}$  and  $j^{th}$  province, to calculate  $w_{ij}$  from  $\omega_{ij}$  as mentioned above.

We also measure neighborliness for each province *i* to other provinces *j* on the basis of per capita income in each province by defining  $\omega_{ij} = \frac{1}{|income_i - income_j|}$  where  $|income_i - income_j|$  is the difference between the average income of province *i* and *j* to calculate  $w_{ij}$  from  $\omega_{ij}$  as before.

Similarly, neighborliness is determined for each province *i* to other provinces *j* on the basis of population in each province as regions with analogous demographics might have significant mutual affect as their residents are expected to compete in domestic markets. So, we define  $\omega_{ij} = \frac{1}{|population_i - population_j|}$ , where  $|population_i - population_j|$  is the difference between the average population of province *i* and *j* over the sample, to calculate  $w_{ij}$  from  $\omega_{ij}$  as before.

#### DATA

For the measurement of government outlays in province *i* in year *t*, we take aggregate expenditure of each province and convert it into per capita terms. The vector  $Z_{it}$  in equation 1 consists of per capita income, per capita federal grants to province, population density and population over 60 years.

The resources available for provincial spending are measured by the federal grants to the provinces and income. Demographic variables are included to capture the disparity in demands for public goods by different age categories whereas population density captures the possibility of scale economies in the provision of public services. Data on aggregate expenditure of each province and federal grants to the provinces is collected from *Pakistan Statistical Year Book* and data on demographic variables is collected from *Pakistan Bureau of Statistics*. The data on different categories of spending which include expenditure on health, education and law and order is also collected from *Pakistan Statistical Year Book*. The data on provincial GDP is extracted and extended to date by following the methodology of the Arby (2008) due to unavailability of official published statistics on Gross Domestic Product (GDP) at the provincial level. The descriptive statistics of the variables are given below in Table 1.

#### TABLE 1

	Descriptive Statistics					
Variables	Mean	Standard Deviation	Maximum value	Minimum value		
Punjab						
Per Capita Expenditures	7.1	1.1	8.98	5.1		
Per capita Output	10.4	0.67	11.8	9.8		
Per capita Grants	6.6	1.32	8.78	4.6		
Population Density	374	87	527	233		
Population 60+	15.35	0.25	16.01	14.9		
Sind						
Per Capita Expenditures	7.40	1.2	9.3	5.24		
Per capita Output	10.7	0.66	12.1	10.2		
Per capita Grants	5.9	1.67	9.1	4.26		
Population Density	225	52	317	140		
Population 60+	14.1	0.25	14.5	13.7		
Baluchistan						
Per Capita Expenditures	7.9	1.18	9.8	5.79		
Per capita Output	10.6	0.58	11.8	10.06		
Per capita Grants	7.2	1.60	9.6	4.33		
Population Density	19	4	27	12		
Population 60+	12	0.25	13.0	12.2		
КРК						
Per Capita Expenditures	7.4	1.10	9.34	5.53		

#### **Descriptive Statistics of Variables**

Variables	<b>Descriptive Statistics</b>					
	Mean	Standard Deviation	Maximum value	Minimum value		
Per capita Output	10.3	0.63	11.6	9.73		
Per capita Grants	6.68	1.45	9.19	4.58		
Population Density	248	58	350	154		
Population 60+	13.5	0.25	14	13.1		

After collecting data on the above mentioned variables from various sources, we end up with an annual data for the 4 provinces of Pakistan over the period 1981-2018. We estimate our model of provincial spending by using four alternative criteria to determine neighborliness.

#### **ESTIMATION PROCEDURE**

In the context of more general space-time modeling, spatial SUR model was introduced by Anselin (1988) which "consists of an equation for each time period which is estimated for a cross-section of spatial units" (Anselin, 1988).

As the time dimension of our sample is longer than the crosssectional dimension, model specification depends on the time dimension (Mur and Lopez, 2010). Fewer cross sectional units allow developing an equation for each unit along with the interaction mechanism. This approach has been followed by White and Hewings (1982), Hordijk (1979), Arora and Brown (1977), and Hordijk and Nijkamp (1977). We will have a separate equation for each spatial unit (province) to investigate whether variables observed in one unit affect the other units, which give a kind of spatial lag/durbin model within seemingly unrelated regression framework. Therefore, a set of four seemingly unrelated expenditure equations can be written in compact form as

$$E_{it} = X_{it}\beta + u_{it} \qquad t = 1..., \text{ n and } i = 1,..., \quad (3)$$

$$E(u_{it}) = 0, \text{ for all } t \text{ and } i$$

$$E(u_{it}u'_{it}) = \sigma^2_i I, \text{ for all } t$$

$$E(u_{it}u'_{it}) = \sigma_{ii'} I, \text{ for all } t, \text{ where } i \neq i'$$

where t and i shows time dimension and cross sectional dimension respectively.  $E_{it}$  and  $u_{it}$  are tx1 vectors of provincial expenditure and error terms respectively,  $X_{it}$  are t x k matrix of k independent variables that includes expenditures in neighboring  $(E_{jt})$  province and other control variables  $(Z_{it})$  that includes per capita income, per capita federal grants to provincial government, population density and population above 60 years of age.  $\sigma_{ii'}$  is the covariance across equations *i* and *i'*. The covariance matrix of **u** in case of four regions is given by

$$(uu') = \begin{bmatrix} \sigma^{ii}I & \sigma^{ij}I & \sigma^{ik}I & \sigma^{il}I \\ \sigma^{ji}I & \sigma^{jj}I & \sigma^{jk}I & \sigma^{jl}I \\ \sigma^{ki}I & \sigma^{kj}I & \sigma^{kk}I & \sigma^{kl}I \\ \sigma^{li}I & \sigma^{lj}I & \sigma^{lk}I & \sigma^{kk}I \end{bmatrix} = \begin{bmatrix} \sigma^{11} & \sigma^{12} & \sigma^{13} & \sigma^{14} \\ \sigma^{21} & \sigma^{22} & \sigma^{23} & \sigma^{24} \\ \sigma^{31} & \sigma^{32} & \sigma^{33} & \sigma^{34} \\ \sigma^{41} & \sigma^{42} & \sigma^{43} & \sigma^{44} \end{bmatrix} \otimes I \\ = \Omega \otimes I$$

where the diagonal terms are variances of  $u_i$  and  $u_j$  and off diagonal terms are the covariance between  $u_i$  and  $u_j$ . So the interactions between the spatial units also come into the model through  $\Omega$  matrix in generalized least square method. The estimated coefficient matrix  $\hat{\beta}$  is given by

$$\hat{\beta} = [X'(\Omega \otimes I)X]^{-1}X'(\Omega \otimes I)E$$

If  $\Omega$  is unknown, it can be replaced by the matrix of mean squares and product of least square residuals. For the most circumstances, the estimated coefficient is more efficient than the ordinary least square estimator for each equation.

We estimate our spatial SUR model with four alternative criteria to determine neighborliness that includes provincial income (W\_Y), provincial population (W\_P), distance based geographic proximity

(W\_D) and geographic proximity based on common border (W\_B). Our basic model within the SUR framework is also estimated for different categories of provincial spending to explore the policy interdependence. The categories considered include expenditure on health, education and law and order.

#### **IV. RESULTS AND DISCUSSION**

Table 2 to 5 present the estimation results for spatial seemingly unrelated regression equation for the four provinces of Pakistan over the period of 1981-2018. We test the notion that provincial public spending is influenced by the spending of the neighboring provinces which indicates fiscal interdependence at the sub-national level.

We start with the analysis of total provincial spending however we also analyze different categories of provincial spending to explore fiscal policy interdependence. The empirical outcome in Table 3 to 5 shows different spatial patterns of provincial spending on health, education and law and order respectively.

Table 2 shows the results on the basis of four alternative weighting specifications to determine neighborliness that involves geographic proximity based on common border (W\_B), distance based geographic proximity (W D), per capita income (W Y) and population (W P) respectively. The analysis of all these specifications shows that spatial interdependence seems to prevail in spending decisions of all the provinces which implies that provincial governments do not compose their spending choices in isolation. The empirical findings of several spillover hypothesis and other studies confirms the spatial interdependence in spending decisions of sub-national governments [For example, Foucalt et al. (2008), Sol'e-Oll'e (2006), Revelli (2006), Lundberg (2006), Brueckner (1998), Case et al. (1993), Arnott and Grieson (1981) and Gordon (1983)].

The estimated SUR model, for aggregate public expenditure, presented in Table 2 shows positive and highly significant spatial interdependence for the province of Punjab, Sind, Baluchistan and KPK which postulates that higher aggregate public expenditures in neighboring province may influence the provincial governments to increase their spending. The interdependence in provincial spending

postulates that an increase in spending, by the neighbors of  $i^{th}$  province, leads to an increase in public expenditure of province *i*. The result shows a very high degree of spatial spillover in provincial public spending. All the weighting specifications indicate that neighborliness matters for spending decisions. We can reject the null hypothesis, that the spatial effects are zero, for almost all weighting specifications (W\_B, W\_D, W\_Y, and W\_P)<sup>1</sup>.

The estimated coefficients of the control variables mostly accord with theoretical expectations. The coefficient of per capita federal grants has expected positive effect on provincial public spending for Baluchistan and KPK, however, it negatively affects per capita spending in Punjab and Sind.

		W_B	W_D	W_Y	W_P
	Spatial lag	0.90	0.99	0.93	0.93
		(0.13)***	(0.14)*	(0.13)***	(0.13)***
	Population	-0.02	-0.38	0.33	0.19
	Density	(0.43)	(0.4)	(0.41)	(0.42)
	Income per	0.13	0.17	0.09	0.12
Dunich	Capita	(0.06)**	(0.06)***	(0.06)*	(0.06)**
Punjab	Grants	-0.28	-0.27	-0.24	-0.26
		(0.06)***	(0.06)***	(0.06)***	(0.06)***
	Pop 60+	0.72	0.68	0.87	0.89
		(0.83)	(0.89)	(0.6)*	(0.57)*
	LM test P- Value	0.01	0.01	0.01	0.01
	Spatial lag	0.89	0.82	0.84	0.82
		(0.12)***	(0.14)***	(0.15)***	(0.16)***
	Population	-0.69	-0.98	-0.78	-0.49
Sindh	Density	0.42*	0.47**	0.13***	0.16***
Sindh	Income per	0.26	0.33	0.37	0.39
	Capita	(0.10)**	(0.12)**	(0.12)***	(0.12)***
	Grants	-0.02	-0.04	-0.05	-0.06
		(0.03)	(0.03)	(0.03)*	(0.04)*

TABLE 2

The Neighborhood Effect and Aggregate Spending Interdependence

<sup>1</sup>The hypothesis is examined by using LM test.

		W_B	W_D	W_Y	W_P
	pop 60+	-0.12	-0.06	-0.36	-0.39
		(0.76)	(0.9)	(1.0)	(1.1)
	LM test P- Value	0.06	0.05	0.04	0.13
Baluchistan	Spatial lag	0.71	0.78	0.49	0.5
		0.08***	0.13***	0.16***	0.15***
	population	-0.32	-0.14	-0.64	-0.7
	Density	(0.34)	(0.02)***	(0.13)***	(0.13)***
	income per	-0.01	0.05	0.15	0.12
	capita	(0.06)	(0.07)	(0.08)**	(0.083)*
	Grants	0.16	0.14	0.16	0.57
		(0.02)***	(0.02)***	(0.03)***	(0.15)***
	pop 60+	0.09	-0.7	0.34	0.02
		(0.54)	(0.77)	(0.92)	(0.02)
	LM test P- Value	0.15	0.07	0.06	0.19
	Spatial lag	0.68	0.73	0.64	0.7
		(0.12)***	(0.13)***	(0.13)***	(0.13)***
	Population	0.24	0.25	0.84	0.87
	Density	(0.06)***	(0.06)***	(0.53)*	(0.52)*
	Income per	-0.28	-0.17	-0.15	-0.16
VDV	Capita	(0.09)***	(0.09)*	(0.09)*	(0.09)*
KF K	Grants	0.24	0.06	0.03	0.02
		(0.06)***	(0.06)	(0.06)	(0.06)
	Pop 60+	0.15	0.82	0.4	0.15
		(0.07)**	(0.42)**	(0.2)**	(0.07)**
	LM test P- Value	0.25	0.07	0.3	0.01

The figures in parenthesis are standard Errors. \*, \*\*, \*\*\* denote significance at 10, 5, 1 percent respectively.

W\_B, W\_D, W\_Y, W\_P are the weighting specifications based on Geographic Contiguity (common border), Geographic Contiguity (distance Km), Income and population respectively.

In Pakistan expenditure decentralization has outpaced the revenue decentralization, therefore provincial governments have to rely on federal grants to finance their expenditures. The provincial governments receive these federal grants without accountability to tax payers, which promotes fiscal indiscipline and inefficiency/corruption in resource allocation.

Further, per capita income has expected positive effect on provincial public spending in Punjab, Sind and Baluchistan but it is negatively related to per capita spending in KPK. This result is surprising for the province of KPK as it indicates under-utilization of available resources which implies that public spending follows counter cyclical variation, rising when the economy is slow down and decreasing when the economy grows faster.

The effect of population density on aggregate spending is negative implying that with increase in population density, provincial spending would fall. Moreover, an increase in old age population tends to increase provincial spending as provincial governments may have to manage their old age pensions and social security.

The pattern of spending interdependence may vary for different categories of spending. The magnitude and sign of response coefficient might be positive or negative for different expenditures categories as some spending may show substitutability and others may have complementarily. We also estimate the SUR model separately for spending on law and order, health and education. We keep on analyzing spending on per capita basis. The results are presented in Tables 3 to 5.

The LM test statistics for the significance of spatial response coefficient,  $\gamma$ , is given at the bottom row of the tables for each weighting specification to define neighborliness. For each category of spending, we reject the null hypothesis that provincial public spending is spatially independent across provinces.

Table 3 reports neighborhood effect and spending interdependence for public expenditure on health.

#### TABLE 3

The Neighborhood Effect and Spending Interdependence (Health)

		W_B	W_D	W_Y	W_P
Decid	Spatial lag	0.38	0.21	0.37	0.48
		(0.24)*	(0.23)	(0.22)*	(0.28)*
	Income per	-0.23	-0.31	-0.23	-0.16
	capita	(0.32)	(0.33)	(0.33)	(0.33)
	Grants	0.9	0.92	0.79	0.75
Fulljad		(0.38)**	(0.37)**	(0.40)**	(0.41)**
	Pop 60+	0.21	0.37	0.27	0.33
		(0.23)	(0.41)	(0.45)	(0.24)
	LM test P- Value	0.05	0.16	0.06	0.2

		W_B	W_D	W_Y	W_P
	Spatial lag	0.81	0.92	0.43	0.75
		(0.31)**	(0.35)**	(0.38)	(0.40)**
	Income per	0.44	0.19	-0.14	0.05
C' 11	capita	(0.72)	(0.8)	(0.87)	(0.83)
	Grants	-0.39	-0.35	-0.33	-0.35
Siliuli		(0.20)**	(0.23)*	(0.24)	(0.23)*
	Pop 60+	0.09	0.7	0.34	0.02
		(0.54)	(0.77)	(0.92)	(0.02)
	LM test P- Value	0.01	0.03	0.06	0.14
	Spatial lag	0.42	0.62	0.29	0.39
		(0.20)**	(0.40)*	(0.31)	(0.25)*
	Income per	-0.3	-0.37	-0.59	-0.6
	capita	(0.36)	(0.41)	(0.4)*	(0.39)*
Deluchiston	Grants	0.49	0.46	0.52	0.54
Dalucilistali		(0.19)**	(0.23)**	(0.21)**	(0.20)**
	Pop 60+	0.8	0.9	0.48	0.5
		(0.38)**	(0.37)**	(0.3)*	(0.3)*
	LM test P-	0.16	0.08	0.09	0.15
	Value	0110	0.00	0.07	0.110
	Spatial lag	0.1	0.3	0.4	0.3
		(0.14)	(0.17)*	(0.15)**	(0.14)**
	Income per	0.46	0.73	0.93	0.52
	capita	(0.23)**	(0.40)*	(0.35)**	(0.21)**
КРК	Grants	0.39	0.39	0.4	0.4
		(0.25)*	(0.26)*	(0.26)*	(0.25)*
	Pop 60+	0.1	0.41	0.61	0.5
		(0.14)	(0.20)**	(0.40)*	(0.3)*
	LM test P- Value	0.35	0.09	0.08	0.56

The figures in parenthesis are standard Errors. "\*", "\*\*", "\*\*\*" denote significance at 10, 5, 1 percent respectively.

W\_B, W\_D, W\_Y, W\_P are the weighting specifications based on Geographic Contiguity (common border), Geographic Contiguity (distance Km), Income and population respectively.

The results in Table 3 show positive and significant spatial interdependence for expenditure on health. This category of spending may result in large spillovers with high substitutability of health facilities across provinces. Domestic residents may be indifferent to avail these facilities in domestic or neighboring province. Due to spillover effects, benefits of health facilities can reach to the neighboring province and the absence of these services in domestic province may become a source of discontent when neighboring provinces make these services available. Baicker (2005) has examined expenditure spillover effects for the US States via exogenous shocks to medical outlays and empirical outcome endorse the hypothesis that state spending is generally affected by the states to which the domestic residents are expected to move. Hence, higher spending on health facilities in neighboring province may influence the domestic government to raise spending on these facilities.

For spending on education, the empirical results in Table 4 show negative coefficient for spatial interdependence in Punjab, Baluchistan and KPK, hence supporting the spillover hypothesis. The advantage of public services provisions in neighboring province spillover to the domestic province. This spillover benefit allows the domestic region to reallocate its budgetary expenditures to other provincial policies. Our empirical findings for health and education are also supported by the findings of Revelli (2002b) which confirm that spatial autocorrelation in social expenditures are endogenous and determined by neighboring regions.

Concerning expenditure on education, provincial governments have a tendency to free ride upon neighboring expenditures. The results verify the spillover hypothesis by showing negative interdependence for expenditures on the provision of education as the benefit of these public services provision in neighboring province spillover to the domestic province. Spillover benefits allow the provincial government to substitute its public spending in education with the public spending of neighboring province in these categories and reallocate its budgetary expenditures to other provincial policies that may be ranked high in priority.

The Neighborhood Effect and Spending Interdependence (Education)

		W_B	W_D	W_Y	W_P
Punjab	Spatial lag	-0.44	-0.53	0.02	-0.362
		(0.25)*	(0.2)**	(0.3)	(0.29)
	Income per	-0.8	-0.9	-0.76	-0.73
	Capita	(0.38)**	(0.37)***	(0.40)**	(0.41)*
	Grants	0.74	1.8	0.56	0.79
		(0.45)*	(0.62)***	(0.5)	(0.5)*

		W_B	W_D	W_Y	W_P
	LM test P- Value	0.02	0.04	0.36	0.35
Sindh	Spatial lag	0.62	0.29	-0.32	-0.496
		$(0.17)^{***}$	(0.14)**	(0.21)*	$(0.17)^{***}$
	Income per	1.1	0.36	-0.24	-0.62
	Capita	(0.7)*	(0.12)***	(0.82)	(0.77)
	Grants	-0.12	-0.01	-0.09	-0.056
		(0.16)	(0.18)	(0.15)	(0.15)
	LM test P- Value	0.012	0.04	0.63	0.055
	Spatial lag	0.36	-0.15	-0.11	-0.16
		(0.12)***	(0.2)	(0.12)	(0.14)
	income per	-0.88	-1.16	-1.33	-1.38
Deluchiston	capita	(0.47)*	(0.58)**	(0.57)**	(0.56)**
Dalucilistali	Grants	0.72	0.96	0.9	0.86
		(0.21)***	(0.26)***	(0.23)***	(0.22)***
	LM test P- Value	0.01	0.13	0.11	0.09
	Spatial lag	-0.67	-0.55	-0.03	-0.357
		(0.18)***	(0.33)*	(0.31)	(0.33)
	Income per	-0.36	-0.38	-0.32	-0.496
VDV	Capita	(0.12)***	(0.11)***	(0.21)*	(0.17)***
NYK	Grants	0.9	0.44	0.53	1.536
		(0.50)*	(0.25)*	(0.2)**	(0.89)*
	LM test P- Value	0.01	0.07	0.12	0.13

The figures in parenthesis are standard Errors. "\*", "\*\*", "\*\*\*" denote significance at 10, 5, 1 percent respectively.

W\_B, W\_D, W\_Y, W\_P are the weighting specifications based on Geographic Contiguity (common border), Geographic Contiguity (distance Km), Income and population respectively.

The results in Table 5 show positive coefficient of spatial correlation for expenditure on the maintenance of law and order as the provision of these services by the government in domestic province may be ranked high in priority when the neighboring province is providing those services. Hence, higher spending to maintain law and order in neighboring province may also influence the domestic government to rise spending for the provision of these facilities.

#### TABLE 5

# The Neighborhood Effect and Spending Interdependence (Law and Order)

		W_B	W_D	W_Y	W_P
	Spatial lag	0.23	0.2	0.18	0.17
		(0.10)**	(0.10)**	(0.09)**	(0.10)*
	Population	-0.7	-0.95	-0.9	-0.97
	density	(0.35)**	(0.60)*	(0.51)*	(0.61)*
	Income per	0.9	0.84	0.87	0.85
Puniah	Capita	(0.13)***	(0.12)***	(0.13)***	(0.13)***
i unjuo	Grants	-0.28	-0.19	-0.17	-0.16
		(0.14)**	(0.12)*	(0.1)*	(0.1)*
	Pop 60+	0.79	0.2	0.18	0.51
		(1.25)	(0.10)**	(0.09)**	(0.24)**
	LM test P- Value	0.07	0.06	0.06	0.059
	Spatial lag	0.7	0.99	0.98	0.79
		(0.35)**	(0.27)***	(0.27)***	(0.21)***
	Population	0.27	0.08	0.83	0.89
	density	(1.63)	(1.58)	(1.44)	(0.54)
C' 11	Income per	-0.61	-0.57	-0.78	-0.74
Sindh	capita	(0.35)*	(0.34)*	(0.32)**	(0.32)**
	Grants	-0.15	-0.16	-0.15	-0.16
		(0.09)*	(0.09)*	(0.09)*	(0.09)*
	LM test P- Value	0.01	0.01	0.01	0.01
	Spatial lag	0.9	0.96	0.72	0.71
		(0.27)***	(0.17)***	(0.12)***	(0.13)***
	Population	-0.62	-0.29	-0.32	-0.496
	-	(0.17)***	(0.14)**	(0.21)*	(0.17)**
	Income per	-0.82	-0.71	-0.79	-0.71
Dalation	Capita	(0.22)***	(0.20)***	(0.20)***	(0.20)***
Baluchistan	Grants	0.32	0.21	0.19	0.17
		(0.10)***	(0.09)**	(0.09)**	(0.09)**
	LM test P- Value	0.01	0.012	0.01	0.01
	Spatial lag	0.8	0.9	0.7	0.72
крк		(0.4)**	(0.46)**	(0.23)***	(0.29)**
	Population	0.6	-0.5	-0.4	-0.2
	density	(2.7)	(0.3)*	(0.23)*	(0.12)*

		W_B	W_D	W_Y	W_P	
	Income per	0.16	0.75	0.3	0.47	
	Capita	(0.06)**	(0.43)*	(0.15)**	(0.29)*	
	Grants	0.06	0.44	0.23	0.23	
		(0.034)*	(0.29)*	(0.29)	(0.27)	
	LM test P- Value	0.11	0.01	0.01	0.01	

The figures in parenthesis are standard Errors. \*, \*\*, \*\*\*denote significance at 10, 5, 1 percent respectively.

W\_B, W\_D, W\_Y, W\_P are the weighting specifications based on Geographic Contiguity (common border), Geographic Contiguity (distance Km), Income and population respectively

Overall, the results explained above are robust to alternative weighting specifications to determine neighborliness that includes provincial income ( $W_Y$ ), provincial population ( $W_P$ ), distance based geographic proximity ( $W_D$ ) and geographic proximity based on common border ( $W_B$ ).

#### **V. CONCLUSIONS**

In this study, we test for the possible evidence of the interdependence in public expenditures of Pakistan's provinces over the period of 1981-2018. We investigate the notion that provincial governments, in making their choices of public spending, consider the choices of neighboring province while determining the overall size of provincial spending as well as its allocation to health, education and law and order.

We have estimated spatial lag/Durbin model by incorporating weighted average of neighboring expenditure within the framework of seemingly unrelated regression model. The results indicate that provincial governments are influenced by the policy choices of neighboring provinces and they use this information to make their domestic policy decisions. Fiscal policy interdependence among the provincial governments may arise for the reason of fiscal competition, complementarity or substitutability with neighbors' expenditures, yardstick competition or cooperation and coordination among provincial governments.

The result shows that provincial governments follow each other in health spending as well as in expenditures on the maintenance of law and order. Positive interdependence for spending on health and law and order confirm fiscal competition among the provincial governments to catch the attention of residents and businesses.

Concerning expenditure on education, provincial governments have a tendency to free ride upon neighboring expenditures. The results verify the spillover hypothesis by showing negative interdependence for expenditures on the provision of education as the benefit of these public services provision in neighboring province spillover to the domestic province.

Spillover benefits allow the provincial government to substitute its public spending in education with the public spending of neighboring province in these categories and reallocate its budgetary expenditures to other provincial policies that may be ranked high in priority. Therefore, provincial governments may spend inefficiently small amounts for uncompensated spillover benefits in such areas.

The assessment of spending interdependence at the provincial level might be an imperative aspect of federal and provincial public policies. The policy guidelines that come out of this study areas follow:

- Spillover benefits allow the provincial government to substitute it's spending with the spending of neighboring province so provincial governments may spend inefficiently small amounts for uncompensated spillover benefits. To tackle the problem of inefficiency, the interprovincial spillover effects may necessitate a different structure of federal grants to provinces that, along with the standard criteria, also consider uncompensated spillover benefits to neighboring regions as an indicator for the distribution of financial resources.
- Further, positive interdependence of provincial spending with spending decisions of neighboring province confirms fiscal competition or complementarity with neighbors' expenditures. Therefore, Federal government may use different influential tools like special grants, project aid and program loans etc. to enhance provincial spending or to control unproductive spending that may arise for unnecessary fiscal and political competitions among the provincial governments.

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## DISTORTIONS IN PRODUCER INCENTIVES OF CASH CROPS IN PAKISTAN

#### **ABDUL SALAM\***

**Abstract**. The cultivation of cotton and sugarcane provides raw material for the textile and sugar industries in the country. Based on the domestic and international prices of relevant commodities nominal protection coefficients for these crops, from 1995 to 2015, were estimated to ascertain the situation of producer incentives. The nominal protection coefficients for sugarcane have ranged between 0.70 and 1.54, indicating a mixed situation of producer incentives. The nominal protection coefficients for seed cotton during the study period have varied from 0.55 to 0.94. As the values of NPCs have been less than one, cotton farmers have received prices less than the opportunity cost of their produce and thus subjected to implicit taxation, varying from 6 to 45 percent per year.

**Keywords**: Border price, Cash crops, Implicit, Incentive, Distortions, Interventions, Market price, Protection

#### JEL Classification: O31, Q13, H25

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#### I. INTRODUCTION

Cotton and sugarcane are the two most important cash and industrial crops of Pakistan. Taken together, their annual area of about four million hectares accounts for about 18 percent of the total cropped area, contributing about 40 percent of the value added by important crops in the recent past (Pakistan 2017). The cultivation of cotton and sugarcane is the principal source of raw material for the largest agro based industries, textile and sugar, in the country. Cotton seed, a valuable by product of cotton farming, is used for producing vegetable oil and "ghee", by edible oil industry in the country. In addition, their farming provides valuable feed and fodder for raising livestock and dairy animals. The production of cotton and sugarcane thus impacts not only the performance and value addition in agriculture but also that of the large scale manufacturing sector in Pakistan.

Pakistan has a history of policy interventions in cotton and sugarcane sectors. These interventions have, inter alia, included: public sector monopoly in trade of sugar and cotton, system of support / procurement prices of sugarcane and cotton crops, minimum export price (MEP) for cotton, government permission to setup sugar mills, sugar mill zones with monopsony of mills in the context of sugarcane, and government approval, permission and subsidy on exports of sugar.

Many of these interventions, however, were effected without in depth analysis and due regard for their implications for producer incentives and consequences for farm production and productivity. In addition, government exchange rate, fiscal and monetary policies have also affected the nature and course of incentives for growers. In the wake of structural adjustment and economic reforms, initiated during mid-80s, most of the above mentioned interventions have been done away. Moreover, role of private sector in domestic marketing and international trade of cotton and sugarcane and their products has expanded as public sector activities in trade have been rolled back. Thus, domestic prices and farm incentives in production and marketing of cotton and sugarcane crops are by and large, since the 1990s, determined by market forces.

The support price for sugarcane, meant to provide a floor to the market prices, in the absences of institutional mechanism to ensure its implementation, has lost its effectiveness and utility for farmers. There are frequent reports in the press, during sugarcane crushing season, highlighting farmers' problems and complaints about sugarcane prices, delayed payments and deductions on one or the other pretext. The system of support price for cotton crop has been nonexistent since the abolition of Cotton Export Corporation (CEC) in the late 1980s. The producer prices of seed cotton are determined by the interplay of market forces. Farmers often complain about erratic behavior of markets, low prices of seed cotton and collusion among the traders and processors. The markets of sugarcane and cotton dominated, as they are, by powerful groups of industrialists, processors and traders, are plagued by many imperfections to the disadvantage of growers. All these factors impact producer prices and incentives and the course of resource allocation, farm production and productivity. It is worth mentioning here that more than 51 percent of the area under sugarcane and 56 percent of cotton area are contributed by small farmers, operating less than 12.5 acres (Pakistan 2012). The small farmers working under several constraints and lacking storage facilities and holding capacity are obliged to sell their produce during harvest season when prices tend to be at their lowest ebb.

In view of the several changes, leading to the increasing role of markets in determining prices of cash crops there is a need to examine and evaluate the changing position of producer incentives. Accordingly, the annual prices of seed cotton and sugarcane, as received by the growers in domestic markets are reviewed and analyzed along with their corresponding border prices. The border prices were estimated from the actual export and imports price of cotton and sugar and further used to calculate the protection coefficients for the respective commodities so as to ascertain the position of producer incentives. The analysis extends from 1995 to 2015, a period which has witnessed a number of changes in political regimes and policy shifts, and is long enough to allow a meaningful analysis of the situation relating to producer incentives.

Rest of the paper is organized as follows. Important studies relating to the topic are reviewed in section II. Methodology for estimating and analysis of incentives in domestic production is explained in section III. Data used in the estimation and their sources are also described in this section. Empirical estimates of producer incentives in cultivation of sugarcane and cotton are presented and discussed in section IV. Section V concludes the paper by summing up salient results emerging from the analysis. It also provides suggestions for consideration of policy makers to improve the economic environment for production of cotton and sugarcane in the country.

#### **II. REVIEW OF LITERATURE**

A number of studies in the past have attempted to examine the impact of policy interventions on farmers' incentives and incomes. But given the fast track of changes on the policy landscape, resulting in contraction of public sector and allowing increasing economic space to private sector and markets in economic activities, there is a need to revisit and examine the course of incentives for producers of cash and industrial crops of cotton and sugarcane and this study is designed to do that. Before starting new estimations, some of the important studies examining / impacting the course of incentives on cash crops are reviewed here.

Appleyard (1987) in his pioneering study of comparative advantage of agricultural production systems in Pakistan observed that difference between domestic prices received by farmers and their respective international equivalent prices indicate whether farmers gain or lose on account of these differences. In his calculations of protection coefficients for seed cotton and sugarcane, for the period of 1975 to 1983, he employed their domestic support prices and found them to be less than their equivalent border prices, indicating implicit taxation of domestic production of these crops.

Hamid, et al. (1990) in their comprehensive analysis of agricultural pricing policies in Pakistan, spanning from 1960 to mid1980s, noted that trade policies, controls on foreign exchange, and major government interventions in domestic agricultural markets created large distortions in agricultural prices. The overall effect of these policies, including the indirect effects of trade policy distortions on real exchange rates, was to lower the real prices of tradable agricultural products. In case of cotton, the study observed that from 1974 to 1986 the Cotton Export Corporation, established in the 1970s, had a monopoly on cotton (lint) exports. By restricting the volume of exports, the Corporation depressed domestic price of cotton below the world price. At the official exchange rate, the nominal rate of assistance (NRA) on cotton lint averaged (-) 12

and (-) 9 percent in the 1970s and 1980s, respectively. Cotton producers nonetheless benefited from the protection for vegetable oils that boosted the domestic price of cotton seed. Including the protection on cotton seed, the total NRAs for cotton farmers were less negative. However, if the dual exchange rate system is taken into account, the average NRAs for cotton become (-)18 percent in the 1960s (-) 6 percent in the 1970s and (-) 2 percent in the 1980s. In their analysis for sugarcane crop, Hamid *et al.* observed wide variations in domestic production, domestic and world prices of sugar were also reflected in varying estimates of the NRAs. The NRAs averaged over 100 percent in the 1960s, the early 1970s, and the later 1980s, when the international prices fell again. Since then, the NRAs have remained above 50 percent. The authors concluded that sugarcane and refined sugar production had been highly protected.

Orden *et al.* (2006) in their study on the Impact of Global Cotton and Wheat Prices on Rural Poverty in Pakistan observed that domestic prices of seed cotton though less than the export parity prices but had generally followed the trend in the latter. Import parity prices were noted to be substantially higher than the domestic prices. Thus, nominal protection coefficient based on import parity prices was below one, indicating implicit taxation, of domestic cotton producers.

Dorosh and Salam (2007) in their study titled: Distortions to Agricultural Incentives in Pakistan, noted that with the introduction of economic reforms, in the mid-1980s, economic environment had witnessed substantial liberalization and reduction of direct government interventions in agricultural markets. For cotton their nominal rates of assistance (NRA), based on export parity averaging (-) 6.1 percent for the five years ending in 1989, rose to (-) 19.9 percent in the next five years and fell to (-) 7.9 percent in during 1995-2000 but changed to positive protection averaging @ 7 percent for the five-year period ending in 2005. For the sugar industry their NRAs estimates, based on import parity indicated positive protection for the sugar industry, estimated positive protection averaging at 123.7 percent during 1985-89, 52.1 percent in 1990-94, 54.3 percent from 1995-200 and 86.5 percent during 2000-05.

Salam (2009) in his study of distortions in incentives of major crops in Pakistan for the period of 1991 -2008, observed large fluctuations in the domestic and world market prices and noted an upward trend in the domestic prices which was triggered by the depreciation of the local currency. The protection coefficients based on export parity prices indicated arresting of implicit taxation of cotton since 1997-98 which however was not the case when protection coefficients were worked from the import parity prices. In his analysis of incentives for sugarcane crop he noted a situation of implicit taxation when the protection coefficients were based on export parity prices and of implicit subsidy if import parity price was used to represent border price of the produce. The protection coefficients based on the average of export and import parity prices of sugarcane, however, yielded the average value of protection coefficient close to one.

#### III. METHODOLOGY AND DATA USED FOR ESTIMATING PRODUCER INCENTIVES

#### METHODOLOGY

The commodity prices in world markets represent a society's short run opportunity costs with respect to their changed consumption or domestic production (Timmer 1986). They provide a ready reference for ascertaining the competitiveness of domestic production, kind of incentives - protection or taxation and economic environment faced by producers in domestic markets. The world prices also known as border prices are converted into local currency by using an exchange rate (Tsakok 1990). The border prices when expressed into local currency can be easily compared with the corresponding prices in domestic market to figure out their divergence, if any, as trade theory provides for equalizing of prices of traded commodities between the trading partners. The examination and analysis of domestic and border prices is helpful in finding out the protection and its level by estimating the nominal protection coefficient (NPC). The formula for estimating NPC is given below (Tsakok 1990):

NPC=
$$P_i^d / P_i^b$$

Where,

P<sub>i</sub><sup>d</sup> is the domestic price of commodity i, and
$P_i^b$  is the border price of the commodity i, expressed in local currency, i.e. international price of the commodity multiplied by the exchange rate.

As per the review of literature, NPC provides an empirical estimate of any distortions in domestic production of a given commodity. It also provides a measure of the incentives or disincentives for producers of a given commodity. When NPC > 1, domestic price is higher than the border price, it indicates incentives and encouragement to the domestic producers. Conversely, when NPC < 1, border price is higher than the domestic price, indicating implicit taxation and disincentives for domestic producers of the commodity (Appleyard 1987). When NPC =1 it is a neutral situation, neither incentive nor disincentive for domestic producers.

# DATA

The requisite data for estimating border prices of sugar i.e. actual import and export prices of refined sugar, were compiled from the annual reports of the Pakistan Sugar Mills Association (PSMA). From these data import and export parity prices of sugarcane were worked back after accounting for the processing and marketing costs of sugar and sugarcane. The data on marketing and processing costs were adapted from the sugarcane policy reports of the Agricultural Prices Commission (APCOM) and Agricultural Policy Institute(API)

The statistics relating to domestic market prices of seed cotton were gleaned from the cotton policy reports of APCOM and API. The data pertaining to prices of exports and imports of cotton, forming the basis of export and import parity prices' calculations of seed cotton, were also culled from these reports. The data on marketing and processing costs of cotton were also adapted from these reports and supplemented, where needed, from the industry sources. The miscellaneous data relating to the production of sugarcane and cotton as used in the paper were obtained from various issues of Pakistan Economic Survey (Statistical Supplement).

# IV. EMPIRICAL ESTIMATES AND ANALYSIS OF PRODUCER INCENTIVES

### SUGARCANE

Sugarcane, annually cultivated over an area exceeding one million hectares in Pakistan, has emerged as one of the important crops, ranking 4th or 5th largest crop in terms of area (Pakistan 2017). Requiring a high delta of water for its cultivation and occupying the crop fields for a period ranging from 9 to 15 months, area under sugarcane has exhibited a cyclical pattern in response to varying availability of water and economic incentives. The sugar industry comprising 89 sugar mills, located in the irrigated regions of the country, with annual capacity of producing 6 to 8 million tons of sugar (PSMA 2018), is dependent on sugarcane farming for the supply of its raw material.

Data on annual domestic prices of sugarcane, from 1995 to 2015, in juxtaposition to their corresponding border prices are set out in Table 1. During this period, Pakistan is reported to have imported as well exported varying quantities of sugar, depending on the domestic demand, supply and developments in the world sugar markets. Accordingly, both the import and export parity prices of sugarcane were used to estimate its border prices and opportunity costs of domestic production. The import parity prices were estimated from the actual import prices of sugar while exports parity prices were calculated from the actual export prices of sugar, as reported by the PSMA in its annual reports, after adjusting for processing and marketing costs involved in its imports and exports. The domestic and border prices of sugarcane are presented in Table 1 and also depicted in Figure.1.

A perusal of the data in Table 1 indicates that nominal domestic prices of sugarcane, during 1995 - 2015, ranging between Rs. 21.20 and 180 per 40 kg and depicting considerable fluctuations seem to have trended upward. The import parity prices of sugarcane, fluctuating between Rs. 28.66 and 196.65 per 40 kg, reflecting developments in world markets and changes in exchange rate, also seem to have, over time, trended upward. Similarly, export parity prices of sugarcane, varying between Rs. 19.66 per 40 kg and Rs. 121.25 have moved upward. The average annual growth rates in the domestic, import and export parity

prices of sugarcane work out to 10.73, 10.14 and 9.83 percent, respectively.

A comparison of the import and export parity prices of sugarcane indicates the former to be always greater. This is quite logical and natural as the freight charges involved in international transport are added to the f.o.b costs and domestic marketing and handling costs are added to the resulting c.i.f. costs of imports (OECD, 2016). On the other hand, in estimating export parity prices, starting with f.o.b costs the domestic marketing and handling costs are subtracted from it, leading to a lower value of export parity price in relation to its corresponding import parity. As a sequel to this, values of NPC1, indicating ratio between the domestic price of sugarcane and import parity in Table 1, in comparison with corresponding values of NPC2, calculated as the ratio between domestic and export parity prices of sugarcane, are considerably lower. Accordingly, the resulting position of incentives varies quite widely.

In view of the real situation, involving both imports and exports of sugar, average of the import and export parity prices was adopted to represent the border price and opportunity cost of domestic production of sugarcane in calculating the nominal protection of sugarcane, NPC 3, as given in the last column of Table 1. The annual values of NPC3 showing a wide range, between 0.70 and 1.54, exhibit wide fluctuations, reflecting the underlying varying situation of incentives in the sugar sector. As per the NPC3 estimates in Table 1, in 13 out of the 21 years, under review, sugarcane farming in Pakistan enjoyed considerable protection, ranging from 13 to 54 percent. However, in 5 of the years farmers growing sugarcane were implicitly taxed, varying from 8 to 30 percent per year, and in 3 of the years the producer prices in the domestic market were quite close to the corresponding border prices. The sugarcane growers since 2006 seem to have faced a favorable economic environment, enjoying significant protection, ranging from 10 to 48 percent during most of these years.

# TABLE 1

# Domestic Market and International Prices of Sugarcane in Pakistan: 1995 – 2015

Year	Domestic price	Import parity price	Export parity price	NPC 1	NPC2	NPC 3
	-	Rs/ 40 kg	_			
1994-95	21.20	35.28	25.64	0.60	0.83	0.70
1995-96	25.00	36.73	27.30	0.68	0.92	0.78
1996-97	39.00	37.21	25.68	1.05	1.52	1.24
1997-98	37.00	34.01	24.23	1.09	1.53	1.27
1998-99	34.00	28.66	21.09	1.19	1.61	1.37
1999-00	38.50	30.27	19.66	1.27	1.96	1.54
2000-01	47.50	39.32	31.76	1.21	1.50	1.34
2001-02	42.00	44.96	29.34	0.93	1.43	1.13
2002-03	35.50	47.75	28.65	0.74	1.24	0.93
2003-04	34.50	44.81	30.00	0.77	1.15	0.92
2004-05	40.50	52.76	41.28	0.77	0.98	0.86
2005-06	60.00	63.43	54.38	0.95	1.10	1.02
2006-07	63.50	67.92	56.49	0.93	1.12	1.02
2007-08	63.50	65.40	45.62	0.97	1.39	1.14
2008-09	100.00	97.44	58.75	1.03	1.70	1.28
2009-10	155.00	104.59	104.82	1.48	1.48	1.48
2010-11	180.00	151.10	136.49	1.19	1.32	1.25
2011-12	151.00	184.89	121.25	0.82	1.25	0.99
2012-13	172.00	196.65	116.70	0.87	1.47	1.10
2013-14	169.50	182.90	107.80	0.93	1.57	1.17
2014-15	169.50	184.63	111.08	0.92	1.53	1.15

Notes: NPC is the ratio between domestic and international prices. NPC 1, NPC 2 and NPC3 are the ratios of domestic prices in relation to import, export, and the average of import and export parity prices, respectively.

In view of large variation in the annual values of NPCs, period of study was divided into sub periods of five years, each. The average values of relevant prices data and protection coefficients for these subperiods are set out in table 2. As per these data, period of 2010-15 was the most favorable for sugarcane farmers since average price received by them exceeded its opportunity cost by 17 percent. The protection enjoyed by sugarcane growers during the entire study period averaged 14 percent per year. The protection during 1st half of study period, 1995-2004, was 10 percent which rose to 15 percent per year during the 2nd half extending from 2005-15.

Empirical estimates of protection coefficients during the period under reference portray a mixed picture of incentives for domestic producers of sugarcane. The emerging situation, notwithstanding introduction of many reforms in the sugar sector, seems to be in line with the findings of the previous studies reviewed in this paper.



FIGURE 1

Domestic and International Prices of Sugarcane in Pakistan: Rs / 40 kg

An important conclusion emerging from careful examination of the NPCs is that Pakistan may have comparative advantage in domestic production of sugarcane for import substitution. However, with the current technological relationships in production of sugarcane, it's processing and marketing, and organization of domestic sugar industry and its international trade Pakistan would be hard pressed to economically export sugar.

#### TABLE 2

Nominal Protection Coefficients Based on the Averages of Domestic and Border Prices of Sugarcane

	Domestic market price	Average of import & export parity prices	NPC3
	Rs/	40 kg	
1995-99	31.24	29.58	1.06
2000-04	39.60	34.65	1.14
2005-09	65.50	60.35	1.09
2010-15	166.17	141.91	1.17
1995-2004	35.42	32.12	1.10
2005-15	120.41	104.83	1.15
1995-2015	79.94	70.21	1.14

Source: calculated from the data in Table 1

# COTTON

Cotton, the 2nd largest crop after wheat in Pakistan, is the principal cash crop and source of raw material for the largest agro - based textile industry in the country. Annually planted on area hovering around 2.87 million hectares in the recent past, it has accounted for 13 percent of the total cropped area and 27 percent of the value added by major crops in the recent past (Pakistan 2017). With the annual production of cotton averaging at 2, 268 thousand tons, Pakistan is the 4th largest cotton producer in the world. Pakistan is also a major player in world cotton markets, exporting as well importing large quantities of the produce in addition to exporting large quantities of cotton made ups and value added products. With its extensive forward and backward linkages, cotton plays an important role in the performance of overall economy. Starting with the rolling back of the monopoly of Cotton Export Corporation (CEC) in cotton exports in the 80s, cotton sector in Pakistan has become to be closely integrated with the world cotton economy. How the developments in world cotton markets have influenced the incentives in cotton production in Pakistan? This is examined below through the analysis and comparison of domestic and corresponding border prices of seed cotton in Pakistan, during 1995- 2015. The requisite data in this context are presented in Table 3.

An examination of the nominal domestic and border prices of seed cotton, as presented in Table 3, leads to the following conclusions. The prices of seed cotton, domestic as well as border prices, have been prone to wide fluctuations. The movements in domestic prices have closely border prices. The correlation coefficients between the tracked the domestic and import parity as well as those between the domestic and export parity prices, each, for the period under review has been estimated at 0.972. Import parity prices of seed cotton as estimated from the international prices have been higher than the corresponding export parity prices. The domestic market prices of seed cotton have ruled much below the corresponding import parity prices. However, domestic prices have occasionally exceeded the export parity prices estimated from the actual export prices of cotton. This is also apparent from the Chart showing domestic and international prices of seed cotton, Figure. 2.

While analyzing the domestic and international prices, three sets of nominal protection coefficients, as in case of sugarcane discussed above, were estimated. These are: NPC1, depicting the ratio between the domestic and import parity prices of seed cotton; NPC2, showing the ratio between the domestic and export port parity prices of seed cotton and NPC3, representing the ratio between the domestic and the average of import and export parity prices of seed cotton. Given the ground realities involving both imports and exports of cotton in Pakistan during the period under reference, the average of import and export parity prices has been adopted to represent the border price and opportunity cost of domestic production of seed cotton. The values of NPC3, as given in the last column of Table 3, are based on this border price. Further discussion of incentives in cotton production is also in the context of NPC3 estimates.

As per the estimates of NPC3 in Table 3, ranging between 0.55 and 0.94, cotton production in Pakistan, throughout the period of this study, has been subjected to implicit taxation, varying from 6 to 45 percent per year. Accordingly, prices received by cotton growers have been much below its opportunity cost and thus entailed resource transfers from cotton farmers, resulting in income and welfare losses for them.

# TABLE 3

# Domestic Market and International Prices of Seed Cotton in Pakistan; 1995 – 2015

Year	Domestic price	Import parity price	Export parity price	NPC1	NPC2	NPC3
		Rs/ 40 kg				
1994-95	794	1,980	919	0.40	0.86	0.55
1995-96	739	1,190	816	0.62	0.91	0.74
1996-97	840	1,239	879	0.68	0.96	0.79
1997-98	808	1,253	818	0.64	0.99	0.78
1998-99	876	1,177	804	0.74	1.09	0.88
1999-00	580	1,208	640	0.48	0.91	0.63
2000-01	941	1,367	828	0.69	1.14	0.86
2001-02	783	1,019	647	0.77	1.21	0.94
2002-03	842	1,319	818	0.64	1.03	0.79
2003-04	1,282	1,595	1,144	0.80	1.12	0.94
2004-05	893	1,248	846	0.72	1.06	0.85
2005-06	1,038	1,367	963	0.76	1.08	0.89
2006-07	1,144	1,467	989	0.78	1.16	0.93
2007-08	1,200	2,234	1,253	0.54	0.96	0.69
2008-09	1,541	2,141	1,413	0.72	1.09	0.87
2009-10	1,910	2,586	1,709	0.74	1.12	0.89
2010-11	3,936	5,583	4,647	0.71	0.85	0.77
2011-12	3,000	4,039	2,415	0.74	1.24	0.93
2012-13	2,614	3,255	2,356	0.80	1.11	0.93
2013-14	3,001	3,688	2,802	0.81	1.07	0.92
2014-15	2,390	3,838	2,446	0.62	0.98	0.76

Notes: NPC is the ratio between domestic and international price. NPC1, NPC2 and NPC3 are the ratios of domestic market prices in relation to import, export and the average of import and export parity prices of seed cotton, respectively.

On the average, resource transfers from cotton farmers, in nominal terms, have averaged at Rs.301 per 40 kg of seed cotton per year. The overall average value of the NPC, estimated at 0.83 represents implicit taxation of cotton farmers @ 17 percent per year



FIGURE 2

Domestic and International Prices of Seed Cotton in Pakistan: Rs / 40 kg

The rate of implicit taxation of domestic seed cotton production during the 1<sup>st</sup> half of the study period, 1995 - 2004, is estimated at 22 percent per year which declined to 15 percent during the 2nd half spanning 2005-15. As per the results of empirical estimates of protection coefficients presented in Table 4, implicit taxation of cotton production averaging 27 percent per year during 1995-99 has trended downward and was estimated at 14 percent during 2010 - 15.

As per results of empirical analysis, presented in this paper and those of the previous studies as reviewed in Section II, domestic cotton producers continue to be taxed implicitly, adversely affecting farm households' income and welfare. In spite of the many reforms aimed at economic liberalization, cotton farmers continue to suffer substantial resource transfers which, inter alia, impairs their capacity to increase farm productivity.

#### TABLE 4

Sub periods	Domestic	Border	Border price – Domestic price	NPC 3
		Rs./ 4	0 kg	
1995-99	811	1,107	296	0.73
2000-04	886	1,059	173	0.84
2005-09	1,163	1,392	229	0.84
2010-15	2,809	3,280	472	0.86
1995-2004	849	1,083	235	0.78
2005-2015	2,061	2,422	361	0.85
1995-2015	1,483	1,784	301	0.83

Nominal Protection Coefficients Based on the Averages of Domestic and Border Prices of Seed Cotton

Source: Calculated from the data in Table 3

### V. CONCLUSIONS AND POLICY SUGGESTIONS

During the study period, 1995–2015, nominal domestic prices of sugarcane ranged between Rs. 21.20 and 180 per 40kg; the corresponding import parity prices varied between Rs. 28.66 and 196.65, while export parity prices fluctuated between Rs. 19.66 and 121.25 per 40kg. Domestic prices of sugarcane have been considerably below the import parity but higher than the corresponding export parity prices, reflecting a diverse and fluctuating situation of distortions in incentives to domestic production. The protection enjoyed by sugarcane growers, estimated with respect to the average of import and export parity prices, during the study period averaged 14 percent per year. The protection during the 1<sup>st</sup> half of study period, 1995–2004, was 10 percent which rose to 15 percent during the 2nd half extending from 2000–15.

Pakistan has imported as well as exported large quantities of cotton during the study period. Domestic market prices of seed cotton have been all along lower than the corresponding import parity prices but occasionally exceeded the relevant export parity prices. The nominal protection coefficients calculated with respect to the average of import and export parity prices of seed cotton have ranged between 0.55 and 0.94. Thus, cotton production in Pakistan throughout the period of this study has been subjected to implicit taxation, varying from 6 to 45 percent per year. Accordingly, prices received by cotton growers have been much below the opportunity costs and entailed substantial resource transfers from cotton farmers. The implicit taxation on domestic cotton production during the 1<sup>st</sup> half of the study period, 1995-2004, is estimated at 22 percent per year which declined to 15 percent during the 2nd half or 2005–15. The cotton growing farm households have thus suffered large resource transfers, resulting in huge income and welfare losses which, inter alia adversely impacts their capacity to increase farm productivity.

Incentives in cultivation of cotton and sugarcane crops, during the period under reference, have exhibited a diverse picture, cotton subjected to implicit taxation while sugarcane enjoying protection. With the 18th amendment to the Constitution, enacted in 2011, the subject of agriculture has been devolved to provinces and prices of sugarcane are now determined by the provincial governments. The pricing of sugarcane in Pakistan has all along been a contentious issue. To improve efficiency in sugar sector it is imperative to link pricing of sugarcane to its sucrose contents. The current practice of its pricing is based on weight with no regard to the quality of the produce. Unless provincial governments develop a capacity to address the numerous problems, issues and challenges in this context and balance the conflicting interests of all the stakeholders, the sugar sector will continue to be inefficient and uncompetitive involving wasteful use of resources.

Notwithstanding the hand picking of seed cotton in Pakistan, its post-harvest storage, whether on or off farm, ginning and marketing practices often result in lower quality of the produce. Inadequate attention to grading and poor ginning practices have fetched lower prices for our cotton in international markets resulting in lower domestic producer prices. The cotton farmers suffer large income losses on this count alone. One of the important aspects deserving attention of the provincial governments is the introduction of compulsory grading at the ginneries and improvement of ginning methods and practices.

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# EVIDENCE OF VOLATILITY CLUSTERING AND ASYMMETRIC BEHAVIOR OF RETURNS IN ASIAN EMERGING STOCK MARKETS

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**Abstract**. In financial time series, the volatility clustering and asymmetry behavior is a vital fact. In this very research, we focus on the important aspects of the existence of volatility clustering and asymmetry by employing the GARCH models which include both symmetric models and asymmetric models on eight Asian emerging financial markets. This research has used log-returns of selected financial markets monthly indexes from 2009 to 2018. This study finds the existence of financial asymmetric behavior and clustering volatility in all sample financial stock markets. The study confirms that asymmetric behavior is high if volatility clustering of returns exists. On the other hand, good news impacts less compared to unfavorable news on t+1 day volatility and vice versa. This study assesses the prognostic ability of asymmetric GARCH models are performed well in capturing the volatility clustering and asymmetric

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behavior than symmetric GARCH on emerging Asian financial markets.

**Keywords**: Asymmetric, Volatility clusters, News impact, symmetric GARCH, Asymmetric G-GARCH and E-GARCH, Investment Decision, Portfolio risk and return

JEL Classification: G10, G11, G15, G52

# I. INTRODUCTION

Due to continuous fluctuation in stock market indices the nature of financial markets is stochastic (Moliner, & Epifanio, 2019). Investors always tend to invest in those markets where they can meet their riskreturn expectations especially due to the presence of uncertainty and volatile movement of stock indices (Cao, Zhang, & Li, 2017). This bullish- bearish (up-down) movements in daily stocks prices are identified as returns' volatility. These up and down movements are considered as normal unless these movements' turn into infrequent like very low or high (Khan, Khan, Mahmood, & Sheeraz, 2019). These unusual movements not only distort the investor confidence but also investment flow and investment planning. Higher volatility in stock indexes leads to increase the uncertainty about expected returns and increase risk (Ning Xu, & Wirjanto, 2008). Prediction about risk-return in instable financial markets is very hard for investor and makes him shaky in making investment decision in that particular market. This uncertainty in markets forbids rational investors to invest in particular volatile market.

Companies face difficulty in raising their capital from financial markets due to volatile situation. It also results in loss of existing and potential investors which in return causes more severe volatile situations for the companies (Bouchaud, Gefen, Potters, & Wyart, 2004). Sometime this uncertainty leads towards financial distress as observed in 2008 and 2011 (Hashmi & Tay 2007). Therefore, it becomes necessary to avoid such situations by accurately assessing the risk measures. As investors are always interested in high returns and low risk which can be difficult to obtain as in financial studies high returns are associated with high risk

(Coskun & Ertugrul. 2016). One can minimize risk but cannot avoid it due to high fluctuations in daily stock prices or even in forex rates which causes sometimes high returns or can often results huge losses (Hoy, 1988; Hull, 2012).

The stock returns in emerging markets are more volatile. Investors want to maximize their portfolio returns however, there is a commonly known fact exists that the relationship between stock returns and volatility is inverse (Coskun & Ertugrul. 2016; Pagan & Schwert 1990). This issue is also recognized as asymmetry. Black (1976) concluded that decrease in stock returns enhances the leverage and in return this leverage effect increases the volatility clustering and asymmetry risk. We can also say that if there is a combination exist between volatility clustering and asymmetry then it is known as leverage effect which can affect both risk and return of stocks (Patton & Sheppard, 2015; Campbell & Hentschel, 1992; Naqvi et al., 2016). The emerging markets then follow the trend of high risk and high return and increasing risk level results the demand of high expected return on investment. Therefore, the relationship between leverage and volatility is casual and different. Previously, the common direction of relationship flow is from return to conditional volatility while now the relationship flow direction reverses from volatility to returns. So, the importance to measure risk before making an investment decision for a specific market and that ultimately helps in good portfolio construction as well as for asset pricing.

For long time, the assumption of normal distribution and stock market returns' performance distribution are aligned. This discrepancy comes out if stock market returns are measured with consideration of asymmetry (skewness) and volatility clustering (kurtosis). The emphasis to incorporate the third and fourth measure of risk was pointed out by the behavior of stock risk-return the assumption of normal distribution and standard deviation (Harvey & Siddique, 2000; Naqvi et al., 2017). The tradition of GARCH models is to integrate the clustering volatility and that is defined as a big shocks followed by big or small shocks regardless of their volatility due to directional effects (positive/negative) (Timmer, 2018). The biggest limitation of traditional symmetric GARCH models was that it does not integrate the effects of favorable or unfavorable news on volatility risk (Horvath & Johnston, 2010). The introduction of

Exp-GARCH and GJR-GARCH has ended this limitation of traditional models. According to exponential-GARCH, Nelson (1991) presented this model, the measurement of asymmetric shocks is vital (favorable or unfavorable). Another asymmetric model GJR-GARCH is introduced by Glosten, Jagannathan, & Runkle, (1993) which is the extension of GARCH (p, q) also known as TGARCH, this is also used to measure the volatility clustering and asymmetric risk. Therefore, it is necessary for the investors to avoid risk in order to maximize the returns and obtain optimal portfolio. This can only be possible if advanced and reliable tools and techniques are applied for measuring the risk as the stock market returns in emerging Asian markets which are considered more volatile. That is why, Khan et al., (2019) suggested that in emerging economies investors can avoid risk and make optimal investment decision only through accurate measurement of volatility.

This study focuses on the consideration of third and fourth moment of risk which is ignored while making investment decision. The traditional mean- variance criteria based on modern portfolio theory still is the primary criteria for many investors while making investment decisions ignoring the factual presence of skewness and kurtosis. However, grim ambiguity exists on the mean-variance decisions because such decisions takes normality assumption which could be a dream in financial time series. By taking this argument, this study tries to test the presence of third and fourth moment of risk and argue that in presence of additional risk decisions should be taken accordingly. This study aims to bring forward the presence of risk proxies that include third and fourth movement of risk refer as asymmetric behavior and volatility clustering respectively for Asian emerging financial markets using symmetric and asymmetric GARCH models. In this way, it provides more predictable and reliable measures of risk and return to investors and also contributes in the investment finance literature in the following ways: Firstly, it gives models to measure asymmetry (third movement of risk) and volatility clustering (fourth movement of risk) for Asian financial markets and that adds comprehensively in finance literature as well. Secondly, it contributes by concluding that asymmetric GARCH models are leading the way by incorporating the third and fourth movement of risk compare to symmetric GARCH for Asian emerging stock markets, chose for this study which can help in investment decision making by considering the

presence of these additional risks. Thirdly, it formulates a suggestion for individual, retail, and institutional investors in policy formulation which could be more realistic provided the presence of these risk and expected return would be accurate. Eventually, the risk reporting mechanism especially in the existence of asymmetric risk and volatility clustering would be a decisive factor in investment decision making and investment flow for a particular market.

# **II. REVIEW OF LITERATURE**

Time series data normally deals with the three most important and widely discussed phenomena of investment finance i.e., volatility clustering, lepto-kurtosis and leverage effect (Akashi, Bai, & Taqqu, 2018). Volatility clustering depicted the periods of fluctuations where large or small variations in data are followed by the periods of large or small fluctuations in stock market (Madan & Seneta, 1990). Therefore, Timmer, (2018) confirmed the effect of past events on the next day stock volatility. Kurtosis risk is also existed in the financial time series data due to volatility clustering. In this situation, investors neither optimized their portfolios nor appraised stock market prices without recognizing the volatility clustering (Khan et al., 2019).

In financial leverage presence, Christie (1982) and Glosten et al., (1993) had studied the level of relationship among returns and volatility. They described that if financial leverage is present then not only correlation between risk and past returns is negative but there is also negative relationship between these two. High risk high return principle comes into effect if volatility is high in a market then investor expects high return. The scholars like Hoy, (1988) and Lau and Lau. (2005) believed that favorable or unfavorable news has a symmetric effect risk volatility. But volatility clustering can be a handy instrument to capture the dynamics of asset's risk deviations (Hoy, 1988). Therefore, it is essential to determine the presence of volatility clustering in financial time series. As it further leads to access the intensity of kurtosis risk due to its presence because high fluctuations in returns increases the kurtosis risk while low fluctuations cause reduction in risk levels (Coskun & Ertugrul. 2016; Ning et al., 2008).

Bouchaud *et al.*, (2004) studied volatility clustering by employing ARCH family models based on financial time series data in order to confirm the ARCH effect because of it. Their findings confirmed the presence of direct positive relation between volatility clustering and kurtosis. They further elaborated that the ARCH effect is present only in the hypothetical market with kurtosis (lepto-kurtosis) and volatility clustering (Horvath & Leipus, 2009). Cao et al., (2017) also confirmed this relationship after comparing the measuring abilities of volatility clustering increases the kurtosis risk, asymmetry and skewness risk. Tseng and Li (2012) confirmed these findings by added that negative clustering that further leads towards skewed distribution of returns rather than gaussian distribution.

To find out the volatility pattern whether this volatility clustering flows systematically from asset returns GARCH models are very handy whereas Exp-GARCH and GJR-GARCH are in a better position to explain the asymmetric effect of volatility clustering in financial time series (Lau & Lau. 2005). Prior literature showed that asymmetry risk arises due to high volatility clustering of returns (Alberg, Shalit, & Yosef, 2008) which can be measured through skewness. Skewness is the third moment of risk (Campbell and Hentschel, 1992) and is a widely used financial measure in the time series studies (Bouchaud et al., 2004; Patton & Sheppard, 2015). But still researchers like Khan et al., (2019) believed on the need of new econometric techniques and better proxies of volatility clustering to accurately evaluate the asymmetric behavior of stock returns. As the financial returns are quite unpredictable in nature and volatility modelling with simple methods like average, standard deviation, coefficient of variation etc., may not provide accurate results (Hoy, 1988). Therefore, it becomes necessary to select an appropriate model of risk measurement in order to obtain reliable results (Alberg et al., 2008).

Recently, ARCH family models are applied to address this issue (Moliner, & Epifanio, 2019). These models are considered better for measuring the conditional volatility in financial market data and provide conditional variance based on reliable past squared residuals for volatility clustering. Previously many researchers used ARCH models for

estimating the risk variances. Engle & Ng, (1993) estimated the fluctuation in inflation at UK, Bollerslev (1986) used GARCH models for measuring the risk variations. Nelson (1991) proposed Exponential-GARCH model for determining volatility clustering and asymmetry risk in time series data which is helpful in identifying skewness of positive or negative shocks.

Baillie (1996) introduced GARCH model for measuring volatility risk. Glosten et al., (1993) and Patton and Sheppard, (2015) extended GARCH (p, q) to assess the additional asymmetric risk. Rizvi, Naqvi, Bordes, & Mirza, (2014) used GJR-GARCH model to analyze the changing patterns of volatility and asymmetry risks. Financial market data is generally volatile and is subjected to intense tailed that typically do not allow asymmetric returns (positive/negative) or even skewness modelling. In this situation GARCH and ARCH family models can perform better and provide better results (Hansen & Lunde, 2005). In order to make more precise estimation of asymmetric behavior and volatility clustering, now finance scholars prefer to use ARCH family models that includes GARCH, M-ARCH, E-GARCH, GJR-GARCH (T-ARCH) and P-ARCH for estimating volatility clustering and asymmetry risks (Bekaert & Wu, 2000).

Currently, many researchers tried to identify the asymmetry risk factors involved in financial market data (Akashi et al., 2018; Kim and White, 2004; Rizvi et al., 2014). They concluded that investors can employ skewness factors along with GARCH models for accurate calculation and forecasting of risk. However, Harvey and Siddique (1999) believed that investors first evaluate conditional T-distribution and then apply combination of T-distribution along with outline factors in the second or third step. Lanne & Saikkonen (2007) applied M-GARCH method of measurement of skewness risk by combining Z-distribution and consider it better in evaluating volatility clustering. Lau and Lau, (2005) has also implemented GARCH models in which conditional variance and asymmetry (skewness) increase the fit of spill over models. Kim and White, (2004) and Chen, Hong, and Stein, (2001) found that the stocks earning larger abnormal returns in the past are more negatively skewed. A study by Hansen and Lunde (2005) confirmed that GARCH

family models are the best to measure the asymmetry risks and volatility clustering.

At this time, skewness (third) and kurtosis (fourth) have caught attention of being a vital component which should not be overlooked while making investment decision. The importance of taking the consideration of third and fourth moment of risk is stressed (Beardsley, Field, and Xiao, 2012; Guidolin and Timmermann, 2008; Li, Qin, and Kar, 2010; Liu, Liu, and Wang, 2013; Naqvi et al., 2017 and Wilcox and Fabozzi, 2009). Due to the presence of volatility clustering which makes financial times series non-convex and less smooth especially in emerging markets the ignorance could be costly for investors and policy makers. The efficient market hypothesis (EMH) states that the news impact reflects in the stock prices but the news impacts differently in emerging markets which leads to asymmetric behavior (Liu et al., 2013; Naqvi et al., 2017). In this study we argue that the presence of asymmetric behavior and volatility clustering in emerging markets should not be overlooked. This study contributes to finance literature that volatility clustering exists in the Asian emerging markets and should be a vital consideration for the investors before making investment decision in these markets and only mean- variance based decision can penalize investors.

# **III. RESEARCH METHODOLOGY**

In this study, we have chosen the eight Asian emerging markets and our selection criteria on these emerging markets is based on the Standard and Poor's emerging market index. We choose index return of following financial markets: SSE Composite (China), Hang Seng (Hong Kong), CNX500 (India), FTSE Bursa (Malaysia), KSE100- PSX (Pakistan), Straits Times-STI (Singapore), SE KOSPI 200 (South Korea) and SE Weighed TAIEX (Taiwan). This study used the monthly data of above listed indices of ten year from 2009 to 2018. Log returns are calculated for each financial market in our sample indices by using following method:

$$R_t = \log \frac{P_t}{P_{t-1}}$$

While R<sub>t</sub> are monthly returns at time t and P<sub>t</sub> price. In order to check the data stationarity, this study has run Unit Root test. We have also checked the ARCH effect on selected data prior to the application of GARCH models by running ARCH test. Our test results negate the presence of Unit Root but affirm the ARCH affect and support the use of ARCH family models (see appendix).

# MEAN EQUATION, GARCH MODELS CONSTRUCTION AND **APPLICATION:**

Bollerslev (1986) was the first who came up with more sophisticated method to measuring of volatility clustering called GARCH which became the significant way for the measurement of volatility clustering. His work was the extension of his predecessor Engle & Ng, (1993) the one who introduced the method to measure the conditional variance named Autoregressive Conditional Heteroscedastic (ARCH). The lagged return function autoregressive AR- (1) process is used in this study. One of the reasons to use the lagged function is to see the level of efficiency in the selected markets in case of new impact (Horvath & Johnston, 2010). Many studies confirm the importance of lagged function AR-(1) term ø1Rt-1 (Cao et al., 2017; Hoy, 1988; Rizvi et al., 2014).

Whereas,  $\mathbf{E}_{t} = \sum_{i=1}^{A} \mathbf{A}_{i} \mathbf{E}_{t-i} + \sum_{i=1}^{B} \mathbf{B}_{i} \mathbf{E}_{t-i} + \boldsymbol{\epsilon}_{t}$ 

#### VARIANCE EQUATION

In order to measure the volatility of returns we have used GARCH in this study.

$$\sigma_t = \alpha + \beta \epsilon_{t-1} + \gamma \sigma_{t-1} \quad -----(a)$$

Equation-a is the measure of volatility in form of square root. However, we need the equation to measure the mean square deviations so we drive equation-b by taking square of equation-a

$$\sigma_t^2 = \alpha + \beta \epsilon_{t-1}^2 + \gamma \sigma_{t-1}^2 - - - - - - - (b)$$

While variance  $\sigma_t^2$  is denoted as  $G_t$  and that is the residual variance resulting from mean equation or t-day risk of sample financial markets. The equation for conditional variance follows as:

$$G_t = \alpha + \sum_{i=1}^{q} \beta_i \in_{t-i}^{2} + \sum_{j=1}^{p} \gamma_j G_{t-j} \quad ----- 1$$

where  $\alpha > 0, \beta_i \ge 0 \& i = 1, 2, 3, 4, 5, 6, 7, 8 \dots ..., q$ 

 $\gamma_j \geq 0 \ \& \ j=1,2,3,4,5,6,7,8,\ldots ..., p$ 

 $G_t$  = t-day residuals variance which comes from equation - one. Whereas  $\epsilon_{t-j}^2$  = lagged squared residuals from equation – one which is an ARCH term in the model to check lagged volatility information of stock returns.

#### **CONSTRAINT OF GARCH MODEL**

In order to capture large symmetrical shocks and volatility clustering GARCH is better measure of conditional risk  $\sigma_t^2$  compare to ARCH (Bollersley, 1986). However, the drawback with GARCH model is that it assumes that volatility is symmetric regardless of shock direction either positive or negative. It is better to use ARCH family models for risk measurement in case returns are distributed symmetrically but in real financial data this could be a dream (Hoy, 1988). By looking at semivariance of returns, various studies say, it is more credible measure of risk due to upside volatility generally liked by individual or institutional investors (Cao et al., 2017). On the other hand, investors do not like downward volatility as well as asymmetric returns' distribution (Alberg et al., 2008). In this study, we capture the asymmetric volatility behavior by using diverse models of asymmetric risk measurement like asymmetrical GARCH models (Christie, 1982; Patton & Sheppard, 2015) (GJR- GARCH and E-GARCH) (Akashi et al., 2018; Khan et al., 2019; Lau & Lau. 2005). To model the asymmetric behavior the derivation is as follow:

$$\sigma_{t} = \alpha + \beta \sigma_{t-1} |\epsilon_{t}| + \gamma \sigma_{t-1} - - - - (c)$$
  
$$\sigma_{t} = \alpha + \beta \sigma_{t-1} |\epsilon_{t} - x| + \gamma \sigma_{t-1} - - - (d)$$

$$\sigma_{t} = \alpha + \beta \sigma_{t-1} [|\epsilon_{t}| - y\epsilon_{t}] + \beta \sigma_{t-1} - - - -(e)$$

$$\sigma_{t} = \alpha + \beta \sigma_{t-1} [|\epsilon_{t} - x| - y(\epsilon_{t} - x)] + \gamma \sigma_{t-1} - - - -(f)$$
While,  $F(\epsilon_{t}) = |\epsilon_{t} - x| - y(\epsilon_{t} - x)$ 

#### **EXP-GARCH and GJR-GARCH Models derivation**

To measure the conditional variance and asymmetrical risk with signs of distress either positive or negative, exponential GARCH is the better due to ability to capture asymmetric behavior (Nelson, 1991). The positive side of this model is that helps capturing and modelling skewness either positive or negative, which is third measure of risk.

$$\begin{split} X_t &= \mathrm{EXP}\left(\frac{G_t}{2}\right)\varepsilon_t, \quad whereas \quad G_t^2 \\ &= \gamma_0 + \gamma_1 G_{t-1} + l\left(\varepsilon_{t-1}\right) - (g) \end{split}$$

while  $l(x) = \omega x + \lambda (|x| - E |x|)$ 

$$G_{t} = \alpha + \sum_{i=1}^{q} \alpha_{i} \left| \frac{\epsilon_{t-i}}{\sqrt{G_{t-i}}} \right| + \sum_{j=1}^{p} \beta_{j} \log G_{t-1} + \sum_{k=1}^{r} \gamma_{k} \frac{\epsilon_{t-k}}{\sqrt{G_{t-k}}} - \dots - \dots - (h)$$

Another measure to capture the asymmetric behavior of financial returns is GJR-GARCH which is a stretched version of symmetric GARCH (p, q) but have ability to capture the additional asymmetric risk.

$$G_t = \alpha + \beta_i \epsilon_{t-i}^2 + \gamma_i \epsilon_{t-i}^2 l_{t-i} + \varphi_j G_{t-j} \qquad ---3$$

#### **IV. RESULTS**

GARCH (p, q) results are shown in Table A of the selected Asian emerging financial markets indexes. The results of GARCH (p, q) parameters ( $\alpha$  and  $\beta$ ) are not only statistically significant at probability of one percent but also positive for all selected Asian emerging financial markets.

			G,	ARCH (p, q)				
Coefficients	SSE composite	Hang Seng Index	CNX500	FTSE Bursa	KSE100	STI Index	SE KOSPI 200	SE Weighed TAIEX
Mean Equation					6			
0.0	-0.00294	0.00911	0.0140*	0.0079**	0.0229***	0.0073	0.0067*	0.0077*
ω 1	-0.01603	0.01512	0.0570	0.0092	-0.029	0.0632	-0.0914	0.0522
Variance Equatic	on							
α	0.00029	0.000371*	0.00041	0.00013	0.00047*	0.000197	4.20E-04	0.000126
β	0.1951*	0.2891**	0.1011*	0.154**	0.1930***	0.2197***	0.1783***	0.2411*
Y	0.784***	0.6324***	0.839***	0.753***	0.769***	0.7280***	0.8192***	0.7292***
R-square	-0.0074	-0.0011	0.0054	0.0017	-0.0193	0.0203	-0.0064	0.0119
R-square	-0.0160	-0.0096	-0.0030	-0.0069	-0.028	0.01197	-0.01496	0.0035
Adjusted								
AIC <sup>1</sup>	-2.165	-2.872	-2.248	-3.792	-2.229	-3.189	-3.498	-3.019
SIC <sup>2</sup>	-2.048	-2.755	-2.131	-3.675	-2.113	-3.073	-3.382	-2.903
*** 1 Percent, **	5 Percent, * 10	0 percent						

Table -A

<sup>1</sup> Akaike info criterion <sup>2</sup> Schwarz criterion

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The  $\beta$  parameter in all emerging market indexes are in between from 0.63 to 0.83 as well as positive in all selected financial emerging markets and that indicates the presence of constant volatility clustering. However, by looking at individual market, the volatility clustering is lower in Hang Seng Index (Hong Kong) (0.632) compare to others while it is highest in CNX500 (India) with a  $\beta$  parameter of (0.838) followed by SE KOSPI 200 (South Korea) with 0.819. While rest of the financial markets in the sample are reflecting less volatility clustering compares to other discussed above in long-run which also point out towards market efficiency. By looking at decision parameters  $(\alpha, \beta)$  the summation of those are above 0.90 which is an indication high volatility clustering (large positive and negative returns). The decision rule for a good GARCH (1, 1) is that the  $\alpha$  and  $\beta$  parameters summation should be less than 1. The results of this study are less than 1 and falls under the decision rules to conclude the presence of volatility clustering. GARCH (p, q) model works on the assumption of symmetric parameters. So, this study goes further to check the asymmetric behavior and news impact (positive, negative) on financial returns so we use heteroskedastic asymmetric models to check the existence of asymmetry in selected Asian emerging stock markets.

EGARCH results are presented in Table B which show the estimation of the parameters of selected Asian emerging financial markets. As described earlier that the EGARCH measures asymmetric volatility as well as aid in finding out the relation between logarithm conditional variance volatility and lagged returns. To make EGARCH friendly to use compare to other different GARCH models log specification is important. EGARCH includes the lagged time (in this study we used time as month) for negative shocks on conditional volatility log that is  $\alpha - \beta$  on the other hand  $\alpha + \beta$  is a positive shock or favorable news. Results show that the impact if news is less on volatility during longer period of time and summation of  $\alpha$  and  $\beta$  parameters show this. As per  $\gamma$  assumption it should be positive. However, in volatility modeling unfavorable news shock impacts more compare to positive shock on variance which is  $\alpha - \beta > \alpha + \beta$ . Based on the explained criteria if we look at the result table B except SSE Composite (china) where  $\gamma$  is negative while in all other Asian emerging markets it is positive which

				T	able -B				
				EXP	-GARCH				
	Coefficient	SSE	Hang Seng	CNX500	FTSE	KSE100	STI Index	SE	SE Weighed
		composite	Index		Bursa			KOSPI	TAIEX
	Man Danka							200	
	Mean Equatio	n							
	00	0.0048**	0.0081	0.0125**	0.0067*	0.022***	0.0091**	0.0019**	0.0064
	ω1	0.215***	-0.012	0.025	0.111	0.009	-0.0057	0.035	0.036
	Variance Equa	ation	1						
	Ω	-8.0020	-1.0054**	-0.68	-4.73**	-0.66	-0.84***	-0.052	-0.74*
	Α	0.86***	0.347**	0.282*	0.204	0.195***	0.184	-0.19	0.31
	В	0.086***	-0.132**	0.038	-0.33**	-0.106	-0.204***	-0.29***	-0.133
	Γ	-0.60***	0.87***	0.91 * * *	0.32	$0.90^{***}$	0.88***	0.97***	0.921***
	R-square	-0.020	-0.003	0.005	0.021	-0.007	-0.006	-0.005	0.010
	R-square Adjusted	-0.029	-0.011	-0.003	0.013	-0.015	-0.015	-0.014	0.0017
	AIC <sup>3</sup>	-2.13	-2.73	-2.26	-3.77	-2.23	-3.17	-3.63	-3.03
	$SIC^4$	-1.99	-2.59	-2.12	-3.63	-2.09	-3.03	-3.49	-2.89
**	l Percent, ** 5 Per	cent, * 10 percent	-					-	

indicates that the unfavorable news shock does not impact with the same velocity as favorable news does.

<sup>3</sup> Akaike info criterion <sup>4</sup> Schwarz criterion

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б	υ
Schwarz criterion	Akaike info criterion

STI Inde           ***         0.007           3         0.025           3         0.025           4         -0.054           5         0.374**           6         0.753**           1         -0.0053           -3.15         -3.01	STI Index         SE KOSPI           ***         0.007         0.005           3         0.025         0.046           7         0.0003***         0.0066***           9         -0.0541         -0.173***           9         -0.0541         -0.173***           12         0.0059         0.0041           12         0.0026         -0.0124           -3.15         -3.59         -3.59           -3.01         -3.45
STI Inde 0.007 0.025 0.025 0.025 0.025 0.025 0.025 -0.054 0.374** 0.753** 0.0053 2 0.0053 1 -0.002 1 -0.002 1 -3.15 -3.01	STI Index         SE KOSPI           200         200           ***         0.007         0.005           0.025         0.046           -0.0541         -0.173***           0.753***         0.637***           0.0059         0.0041           -0.004         -0.173***           0.0059         0.0041           -0.0124         -3.15           -3.15         -3.59           -3.01         -3.45
	x SE KOSPI 200 0.005 0.046 *** 0.0006*** 1 -0.173*** ** 0.489*** ** 0.637*** 0.0041 6 -0.0124 -3.59 -3.45

Table -C

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Table C shows GJR-GARCH results.  $\alpha - \beta$  is greater than  $\alpha + \beta$  in results table in all selected Asian emerging markets except CNX500 (India) index where  $\alpha - \beta$  is less compare to  $\alpha + \beta$ . This shows that negative shocks do not influence in long run on returns. Parameter for GARCH  $\gamma$  is significant in above table in selected indexes at p one percent and shows the leverage which can be confirmed from  $\beta$  value. Negative shocks or unfavorable news influence more on volatility comparative to positive shocks and news especially in the presence of leverage effect. Negative correlation between risk and return is leverage effect which is also a debt-equity ratio. In simple risk goes up then return goes downward. If leverage effect is high that means high debt-equity ratio which ultimately leads to high volatility. So, in the presence of high leverage effect the returns would be lower. GJR-GARCH (TARCH) results are in table C above of our sample indexes. The outcomes are positive and agreeable. In long run interestingly, our outcomes the CNX500 (India), KSE100 (Pakistan) and SE Weighed TAIEX (Taiwan) confirm that there is no leverage effect since our  $\beta$  parameter of each index is not statistically significant. Hang Sang, in long run, shows lesser leverage effect. Interestingly unfavorable news does not have influence in CNX500 (India), KSE100 (Pakistan) and SE Weighed TAIEX (Taiwan) compare to other markets. Except in the above three markets the conditional volatility increases due to unfavorable news.  $\gamma$ , the asymmetric parameter, is significant at probability of 1 percent in all selected indexes and which is quite expected, and this explains impact of good and bad news on t+1 day volatility. If bad news strikes in the market it had more impact on t+1 day that also increases volatility compare to good news. The primarily reason is that  $\gamma$ , the asymmetric parameter, is higher than  $\alpha$ , the ARCH parameter of squared residuals. These results also conclude that in long run, KSE100 is an efficient market. The results of this study also show that in order to measure fourth measure of risk kurtosis (leptokurtic kurtosis- Fat-tail) and conditional volatility GJR-GARCH is superior model compare to symmetric GARCH because the selection parameters of a good model AIC and SIC values are low which are required to be low.

# VOLATILITY CLUSTERING EVIDENCE

-.3

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20

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# Figure-A



Hong Kong (Hang Seng Index)

60

70

Actual

80

90

Fitted

50

Residual

40



.2 .1 .0

-.1

-.2

-.3

110

100

120





Figure-A shows the test results of sample financial time series and confirms the existence of volatility clustering in the sample markets. The volatility clustering can be seen by looking at figure which shows that periods of low volatility are followed by periods of low volatility for a long time. While periods of high volatility are followed by periods of high volatility from 2009 to 2011 which is also for long time. These persistent fluctuations in residuals of returns strongly favors the argument of presence as well as volatility clustering measurement.

# MEASURING ASYMMETRY USING GARCH, GJR-GARCH, AND E-GARCH MODELS

News Impact Curve (NIC) has been used for comprehensive investigation of asymmetric behavior and volatility. To grasp the effect of favorable news (good news) and unfavorable news (bad news) on volatility NIC is used. Many researchers like Bekaert and Wu, (2000), Campbell and Hentschel (1992) and Patton and Sheppard, (2015) have incorporated the idea of good or bad news impact on the volatility risks. To keep information as constant at t-1 and t-2, the implicit relationship can be observed while keeping between  $G_t$  and  $E_{t-1}$  which is NIC. The basic purpose of NIC's is to show t-1 shocks due to news on t-day volatility and the representation is graphical. This is helpful in drawing and forecasting future volatility from past shocks either positive or negative ( $E_{t-1}$ ) and that eventually helpful in risk-return measurement.

GARCH (1, 1)

While And

$$\bar{\sigma}^2 = \frac{w + \beta_1 \sigma^2}{[1 - \alpha_1 - \beta_1]}$$

 $\textbf{GJR} - \textbf{GARCH} (\textbf{1}, \textbf{1}) \quad \textbf{G}_{t} = \textbf{A} + (\alpha_{1} + \gamma_{1} \textbf{I}_{t-1}) \textbf{E}_{t-1}^{2} \qquad ----5$ 

While  $A = w + B_1 \bar{\sigma}^2_W$ And  $\bar{\sigma}^2 = \frac{w + B_1 \bar{\sigma}^2}{[1 - a_1 - B_1 - (\frac{\gamma_1}{2})]}$ 

Exp - GARCH (1,1) 
$$G_t$$
  
=  $A \exp\left\{\frac{a_1(|E_{t-1}| + \gamma_1 E_{t-1})}{\overline{\sigma}}\right\}$  -----6

While

$$A = \bar{\sigma}^2 \beta_1 \exp \left[\omega\right]$$
$$\bar{\sigma}^2 = \frac{w + a_1 \sqrt{2/d}}{1 - B_1}$$

And

# Figure-B

News Impact Curve using Symmetric GARCH model










News Impact Curve using Symmetric GARCH model







News Impact Curve using asymmetric GJR-GARCH







Various NICs are shown in the above Figures-B, C and D respectively. These models confirm that the news impact asymmetrically on volatility of financial markets. Above figures confirm this argument.

Asymmetric models predict the future, t+1, t+2, volatility based on bad news and good news and impact of news varies. NIC not only helps to distinguish the velocity of past shocks in the presence of good or bad news on volatility while keeping information of t-2 constant. In this study we try to inspect the possible impact and connection between  $\in_{t-1}$  (returns shock) and variance of returns  $(\sigma_t^2)$ ,  $\omega$  is constant.  $\alpha_1$  and  $\beta_1$  are our parameters for GJR-GRACH and E-GRACH? In order to estimate the unconditional variance of returns NIC has integrated the lagged, t-1, conditional variance. Based on this we can derive that NIC model's past volatility, t-1, t-2, with current t as well as t+1, t+2, volatility. The shape of the NIC depends on the slope values of bad or good news. Since GARCH (p, q) is a symmetric measure of volatility so the slope values are symmetric or same. On the other hand, looking at asymmetric models. GJR-GARCH and E-GARCH. if  $\in_{t-1}$  is greater than 0 that means a good news and if  $\in_{t-1}$  less than 0 indicates the presence of bad news while  $\gamma$  is a leverage effect parameter for both asymmetric models. NIC volatility symmetric models result are alike the tested models and confirm our findings are true in sample indexes. The left hand side of Y-axis shows the impact of unfavorable news while right side of Y-axis displays impact of favorable news, the asymmetric shape confirms that unfavorable news has high impact on volatility compare to favorable news.

## **V. CONCLUSION AND DISCUSSION**

This study has emerged with three factual pieces of evidence about financial time series. Evidence one is about the presence of unit root in returns, evidence two is about the presence of volatility clustering and evidence three is about the asymmetric behavior of financial time series. To investigate the evidence one, we run ADF test of Unit Root to check out the presence of stationarity. To check the ARCH effect on returns this research has also applied heteroskedasticity test. The outcomes of both the tests confirm that the data is not only stationary but also has an ARCH effect. Based on evidence one, to check the existence of volatility clustering this study runs various symmetric and asymmetric GARCH, GJR-GARCH, and E-GARCH. The outcomes confirm the existence of volatility clustering in all selected stock markets and investors need to be

careful while investing. By summing up  $\alpha$  and  $\beta$  parameters of symmetric GARCH we find these are closer to one which shows high clustering volatility and fat-tail risk in sample markets indexes. In asymmetric E-GARCH  $\alpha - \beta$  is greater than  $\alpha + \beta$  and that endorses the presence of high volatility clusters as well as the effect of leverage. GJR-GARCH also supports the existence of volatility clustering. To investigate evidence three, NIC confirms the existence of asymmetric behavior in all used models. This study concludes that unfavorable news has a severe effect and increases volatility clustering, as well as asymmetry, compare to favorable news. This study tests the prognostic ability of symmetric and asymmetric GARCH models and concludes that asymmetric GARCH models perform better to capture conditional volatility and asymmetric behavior in Asian emerging stock markets. This study can be expendable to other markets e.g. Australia, East Asia, and South American financial markets. By using the broader sample size helps the investors, portfolio managers and policy makers to analyze the existence of level of asymmetric and volatility clustering and make investment and policy decision accordingly. This could be the natural extension to this study and can possible provide commentary over the efficiency of these markets especially in case of good or bad news on time t+1, t+2, from t-1, t-2.

### DISCUSSION

This study confirms the volatility clustering and asymmetry presence which are consistence with Ang and Liu (2007), Hashmi and Tay (2007), Ray (2012). The results reveal that volatility clustering is high due to the bad news impact as compare to a good news which also leads to asymmetric and kurtosis risk. The kurtosis and asymmetric risk are confirmed by the presence of volatility clustering and leverage effect which should be taken into consideration while investment making decisions and asset pricing and these are in line with Ang and Liu (2007), and Rossi and Timmermann (2011). The main focus of this study is on the measurement of risk for asset pricing in the presence of additional risks. In case returns are high and volatile then presence of asymmetric risk (skewness) or volatility risk (kurtosis) cannot be denied. The presence of asymmetric risk and volatility clustering risk make returns more volatile and shake out investor confidence. These elements of risks should be considered wisely in construction of portfolios for risk avoider investors and asset pricing. If leverage effect and volatility clustering exist in financial time series then portfolio construction based on menvariance could be miss-leading especially for risk averse investors because these are indications of third (skewness- asymmetry) and fourth ( kurtosis- volatility clustering) movements of risk. The presence of third and fourth moments of risk can lead to large positive and negative return and risk forecasting based on mean- variance cannot be reliable. Our results confirm the presence of these higher moment risk. Investor should learn that their returns are not only reward of variance but also of volatility clustering. By ignoring the fact may lead to higher extremes either positive or negative. However, investors would not mind higher positive returns but what if due to these higher moments the investors loss their investment. A must learn lesson for investor could be that ignoring volatility clustering especially in less efficient markets can be fatal.

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	SSE	Hang Seng	CNX500	FTSE Bursa	KSE100	STI Index	SE KOSPI 200	SE Weighed
	composite	Index						TAIEX
<b>F-statistic</b>	1.31	23.07	9.63	1.472	0.014	25.61	33.1221	12.1612
Observed R-square	1.25	19.58	9.03	1.483	0.014	21.38	26.2532	11.2112
Probability of F(1,118)	0.0232	0	0.004	0.03	0.0081	0	0	0
Probability of Chi- Square(1)	0.0354	0	0.005	0.22	0.0081	0	0	0

Table -II ARCH Test

Z	
5	- 1
-	- 5
-	
-	

				Table	<u>-</u>			
				ADF-Unit R	oot Test			
	SSE	Hang Seng	CNX500	FTSE Bursa	KSE100	STI Index	SE KOSPI	SE Weighed
	composite	Index		2			200	TAIEX
SIC criteria of re-	turns (Lag=13)							
Unit root (ADF)	test							
Critical Values	(-11.21)*	(-10.27)*	(-9.52)*	(-9.29)*	(-9.37)*	(-9.34)*	(-10.99)*	(-8.94)*
At 1 percent	-4.04	-3.49	-3.49	-3.49	-3.49	-3.49	-3.49	-3.49
At 5 percent	-3.45	-2.89	-2.89	-2.89	-2.89	-2.88	-2.89	-2.89
At 10 percent	-3.15	-2.58	-2.58	-2.58	-2.58	-2.58	-2.58	-2.58
)= p < 0.05								

# HETEROGENEOUS EFFECTS OF SECTORAL GROWTH ON TAX YIELDS IN DEVELOPING ECONOMIES

# FAIZ UR RAHIM AND MADIHA ASMA\*

Abstract. Sectoral composition of the economy is taken as a major determinant of tax revenues in the analytical framework of this study. The impact of sectoral growth on tax yields is explored using panel dataset of 94 countries for the period of 2000-2015. The panel estimation technique of Generalized Method of Moments (GMM) is used for analysis. Moreover, besides the main model of estimation two more models are introduced to assess the role of level of development in the economy in tax revenue collection. Other than sectoral growth, some control variables which can potentially influence tax revenues like government expenditures, per capita income, trade openness, inflation, urbanization, voice and accountability and control of corruption are also added in the model. The study finds that the growth of agriculture, industry and services sectors has positive and significant impact over the tax collection of the economy in our main model of all developing economies. However, an interesting result is found when we bifurcated our dataset into further two categories i.e. low income and high income developing economies. In low income economies, the sectoral growth of all three sectors has a negative impact over the tax yields. However, in high income developing

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economies, industry and services sector contributes positively while agriculture sector contributes negatively in tax revenue collection.

Keywords: Tax Revenue, Sectoral growth, Tax determinants, Panel data, GMM

### JEL Classification: H2, O1, O12, O13, O14

# I. INTRODUCTION

Tax revenue is a vital source of income for both developed and developing economies. The key purpose of a tax structure is to raise an adequate amount of revenue to finance necessary expenditures on the goods and services supplied by government. According to Kaldor (1963) "if a country wishes to become 'developed' it needs to collect an amount in taxes greater than the 10-15 percent found in many developing countries." A country's revenue generation mainly depends on its adequate capacity to tax (tax base). Tax revenues have a power to decide what a country can do, i.e. how efficiently it can allocate it's resources to set its targets and how successfully it can take on its plans and policies at the domestic and global level, determined by political and economic concerns.

The studies of Gupta, (2007), Chaudhry and Munir, (2010), Ajaz and Ahmed, (2010) and Addison and Levin, (2011), Mawejje and Munyambonera, (2016) explored that the developing economies normally get a very low amount of tax revenues because these economies face a number of problems in revenue generation process. There are many reasons of low tax revenues in developing countries, e.g. higher agricultural share with substantial low income of the farmers, lower industrial and services share, narrow tax base, corruption, tax evasion, political instability, poor tax reforms, bad law and order situation and foreign aid. These factors can significantly reduce tax revenues and seriously hurt economic growth and development.

The sector wise composition of an economy plays a vital role in determination of tax revenues. Agriculture sector is considered as a backbone of many developing economies, as it contributes largely to their

GDPs. It may be difficult to tax agriculture sector, especially if it is dominated by a large number of subsistence farmers and subsistence activities are mostly informal (Gupta,(2007) and Addison and Levin, (2011)). Agbeyegbe et al., (2004) states the same story that in lower income countries, where the largest part of agricultural sector is placed on a small scale basis, the contribution of the agriculture sector in tax yield remains low. Furthermore, a large agriculture sector may shrink the need to spend on public goods and services, which have a tendency to be urban-based (Gupta, 2007). On the other hand, it may be easy to tax this sector where agriculture sector exports are dominant in nature (Agbeyegbe et al., (2004) and Karagoz, (2013)).

However, it is easier to tax industry than agriculture sector. A higher industrial share tends to have higher tax revenue. A large number of businessmen own this sector, as they keep better records, which further lead to have more tax revenues from industrial sector (Ayenew, (2016) and Basirat et al, (2014)). The more the countries develop economically, the more the domestic spending and imports boost, which further increases tax revenue (Basirat et al., (2014)).

Services sector is one of those sectors which are also easier to tax with certainty. Tax revenue is higher in those countries where services and industrial sectors are developed (Karagoz, (2013)). In many developing countries, the services sectors are informal. Due to informal service sector, corruption and tax avoidance is also high, so revenue generation from this sector is low in most of the developing countries (Ahmed and Muhammad, (2010)).

The main objective of the study is to explore the relationship between tax revenues and sectoral growth (value addition) in different composite parts of GDP i.e. agricultural, industrial and services sectors of developing economies.

Secondly, the objective of this study is also to explore the impact of sectoral growth on tax revenue collection of developing economies having heterogeneous level of development as it can be hypothesized that sectoral growth is contributing positively in tax yields in some developing economies and not in others due to their heterogeneous structure of development. This work is not done so far. In this study we have also added few control variables drawn from literature like government expenditures, per capita income, trade openness, inflation, urbanization rate and some governance indicators.

The remainder of the paper is structured as follows. Section II presents an overview of the theoretical as well as empirical literature. Section III provides a brief discussion of model, data and econometric methodology. Section IV includes results, discussion and interpretation. The last section concludes the study.

# **II. LITERATURE REVIEW**

Theoretical and empirical literature is reviewed in this section. Lotz and Morss (1967) formulated a theoretical base for the impacts of per capita income and foreign trade on tax efforts. They also empirically tested the model for tax effort in 72 countries from 1953 to 1964 and found that per capita GNP and foreign trade sector share had strong positive impact on tax effort. In their later study in 1970, they used monetization rate and export share as variables and found that both variables significantly improve the tax to GDP ratio.

Later on Shin (1969) followed Lotz and Morss (1967) and proposed a new model by incorporating some more variables (agriculture share, inflation rate and population growth rate) in the model. Estimation results showed that per capita income, trade openness, inflation had positive association with tax revenue while population growth and agricultural share had negative association with tax revenue. Bahl (1971) and Chelliah (1975) extended the model adopted by Lotz and Morss (1967) by adding more variables (agriculture share in GDP, mining share in GDP, per capita income and export ratio). Piancastelli (2001) followed the same model and incorporated new variables like industry share and services share.

Bahl (1971) investigated the relationship between tax ratio and various factors in developing countries from 1966 to 1968. His findings revealed that agricultural share, mining share, export share and per capita income were strong determinants of tax revenues in developing countries. Per capita income, mining share and export share had positive association with tax revenues while agriculture share was negatively related to tax

revenues. Similarly, Chelliah et al., (1975) came across the same outcome.

Islam (1979) conducted a study of tax revenues and its factors in Bangladesh from 1968 to 1978. Moreover, his results showed that degree of trade openness and agricultural sector share positively influenced the tax revenues. On the other hand, tax ratio was negatively influenced by government expenditures and per capita income.

Ghura (1998) analyzed tax revenue in 39 sub Saharan African countries over the period of 1985 to 1996. He observed that tax revenue was negatively related to per capita income, agricultural share in GDP, inflation, external grants. While, it was positively related to trade openness, mining share in GDP, oil sector share in GDP, real exchange rate, structural reforms, human capital index, corruption external debt and terms of trade.

Piancastelli (2001) observed the determinants of tax revenue in 75 countries throughout the period of 1985 to 1995 by using ordinary least square (OLS) and fixed effect modeling technique (FEM). Estimation results showed that tax revenue was negatively associated to agricultural share whereas, positively related to industrial share, services share, trade openness and per capita income.

Using a panel of 105 developing countries during 1980-2004, Gupta (2007) analyzed the determinants of tax revenue and constructed a measure of tax effort. He used the GMM regression in his analysis. His findings urged that agriculture share and corruption had strong negative and significant relationship with tax revenue. Moreover, aid share, trade openness, and political stability positively influenced the tax revenue while law and order, government stability and debt share negatively influenced the tax revenue.

Karagoz (2013) examined the determinants of tax revenue in Turkey during 1970-2010 and used time series regression analysis. He suggested that agricultural and industrial shares, foreign debt, monetization rate of the economy and urbanization rate were strong determinants of tax revenues. The estimation results explained that agricultural sector was negatively related to tax revenue while industrial share, foreign debt, monetization rate of the economy and urbanization rate were positively related to tax revenues.

Basirat et al., (2014) investigated the effects of economic variables on total tax revenues in Iran for the duration of 1974 and 2011. They found that industry share, exchange rate and imports share had a positive relationship with total tax revenues whereas, the agriculture sector had a strong negative relationship with total tax revenues.

Gaalya (2015) analyzed the determinants of tax revenue in Uganda for the period of 1994-2012 using random and fixed effect modeling technique and found that agriculture share, industry share, exchange rate, aid and trade openness were strong and significant determinants of tax revenue performance. The estimation results suggested that tax revenue was positively affected by trade openness, exchange rate and industry share. At the same time it was negatively affected by agricultural share and aid share.

Ayenew (2016) analyzed the tax revenue determinants in Ethiopia during the period of 1975 to 2013. He found that GDP per capita, industrial share, inflation and foreign aid were strong and significant determinants of tax revenue. The estimation results showed that industry share, GDP per capita and foreign aid had positive relationship with tax revenue, whereas inflation had negative relationship with tax revenue in long run.

Mawejje and Munyambonera (2016) explored the effects of tax revenue to sectoral growth and government expenditure in Uganda during 1999-2013.Their findings discovered that tax revenue was negatively affected by agriculture sector and informal sector whereas industrial sector, trade openness and development expenditures had positive relationship with tax revenue.

Through the empirical investigation of the above mentioned studies we have learned that the sectoral growth of different sub sectors of the economy is having a heterogeneous impact over the tax yields. It implies that there is some factor within developing economies which is a strong cause in heterogeneity of outcome. This study is an effort to explore that the level of development of a developing economy can be a cause of this outcome.

Therefore, we are exploring the same relationship across 94 developing economies in our first model and then dividing the same dataset in two categories according to their income level to analyze the heterogeneous effects of sectoral growth on tax yields in developing economies. The contribution of this study can be judged on the basis of the fact that there is no empirical study available to check the impact of sectoral growth in developing countries which are having a heterogeneous level of development/ national income. This work is not done so far.

# III. MODEL, METHODOLOGY AND DATA

# THEORETICAL FRAMEWORK

The theoretical model is adopted from Lotz and Morss (1967). According to their model tax returns are based on per capita income and foreign trade shares of an economy. Both variables had strong and significant association with tax to GDP ratio. The relationship between per capita income, trade openness and tax to GDP ratio was captured linearly.

$$Tax/GDP_{it} = f(PCI_{it}, TO_{it})$$

Later on, Shin (1969) followed Lotz and Morss (1967) and proposed a new model by incorporating some more variables (agriculture share, inflation rate and population growth rate) in the model. Bahl (1971) and Chelliah (1975) extended the model adopted by Lotz and Morss (1967) by adding more variables (agriculture share in GDP, mining share in GDP, per capita income and export ratio). Piancastelli (2001) followed the same model and incorporated new variables like industry share and services share.

## **MODEL SPECIFICATION**

In the light of above discussion we now propose the following models for estimation of study. Three different econometric models are tested to investigate the relationship. First model explores an overall relationship between tax revenues and sectoral growth for the whole available dataset of developing economies. Next two models are formulated through the division of these developing economies into two further groups i.e. higher & upper Middle Income in model 2 called as Higher Income developing economies and Lower & lower Middle Income in model 3 called as lower income economies. Functional equation of the model is given below: -

 $Tax / GDP_{ii} = f (AGR_{ii}, IND_{ii}, SERV_{ii}, GE_{ii}, PCI_{ii}, TO_{ii}, INF_{ii}, URB_{ii}, CORR_{ii}, VA_{ii})$ (i)

The econometric specification of all models takes the following form.

$$Tax / GDP_{ii} = a_0 + a_1 \ln AGRR_{ii} + a_2 \ln IND_{ii} + a_3 \ln SERV_{ii} + a_4 \ln GE_{ii} + a_5 \ln PCI_{ii} + (ii)$$
$$a_6 \ln TO_{ii} + a_7 \ln INF_{ii} + a_8 URB_{ii} + a_9 VA_{ii} + a_{10} CORR_{ii} + \mu_{ii}$$

Notations/Abbreviations used in above equation are defined as follows: -

Tax/GDP = Tax to GDP ratio, AGR = Agriculture sector share as percentage of GDP, IND = Industry sector share as percentage of GDP, SERV = Service sector share as percentage of GDP, PCI = Per Capita Income, TO = Trade Openness, INF = Inflation, URB = Urbanization rate, CORR = Control of Corruption, VA = Voice and Accountability.

# SOURCES OF DATA

This study is based on the panel data set of 94 developing countries from 2000-2015 (Appendix A, TABLE, A-1). The countries are chosen on the basis of availability of data. These countries are classified as the developing countries by the World Bank<sup>1</sup>and are divided into four categories because of their Gross National Income (GNI) Per Capita. They are high- income (\$12,476 or more GNI per capita), upper middle income (\$4,036 and \$12,475 GNI per Capita), lower middle- income (\$1,026 and \$4035) and low-income economies (\$1,025 or less GNI per capita). But because of less observation in each group we have merged these economies into two categories as mentioned above.

The data of dependent variable (Tax to GDP ratio), and independent variables (Agricultural sector share in GDP, Industrial sector share in GDP, Services sector share in GDP, Per Capita Income, Trade Openness, Inflation and Urbanization rate) is collected from Worldwide Development Indicators (WDI)<sup>2</sup>.While data on governance indicators like

<sup>&</sup>lt;sup>1</sup> http://data.worldbank.org/about/country-classifications.

<sup>&</sup>lt;sup>2</sup> http://data.worldbank.org/data-catalog/world-development-indicators.

Voice and Accountability and Control of Corruption is collected from Worldwide Governance Indicators (WGI)<sup>3</sup>.

# **ESTIMATION METHODOLOGY**

Panel estimation technique is required for estimation of this model. Pooled OLS estimation is rejected due to the presence of heteroscedasticity indicated by B&P (Breusch & Pagan) Lagrangian test as the  $p \le 0.05$  in all three models. Then, we move towards Fixed and Random effect estimations, Hausman test suggests us Fixed model is suitable. In case of Fixed effect, heterogeneity problem may not exist in cross sections but group wise heteroscedasticity may exist (Baum *et al.*, 2003).

So after Hausman test, Modified Wald test for group wise heterscedasticity is used. This test suggests that p-value is less than 0.05 which is the clear indication of presence of group wise heteroscedsticity. In next step, Wooldridge test for autocorrelation in panel data is used. The test implies that p- value is less than 0.05 which rejects null hypothesis statement of no first order autocorrelation (results attached in appendices, Table: A-2).

These econometric problems like heteroscedasticty, endogeneity and serial autocorrelation in panel data analysis make model a dynamic panel model. However, for this study, we have crossed through various estimation techniques in search of the most appropriate technique for this model, *i.e.* Pooled OLS, Fixed and Random effects Modeling technique and finally we selected Difference GMM on the basis of appropriate diagnostic tests.

Generalized Method of Moments (GMM) is selected for estimation of this model as the model seems dynamic in nature on theoretical grounds and moreover, GMM estimation is a best practice in order to resolve the issues of model uncertainty, endogeniety, heterogeneity and serial correlation. According to Arellano-Bond (1991), GMM estimator is the most popular choice for estimating dynamic panels with unseen

<sup>&</sup>lt;sup>3</sup> http://info.worldbank.org/governance/wgi/#home.

heterogeneity and predetermined regressors (Moral Benito et al., 2017). GMM is very useful when we have less time span and more cross country observations (Roodman, 2006; Perera and Lee, 2003).

Furthermore, Sargan test is executed to check the validity of restrictions. The null hypothesis of this test is about the validity of over identifying restrictions which checks whether the instruments used in regression analysis are exogenous or not. The probability value of Sargan test should be less than 5%, ( $\alpha = 0.05$ ) because only in this case null hypothesis will be rejected.

After applying Sargan test, estimation will be done through two step estimator method of Arellano-Bond (1991) instead of one step estimator method. Windmeijer, (2005) finds that two step method works very well than one step method. Lag value of dependent variables creates problem of autocorrelation (Mileva, (2009)). To get rid of autocorrelation problem, Arellano-Bond test for zero autocorrelation is used. The null hypothesis of this test is that there is no autocorrelation. Normally, at AR (1), null hypothesis is rejected. Whereas, at AR (2), if the probability value is greater than 0.05, the autocorrelation problem will be removed automatically.

The probability value of Sargan test in model 1, 2 and 3 is 0.000 which is less than 0.05. It moves toward clear rejection of null hypothesis stating that over identifying restrictions are valid. Hence, Sargan test shows that in case of Arellano Bond with one step estimator the over identifying restrictions are invalid so it moves towards Arellano Bond dynamic panel data estimation with two step estimators.

After carrying out Arellano Bond dynamic panel data estimation with two step estimators the results are set under the analysis in order to tackle autocorrelation problem. The probability values in all models at order 1 is less than 0.05 which is clear indication of rejecting null hypothesis stating that there is no autocorrelation. Whereas at order 2 the probability value is greater than 0.05 i.e. 0.941 in model 1, 0.283 in model 2 and 0.818 in model 3 respectively. Probability value greater than 0.05% at AR (2) is in the favor of null hypothesis (No Autocorrelation). Autocorrelation problem is removed at order 2. Now the estimates are unbiased and consistent which we obtain from Arellano Bond dynamic panel data estimation with two step estimators.

# **IV. RESULTS AND DISCUSSION**

In this section, we will discuss the regression results of the model 1 (all developing countries), model 2 (Higher income developing economies) and model 3 (lower income developing economies) based on the methodology discussed previously. The results are reported in Table 1 as under: -

#### Model 1 Model 2 Variables Model 3 (All Developing (High Income) (Low Income) Countries) InTaxGDP L1 .3329772 .2551344 .2657181 (.02923)(.02227) (.08408)lnAGR .0141353\*\*\* -.0955217\*\*\* -.1226184\*\* (.00407)(.01079)(.05406).1244597\*\*\* .0249026\*\* lnIND -.2105607\*\* (.00846) (.01176) (.10511) InSERV .3419922\*\*\* .3417036\*\*\* -.1924192\* (.00958)(.05363)(.14260).0757499\*\*\* -.1200953\*\*\* .1576161\*\*\* lnGE (.00425)(.01646) (.03781) .3564642\*\*\* .2949552\*\*\* .5333341\*\*\* InPCI (.01430)(.05833)(.14335) .2188344\*\*\* .189374\*\*\* .2630391\*\*\* lnTO (.00467)(.00904)(.03572) lnINF -.0612209\*\*\* -.1407293\*\*\* -.1605495\*\*\* (.00634)(.02538)(.06792)URBAN -.0020002\*\*\* .0054954\*\*\* (.00083)(.00200)VA .025592\*\*\* .0069279 -.0557236\*\* (.00418)(.01243)(.02733)CORR .0086237\*\*\* .0331683\*\*\* .0172366 (.04703)(.00275)(.00898) $\mathbb{R}^2$ 0.46 0.38 0.54 F-stat 84.30 23.34 46.79 (0.000)(0.000)(0.000)

# TABLE 1

Results of Difference GMM (Dynamic Panel Data Specification)

Variables	Model 1	Model 2	Model 3
	(All Developing Countries)	(High Income)	(Low Income)
Sargan test	154.8345	161.2013	118.1603
	(0.000)	(0.000)	(0.040)
AR(1)	-4.7431	- 3.1713	-2.417
	(0.000)	(0.001)	(0.015)
AR(2)	073	1.0727	22924
	(0.941)	(0.283)	(0.8187)
Observations	993	498	398
Countries	94	45	36

Note: (1) Standard errors are in parentheses. \*\*\*, \*\*, \* denotes 1%, 5%, 10% level of significance respectively. (2) AR (1) and AR (2) are tests for first order and second order serial correlation with p-values in parentheses. (3) Sargan test of the over-identifying restrictions of each model is given with p-value in parentheses.

### **RESULTS OF MODEL 1**

Agricultural sector share in GDP is positive and significant. The positive relationship between agriculture share and tax revenue is supported by theory that countries in which share of agriculture sector is large and depend more on international trade taxes e.g. agriculture exports are dominant. These results are consistent with the findings of Agbeygbe *et al.*, (2004) and Mahdavi, (2008).

Industrial sector share to GDP, the regression coefficient of the share of industrial sector in GDP is positive and significant, indicating that the composition of GDP matters and industrial sector contributes relatively more to tax. Higher the industrial sector share in GDP higher will be the tax to GDP ratio. A large number of businessmen own this sector, as they keep better records, which further lead to have more tax revenues from industrial sector. A number of studies Chaudhary and Munir, (2010); Basirat *et al.*, (2013); Karagoz, (2013) Gaalya, (2015) and Mawejje and Munaymbonera, (2016)) have found positive relationship between industrial share and tax revenues. Our findings are also consistent with them.

Services sector share in GDP sign is positive and is supported by theory that the countries in which this sector is highly developed have more tax revenue collection. The results regarding this variable confirms the findings of Piancastelli, (2001); Ahmed and Muhammed (2010) and Mawejje and Munaymbonera, (2016).

Government expenditures positively influence the tax revenues. According to Friedman (1978) the level of spending adjusts to the level of tax available and causality runs from tax to expenditure. This hypothesis defines a positive relationship between government spending and taxation. If tax revenue is increased government spending will also increase and will decrease with the decrease in tax revenue. As Government want to spend whatever is available for spending. The result regarding this variable is supported by the theory that high Government expenditures lead to higher tax revenue which can further increase economic growth. The results are consistent with the findings of Agbeygbe *et al.*, (2004), Hossain, (2014) and Mawejje and Munaymbonera, (2016).

Per Capita income is positively associated with tax revenues. The positive sign shows that with the increasing level of income growth, the demand for public goods increases hence it smooth the ways for government to impose and collect more taxes. The result of this variable is well matched with the findings of Davoodi and Grigorian, (2007); Pessino and Fenochietto, (2010); Gaalya (2015) and Ayenew, (2016).

Trade openness sign is positive. In most of developing countries the contribution of foreign trade is very important in tax revenue collection through exports duties, import duties, tariffs etc. The result regarding this variable is similar to the findings of Gupta, (2007); Chaudhary and Munir, (2010); Addison and Levin, (2012) and Gaalya, (2015).

Inflation impact on tax revenues is negative. It is justified from theory that the demand for goods and services decreases as prices increase which further decreases the purchasing power of consumer and hence the tax revenue collection falls. The result of inflation is similar to the findings of Agbeygebe et al., (2004); Mahdavi, (2008); Fenochietto and Pessino, (2010) and Gaalya, (2015).

Urbanization rate and tax revenues are negatively related to each other. The negative association between urbanization and tax revenue is justified by the theory that in most of the developing countries urbanization is associated with underground economy. The regression result regarding urbanization is compatible with the findings of Davoodi and Grigorian, (2007); Addison and Levin, (2011) and Aizanman et al., (2015).

Voice & Accountability and Control of corruption both have positive and significant impact on tax revenue in model 1. This means that improved institutions raise total tax revenue collection. Good governance contributes to better tax administration leading to high tax revenue generation. The results of these variables are justified by the work of Bird et al., (2008) and Hossain, (2014) who argue that tax revenue collection can be increased by improving voice and accountability and control of corruption.

### **RESULTS OF MODEL 2**

Agricultural sector share in GDP is negative and this correlation is supported by theory that the tax revenues are low in those countries where agriculture sector is dominated by a large number of subsistence farmers and where its activities are typically free from taxes in order to generate tax structures more progressive to the poor. The result regarding agricultural sector share to GDP is consistent with the findings of Gupta, (2007); Karagoz, (2013); Gaalya, (2015) and Mawejje and Munaymbonera, (2016).

The results regarding Industrial Sector share in GDP and Services Sector share in GDP are same as of model 1.

Government expenditures are negatively and significantly related to tax revenues in model 2. Lower government expenditures tend to have lower tax revenue collection. The result regarding this variable is inconsistent with the above mentioned studies.

The results of Per Capita Income, Trade Openness and Inflation are same as of model 1.

Urbanization rate is positively linked with tax revenues. In most of developing countries the higher level of urbanization is linked with the large informal sector as it brings new needs and demand for public services which further enhance government's ability to collect taxes. The result regarding this variable confirms the findings of Botlhole, (2010); Karagoz, (2013) and Hossain, (2014).

In case of higher income developing economies, the variable, Voice and Accountability is insignificant whereas Control of corruption is positive. From the results it is clear that "Control of corruption" is positively contributing in tax revenues collection.

### **RESULTS OF MODEL 3**

Agriculture Sector Share in GDP has a same impact as of model 2. Industrial Sector share in GDP is negative and significant in case of model 3. It means that industrial sector is not contributing well in expansion of tax yields of the low income developing countries and it is generally due to tax evasion, corruption and tax avoidance. The result regarding this variable confirms the findings of Botlhole, (2010) and Potanlar et al., (2010).

Services Sector share in GDP is negatively linked with tax revenues. It is clear from the result that Services sector share to GDP in low income countries is not much developed as in the case of overall developing and high income economies. In many developing economies, the services sectors are informal. Due to informal service sector, corruption and tax evasion is high. So revenue generation from this sector is low in mostly low income economies (Ahmed and Muhammad, (2010)).

The result regarding this variable is consistent with the findings of Botlhole, (2010) and Potanlar, (2010). The results regarding Per Capita Income, Trade openness and Inflation are same as of model 1 and 2 except Government Expenditures whose results are same as of model 1. The coefficient of Voice & Accountability is negative and significant while "control of corruption" is insignificant in model 3.

### **V. CONCLUSION**

Main focus of our study is to investigate the contribution of value addition in sectoral composites of GDP (agriculture, industry and services sectors) in total tax yields of developing economies. In our overall model of 94 developing economies, we found that growth in all three sectors plays a significantly positive role in tax effort. Along with these factors, government expenditures, per capita income, trade openness and governance indicators also played a positive role in contribution to total tax collection, while, Inflation and Urbanization rate contributed negatively.

Surprisingly, the agriculture sector is not contributing positively when we bifurcated our sample which is clearly indicating that this sector needs much attention in per capita income generation and expansion of tax base while industrial and services sectors showed us a mixed result, however, in low income economies these two sectors are still unable to contribute positively in total tax collection. We can conclude that low income developing economies, the sectoral growth is playing a negative role in determining the tax effort which clearly indicates toward stagnation in tax yield of these countries. Government expenditures, per capita income, trade openness, inflation, voice & accountability and control of corruption are also playing a significant role in determining tax effort. As far as the significance of voice & accountability and control of corruption is concerned, it is clearly seen that good governance is inevitable in order to improve tax collection.

# POLICY RECOMMENDATIONS

Developing countries should move towards intensive farming and commercialization of agricultural sector from substantial farming so that income of the farmer may increase and can be brought into tax net. As far as tax reforms are concerned, the governments in developing countries should invest in research which will facilitate them to come up with effective policy reforms and initiatives. These policies will further make tax revenue collection more efficient and effective. As the agricultural sector holds the largest impediment in way of tax revenue collection in many developing countries, policy makers should focus on structural transformation of agricultural sector so that this sector may develop in better ways. The development in agriculture sector can further bring development in industrial and services sectors. Industrial and services sectors are not well developed and organized in most of the developing countries, policy makers should also focus on working with these sectors to improve tax revenue performance and to broaden the tax base so that these sectors could be brought into tax net.

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# APPENDICES

# TABLE A-1

# List of Countries According to Income Level

Antigua and BarbudaAlbaniaArmeniaAfgenaistanBahrainAlgeriaBangladeshBeninBarbadosBelizeBhutanBurkina FasoChileBosnia & HerzegovinaBoliviaCentral African, Rep.CroatiaBotswanaCabo VerdeCongo, Dem. RepHong KongBrazilCambodiaEthiopiaKorea, RepublicChinaCongo, Rep.MadagascarQatarColombiaCote d' IvoireMalaviSeychellesCosta RicaEgypt, Arab Rep.MaliSingaporeDominican RepublicGhanaNepalTrinidad and TobagoDominican RepublicGhanaSiera LeoneI'gijHondurusSenegalSiera LeoneGeorgiaIndiaSiera LeoneJamaicaJamaicaKrygy RepublicSiera LeoneI'annaicaKrygy RepublicSiera LeoneJamaicaMoldovaSiera LeoneJamaicaMoreccoSiera LeoneMalaysiaMoldovaSiera LeoneMaldivesPakistanSiera LeoneMaldivesPakistanSiera LeoneMaldivesPakistanSiera LeoneMaldivesPakistanSiera LeoneMaldivesPakistanSiera LeoneHandifueParaguaySiera LeoneHandifueParaguaySiera LeoneHandifueParaguaySiera LeoneHandifueParaguaySiera LeoneHandifueParaguaySiera Leone <td< th=""><th>HIC</th><th>UMIC</th><th>LMIC</th><th>LIC</th></td<>	HIC	UMIC	LMIC	LIC
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Peru Tunisia Romania Ukraine		Paraguay	Swaziland	
Romania Ukraine		Peru	Tunisia	
		Romania	Ukraine	
Russian Federation Veitnam		Russian Federation	Veitnam	

HIC	UMIC	LMIC	LIC
	Serbia	Zambia	
	South Africa		
	St. Lucia		
	Suriname		
	Thailand		
	Turkey		
	Venezuela, RB		

Note: HI = High Income countries, UMIC= Upper middle income countries, LMIC= Lower middle income countries and LI= Lower income countries

# TABLE A-2

# Statistical Tests

Statistical tests	Model 1	Model 2	Model 3
Breusch and Pagan test	1927.13	492.69	862.04
	(0.0000)	(0.0000)	(0.0000)
Hausman test	53.85	44.80	16.13
	(0.0000)	(0.0000)	(0.0000)
Modified Wald test for Group wise	11128.51	5745.06	5211.40
Heteroscedasticity	(0.0000)	(0.0000)	(0.0000)
Panel data Wooldridge test for autocorrelation	82.200	20.168	47.414
	(0.0000)	(0.0000)	(0.0000)

Note: The probability values of all tests are less than 5 % ( $p \le 0.05$ )
## GENDER DISPARITIES IN HUMAN DEVELOPMENT AND ASSOCIATED FACTORS IN LOW, MEDIUM, HIGH AND VERY HIGH HUMAN DEVELOPED COUNTRIES

## REHAN AHMAD KHAN SHERWANI, KAMRAN ABBAS, MUHAMMAD FAROOQ, SHUMAILA ABBAS, MUHAMMAD ALI RAZA AND MUHAMMAD ABID\*

Abstract. The welfare of human-beings serves as a catalyst for laying down the foundation of an egalitarian social order where the fruits of development are distributed evenly. Sadly, Women have always been at the receiving end and stark disparities have been witnessed in their access to socio-economic indicators. This state of affairs has stimulated the interest of researchers in the respective area. The current research aims to highlight the gendered patterns of development and associated discrepancies in low to highly developed countries. The findings of the research will offer an insight to the policymakers and those at the helm of affairs an insight to adopt gender-responsive policies boosting the human capital of the society. The growing interdependence globalization of the world economies has alerted the countries to utilize the women's potential and

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Millennium Development Goals and Short Term Development Goals are current manifestations of this awareness. Countries are getting their hands on policies that minimize the gender gap as it hinders the country from treading over the path of progress and prosperity. However, despite all the endeavors, gender discrimination still prevails and a little higher in less developed countries. The results of the study indicate comparatively better human development indices for men than women in less developed as well as in highly developed countries.

#### Keywords: Gender, Disparities, Human Development, Human Development Index

## I. INTRODUCTION

Since the beginning, gender disparities examination has been the subject matter of various researches because of insufficient data on the matter in public and private spheres. The division of labor within the premises of households and incentives associated with it may offer an insight into the underlying factors of gender discrimination. Mainstreaming the gendered power relations within and without the familial units will pave the way for better future prospects for women in social and economic spheres. A gender-based examination is in this manner a method for expanding the quality and viability of activities and additionally supporting gender correspondence (Cooray et al., 2014; Sunde and Vischer, 2015).

Men and women are the two pillars of society and no exclusive progress paradigm can guarantee social progress. Gender disparity is the magnitude of tenacious discrimination between women and men in all areas of life. Gender disparity obstructs financial and human advancement: a one standard deviation change in the Gender Inequality Index (GII) will increment long haul salary per capita by 9.1% and the Human Development Index (HDI) by 4%. Gender disparity might be a clarification of monetary improvement contrasts: 16% of the long haul salary distinction between South Asia and East Asia and Pacific can be represented by the distinction in gender imbalance (Ferrant, 2011). In barring a large portion of their populaces by segregation, a few nations strip them of their capacity to take advantage of physical and human capital. Gender discriminatory practices restraints women from contributing to national GDP and being a productive citizen of society (Klasen, 2002).

To ascertain the provision of fundamental human rights and privileges granted to women in comparison to men, it is imperative to consider the dimensions associated with gender and to highlight the gender disparity in human development. To capture the aspects of human development not covered by income alone, the United Nations Development Program (UNDP-1990) introduced the concept of human development index (HDI). This measure consolidates different measurements of human improvement other than income, for example, life span and education as income is just a part of human life and does not span the whole life of an individual.

Most of the times women are rewarded with less remuneration and are deprived of their due share of incentives, despite being equally capable of men. In Asian countries, women constitute a major share of people grappling with entrenched poverty. However, even with the best monetary advancement approaches, most poor families would not have the capacity to get by without the commitment of the female members. Women normally receive low wages for their work and have poor access to economic and social assets such as credit, land, innovation, and opportunities. The burdens of dual roles of women and divergent rewards for the same pastimes have attracted the attention of the researchers for so long (Bayeh 2016). Commonly there is a prerequisite for taking a gander at the quantifiable pointers that demonstrate the proof of imbalance so that appropriate arrangements and policies can be conceived. Understanding the significance, in recent years, UNDP began ascertaining gender-related indices in its reports.

In March 1995, verbal confrontation on gender orientation and advancement was at all important focal points in the global field on account of UN's Fourth International Conference of Women in Beijing and additionally at UN's Social Summit Conference at Copenhagen (Recci and Ganzeboom, 2015). These occasions have produced discussions among analysts, approach creators, organizers and grassroots activists on advancement, human improvement, and gender orientation improvement. The United Nations classifies countries as having a low, medium, high or very high human development index (UNDP 2014). These countries have different infrastructure, political systems, social development and many other factors that might affect directly or indirectly human development in the country. In the present study, we explore the possible associated factors of HDI among highly developed nations to low developed nations. The outcomes of the study will be helpful for the low developed nations to identify the shortcomings in their policies that obstacle them to be among the highly developed nations. By concentrating on the factors associated with higher HDI low developed nations can improve the human development index.

### **II. MATERIALS AND METHODS**

The data used in the present research was secondary data obtained from the United Nations Development Report published in 2015 (UNDP 2015). The primary variable of interest was HDI that quantifies human development by taking literacy rate and school enlistment as a measure of knowledge, life expectancy as a tool of a long and healthy life, furthermore, per capita GDP in view of buying force equality as a measure of material richness level. So HDI was comprised of three components; longevity, education level and a decent standard of living. These three components were computed as:

$$Longevity = Life Expectancy Index(LEI) = \frac{Life Expectancy - Life Expectancy_{min}}{Life Expectancy_{max} - Life Expectancy_{min}}$$
(2.1)  

$$Education Index(EI) = \frac{2}{3} * \left( \frac{A \, dult \, Literacy - A \, dult \, Literacy_{min}}{A \, dult \, Literacy_{max} - A \, dult \, Literacy_{min}} \right) + \frac{2}{3} * \left( \frac{Enrollment - Enrollment_{min}}{Enrollment_{max} - Enrollment_{min}} \right)$$
(2.2)

$$GDP Index (GDPI) = \frac{\ln (GDP) - \ln (minimum GDP)}{\ln (maximum GDP) - \ln (minimum GDP)}$$
(2.3)

HDI is simply the average of (2.1), (2.2) and (2.3) i.e.,

$$HDI = \frac{LEI + EI + GDPI}{3}$$
(2.4)

In present data, HDI was calculated from 188 countries (very high 49, high 56, medium 39 & low 44) and the classifications of HDI were based on the quartiles of the HDI distribution. For low human

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development countries, HDI was below 0.550; medium human development 0.550-0.699; high human development 0.700-0.799 and for very high human development countries value of HDI was at least 0.800. Pearson and Spearman's correlation coefficient were used to measure the relationship between HDI and other factors in low human development countries – very high human development countries. All the data were analyzed in SPSS v 24.

## **III. RESULTS AND DISCUSSIONS**

Results presented in Table 1 depict the mean values of the human development index and associated factors both for females and males in very high, high, medium and low human developed countries. Parametric and non-parametric tests for two independent samples were used wherever standard assumptions held or did not meet respectively.

### TABLE 1

Gender Differences in the Human Development Index and Associated Factors in very High, High, Medium and Low Human Developed Countries

		HDI Countries			
	Gender	Very High	High	Medium	Low
Human development	Female	0.825	0.614	0.490	0.336
index	Male	0.847	0.638	.0535	0.399
Life expectancy at	Female	79.001	73.273*	70.859***	60.925**
birth (years)	Male	74.100	67.548	65.974	58.284
Expected years of	Female	16.167	13.454	10.497	7.509
schooling	Male	15.447	12.754	10.608	8.727
Mean years of schooling	Female	10.569	7.916	5.759	2.904***
	Male	10.884	8.280	6.744	4.382
Vouth literacy rate	Female	48.669	81.112	85.269	58.732*
routh includy fate	Male	48.561	80.989	87.174	68.496
Population with at	Female	80.388	56.834	35.054	10.296***
least some secondary education	Male	82.633	59.845	40.069	18.743
Adult mortality rate	Female	52.020***	95.304***	159.077***	276.546**
	Male	101.306	173.214	232.744	321.227
Estimated gross national income per capita	Female	27655.4***	8369.8***	4721.6***	1592.6***
	Male	48823.9	16205.1	8783.4	2833.4

		HDI Countries				
	Gender	Very High	High	Medium	Low	
Domestic workers	Female	6.963***	4.700***	2.956***	1.957*	
(% of total employment)	Male	0.806	0.500	0.513	0.284	
Labor force	Female	49.708***	42.148***	48.020***	60.932***	
participation rate	Male	67.045	65.595	72.513	77.891	
Suicide rate	Female	4.351***	2.962***	4.626***	6.836***	
	Male	15.776	10.455	11.992	8.948	

\*p<0.10; \*\*p<0.05; \*\*\*p<0.01

#### **GENDER AND HUMAN DEVELOPMENT INDEX**

The basic rule of human advancement is for individuals to expand their decisions, to understand their potential, and to appreciate the opportunity to lead lives they esteem or have the motivation to esteem. Level with circumstances in all circles, for all individuals, ladies and men alike, are at the heart of human improvement. In any case, those alternatives remain unequally conveyed inside and crosswise over social orders and tragically many are still to a great extent inaccessible to ladies. Detriment and segregation, absence of bits of knowledge into what especially influences females' lives, including wellbeing (physical and enthusiastic), fortified by social standards and qualities, organizations, and open strategies, exist in each circle of ladies' lives, showed distinctively in various nation settings. They point of confinement ladies' abilities, openings, and decisions, bringing about fewer advances than men as far as wellbeing, instruction, and way of life, strengthening, and other basic measurements individual security of human improvement. Subsequently, the maximum capacity of many ladies' lives can't achieve the ideal level and mankind overall does not procure its possibilities (Vepa, 2007; Folbre 2006).

From the earliest starting point, the Human Development Report has been worried about imbalances in the open doors and issues of females and males. In spite of the fact that this point of view has gotten some consideration in past Reports, there is a solid case right now for focusing particularly on that issue for a more far-reaching examination of gender imbalance in monetary and social game plans in the contemporary world.

Gender segregation in work has turned into a principle issue in which strategy producers are anxious to unravel. Of note, because of the noteworthy decrease in the support rate of female work as of late, gender separation in business has appeared as a heightened incline. No ifs and or buts, it negatively affects business shield and even individuals' expectations for everyday comforts (Chen et al., 2017).

Among very high HDI countries; Saudi Arabia had the minimum HDI (0.778), Norway had the maximum HDI (0.940) among females with 0.82±0.18 whereas human development among males, Latvia had the minimum HDI (0.805) and Switzerland had the maximum HDI (0.945) value with 0.85±0.18. Among high HDI countries; Algeria had the lowest HDI (0.637), Belarus had the highest HDI (0.806) with 0.61±0.27 in females whereas in male Samoa & Dominican Republic had the highest HDI (0.713) with 0.64±0.24. Among medium HDI countries; Cambodia had the lowest HDI (0.519), Botswana had the highest HDI (0.691) with 0.49±0.24 in females whereas in male Cambodia had the lowest HDI (0.584), and Egypt had the highest HDI (0.729) with 0.54±0.26. Among low HDI countries; Niger had the lowest HDI (0.287), Kenya had the highest HDI (0.527) with  $0.34\pm0.18$  in females whereas in the male the Central African Republic had the lowest HDI (0.392), and Pakistan had the highest HDI (0.601) with 0.40±0.21. Although, no significant differences were observed in the human development index between women and men comparatively men had more human development than women in very high, high, medium and low human development countries.

# GENDER, LIFE EXPECTANCY AT BIRTH AND ADULT MORTALITY RATE (AMR)

Life expectancy and adult mortality rate are key components of health outcomes and the resultant human development of a country. Life expectancy represents the mean period of time an individual is required to live if winning mortality conditions hold on all through the individual's life. It can be computed for people at the season of birth or in any ensuing age bunch. The future at birth ascertained for guys and females is widely utilized as a measure of gender differentials in prosperity by national governments and additionally the World Bank and the UNDP (UNDP, 2015). Life expectancy, once an extravagance of rich populaces, is progressing quickly in the creating scene. The setting of advancement makes one of a kind examples and difficulties for populace maturing, for example, endless imbalance crosswise over areas and associates that go through phases of improvement at various circumstances (Weir et al., 2014).

So far the investigation has been limited to accomplishments in which the "possibilities" of females furthermore, men vary the circumstance is distinctive, be that as it may, with regards to mortality rates and life expectancy where the proof of organic contrasts in survival rates favoring women. Organic variables appear to guarantee higher female survival than males, ideal from the fetal stage and early stages onwards. Amid the earliest stages, females have a higher imperviousness to irresistible illness. Sometime down the road, contrasts in gender hormones bringing on expanded demise rates in men by mishaps and other rough causes and security in ladies to ischaemic heart sicknesses, consolidate to guarantee that female survival is higher than a male given comparable care (Mallick 2014). Women's part being developed is reflected in diminished maternal mortality and enhanced maternal care, better training and sustenance of youngsters, lessened richness, and increment in the normal age at first marriage (Arora 2012). In addition, the enhanced status of ladies as a rule, and better training of the mother specifically impacts general mentalities, including inclinations of ladies towards the young lady youngster. Regularly, it is this oppression the young lady kid from the minute she is conceived, or even before her introduction to the world, which comes full circle in the long run in the low status of ladies, and prompts to numerous other poor monetary and social results.

Among very high HDI countries; Saudi Arabia had the minimum life expectancy (75.7), China had the maximum life expectancy (86.8) among female with 79.0 $\pm$ 16.7 whereas life expectancy among male, Lithuania had the minimum life expectancy (67.7) and China had the maximum life expectancy (81.2) with 74.1 $\pm$ 15.8. Although no significant differences were found in life expectancy between females and males comparatively females had more life span than males in very high human development countries. Among high HDI countries; Belize had the minimum life expectancy (72.9), Cost Rica had the maximum life expectancy (81.9) among female with 73.3 $\pm$ 17.7 whereas life expectancy (64.4) and Lebanon had the maximum life expectancy (77.6) value with 67.6 $\pm$ 16.5. Among

medium HDI countries; Equatorial Guinea had the minimum life expectancy (59.0), Viet Nam had the maximum life expectancy (80.5) among female with 70.9 $\pm$ 5.0 whereas life expectancy among male, South Africa had the minimum life expectancy (55.2) and Nicaragua had the maximum life expectancy (71.9) value with 66.0 $\pm$ 4.3. Among low HDI countries; Swaziland had the minimum life expectancy (48.2), Nepal had the maximum life expectancy (71.1) among female with 60.9 $\pm$ 5.7 whereas life expectancy among male, Central African Republic had the minimum life expectancy (48.8) and Nepal had the maximum life expectancy (68.2) value with 58.3 $\pm$ 5.0. Furthermore, in high, medium and low human development index countries females had a significantly higher life span than males.

Among very high HDI countries; Cyprus had minimum (36.0), Hungary had maximum (91.0) AMR for a female with 52.0±17.8 whereas among males, Kuwait had minimum (59.0) and Lithuania had the maximum (254.0) AMR with 101.3±48.9. Among high HDI countries; Lebanon had minimum (46.0), Tonga had maximum (245.0) AMR for a female with 95.3±31.4 whereas among males, Lebanon had the minimum (70.0) and Russian Federation had the maximum (339.0)AMR with 173.2±57.1. Among medium HDI countries; Cabo Verde had minimum (68.0), South Africa had maximum (320) AMR for a female with 159.1±71.6 whereas among males, the Syrian Arab Republic had the minimum (116.0) and South Africa had the maximum (441.0) AMR with 232.7±83.1. Among low HDI countries; Pakistan had minimum (155), Swaziland had maximum (496) AMR for a female with 276.5±85.0 whereas among males, Pakistan had the minimum (189.0) and Lesotho had the maximum (577.0) AMR with 321.2±83.7. The adult mortality rate for females was significantly lower than males in all the HDI countries groups.

#### **GENDER AND EDUCATION**

Education is one of the components that determines human development that reflects the growth of a country and the literature is evident that larger the gap between gender inequality in education the slower the growth of the economy and development in all (Knowles and Lorgelly, 2002). In the current decades, the proficiency rate among the ladies are expanding steadily, the gender gap in essential and optional level enlistment rate diminished strikingly (Behrman et al., 1999). Low education rates among the ladies of age gathering (15-49) improve the proportion of tyke marriage and juvenile parenthood (Klasen and Lamanna, 2009).

Among very high HDI countries; UAE had minimum (13.9), Australia had maximum (20.7) expected years of schooling for a female with 16.2±2.8 whereas among males, UAE had the minimum (12.9) and Australia had the maximum (19.7) expected years of schooling with 15.4±2.7. Among high HDI countries; Azerbaijan had minimum (11.8), Barbados had maximum (17.2) expected years of schooling for females with  $13.4\pm3.4$  whereas among males, Armenia had the minimum (11.2) and Fiji had the maximum (15.5) expected years of schooling with 12.8±3.2. Among medium HDI countries; Iraq had minimum (8.7), Cabo Verde had maximum (13.9) expected years of schooling for females with 10.5±3.8 whereas among males, Guyana had the minimum (9.4) and Zambia had the maximum (13.9) expected years of schooling with 10.6±3.8. Among low HDI countries; Niger had minimum (4.8), Nepal had maximum (12.5) expected years of schooling for females with  $7.5\pm3.4$  whereas among male, Niger had the minimum (6.1) and Angola had the maximum (14.0) expected years of schooling with  $8.7\pm3.9$ . Although, no significant differences were found in expected years of schooling between females and males but comparatively females had higher expected schooling than males in very high and high human development countries while slightly lower in medium and low HDI countries.

Among very high HDI countries; Kuwait had minimum (7.3), Australia had maximum (13.1) mean years of schooling for females with  $10.6\pm2.6$  whereas among males, Kuwait had the minimum (7.1) and Germany had the maximum (13.8) mean years of schooling with  $10.9\pm2.7$ . Among high HDI countries; Algeria had minimum (4.8), Georgia had maximum (12.0) mean years of schooling for females with  $7.9\pm3.4$  whereas among males, Maldives had the minimum (6.0) and Georgia had the maximum (12.3) mean years of schooling with  $8.3\pm3.5$ . Among medium HDI countries; Bhutan had minimum (2.0), Moldova had maximum (11.1) mean years of schooling for females with  $5.8\pm3.0$ whereas among males, Bhutan had the minimum (4.1) and Moldova had the maximum (11.3) mean years of schooling with  $6.7\pm3.9$ . Among low

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HDI countries; Chad had minimum (1.0), Swaziland had maximum (7.4) mean years of schooling for females with  $2.9\pm2.0$  whereas among male, Burkina Faso had the minimum (1.9) and Zimbabwe had the maximum (7.7) mean years of schooling with  $4.4\pm2.1$ . No significant differences were found in mean years of schooling between females and males in very high, high and medium human development countries whereas this was significant in low HDI countries. In addition, females had comparatively lower mean years of schooling than males in all HDI countries groups.

Among very high HDI countries; Portugal had minimum (47.7), Estonia had maximum (100.0) population with atleast some secondary education for females with 80.4±19.4 whereas among male, Portugal had the minimum (48.2) and Estonia had the maximum (100.0) population with atleast some secondary education with 82.6±19.5. Among high HDI countries; Algeria had minimum (26.7), Kazakhstan had maximum (95.3) population with atleast some secondary education for females with  $56.8\pm27.4$  whereas among male, Dominica had the minimum (23.2) and Kazakhstan had the maximum (98.8) population with atleast some secondary education with 59.8±28.0. Among medium HDI countries; Cambodia had minimum (9.9), Tajikistan had maximum (95.1) population with atleast some secondary education for females with 35.1±27.8 whereas among male, Cambodia had the minimum (22.9) and Kyrgyzstan had the maximum (96.8) population with atleast some secondary education with 40.1±28.6. Among low HDI countries; Mozambique had minimum (1.4), Zimbabwe had maximum (48.7)population with atleast some secondary education for females with  $10.3\pm10.0$  whereas among male, Burkina Faso had the minimum (3.2) and Zimbabwe had the maximum (62.0) population with atleast some secondary education with 18.7±15.3. No significant differences were found in a population with atleast some secondary education between females and males in very high, high and medium human development countries whereas this was significant in low HDI countries. In addition, females had a comparatively lower population with atleast some secondary education than males in all HDI countries groups.

Among very high HDI countries; UAE had lowest (97.0), Estonia & Poland had the highest (100.0) youth literacy rate for females with

48.7±50.2 whereas among males, UAE had the lowest (93.6) and Poland had the highest (100.0) youth literacy rate with 48.6±50.0. Among high HDI countries; Algeria had the lowest (89.1), Cuba had the highest (100.0) youth literacy rate for females with 81.1±38.2 whereas among males, Jamaica had the lowest (93.3) and Cuba had the highest (100.0) youth literacy rate with 81.0±38.1. Among medium HDI countries; Zambia had the lowest (58.5), Moldova had the highest (100.0) youth literacy rate for females with 85.3±22.6 whereas among males, Zambia had the lowest (70.3) and Moldova had the highest (100.0) youth literacy rate with 87.2±21.8. Among low HDI countries; Niger had the lowest (15.1), Myanmar had the highest (95.8) youth literacy rate for female with 58.7±26.6 whereas among males, Niger had the lowest (34.5) and Yemen had the highest (96.7) youth literacy rate with  $68.5\pm24.0$ . No significant differences were found in the youth literacy rate between females and males in very high, high and medium human development countries whereas significant in low HDI countries. In addition, females had a comparatively higher youth literacy rate than males in very high & high HDI countries while lower in medium & low HDI groups.

Literacy rate differential alone is not an all-encompassing pointer of the gender crevice, particularly if what is measured is not useful proficiency. Notwithstanding when the wage crevice is lower for instructed than ignorant, separation in business and developing unemployment of ladies contrasted with men at more elevated amounts of proficiency augment the gender crevice in normal income. Combined with speedier wage development of men at all levels of education on one hand, what's more, the expanded work weight of utilized ladies on the other gender crevice in welfare augments. It could be for the most part because of the school enlistments and school participation of young ladies, the crevice between grown-up females and guys is still high, however, the hole has been diminishing. This plainly indicates the gender separation in sending young ladies to class and holding them in school until they get to be distinctly proficient. The proficiency hole is much higher among the different levels of instructive accomplishments of the grown-up populace and twofold the quantity of guys exists for the number of females who achieved training levels above the essential level. All the more request-driven training with cutting edge aptitudes presumably would put young ladies comparable to young men as found in the diminishing winning hole. It is important to focus on practical instruction instead of the unimportant proficiency of females.

# GENDER, WORK AND GROSS NATIONAL INCOME (GNI) PER CAPITA

Work compel support measures the extent of men and women who will draw in themselves in the monetary exercises which are incorporated into the arrangement of national salary book keeping (add to the national Income). Work drive comprises of the individuals who are utilized and the individuals who are unemployed yet searching for work. The individuals who are not willing to work and the individuals who are in the instructive foundations are excluded in the work drive. The work cooperation proportion or laborer populace proportion demonstrates just the individuals who are utilized as the extent of the aggregate populace (Tzannatos, 2010). In the late decades, ladies' interest in labor constrains higher than at any other time over the world. It was contended that numerous females envision short and intruded on spells of market business in light of their customarily more noteworthy responsibility to home-related exercises. Guys, then again, expect long haul inclusion in labor advertise work and, as needs be, put resources into qualitatively and quantitatively extraordinary human capital and development (Vella 1994). In 2015 the worldwide work constrains support rate was 50 percent for ladies however 77 percent for men (UNDP, 2015).

The exchange of ladies' work from the family to business is a standout amongst the most outstanding components of financial advancement. It is not by all methods all pickup, rather the pick up is considered in light of the fact what ladies generally do in the family unit should in truth be possible much better and inexpensively outside, because of the scale economies and specialization and furthermore utilization of capital and drudgery lessening hardware. One of the surest methods for expanding national wages in this way is to make new wellsprings of work for ladies outside the home (Lewis, 2003). Facilitate the decrease in fruitfulness rates and the decrease in reliance proportions were a consequence of ladies' support in the work constrains. The support of ladies in wage work outside the house prompted many components that decidedly affected the monetary development of the countries. The decrease in fruitfulness rates and reliance proportions have

appeared as wellsprings of immense reserve funds and speculation by family units that prompt to financial development in the East Asian nations (Braunstein, 2007).

Work empowers individuals to acquire an occupation and be monetarily secure. It is basic for impartial monetary development, neediness diminishment, and gender correspondence. It likewise permits individuals to completely partake in the public eye while bearing them a feeling of poise and worth. Work can contribute to general society greatly, and work that includes watching over others fabricates attachment and bonds inside families and groups (UNDP, 2015). Work measurement mirrors the financial force of every gender and creates twisting similar to gender disparities in education. Without a doubt, women who are more gainful than men are rejected from the work advertise. In this manner, the pool of ability from which firms can pick their workers is lessened by gender separation, so that the allotment of ability is not ideal (Barta, 2004). Besides, rise to access to work prompts to lower fertility rates also, lessens the reliance rate (Langerlof, 2003).

Among very high HDI countries; Montenegro had minimum (0.10), Kuwait had maximum (53.3) DW for females with  $6.96\pm14.0$  whereas among males, Montenegro had minimum (0.10) and Kuwait had the maximum (11.3) DW with 0.81±2.0. Among high HDI countries; Russian Federation had minimum (0.10), Oman had maximum (59.3) DW for females with 4.70±9.2 whereas among males, Yugoslav Republic had the minimum (0.10) and Bahamas had the maximum (3.0) DW with 0.50±0.71. Among medium HDI countries; Tajikistan had minimum (0.10), Namibia had maximum (19.4) DW for females with 2.96±5.0 whereas among males, Sao Tome and Principe had the minimum (0.10)and Namibia had the maximum (4.2) DW with 0.51±1.0. Among low HDI countries; Nepal had minimum (0.30), Djibouti had maximum (41.6) DW for females with 1.96±6.5 whereas among males, Ethiopia had the minimum (0.10) and Djibouti had the maximum (1.9) DW with 0.28±0.5. Percent of domestic workers for females was significantly higher than males in all the HDI countries groups.

Among very high HDI countries; Saudi Arabia had minimum (20.2), Iceland had a maximum (70.5) labor force participation rate for females with  $49.7\pm13.1$  whereas among males, Montenegro had minimum (57.3)

and Qatar had the maximum (95.5) labor force participation rate with 67.1±16.0. Among high HDI countries; Algeria had minimum (15.2), the Bahamas had a maximum (69.3) labor force participation rate for females with 42.2±19.9 whereas among male, Bosnia & Herzegovina had the minimum (57.3) and Peru had the maximum (84.4) labor force participation rate with 65.6±23.8. Among medium HDI countries; the Syrian Arab Republic had minimum (13.5), Equatorial Guinea had maximum (80.7) labor force participation rate for females with  $48.0\pm21.1$ whereas among male, Moldova had the minimum (44.2) and Equatorial Guinea had the maximum (92.2) labor force participation rate with 72.5±19.6. Among low HDI countries; Afghanistan had minimum (15.8), Tanzania had maximum (88.1) labor force participation rate for females with  $60.9\pm21.3$  whereas among males. Nigeria had the minimum (63.7) and Madagascar had the maximum (90.5) labor force participation rate with 77.9±13.9. The labor force participation rate for females was significantly lower than males in all the HDI countries groups.

Gender imbalance overruns the world. In considering the measurements of financial gender imbalance, ladies still make not as much as men in the formal work division, will probably live in destitution, are more averse to partake in the formal work division, and do a bigger share of work in the family area.

Among very high HDI countries; Montenegro had minimum (11106), Singapore had maximum (59994) estimated GNI per capita for females with 27655.4 $\pm$ 13218.7 whereas among males, Montenegro had minimum (18094) and Qatar had the maximum (143979) estimated GNI per capita with 48823.9 $\pm$ 25856.5. Among high HDI countries; Samoa had minimum (3416), the Bahamas had maximum (17868) estimated GNI per capita for females with 8369.8 $\pm$ 4823.4 whereas among males, Tonga had the minimum (6336) and Oman had the maximum (46400) estimated GNI per capita with 16205.1 $\pm$ 9144.6. Among medium HDI countries; the Syrian Arab Republic had minimum (864), Equatorial Guinea had maximum (17073) estimated GNI per capita for females with 4721.6 $\pm$ 3709.8 whereas among male, Tajikistan had the minimum (3017) and Equatorial Guinea had the maximum (24850) estimated GNI per capita with 8783.4 $\pm$ 5869.4. Among low HDI countries; the Central African Republic had minimum (476), Angola had maximum (5497)

estimated GNI per capita for females with  $1592.6\pm1067.1$  whereas among male, Central African Republic had the minimum (689) and Angola had the maximum (8169) estimated GNI per capita with 2833.4 $\pm2037.9$ . The estimated gross national income for females was significantly lower than males in all the HDI countries groups.

#### **GENDER AND SUICIDE RATE**

Females are regularly under a considerable measure of stress and weight to perform well in schools and colleges. The individuals who can't adapt to high scholastic execution regularly feel detached and confer suicide. Women all in all show inclinations for work in the general population part where they confront less segregation and experience more noteworthy vocation versatility. Ladies with next to zero training are additionally inclined to high suicide rates. Huge numbers of the uneducated ladies are utilized in minor occupations where they are abused with minimal money related pay (Mitra and Singh, 2007).

Among very high HDI countries; Saudi Arabia had minimum (0.20), Korea had a maximum (18.0) suicide rate for females with  $4.35\pm3.06$ whereas among males, Saudi Arabia had minimum (0.6) and Lithuania had the maximum (51.0) suicide rate with 15.78±10.32. Among high HDI countries; Belize had minimum (0.50), Sri Lanka had a maximum (12.8) suicide rate for females with 2.96±2.96 whereas among males, Lebanon had the minimum (1.2) and Sri Lanka had the maximum (46.4) suicide rate with 10.46±11.69. Among medium HDI countries; the Syrian Arab Republic had minimum (0.20), Guyana had a maximum (22.1) suicide rate for females with 4.63±4.64 whereas among males, the Syrian Arab Republic had the minimum (0.7) and Guyana had the maximum (70.8)suicide rate with 11.99±12.81. Among low HDI countries; Mauritania had minimum (1.5), Mozambique had maximum (21.1) suicide rate for females with 6.84±4.89 whereas among males, Haiti had the minimum (3.3) and Mozambique had the maximum (34.2) suicide rate with 15.20±8.95. The suicide rate among females was significantly lower than males in all the HDI countries groups.

### **IV. CONCLUSION**

Gender discrimination is a multidimensional issue that is profoundly implanted in the ad-libbed and conventional social settings around the globe, and it is considered as a noteworthy imperative towards the improvement procedure in the nation. We, therefore, made an attempt to determine the root causes of pervasive gender gap persist in the developed and under-developed countries. The gender correspondence implies that both men and ladies, as an individual, have measured up to rights and openings regardless of gender. It likewise alludes that all individuals (men and ladies) must have a level with appropriate to build up their own capacities and allowed them to settle on individual decisions. State or society won't segregate amongst men and ladies on the premise of gender. Additionally, gender correspondence accentuation that characteristic or natural distinction amongst males and females won't prompt to contrast in status and rights in all circles of life amongst males and females. The measurement and level of oppression females show itself in various cultures, legislative issues, races, districts, nations, and economies in an unexpected way. Be that as it may, gender segregation is considered an enormous requirement towards the advancement procedure and it is found as a causal component of brutality against ladies. Gender fairness, thusly, is the present subject of worry among the arrangement creators of the world in view of upgrading monetary development and keeping up the progression of the improvement procedure too.

In spite of impressive advances in diminishing gender crevice, there still exists enormous oppression ladies in various parts, for example, ladies have less access than men to assets and financial open doors. Moreover, they have constrained access to an extensive variety of administrations and the development of ladies is still confined in numerous social orders. Strategies that support women's empowerment can contribute to women's ability to formulate and advocate their own visions for their society - including interpretations and changes to cultural and gender norms. Albeit huge advance has been made in the course of recent decades, gender disparity remains a noteworthy obstruction to human improvement. Ladies in each general public still face different inconveniences and separations. Such disservices and separations have changed shape after some time and crosswise over social orders. For instance, between 1990-2012 meeting towards gender correspondence in training at the sum total of what levels has been occurring. Nonetheless, ladies' advance in limit has not made an interpretation of consistently into monetary open doors and results. Wage

holes and word related isolation amongst ladies and men keep on persisting, with the correct degree shifting crosswise over nations.

This study demonstrates that the human capital model, which highlights the significance of instruction and aptitudes in adding to the strengthening of ladies, is only one a player in the story. Social and social variables ought to be joined too so as to test into issues of gender relations, which, combined with high instructive fulfillment, will decide the social, economic, and individual prosperity of ladies in any nation. High instructive fulfillment alone won't advance gender strengthening unless the social and social standards of a nation or state guarantee correspondence of ladies in every aspect of life. In short, it is recognized that gender equity is a complex and long-term project. It can only be achieved through a variety of initiatives and a process of trial and error and will be more effective if women's organizations have the support of governments and international organizations.

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## IMPACT OF PERCEIVED RISKS AND BENEFITS OF SOCIAL NETWORKING SITES ON BEHAVIORAL INTENTION OF USERS: MEDIATING ROLE OF USERS' SATISFACTION

## MUBBSHER MUNAWAR KHAN, KASHIF IMRAN, BILAL MAHMOOD AND HIBA SAEED\*

Abstract. This study is conducted to investigate the role of perceived risks and benefits on the behavioral intention of users with the mediating role of satisfaction associated with the use of social networking sites (SNS). Data were collected by distributing 350 questionnaires among the employees of various public sector organizations using simple random sampling technique. 300 duly filled questionnaires were used for data analysis. Results revealed that there is a significant impact of perceived risks and benefits of SNS on the behavioral intention of users. The study also confirmed mediating role of satisfaction in this relationship. Furthermore, the results of paired sample t-test show a significant difference in the scores of perceived risks and benefits. Results of paired sample t-test showed that perceived benefits associated with SNS are greater than perceived risks. Therefore, it may be recommended that usage of SNS is beneficial for enhancing the productivity and efficiency of public sector employees. In the future, practitioners may apply the findings of this study in making strategic decisions in the borderless intertwined world of SNS. The study may provide important

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implications regarding the impact of perceived risk and benefits of SNS usage on the behavioral intention of public sector employees with mediating role of user satisfaction, in their official assignments.

**Keywords:** Behavioural intention, Perceived benefits, Perceived risks, Social media application

## I. INTRODUCTION

Social media is playing a crucial role in today's dynamic and competitive environment. It has changed the lifestyles of people. In today's highly competitive and dynamic business environment social media has become an important medium of communication and interaction between employees and their organizations (Santoso, 2012). Social media highly boost openness, social participation and information sharing among all segments of the society. In this study we would investigate how different perceived risks and benefits associated with social media impacts- the behavioral intention of employees working in different organizations, particularly in government organizations (Khan, Swar, & Lee, 2014), to use social networking site (SNS) and how satisfaction mediates this relationship. The increasing use of SNS has resulted in a reduced face to face interaction among employees in their normal business practices. In fact, today, the need for the physical presence of employees for business communications and routine assignments has also reduced in some societies - such as in work from home jobs. Social media applications have proven as innovative and technological advancement in social interaction which highly facilitates formal communication among the employees of both public and private sector organizations (Chun & Luna-Reyes, 2012).

According to Curtis et al. (2010), social media applications provide countless opportunities to individuals and organizations for sharing formal and informal information regarding their day to day activities. Chun and Reyes (2012) argued that the use of social media tools also reveals the social behaviors of the individuals such as; their sentiments, thoughts, intentions, attitudes, and responses towards their work activities. Therefore, it is obvious how SNS have made it possible for the employees, individuals, and students to interact, communicate and collaborate virtually with their organizations and institutions (Sandoval-

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Almazan & Valle-Cruz, 2016). Moreover, social media applications highly influence the lifestyle of individuals, employees, and customers in their social interactions in terms of risks and benefits of social media (Bertot & Jaeger, 2011).

Coupled with the fact that there are several advantages of online social media applications for the employees and organizations, there are various disadvantages too. For instance, the users of social media applications may face various types of risks and challenges regarding their privacy, security, social interactions, approachability and time management (Bertot, Jaeger, & Hansen, 2012). Some scholars argued that social media applications are unproductive and ineffective tools for social interactions among individuals due to security concerns and wastage of time (Baumgartner & Morris, 2010). It is well known that incidents like Wiki Leaks and Panama Leaks proved disastrous for the governments of the many countries across the world.

The present study aims to fill the gap in the existing body of literature in three different ways. First, in Pakistani context, there have been few, if any, studies conducted to investigate the impact of perceived risks and benefits of social media on the behavioral intention of employees (Arslan & Zaman, 2014; Ashraf & Javed, 2014) belonging to public sector organizations in Pakistan (Irfan, Hassan, & Hassan, 2018). Secondly, we have tested the impact of perceived risks and benefits of social media on user intention through the mediating role of users' satisfaction. Finally, we have also compared the perceived risks and benefits associated with social media application using paired sample t-test.

The study may provide important implications regarding the impact of perceived risk and benefits of SNS usage on the behavioral intention of public sector employees with mediating role of user satisfaction, in their official assignments.

#### **II. LITERATURE REVIEW**

#### **OVERVIEW OF SOCIAL MEDIA APPLICATIONS**

Social media includes a set of online applications and websites that are designed to facilitate the users by providing them with the opportunity to share their opinions, information and interests (Khan et al., 2014). Social media comprise of a large number of platforms and technologies that includes social networking sites and applications like Facebook, Twitter, Instagram, LinkedIn, Pinterest, Tumblr, etc.; blogs, microblogs, collaborative projects like WhatsApp, and all other internet based platforms that facilitates the users in their social interactions (Khan et al., 2013). A study conducted by Zheng (2013) demonstrated that the number of social media users are rapidly increasing in Chinese public sector organizations and government agencies are using this medium for public social interactions. Former studies show that the use of social media applications has increased at a very fast pace in the last few years (Sandoval-Almazan & Valle-Cruz, 2016; Sandoval-Almazan & Gil-Garcia, 2012).

Thinking about the significance of web based applications, these may very well be categorized into two types: web-based SNS and smartphone-based social media applications (Khan et al., 2014; Bertot & Jaeger, 2011). The users of web-based SNS may access them with the help of their e-mail addresses. Facebook, Twitter and LinkedIn are the best examples of web-based SNS. Whereas, smartphone-based social media applications may be accessed by the cellphone numbers of their users. WhatsApp is the best example of a smartphone-based application in this regard. In this study, we aim to investigate the benefits and risks of both types of social media platforms for the employees of public sector organizations of Pakistan.

The use of social media applications is also very crucial in terms of task fulfillment for the employees particularly when the deadlines of the projects are coming closer. Therefore, it is obvious that the social media applications are very important for employees in terms of risk and benefits, particularly in public sector organizations. In this study, our main objective is to investigate the impact of social media applications on various types of risk associated with employees such as time risk, psychological risk, social risk, and privacy risk. On the other hand, the present study is also concerned to investigate the impact of social media applications on various types of benefits related to employees such as social connectivity, social involvement, information attainment, and entertainment.

## OVERVIEW OF SOCIAL MEDIA APPLICATIONS IN THE PUBLIC SECTOR

The revolution of social media and communication technologies has greatly influenced the social interaction patterns of individuals in our societies (Bertot, 2011). Social media is becoming an integral part of the day to day activities of people, customers, employees and organizations (Picazo-Vela & Gutiérrez-Martínez, 2012). It is a fact that the social networking sites (SNS) are very crucial for implementing the marketing strategies of organizations. According to Irfan et al. (2018) SNS have a significant and positive impact on economic sustainability, social sustainability and corporate reputation in public sector organizations of Pakistan. Social media provide the opportunity to the employees and their organizations to collaborate with each other on the matters of mutual interests. Social media is also playing a crucial role in social transformation by providing open access to global markets, financial services and by providing employment opportunities in private and public sector organizations (Rehman, Irem, & Ilyas, 2014).

Another study, conducted to examine the impact of social media on employee performance in the public sector organizations of Pakistan, reported that SNS have a strong impact on the performance and satisfaction of employees (Ashraf & Javed, 2014). In recent years, social media have greatly influenced the intention of its users to use new media technologies for their social interactions (Zaheer, 2018). Moreover, individuals and employees of the organization are also using SNS for their social interactions and for daily assignments. However, these applications significantly influence the employees in terms of their risks and benefits related to their official duties and work performances. Therefore, this study is conducted to investigate the impact of social media risks and benefits associated with SNS on user intention with the mediating effect of user satisfaction on public sector organizations employees in Pakistan.

#### **BENEFITS OF SOCIAL MEDIA IN PUBLIC SECTOR**

Social media applications are widely used by the different segments of the society around the world. According to Global Digital 2019 collection of reports from Hootsuite and WeAreSocial the number of active social media users has grown to 3.48 billion representing 45% of world population while 3.26 billion (42% of world population) people are using social media on smartphones (Kemp, 2019, Jan 30). Social media applications provide a platform for social interactions, where individuals discuss and share their opinions, issues, mutual interests and can create new relationships (Siddiqui & Singh, 2016). Social media also provide enormous benefits and opportunities to people in their formal and provide informal activities. Social media facilities two-wav communication between the employees and their organizations which help them to achieve their organizational goals and objectives.

According to Siddiqui and Singh (2016), social media applications enable the public sector organizations to enhance their brand image, increase market insight and promote responsiveness among the employees. Past studies also supported that social media applications have a positive and significant impact on different segments of the society, such as general public, academia, public and private sector organizations, business communities and political circles in the different countries across the world (Siddiqui & Singh, 2016; Sandoval-Almazan & Valle-Cruz, 2016; Khan et al., 2014; Bertot, Jaeger, & Hansen, 2012; Chun & Luna-Reyes, 2012; Bertot, 2011). The benefits associated with SNS may include; social connectivity, social involvement, information attainment, and entertainment.

#### **RISKS OF SOCIAL MEDIA IN THE PUBLIC SECTOR**

Despite the fact that social media applications have many benefits, there are several forms of issues, challenges, and risks as well. These include social, time, privacy and psychological risks as faced by the users of social networking sites. In 2009, the US government took initiatives to enhance transparency, openness and public participation through social media applications (Snead, 2013). After these initiatives, many US agencies have adopted social media to enhance public sharing and to spread information among the people and state organizations. In Pakistani context, social media applications have also proven detrimental impacts on different segments of the society. In a study conducted by Khalid (2017), it was found that excessive use of social media applications has a significant negative impact on the physical and psychological health of the students.

One of the major drawbacks of social media is the privacy issues faced by students when they interact with their institutional groups (Ali, Iqbal, & Iqbal, 2016). Past studies also supported that social media tools have adverse effects on the progress and productivity of organizational employees particularly in public sector organizations (Irfan et al., 2018). According to Irfan et al. (2018) the use of social media is creating social and ethical issues among the employees of public sector organizations in Pakistan which raises psychological, social and privacy risks among them. In another study, Arsalan and Zaman (2014) reported that organizational culture is highly affected by the use and application of social media. In the light of aforementioned review of literature, our aim is to find out the impact of perceived risks and benefits associated with SNS on the users' intention with the mediating role of users satisfaction in the public sector organizations of Pakistan.

## **RESEARCH HYPOTHESES**

The following research hypotheses are proposed to investigate the variables of our study:

**H1**: There is a significant impact of perceived risks associated with SNS on the behavioral intention of users

**H2**: There is a significant impact of perceived benefits associated with SNS on the behavioral intention of users

**H3**: Users' satisfaction has a significant impact in the relationship between perceived risks and benefits and behavioral intention of SNS users

**H4**: There is a significant difference in perceived risks and benefits associated with SNS



#### FIGURE 1

### Schematic Diagram

## **III. RESEARCH DESIGN AND METHODOLOGY**

This study has used quantitative and deductive approach. The study is explanatory in nature. Data for the study have been collected from primary data sources using the survey technique. We have adapted a well-developed and close-ended questionnaire of Khan et al. (2014). The questionnaire comprised of 43 five-point Likert scaled items divided among 10 constructs. It measured four important aspects of risks related to SNS through: time, psychological and social risks (Featherman & Pavlou, 2003); and privacy risks (Tsoi & Chen, 2011). Benefits of SNS were measured through four variables: social connectivity (Ellison, Steinfield, & Lampe, 2007); social involvement, information attainment and entertainment (Ellison, et al., 2007; Featherman & Pavlou, 2003; Shu & Chuang, 2011). User satisfaction was measured using scales items adapted from Wixom and Todd (2005) and behavioral intention to use SNS from Gefen and Straub (2000) and Carter and Bélanger (2005). We distributed 350 questionnaires through personal contacts among the employees working in various government departments at a single point in time. Out of total distributed questionnaires, we received back 325 and found 300 as being able to be used for statistical analyses.

#### **RESEARCH MODEL**

To test the relationship among the variables of the study, we have performed mediated multiple regression analysis based on the following equation:

$$\begin{split} BI_i &= \beta_\circ + \beta_1 TR_i + \beta_2 PR_i + \beta_3 SR_i + \beta_4 PRR_i + \beta_5 SC_i + \beta_6 SI_i + \\ \beta_7 IA_i + \beta_8 E_i + \beta_9 US_i + \mu_I \end{split}$$

Where; BI refers to behavioral intentions of users, TR refers to time risk, PR refers to psychological risk, SR refers to social risk, PRR refers to privacy risk, SC refers to social connectivity, SI refers to social involvement, IA refers to information attainment, E refers to entertainment, US refers to users' satisfaction,  $\mu$  refers to error term and i refers to employees.

#### FINDINGS AND ANALYSES

In this section, after reliability analysis, we have performed advanced statistical tests such as correlation and multiple regression analyses in order to interpret results:

#### **RELIABILITY ANALYSIS**

This analysis is carried out to check the consistency of the instrument. The findings given in Table 1 shows that the instrument is

81.7% reliable and it's measuring what it ought to measure. While calculating the Cronbach's alpha values, a number of outlier items were detected which were deleted to make the results more reliable. For all the constructs the Cronbach's alpha values came around to be approximately .80, which is fairly acceptable for social sciences studies (Nunally, 1978).

TABLE	1
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Items	Cronbach's Alpha if Item Deleted
Social Connectivity	0.799
Social Involvement	0.797
Information Attainment	0.800
Entertainment	0.800
Psychological Risk	0.807
Social Risk	0.785
Time Risk	0.786
Privacy Risk	0.801
Satisfaction	0.802
Behavioral Intention	0.827
Average	0.817

Reliability of the Instrument

#### **CORRELATION**

According to Table 2, perceived benefits generally seem to have a significant and positive correlation with the behavioral intention to use SNS, except social connectivity, because increase in social connectivity of government employees reduces their behavioral intention to use SNS, while its other three benefits have grown more in importance. Perceived risks generally seem to have no significant correlation with the behavioral intention to use SNS. Surprisingly time risk showed a significant but very weak correlation with the behavioral intention to use SNS because, again, loss of time while using SNS does not seem to worry a lot of people or people do not consider using of SNS a loss of

time nowadays. Privacy risk does show a negative, but insignificant correlation because currently not much people in Pakistan are aware of the privacy risks associated with the use of SNS. Satisfaction also shows a positive and significant correlation with the behavioral intention to use SNS.

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Variables	1	2	3	4	5	6	7	8	9	10
Social Connectivity	1									
Social Involvement	0.470**	1								
Information Attainment	0.380**	0.564**	1							
Entertainment	0.321**	0.298**	0.429**	1						
Psychological Risk	0.292**	0.129**	0.171**	0.554**	1					
Social Risk	0.401**	0.349**	0.260**	0.269**	0.562**	1				
Time Risk	0.329**	0.355**	0.442**	0.261**	0.340**	0.604**	1			
Privacy Risk	0.416**	0.303**	0.128**	0.159**	0.290**	0.509**	0.575**	1		
Satisfaction	0.276**	0.344**	0.352**	0.170**	0.136*	0.378**	0.414**	0.509**	1	
Behavioral Intention	0.080	0.389**	0.228**	0.304**	0.078	0.065	0.173**	-0.057	0.255**	1

**Correlation Matrix** 

\*\* Indicate significance at 1% level; \* Indicate significance at 5% level

## MULTIPLE MEDIATED REGRESSION ANALYSIS

We have investigated the impact of perceived risks and benefits of social media on the behavioral intention of users of SNS, with mediating role of users' satisfaction. As the table shows, we have applied mediated regression analysis in four steps:

- Checked the impact of perceived risks and benefits of SNS (IVs) on users' behavioral intention (DV).
- Check the impact of benefits and risks associated with SNS (IVs) on users' satisfaction (MV).
- Investigated the role of users' satisfaction (MV) on their behavioral intention to use SNS.

• Examined the role of perceived benefits and risks (IVs) on behavioral intention to use SNS (DV) controlling the role of users' satisfaction (MV).

#### TABLE 3

Steps	1	2	3	4	
Dependent Variable	Behavioral Intention	Satisfaction	Behavioral Intention	Behavioral Intention	Hypotheses
Independent variables	Coefficients	Coefficients	Coefficients	Coefficients	
Constant	2.266***	.782***	2.479***	1.975***	
Social Connectivity	-0.100	-0.062		-0.077	Not Confirmed
Social Involvement	0.585***	0.048		0.568***	Confirmed
Information Attainment	-0.215***	0.270***		-0.315***	Confirmed
Entertainment	0.290***	0.015		0.285***	Confirmed
Psychological Risk	-0.040	-0.083*		-0.009	Not Confirmed
Social Risk	-0.077	0.127**		-0.124*	Confirmed
Time Risk	0.266***	-0.020		0.273***	Confirmed
Privacy Risk	-0.339***	0.458***		-0.509***	Confirmed
Satisfaction			0.298***	0.372***	Confirmed
R Square	0.279	0.362	0.065	0.344	
F Statistics	14.090***	20.627***	20.709***	16.878***	

#### Multiple Regression Analysis

\*\*\*, \*\* and \* indicate p-value is significant at the levels of 1%, 5%, and 10% respectively

The findings of mediated regression analysis have revealed a significant impact of various dimensions of risks and benefits associated with the usage of SNS. The findings related to the perceived benefits of social media show that there is significant as well as the positive impact of social involvement and entertainment on behavioral intention to use SNS. These findings are consistent with the existing body of literature (see for example; Khan et al., 2014; Sandoval-Almaza & Valle-Curz, 2016; Sandoval-Almaza & Gil-Garcia, 2011). The impact of information attainment in behavioral intention to use SNS is found significant but negative. This implies that the availability of abundant information plays a negative role in social media usage which is in agreement with a study conducted by Lee and Kwak (2012). Another plausible reason for this

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negative coefficient is the absence of monitoring authority to filter authentic sources of information from unauthentic sources; which reduce the utility of SNS. Social connectivity is found to be having no impact on behavioral intention to use SNS at any given conventional levels of significance. The finding implies that an increase in social connectivity of government employees reduces their behavioral intention to use SNS.

The findings of perceived risks of SNS revealed that there is a significant and negative impact of social and privacy risks on behavioral intention to use SNS; which is consistent with the findings of Khan et al. (2014) and Ali et al. (2016). The findings reveal that an increase in social as well as privacy perceived risks would negatively affect the behavioral intention to use SNS. Furthermore, there is a significant and positive impact of time risk on the behavioral intention to use social media sites; which is in agreement with the findings of Khan et al. (2014). However, the findings uncovered that there is no impact of psychological risk on behavioral intention to use SNS; which is in line with a study conducted by Khalid (2017).

In model 4, we have considered satisfaction as a mediating variable. The findings show that there is a significant and positive role of users' satisfaction in their behavioral intention to use SNS; which is in line with the findings of Khan et al. (2014). Thus, findings imply that the relationship between perceived risks and benefits of SNS on their behavioral intention is because of users' satisfaction which indicates partial mediation. The value of R-square shows that behavioral intention to use SNS is 34.4% explained by perceived risks and benefits of SNS; with the mediating role of users' satisfaction. Furthermore, the score of F-statistics shows that the model is a good fit at 1% level of significance.

## COMPARATIVE ANALYSIS OF PERCEIVED RISKS AND BENEFITS

To compare the role of perceived risks and benefits of SNS, we have performed comparative analysis using paired sample t-test.

The results of this analysis show that the perceived benefits of SNS overweighed perceived risks associated with it which confirmed H4. Therefore, the study recommends that the usage of SNS is overall

beneficial in improving the productivity and efficiency of the government employees.

#### TABLE 4

#### Paired Sample T-Test

Method	Value			
Z score	-5.877***			
Mean Score				
Perceived benefits	3.6511			
Perceived risks	3.4297			

## **IV. DISCUSSIONS AND CONCLUSIONS**

Today, social media plays a significant role in our lives. Use of SNS has not only facilitated in our academic life but also in our professional lives. However, the usage of SNS such as Facebook, WhatsApp, Twitter and Instagram, is subject to certain risks and benefits associated with them. The benefits of SNS include; social connectivity, social involvement, information attainment, and entertainment. These benefits imply that usage of SNS has increased the productivity of students, employees, and businessmen. However, excess usage of SNS has also subject to certain risks such as privacy, psychological, social and time risks. It's crucial to evaluate the role of perceived risks and benefits in the behavioral intention of users. Therefore, the study is conducted to evaluate the impact of such risks and benefits on users' behavioral intention with the mediating role of user satisfaction. We have collected data from government employees from various departments. The choice of government employees is made because we want to gauge the impact of perceived risk and benefits of SNS usage on the behavioral intention of public sector employees with mediating role of user satisfaction, in their official assignments.

The findings of the study reveal that there is a significant impact of certain risks and benefits associated with social media on the behavioral intention of users. Furthermore, the results also demonstrate that users' satisfaction plays an intervening role between the relationship of perceived risks as well as benefits and behavioral intention of using SNS. The findings of the study are in line with the existing body of literature (see for instance; Ali et al., 2016; Khalid, 2017; Khan et al., 2014). The findings of paired sample t-test indicate that there is a significant difference in mean scores of perceived risks and benefits of SNS; which implies that usage of SNS is more beneficial for the government employees in terms of their behavioral intention as compared to perceived risks associated with it.

#### LIMITATIONS AND FUTURE DIRECTIONS

Though we have put our best efforts in the present study; but still some limitations seem to prevail. The first limitation is that the study has collected data from government employees; therefore, the results may not be generalizable to the private sector of Pakistan. The study has collected data at a single point in time which ignored that behavioral change in usage on SNS with the passage of time.

To overcome the limitations, it is recommended for future researchers to conduct a longitudinal study on this area in order to measure the change in usage of SNS over recent years. A comparative study can be done to check the usage of SNS in public as well as private sector employees. Potential researchers can also investigate some other variables, such as; ethical issues and age. Moreover, a cross-cultural study can also be conducted to check the usage of SNS in developed and developing countries of the world.

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