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An Evaluation of Different Tax Reform Proposals in Pakistan using CGE Model

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Taxes are an important tool of fiscal policy. However, the taxation system of a country also affects its economic growth and the welfare of the people. Since a change in tax policy has far-reaching consequences for various interconnected economic agents, computable general equilibrium model is used to quantify the impact of changes in direct and indirect tax rate policies on various economic indicators. For this, first a social accounting matrix based on 2017 data is also developed. The results show that in the long run under the unbalanced budget condition, reducing personal income tax rates results in increased consumption, government expenditures, and incomes of various types of labour, but decreased economic growth and exports. However, introducing a flat and low-income tax rate along with decreasing corporate tax, sales tax, and customs duties results in higher economic growth, exports, consumption expenditures, and household income. On the other hand, a balanced budget condition produces better economic results.

JEL Classifications: H23, H24, H25.
Keywords: Income Tax, Corporate Tax, Direct Tax, Indirect Tax, CGE model, SAM, Economic Growth

1. INTRODUCTION

To provide people with public goods, infrastructure, and foster economic activities, governments need funds which are collected through various means including taxation, foreign aid and borrowing. However, after the Global Financial Crisis of 2008, it was realised that domestic resource mobilisation is the only sustainable and reliable way to finance such public expenditures (Fossat & Bua, 2013; Gordon, 2010; Keen, 2012). In this context, taxes of various kinds become important fiscal policy tools that are also used for stabilising the economy and income redistribution (Wawire, 2017).

There is rich literature available on the relationship between taxation and economic growth (see Engen & Skinner, 1996; Gemmell, 1988; Goulder & Summers, 1989; Lee & Gordon, 2005). These studies reach different conclusions while

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investigating the relationship. According to Auerbach (1996) and Eicher, et al. (2003), these contradictory results are because of different socioeconomic and political systems prevailing in different countries. Therefore, while developing a comprehensive, efficient, and equitable taxation system, governments must take a proper account of the system's macroeconomic and distributional impacts (Sahn & Younger, 2000).

In the literature, the taxation—economic growth nexus and the impact of tax reforms is usually analysed using the general equilibrium approach by considering the interrelationships between all the sectors of the economy. Such an analysis shows the complete picture of the economy and gauges the effects of any tax policy change on all the sectors of the economy. Unfortunately, there is no such study on Pakistan that discusses the relationship between various kinds of taxes and macroeconomic indicators to evaluate various tax reform proposals by studying their impact on economic growth, fiscal deficit, exports, and income. Previous studies are limited in scope, such as Cororaton & Orden (2009) studied the impact of trade liberalisation, Ahmed, et al. (2011) and Iqbal, et al. (2019) investigated the impact of changing general sales tax (GST) only, whereas Naqvi, et al. (2011) examined the impact of agriculture income tax only. Moreover, these studies are based on quite old social accounting matrices (SAMs).

The study aims to identify and quantify the direction and magnitude of impacts of reducing the marginal income tax rate, decreasing the number of slabs, and introducing flat income and corporate tax rates with a reduction in sales tax and customs duties on the economy at both macro and micro levels. This includes the effects of such changes on economic growth, private consumption, investment, government budget, sectoral impacts, and labour income.

This is the first study in Pakistan that uses the computable general equilibrium (CGE) model to analyse the proposed tax reforms, especially in the income tax system. We utilised the latest input-output (IO) table, an updated social accounting matrix (SAM) based on 2017 data from the Labour Force Survey (LFS) and the Household Integrated Economic Survey (HIES). This study hopes to add to the debate on income tax issues in developing economies and reforming taxation systems in developing countries.

The results show that with decreasing personal income tax only, by lowering marginal tax rates and reducing the number of slabs, the size of the economy as measured by real GDP may not increase in the long run though there will be an increase in private and government expenditures, but exports will decline. However, if there is a reduction in all the taxes across the board, then GDP, private consumption, government consumption and exports will increase in both short as well as in long run. The income of the people will increase in both scenarios across all occupations as well. However, comparing the conditions of allowing for fiscal deficit or keeping budget balance, the simulations show that overall economic results are better when budget is kept in balance. The results favour for a cut in taxes across the broad for better economic outcomes.

The plan of the study is as follows. Next subsection gives a brief overview of the tax structure in Pakistan. Section 2 presents a brief review of the literature. Section 3 is on the methodology and the next section presents the results and discusses the findings, followed by the concluding section.

1.1. Tax Structure in Pakistan

The structure of taxes in Pakistan is quite complex. There are multiple taxes in two broader categories of direct and indirect taxes. Direct tax includes income tax, which is further divided into income and corporate tax, wealth tax, corporate value tax (CVT), workers' welfare fund (WWF), and Workers' Profit Participation Fund (WPPF). Similarly, the broad categories of indirect taxes include customs duties, federal excise duty (FED), and sales tax (ST) from domestic production and imports. The broader categories are further subdivided into many sub-categories and the frequency of these taxes is also different. The sales tax on services falls in the domain of provinces and, therefore, its rates are decided by provinces and the revenue is collected by provincial tax authorities. Moreover, the share of indirect taxes is higher (60 percent or above) in the total revenue collection and out of it, most of the taxes are collected from the international trade of goods and services. Therefore, this has additional effects on productivity, resource utilisation, balance of payments, and economic growth (Jamal & Javed, 2013; Pasha & Ghaus-Pasha, 2015). Moreover, a part of taxes is collected through withholding tax, which is by nature an indirect tax and has additional compliance costs. The revenue collected through different kinds of taxes is given in Table 1 below:

Table 1

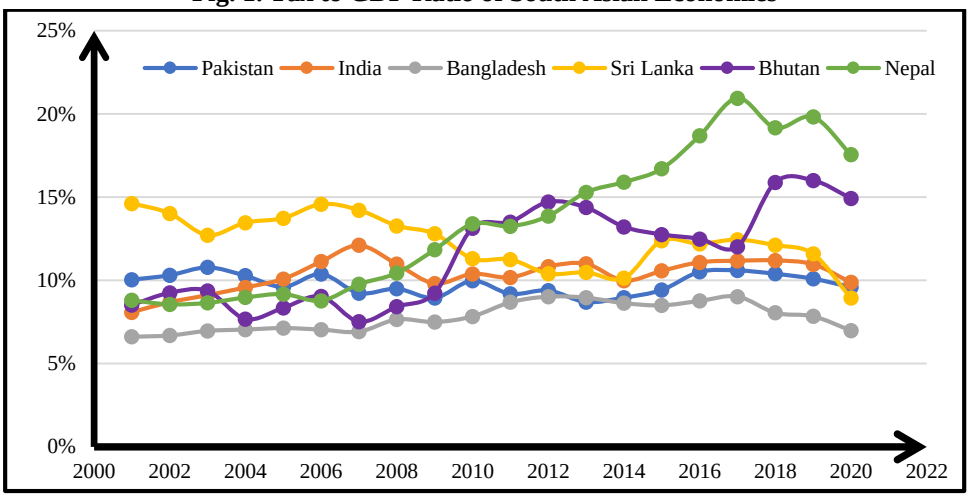
Breakdown of Federal Tax Revenues (Rs. in Billion)

	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22
Fed. Tax Revenue (a + b)	2,255	2,590	3,112	3,368	3,844	3,828	3,997	4,745	6,148
a. Direct Tax	877	1,034	1,217	1,344	1,537	1,446	1,523	1,731	2,285
I. Income Tax	855	1,007	1,192	1,324	1,515	1,426	1,502	1,711	2,270
II. Wealth Tax	0	0	0	0	0	0	0	0	0
III. CVT	1	1	2	2	5	5	2	0	0.104
IV. WWF/WPPF	21	26	23	18	16	14	19	20	15
b. Indirect Tax	1,377	1,556	1,895	2,024	2,307	2,383	2,474	3,014	3,866
I. Custom Duty	243	306	405	497	608	686	627	748	1,011
II. FED	138	162	188	198	213	238	250	277	321
III. ST (Import)	495	553	678	703	824	810	876	1,116	1,741
IV. ST (Domestic)	501	535	624	626	661	649	721	872	792

Source: FBR Revenue Division Year Book 2021-22.

Moreover, the tax to GDP ratio in Pakistan is also low in comparison with the regional economies. Figure 1 below shows Pakistan's Tax to GDP ratio with the countries in the same region, we see that the ratio was at 10.28 percent which was just lower than Nepal in the region till 2004. But other regional economies improved their tax to GDP ratio and Pakistan deteriorated it until it came down to 8.96 percent, the lowest in the region in year 2013. In year 2017, the ratio reached 10.6 percent and it was higher than of Bangladesh only. Tax to GDP ratio of India was lower than Pakistan in early 2000s but it surpassed Pakistan in 2005 and since then it is higher. Similarly, Bhutan's tax to GDP ratio surpassed Pakistan in 2009. This figure shows that as per tax to GDP ratio, Pakistan is lagging in the region.

Fig. 1. Tax to GDP Ratio of South Asian Economies



Source: Various issues of Pakistan Economic Survey, WDI and respective countries' financial reports.

An overview of the fiscal indicators shows that Pakistan's fiscal issues are severe. Low tax-to-GDP ratio and greater reliance on indirect taxes are making it difficult for the government to finance public expenditures. As a result, expenditures on human resources, law and order, and important infrastructure projects are low. This low spending may compromise future GDP growth as well. Therefore, there is a need to reform the tax structure to increase tax collection. In the recent past, the government attempted to experiment with decreasing the number of slabs and personal income tax rates. However, most of the changes introduced were undone after a few months only. Therefore, we do not have actual outcomes to study the impact of the changes. Moreover, a group of tax experts proposed to limit the number of taxes to four only, a flat income tax rate, a low corporate income tax rate, and flat and low sales tax and customs duties. According to the experts, the simplified and low rate-based system will help to boost economic activity and, ultimately, result in higher tax collection and increase national wealth.

2. REVIEW OF LITERATURE

The recent literature has concentrated on studying the effects of fiscal stimulus through tax cuts and increases in government expenditures on economic and social indicators. Hamilton & Whalley (1989) evaluated the outcomes of various changes in the Canadian indirect taxation system using a general equilibrium tax model. The results showed an improvement in both welfare and revenue collection by adopting a broad-based sales tax instead of federal or provincial sales taxes. Fortin, et al. (1997) examined the impact of taxation and wage-setting in a developing economy with an informal sector. Analysis using the CGE model showed that an increase in corporate taxes, payroll taxes, and minimum wage rate led to growth in the informal sector, an increase in unemployment, and efficiency costs. Diao, et al. (1998) used a dynamic general equilibrium model to study various debt management policies in the Turkish economy and concluded that although reliance on indirect taxes had distortionary effects and resulted in the loss of welfare, fiscal targets were achieved.

Knudsen, et al. (1998) studied the Danish tax reforms of 1993 using a dynamic CGE model. The simulations showed that reducing taxes, the progressivity of labour income taxation, and a restructuring of capital income taxation resulted in the accumulation of wealth and increased consumption. The reforms brought Pareto improvement. Damuri & Perdana (2003) studied the effect of a 20 percent increase in government spending under different financing conditions on income distribution and poverty in Indonesia using a comparative static CGE model. They found that an increase in spending had a significant and large positive impact on the GDP if it was not followed by an increase in taxes and financed through an increase in loans. However, Begg, et al. (2003) found the opposite results as an increase in spending financed by an increase in income taxes showed an improvement in GDP through the balanced budget multiplier effect. On the same lines, Mabugu, et al. (2013) studied the impact of a 6 percent increase in government spending on South Africa's economy using the dynamic CGE model. They concluded that an increase in government spending resulted in higher GDP no matter if it was financed through a higher income or output tax, or all the taxes.

Mountford & Uhlig (2009) analysed the impact of changes in tax on the economy and concluded that unanticipated deficit-financed tax cuts stimulated the economy in the short term. However, the growing deficit might have consequences in the long run which overweigh the short-term gains. Cororaton & Orden (2010) evaluated the effects on poverty reduction of trade liberali station when tariff revenue was replaced with either direct or indirect taxes to keep the government budget balanced, with a greater reduction in poverty when a direct tax was imposed. Romer & Romer (2010) found that tax changes had very large effects on output and investment. Particularly, they showed that an exogenous tax increase of one percent of GDP lowered real GDP by approximately three percent. Amir, et al. (2013) identified and quantified the impacts of income tax reforms on the Indonesian economy using key macroeconomic and socioeconomic indicators. The results of the CGE model showed that reducing income tax and introducing a low and flat tax rate for corporate tax led to higher economic growth and poverty reduction.

Gale & Samwick (2014) suggested that though the tax cuts may encourage individuals to work, save, and invest more, such policy must be backed by spending cuts to avoid large deficits. Otherwise, it may result in reducing national savings, increasing interest rates and, thus, a drop-in investment in the long run. Hasudungan & Sabaruddin (2016) investigated the impact of choosing between increasing borrowing to support increased government expenditures or simultaneous increase in both borrowing and exogenous output tax rates or a reduction in subsidies on the Indonesian economy using the CGE model. The simulations showed that the first proposal improved GDP but also increased the fiscal deficit, whereas the other two alternatives resulted in lowering the GDP because both resulted in increasing the cost of production and thereby increasing inflation and decreasing consumption.

Huang & Rios (2016) derive the framework for optimal taxation when households are involved in tax evasion. The paper derives the mix of linear optimal consumption and non-linear optimal income tax for redistribution purposes. It is assumed that consumption taxes are enforceable, while income taxes can be evaded. To achieve the goal of income redistribution in economies with low compliance, the two tax instruments are

complementary. As the social planner puts more weight on the lower-ability households, the income tax becomes more progressive, but the optimal consumption tax rate also increases because of higher evasion at higher marginal tax rates.

Hussain & Malik (2016) investigated the asymmetric response of output to changes in average marginal tax rates using Romer & Romer's (2010) data and found that only a tax decrease resulted in a significant and permanent increase in output whereas the tax increase had no significant impact. Using a simple model, it was shown that this asymmetry was derived from the asymmetric response of individual consumption to change in taxes as households face asymmetric consumption adjustment costs. Bhattarai & Trzeciakiewicz (2017) developed a DSGE model and analysed the fiscal policy in the UK. The findings showed that public consumption and capital income tax were the most effective fiscal tools in the short and long runs, respectively, whereas public investment was effective in both short and long runs and transfer payments were the least effective tool. On the other hand, when the interest rate fell to a zero lower bound, the effectiveness of consumption taxes and public expenditures increased, and the income taxes became the least effective. The analysis also showed that non-Ricardian households make fiscal policy more effective and nominal rigidities enhance the effectiveness of public spending and consumption taxes and decrease the effectiveness of income taxes.

Giraldo & García (2018) examined the effects of changes in the tax system on economic growth, welfare, and income distribution in the Colombian economy using a CGE model. Considering three alternatives of increasing the VAT, extending the VAT to all products, or decreasing the corporate income tax by 20 percent and a progressive income of the tax rate on wealthy people, they found that an increase in indirect taxes did not have a large significant impact on the welfare of low-income households and taxing production. Mertens & Montiel Olea (2018) provided empirical evidence that a cut in marginal tax rates increased output and decreased unemployment. Belayneh (2018) examined the impacts of a cut in direct taxes on macroeconomic variables, fiscal balance, income distribution, and the welfare of households using the dynamic CGE model. The simulations showed that such a reform would result in increasing the income of the households. However, non-poor urban households would enjoy more benefits. The manufacturing sector would receive more benefits from such reform than any other sector of the Ethiopian economy.

Abdisa (2018) studied the effect of tax reforms on major macroeconomic indicators in the Ethiopian economy of tax reforms using the dynamic CGE model. The results showed that reducing direct tax or increasing the sales tax would boost overall economic activity, whereas reducing tariffs would have negative consequences. Lin & Jia (2019) analysed the impact of taxes on energy production sectors energy, CO_2, and the Chinese economy using a dynamic recursive CGE model. They found that the tax rate in the ad valorem tax system affected the GDP negatively, while the tax rate in a specific and fixed tax regime had a limited positive relationship with the GDP. Switching to a fixed tax system would also result in decreasing inflation. Nandi (2020) proposed and calibrated a DSGE model for the Indian economy to study the impact of fiscal policy shocks. The results showed that the GDP and employment were positively related to government spending, negative consumption tax reduced inflation and induced consumption, while negative labour income tax had an asymmetric effect on the

economy. Results also showed that an increase in public investment did not crowd out private investment.

The US Senate approved a new tax plan that reduced almost all kinds of taxes. The supporters of this move argued the workers would enjoy higher wages, while the opponents argued that a reduction in government expenditure because of this would be costly for workers. Using Romer & Romer's (2010) average marginal tax rate data, Berisha (2020) studied the effect on middle-class workers' earnings of these changes. The results suggested that a one percentage point increase in tax liabilities (relative to the GDP) led to about a 1.5 percent decrease in real GDP growth and a 0.5 percent decrease in median weekly earnings. However, the direct effect of decreasing taxes on median weekly earnings was not statistically significant. The outcomes also suggested that deficit-driven tax increases contributed to lower median weekly earnings.

This review of selected literature shows that most economists view that a fiscal stimulus results in higher GDP and poverty. However, the choice of mechanism is critical, and the optimal choice depends on a particular economy's conditions. Moreover, we find only a few studies on Pakistan and even those are very limited in scope. For example, the study of Iqbal et al. (2019) looked at the impact of the GST only on household consumption patterns. Similarly, the focus of Ahmed, et al. (2011) was on the GST only and it is conducted by using SAM for 2004, which is quite old now. Naqvi et al. (2011) covered agricultural income tax by using SAM 2001-02. A comparative study of different income tax rate proposals that examines the impact on key economic variables of Pakistan's economy is missing and the current study aims to fill this gap.

3. METHODOLOGY

Computable General Equilibrium (CGE) model has been used in this study to investigate the impact of tax reform proposals. CGE models are based on Input-output (IO) tables data or Social Accounting Matrix (SAM) data. In this section, we first discuss Social Accounting Matrix 2017 developed for this study and then shed light on CGE model.

3.1. Social Accounting Matrix 2017

A social accounting matrix (SAM) is based on a single-entry accounting system, which assigns values to incomes and expenditures in a circular flow and records all the transactions in an economy (Breisinger, et al. 2009; Dorosh, et al. 2004). Mathematically, a SAM is a square matrix each row and column of which represents an account and each cell shows an expenditure made by the sector/agent (column) to purchase the goods or services of the sector/agents (row). The income-expenditure equality is maintained in the SAM. Thus, on one hand, macroeconomic consistency is maintained and, on the other, details of the income of the factors, expenditures of the households, and production of various goods and services are also recorded. Rich multisectoral data helps policymakers to quantify the impact of change in a policy on various sectors of the economy (Robinson, et al. 2001).

Building a SAM requires collecting data from various sources such as input-output (IO) tables, national accounts, the desegrated balance of payment, fiscal account, household income and expenditures surveys, and labour force surveys. The rich information gathered from all these resources captures the heterogeneity of production activities, incomes and expenditures. This strongly interconnected information helps policymakers to perform structural analysis, and allows the study of the distributional impact of a change in a policy parameter.

In the current SAM, unlike previous ones, mining and food, beverages, and tobacco sectors were introduced separately because they are treated differently for tax purposes. Similarly, manufacturing sector was split into various categories, such as electrical and optic equipment, rubber and plastic, chemical and chemical products, paper, printing and publishing, etc. Besides common public and private services, such as education, healthcare, and public administration, hotel and restaurant services were also introduced as these represent a growing tourism and hospitality industry. For most of the disaggregations described above, the IO 2017 Table was used. The final 2017 SAM included 34 commodities produced by 34 activities with detailed disaggregation of industries and services sectors, but limited disaggregation of the agriculture sector. Detailed interconnections between various industries help gauge the impact of change in any such policy on various sectors and, thus, on the overall economy.

Next, we introduced 24 factors. Two basic economic factors of production, labour and capital, were divided into three categories, namely, low-skilled labour, high-skilled labour and capital. These three categories were further split into rural and urban geographies of all four provinces. Likewise, we introduced 8 categories of households based on the rural-urban divide in each province. The households earned an income equal to the value-added of the factors of production they own. Remittances from foreign and transfer payments from the government were the other sources of income for these households. Out of their income, they paid direct tax to the government, paid firms for consuming their goods and services and the leftover income s saved.

The government earns income by collecting tax revenue, in terms of the renumeration of the capital it owns and in terms of loans, aids and grants. While developing the current SAM, we considered various direct and indirect taxes such as income tax on individuals, firms and associations of persons etc. On the expenditure side, the government provides public goods to the general public which needs various commodities as inputs. Similarly, the government needs services of various factors of production to enable itself to produce and supply public administration. It makes transfer payments and gives subsidies to households and firms. Along with all these, some of the government expenditures are on debt servicing. The information on all such incomes and expenditures was obtained from the FBR Yearbook 2017, National Income Accounts, and Handbook of Statistics on Pakistan Economy 2020.

The rest of the world account records the flow of funds from and to foreign countries. These include payments made against imports, payments received against exports, the flow of remittances, capital payments and the flow of savings and loans, grants, and aid. The information on all these was obtained from the Balance of Payment (BOP) account published by the State Bank of Pakistan (SBP), National Income

Accounts published by the Finance Ministry, and trade statistics published by SBP and Pakistan Bureau of Statistics (PBS). While developing the SAM, this account was not disaggregated, but it can be done using the IO table and information from the sources cited above.

After cross-checking each value from multiple sources and minimi sting row-column sum differences, we used the cross entropy approach following Golan, et al. (1994, 1997); Judge & Mittelhammer (2011); Robinson, et al. (2001).

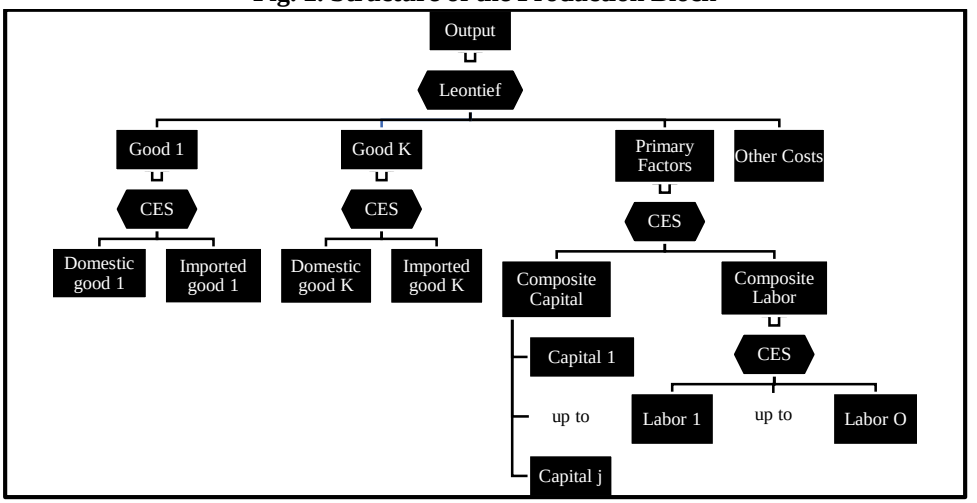
3.2. Computable General Equilibrium (CGE) Model

To study the impact of various policy interventions on Pakistan's economy, researchers have utilised different CGE models. Siddiqui and Iqbal (2001) developed the CGE model for Pakistan and used it to analyse the impact of tariff reduction. The same model was used by Siddiqui, et al. (2008) for studying the impact of fiscal and trade policy changes on poverty. Ahmed, et al. (2011) used the CGE model developed by Poverty and Economic Policy (PEP) Research Network to examine the impact of changes in indirect taxes in Pakistan. Khan, et al. (2018); Shaikh (2009); Shaikh & Rahpoto (2009) used the Global Trade Analysis Project (GTAP) model to investigate the effects of various trade-related policies on Pakistan's economy. Robinson & Gueneau (2013) used the basic CGE model developed by International Food Policy Research Institute (IFPRI) and extended it for exploring the impact of changes in water resources in the Indus River, especially focusing on the impact of water shocks on Pakistan's economy.

The main inspiration for developing a CGE model for this study was based on ORANI-G (Horridge, 2000; Horridge, 2003), Applied General Equilibrium Model for Fiscal Policy Analysis (AGEFIS) by Yusuf, et al. (2007), Amir, et al. (2013), Siddiqui & Iqbal (2001) and Siddiqui, et al. (2008). However, the main differences between the CGE model developed for this study and one earlier developed by Siddiqui & Iqbal (2001) is that in the previously developed model, domestic production is divided into five sectors, whereas in the current model, we divide it into 34 sectors, labour is assumed to be homogenous in the model of Siddiqui & Iqbal (2001), whereas in our model we introduce 16 different types of labour based on geographical local and skill level and 8 categories of capital. Similarly, we also introduce eight different types of households based on rural-urban localities of each province whereas the older study included only one household. Because of these additions, we believe that the current model is more flexible as it can show mobility of labour and capital between different areas and sectors, the kind of labour, i.e., low skilled or high skilled, being chosen by different industries, the labour-capital intensity of various sectors, rate of unemployment, and wage rigidities. Since labour income is a major share of household earnings, the ability to study these labour market adjustments is an important addition to the model.

Following other CGE models, such as Dixon (2006); Dixon, et al. (1982; 1992), Dixon & Rimmer (2002), the equations of the model are linearised using percentage changes based on the Johansen approach instead of the levels of variables. Moreover, for each component of demand, the price formation process is described in various factors such as basic value, margin, taxes, etc.

Fig. 2. Structure of the Production Block



Source: Adopted from Horridge (2003) with some modifications.

In the present mode, the short-run closure is achieved by assuming that capital is fixed capital, which implies no new investment. The rate of return on capital adjusts to equate the demand for and the supply of capital. Similarly, short-run closure also assumes that the real wage rate is predetermined. These are all assumed to be fully flexible in the long run. However, the tax rates, technological change, and transfer between institutions are assumed to be exogenous in both the short and the long run. The exchange rate is assumed to be numéraire.

It is also worth mentioning that the model does not generate a recursive dynamic path of the results from the short run to the long run; rather the two results are generated because of the difference coming from the model closure.

3.3. Policy Scenarios and Impacts

To widen the scope of the model, corporate income tax and indirect tax were also added. The following are the alternative scenarios that were tested against the baseline scenario.

3.3.1. *Simulation 1*

Income Tax Rate Brackets

Table 2

Proposed Personal Income Tax Rate

Income	Tax Rate
≤ 400,000	0
400,001 – 800,000	Rs. 1,000
800,001 – 1,200,000	Rs. 2,000
1,200,001 – 2,400,000	5%
2,400,001 – 4,800,000	Rs. 60,000 + 10%
4,800,001 and above	Rs. 300,000 + 15%

3.3.2. *Simulation 2*

In this scenario, a flat income tax rate of 10 percent for households having a taxable income of Rs. 400,000, a corporate tax rate of 20 percent, a sales tax rate of 5 percent, and a custom duty of 5 percent across all commodities and no other tax as proposed by Bukhari & Haq (2016, 2020) was assumed.

Both scenarios were simulated for two conditions, i.e., the unbalanced budget condition and the balanced budget condition.

4. RESULTS AND INTERPRETATION

Modelling the policy changes requires changing the marginal income tax rate. However, the equations of the model are not based on marginal income tax rates, but rather on average tax rates. Therefore, average tax rates were calculated based on new marginal tax rates and these values were used as new tax rates.

In this section, first, the simulation results of changes in marginal tax rates on key macroeconomic indicators are presented followed by sectoral impacts and impacts on labour income. The two simulation scenarios were decreasing the personal income tax rate along with a smaller number of slabs (SIM 1) and introducing fixed personal income, and a reduction in corporate tax, sales tax, and customs duties and abolishing all other taxes (SIM 2).

4.1. Key Macroeconomic Indicators

Simulation results on key macroeconomic indicators such as real gross domestic product (GDP), private consumption expenditures, investment expenditures, government consumption expenditures, exports, imports, and consumer price index (CPI) are presented in the table below. The results show that reducing personal income tax rates left households with higher disposable income. As a result of which, in the long run, the consumption expenditures of the households would increase by 0.4 percent and investment by 0.006 percent. This increase in household disposable income would lead to more demand, which is reflected by an increase in imports by 0.069 percent and a reduction in exports by 0.389 percent. Government expenditures would also rise by 0.032 percent and the consumer price index would rise by 0.119 percent. An increase in government expenditures would result in increasing the budget deficit and, hence, future interest and capital payments by the government. Together, all these components of demand would result in reducing the real GDP by 0.102 percent.

Table 3

Simulation Results for Key Macroeconomic Indicators

Macroeconomic Indicators	Unbalanced Budget				Balanced Budget			
	Short Run		Long Run		Short Run		Long Run	
	SIM 1	SIM 2	SIM 1	SIM 2	SIM 1	SIM 2	SIM 1	SIM 2
GDP	0.024	0.031	– 0.102	0.158	– 0.008	– 0.019	0.014	0.213
Private Consumption	0.422	0.455	0.4	0.417	0.121	0.119	0.391	0.402
Investment	0.001	0.002	0.006	0.019	0.000	0.000	0.037	0.128
Govt. Cons	0.041	0.059	0.032	0.029	– 0.311	– 0.513	– 0.229	– 0.278
Exports	– 0.189	0.015	– 0.389	0.162	0.015	0.102	0.0412	0.197
Imports	0.130	0.131	0.069	0.098	– 0.018	0.006	0.061	0.058
CPI	0.298	0.137	0.119	– 0.079	– 0.020	– 0.123	– 0.029	– 0.126

Notes: Simulation Results.

The reduction in the personal income tax rate, adds more income to the economy. However, most of this income is used to finance increased consumption expenditures. As savings grow slowly, which was reflected by smaller growth in investment, domestic production fails to match the higher domestic demand. This is also fuelled by higher government expenditures and in the case when balancing the budget is not binding, leads governments to accumulate more debt, leaving little for the private sector. As the model was built to account for the sale of goods produced both in domestic and foreign markets based on the prices producers receive, exports reduce and demand for imported goods increases. This would result in decreasing the GDP. This suggests that along with decreasing income tax, the government should also cut down its expenditures so that government would borrow less to make more funds available to the private sector to increase production. This would also moderate increased aggregate demand, which would reduce the demand for imports and increase exports, resulting in a lower trade gap, which could result from the reduced personal income tax.

The results of Simulation 2 can also be interpreted along the same lines. In this case, real GDP would increase because of positive growth in private consumption, investment, government consumption, and higher trade. A significant difference can be noted in exports which showed an increase of 0.162 percent compared to a decline of 0.389 percent in the case of lower PIT only. This could be because of the low financial cost under the simplified tax system with lower taxes, which encourages more investment and also leads to improving competitiveness as noted by Cororaton & Orden (2010).

Short-run results are also reported which can be interpreted along the same lines. In the short run, GDP growth was positive even in Scenario 1 when there was a decrease in income tax only. The other difference is that there was a price increase even in the case when all the taxes were lower. This shows that a decrease in the cost of production due to lower taxes is not passed through to the consumers in the short run. This is possible, according to economic theory, because of some of the frictions in the economy, which may lead to some kind of market power that results in delaying passing the benefit of the decrease in cost to the consumers. The model also incorporates these frictions. As mentioned above, the sources of friction in the model are margins and transportation costs.

The reduction in the personal income tax rate would add more income to the economy. However, most of this income would go into financing the increased consumption expenditures. As savings grow slowly, which was reflected by smaller growth in investment, domestic production would fail to match the higher domestic demand. This is also fuelled by higher government expenditures and, therefore, in the case when balancing the budget is not binding, this would lead the government to accumulate more debt leaving less for the private sector. As the model was constructed in a way that goods produced could be sold in domestic as well as in foreign markets based on the prices producers receive, exports would reduce and demand for goods produced in foreign countries would increase, which would lead to a decrease in the GDP. This suggests that, along with decreasing income tax, the government should also cut down its expenditures so that the government has to borrow less and more funds are available to the private sector for increasing production. Moreover, this might also moderate the increased aggregate demand leading to reduced import demand and increased exports. This would improve the trade gap which resulted from the reduced personal income tax.

The results of Simulation 2 can also be interpreted along the same lines. In this case, real GDP would increase because of positive growth in private consumption, investment, government consumption, and higher trade. A significant difference can be noted in exports which showed an increase of 0.162 percent compared to a decline of 0.389 percent in the case of lower PIT only. This is primarily because lower taxes would reduce financial costs resulting in higher profit and, thus, encouraging more investment.

The short-run results show that in the short run, GDP growth would be positive even in Scenario 1 when there was a decrease in income tax only. The other difference is that there was a price increase even in the case when all the taxes were lower. This shows that a decrease in the cost of production due to lower taxes would not be passed through to the consumers in the short run which is an indication of some kind of friction in the system.

The results of simulations for both scenarios under balanced budget condition show that in the long run, the GDP would grow at a higher rate under both kinds of tax reforms when the balanced budget condition is binding. However, in the short run, GDP growth is negative in both scenarios. This shows that under the balanced budget condition, the government would have to cut its expenditures, which would negatively affect economic growth in the short run. However, in this condition, the financial needs of the government would not create more debt leaving more liquidity for households and firms, which may be the key to economic growth in the long run.

4.2. Sectoral Impacts

Long-run sectoral impacts in terms of percent changes in output and prices are reported below. These impacts suggest that decreasing income tax rates and slabs only, as for simulation 1 (Sim 1), would result in decreasing the output of mining and related activities, textile, machinery, manufacturing, and construction sectors, whereas it would increase the output of electricity, trade at various levels, hotelling, rent, financial services, education, and health. The prices of almost all the items would increase because of higher demand driven by an increase in the take-home income of the households. However, there would be a prominent increase in the prices of mining, textile, leather, agricultural goods, machinery, transportation services, and real estate services.

Analysing the impacts of cuts in both direct and indirect taxes across the board, we can observe that the output would increase and the price of the output of most of the sectors would decrease. This shows that with a decrease in income tax, households would increase their consumption but most of the additional supply would come from the increase in imports rather than from the increase in local production. This may be because only households were given tax relief which resulted in increasing the demand but firms were not given any incentive or additional benefit that could have resulted in decreasing their cost of production. Therefore, domestic firms had little margin to increase their supply and, hence, the additional demand was fulfilled largely from the imported goods. Therefore, significant growth in the output of the firms was not observed. On the other hand, if we look at the second scenario where a flat personal income tax rate was combined with a decrease in corporate income tax, sales tax, customs duty and abolishing all

other taxes, it would result in decreasing the financial cost of the firms. Therefore, the firms could earn higher profits and look forward to expanding their production capacity. This is observed in increasing the output level as well as a decrease in the price of several commodities which may be the result of decreasing the indirect taxes which are passed on to consumers.

Short-run sectoral impacts are reported for both simulation conditions in the last two columns of Table 4. Overall, short-run impacts are quite similar to long-run outcomes, but there are slight differences between the two cases, such as wood, paper making, chemicals, and construction sector in terms of output and textile, coke and public administration in terms of prices.

Table 4

Sectoral Impacts of Tax Reforms Under Unbalanced Budget Condition

Commodities/ Industries	Long-Run Impact				Short-Run Impact			
	SIM 1		SIM 2		SIM 1		SIM 2	
	Output	Price	Output	Price	Output	Price	Output	Price
Agriculture	0.096	0.205	0.107	0.012	0.101	0.199	0.103	0.013
Mining	– 1.023	0.283	0.210	0.016	– 0.233	0.263	0.119	0.019
Food	0.062	0.124	0.114	– .103	0.132	0.167	0.122	– 0.094
Textile	– 0.413	0.249	0.179	– .002	– 0.019	0.255	0.154	0.001
Leather	– 0.104	0.201	0.246	– .011	0.043	0.198	0.260	– 0.019
Wood	– 0.219	0.103	– 0.097	0.037	– 0.037	0.110	0.008	0.042
Paper	0.023	0.021	– 0.107	0.011	0.040	0.073	0.067	0.013
Coke	– 0.017	0.107	0.109	– .005	0.001	0.113	– 0.013	0.001
Chemicals	0.132	0.128	0.140	– 0.01	0.122	0.129	0.144	– 0.007
Rubber	0.097	0.094	0.107	0.004	0.101	0.100	0.121	0.010
Nonmetallic Minerals	– 0.521	0.066	– 0.877	– .016	– 0.239	0.072	– 0.767	– 0.008
Metals	0.012	0.100	0.093	0.009	0.107	0.106	0.104	0.012
Machinery	– 0.059	0.223	0.108	– .031	0.011	0.230	0.112	– 0.024
Electric Equipment	0.394	0.195	0.455	0.009	0.104	0.202	0.461	0.011
Transport Equipment	– 0.021	0.197	– 0.122	0.003	– 0.009	0.214	– 0.013	0.004
Manufacturing	– 0.031	0.182	0.140	– .011	0.016	0.186	0.140	– 0.017
Utility Supply	0.173	0.132	– 0.061	0.004	0.214	0.129	– 0.003	0.005
Construction	– 0.109	0.114	– 0.002	0.001	– 0.021	0.130	0.010	0.004
S&M of Vehicles	0.104	0.092	0.113	0.003	0.022	0.099	0.142	0.090
Wholesale Trade	0.098	0.057	0.102	– .017	0.100	0.070	0.079	– 0.009
Retail Trade	0.084	0.103	0.084	0.008	0.069	0.111	0.103	0.010
Hotels	0.102	0.034	0.214	0.011	0.092	0.053	0.200	0.012
Inland Transport	– 0.034	0.192	0.098	0.009	– 0.043	0.199	0.106	0.008
Water Transport	0.117	0.279	0.216	0.010	0.124	0.286	0.223	0.009
Air Transport	0.097	0.226	0.100	– .017	0.103	0.233	0.099	– 0.012
Transport Services	0.037	0.198	0.049	0.007	0.078	0.201	0.063	0.014
Telecom	0.010	0.154	0.021	– .006	0.031	0.193	0.101	– 0.001
Financial Institutions	0.242	0.245	0.249	– .011	0.098	0.267	0.216	– 0.003
Real Estate	0.131	0.271	0.102	0.018	0.129	0.290	0.113	0.012
Renting Business	0.034	0.109	0.021	– .007	0.029	0.111	0.016	– 0.003
Public Administration	– 0.140	0.112	0.138	– .010	– 0.024	0.109	0.171	0.002
Education	0.152	0.158	0.168	0.001	0.155	0.169	0.201	0.009
Health	0.126	0.151	0.159	– .005	0.121	0.162	0.189	– 0.001
Communication Services	– 0.042	0.023	0.003	0.008	– 0.019	0.030	0.021	0.012
Average Impact	–0.012	0.151	0.076	–0.002	0.044	0.161	0.093	0.003

Note: Simulation Results.

As different sectors of an economy have strong forward and backward linkages, the effects of changes in the cost of production through prices transmit from one firm to another and the transmission mechanism is stronger for input–producing industries. According to Carvalho et al. (2021), the effects of change in the price of a good, produced by an industry impact all industries that use this good as input especially when the elasticities of substitution between various intermediate inputs or between intermediate goods and factors of production are not equal to one. Blöchl, et al. (2011), Fadinger, et al. (2016), and McNerney, et al. (2013) document that the distribution of sectoral impacts is highly heterogeneous. The magnitude of the impact on other industries also depends on the size of the industry. Carvalho, et al. (2021) and Bernard, et al. (2019) report that large firms in terms of sales and employment also have a large number of buyers and suppliers and, therefore, have deeper effects on the input suppliers and output buyers. According to Barrot & Sauvagnat (2016) and Boehm et al. (2019), these effects may have a significant impact on the overall economy.

Both alternatives that this study tested, focussed on decreasing the tax burden. In Scenario 2, only the tax burden on individuals was decreased, whereas in Scenario 2 the tax burden on both the individuals and the firms was decreased. An increase in disposable income of the households following the decrease in income taxes would lead to an increase in consumption demand and savings. The increased savings then would lead to higher investment and, therefore, higher production. As a result, firms would hire more factors of production, which would decrease unemployment and increase labour income and the GDP. Similarly, a decrease in corporate income tax and customs duties led to lowering the cost of production and increasing the output produced. Moreover, since, at present, the different sectors are treated differently as a part of protection policies through various kinds of indirect taxes, such as tariffs, customs duties, and regulatory duties, opting for similar tax treatment for all the sectors would result in impacting different sectors differently. For example, in our case, we observed a resource shift from the textile sector to other sectors, like the manufacturing of electric equipment and financial institutions as a result of the change in the tax treatment. However, lowering taxes would also decrease government revenue collection, at least in the short run, which might affect the provision of public goods or lead to debt accumulation.

Sectoral impacts of tax reforms under balanced budget conditions are presented in the Table 5.

4.4. Effects on Labour Income

Lastly, the effect of changes in tax rates on the income of different kinds of labour used in the model is discussed. The long-run and short-run results reported in the table below show that all the various categories of labour would experience an increase in income under both scenarios of a tax rate decrease. However, the increase in labour income would be higher in the case of Scenario 2 in which there was a decrease in the rate of all kinds of taxes which would benefit not only households and result in increasing their demand for the product but would also reduce the cost of production for the firms making it more profitable for corporations to increase their production.

Table 5

Sectoral Impacts of Tax Reforms under Balanced Budget Condition

Commodities/ Industries	Long-Run Impact				Short-Run Impact			
	SIM 1		SIM 2		SIM 1		SIM 2	
	Output	Price	Output	Price	Output	Price	Output	Price
Agriculture	0.090	0.113	0.101	0.101	0.087	0.028	0.080	0.031
Mining	– 2.287	0.213	0.011	0.022	– 0.013	0.067	0.011	– 0.009
Food	0.071	0.083	0.193	0.009	0.117	0.122	0.113	0.003
Textile	0.132	0.034	– 0.149	– 0.010	– 0.012	– 0.03	– 0.045	0.010
Leather	– 0.122	0.029	– 0.021	0.102	0.003	0.022	– 0.002	0.013
Wood	0.109	0.017	– 0.013	0.021	– 0.021	– 0.11	– 0.101	– 0.002
Paper	– 0.031	– 0.011	0.102	– 0.002	0.029	– 0.04	0.031	– 0.022
Coke	– 0.013	0.011	0.212	– 0.006	0.000	0.026	0.004	– 0.003
Chemicals	0.210	– 0.025	0.140	– 0.010	– 0.013	0.014	– 0.013	0.002
Rubber	– 0.013	0.008	0.197	0.004	0.032	– 0.10	– 0.021	0.010
Nonmetallic Minerals	– 0.112	0.056	– 0.110	– 0.012	0.002	0.025	0.015	– 0.002
Metals	0.013	– 0.070	0.032	0.002	– 0.091	0.016	– 0.011	0.012
Machinery	– 0.031	– 0.002	– 0.013	– 0.017	0.022	– 0.03	0.101	– 0.04
Electric Equipment	0.344	– 0.079	0.155	0.009	– 0.033	– 0.17	0.076	– 0.03
Transport Equipment	– 0.002	– 0.011	– 0.122	0.003	– 0.017	0.130	– 0.011	0.002
Manufacturing	0.010	0.151	0.224	– 0.009	0.012	0.092	0.121	– 0.02
Utility Supply	0.105	– 0.012	0.013	– 0.001	0.101	0.091	0.004	0.004
Construction	– 0.011	0.101	0.230	– 0.011	– 0.043	– 0.01	– 0.009	0.004
S&M of Vehicles	0.101	0.071	0.111	0.006	– 0.006	0.023	– 0.111	0.079
Wholesale Trade	0.066	0.023	0.153	– 0.002	0.120	– 0.05	0.021	– 0.009
Retail Trade	0.079	0.107	0.082	– 0.003	0.051	0.111	– 0.001	– 0.003
Hotels	0.098	0.029	0.323	0.020	0.065	– 0.05	0.018	0.011
Inland Transport	– 0.003	– 0.010	0.082	0.001	– 0.031	0.170	0.009	– 0.002
Water Transport	0.124	0.283	0.229	0.011	0.122	0.201	0.021	0.010
Air Transport	0.092	0.199	0.137	– 0.012	– 0.009	0.023	0.069	– 0.002
Transport Services	0.040	0.168	0.051	– 0.002	– 0.101	0.102	0.041	0.021
Telecom	0.018	0.133	0.043	0.013	0.009	0.112	0.100	– 0.013
Financial Institutions	0.199	0.234	0.244	0.009	0.031	0.037	0.127	– 0.010
Real Estate	0.170	0.310	0.112	0.019	0.132	– 0.02	– 0.101	0.011
Renting Business	0.043	0.009	0.041	– 0.011	0.030	– 0.01	– 0.009	– 0.001
Public Administration	– 0.009	0.110	– 0.013	0.107	– 0.106	0.012	– 0.054	0.021
Education	0.133	0.065	0.209	0.021	0.103	0.113	0.131	0.0010
Health	0.134	0.130	0.189	0.002	0.079	– 0.03	0.138	– 0.003
Communication Services	– 0.014	– 0.006	0.019	0.010	– 0.008	0.020	– 0.018	0.008
Average Impact	–0.008	0.072	0.094	0.011	0.019	0.027	0.021	0.002

Note: Simulation Results.

Table 6

Impact on Labour Income under Unbalanced Budget Conditions

	Long-Run Income Effect		Short-Run Income Effect		Average
Labour Classification	SIM 1	SIM 2	SIM 1	SIM 2	Impact
Punjab Rural Low-Skilled	0.245	0.297	0.099	0.313	0.239
Punjab Rural High-Skilled	0.341	0.439	0.162	0.492	0.359
Punjab Urban Low-Skilled	0.279	0.301	0.103	0.381	0.266
Punjab Urban High-Skilled	0.358	0.513	0.217	0.599	0.422
Sindh Rural Low-Skilled	0.242	0.289	0.064	0.294	0.222
Sindh Rural High-Skilled	0.281	0.357	0.103	0.401	0.286
Sindh Urban Low-Skilled	0.299	0.348	0.199	0.481	0.332
Sindh Urban High-Skilled	0.446	0.792	0.342	0.829	0.602
KP Rural Low-Skilled	0.241	0.331	0.197	0.367	0.284
KP Rural High-Skilled	0.34	0.392	0.223	0.396	0.338
KP Urban Low-Skilled	0.282	0.310	0.203	0.344	0.285
KP Urban High-Skilled	0.353	0.412	0.299	0.396	0.365
Balochistan Rural Low-Skilled	0.221	0.299	0.193	0.334	0.262
Balochistan Rural High-Skilled	0.253	0.398	0.210	0.402	0.316
Balochistan Urban Low-Skilled	0.25	0.351	0.144	0.377	0.281
Balochistan Urban High-Skilled	0.316	0.443	0.231	0.476	0.367

Note: Simulation Results.

Table 7

Impact on Labour Income Under Balanced Budget Conditions

	Long-Run Income Effect		Short-Run Income Effect		Average
Labour Classification	SIM 1	SIM 2	SIM 1	SIM 2	Impact
Punjab Rural Low-Skilled	0.251	0.304	0.101	0.340	0.249
Punjab Rural High-Skilled	0.356	0.453	0.170	0.499	0.370
Punjab Urban Low-Skilled	0.291	0.322	0.121	0.393	0.282
Punjab Urban High-Skilled	0.339	0.499	0.209	0.624	0.418
Sindh Rural Low-Skilled	0.239	0.297	0.099	0.323	0.240
Sindh Rural High-Skilled	0.292	0.361	0.100	0.370	0.281
Sindh Urban Low-Skilled	0.297	0.386	0.210	0.253	0.287
Sindh Urban High-Skilled	0.460	0.799	0.4012	0.843	0.626
KP Rural Low-Skilled	0.270	0.437	0.210	0.388	0.326
KP Rural High-Skilled	0.279	0.282	0.283	0.312	0.289
KP Urban Low-Skilled	0.268	0.299	0.229	0.371	0.292
KP Urban High-Skilled	0.365	0.423	0.308	0.399	0.374
Balochistan Rural Low-Skilled	0.200	0.264	0.198	0.254	0.229
Balochistan Rural High-Skilled	0.231	0.299	0.252	0.456	0.310
Balochistan Urban Low-Skilled	0.248	0.362	0.160	0.401	0.293
Balochistan Urban High-Skilled	0.280	0.490	0.245	0.489	0.376

Note: Simulation Results.

CONCLUSION AND POLICY RECOMMENDATIONS

This study was conducted to quantify the impact of changes in tax rates on the overall economy of Pakistan. For changing the tax rates, we tested two scenarios. In the first scenario, the marginal tax rate and the number of slabs for the individuals paying personal income tax were decreased but kept the taxes progressive. In the second scenario, a flat personal income tax rate was introduced, corporate income tax, sales tax, and customs duties were decreased, and all other direct and indirect taxes were abolished.

Both of these scenarios simplified the tax structure and reduced the tax burden, leaving the agents with higher after-tax income. We used the CGE model to study the sectoral and macroeconomic impacts of the said changes. However, we first developed an updated SAM based on the 2017 data taken from the 2017 IO table, national accounts data, HIES and LFS for the corresponding year. The SAM developed for this study consisted of 34 industries, all producing one commodity, multiple types of labour, capital, and households and incorporated direct and indirect taxes paid by the households and firms to the government. It presented a useful picture of the economy using the double-entry system in which each entry in a cell represents the flow of income from one agent to another. After that, ORANI-G modifications of the CGE were made to make it better applicable to Pakistan's economy and the objectives of the study.

Our analysis shows that decreasing the personal income tax rate applied to individuals would only result in increasing the disposable income of the households, which, in turn, would result in increasing household consumption expenditures and decreasing government income, consequently increasing the fiscal deficit. The increased demand would be mostly fulfilled by imports, which would also widen the trade deficit. On the other hand, reducing rates of all the taxes, as modelled in Scenario 2, would enable firms to reap higher profits increasing the demand due to higher after-tax income, which would be matched by higher supply resulting from higher production motivated by lower financial and psychic costs of production and higher profits. However, the rate of growth in output and prices would be different for different sectors. Scenario 2 especially suits the export industry as it would reduce its cost making the exports more competitive. This was noted by an increase in the exports reflected in the analysis. Both these scenarios would result in increasing the take-home income of various categories of labour and the income of the households. Higher consumption due to higher income would increase the welfare of the households and improve their living standards. The expenditures on health and education would also increase. The results also show that the overall positive impact of tax reforms on the economy would be more pronounced when the balanced budget condition is binding.

This analysis leads to some simple but important policy recommendations. One of the policies that can be recommended based on the analysis is that simplifying the tax regime and lowering taxes will result in higher income of the citizens and corporations, a sectoral shift in favour of competitive and efficient sectors and, resultantly, higher economic growth. This higher growth will result in increased tax revenue without overburdening the citizens and businesses. Therefore, if the government wants to raise the living standard of the people, it should introduce a simplified tax system which is broad-based with a low tax burden. Secondly, reducing rates of only one or few taxes will not work as effectively as lowering all the tax rates, reducing the total number of taxes to be paid by firms and individuals, and letting various sectors compete based on productivity and efficiency rather than using tax as a tool for creating favourable grounds for a few sectors. The results of the study also show that reducing tax rates will result in increasing the fiscal deficit when the balanced budget condition is not binding. However, if the government is restricted to keeping the budget balanced or the deficit under control, it will compel the government to cut down or abolish unnecessary expenditures and reduce its footprint on the economy, which will result in lowering labour demand in the

public sector and release it for private firms, which will result in reducing market distortions. Therefore, we recommend that the government should be restricted to keep the fiscal deficit within the target. Although this study did not extend to that area, the literature suggests that combining a simplified tax regime based on low tax rates benefits higher-income groups more than lower-income groups. Such a situation, on the one hand, encourages wealth creation but, on the other hand, it increases inequalities which need to be taken care of using suitable policies.

REFERENCES

Abdisa, T. (2018). Macroeconomic Impact of tax reform in Ethiopia. *Journal of Economics and Sustainable Development*, *9*.

Ahmed, S., Ahmed, V., & O'Donoghue, C. (2011). Reforming indirect taxation in Pakistan: A macro-micro analysis. *EJTR*, *9*, 153.

Amir, H., Asafu-Adjaye, J., & Ducpham, T. (2013). The impact of the Indonesian income tax reform: A CGE analysis. *Economic Modelling*, *31*, 492–501.

Auerbach, A. J. (1996). Measuring the impact of tax reform. *National Tax Journal*, 665–673.

Barrot, J.-N., & Sauvagnat, J. (2016). Input specificity and the propagation of idiosyncratic shocks in production networks. *The Quarterly Journal of Economics*, *131*(3), 1543–1592.

Begg, D., Fischer, S., & Dornbusch, R. (2003). *Economics* (7th ed.). McGraw-Hill Education.

Belayneh, A. (2018). Economy wide impact of direct tax reform in Ethiopia: A recursive dynamic computable general equilibrium analysis (PhD Thesis). AAU.

Berisha, E. (2020). Tax cuts and" middle-class" workers. *Economic Analysis and Policy*, *65*, 276–281.

Bernard, A. B., Moxnes, A., & Saito, Y. U. (2019). Production networks, geography, and firm performance. *Journal of Political Economy*, *127*(2), 639–688.

Bhattarai, K., & Trzeciakiewicz, D. (2017). Macroeconomic impacts of fiscal policy shocks in the UK: A DSGE analysis. *Economic Modelling*, *61*, 321–338.

Blöchl, F., Theis, F. J., Vega-Redondo, F., & Fisher, E. O. (2011). Vertex centralities in input-output networks reveal the structure of modern economies. *Physical Review E*, *83*(4), 046127.

Boehm, C. E., Flaaen, A., & Pandalai-Nayar, N. (2019). Input linkages and the transmission of shocks: Firm-level evidence from the 2011 Tōhoku earthquake. *Review of Economics and Statistics*, *101*(1), 60–75.

Breisinger, C., Thomas, M., & Thurlow, J. (2009). *Social accounting matrices and multiplier analysis: An introduction with exercises* (Vol. 5). Intl Food Policy Res Inst.

Carvalho, V. M., Nirei, M., Saito, Y. U., & Tahbaz-Salehi, A. (2021). Supply chain disruptions: Evidence from the great east japan earthquake. *The Quarterly Journal of Economics*, *136*(2), 1255–1321.

Cororaton, C. B., & Orden, D. (2009). *Poverty implications of agricultural and non-agricultural price distortions in Pakistan*.

Damuri, Y. R., & Perdana, A. A. (2003). The impact of fiscal policy on income distribution and poverty: A computable general equilibrium approach for Indonesia. Economics Working Paper No. WPE068, Center for Strategic and International Studies, Jakarta, Indonesia.

Diao, X., Roe, T. L., & Yeldan, A. E. (1998). Fiscal debt management, accumulation and transitional dynamics in a CGE model for Turkey. *Canadian Journal of Development Studies/Revue Canadienne d'études Du Développement*, *19*(2), 343–375.

Dixon, P. (2006). *Evidence-based Trade Policy Decision Making in Australia and the Development of Computable General Equilibrium Modelling*. Centre of Policy Studies (CoPS).

Dixon, P. B., Parmenter, B. R., Powell, A. A., Wilcoxen, P. J., & Pearson, K. R. (1992). *Notes and problems in applied general equilibrium economics*.

Dixon, P. B., Parmenter, B. R., Sutton, J., & Vincent, D. P. (1982). *Orani, a multisectoral model of the Australian economy* (Vol. 142). North Holland.

Dixon, P., & Rimmer, M. T. (2002). *Dynamic general and equilibrium modelling for forecasting and policy: A practical guide and documentation of MONASH* (Vol. 256). Elsevier.

Dorosh, P., Niazi, M. K., & Nazli, H. (2004). A Social Accounting Matrix for Pakistan, 2001-02: Methodology and Results. A Background Research Paper for the Pakistan Rural Factor. Markets Study, World Bank. *South Asia Rural Development Unit of the World Bank, Washington DC*.

Eicher, T. S., Turnovsky, S. J., & Prunera, M. C. R. (2003). The impact of tax policy on inequality and growth: An empirical and theoretical investigation. *Inequality and Growth: Theory and Policy Implications*. MIT Press, Cambridge, MA.

Engen, E. M., & Skinner, J. (1996). *Taxation and economic growth*. National Bureau of Economic Research.

Fadinger, H., Ghiglino, C., & Teteryatnikova, M. (2016). *Income differences and input-output structure*.

Fortin, B., Marceau, N., & Savard, L. (1997). Taxation, wage controls and the informal sector. *Journal of Public Economics*, *66*(2), 293–312.

Fossat, P., & Bua, M. (2013). *Tax administration reform in the Francophone countries of Sub-Saharan Africa*.

Gale, W. G., & Samwick, A. A. (2014). Effects of income tax changes on economic growth. *Economic Studies, Https://Www. Brookings. Edu/Wpcontent/Uploads/2016/06/09_Effects_Income_Tax_Changes_Economic_Growth_Gale_Sa Mwick. Pdf*.

Gemmell, N. (1988). Tax systems, tax revenue and growth in LDCs: A review of empirical evidence. *Intereconomics*, *23*(2), 84–90.

Giraldo, M. C., & García, J. A. B. (2018). *Fiscal Policy and Inequality in a CGE Model for Colombia*.

Golan, A., Judge, G., & Miller, D. (1997). *Maximum entropy econometrics: Robust estimation with limited data*.

Golan, A., Judge, G., & Robinson, S. (1994). Recovering information from incomplete or partial multisectoral economic data. *The Review of Economics and Statistics*, 541–549.

Gordon, R. (2010). *Taxation in developing countries: Six case studies and policy implications*. Columbia University Press.

Goulder, L. H., & Summers, L. H. (1989). Tax policy, asset prices, and growth: A general equilibrium analysis. *Journal of Public Economics*, *38*(3), 265–296.

Hamilton, B., & Whalley, J. (1989). Reforming indirect taxes in Canada: Some general equilibrium estimates. *Canadian Journal of Economics*, 561–575.

Hasudungan, H. W., & Sabaruddin, S. S. (2016). The Impact of Fiscal Reform on Indonesian Macroeconomy: A CGE Framework. *Central European Journal of Economic Modelling and Econometrics*, *8*(3), 181–202.

Horridge, J. (2000). *ORANI-G: A general equilibrium model of the Australian economy*. Centre of Policy Studies (CoPS).

Horridge, M. (2003). ORANI-G: A generic single-country computable general equilibrium model. Centre of Policy Studies and Impact Project, Monash University, Australia.

Huang, J., & Rios, J. (2016). Optimal tax mix with income tax non-compliance. *Journal of Public Economics*, *144*, 52–63.

Hussain, S. M., & Malik, S. (2016). Asymmetric effects of exogenous tax changes. *Journal of Economic Dynamics and Control*, *69*, 268–300.

Iqbal, Z., Ayyubi, M. S., Farooq, A., & Lodhi, S. (2019). Microeconomic Impact of GST on Household Consumption Patterns in Pakistan. *Forman Journal of Economic Studies*, *15*.

Jamal, H., & Javed, S. (2013). Incidence of general sales tax in Pakistan: Latest estimate. *Pakistan Journal of Applied Economics*, *23*(2), 73–95.

Judge, G. G., & Mittelhammer, R. C. (2011). *An information theoretic approach to econometrics*. Cambridge University Press.

Keen, M. (2012). *Taxation and development-Again.* (IMF Working Paper, WP/12/220). International Monetary Fund Washingtone DC.

Khan, M. A., Zada, N., & Mukhopadhyay, K. (2018). Economic implications of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) on Pakistan: A CGE approach. *Journal of Economic Structures*, *7*(1), 1–20.

Knudsen, M. B., Pedersen, L. H., Pedersen, T. W., Stephensen, P., & Trier, P. (1998). *A CGE anlysis of the Danish 1993 Tax Reform*. Danish Rational Economic Agents Model, DREAM.

Lee, Y., & Gordon, R. H. (2005). Tax structure and economic growth. *Journal of Public Economics*, *89*(5–6), 1027–1043.

Lin, B., & Jia, Z. (2019). How does tax system on energy industries affect energy demand, CO2 emissions, and economy in China? *Energy Economics*, 104496.

Mabugu, R., Robichaud, V., Maisonnave, H., & Chitiga, M. (2013). Impact of fiscal policy in an intertemporal CGE model for South Africa. *Economic Modelling*, *31*, 775–782.

McNerney, J., Fath, B. D., & Silverberg, G. (2013). Network structure of inter-industry flows. *Physica A: Statistical Mechanics and Its Applications*, *392*(24), 6427–6441.

Mendoza, E. G., Razin, A., & Tesar, L. L. (1994). Effective tax rates in macroeconomics: Cross-country estimates of tax rates on factor incomes and consumption. *Journal of Monetary Economics*, *34*(3), 297–323.

Mertens, K., & Montiel Olea, J. L. (2018). Marginal tax rates and income: New time series evidence. *The Quarterly Journal of Economics*, *133*(4), 1803–1884.

Mountford, A., & Uhlig, H. (2009). What are the effects of fiscal policy shocks? *Journal of Applied Econometrics*, *24*(6), 960–992.

Nandi, A. (2020). Indian Fiscal Policy: A DSGE Primer. *The Journal of Developing Areas*, *54*(2).

Naqvi, H. A., Hakeem, M. M., & Naeem, R. A. (2011). Impact of agricultural income tax on household welfare and inequality: Pakistan A case-in-point. *International Journal of Business and Social Science*, *2*(6), 103–118.

Pasha, H. A., & Ghaus-Pasha, A. (2015). The future path of tax reforms in Pakistan. *Moving the Economy Forward*, 171.

Robinson, S., Cattaneo, A., & El-Said, M. (2001). Updating and estimating a social accounting matrix using cross entropy methods. *Economic Systems Research*, *13*(1), 47–64.

Robinson, S., & Gueneau, A. (2013). *CGE-W: An integrated modeling framework for analyzing water-economy links applied to Pakistan*.

Romer, C. D., & Romer, D. H. (2010). The macroeconomic effects of tax changes: Estimates based on a new measure of fiscal shocks. *American Economic Review*, *100*(3), 763–801.

Sahn, D. E., & Younger, S. D. (2000). Expenditure incidence in Africa: Microeconomic evidence. *Fiscal Studies*, *21*(3), 329–347.

Shaikh, F. M. (2009). Analysis of bilateral trade liberalistation and South Asian free trade Agreement (SAFTA) on Pakistan's economy by using CGE model. *Journal of International Trade Law and Policy*.

Shaikh, F. M., & Rahpoto, M. S. (2009). Impact of trade liberali station and SAFTA on Pakistan's Economy by Using CGE Model. *International Journal of Business and Management*, *4*(4), 192.

Siddiqui, R., & Iqbal, Z. (2001). *Tariff reduction and functional income distribution in Pakistan: A CGE model*. Pakistan Institute of Development Economics.

Siddiqui, R., Kemal, A. R., Siddiqui, R., & Ali Kemal, M. (2008). *Tariff reduction, fiscal adjustment and poverty in Pakistan: A CGE-based analysis*.

Wawire, N. (2017). Determinants of value added tax revenue in Kenya. *Journal of Economics Library*, *4*(3), 322–344.

Yusuf, A. A., Djoni, H., & Wawan Hermawan, Y. (2007). *AGEFIS: Applied general equilibrium for fiscal policy analysis*. Working Paper in Economics and Development Studies.

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Decentralisation's Effects on Health: Theory and Evidence from Balochistan, Pakistan

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The paper investigated the impact of decentralisation on health outcomes in Balochistan. It looked at how decentralisation has been [in]effective in improving (worsening) the overall healthcare services in the province. The impact of decentralisation was seen through the National Finance Commission's (NFC) 7th NFC Award and the 18th Amendment to the Constitution. Both initiatives provide fiscal and administrative decentralisation to the provinces in Pakistan. Healthcare service in Pakistan is a provincial subject and any step that helps to improve the capacity of the provinces should supposedly translate into better services of healthcare. After the 7th NFC Award and the 18th Amendment, Balochistan has gained bigger fiscal space and provincial autonomy to improve social services including health. The study used a time series dataset from 1975 to 2020 from federal/provincial/district sources to provide micro-level evidence of static (or otherwise) outcomes in health corresponding to decentralisation. The paper compared the public health provision by provincial/subnational government with a centralised government to assess which tier is more effective (or otherwise) in health care provision considering various institutional types in both decentralised and decentralised regimes. The findings show that decentralisation did not improve health outcomes such as life expectancy, infant mortality rate, and child immunisation. Instead, it caused an increase in infant mortality in Balochistan. The paper concludes that health outcomes have not improved in post decentralisation despite bigger fiscal space and provincial autonomy. Thus, the province has not been able to increase healthcare services with qualitatively better outcomes.

JEL Classificatin: H77, H75,H7
Keywords: Decentralisation, 7th NFC Award, 18th Amendment, Healthcare Outcomes, Balochistan.

1. INTRODUCTION

Decentralisation is one of the most widespread policy reforms in the world. It is being pursued or has recently been implemented in many countries across all political systems and income levels. The World Bank estimated that decentralisation was being pursued in 80 to 100 percent of the world (World Bank, 2012). The interest in decentralisation has further grown recently, with new or deepening reforms announced in countries such as Bolivia, Pakistan, Turkey, France, Japan, Kenya, Cambodia, and India, to name a few (Faguet and Pöschl, 2015; Hooghe and Marks, 2016; Rodden, 2006;

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Ahmed and Baloch, 2019). The scholarly response to the decentralisation debate has similarly been vast, with hundreds of articles published on decentralisation and its different aspects. For reasons such as data and funding availability and policy interest, most of these studies focus more on the high-income OECD countries. However, most of the world's approximately 190 countries, and hence most of the world's decentralisation, lie outside this thirty-six-country OECD club. Therefore, more research needs to be done focusing on developing countries where decentralisation is adopted as a reform policy.

Decentralisation can broadly be defined as the shifting of obligations, authority, and resources from the centre (federal) to regions/provinces to enable the latter in policy-making, and financial and administrative planning for better service delivery (Schultz, 2004). Decentralisation has different forms, such as administrative, political, and fiscal, and each kind of decentralisation has different features, policy repercussions, and preconditions for success. The proponents of decentralisation argue that it can foster good governance, help improve the lives of common people by bringing decision-making processes closer to the people, and enhance coverage and scope, and the quality of service delivery. Recent literature (see, for example, Faguet and Pöschl, 2015; Hooghe and Marks, 2016) on decentralisation indicates that over the past decade, emphasis has shifted away from the analysis of the impacts of decentralisation on macroeconomic indicators towards investigating its human face, i.e., its impact on the social indicators, especially health, education, and other basic local services.

In the decentralisation literature, Pakistan is notably underrepresented. This paper, therefore, is an attempt to provide some insights into decentralisation as a policy reform in Pakistan. Notably, observing the impact of decentralisation on healthcare and establishing a direct or indirect link (either positive or negative) has been and remains a challenge for both public and social scientists. The paper seeks to add to knowledge about decentralisation by exploring its effects on health in Balochistan, the largest province of Pakistan. In line with modern research, the paper examines and analyses the effects of decentralisation on health in Balochistan in light of the 7th NFC Award and the 18th Amendment to the Constitution of Pakistan, implemented in 2010.

According to the 1973 Constitution of Pakistan, and further to its 18th Amendment in 2010, health primarily has become a provincial subject. However, planning, finance, and administration of health were partially conducted by the federation in parallel to the provinces. The federal health department used to set the overall policy planning, coordination, and standard for primary and tertiary healthcare before the 18th Amendment (Khan and Mirza, 2011).

It has been more than a decade since both these initiatives for decentralisation were taken, so it is imperative to assess how decentralisation initiatives have affected the health sector, which is an important social sector with a significant impact on social and economic development. To the best of our knowledge, this relationship has not been empirically examined within a robust theoretical context. Thus, we examine whether access to healthcare facilities and their quality has improved after decentralisation in Balochistan.

The paper contributes to the relevant literature by building a theoretical framework, compiling a novel dataset, and highlighting possible policy issues related to devolution and the health sector.

Politically, Balochistan, in many ways, has been at the forefront of the decentralisation campaign, and much of the argument for this came in the backdrop of the underdeveloped socioeconomic landscape in the province. Lack of resources and autonomy in Balochistan are cited as key causes for this underdevelopment. The social sector in Balochistan has historically been poor with weak healthcare indicators. However, the issues of autonomy and resource availability have been addressed to a certain extent, if not fully, through the 7th NFC Award and 18th Amendment initiatives.

Therefore, it is pertinent to examine how and to what extent the province has been successful in addressing its healthcare services. The overarching question of the paper, therefore, is the extent to which decentralisation has affected healthcare services in Balochistan. The question is tested using the following hypothesis: Decentralisation, owing to the 7th NFC Award and 18th Amendment, leads to more expenditure/investment on health in Balochistan, which translates into better healthcare-related facilities and outcomes.

The rest of the paper is organised as follows. Section 2 presents a review of the existing literature. Sections 3 and 4 discuss the status of health and decentralisation in Balochistan. Section 5 presents a theoretical framework, and Section 6 explains methodology, data, and variables. Section 7 shows and discusses the descriptive statistics, Section 8 discusses the results, and Section 9 concludes with policy recommendations.

2. LITERATURE REVIEW

2.1. Decentralisation

Upto 1945, Australia, Canada, Switzerland, and the USA were the only functioning federal countries in the world, whereas as recently as 2015 some 20 to 30 countries with 40 percent of the world's population are federal (Anderson, 2015). Ninety-five percent of democratic countries have elected regional or local governments with different levels of fiscal, administrative, and political decentralisation (World Bank, 2018). Subnational governments in some countries (the USA, Canada, Switzerland, Pakistan, and India) are more autonomous, while in many other countries (Thailand, Spain, Indonesia, and Chile) subnational governments have restricted autonomy (Hooghe and Marks, 2016). Several developing countries have adopted decentralisation as a policy strategy to resolve many compelling political and fiscal problems, and to improve the social and economic service delivery (Bird, 1993).

The question that arises is, what is decentralisation. It is hard to give a precise definition of decentralisation. Fesler (1965) considers that decentralisation is rich with conceptual and empirical significance that reflects the dynamic political and fiscal realities, and incremental changes in society. Scholars believe that the problems related to decentralisation are purely conceptual, and ironically in many developing countries it is proposed and implemented without comprehending its true meaning (Fantini & Gittell, 1973; Rondinelli, 1981). Decentralisation is used in different contexts with distinctions among fiscal, political, and administrative decentralisation (Martinez-Vazquez, 1998; Litvak & Seddon, 1999).

Fiscal decentralisation is broadly defined as the transfer of fiscal decision-making and the authority of planning and management of public functions from the central government (first tier) to subnational governments (regional/provincial/local) (Bahl,

2006). The advocates of fiscal decentralisation assert that because of the absence of a significant spillover effect, the provision of public goods and services by subnational governments increases efficiency (Oates, 1968, 1972; Ostrom, et al. 1993; Qian & Weingast, 1997), which ensures national unity (Litvack, et al., 1998).

2.2. The Process of Decentralisation in Pakistan

Like many countries, in Pakistan, besides other political motives, decentralisation is adopted mainly to empower the provinces and enable them to deliver better social services and improve governance. Decentralisation in Pakistan has empowered the provinces in terms of finance and administrative controls. Decentralisation in many ways can enhance the harmony among the provinces in Pakistan and can promote coordination between them and the local governments (the third tier), which can help strengthen the overall federal structure.

Pakistan has historically been a centralist federation with a centralised system of taxation, in which the federal government collects most of the tax and non-tax revenues and distributes them vertically—between the centre and the provinces—and horizontally – among the provinces—based on the criteria of population, poverty, revenue generation, and inverse population density. Revenue centralisation and expenditure decentralisation in Pakistan make public finances extremely imbalanced, in which the federal government dominates revenue collection in comparison to conducting the public sector expenditures. Having this mismatch, intergovernmental transfers have become an imperative tool in meeting the resource requirements of subnational governments. The intergovernmental resource transfer, a significant feature of provincial governments' finances in Pakistan, takes place under the fiscal arrangement of the NFC Award. As mandated by the Constitution, after every five years an NFC Award is constituted to prescribe a formula-based vertical and horizontal distribution of both tax and non-tax revenues.

Table 1 shows the share of the provinces in various resource-sharing awards.

In the 7th Award, the smaller provinces (in terms of population) of Pakistan insisted on the inclusion of indicators such as poverty, backwardness, inverse population density, and poor collection of infrastructure tax on services in distribution criteria for horizontal distribution (see Table 2).

Table 2

Distribution Criteria for the 7th NFC Award (Share in Percentage)

Indicators	Pop.	Poverty/ Backward	Revenue Generation	Inverse Population Density	Grants for Compensation on Account of OZ&T*	Grant for War on Grants for War on Terror**	Share based on the previous award	7th NFC Award
Weight	82	10.3	5	2.7			100	100
Punjab	57.37	23.16	44	4.34			53.01	51.74
Sindh	23.71	23.41	50	7.21	0.66		24.94	24.55
KP	13.82	27.82	5	6.54		1.8	14.88	14.62
Balochistan	5.11	25.61	1	81.92			7.17	9.09

Source: NFC document (2010) and Nabi and Sheikh (2011).

* Grant-in-Aid to Sindh province is equivalent to 0.66 percent of the net Provincial Divisible Pool and is given as compensation for losses on account of the abolition of OZ&T.** The grant for the war on terror is 1 percent of the total divisible pool, which is equivalent to 1.8 percent of the provincial share in the net proceeds of the Provincial Divisible Pool.

On 10th March 2010, the 7th NFC was announced with the consensus of all stakeholders, which may rightly be considered a quantum jump towards decentralisation of fiscal resources to provinces. The Award introduced some fundamental shifts in both horizontal and vertical distributions:

- The Award increases the share of the provinces in the divisible pool to 56 percent in the first year, effective from July 01 2010, and 57.5 percent in the remaining 4 years of the award. In addition, the collection charges by the federal government, which hitherto had been 5 percent, have been reduced to 1 percent. The federal government also relinquished the sales tax on services under federal excise duties to the provinces (Nabi & Sheikh, 2011).
- Besides population, poverty, backwardness, resource mobilisation, and inverse population density are used as criteria for the distribution of the divisible pool among the provinces (see Table 2). Though population remains the major criterion with 82 percent weight, poverty/backwardness, revenue mobilisation, and inverse population density have 10.3 percent, 5 percent, and 2.7 percent weights, respectively, which has increased the share of provinces in vertical distribution.
- To compensate the provinces with extraordinary financial difficulties, special considerations have been made in the Award. It is agreed upon that each province would receive 50 percent of the net proceeds of total royalty from crude oil. In addition to this, Balochistan is set to receive Rs. 120 billion under the head of the Gas Development Surcharge, which the federation owed to Balochistan, in 12 years installments. Likewise, KP would get Rs. 110 billion in the head of hydel profit in 5 years (Pakistan, 2010).

The bottom line of the 7th NFC Award is that it recognised the federal spirit of Pakistan and conceded the fact that without greater decentralisation provinces would desperately fail in providing social services for which they have constitutional obligations.

2.3. The 18th Amendment to the Constitution

The 18th Amendment to the Constitution of Pakistan passed in April 2010 was a historic amendment that sought to decentralise power in important ways. It devolved several key functions to the provinces by abolishing the Concurrent Legislative List in the Constitution and amending the Federal Legislative List. The decentralisation of responsibility and authority provided the context in which various institutional actors renegotiated their roles in a contested space. In light of the 18th Amendment, the provinces further amended their laws, established new institutional frameworks, developed policies and strategies, and built the capacity to effectively discharge their newly acquired responsibilities.

The Concurrent List was abolished. The subjects such as health and education were devolved to the provinces. This represents the extended sphere of provincial autonomy. For provinces, it meant two things. First, they were now required to legislate on these subjects, even if this amounted to changing the federal legislation mutatis mutandis. After the Amendment, the provinces can frame their laws, rules, and policies on a plethora of subjects, including health.

The key structural changes brought about by the 18th Amendment are in line with the nature of decentralisation in Pakistan. Articles 141 to 159 of the Constitution delineate the relationship between the federation and the provinces. In this relationship, the difference is that the Concurrent List, comprising subjects on which both the national and provincial assemblies could legislate, has been largely done away with. The 18th Amendment has, therefore, created not only the necessary constitutional framework and administrative responsibilities, but it has also provided a much bigger fiscal space for the provinces to perform all devolved functions.

2.4. Decentralisation and Health

Decentralisation of the health sector was implemented in many states as a subsection of extensive health reorganisations or as a priority management policy (Rico & Leon, 2005; Saltman, 2007). The aim and logic of this policy initiative differ widely from country to country, but in the overall extensive process of health decentralisation, the provision of better health services invariably is the key purpose (Saltman, et al. 2007; Costa-Font & Greer, 2013). Health decentralisation literature vigorously advocates decentralisation as an effective reform policy for the delivery of public goods, including healthcare amenities (Robalino & Voetberg, 2001; Asfaw, et al. 2007).

A key purpose of adopting health decentralisation is to make the health provision more inclusive because, in a centralised health system, those who are at the margins are invariably left out (Magnussen, et al. 2007). A review study conducted by Saltman, et al. (2016) on decentralisation and health equity concludes that decentralisation creates greater local autonomy among regions but generates disparities among them in terms of healthcare. On the other hand, Regmi, et al. (2010) argue that the decentralisation of the health sector is important because it aids in providing health services according to the needs of the local people and improves accessibility.

Schwartz, et al. (2002), using a panel of middle-income countries, showed that local public health expenditures had increased after decentralisation, though over time the subnational governments decreased the share of revenue allocated for public health. Based on evidence from 166 countries, Treisman (2002) pointed out that the impact of decentralisation on the percentages of new-born immunised against diphtheria, tetanus, and pertussis and accessibility to medicines depended largely on the income level of those countries. Asfaw, et al. (2007) showed that decentralisation had increased the infant mortality rate in India. Khaleghian (2003) showed that from 1980 to 1997 in 140 countries and provinces/states, the impact of decentralisation on vaccination coverage of one-year-old children fell under the category of “below average” to “average”.

Meher and Samina (2018) and Aftab (2019) examined the impact of decentralisation on health in Pakistan. They found that decentralisation had improved the delivery of health services.

3. THE STATUS OF HEALTH IN BALOCHISTAN

In Balochistan, the structure for the provision of basic health services is either nonexistent or very poor. For example, out of 10,000 pregnant women, about 785 women experience pregnancy-related complications which have adverse consequences for overall family lives and their earning capabilities. The proportion of mortality is grotesquely high

at 600 for each 10,000. Similarly, the newborn child mortality of 128 out of 1,000 shows the quality and quantity of the maternity staff, problems with well-being administration, underage marriages, and other well-being issues (Health Facility Assessment, Balochistan Provincial Report, 2020). Most of the population in the province (more than 70 percent) lives in far-flung areas that have an urgent need for maternity specialists and well-being administration (MICS, Govt. of Balochistan, 2018).

In Balochistan, during the past 10 years, one million children have died before reaching the age of five. The maternal mortality rate (MMR) is alarmingly high at 785 per 100,000 live births, while the infant mortality rate (IMR) is 97 per 1000 live births. These health-related outcomes are the worst in Balochistan compared to other provinces. Similarly, birth by skilled birth attendants is 18 percent, birth offices are 16 percent, and completely inoculated kids are a mere 16 percent. The physical infrastructure of the health sector is virtually dysfunctional in rural areas, whereas it is in bad condition in towns and urban centres (Government of Balochistan, 2020).

In terms of health facilities and the provision of basic health services, the primary healthcare system, such as where the Basic Health Units (BHUs) and Rural Health Centres (RHCs), plays a critical role. In Balochistan, there are 909 BHUs, 103 RHCs, 82 Maternal Child Care Centres (MCHs), and 575 Civil Dispensaries (CDs) officially registered (PPHI, 2021). Although the physical infrastructure has increased over time, these BHUs, RHCs, and MCHs are either closed or dysfunctional. This is partly because of the non-supply of medicines and other equipment by provincial and district health departments.

4. DECENTRALISATION IN BALOCHISTAN

The trend of decentralisation, particularly fiscal decentralisation, had increased before the 7th NFC Award and the 18th Amendment, as we showed above. However, after both reforms in 2010, significant decentralisation took place in all provinces in general and Balochistan in particular. As shown in Table 7 (also see Ahmed and Baloch, 2014), the horizontal distribution for Balochistan has increased from approximately 5.3 percent to 9.09 percent, as more criteria for horizontal distribution along with population, which hitherto had been the sole criterion (Table 7).

Table 7

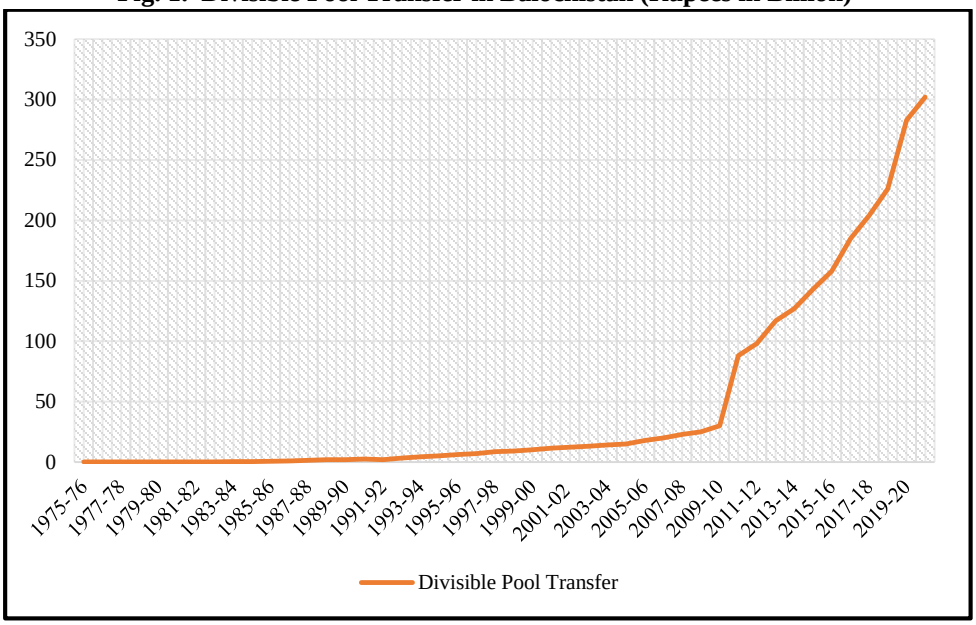
Summary of the Provincial Share in the NFC Award — 1974 to 2010 (%)

NFC Awards	Punjab	Sindh	KPK	Balochistan
NFC Award 1974	60.25	22.5	13.39	3.86
NFC Award 1979	57.97	23.34	13.39	5.3
NFC Award 1885	57.97	23.34	13.39	5.3
NFC Award 1990	57.88	23.28	13.54	5.3
NFC Award 1996	57.88	23.28	13.54	5.3
NFC Award 2000	57.88	23.28	13.54	5.3
7th NFC Award 2010	51.74	24.55	14.62	9.09

Source: National Finance Commission Report, 2010.

As Figure 1 shows, expenditures have been significantly decentralised post-7th NFC award and the 18th Amendment.

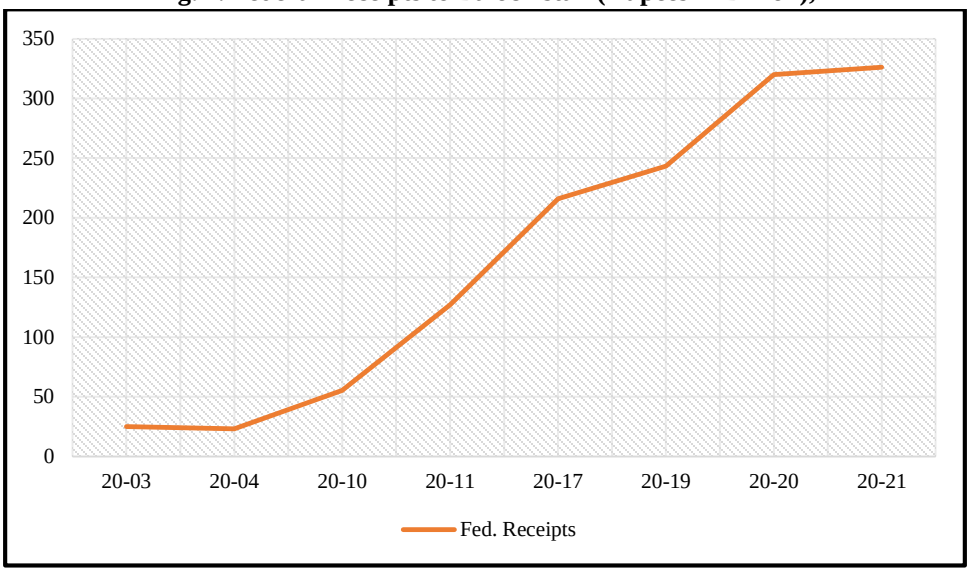
Fig. 1. Divisible Pool Transfer in Balochistan (Rupees in Billion)



Source: Budget Documents, Ministry of Finance, Government of Balochistan.

As Figure 2 shows, a steep rise in all federal receipts, both the divisible pool and straight transfers, after 2010 is a typical manifestation of decentralisation in Balochistan.

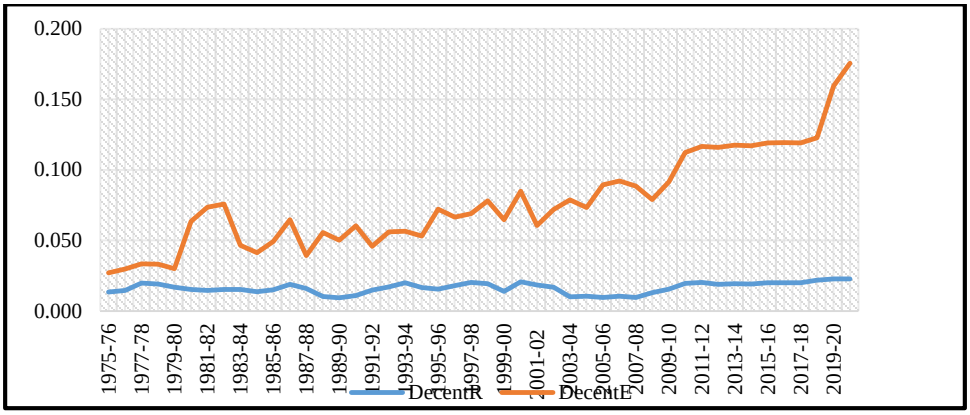
Fig. 2. Federal Receipts to Balochistan (Rupees in Billion),



Source: Budget Documents, Ministry of Finance, Government of Balochistan.

As shown in Figure 3, expenditure decentralisation in Balochistan has substantially increased, post-2010, displaying a somewhat steep and consistent rise.

Fig. 3. Overall Trend of Expenditure and Revenue Decentralisation in Balochistan—1975 to 2020



Source: Federal and Provincial Budget Documents (various Years; Statistical Yearbook, State Bank of Pakistan (2010); Economic Survey of Pakistan (Various Issues).

5. THE THEORETICAL FRAMEWORK

This section builds a model and theoretical framework to assess how widespread better quality public health can be provided in a decentralised setup considering various institutional arrangements. Bardhan and Mookherjee (2005; Besley and Coate (2003); Faguet (2002,2004); and Lockwood's (2006) existing work provides a benchmark to develop the theoretical framework.

Prima facie, in a federal structure, decentralisation reform is adopted to improve service delivery given the proximity of the subnational governments to the local people and assuming that the local governments are more responsive to the needs of the local people. For the present study, a model is constructed in which the proximity/ responsiveness advantage of the decentralisation is compared to the federal government's efficiency parameter, dubbed as 'technological advantage' for the provision of health services.

For simplicity, two regimes are considered, i.e., a centralised regime (C) and a decentralised regime (D). In the centralised regime, there is only the central government, without any provincial or subnational governments. In the decentralised regime, there is a central government and k provinces in which each province governs its respective jurisdiction. It is assumed that every province has two types of inhabitants, namely, poor and rich (or non-poor), and the inhabitants are immobile. In other words, local inhabitants may not fully migrate from one province/locality to another.

The inhabitant of a locality consumes two baskets: public goods (G) and private goods (N).

$$L = f(G, N) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where L is the living condition or the standard of living of the citizen. To maintain L, G, and N amount of goods and services is required. The public goods basket, G, also contains public health provision, H. Thus, G is the function of H and X, where X is the set of public goods/services other than H.

$$G = g(H, X) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

It is further proposed that all basic social services are included in the public goods basket. The basket of private goods, N, is the function of non-necessary/non-basic goods/services, which is denoted by Z.

$$N = n(Z) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Furthermore, the first- and second-order conditions of the argument in Equation (1) are:

$$L_G > 0 \;\; and \; L_{GG} \leq 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

Likewise,

$$L_N > 0 \;\; and \; L_{NN} \leq 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

The argument is that when the provision of public goods basket, G, improves, the living conditions of the individual also improve at a decreasing rate (as shown in Equation 4). The same argument is true for the private goods basket, N, in Equation (5).

In addition, it is assumed that the provinces have the perfect knowledge of the people's basic needs for public goods and services characterised as the "Basic Need" parameter, denoted by $\lambda > 0$. This factor gives information to policymakers on the amount of H and Z required to ensure basic social services. Since the decentralised regimes/provinces are closer to the population, and the proximity condition holds, the decentralised setup has an advantage in terms of the local basic need parameter λ. On the contrary, the centralised regime has a disadvantage in terms of the parameter λ given its remoteness from the population and, therefore, the lack of knowledge about their basic needs. Putting Equation (3), Equation (4), and Equation (5) together given the above arguments, the following valuation function can be derived:

$$L = f[\lambda\, G(H), N(Z)] \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

Public and private goods are on the horizontal axis, while the living standard is on the vertical axis. The figure shows that with an increasing amount of public and private goods, H and Z, respectively, the living standard also increases but at a decreasing rate

The total and marginal utility from G is increasing in λ because of the assumption that the provinces are better situated in realising the "basic needs" than the federation. The estimation of the ability of the federation to people with basic needs may be overestimated or otherwise (Bardhan and Mookherjee, 2005).

5.1. The Budget Constraint

Besley and Coate (2003), Basely and Smart (2003), and Lockwood (2006) use the term representative government, which represents the median voters. Corresponding to the people's needs, the representative government is highly likely to provide better H and Z. The representatives are elected through a majority vote, so to ensure reelection they try to satisfy the people by meeting their basic social needs, such as health and education.

It is further assumed that both centralised or decentralised regimes have balanced budgets with revenue, R, and expenditure, E. That is:

This implies that revenues = expenditures or total taxes = total expenditure.

$$\tau^i = w(N + G + Z) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

In Equation (7), τ^i is the total tax for all i, where i= 1,2…..n

As noted earlier, there is only one representative government in the centralist regime that decides how much health services H within the basket of public goods, $G^{\wedge}$, should be provided. The efficiency or cost-effectiveness of centralisation in production and provision of G is captured by the parameter γ.

Reproducing Equation (6) and inserting superscripts *i* and *j*, the equation becomes:

$$L = f[\lambda^i G(H^j), N(z^j)] \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

Where J = D (decentralised regime), and C (centralised regime).

The private consumption, $C^{\wedge}(i)$, of an individual i is the function of the total number of hours worked, w, minus the amount of taxes τ^i which they must pay.

$$C^i = V(wL^i - \tau^i) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (9)$$

Applying the Lagrange and combining Equations (7), (8), and (9), the objective function becomes:

$$\boldsymbol{\mathcal{L}} = \left\{ \sum_{i=1}^{n} \left(\sum_{i=0}^{n} \mathrm{f}[\lambda^i\ \mathrm{G(H)}, \mathrm{N(Z)}\right) + \mathrm{V(WL}^i - \boldsymbol{\tau^i}\mathrm{)}] + \theta\left(\sum_{i=1}^{n} \boldsymbol{\tau^i} - \mathrm{WH} - \mathrm{WZ}\right) \right\} \quad (10)$$

$$\frac{\partial L}{\partial H} = f_G\ G_P\ -\ \theta W = 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (11)$$

$$\frac{\partial L}{\partial Z} = f_N\ N_Z\ -\theta W = 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (12)$$

Equating Equations (11) and (12), the following equation is arrived at:

$$\Rightarrow f_G\ G_{H\,=}\ f_N\ N_Z\ = \theta W \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (13)$$

$$\frac{\partial L}{\partial \tau} = -V_\tau + \gamma\ \theta = 0 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (14)$$

$$\theta = \frac{V_\tau}{1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (15)$$

Combining Equations (11), (12), and (14), and simplifying:

$$\frac{V_\tau W}{1} = f_G G_P = f_N N_Z \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (16)$$

According to Equation (16), the proportional tax rate, τ^i, on W is equal to the marginal benefit which is extracted from the public goods basket, G, which includes H. In other words, the marginal benefit from goods and services provided by the state is equal to the marginal cost.

Furthermore, we assume that the function f is equal to:

$$f = A\lambda^i G^\alpha\ N^\beta \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (17)$$

In Equation (17), A is a constant, and α and β are the marginal utilities that citizens derive from consuming both baskets G and N, respectively.

$$f_G\ = \alpha\lambda^i G^{\alpha-1}\ N^\beta \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (18)$$

$$f_G\ = \alpha\ \frac{f}{G} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (19)$$

$$f_N = \frac{f}{N}(\beta) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (20)$$

Furthermore, we assume that:

$$C = \ln(WL - \tau^i) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (21)$$

Since it was earlier noted that $\theta = V_t$, substituting (21) for V, Equation (15) becomes:

$$\theta = \frac{V_\tau}{\gamma} = \frac{-1}{WL-\tau} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (22)$$

$$\theta WL - \emptyset\tau = -1 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (23)$$

$$\tau^i = \frac{1+\emptyset WL}{\theta} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (24)$$

Thus, $\tau\hat{}i$ amount of tax is needed per head to finance the provincial public goods and services in either type of government.

Combining Equations (11), (12), and (21):

$$-\frac{W}{\gamma(WL-\tau^i)} = \frac{f}{G^\alpha} * \frac{\partial G^\alpha}{\partial H} = \frac{f}{N^\beta} * \frac{\partial N^\beta}{\partial Z} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (25)$$

Equation (25) depicts the trade-off between a basket of private goods, N, and a basket of public goods/social services, G, that citizens get from a given level of the tax rate, (τ^i, which they must pay as a proportion of the wage rate (W).

Equation (25) further leads to Equations (26) and (27):

$$\alpha \frac{f}{N}\frac{\partial G}{\partial H} = -\frac{W}{W-\tau} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (26)$$

$$\beta \frac{f}{N}\frac{\partial N}{\partial Z} = -\frac{W}{W-\tau} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (27)$$

Assuming that:

G= H^γ $\ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (28)$

N= Z^γ $\ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (29)$

Combining Equations (26) and (27):

$$\alpha \frac{f}{G}\frac{\partial G}{\partial H} = \beta \frac{f}{N}\frac{\partial N}{\partial Z} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (30)$$

Extracting common factor f from both sides and using Equation (28) and Equation (29):

$$\frac{\alpha}{h^\gamma}\gamma H^{\gamma-1} = \frac{\beta}{H^\gamma}\gamma H^{\gamma-1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (31)$$

$$H = \frac{\alpha}{\beta}Z \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (32)$$

Using Equation (28) and Equation (29) to substitute G and N in Equation (22):

$$\alpha \frac{f}{G}\frac{\partial G}{\partial H} = \alpha A\lambda^i G^{\alpha-1}\gamma H^{\gamma-1}(Z^\gamma)^\beta \; yields \Rightarrow \alpha A\lambda^i \gamma H^{\gamma(\alpha-1)} Z^{\beta\gamma} \quad \ldots \quad (33)$$

Since $H = \frac{\alpha}{\beta}Z$, Equation (33) becomes:

$$\alpha \frac{f}{G}\frac{\partial G}{\partial H} = \alpha A\lambda^{i}\gamma \left(\frac{\alpha}{1-\alpha}\right)^{\gamma(\alpha-1)} Z^{\gamma-1} = \frac{1}{\tau-1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (33')$$

After having the interior solution of the above equation, Z can be written as:

$$Z = 1/((\alpha A\lambda\hat{}i\ \gamma(\alpha/(1-\alpha)\ )\hat{}\gamma(\alpha-1)\ ((1+\emptyset WL-\emptyset)/\emptyset))\hat{}(1/(\gamma-1)) \quad \ldots \quad (34)$$

Substituting (34) for Z, Equation (33) becomes:

$$H = (\alpha/\beta)/((\alpha A\lambda\hat{}i\ \gamma(\alpha/(1-\alpha)\ )\hat{}\gamma(\alpha-1)\ ((1+\emptyset WL-\emptyset)/\emptyset))\hat{}(1/(\gamma-1)) \quad (32')$$

The health services provision H by the provinces is a trade-off between the "proximity advantage factor" γ and the federation's "cost-effectiveness" parameter γ.

Assuming assume that marginal utilities of both public and private goods are the same, i.e., α=β, and if this condition holds, then Equations (34) and $(32\hat{}')$ are equal, i.e., H=Z.

Taking the first differential of the above equation with respect to λ and γ:

$$\frac{\partial H}{\partial \lambda} = H\frac{-1}{\gamma-1}\frac{1}{\lambda} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (35)$$

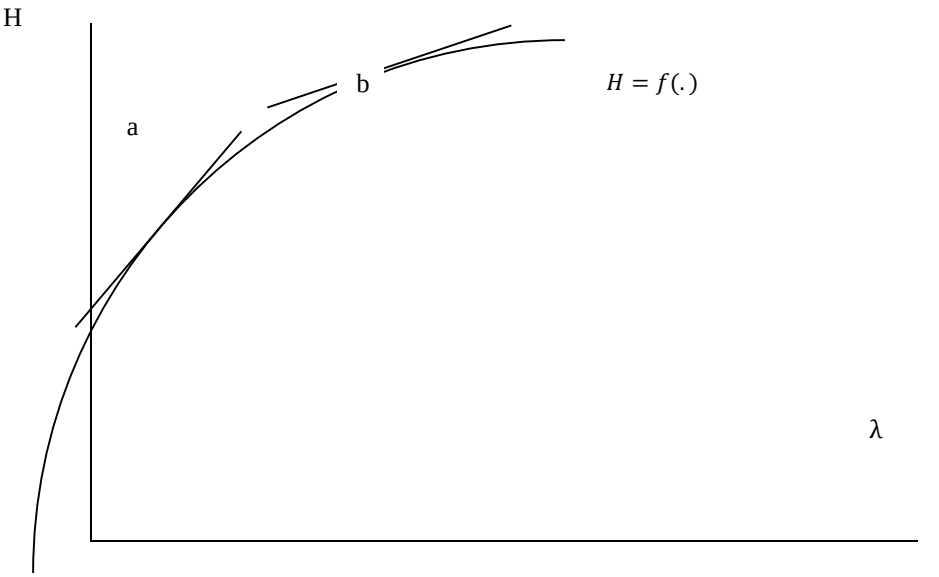
As noted earlier, $0 \leq \lambda \leq 1$ and λ capture the proximity advantage of the provinces to the population. In the case of absolute proximity, the parameter λ becomes equal to one ($\lambda = 1$).

Equation (35) shows how much changes take place in the provision of public health services, H, if the proximity factor λ changes.

The above equation is a concave continuous function and twice differentiable ($H\_\lambda > 0\ and\ H\_\lambda \leq 0$).

Figure 09 figure draws on the marginal effect of the proximity advantage, λ, of the local government in public health provision, H decreases as it approaches one ($\lambda \to 1$). The marginal effect of (λ) is higher at point (a) compared to point (b).

Fig. 9. Relationship between Public Health Provision and Provincial Government Proximity Advantage



The health service, H, is on the vertical axis and the proximity advantage of the provinces, λ, is on the horizontal axis. As λ increases (approaches one), H also increases but at a decreasing rate. As shown in Figure 09, given the marginal benefit of λ, the provision of health services is higher at point (a) compared to point (b).

Likewise,

$$\frac{\partial H}{\partial \gamma} = \frac{H}{\gamma - 1}\left(\frac{\ln 1}{\beta A \lambda^{i}} - \frac{\alpha \ln \alpha}{1-\alpha} - lnH - \frac{1}{\gamma}\right) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (36)$$

γ denotes the technological advantage or the cost-effectiveness of the federal government in the provision of health services. The same argument applies to the relationship between H and γ as applies to the relationship between H and λ. The above equation shows marginal changes in the provision of H when γ changes, i.e., H increases at a decreasing rate when γ tends to approach one ($\gamma \rightarrow 1$).

5.2. Comparison of the Provision of Public Health Services (H) Under Centralised and Decentralised Regimes

The present study compares the provision of health services in both types against the tax rate, τ^{i}, which individuals must pay in either type of regime. As discussed above, the central government has a technological advantage over provincial governments. The relative technological advantage or cost-effectiveness of the central government in public health provision lies between $0\ and\ 1$ ($O \leq \gamma \leq 1$). When γ approaches 1, the central government has more competency in the provision of public health. On the other hand, since the provincial government is nearer to the local people compared to the central government, it has an advantage in estimating the local needs, which is the proximity factor, λ. Furthermore, it is assumed that both types of governments levy the same type of tax, therefore, the tax rate is considered to be equal in both types of government.

Moreover, according to the above discussion, the provision of public health in either type of government depends on their respective advantages, that is, the proximity advantage of the provincial government, and the technological advantage of the federal government. Thus, to compare the centralisation and decentralisation for the provision of health services, the marginal benefit people extract from the H in terms of γ and λ against the marginal cost in terms of the tax rate, $\tau\hat{}i$.

Based on the information discussed above, a comparative analysis is undertaken between both types of government for the provision of health services to assess whether decentralisation or centralisation is better for the efficient provision of public health, or whether the combination of both types of governments is preferred.

5.3. Proposition

The outcomes of the centralisation and decentralisation in the provision of public health may be summarised as follows:

(1) If the provincial government's proximity parameter (λ), is superior to that of the federal government's technological advantage parameter (γ), the provincial government is preferred for the provision of public health provision.

(2) If the federal government's technological efficiency factor (γ) outweighs the proximity factor of the provincial government, the federal government is preferred.
(3) If the proximity factor (λ) offsets the technological advantage factor (γ) of the federal government for the provision of health services, both types of governments are equally preferred.

5.4. Discussion of the Model

The optimal provision of public health through either type of government is analysed by comparing the ratios of the cost-effectiveness parameter of centralisation, and the proximity parameter of decentralisation with the marginal cost, individuals must bear in terms of proportional tax (τ^i). Since, marginal cost, in terms of tax, is fixed, $\left(\frac{\xi}{n_i}\right)$ remains the same for the entire analysis.

As mentioned in Table 8 (first column), the marginal benefit gained from health services (H) given the proximity parameter, λ, of decentralisation is higher than the marginal benefit of cost-effectiveness parameter, γ, of centralisation $\left(\frac{\partial H}{\partial \lambda} > \frac{\partial H}{\partial \gamma}\right)$. In other words, the proximity parameter of the provincial government outweighs the cost-effectiveness, or parameter of the federal government, in the provision of health services, given the equal burden of marginal cost, the provincial government would better target the local needs $\left(\frac{\frac{\partial H}{\partial \lambda}}{\frac{\partial H}{\partial \gamma}} > \frac{\xi}{n_i}\right)$. Therefore, people prefer that the provincial government provides health services. The second column of Table 8 shows the opposite results, i.e., the cost-effectiveness parameter of the federal government is higher than the provincial government's proximity advantage parameter in the process of health services provision $\left(\frac{\partial H}{\partial \lambda} < \frac{\partial H}{\partial \gamma}\right)$. The marginal benefit from the federal government's cost-effectiveness factor dominates the provincial government's proximity parameter in the provision of health

Table 8

A Comparison of Public Health Provision in Provincial and Federal Governments Based On Equations 35 And 36 in the Model

1	Preference of the provincial government for the provision of public health	$\left(\frac{\frac{\partial H}{\partial \lambda}}{\frac{\partial H}{\partial \gamma}}\right) > \left(\frac{\xi}{n_i}\right)$	H^D is preferred to H^C $H^C < H^D$
2	Preference of the federal government for the provision of public health	$\left(\frac{\frac{\partial h}{\partial \lambda}}{\frac{\partial H}{\partial \gamma}}\right) < \left(\frac{\xi}{n_i}\right)$	H^C is preferred to H^D $H^C > H^D$
3	Indifference between the two governments for the provision of public health.	$\left(\frac{\frac{\partial h}{\partial \lambda}}{\frac{\partial h}{\partial \gamma}}\right) = \left(\frac{\xi}{n_i}\right)$	h^C as preferred h^D $h^C = h^D$

services corresponding to the tax rate $\left(\frac{\frac{\partial H}{\partial \lambda}}{\frac{\partial H}{\partial \gamma}} < \frac{\xi}{n_i}\right)$. In such a case, the individuals would prefer the federal government for the provision of health services, suggesting that, if the above argument holds, the federal government is more efficient and competent to provide health services.

Finally, if in case the provincial government's proximity parameter (λ) is as good as the federal government's cost-effectiveness parameter (γ), individuals remain indifferent $\left(\frac{\frac{\partial H}{\partial \lambda}}{\frac{\partial H}{\partial \gamma}} = \frac{\xi}{n_i}\right)$. The marginal benefits from the provincial government proximity parameter equal the federal government's cost-effectiveness parameter $\left(\frac{\partial H}{\partial \lambda} = \frac{\partial H}{\partial \gamma}\right)$. In such a situation, individuals may not be concerned with which type of government provides them health services.

6. DATA, VARIABLES, AND METHODOLOGY

The paper aims to assess the impact of decentralization on health outcomes through a pre-post comparison in Pakistan. This is facilitated by the strong intergovernmental fiscal relations between federal and provincial expenditures, particularly in the health sector. The study employs three vital indicators: life expectancy at birth (LE), infant mortality rate (IMR), and immunization coverage (FIC). LE estimates expected lifespan based on demographic, socioeconomic, and environmental factors. IMR is the number of infant deaths per 1,000 live births, while FIC represents children fully immunized within their first year. These indicators are widely acknowledged in development studies for gauging health system performance.

They were selected for their continuous subnational data availability and responsiveness to policy changes. Unlike disease-specific metrics, which can be affected by biological and demand shocks, LE, IMR, and FIC demonstrate more stable, incremental responses to policy levers. The empirical model, derived from established frameworks (Robalino et al., 2001; Barankay and Lockwood, 2007; Faguet and Sánchez, 2014; Faguet et al., 2020), is expressed as:

$$HS_t = \beta_0 + \beta_1 PCI_t + \beta_2 HEPC_t + \beta_3\, DPT_t + \beta_4\, DPC_t + \beta_5\, RHCS_t + \beta_6 PS_t + \beta_7\, BHUs_t + \beta_8\, FD_t + LD_t + \epsilon_t \quad \ldots \quad \ldots \quad (6.1)$$

Where HS represents health outcomes (IMR, LE, FIC). PCI represents per capita income, HEPC symbolizes health expenditures by provincial health department, DPT symbolizes divisible pool transfer from center to province, RHCS symbolizes regional health centers per district, BHUs symbolizes basic health units in rural areas, DPC symbolizes population per dispensary, PS symbolizes paramedic staff, and FD symbolizes decentralization dummy (1 after 2009, 0 otherwise).

The model is log-transformed for elasticity interpretation. Anticipated findings are positive (or occasionally negative) relationships between health outcomes and decentralization variables, with significant coefficients. The Augmented Dickey-Fuller (ADF) unit root test confirms stationary time series, justifying the use of the Autoregressive Distributed Lag (ARDL) regression model.

7. DESCRIPTIVE STATISTICS

A time series dataset from 1975 to 2020 was constructed for both health and finance indicators in Balochistan. In three separate equations, life expectancy at birth, infant mortality rate, and fully immunised children were regressed on key explanatory variables to assess their impact on healthcare outcomes.

Table 9

Descriptive Statistics

Variables	Minimum	Maximum	Average	Standard Deviation
Pop per Bed	1,269.0	2,954.0	1,635.4	438.7
Per Capita Income (Rs.)	2,264.0	4,319.0	3,370.5	596.2
Population (Million)	3.6	13.7	7.1	2.6
Population per Dispensary	24.7	39.2	30.2	4.1
Doctor Absenteeism (%)	8.0	51.0	24.7	12.6
Divisible Pool Transfer	0.1	302.0	47.4	80.5
Number of BHUs	70.0	909.0	391.5	219.0
Number of RHCs	9.0	113.0	55.9	32.0
Per Capita Health Expenditures (Rs.)	10.3	2,322.0	420.7	640.2
Infant Mortality Rate	71.0	119.0	92.5	14.2
Life Expectancy	56.0	67.2	62.2	3.2
Fully Immunised Children	1.0	62.0	36.7	19.6
Provincial Budget (Rs. Billion)	0.3	465.5	79.4	121.9
Decentralisation (Revenue)	0.01	0.02	0.02	0.00
Decentralisation (Expenditure)	0.01	0.15	0.06	0.03
Decentralisation (Local)	0.04	0.58	0.23	0.12

The descriptive statistics of all variables based on various data sources are reported in Table 9. The value of overall expenditure decentralisation in Balochistan ranged between 0.01 and 0.15, which illustrates a significant improvement. In revenue decentralisation, Balochistan lags far behind its maximum share in total national revenue was just 0.02 percent. Another important variable is local decentralisation (devolution), which is expenditure decentralisation to the third tier (local governments) from the second tier (provincial government). It is interesting to note that there was a large dispersion in the devolution variable (Table 9). Three dependent variables also showed much dispersion. The highest variation was observed in immunised children since the maximum value is 62 and the minimum is just 1. Another important variable to report is divisible pool transfer, which was as low as Rs. 1 billion and as high as Rs. 302 billion, which shows better fiscal space made available for the province over time, particularly post-7th NFC Award.

8. RESULTS AND DISCUSSION

The ARDL regression model is used to regress all three health outcome variables on decentralisation and a range of other control variables using data from 1975 to 2020.

As discussed earlier, the 7th NFC Award and the 18th Amendment 2010 were the turning points towards decentralisation in which Balochistan gained not only a bigger fiscal space but also more autonomy in several subjects, including health. A dummy variable of fiscal decentralisation was used in the model besides the divisible pool transfer variable, which captures the nature and size of fiscal decentralisation.

Table 10

ADF Unit Root Test

	Level		First Difference	
Variable	t-Statistic	P-Value	t-Statistic	P-Value
LE	–1.818	0.367	–6.927	0.000
IMR	–1.108	0.704	–1.957	0.049
FIC	–3.200	0.027	–6.063	0.000
PCI	–0.993	0.748	–5.637	0.000
PCHE	0.005	0.954	–5.386	0.000
DPT	–0.479	0.886	–6.743	0.000
RHCS	–2.812	0.065	–7.994	0.000
DOC	–2.075	0.255	–5.465	0.000
ABDOC	–1.197	0.667	–8.231	0.000
DPC	–1.357	0.594	–6.122	0.000

Note: All variables are transformed into natural log.

8.1. Infant Mortality Rate and Decentralisation

The ARDL regression-based results (Table 10) indicate the significant impact of per capita income, regional health centers, and paramedic staff on reducing infant mortality rate (IMR) in Balochistan. However, fiscal decentralisation, divisible pool transfer, and doctor absenteeism did not favorably influence IMR.

Long-term coefficients suggest that a 1 percent increase in per capita income (PCI), regional health centers (RHCs), and paramedic staff (PS) led to a 0.848 percent, 0.764 percent, and 0.387 percent decrease in IMR, respectively. Conversely, decentralization led to an average annual increase of 0.106 percent in IMR. Notably, health expenditure per capita showed theoretical consistency but lacked statistical significance in reducing IMR. Additionally, in the short term, a 1 percent increase in lagged per capita income (PCI) raised the current IMR by 0.16 percent. Similarly, a 0.06 percent rise in divisible pool transfer led to a short-term increase in IMR. Conversely, regional health centers (RHCS), basic health units (BHUs), and paramedic staff (PS) played pivotal roles in reducing IMR. A 1 percent increase in RHCS and PS resulted in respective short-term reductions of 0.18 percent and 0.26 percent in IMR. These effects may vary with time lags. Doctor absenteeism in Balochistan led to a 0.027 percent increase in IMR. The fiscal decentralization dummy indicated that its short-term impact mirrored that of the long term, causing a 0.04 percent rise in IMR. Finally, the ECM (-1) coefficient was negative and significant, signifying that any short-term disequilibrium in IMR moved towards equilibrium at an approximate rate of 0.379 in the immediate year.

8.2. Life Expectancy Rate and Decentralisation

Life expectancy (LE) is examined alongside per capita health expenditure (PCHE) and regional health centers (RHCS). PCHE and RHCS are positively associated with life expectancy in Balochistan, while basic health units (BHUs) and paramedic staff have negative impacts. Per capita income and fiscal decentralization show negative but statistically insignificant effects in the long run. In the short run, increases in DPT and RHCS are associated with higher LE, while a 1 percent increase in paramedic staff leads to a 0.3 percent decrease in LE. The coefficient of ECM (-1) indicates a strong cointegrating relationship between LE and regressors. In a nutshell, it is suggesting that fiscal decentralization does not significantly contribute to improving life expectancy in Balochistan.

8.3. Child Immunisation Rate and Decentralisation

Fully Immunised Children (FIC) is a crucial healthcare indicator. Control variables including per capita income, BHUs, and paramedic staff show positive but statistically insignificant relationships. Divisible pool transfer (DPT) and per capita health expenditure (PCHE) are not significant in the long run. However, the FIC is positively related to RHCS, BHUs, and DPC, with highly elastic relationships. The decentralization dummy (FD) is negative but insignificant, indicating no favorable long-term impact on FIC.

In the short run, DPT has a positive and significant impact on FIC. The DPC has a negative and significant impact, indicating inefficiency in dispensaries. The ECM (-1) coefficient demonstrates a strong cointegrating relationship, with disequilibrium being corrected at a rate of 63.8 percent in the following year.

8.4. Local Government Decentralisation (Devolution) and Healthcare Outcomes

In 2001, Pakistan underwent a significant political transformation with the implementation of the Devolution of Power Plan. This shifted public services, including healthcare, to local governments, under elected representatives' control. The impact of local government decentralization (devolution) on healthcare outcomes is considered. Results show a positive and significant impact on all three health outcomes, driven primarily by devolution from the second tier to the third tier, distinct from provincial decentralization. The latter was given the wherewithal through a formula-based Provincial Finance Commission (Ahmed, 2016).

9. CONCLUSION AND POLICY RECOMMENDATIONS

A simple theoretical framework was built to compare the role of centralisation and decentralisation in health services provision. The model suggests that decentralisation, given its proximity parameter and accountability factor, may be more suitable for providing health services. Centralisation, on the other hand, is perhaps more efficient in providing health services due to better governance and institutional structure. According to the model's results, due to weak institutional structure and poor governance, the provincial setup can hardly improve the health services provision with better access and quality despite the decentralisation of administrative authorities and financial resources.

The model suggests that the provision of healthcare services under a provincial set-up will be effective only if the accountability mechanism and governance are strong. Otherwise, centralisation is more impactful than decentralisation given its efficiency and technological advancement in the provision of health services.

Second, using data from 1975 to 2020 to examine the effect of decentralisation, it was hypothesised that the health outcomes would improve if the total resource availability to the province increased, which is broadly in line with the literature on decentralisation and healthcare and other social services. In contrast to the existing literature, our empirical findings suggest that decentralisation does not significantly contribute to health outcomes when it comes to infant mortality rates in Balochistan. However, a negative but insignificant relationship was observed between decentralisation and life expectancy rate and immunisation rate in Balochistan. The main reason for this ineffectiveness appears to be weak institutions and governance structure. Moreover, various local factors were found to be responsible. These could be both supply-side and demand-side factors. The supply-side factors could be greater inefficiency in public management or ill-informed decisions, while demand-side factors could be a lack of awareness and lower public demand for health services.

Third, the empirical results show that in terms of better health services provision decentralisation seems ineffective on all accounts. The relationship between decentralisation variables and healthcare outcomes shows undesirable signs and statistical insignificance. Evidence for this comes from provincial-level time series regressions.

The present study adds to a broader understanding of decentralisation in Pakistan. First, the study adds to the understanding of the effects of decentralisation by undertaking a case study of the provision of health services in a large and important province of Pakistan that had problems in the past with the lack of autonomy and centralisation. Second, the theoretical framework shows that even if the fiscal space is enhanced and allocations to the health sector are increased, a decentralised setup may not be effective in improving public health services provision till the provinces have the requisite institutional and administrative capacity. Third, empirical results provide a solid ground to undertake more qualitative analyses of decentralisation in Pakistan.

Based on the theoretical and empirical results of the study, the following policy options may be considered:

- To make decentralisation effective for health services delivery, the governance structure at the provincial level needs to be improved, focusing more on the punctuality of the staff working in the health department and utilising the allocated funds efficiently to ensure the availability of equipment and medicine even at the BHUs level. Staff, including nurses, doctors, and paramedics, should be provided regular training.
- To optimise decentralisation for the health services provision, better decision space is required at the sub-national (district level), and the decision space may be accompanied by an expanded capacity and strong accountability.
- For all tiers of government to implement decentralisation, there should be a concerted effort to encourage greater knowledge of the de jure decision space and push all health officials to take responsibility for making decisions aiming at the better performance of health services.

- The development of an accountability mechanism at the local level as a policy objective should be given priority. Moreover, local decision-making with balanced configurations of the decision space must be encouraged along with the strengthening of institutional capacity and robust accountability mechanisms.

REFERENCES

Ahmed, M. (2015). The Political Economy of Decentralization and Access to Pro-Poor Social Services Delivery in Pakistan. *The Pakistan Development Review*, *54*(4).

Ahmed, M. (2016). Does decentralisation enhance responsiveness to people's needs? Empirical evidence from Pakistan. *Pakistan Journal of Applied Economics, 26,*special issue..

Ahmed, M. & Baloch A. (2019). The consequences of fiscal decentralization through the 7th NFC award on healthcare and basic education in Balochistan, Pakistan. *International Journal of Applied Business and Management Studies,* 4(2), 1–13.

Ahmed, Iftikhar, U. Mustafa & M. Khalid (2007). National Finance Commission Awards in Pakistan, A Historical Perspective. (PIDE Working Paper Series No. 33). PIDE, Islamabad.

Ahmed, Q. M., & Sabir, M. (2003). The burden of stabilization on provinces and its implications for the social sectors. *The Pakistan Development Review*, 783–791.

Ahmed, Raza (2010). The Endemic Crisis of Federalism in Pakistan. *The Lahore Journal of Economics, 15:* 15–31.

Anderson, C. (2006). Centralisation or decentralisation—what is the best way forward for sports organisations? *Olympic Capital Quarterly*, *1*(2).

Asfaw Forsberg K., James K. S. & Jutting, J. (2007). Fiscal DecentraliSation and Infant Mortality: Empirical Evidence from Rural India. *Journal of Development Areas,* 41(17). 35.

Bahl, Roy., & Musharraf Cyan (2009). Local government Taxation in Pakistan. (International Studies Program Working Paper 09-09), August 2009.

Barankay, I., & Lockwood, B. (2007). Decentralisation and the productive efficiency of government: Evidence from Swiss cantons. *Journal of Public Economics*, *91*(5-6), 1197–1218.

Bardhan, Pranab K., & Dilip Mookherjee (2005). Pro-poor targeting and accountability of local governments in West Bengal. *Journal of Development Economics*, 79, 303–327.

Bardhan, Pranab K., & Dilip Mookherjee (2006). Decentralising antipoverty programme delivery in developing countries, *Journal of Public Economics*, 98(4): 675-704.

Bednar, J. (2011). The political science of federalism. *Annual Review of Law and Social Science*, *2*(7): 269-288.

Behrman, J. R., Deolalikar, A. B., & Soon, L. (2002). Conceptual Issues in the Role of Education Decentralization in Promoting Effective Schooling in Asian Developing Countries. (ERD Working Paper Series, No. 22).

Besley, Timothy & Stephen Coate (2003). Centralised versus decentralised provision of local public goods: A political economy approach. *Journal of Public Economics*, *87*, (12), 261– 37.

Bhatti, M. N. (2015). Health Care in Pakistan. *The Nation*. Retrieved April 15, 2016.

Birch, A. H. (1961). Intergovernmental financial relations in new federations. In *Federalism and economic growth in underdeveloped countries, a symposium*, London (p. 113).

Bird, R., & Rodriguez, E. R. (1999). Decentralization and poverty alleviation. International experience and the case of the Philippines. Public Administration and Development: *The International Journal of Management Research and Practice*, 19(3), 299–319.

Bossert T., Mitchell A (2010). Health sector decentralization and local decision-making: Decision space, institutional capacities, and accountability in Pakistan *Social Science and Medicine, 72*(2011), 39–48.

Buse, K, & Hawkes, S (2015). Health in the sustainable development goals: Ready for a paradigm shift? *Globalisation and Health* 2015(11): 13.

Cantarero, D., and Pascual, M. (2008). Analysing the impact of fiscal decentralization on health outcomes: empirical evidence from Spain, *Applied Economics Letters*, 15, 109–111.

Channa, A., & Faguet, J. P. (2016). Decentralization of health and education in developing countries: a quality-adjusted review of the empirical literature. *The World Bank Research Observer*, *31*(2), 199-241.

Constitution of the Islamic Republic of Pakistan (1973). Constitution of Pakistan, Government of Pakistan, Islamabad.

Costa-Font J, Greer, S (2013). *Federalism and decentralisation in European health and social care*. Palgrave MacMillan, London.

De Grauwe, A. (2005). Improving the quality of education through school-based management: learning from international experiences. *International review of education*, 51(4), 269–287.

Di Gropello, E., & Marshall, J. H. (2011). Decentralisation and educational performance: Evidence from the PROHECO community school program in rural Honduras. *Education Economics*, 19(2), 161–180.

Dwicaksono, A., & Fox, A. M. (2018). Does decentralization improve health system performance and qutcomes in low-and middle-income countries? A systematic review of evidence from quantitative studies. *The Milbank Quarterly*, *96*(2), 323–368.

Emamgholipour, S., & Zamandi, M. (2018). Analysis of health system decentralisation outcomes on governance and justice in health: Updating rsegular review studies. *Health Research Journal*, *3*(4), 211–224.

Enikolopov, Ruben & Zhuravskaya, Ekaterina (2007). Decentralisation and political institutions. *Journal of Public Economics, 91*, 2261–2290.

Ezcurra, R. and A. Rodríguez-Pose. (2013). Political Decentralisation, Economic Growth and Regional Disparities in the OECD. *Regional Studies*, 47 (3): 388–401.

Faguet, J. P., & Sánchez, F. (2014). Decentralization and access to social services in Colombia. *Public Choice*, *160*(1), 227-249.

Faguet, J.P. and C. Pöschl (eds.). (2015). *Is decentralisation good for development? perspectives from academics and olicy makers.* Oxford: Oxford University Press.

Faguet, J. P. K., Qaiser; & K. D. Priyanka (2020). Decentralisation's effect on education and health: Evidence from Ethiopia, School of Economics and Political Science

(LSE), Department of International Development, London. (Working Paper Series, No. 20-201), London

Filippetti, A., & Cerulli, G. (2018). Are local public services better delivered in more autonomous regions? Evidence from European regions using a dose-response approach. *Papers in Regional Science*, 97(3), 801-826.

Ghaus, Aisha, & Hafiz A. Pasha (1994). Dynamic budgetary consequences of the 1991 NFC award. *The Pakistan Development Review*, *3*(3), 123–156.

Government of Balochistan (2016). Ministry of Planning and Development Department, Quetta, Balochistan.

Haque, A. U., & Oino, I. (2019). Managerial challenges for software houses related to work, worker, and workplace: Stress reduction and sustenance of human hapital. *Polish Journal of Management Studies*, vol. 19(1), 170-189.

Haque, A. (2012). Theoretical herspective of local government—Literature review. Research Institute of Behavioural Psychology. (MPRA Paper No. 46301). Retrieved from: https://mpra.ub.uni-muenchen.de/80754/1/MPRA_paper_80754.pdf

Hausman, Jerry A. (1978). Specification tests in econometrics. *Econometrica*, *46*(6),1251–71.

Homedes, N., & Ugalde, A. (2005). Why neoliberal health reforms have failed in Latin America. *Health policy*, 71(1), 83–96.

Hooghe, L. and G. Marks. (2016). *Community, scale, and regional governance: A postfunctionalist theory of governance*, Volume II. Oxford: Oxford University Press.

Institute of Development Studies (2013). Nutrition political economy, Pakistan, Balochistan Province Report, the Agha Khan University, Karachi, Pakistan.

Jaffery, Nighat Bilgrami, and Mahpara Sadaqat (2006). NFC Awards Commentary and Agenda' Pakistan *Economic and Social Review*, vol. 44(2), 209– 234.

Jamal, Haroon. (2013). Pakistan Poverty Statistics, Estimates for 2011. SPDC Research Report No. 84.). Social Policy and Development Centre, Karachi.

Jiménez-Rubio, Dolores (2010). Is fiscal decentralization good for your health? Evidence from a panel of OECD countries. (HEDG Working Paper 10/30). The University of York.

Joan Costa-Font and Laurie Perdikis (2021) *Journal: Regional science policy & practice*, 2021, 13(3), 49.

Joseph, R. & A. Ayee (1997). The adjustment of central bodies to decentralization: The case of the Ghanaian bureaucracy. *African Studies Review*, *40*(2), 37–57. https://doi.org/10.2307/525156.

Khaleghian, P. (2004). Decentralisation and public services: The case of immunisation. *Social Science and Medicine*, *59*(1), 163–183.

Khan, Muhammad Ayaz & Mirza Munawar S. (2011). Implementation of decentralisation in education in Pakistan: Framework, status, and the way forward, *Journal of Research and Reflections in Education*, 5(2): 146 -169

Khemani, Stuti (2001). Decentralisation and accountability: Are voters more vigilant in local than in National elections? (The World Bank Policy Research Working Paper 2557).

Law, J (2006). How Can We Define Federalism? *The politicization of the European elections and its potential effects on the EU*, 88.

Lockwood, Ben. (2006). The Political economy of decentralisation. In *Handbook of Fiscal Federalism*, edited by Ehtisham Ahmad and Giorgio Brosio, 33–60. Cheltenham, U.K. Edward Elgar.

Magnussen, J., Hagen, T. P., & Kaarboe, O. M. (2007). Centralised or decentralised? A case study of Norwegian hospital reform. *Social science & medicine*, *64*(10), 2129–2137.

Marijani, R. (2017). Community Participation in the Decentralized Health and Water Services Delivery in Tanzania. *Journal of Water Resource and Protection*, *9*(06), 637.

Mills, A., Vaughan, J. P., Smith, D. L., Tabibzadeh, I., & World Healths. (1994). Health system decentralization: concepts, issues, and country experience. World Health Organization.

Mustafa, Usman (2011). Fiscal Federalism in Pakistan: the 7th National Finance Commission Award and Its Implication. *PIDE Working Papers 2011: 73, Pakistan Institute of Development Economics, Islamabad, Pakistan.*

Muzaffer, U., Iftikhar, S., & Illyas, A. (2011). Interactive health interface for Rural community of Pakistan.

Nabi and Shaikh (2010). Fiscal Federalism in Pakistan: a Radical Departure and Some New Challenges. (DPRC Working Paper). School of Humanities Social Science and Law, Lahore University of Management Sciences, Lahore, Pakistan.

Oates, Wallace E. (1972). *Fiscal Federalism.* New York: Harcourt Brace Jovanovich.

Omrani. Z. (2011). Health Issue in Balochistan. *The Daily Dawn*. Retrieved April 15, 2016, accessed at http://www.dawn.com/newspaper/national/2011-05-01.

Pakistan, Economy Survey of (Various Issues) Finance Division, Economic Advisor's Wing, Government of Pakistan, Islamabad.

Psacharopoulos, George (1994). Returns to investment in education: A global update. *World Development*, 22, 325–43.

Qian, Yingyi, and Barry R. Weingast. (1997). Federalism as a commitment to reserving Market incentives. *Journal of Economic Perspectives*, *11*(4), 83–9.

Ranis, G., F. Stewart, and A. Ramirez (2000). Economic growth and human development. *World Development, 28*(2), 197–219.

Rico, A. & Léon, S. (2005). Health care devolution in Europe: Trends and prospects. HORN skriftserie http://urn. nb. no/URN: NBN: no-26353.

Rizvi, H. A. (2006). Dynamics of federalism in Pakistan: *Current challenges and future directions.*

Robalino, D. A., Picazo, O. F., & Voetberg, A. (2001). Does fiscal decentralization improve health outcomes? Evidence from a cross-country analysis. (World Bank Policy Research Working 2565).

Rodden, J. (2004). Comparative federalism and decentralization: on meaning and measurement. *Comparative Politics*, 3(12), 481-500.

Rodden, Jonathan (2006). *Hamilton's Paradox: The Promise and Peril of Fiscal, Federalism*. Cambridge: Cambridge University Press.

Rondinelli, D.A., Cheema, G. S., and Nellis, J (1983). Decentralisation in Developing Countries: A Review of Recent Experience. World Bank, Washington, DC. (Staff Working Paper No.581).

Sabir, M. (2010). Financial implications of the 7th NFC award and the impact on social services. *The Pakistan Development Review*, 387–403.

Saltman, R. B., Bankauskaite, V., & Vrangbaek, K. (2007). Conceptualizing decentralization in health care systems: A functional perspective. *Health Econ Policy Law* 2006; 1:127 47.

Schultz, T. Paul (2004). School subsidies for the poor: evaluating the Mexican Progresa poverty program ', Journal of Development Economics, vol. 74: pp. 199– 250.

Shaikh, Babar T. & Hatcher Juanita (2004). Health seeking behaviour and health service utilisation in Pakistan: Challenging the policy-makers. *Journal of Public Health* 27:1, 49–54.

Social Policy and Development Centre (SPDC) (2010). Social of the security crisis. Social development in Pakistan. *Annual Review 2009-10.*

Soto Victoria, Eugenia, Farfan, Maria Isabel and Lorant, Vincent (2012). Fiscal decentralisation and infant mortality rate: The Colombian case. *Social Science & Medicine* 74 (2012) 1426–1434.

Tariq, M. (2013). Conflict in Balochistan: natural resources and the way forward. *Strategic Studies*, *33*(3-4), 23–51.

The World Health Report (2008). primary health care now more than ever, World health – trends. Primary health care – trends, Delivery of health care, Health Policy.

Treisman, D. (2000). Decentralization and Inflation: Commitment, Collective Action, or Continuity. *American Political Science Review*. 94 (4). pp. 837–857.

UNICEF (2013). Committing to Child Survival: A Promise Renewed. *Progress Report 2013*, New York, UNICEF.

Utomo Tri Widodo W. (2009). Balancing Decentralisation and Deconcentrating: Emerging Need for Asymmetric Decentralization in the Unitary States, (Discussion).

Von, Braun, J., & Grote, U. (2000). Does decentralisation serve the poor? [online]. Bonn; Washington: Center for Development Research (ZEF-Bonn) the University of Bonn: IMF. In Conference on fiscal decentralization.

Wasti, S. E. (2014). *Pakistan Economic Survey 2013-2014*. Ministry of Finance.

Winkler, Donald R (1989). Decentralisation in Education: An economic perspective. The World Bank, Washington D.C.

Wooldridge, Jeffrey M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, and London: MIT Press.

World Bank (1995). Development in practice: Priorities and strategies for education.

World Bank (2012). Learning for All: Investing in People's Knowledge and Skills to Promote Development. *Education Strategy 2020*. Washington, D.C.: World Bank.

World, Bank (1994). *World Development Report: Infrastructure for Development*. New York. Oxford University Press.

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Factors Affecting Food Prices in Pakistan

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The purpose of the study is to identify the factors affecting food prices in Pakistan. The findings reveal that there is a negative and significant impact of the real effective exchange rate on wheat prices in the long run. Similarly, the real interest rate affects wheat and rice prices indirectly, while it has a direct impact on tea prices. There is a positive and significant impact of international crude oil prices and international food prices on most food commodities. Moreover, the study explains that in the long run, the increase in local production significantly reduces the prices of food commodities. It is also found that the government policy of adjusting (increasing) wheat support prices also has a positive and significant impact on wheat prices.

JEL Classification: L66, E4, G18

Keywords: Food Prices, Real Effective Exchange Rate, Real Interest Rate, International Crude Oil Prices, International Food Prices, Government Policy

1. INTRODUCTION

Globalisation has increased the economic integration of the world integrated economically, and the interdependency of developed and developing nations on various commodities has also increased. It is evident that during the past two decades, commodity prices exhibited increasing and volatile behaviour globally. International food prices almost doubled in the year 2007-08, which is evident from the Food and Agriculture Organisation (FAO) Index—the food price increased up to 27 percent. Like other developing countries, Pakistan was also affected by the international food price crisis. In 2008-09, food inflation broke the record for the last 23 years as it increased by 23.13 percent compared to 17.65 percent in 2007. Between 2005 and 2008, the wheat price increased by 106 percent, whereas, the variation in the price of other staple food commodities remained in the range of 20 to 120 percent. Besides high global food prices, there were also some domestic reasons behind the inflated wheat price, for instance, regional smuggling and hoarding of wheat were important reasons. To combat the hoarding and smuggling of wheat, Pakistan Government increased the wheat procurement price. According to the Ministry of Finance 2008-09, due to this act, the

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local wheat price was increased more than the international price of wheat. These elevated wheat prices also accelerated the prices of vegetables, meat, oil and milk (Awan, et al. 2015). Khan and Qasim (1996), Sherani (2005) and Schimmelpfennig and Khan (2006) stated that wheat procurement prices increased inflation in Pakistan.

The literature has identified different factors that can cause changes in food prices. For instance, Frankel (2006), Calvo (2008), and Roache (2010) explained that agricultural commodity prices are affected by small changes in interest rates. It is identified that interest rate affect food prices both positively and negatively. As it is the cost of borrowing that a farmer pays on a loan, a high interest rate discourages agricultural investment which increases food prices. On the other hand, the interest rate is used as a policy tool to tackle the rising general price level. Ismail, et al. (2017) identified both positive and negative impacts of interest rates on some food commodities. Furthermore, according to Landerretche, et al. (2007); Abbot, et al., (2009); Nakamura & Zerom (2010), exchange rate has a leading role in the transmission of international goods prices to the national. There are two ways in which the exchange rate affects food prices. First, as the currency depreciates, it increases the prices of inputs or raw materials, for instance, seeds, pesticides, and fertilisers. It also increases the prices of final food commodities that are imported, such as pulses. Second, a depreciation in the exchange rate also increases the import price of crude oil which further raises the transportation cost of agricultural commodities exerting inflationary pressure on food prices. Therefore, a depreciation of the exchange rate causes an increase in food prices. Furthermore, a depreciation in the exchange rate or a decline in the REER (depreciation in the value of the rupee) is an indication that the country's exports have become cheaper and imports more expensive In other words, the country gains trade competitiveness but also causes inflationary pressure (Hayes,[1] et al. 2021). Moreover, Herrmann (2009); Baffes (2007); Ghani, et al. (2018) have found a significant effect of crude oil or diesel on agricultural commodities. Oil price shock influence domestic food prices in several ways through the food supply chain. For instance, it not only affects the production of the commodity by increasing the cost of production but also influences the processing and local and international distribution of the commodity. It amplifies the retail price and farm gate price, as it is used to transport the commodity from the producers to buyers. The literature suggests that an increase in agricultural input prices, namely fertiliser and crude oil, increases the expenditures of producers, which ultimately raises the prices of agricultural outputs.

Furthermore, Tadesse, et al. (2016) explained that various government policies, for instance, discretionary trade policy, export bans, aggressive imports, delays in the decision to import, etc., have a direct impact on the variability in food prices. It is considered that political condition is an endogenous variable that amplifies the spikes in food prices.

Moreover, Salman, et al. (2013); Awan & Imran (2015) highlighted that input prices, money supply, foreign aid, exchange rate and transportation cost played an adverse role in increasing food prices in Pakistan. Realising the importance of the issue, the current study is planned to investigate the impact of various exogenous and endogenous covariates on prices of fifteen major food commodities; beef, chicken, rice,

[1]See https://www.investopedia.com/terms/r/reer.asp

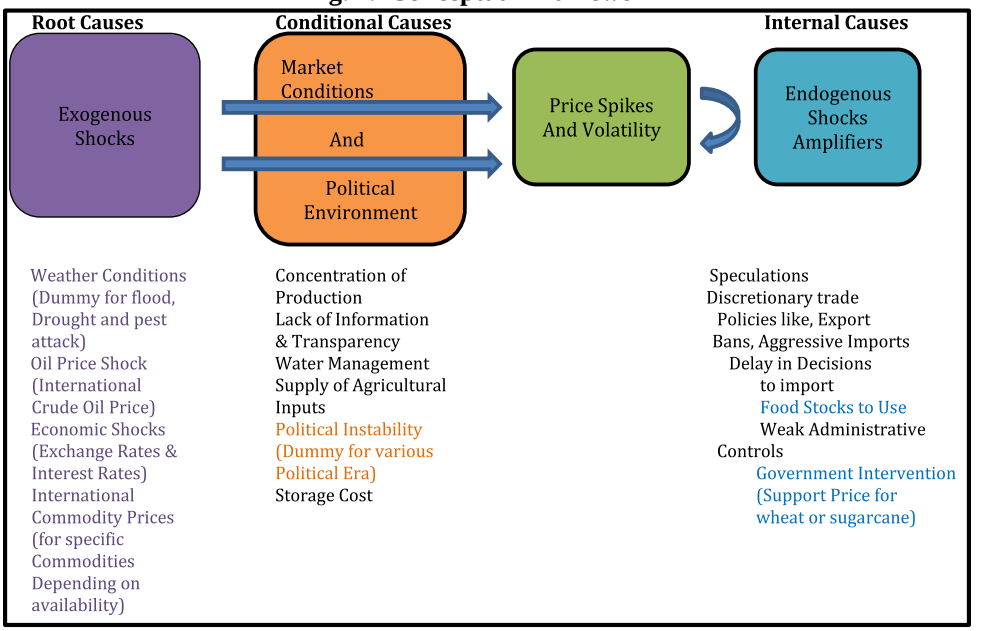
wheat, mash, mung, masur, tomato, potato, garlic, onion, sugar, tea, milk, and eggs over the years. The study clears the role of each factor (used in the study) in food price changes. The study will help the policymakers to design policies to control the variation and increase in food prices. The proposed study will lengthen the literature by investigating the main drivers of food prices for the given period.

Following the introduction in Section 1, the paper is organised as follows. Section 2 explains the conceptual framework of the study. Section 3 details data sources and methodology. Section 4 gives results and discussion. Section 5 provides the conclusions and the policy recommendations.

2. CONCEPTUAL FRAMEWORK

To determine the main drivers of food prices the study adopts the concept proposed by Tadesse, et al. (2016) with a small modification.

Fig. 1. Conceptual Framework



Source: Tadesse, et al. 2016.

According to the framework given in Figure 1, the determinants of food prices are divided into three groups, i.e., exogenous shocks, market conditions and political environment, and endogenous shocks. It is postulated that exogenous factors are the root cause of price fluctuation. These include extreme weather shocks (heavy rains and floods), economic shocks (changes in the interest rate and exchange rate), international commodity price shocks, and oil price shocks. These exogenous shocks are expected to be responsible for generating variability in food prices, while the extent of their influences or the saturation of their effect on the native economy partly depends on the market conditions and political situation of the country. Hence, the second group of factors is associated with political and market conditions that can reduce or aggravate

exogenous shocks. The majority of these factors, such as the lack of transparency in water management and commodity markets, are time-invariant and quite hard to measure. Consequently, these factors are not taken into account in the empirical analysis. Factors included in the third group are endogenous shocks. These include unrestricted trade policies, speculative activities determined by price expectations, weak administrative controls, etc. Some of the other country-specific endogenous factors, such as the role of the middleman, hoarding, etc., are also important factors. These factors amplify the effect of other factors present in the first and second groups. However, similar to the second group of factors, most of the endogenous factors are qualitative in nature and, hence, difficult to include in the modelling of the framework. Although the present study mainly emphasises exogenous shocks as they may cause other factors to emerge, some country-related political, economic, and other endogenous factors are also included in the empirical analysis.

2. DATA SOURCES AND METHODOLOGY

This section provides the data sources and describes the methodological approach that is adopted for accomplishing the objective of the study.

2.1. Data Sources

The study employs monthly data of food prices for fifteen food commodities that are a part of the CPI basket, namely, beef, chicken, pulses (mash, mung, masur), rice (IRRI), wheat, tomato, potato, onion, garlic, milk, egg, sugar, and tea for 14 large cities of Pakistan. Cities included in this analysis are Bahawalpur, Faisalabad, Hyderabad, Islamabad, Karachi, Khuzdar, Lahore, Multan, Peshawar, Quetta, Rawalpindi, Sargodha, Sialkot, and Sukkur. Cities are selected based on the definition of a big city by the Pakistan Bureau of Statistics. Monthly data is gathered from July 2002 to July 2021, from various issues of the Monthly Statistical Bulletin published by the Pakistan Bureau of Statistics. Furthermore, the monthly data of real effective exchange rate, interest rate, international crude oil prices[2], and international prices of food commodities (tomato, beef, chicken, milk, wheat, rice, sugar and tea) in Pak Rupees is collected from the IMF and State bank of Pakistan from July 2002 to April 2021. The yearly data of the total production of food commodities (except garlic and tea) and wheat support price is collected from the Ministry of Agriculture Pakistan and PBS respectively. Moreover, the dummy variable is used for a political era.

2.3. Methodology

The study employed Autoregressive distributed lag (ARDL) model to identify the factors responsible for the change in food prices**.** The empirical time series model that shows the association among the prices of food commodities and their associated factors is as follows:

$$LP_t = \beta_0 + \beta_1 LREER_t + \beta_2 LRIR_t + \beta_3 LOP_t + \beta_3 LIP_t + \beta_3 LPD_t + \beta_3 LSP_t + \varepsilon_t \qquad (1)$$

[2]Brent Crude Oil $/(Barrel)/159L.

Where, LP_t is the log of price series of a particular food commodity at time t. LREER, LRIR, LOP, LIP, LPD and LSP are logs of the real effective exchange rate, the real interest rate, input prices (crude oil prices), international prices, production and support prices respectively. The above independent variables are almost the same for each commodity. The study uses the ARDL bound test developed by Pesaran (2001). The model identifies a long-run and short-run association among the covariates and prices of each commodity. There are different cointegration approaches, for instance, Engle-Granger (1987); Johansen & Juselius (1990), and Johansen (1991). The ARDL is the most suitable model as it is applicable for the series with different integrating orders, e.g., I(0) or I(1) (Pesaran, et al. 2001) unlike other models. The ARDL model is given by the following equation:

$$\begin{aligned}\Delta LP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i}\Delta LP_{t-i} + \sum_{i=0}^{p} \alpha_{2i}\Delta LREER_{t-i} + \sum_{i=0}^{p} \alpha_{3i}\Delta LRIR_{t-i} + \\ \sum_{i=0}^{p} \alpha_{4i}\Delta LOP_{t-i} + \sum_{i=0}^{p} \alpha_{5i}\Delta LIP_{t-i} + \sum_{i=0}^{p} \alpha_{6i}\Delta LPD_{t-i} + \\ \sum_{i=0}^{p} \alpha_{7i}\Delta LSP_{t-i} + \alpha_8 LP_{t-1} + \alpha_9 LREER_{t-1} + \\ \alpha_{10} LRIR_{t-1} + \alpha_{11} LOP_{t-1} + \alpha_{12} LIP_{t-1} + \alpha_{13} LPD_{t-1} + \alpha_{14} LSP_{t-1} + \varepsilon_t \quad (2)\end{aligned}$$

Where, Δ and i are the difference operator and lag length, respectively. The long-run relationship between the covariates (variables) is identified by the F-test of the joint significance of the coefficient of lagged variables. The null hypothesis of the model is $\alpha_8=\alpha_9=\alpha_{10} = \alpha_{11}=\alpha_{12}=\alpha_{13} =\alpha_{14}= 0$, showing the absence of a long-run relationship.

In this test, the variables are cointegrated if the F-statistic (calculated) is greater than the upper critical bound (UCB), while if it is less than the lower critical bound (LCB), the series are not cointegrated. The result is inconclusive if the F-statistic (calculated) is between the UCB and the LCB. These critical bounds are given by Pesaran (1997). To estimate the short-run association, the following equation presents the error correction model separately for each commodity price.

$$\begin{aligned}\Delta LP_t = \gamma_0 + \sum_{i=0}^{p} \gamma_{1i}\Delta LREER_{t-i} + \sum_{i=0}^{p} \gamma_{2i}\Delta LRIR_{t-i} + \sum_{i=0}^{p} \gamma_{3i}\Delta LOP_{t-i} + \\ \sum_{i=0}^{p} \gamma_{4i}\Delta LIP_{t-i} + \sum_{i=0}^{p} \gamma_{5i}\Delta LPD_{t-i} + \sum_{i=0}^{p} \gamma_{6i}\Delta LSP_{t-i} + \phi ECT_{t-1} + \varepsilon_t \quad (3)\end{aligned}$$

The negative and significant value of the coefficient of $ECT_{t-1}(\phi)$ means that the dependent variable monotonically converge to long-run equilibrium as a result of a change in its determinants.

3. RESULTS AND DISCUSSION

In this section, the ARDL results are discussed. In the ARDL model, most of the policy macroeconomic variables, such as real effective exchange rate, real interest rate, and crude oil prices, are included for all food commodities to capture the intensity of exogenous shocks in determining the prices of food commodities. However, some other regressors, for instance, international prices of the same commodities and local production of commodities are included in the model depending on the availability of time series data. Another important group of factors identified by the literature are the political and market conditions. However, such factors, for example, transparency and political stability are difficult to quantify.

Therefore, to gauge the impact of political instability, three dummies for different political eras are included in the model. Support prices are announced only for wheat by the Government of Pakistan each year. Therefore, only the wheat support price is included in the model. This variable signifies the role of the government in determining the prices of wheat. Table A-1 in the Appendix shows the group unit root test results. A group unit root test is performed for the first difference to ensure that all the series are integrated at I(1) or I(0). It has been argued that higher-order integrated variables can exhibit spurious regression results in Autoregressive Distributed Lag Models (ARDLs). Therefore, for examining the cointegration of variables using ARDL bound testing, the stationarity of the series was checked, as a precondition, suggested by Dickey and Fuller (1979). The group unit root test for the first difference confirmed that the order of integration for each variable of each model was either I(0) or I(1). Therefore, ARDL bound testing was performed to determine the long-run as well as short-run impacts of various factors on the prices of food commodities. The order of lags for each model was selected based on the AIC. According to Pesaran & Shin (1999), precise adjustment of orders of the ARDL model is necessary to remove serial correlation in the residual and resolve the endogenous variable issue. Hence, the lags' maximum values are decided for each of the fifteen models based on the AIC criterion. The results are given in Figure A-1 (Appendix). Table 1, shows the F-statistics for the ARDL long run form and bounds test along with the corresponding lower bounds, i.e., I(0) and upper bounds, i.e., I(1) at a 5 percent level of significance. Results confirm the presence of a long-run cointegrating association between the variables for most of the models. With log prices of various food commodities, for instance, onion, tomato, potato, beef, chicken egg, milk, wheat, pulse mash, sugar, and tea, as dependent variables, the null hypothesis of no level relationship was rejected as the F-statistics exceeded upper bound critical values.

Table 1 provides evidence of a long-run relationship between log prices of onion, tomato, potato, beef, chicken egg, milk, wheat, pulse mash, sugar, and tea and their determinants. Table 2 describes the partial long-term impact of various factors on the log prices of these food commodities. Table 2 shows that the log of the real effective exchange rate (REER) significantly influenced the log prices of wheat. A 1 percent point decrease in the REER increased the wheat prices by 0.64 percent. The model with log wheat price confirms the negative association of prices with the REER, which is supported by literature as well. For instance, it is well documented that the exchange rate transmits international goods prices to local markets (Zerom & Nakamura, 2010; Abbot, et al. 2009; Landerretche, et al. 2007). Ismail, et al. (2017) also found the same results for Pakistan. The results show that there is a negative relationship between the prices of wheat and rice and interest and a positive relationship between the price of tea and interest rate. These results mean that a 1 percent decline in interest rate caused the prices of wheat and rice to increase by 0.11 and 0.57 percent, respectively. On the other hand, a 1 percent increase in interest rate increased the price of tea by about 0.72 percent respectively. Ismail, et al. (2017) also found mixed results regarding the impact of the interest rate on the prices of various food commodities.

Table 1

ARDL Bound Test Results

Dependent Variables	F-Statistics	Lower bound at 5%	Upper Bound at 5%	k	Remarks
Vegetable Group					
log (Onion price)	8.29	2.56	3.49	4	Present
log (tomato price)	8.10	2.39	3.38	5	Present
log (garlic price)	0.90	2.79	3.67	3	Absent
log (potato price)	8.29	2.56	3.49	4	Present
Meat Group					
log (beef price)	4.54	2.39	3.38	5	Present
log (chicken price)	5.93	2.39	3.38	5	Present
Dairy Group					
log (egg price)	9.99	2.56	3.49	4	Present
log (milk price)	9.79	2.39	3.38	5	Present
Cereal & Pulses Group					
log (wheat price)	9.66	2.27	3.28	6	Present
log (rice price)	2.13	2.39	3.38	5	Absent
log (Pulse moong price)	3.03	2.56	3.49	4	Absent
log (pulse mash price)	3.4	2.56	3.49	4	Present
log (pulse masoor price)	2.32	2.56	3.49	4	Absent
Other Group					
log (sugar price)	3.38	2.39	3.38	5	Present
log (tea price)	14.94	2.56	3.49	4	Present

Source: Authors' calculations.

Table 2

Long-run Coefficients

Dependent (prices) \ Independent Variables	Exchange Rate	Interest Rate	International Oil Price	International Price	International Production	Support Price	c
Vegetable Group							
log (Onion price)	0.24	0.02	0.27**		0.67	–	–3.50
log (tomato price)	0.57	–0.53	0.40**	–0.56	–1.02**	–	–1.88
log (garlic price)	1.01	3.43	-0.99	–	–	-	-2.83
log (potato price)	0.48	–0.05	0.53***	–	–0.27	–-	1.84
Meat Group							
log (beef price)	0.40	–0.19	0.05	0.58***	0.25	–	-1.07
log (chicken price)	-0.16	–0.03	0.15***	0.45***	0.18	–	1.37
Dairy Group							
log (egg price)	–0.54	–0.18	0.25***	–	–1.53***	–	–8.55***
log (milk price)	–1.18	0.48	0.90	0.12	1.26	–	–8.19
Cereal & Pulses Group							
log (wheat price)	–0.64***	–0.11***	0.05*	0.10***	–0.17	0.74***	5.52***
log (rice price)	0.12	–0.57***	0.48***	0.92***	–0.61	–	3.93
log (Pulse moong price)	–8.09	1.32	0.16	–	–2.02	–	49.95
log (pulse mash price)	–0.25	0.40	–0.14	–	–1.55***	–	20.17*
log (pulse masoor price)	–4.76	–0.27	0.06	–	–1.60***	–	30.05
Other Group							
log (sugar price)	0.07	–0.25	0.21***	0.56***	–1.20***	–	14.65
log (tea price)	0.08	0.72***	0.04	0.22**	–	–	–0.01

Source: Authors' calculations. ***, **, and * show 1 percent, 5 percent, and 10 percent level of significance, respectively.

The other most important exogenous factor is the crude oil price. Table 2 shows a significant and positive impact of oil prices on almost all commodities. The largest impact of oil prices was found on vegetable prices. Results reveal that a 1 percent increase in crude oil price led to 0.53 percent, 0.40 percent, and 0.27 percent increase in the prices of potatoes, tomatoes, and onions, respectively. Similarly, chicken and egg prices were also affected by increases in oil prices. A 1 percent increase in oil price raised the prices of chicken and eggs by 0.15 percent and 0.25 percent, respectively. Wheat prices were also affected by oil prices but the impact was minimal. The sugar price model, however, exhibited a significant and positive impact of a rise in oil prices on sugar prices. These findings are consistent with the earlier findings. For instance, Herrmann (2009), Ismail et al. (2017), and several other researchers showed that, among other variables, the crude oil price was the foremost factor in the case of Pakistan that caused fluctuation in the commodity prices. Table 2 confirms the proposition that international prices of commodities affect the local prices even in the absence of trading activities (Ahsan et al., 2011 and ADB, 2008). The present study also found a positive impact of international food prices on the prices of staple food commodities, such as beef, chicken, wheat, rice, sugar, and tea. A 1 percent increase in international food prices increased the local prices of beef, chicken, wheat, rice, sugar, and tea by 0.58, 0.45, 0.1, 0.92, 0.56, and 0.22 percent, respectively. Another factor that plays a major role in reducing domestic prices is total local production (TLP), which has an inverse relationship with local prices (Tadesse, et al. 2016). TLP is included in the model only for those commodities that are produced locally. Table 2 shows the impact of TLP on the production of various commodities on their prices. According to the results, a 1 percent increase in the local production of mash, masoor, sugarcane, tomato, and egg led to a decrease in decline their prices by 1.55, 1.6, 1.2, 1.0, and 1.5 percent, respectively. The literature also supports these findings. For example, Ahsan, et al. (2011) found that a decline in the production of wheat and rice increases food prices in Pakistan. The wheat support price is the foremost policy tool to regulate the price of wheat. There are a few studies that look at the relationship between the wheat support price and inflation. For example, Khan and Qasim (1996) and Sherani (2005), Schimmelpfennig, and Khan (2006) found a positive and significant link between the wheat support price and food inflation in Pakistan. However, no study looks at the relationship between the wheat support price and the market price of wheat. Therefore, to fill this gap, the present study includes the wheat support price in the empirical analysis. The results, given in Table 2, show a positive and highly significant impact of the wheat support price on wheat prices. These findings suggest that a higher support price encourages farmers to increase wheat production, not only by increasing yield per acre but also by bringing more area under wheat cultivation.

Table 3 shows the coefficients of ECTt-1 for each model which is given by Equation 3. The ECTt-1 coefficients show the short-run adjustment. It is worth mentioning here that an ECT coefficient between -1 to 0 implies that the correction in commodity prices in period t is a proportion of the error in the previous period, i.e., t-1. This means that the food commodity prices would converge monotonically to a long-run equilibrium as a result of changes in their determinants. On the other hand, a positive or

lower than -2 ECT coefficient, implies that the food commodity prices would diverge. Moreover, a value between –2 and –1 implies a dampening oscillation in the food commodity prices around their equilibrium trail.

Table 3

Short-run Coefficient

Dependent Variables (Prices)	ECT_{t-1}
Vegetable Group	
△log (Onion price)	–0.35***
△log (tomato price)	–0.41***
△log (garlic price)	–
△log (potato price)	–0.24***
Meat Group	
△log (beef price)	–0.12***
△log (chicken price)	–0.49***
Dairy Group	
△log (egg price)	–0.37***
△log (milk price)	–0.009***
Cereal & Pulses Group	
△log (wheat price)	–0.33***
△log (rice price)	–
△log (Pulse moong price)	–
△log (pulse mash price)	–0.04
△log (pulse masoor price)	–
Other Group	
△log (sugar price)	–0.13***
△log (tea price)	–0.24***

Source: Authors' calculations. ***, **, and * show 1 percent, 5 percent, and 10 percent level of significance, respectively.

Table 3, however, shows that the coefficients of ECTt-1 are between -1 and 0 for each model. It must be noted that the long-run bound test, discussed above, indicated the presence of long-run cointegration among the food commodity prices and their determinants. The coefficients of all the models are statistically highly significant at the 1 percent level. This indicates that the error correction method monotonically converges to the equilibrium. The coefficient of ECTt-1 of the prices of onions, tomatoes, potatoes, chicken, eggs, wheat, and tea reveals a higher pace of correction each month and implies that the divergence from the equilibrium level of prices in the current period was corrected by 35, 41, 24, 49, 37, 33, and 24 percent, respectively, in the following month. However, the pace of adjustment was relatively slower for other commodities such as beef, milk, mash, and sugar. Residual diagnostic tests separately for each model were also run to check their robustness. Table A-2 (Appendix) shows the results of tests for F-statistics, serial correlation, homoscedasticity, and lag selection criteria. Figure A-2 (Appendix) shows the graphs of the CUSUM stability test for each model. The test for serial correlation confirmed

the Gauss-Markov assumption of no serial correlation. Although the problem of heteroscedasticity was detected in some of the models, these models were reestimated by employing the robust standard error process. The literature suggests that for large sample sizes, robust standard errors overcome the problem of heteroscedasticity and provide unbiased standard errors of slope coefficients. F^2 shows the overall significance of the models, which confirms the model's accuracy. Figure A-2 (Appendix) shows that CUSUM lines are within the 5 percent level of significance critical bounds. This shows the precision of the long-run and short-run parameters of the models. This also proves that models are correctly specified.

4. CONCLUSIONS AND POLICY IMPLICATIONS

The study is an attempt to identify the main factors related to food prices. For this purpose, monthly data from July 2002 to July 2021 was collected from the monthly statistical bulletin for 14 large cities of Pakistan for 15 important food commodities. The ARDL bound test shows that there was a negative and significant impact of the REER on wheat prices in the long run. The real interest rate had a mixed effect on food prices in the long run. It inversely affected wheat and rice prices but directly affected tea prices. An increase in international crude oil prices significantly increased the prices of vegetables except for garlic. It also increased the prices of chicken, eggs, wheat, rice, and sugar in the long run. The study finds support for international food price transmission to domestic prices in the long run. The results revealed that an increase in international prices of beef, chicken, wheat, rice, sugar, and tea significantly increased their domestic prices. On the other hand, in the long run, an increase in local production of tomatoes, eggs, mash, masoor, and sugar significantly reduced their prices. Regarding the government's wheat support price policy, it was observed that an increase in the wheat support price had a positive and significant impact on wheat prices. The results also indicate that the log prices of onions, tomatoes, potatoes, chicken, eggs, wheat, and tea monotonically converged to equilibrium. It implies that the divergence from the equilibrium level of prices in the current period would be corrected by 35, 41, 24, 49, 37, 33, and 24 percent, respectively in the next month. However, the pace of adjustment was relatively slower for other commodities, such as beef, milk, mash, and sugar. The results of this study show that the wheat support price increases the price of wheat. This increase in wheat prices will decrease the production of other agricultural commodities and, ultimately, hurt the consumers. Thus, there is a need to increase the per acre yield of wheat instead. To encourage investment in crop production by local farmers, it is important to provide loans at a low interest rate. The results reveal that the high crude oil prices increase the prices of most of the food commodities. Even though international crude oil prices are out of the government's control, the government may consider the provision of crude oil at subsidised rates to the producers to reduce the input cost. Furthermore, there is a need to construct a proper transportation system from farms (villages) to the city markets to reduce transportation costs.

APPENDIX

Table A-1

Group Unit Root Test (First Difference)

Variables	Lags	P-Values
	Vegetable Group	
	(a) Onion	
Method	Statistic	Probabilities
ADF - Fisher Chi-square	592.357	0.0000
ADF - Choi Z-stat	-23.5522	0.0000
Domestic Price	0	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
	(b) Tomato	
Method	Statistic	Probabilities
ADF - Fisher Chi-square	543.860	0.0000
ADF - Choi Z-stat	-22.3832	0.0000
Domestic Price	6	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
International Price	9	0.0000
	(c) Garlic	
Method	Statistic	Probabilities
ADF - Fisher Chi-square	443.085	0.0000
ADF - Choi Z-stat	-20.3277	0.0000
Domestic Price	0	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
	(d) Potato	
Method	Statistic	Probabilities
ADF - Fisher Chi-square	549.063	0.0000
ADF - Choi Z-stat	-22.5697	0.0000
Domestic Price	6	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
	Meat Group	
	(a) Beef	
Method	Statistic	Probabilities
ADF - Fisher Chi-square	727.967	0.0000
ADF - Choi Z-stat	-26.0537	0.0000
Domestic Price	0	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
International Price	0	0.0000

Continued—

Table A-1—(*Continued*)

(b) Chicken		
Method	Statistic	Probabilities
ADF - Fisher Chi-square	592.152	0.0000
ADF - Choi Z-stat	-21.9616	0.0000
Domestic Price	2	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	11	0.0857
International Price	0	0.0000
Dairy		
(c) Egg		
Method	Statistic	Probabilities
ADF - Fisher Chi-square	428.660	0.0000
ADF - Choi Z-stat	-18.0830	0.0000
Domestic Price	9	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	11	0.0000
(d) Milk		
Method	Statistic	Probabilities
ADF - Fisher Chi-square	612.330	0.0000
ADF - Choi Z-stat	-23.3152	0.0000
Domestic Price	2	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
International Price	1	0.0000
Cereal & Pulses Group		
(a) Wheat		
Method	Statistics	Probabilities
ADF - Fisher Chi-square	615.707	0.0000
ADF - Choi Z-stat	-22.5829	0.0000
Domestic Price	0	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	11	0.0000
International Price	0	0.0000
Wheat Support Prices	11	
(b) Rice		
Method	Statistics	Probabilities
ADF - Fisher Chi-square	628.433	0.0000
ADF - Choi Z-stat	-24.0702	0.0000
Domestic Price	0	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0857
International Price	0	0.0000

Continued—

Table A-1—(*Continued*)

	(c) Pulse Moong	
Method	Statistics	Probabilities
ADF - Fisher Chi-square	517.882	0.0000
ADF - Choi Z-stat	-21.6735	0.0000
Domestic Price	1	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
	(d) Pulse Mash	
Method	Statistics	Probabilities
ADF - Fisher Chi-square	617.970	0.0000
ADF - Choi Z-stat	-24.0504	0.0000
Domestic Price	0	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
	(e) Pulse Masoor	
Method	Statistics	Probabilities
ADF - Fisher Chi-square	427.919	0.0000
ADF - Choi Z-stat	-19.2625	0.0000
Domestic Price	2	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
	Others Group	
	(a) Sugar	
Method	Statistics	Probabilities
ADF - Fisher Chi-square	639.151	0.0000
ADF - Choi Z-stat	-24.3413	0.0000
Domestic Price	1	0.0000
Exchange Rate	0	0.0000
Interest Rate	1	0.0000
Oil Price	0	0.0000
Production	0	0.0000
International Price	0	0.0000
	(b) Tea	
Method	Statistics	Probabilities
ADF - Fisher Chi-square	488.457	0.0000
ADF - Choi Z-stat	-21.2557	0.0000
Domestic Price	1	0.0000
Exchange Rate	0	0.0000
Interest Rate	0	0.0000
Oil Price	0	0.0000
International Price	1	0.0000

Source: Authors' calculations.

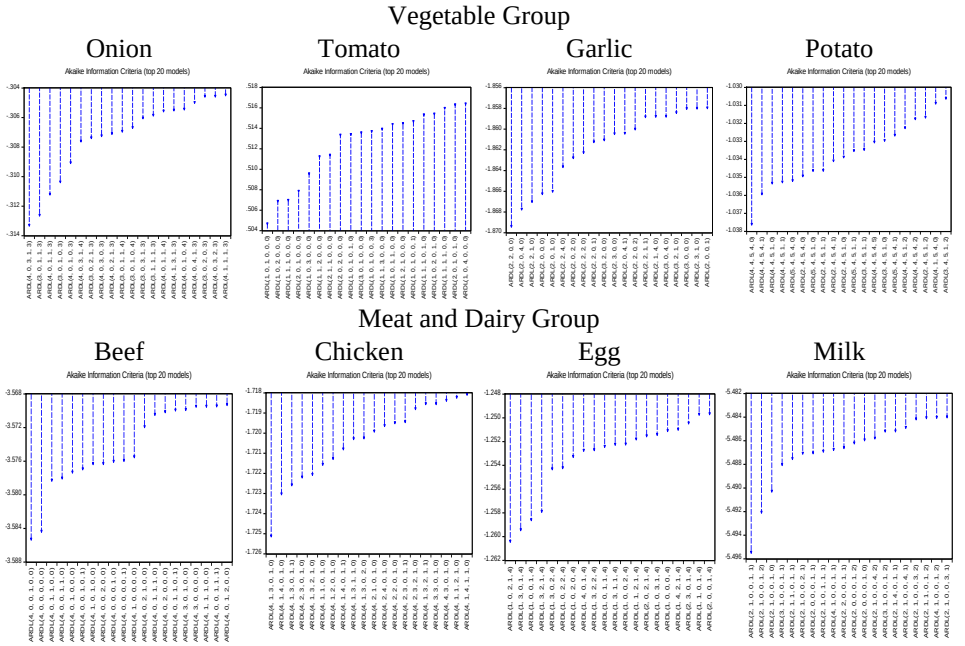
Table A-2

Residual Diagnostic Test/ Model Robustness

Dependent Variables	F^2Stat	R^2	$\chi^2_{Serialcorrelation}$	χ^2_{hetero}	AIC lag selection
Vegetable Group					
log (Onion price)	101.7606***	0.90	0.89	Robust SE (HAC)	(4, 0, 3, 1, 3)
log (tomato price)	49.08887***	0.71	0.80	Robust SE (HAC)	(1, 0, 1, 0, 0, 0)
log (garlic price)	1832.16***	0.98	0.86	Robust SE (HAC)	(2, 2, 0, 0)
log (potato price)	131.8729***	0.94	0.93	Robust SE (HAC)	(4, 4, 5, 4, 0)
		Meat Group			
log (beef price)	3840.197***	0.99	0.11	0.93	(4, 0, 0, 1, 0, 0)
log (chicken price)	229.9765***	0.95	0.20	Robust SE (HAC)	(4, 1, 3, 0, 1, 0)
Dairy Group					
log (egg price)	260.0035***	0.94	0.30	0.24	(1, 0, 2, 1, 4)
log (milk price)	31401.96***	0.99	0.81	Robust SE (HAC)	(2, 1, 0, 0, 1, 1)
Cereal & Pulses Group					
log (wheat price)	2575.58***	0.99	0.435	Robust SE (HAC)	(2, 2, 0, 0, 0, 4, 3)
log (rice price)	7057.850***	0.99	0.65	Robust SE (HAC)	(2, 0, 2, 0, 3, 0)
log (Pulse moong price)	4970.500	0.99	0.17	0.13	(3, 0, 0, 0, 2)
log (pulse mash price)	2181.496***	0.99	0.59	Robust SE (HAC)	(3, 0, 5, 0, 1)
log (pulse masoor price)	3847.106***	0.99	0.72	Robust SE (HAC)	(4, 1, 0, 2, 0)
Other Group					
log (sugar price)	552.98***	0.98	0.31	Robust SE (HAC)	(3, 0, 3, 1, 2, 3)
log (tea price)	2804.805***	0.99	0.41	Robust SE (HAC)	(1, 4, 4, 1, 0)

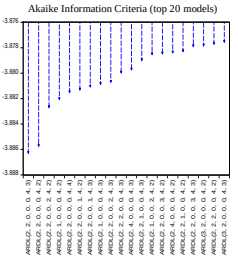
Source: Authors' calculations.

Figure A-1. Akaike Information Criteria

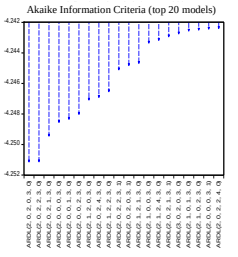


Cereal & Pulses Group

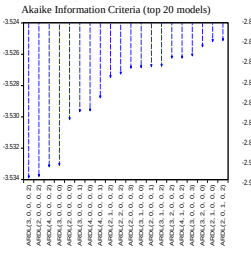
Wheat



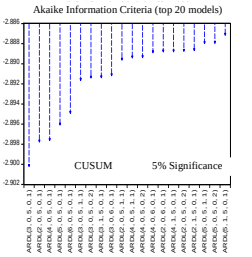
Rice



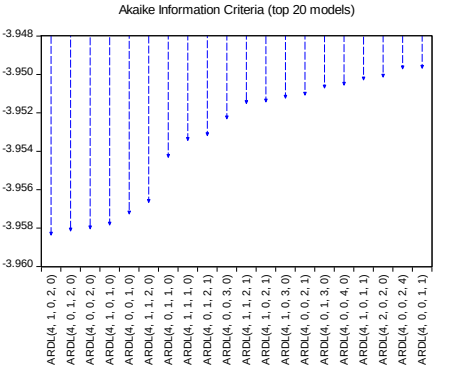
Pulse Moong



Pulse Mash

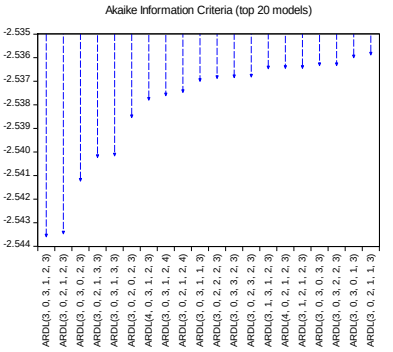


Pulse Masoor

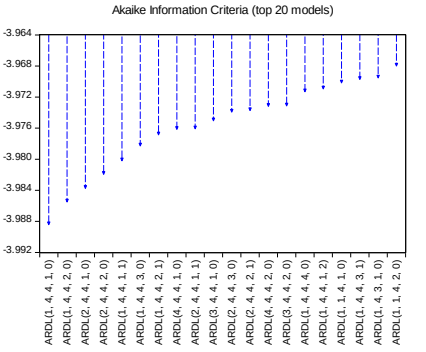


Other Group

Sugar



Tea

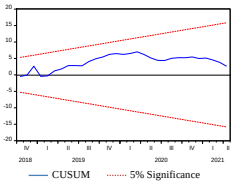


Source: Author's illustration.

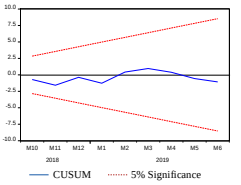
Fig. A-2. CUSUM Stability Test

Vegetable Group

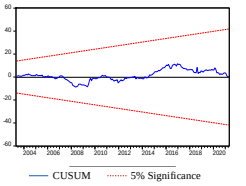
Onion



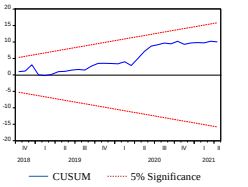
Tomato

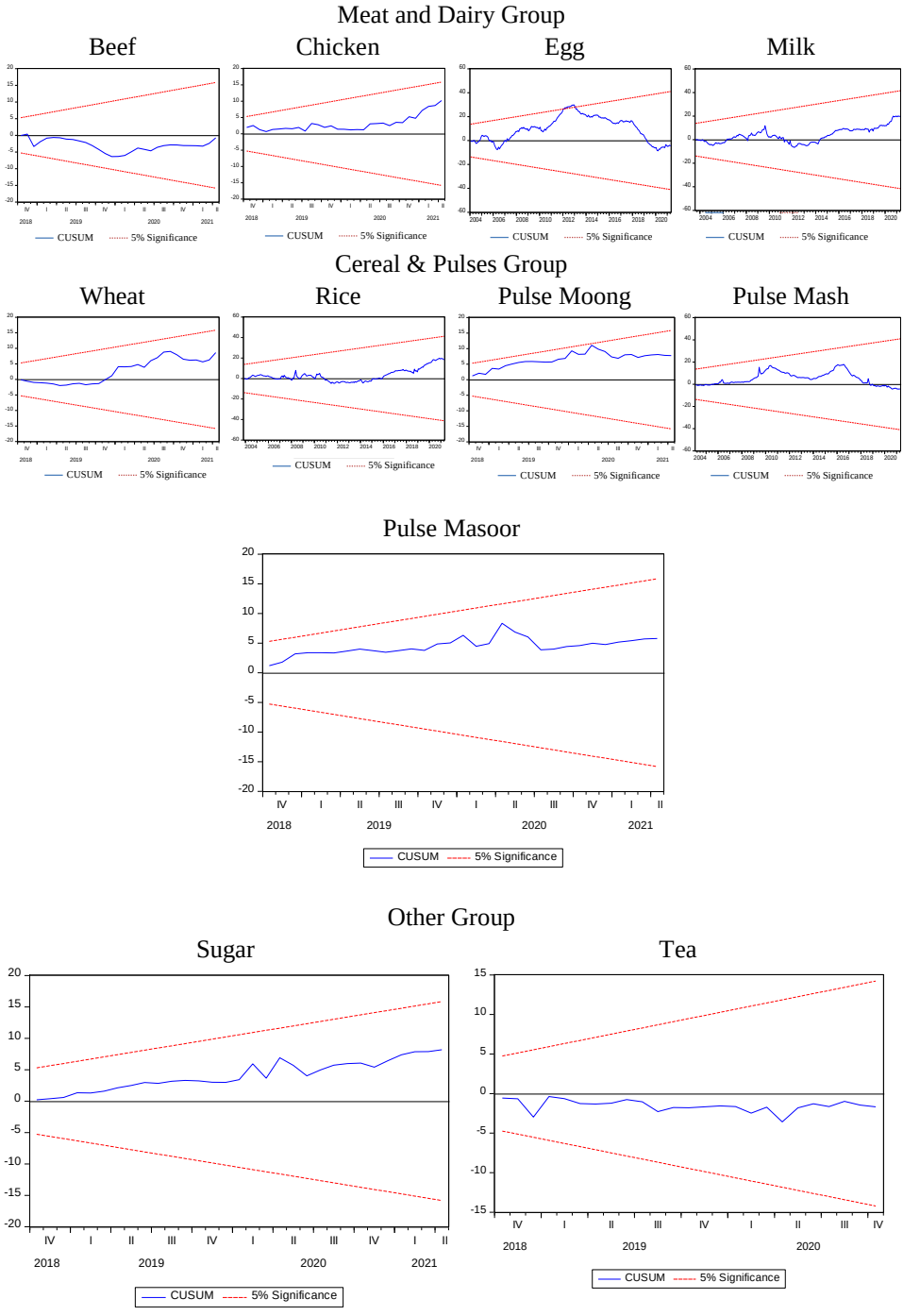


Garlic



Potato





Source: Authors' illustration.

REFERENCES

Abbot, P. C., Hurt, C. and Tyner, W. E. (2009). What's driving food prices? Oak Brook (IL), Farm Foundation 48495.

ADB (Asian Development Bank) (2008). Food prices and inflation in developing Asia: Is poverty reduction coming to an end? In Ahsan, H. and Kemal, M. A. 2011. The Determinants of Food Prices: A Case Study of Pakistan https://www.researchgate.net/publication/241765035

Awan and Imran (2015). Food price inflation and its impact on Pakistan's economy. *Food Science and Quality Management*, 41, 61–72.

Baffes J. (2007). Oil spills on other commodities. *Resour. Pol*., *32*(3), 126–134.

Calvo, G. (2008). Exploding commodity prices, lax monetary policy, and sovereign wealth funds. Internet site: http://voxeu.org/index.php?q5node/1244

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, *74*, 427–431

Engle, R. & Granger, C. (1987). Cointegration and error correction representation: estimation and testing. *Econometrica, 55*, 251–276.

Frankel, J. (2006). The effect of monetary policy on real commodity prices. (NBER Working Paper, No. 12713).

Ghani, G. M., Khalid, H. & Norazman, U. Z. (2018). Food inflation: A study on key determinants and price transmission processes for Malaysia. *International Journal of Business and Society*, *19*(1), 117–138.

Herrmann, M. (2009). Food security and agricultural development in gimes of high commodity prices. United Nations Conference on Trade and Development (UNCTAD) Discussion Papers No. 196. United Nations, Geneva.

Ismail, A., Ihsan, H., Khan, S. A. & Jabeen, M. (2017). Price volatility of food and agricultural commodities: A case study of Pakistan. *Journal of Economic Cooperation and Development, 38,* (3).

Johansen, S. & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—With applications to the demand for money. *Oxford Bulletin of Economics and Statistics*, 52(2), 169–210, doi: 10.1111/j.1468-0084.1990.mp52002003.x.

Johansen, S. (1991). Estimation and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. *Econometrica* 59, 1551–1580.

Khan, A. H. & Qasim, M. A. (1996). Inflation in Pakistan revisited. *The Pakistan Development Review, 35*(4), Part II, pp. 747–759.

Landerretche, Ó., De Gregorio, J., Neilson, C., Broda, C., & Rigobon, R. (2007). Another Pass-through bites the dust? Oil prices and inflation. *Economia, 7*(2), 155–208.

Nakamura, E., & Zerom, D. (2010). Accounting for incomplete pass-through. *The Review of Economic Studies*, *77*(3), 1192–1230.

Pesaran, M. H., Shin, Y. & Smith, R.J. 2001. Bounds testing approaches to the analysis of level relationships. *Journal of Applied Economics 16*, 289–326.

Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed lag modeling approach to cointegration analysis, Chapter 11 in *Econometrics and Economic Theory in the 20th Century*: The Ragnar Frisch Centennial Symposium, Strom S (ed.). Cambridge University Press: Cambridge

Pesaran, M. H & Pesaran, B. (1997). Working with microfit 4.0: Interactive econometric analysis. Oxford: Oxford University Press.

Roache, S. K. 2010. What explains the rise in food price volatility? IMF Working Paper No. 10/ 129

Salman. A. J. & Shahzad, A. A. (2013). Determinants of high food prices: The case of Pakistan, *Pakistan Economic and Social Review*, 51(01), 93–107.

Schimmelpfennig, A. & Khan, M. S. (2006). Inflation in Pakistan: Money or wheat? International Monetary Fund, Working Paper /06/60

Sherani, Sakib (2005) The dark side of the force. ABN-AMRO, Economic Focus—Pakistan, Monday, May 30, 2005.

Tadesse, G., Algieri, B., Kalkuhl, M., & Braun, V. (2016). Drivers and triggers of international food price spikes and volatility. In Food Price Volatility and Its Implications for Food Security and Policy, pp. 59-82. Springer International Publishing.

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Household Market Participation, Access, and Farm Productivity in AJK: Evidence from Farm Household Data

KHUSH BUKHAT ZAHID

The goal of the study is to get insight into agriculture production and market constraints in the AJK region. To achieve the objectives of the study, in the first stage, production function is estimated to obtain technical efficiency scores that are explicitly dependent on the farm and farm-specific variables. For this, single-step stochastic production estimation was applied. Tobit regression was employed in the second phase, with the market participation index as the dependent variable and market accessibility factors and efficiency as explanatory variables. The findings show that all inputs contributed favourably and considerably to farm production, with a mean technical efficiency of 58 percent, indicating that sample farmers might achieve the maximum production frontier by raising their efficiency to 42 percentage points.

Among the determinants of technical efficiency farm size, land fragmentation and traction power negatively contributed to efficiency. Market participation was low as approximately 47 percent of the sampled farmers had less than 50 percent market participation and 20 percent did not participate in the market. The remaining 33 percent had market participation greater than 50 percent. The major factors that affect market participation were production efficiency, distance from roads and the market, credit facility, training, experiences, and internet and refrigerator facilities. All these variables were positive and significantly contributed to market participation.

JEL Classifications: D24,Q12,Q13
Keywords: Market Participation, Stochastic Production Estimation, Technical Efficiency Scores, Farm Productivity

1. INTRODUCTION

Understanding barriers to market access and factors affecting production efficiency are key to overcoming market failures. Most of the small farmers in Azad Kashmir, whose access to the market is limited and the only farmers who have access to the market, participate in the agricultural market. Due to this market failure in this particular area, there is a dire need for government programmes in this area to invest in improving market access, infrastructure, and agricultural production. Improving

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productivity can help improve market participation as long as incentives and information for working capital are improved. Higher yields may increase market participation because higher yields may have additional crops to be sold.

AJ&K has abundant rich terrain and seasons that are ideal for various crops and fruits. Due to its climate-friendly nature, the traditional farming system has a distinct advantage. All of AJ&K's districts, which are located in distinct agro-climatic zones, provide ideal circumstances for growing multiple crops at the same time. However, agriculture's potential is not being completely realised since the AJ&K agricultural sector is beset by challenges. The development of the agricultural industry in Azad Kashmir is hampered by a lack of financial resources as well as agriculture-related enterprises, packing and value addition, storage facilities, and advanced research and development facilities.

According to Anwar (2020), the agricultural sector employed 8 percent of the active labour force. Around 72 percent of the households owned agricultural land. The average size of the farm was assessed to be 1.1 acres. Bhimber had the highest percentage of agricultural proprietors at 76 percent, with around 87 percent growing crops. Only 10 percent of households sold and contributed to market participation indicating that 90 percent of the households were subsistence farmers who grew crops for their consumption. Only 31 percent of subsistence farmers could meet their household consumption demands. The average income per harvest of commercial farmers was Rs. 81,086, which is low. In AJ&K, 77.2 percent of the sampled farmers cultivated maize. Wheat was grown by 59.4 percent of farmers, while pulses and rice were grown by 3.2 percent . The growers of vegetables and fruits accounted for 18.4 percent and 12.8 percent, respectively (SDG, 2021).

Weak marketing strategies have contributed to the peasant community's lack of interest. Standard seed production is also difficult. On a commercial scale, small farms holding have an impact on agricultural production. The overall farmland area in Azad Kashmir was around 47 percent of the total land area. Approximately 31 percent of the entire farmland was under cultivation. AJ&K's irrigation area was 6.2 percent of the total agricultural area (P&DD, 2020).

The wheat-maize-wheat cropping pattern is "mountain agriculture" as opposed to agriculture in the lowland plains. Crop and marketing promotion plans have not been devised. Due to a lack of infrastructure and financial assistance, the area is characterised by low productivity and limited market access. Market involvement is contingent on having access to the market. Smallholders sell from their farms or manually lug the produce to the closest local markets. An increasing body of evidence suggests that improving infrastructure, such as road conditions, and market information, has a positive impact on farmers' access to markets (Sigei, et al. 2014; Fraser, et al. 2014). However, there is no actual data on the magnitude and scope of inefficiency. Our hypothesis is that farmers participate in the market with a high level of efficiency and have better market access. To overcome the problem of market failure in this specific sector, this must be investigated.

Although many other factors contribute to agricultural productivity, such as technological advancement, regulatory framework, and optimal use of material inputs, these elements may not have an impact on agricultural performance unless better

marketing conditions prevail (Cabas, et al. 2010). Landowners in Azad Kashmir, who are often peasants, have limited financial and technical resources. Hence, policy intervention in this area is critical. To our knowledge, there is no systematic research on agricultural productivity and market participation in the Azad Jammu Kashmir (AJK) region. There are issues with the region's data availability and veracity. To compensate for these statistical flaws, it might be beneficial to limit international studies to a local environment.

Purpose and Scope

The idea of the study is to evaluate farm productivity given resources and technology, and household market participation given market access conditions to establish a linkage between these in the agriculture market of the Azad Jammu Kashmir. Particularly, this study focuses on:

- Measuring the impact of farm variables on farm production and technical efficiency.
- Estimating the linkage between market participation and market access conditions in addition to farm-level efficiencies.
- Recommending policy options based on the outcomes of this study.

Apart from quantitative, the study traces the policy interventions that have been adopted by relevant departments to reduce farm inefficiency and support the farmers to link with the market and the challenges they face to implement their policy agenda.

The study aims to answer the following key questions related to the development strategy in this specific area.

- What are the reasons that cause production inefficiency at the farm level?
- Do farmers produce the optimum level of output to market it?
- What are the area-specific barriers to market access?
- Do improvements in farm productivity increase market participation, having better market access?
- Do new roads and improved accessibility to the market increase commercialisation leading to continuous production?

2. REVIEW OF LITERATURE

Many studies have been conducted to assess the technical efficiency of crops in underdeveloped nations. In Sudan, Adam, et al. (2005) calculated the technical efficiency of sorghum yield, whereas Alemu, et al. (2007) estimated it for agricultural output in Ethiopia. Similarly, Binam, et al. (2004) did a study on Cameroon to measure the technical efficiency of maize and sorghum production. There is no shortage of research on assessing technological efficiency in Sub-Saharan African countries (Fakayode, 2009; Kariuki, et al. 2008; Kibara, 2005). Rios & Shively (2005) calculated the technical efficiency of Vietnam's coffee yield. The measurement of technical efficiency for farmers has also been done using evidence from South Asian countries. Thiruchelvam (2005) conducted a study on Sri Lanka that estimated the technical efficiency of chilli and onion growers.

Similarly, for different crops, a large body of literature has studied farm efficiency in other South Asian countries. Hassan & Ahmad (2005) estimated farm efficiency in Pakistan (Punjab). Thus, creative literature exists in Pakistan that has measured farm efficiencies for various crops such as wheat, rice, vegetables, and citrus (Zahid & Ahmed; 2018; Javed, et al. 2009; Hussain, et al. 2012; Sohail, et al. 2012; Khan & Ghafar, 2013). The majority of these are focused on a particular crop and do not link farm productivity to market participation which limits their scope. Therefore, the focus of this research is on agricultural productivity and market participation. Surprisingly little research has been done on how these variables interact. Previous studies have investigated the relationship between market involvement and productivity (Govereh, Jane, & Nyoro, 1999; Strasberg, et al. 1999; Govereh & Jayne, 1999).

Few studies related to the current work that focused on a single crop in developing countries such as Africa, Latin America, and South Asia are Deaton (1989); Benjamin & Deaton (1993); Barrett & Dorosh (1996); Jayne, et al. (2001); Makhura, Kirsten, & Delgado (2001); Vakis, Sadoulet, & de Janvry (2003); Renkow, Hallstrom; Karanja (2004); Edmeades (2006); Boughton, et al. (2007).

A strand of research has also investigated crop market involvement. In West Africa, Strauss (1984) studied cereals, whereas Budd (1993) looked at food crops, and Strasberg, et al. (1999) and Heltberg & Tarp (2001) looked at total crop production in East Africa. In Pakistan, recent studies on the technical performance of agriculture in Pakistan do not provide a clear picture of farmers' productive performance. The current study adds to this analysis. All crops should be combined with all measurable inputs and outputs and link them with the market. By summarising the preceding debate, the present study contributes to the literature on the AJK agriculture market's agro-climatic structure. It evaluates local farmers' farm inefficiencies and tracks their market involvement. The findings of the study would add to the literature on agriculture specifically related to farm efficiency and farmers' market involvement because the topography, cropping patterns, and adoption of technology differ from one region to another.

3. METHODOLOGY

The study primarily focused on the use of mixed approaches to assess the defined objectives. This method is often used to combine the results of quantitative and qualitative instruments to provide a comprehensive picture of the study problem (Aramo-Immonen, 2011, 2013). The project followed a quantitative approach in which primary data was obtained from farmers in AJK using a detailed questionnaire. In addition to primary data, secondary data was used to establish facts and figures about the structure of the agriculture sector in the sampled areas. Secondary data was collected by conducting a desk review of secondary sources, such as government-published reports on the agriculture sector in the AJK.

Furthermore, the qualitative method was used to conduct key informant interviews (KIIs) to obtain expert opinions on policy activities related to the study's objectives. Questions about their views, subjective norms, perceived behaviour, future expectations, and attitude toward new technology adaptation, government backing, and input availability made up qualitative data. The following is a detailed discussion of qualitative and quantitative approaches.

3.1. Quantitative Methods

The quantitative methods involved the use of primary data gathered from 1,200 farmers in all 10 districts of the AJK via a detailed questionnaire. All socioeconomic characteristics of farmers, farm features, and specific information on agricultural activities and market accessibility factors were included in the questionnaire.

In the first step, the study area was divided into two regions[1] based on topography and climate to give due coverage to all types of heterogeneity in units of farm households in the AJK. In the second step, since all ten districts are located at different climatic zone, two tehsils were selected from each sampled district based on farm population for the household survey taking the total sampled tehsils to 20 (10*2). In the third step, two union councils (villages) were taken from each tehsil. Thus, there were 40 (20*2) UCs (villages) in 20 tehsils from which sampled respondents were taken. In the final step, 30 farmers were selected from each union council, giving us a sample of 1,200 farmers. Based on potential villages, a sample of farm households was randomly chosen from each union council. The geographical, agricultural, demographic, and socioeconomic characteristics can provide important understandings for our research questions. We concentrated on a diverse sample because these traits are almost similar within a certain place. Secondly, given time and money constraints, the sample size of 30 farmers from each UC was considered adequate to achieve our goals. We focused on Rabi (winter) and Kharif (summer) crops for the agriculture year 2020-21 for simplification because these crops are grown at a specific time of the year.

Two principal crop seasons were covered in our data set, i.e., Rabi, which stretches from October-December 2020 to April-May 202 and "Kharif," with sowing beginning in April-June 2021 and harvesting taking place in October-December 2021. Agriculture is a process that involves multiple crops and inputs. The production of several crops on each farm was merged into a single product to apply the production function technique. Farm products included all outputs of the farm including crops, livestock, fruits, and vegetables. We did not consider livestock and livestock products in our analysis for which representative data are hard to come by and need a couple of years to collect. Statistical data included information about household demographics, farm-specific characteristics, farm-level inputs, technical practices, and variables related to output production, geography, infrastructure, and market access. We employed field assistants and agriculture graduates from different tehsils to collect the data. Subsequent training was given to the selected enumerators. Trained enumerators conducted face-to-face interviews. Quantitative data were collected during November and December 2021 because the harvesting of summer crops starts in November. The primary data was then compiled, cleaned, and estimated to analyse the research questions.

Empirical Model

After quantitative data collection, statistical analysis was carried out. Since the computation of farm inefficiency is purely econometric based, we used an empirical model to evaluate the objectives of the study.

[1]The Northern districts which are generally mountainous include Muzaffarabad, Jhelum Valley, Neelum valley, Bagh, Haveli, Poonch, and Sudhnoti while Southern are comparatively plain districts such as Kotli, Mirpur, and Bhimber.

The stochastic production frontier approach was preferred instead of using a simple production approach because it fitted the data the best, i.e., large units of cross-sectional data, separate form, biological, the inclusion of social features, non-observable characteristics of the farmer, and technological neglect (Kumbhakar & Lovell, 2000; Salvo, et al. 2013). The stochastic approach was also found to be suitable for our objectives.

The study covered three aspects of the farm household. First, we evaluated farm-level technical performance scores using the stochastic production frontier. If there is a technical inefficiency, it means that the farmers are not producing at the maximum level of the production frontier curve but below and, therefore, the technical performance is less than one. Second, we gained access to the specific constraints and conditions of the region for market access to the sampled households. This test assumes that production efficiency increases market participation due to higher sales in the presence of improved market access conditions. Third, we analysed the relevance of production efficiency and market participation in terms of market accessibility, such as infrastructure, distance to roads, sources of market information, distance from markets, marketing experience, and other market-related variables. The Tobit model was used to determine the relationships. For market participation, the sales index was used as a fraction of the total sales. Farm-specific inputs (land, labour, capital, and materials) served as explanatory variables to determine their impact on farm production (gross value of vegetables, fruits, grains, and other food crops). The study considered the effects of different farmers' characteristics, such as experience, education, and farm size on farmer performance such as the 'technical ineffectiveness model' depending on the specific features of the farm as done by Battese & Coelli (1995).

Specification of Empirical Model

When analysing unit-level information like the household farm survey, the production frontier using the stochastic frontier approach is a better way to quantify production efficiencies (Hughes, et al. 2011). We can also use the stochastic frontier model to deal with specific random shocks (Thiam and Bravo-Ureta, 2001). Traditional deterministic methods ignore the noise, which can lead to an overestimation of technical inefficiency. A 'composite error term' with two components is used in the stochastic frontier technique. The first is technical inefficiency, which is defined as "farm departures from the production frontier," and the second is statistical noise, which captures the influence of random shocks on each producer as defined by his or her operating environment (Coelli, 1995). This method also enables the statistical testing of assumptions about the production structure and degree of inefficiency.

Various functional forms have been used in the literature to assess farm performance. Cobb-Douglas and translog functions are the most employed functional forms by academics to measure efficiency in the agriculture sector. The translog function has a more flexible functional form and is most represented in logarithm form such as:

$$ln(Y_i) = \alpha_o + \sum_k \beta_k lnX_{ki} + \sum_j \beta_j ln\, X_{ji} + \frac{1}{2}\sum_j \sum_k \beta_{jk} lnX_{ji} lnX_{ki} \quad \ldots \quad (1)$$

This function is viewed in three ways by Boisvert (1982). It is viewed, first as an exact production function, second, as a second-order Taylor series approximation to a general, but unknown production function, and, third, as a second-order approximation to a CES production function. Boisvert (1982) defined the exact production function in Cobb-Douglas functional form as

$$ln(Y_i) = \alpha_o + \sum_k \beta_k lnX_{ki} + \sum_j \beta_j lnX_{ji} \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

We chose Cobb Douglas functional form because this study employed several exogenous variables and a large number of parameters to evaluate. Assuming that the number of production factors is n, the number of parameters to be estimated is n (n+3)/2, which increases the risk of severe multicollinearity, which could result in contradicting interpretation of parameters (Pavelescu, 2011). Based on applied economic literature, the Cobb-Douglas function form is favoured because of its simplicity and ability to avoid collinearity among the independent variables. The linear form of the Cobb-Douglas production frontier function is as follows:

$$\ln(Y_i) = \alpha_o + \sum_k \gamma_k \, lnX_{ki} + \sum_j \beta_j lnX_{ji} + v_i - u_i \dots \mathrm{i} = 1, 2, 3, \dots, \mathrm{N} \quad \dots \quad (3)$$

In Equation 3, *ln* denotes the natural logarithm to the base e, Y_i is the ith farm output (gross value from all crops), X_{ki} is the vector of k inputs, and X_{ji} is the vector of *j* inputs (land, labour, capital and material) of the i[th] farm. Technical inefficiency affects u_i derived in the preceding equation is specified as:

$$u_i = d_\circ + d_1 Z_i + e_i \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (4)$$

where Z_i are the vectors of farmer and farm-specific characteristics of the *i[th]* household, and e_i is the error term. $u_i = Z_i d' + e_i$ where d' denotes the vector of parameters, d is the constant term with d_0 omitted, assumed that it is included in the expression $Z_i d'$

$$TE_i = \exp(-u_i) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (5)$$

This demonstrates that the lesser the nonnegative inefficiency component *u*, the more efficient the *ith* farm. By construction, technical efficiency indices range from zero to one, and higher technical efficiency indices denote higher levels of efficiency. Households having a technical efficiency index of one are considered technically efficient. A single-step estimating technique was used to estimate the model (Battese & Coelli, 1995). The maximum likelihood technique (MLE) was proposed by Battese and Coelli (1995) for the simultaneous estimation of parameters of the stochastic production frontier and the inefficiency model. The MLE technique employs the following variance parameters: δ^2 is total error variation, $\delta^2 = \delta^2{}_v + \delta^2{}_u$, and $\gamma = \frac{\delta_\mu^2}{\delta^2}$, which represents the technical inefficiency contribution to total error variation.

The two-step modelling approach has been questioned by Battese and Coelli (1995) and Battese, et al. (1996) because it violates one of the most crucial assumptions of the stochastic frontier model, i.e., identically independently distributed technical inefficiency effects. Various statistical tests can be used to determine the model's validity. The null hypothesis, H_0=γ=0, i.e., the technical inefficiency effects are not present in the model and are not random, is of particular importance. Furthermore, $H_0 =$

$d' = 0$, expressed the null hypothesis that the household-specific attributes do not affect the technical inefficiency level. The generalized likelihood-ratio statistic λ is defined as λ = -2 ln $[L.(H_0)/L.(H_1)]$, where H_0 and H_1 are the null and alternative hypotheses, respectively. If, H_0 is true, then is asymptotically distributed as a chi-square random variable (see Coelli, 1995 and 1996).

Market Participation

Market participation was measured by sales as a fraction of the overall output of the household's entire agricultural crop production. This "sales index" would be zero for a household that sells nothing, more than zero for a household that sells their crops, and greater than unity for households that add value to their crop production through additional processing (Govereh & Jayne, 1999). It is defined as:

$$sale\ index_i = \left[\frac{\sum_{j=1}^{J} Crop\ marketed_{iy}}{\sum_{j=1}^{J} Crop\ harvested_{iy}}\right] \begin{Bmatrix} Non\ seller & = 0 \\ seller & > 0 \end{Bmatrix} \quad \ldots \quad \ldots \quad (5)$$

where a different jth crop is grown on an ith farm. The sale of crops involves transactions with people and organisations outside of the farm household. Y_m is the amount marketed, Y_h is amount harvested but it does not contain the portion used for household consumption, Y_C, the gift portion, Y_G, or stored as seeds, Y_S, for the next season.

$$Y_m = Y_h - Y_C - Y_S + Y_G$$

where $Y_h > 0$ if $Y_C, Y_S, Y_G > 0$, Y_m/Y_h=1 if the farmer sells all the crop harvested or, $0 < \frac{Y_m}{Y_h} < 1$ if the farmer distributes his crop and sells a portion of it in some market. Therefore, the value of the dependent variable is between 0 and 1.

The next analytical step involved identifying factors that influence market participation using regression analysis. The determinants of market participation are those that affect productivity and, hence, domestic market access conditions.

The general model can be written as

$$(MP)_i = f\{(u)_{i,}, (MA)_i, (D)_i\} \ldots i = 1 \ldots\ldots N \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

where MA is the vector of variables that determine market access conditions, u is the technical efficiency scores generated from the above model, D shows demographic conditions, and MP is market participation. We used the Tobit model to estimate this because of the truncation of market participation variables (Barrett, et al. 2001).

$$\text{Tobit}(\text{MP}_i) = \ln\left[\frac{Y_m}{Y_h}\right] = \beta_1 + \beta_2(\text{MA})_i + \beta_3(D)_i + \beta_4(u)_i + \varepsilon_i \quad \ldots \quad (7)$$

3.2. Qualitative Methods

The study implemented qualitative methods to accomplish the objectives related to the policy interventions by stakeholders. The study implemented the qualitative method to get information from the key informant interviews (KIIs), which contained the information about agriculture sector in the AJK. The objective was to ask them about the sort of support they provided to the farmers to reduce farm inefficiencies. Moreover, KIIs

maintained focus on the problem faced during the provision of assistance to farmers, and how the relevant institutions provided help to farmers to participate in the market. Qualitative information was collected from different interlinked departments such as the agriculture department officials, Planning and Development Department (P&DD), Irrigation and Small Dams Department, Extension Service Management Academy (ESMA), Agriculture Tourism Development Corporation, and Crop Reporting Services (CRS).

Focused Interviews

The qualitative data were collected following Yin (2003) to ensure the reliability of individual case study interviews, and personal observations using the focus group discussions (FGD) methods. Some crucial questions about agriculture productivity and marketing of the relevant sectors were included in the surveys. They were also given some specific questions about the reasons for agricultural inefficiencies and marketing faults, as well as their suggestions, roles, challenges, and expected policy recommendations.

To collect data, 40 key informant interviews (KIIs) and direct observations at various institutions at all levels were conducted. This group was made up of people from ten interconnected departments. Interviews were conducted with 36 field specialists and four members of a privately owned farm. Each interview lasted approximately one hour. Twenty percent of the key informants (KIs) were female, and eighty percent were male. Of those working on private farms, 68 percent had M.Sc. (Hons) or higher education, 22 percent had B.Sc. (Hons), and 10 percent had intermediate education. Experts represented all agriculture sector departments from all districts. Fifty percent had more than 14 years of experience in the agricultural sector. Four focus group discussions (FGD) with eight to ten participants were also held.

The overall goal of these interviews was to gather the most relevant information, opinions, experiences, and other issues. Additionally, we utilised these as a foundation for identifying issues, difficulties, future expectations, convictions, and driving forces associated with this particular sector.

4. RESULTS AND DISCUSSION

4.1. Technical Inefficiency Score

The mean value of efficiency derived from the above model that was estimated in Table 1. These efficiency score are presented in Table 2, was 58 percent , with a range of 7.5 percent to 86 percent . It indicates that farmers might achieve the maximum output frontier by raising their efficiency by 42 percent . This could be accomplished through the use of current technology and other measures. This suggests that by utilising agricultural resources more efficiently, the gross value from crops might increase by 42 percent . While 53 percent of the sampled farmers were under 60 percent efficient, there is still space for the average farmer to increase farm production by 40 percent with the same level of inputs and technology by strengthening the farming community's managerial capacity.

Table 1

The Maximum Likelihood Estimates for Cobb-Douglas Production Frontier including Determinants for Technical Inefficiency

	Estimate	Std. Error	z value	Pr(>|z|)	Significance
(Intercept)	9.56	0.22	43.53	< 2.2e-16	***
Weedicide/insect (dummy variable)	0.10	0.03	3.26	0.00	**
FYM(trolleys)	0.11	0.02	5.17	0.00	***
NPK (nitrogen and phosphorous nutrients, kg)	0.16	0.02	8.35	< 2.2e-16	***
Irrigation (numbers)	0.16	0.03	6.22	0.00	***
Cultivated area (kanal)	0.48	0.04	12.96	< 2.2e-16	***
Seed (kg)	0.01	0.03	0.49	0.63	.
Man days (for hired labour one man-day=8 hours)	0.17	0.04	4.68	0.00	***
Tractor (dummy)	0.47	0.10	4.66	0.00	***
District south (dummy)	0.42	0.08	5.08	0.00	***
Intercept	-0.23	0.81	-0.29	0.78	
Farm size	-0.02	0.01	-1.94	0.05	.
Farming experience	0.01	0.01	1.83	0.07	.
Education	0.09	0.04	2.54	0.01	*
Farming area	0.66	0.26	2.50	0.01	*
Irrigation sources	0.10	0.05	1.90	0.06	.
Land fragmentation	-0.61	0.27	-2.31	0.02	*
Traction power	-0.55	0.24	-2.29	0.02	*
Sigma sq.	1.73	0.51	3.37	0.00	***
Gamma	0.72	0.08	8.51	< 2.2e-16	***
Log-likelihood	-1549.364				

Source: Author own estimations.

Significance: 0***, 0.001 **, 0.01*, 0.05 '.' 0.1 ' ' 1.

Table 2

Efficiency Estimates Distribution Using CD -SFA Model

TE Range	Percent of Farms
<50	21
50-60	32
60-70	30
70-80	15
80-90	2
90-100	0
Total	100

Source: Author own estimations.

4.2. Market Participation Index

Market participation is calculated by the sum of all crops marketed divided by the sum of all crops harvested $\left[\frac{\sum_{j=1}^{J} \text{Crop marketed}_{iy}}{\sum_{j=1}^{J} \text{Crop harvested}_{iy}}\right]$. Its value ranged between 0 and 0.9 with a mean of 0.36. Zero means they marketed nothing, whereas a value close to 1 means that the share of the crop marketed in total production increased, which implies more market participation. 1 means that they sold the whole crop produced. On average, the farm output produced was 4,215 kg and the amount marketed was 2,319 kg. Forty-seven percent of the farmers had less than 50 percent market participation, while 20 percent did not participate in the market at all. The remaining 33 percent had market participation greater than 50 percent . The distribution is shown in Table 3.

Table 3

Market Participation Distribution

MP Range	Percent of Farms
0	20
0.01-0.10	5
0.10-0.20	13
0.20-0.30	12
0.30-0.50	17
0.50-0.70	17
0.70-1	16
Total	100

Source: Author own estimations.

Factors Affecting Market Participation

We used the technical efficiency level generated from the above model along with other market accessibility factors and household characteristics, which include credit facility, agriculture, and a market training dummy variable as the determinants of market participation. For the distance dummy variable, the farm that was within 5 km from the road was taken as the base category. The other determinants of market participation included the processing or value addition dummy variable, the distance from the market between 15-30 km dummy variable, marketing experience in years, having a refrigerator for storage dummy variable, having the internet as a source of information dummy variable, and family size in numbers. The model fit was good as the sigma coefficient was highly significant and the log-likelihood value was also large (404) with df 12. The results are presented in Table 4. All the variables, except the family size and processing, were positive and significantly contributed to market participation. An increase in credit facilities along with training and an increase in technical efficiency at a farm increase

Table 4

Analysis of Market Participation Determinants (Tobit Model)

	Estimate	Std. error	t value	Pr(> t)	Significance
Intercept	-0.69	0.06	-11.32	< 2e-16	***
Credit (dummy)	0.04	0.02	1.85	0.06	.
Training (dummy)	0.12	0.02	5.65	0.00	***
Technical efficiency index	1.39	0.08	16.80	< 2e-16	***
Distance from the road (within 5 km)	0.08	0.02	4.29	0.00	***
Processing	-0.05	0.02	-2.34	0.02	*
Distance from the market (within 15-30km)	0.11	0.02	4.77	0.00	***
Marketing experience (years)	0.01	0.00	6.18	0.00	***
Refrigerator (dummy)	0.06	0.02	2.91	0.00	**
Internet (dummy)	0.04	0.02	1.90	0.06	.
Family size(number)	-0.01	0.00	-3.17	0.00	**
Log sigma	-1.21	0.02	-51.16	< 2e-16	***
Log-likelihood	-405.00				

Source: Author own estimations.

Significance: 0***, 0.001 **, 0.01*, 0.05 '.' 0.1 ' ' 1.

market participation. Chandio, et al. (2018); Ali, et al. (2014); Mukasa, et al. (2017) also found evidence to prove that credit increases agricultural gross domestic product in Pakistan. Marketing experience also positively contributed as experienced farmers have established customer bases who usually buy from them (Harriet, et al. 2018).

The coefficient of efficiency was 1.39 indicating that one point increase in efficiency score increased market participation by 1.39 percent. Rios, Shively, & Masters (2009); Abu, Issahaku, & Nkegbe (2016); Mekonnen (2017) & Alhassan, et al. (2020) observed that farm households who are more productive have higher market participation rates.

Similarly, closer distance from the roads and market also significantly increased market participation. Makhura, et al. (2001) found that more distance to the market negatively influences both the decision to participate in markets and the proportion of output sold. Acheampong, et al. (2018) reported that access to improved roads encourages the use of modern farm inputs giving higher yields. The positive effect of the market on the community supports the argument that physical infrastructure reduces transaction costs associated with marketing and information, which increases the quantities sold (Abu & Issahaku, 2017). Since the internet is a source of information, having the internet also positively contributed. Other studies have also found a positive effect of market information on market participation (see, for example, Abu, et al. 2016 & 2014; Siziba, et al. 2011).

The family size and processing negatively contributed to participation because larger families mostly process products for their immediate consumption at home, such as spices, maize, and wheat flour. Therefore, an increase in family size increases household consumption and results in a decrease in the amount marketed. The result is consistent with Olwande & Mathenge (2012).

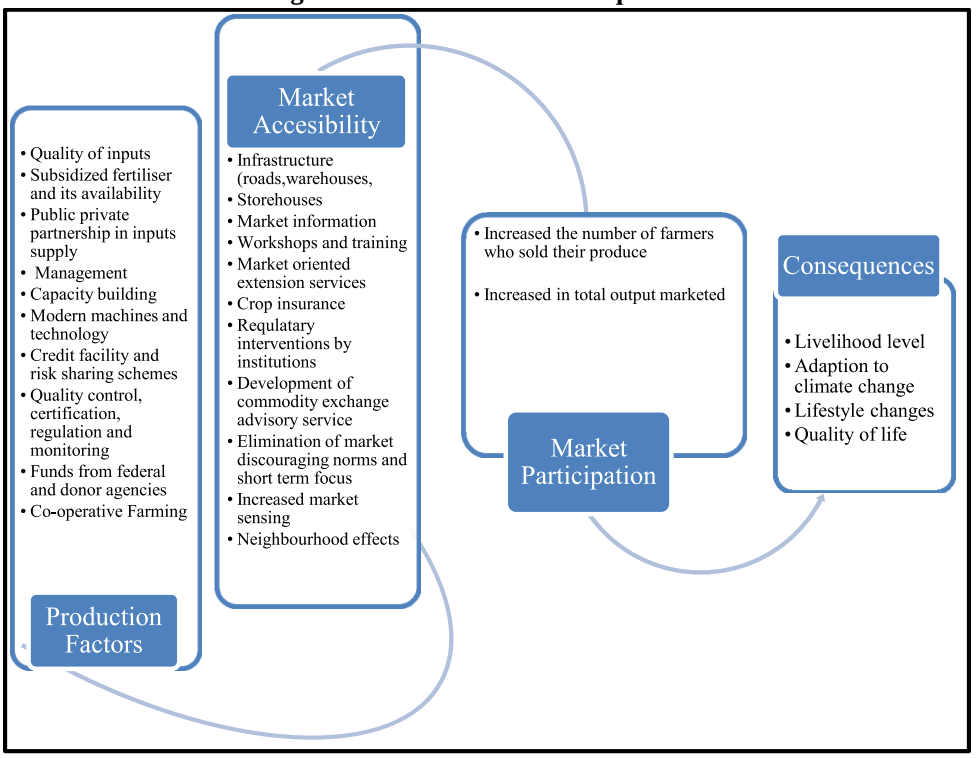
4.4. Response Generated from KIIs

Two sections make up the qualitative questionnaire. We posed questions about farm efficiency in Section A and market involvement in Section B. The results are summarised here in percentage terms. One of the questions was, "*How are you contributing/assisting the farmers to improve farm productivity?"* Twenty percent said that they provided instant information. Another 20 percent said that by introducing efficient farm practices. Similarly, 25 percent said that they assisted by educating, training, and demonstrating. Seven percent helped with irrigation, while 27 percent assisted with other measures such as enhancing soil fertility. Another question was "*Your organisation is demonstrating/working on which impact-based policy type?* Thirty-five percent responded that they provided input support, 5 percent output support, 50 percent technical support, and 10 percent financial assistance. In response to the question "*Is your department playing a role in the timely provision of pesticides, fertilisers, and other inputs to farmers?"* 42 percent answered yes, while 58 percent said no. Another question was "*In the face of climatic shocks/disasters, what has been your role to assist the farmers?"* Thirty percent that they assisted with adaptation, 25 percent with financial assistance, 45 percent with climate change perceptions, and 22 percent said they assisted with other measures. In response to the question "*Does your department have any collaboration with some other department to assist the farmers?"* 82 percent

said yes, while 18 percent responded with no. The question "*Is your department engaged in finding new research-based ways to increase the productivity of the farmers?"* yes answers accounted for 55 percent of the total, while no answers accounted for 45 percent.

The question "Which extension teaching method, in your opinion, is most persuasive for farmers in terms of an innovation's adaptability?" was also asked. The responses show that individual interaction was preferred by 32 percent , group contact by 55 percent , and mass contact by 12 percent . In response to the question "*Is the district administration working with you to help farmers raise their output?"* 37 percent said yes, while 62 percent said no. *Similarly, to the question "Are you training farmers on how to gain market access?"* 25 percent responded with yes, while 75 percent responded with no. There was also a question that asked "*Is your department encouraging farmers to go into commercial farming and switch from traditional to high-yield crops?"* Eighty percent responded with no, while 20 percent with yes. Finally, a question asked, "*Are you having difficulty carrying out your plan to enhance farmer market participation?"* In response, 65 percent said yes and 35 percent said no. The overall discussion and response are summarized in given Figure 1.

Fig. 1. Antecedents and Consequences



6. CONCLUSION AND POLICY RECOMMENDATIONS

The positive coefficients of inputs on output, as previously mentioned, may indicate that measures to enhance input availability would be beneficial, or the fact that

higher traction power increases efficiency may indicate the need for private-public partnerships to boost power availability. Similarly, the positive role of training in increasing market participation may imply that some training programmes are beneficial. Improvement of infrastructure by constructing local markets, roads and storage houses may also positively contribute to market participation.

The study's main goal was to establish a relationship between farm production, technical efficiency, and market participation. The research question was whether increasing agricultural production leads to increased market participation, having better market access conditions. To this purpose, the study demonstrates that farm-level variables and market accessibility factors have a significant impact on agricultural productivity and market participation. The findings also revealed that, in addition to market accessibility factors, production and technical efficiencies play a substantial impact in influencing market participation levels, with a positive coefficient of 1.39. There is room to increase the efficiency level by 42 percent. Therefore, there is a need to take the following steps:

- To control the effects of farm inputs on production; the inputs should be available to every farmer timely and in good quality and quantity.
- Socioeconomic factors influence farm performance. Education and agriculture skills along with training should create awareness and interest so that more educated people are involved in agriculture.
- Innovative machines should improve the management capabilities of the agricultural community, which enhance technical efficiency and market participation by designing and promoting infrastructure support, i.e., roads, markets, storage and warehouses, and transport facilities.
- Poor monitoring mechanisms were noted. To evaluate the impact of development schemes, advisory support systems, monitoring and evaluation mechanisms can assist in reorganising schemes to achieve the desired goals.
- Credit and short-term loans have a significant impact on market participation. The loans are used to convert traditional agriculture to modern commercial farming, which increases market participation.
- Strategies need to be devised to equip farmers with marketing skills and opportunities so that their products can reach the market at a lower cost and in a shorter time. .
- The agricultural extension should be market-oriented. Reorganise the agricultural extension system to meet the challenges of the market because extension agents are the ones who are in close contact with the community. Therefore, they should be well equipped with updated information about marketing. The farmers should be provided training to improve their management skills in the changing environment.
- The study's findings also show that increasing production efficiencies increase market participation. As a result, greater infrastructure and farmer-friendly policies are required to remove input and output market inefficiencies, lowering production costs, and making the sector more competitive.

REFERENCES

Abu, B. M. & Haruna, I. (2017). Financial inclusion and agricultural commercialisation in Ghana: An empirical investigation. *Agricultural Finance Review*, *77*(4), 524–544.

Abu, B. M., Issahaku, H., & Nkegbe, P. K. (2016). Farmgate versus market centre sales: A multi-crop approach. *Agricultural and Food Economics*, *4*(1), 1-16.

Abu, B. M., Osei-Asare, Y. B., & Wayo, S. (2014). Market participation of smallholder maize farmers in the Upper West region of Ghana. *African Journal of Agricultural Research*, *9*(31), 2427–2435.

Acheampong, E. O., Sayer, J., & Macgregor, C. J. (2018). Road improvement enhances smallholder productivity and reduces forest encroachment in Ghana. *Environmental Science & Policy*, *85*, 64-71.

Ahmed, A. E., Kuhlmann, F., Mau, M., Elobeid, H. A., & Elamin, E. M. (2005, October). Analysis of factors affecting sorghum production in the Gezira Scheme-Sudan and implication of the household food security. In *Proceedings of Conference on International Agricultural Research for Development* (pp. 11-13).

Ahmad, M. (2003). Agricultural productivity, efficiency, and rural poverty in irrigated Pakistan: A stochastic production frontier analysis. *The Pakistan Development Review*, 219–248.

Ahmad, M. & Ahmad, A. (1998). An analysis of the sources of wheat output growth in the "Barani" area of the Punjab. *The Pakistan Development Review*, 231–249.

Ahmad, M., Chaudhry, G. M., Iqbal, M., & Khan, D. A. (2002). Wheat productivity, efficiency, and sustainability: A stochastic production frontier analysis [with comments]. *The Pakistan Development Review*, *4*, 643–663.

Alemu, B. A., H. Bola, & E. A. Nuppenau (2007) Technical efficiency of farming systems across agro-ecological zones in Ethiopia: An application of stochastic frontier analysis. *Medwell Journal of Agriculture Science*, 202– 207.

Alhassan, et al. (2020) Access to credit, farm productivity and market participation in Ghana: A conditional mixed process approach.

Ali, D. A., Deininger, K., & Duponchel, M. (2014). Credit constraints and agricultural productivity: Evidence from rural Rwanda. *The Journal of Development Studies*, *50*(5), 649–665.

Ali, M., Malik, I. A., Sabir, H. M., & Ahmad, B. (1997). *The mungbean green revolution in Pakistan* (No. 97). Shanhua, Taiwan: Asian Vegetable Research and Development Center.

Aramo-Immonen, H. (2013). Mixed methods research design. In i*nformation systems, E-learning, and knowledge management research: 4th world summit on the knowledge society*, WSKS 2011, Mykonos, Greece, September 21-23, 2011. Revised Selected Papers 4 (pp. 32-43). Springer Berlin Heidelberg.

Barrett, C. B., & Dorosh, P. A. (1996). Farmers' welfare and changing food prices: Nonparametric evidence from rice in Madagascar. *American Journal of Agricultural Economics*, *78*(3), 656–669.

Battese, G. E., & Coelli, T. J. (1995). A model for technical inefficiency effects in a stochastic frontier production function for panel data. *Empirical Economics*, *20*, 325–332.

Battese, G. E., Malik, S. J., & Gill, M. A. (1996). An investigation of technical inefficiencies of production of wheat farmers in four districts of Pakistan. *Journal of Agricultural Economics*, *47*(1-4), 37-49.

Battese, G. E. & Broca, S. S. (1997). Functional forms of stochastic frontier production functions and models for technical inefficiency effects: A comparative study for wheat farmers in Pakistan. *Journal of Productivity Analysis*, *8*, 395–414.

Benjamin, D. & Deaton, A. (1993). Household welfare and the pricing of cocoa and coffee in Côte d'Ivoire: Lessons from the Living Standards Surveys. *The World Bank Economic Review*, *7*(3), 293–318.

Binam, J. N., J. et al. (2004) Factors affecting the technical efficiency among smallholder farmers in the slash and burn agriculture zone of Cameroon. *Food Policy*, 29(5), 531–545.

Boisvert, R. N. (1982) The translog production function: Its properties, Its several Interpretations and estimation problems.

Boughton, D., Mather, D., Barrett, C. B., Benfica, R. S., Abdula, D., Tschirley, D., & Cunguara, B. (2007). Market participation by rural households in a low-income country: An asset based approach applied to Mozambique. *Faith and Economics*, *50*, 64–101.

Bozoğlu, M. & Ceyhan, V. (2007). Measuring the technical efficiency and exploring the inefficiency determinants of vegetable farms in Samsun province, Turkey. *Agricultural Systems*, *94*(3), 649–656.

Bravo-Ureta, B. E., & Pinheiro, A. E. (1997). Technical, economic, and allocative efficiency in peasant farming: Evidence from the Dominican Republic. *The Developing Economies*, *35*(1), 48-67.

Budd, J. W. (1993). Changing food prices and rural welfare: A nonparametric examination of the Cote d'Ivoire. *Economic Development and Cultural Change*, *41*(3), 587–603.

Cabas, J., Weersink, A., & Olale, E. (2010). Crop yield response to economic, site and climatic variables. *Climatic Change*, *101*(3-4), 599–616.

Chandio, A. A., Jiang, Y., Wei, F., & Guangshun, X. (2018). Effects of agricultural credit on wheat productivity of small farms in Sindh, Pakistan. Are short-term loans better? *Agricultural Finance Review*, *78*(5), 592–610

Chaudhry, S., Hussain, M., Ali, M. A., & Iqbal, J. (2008). Efficacy and economics of mixing of narrow and broad leaved herbicides for weed control in wheat. *Journal of Agricultural Research (Pakistan)*.

Coelli, T. J. (1995). Recent developments in frontier modelling and efficiency measurement. *Australian Journal of Agricultural Economics*, *39*(3), 219–245.

Coelli, T. J. (1996). *A guide to FRONTIER version 4.1: A computer programme for stochastic frontier production and cost function estimation* (Vol. 7, pp. 1-33). CEPA Working papers.

Coelli, T. J., & Battese, G. E. (1996). Identification of factors which influence the technical inefficiency of Indian farmers. *Australian Journal of Agricultural Economics*, *40*(2), 103–128.

Deaton, A. (1989). Rice prices and income distribution in Thailand: A non-parametric analysis. *The Economic Journal*, *99*(395), 1–37.

Edmeades, S. (2006). Varieties, attributes and marketed surplus of a subsistence crop: Bananas in Uganda.

Ehui, S., Benin, S., & Paulos, Z. (2003). Policy options for improving market participation and sales of smallholder livestock producers: A case study of Ethiopia.

Fakayode, S. B. (2009) Technical efficiency and factor productivity in upland and lowland rice production systems in Kwara State, Nigeria. PhD Thesis Submitted to the Department of Agricultural Economics and Farm Management. University of Ilorin, Nigeria

Fraser, J., Fisher, E., & Arce, A. (2014). Reframing 'crisis' in fair trade coffee production: trajectories of agrarian change in Nicaragua. *Journal of Agrarian Change*, *14*(1), 52-73.

Govereh, J. & Jayne, T. S. (1999). *Effects of cash crop production on Food crop productivity in Zimbabwe: Synergies or trade-offs?* (No. 1096-2016-88413).

Harriet, et al. (2018) Potato market access, market efficiency and on-farm value addition in Uganda. Elsevier.

Hassan, S. & Ahmad, B. (2005). Technical efficiency of wheat farmers in mixed farming system of the Punjab, Pakistan. *International Journal of Agriculture and Biology*, *3*, 431–435.

Heltberg, R., & Tarp, F. (2001, May). Agricultural supply response and poverty in Mozambique. Institute of Economics, University of Copenhagen. In *conference on "Growth and Poverty" at the World Institute for Development Economics Research in Helsinki on 25th-26th May*.

Hughes, N., Lawson, K., Davidson, A., Jackson, T., & Sheng, Y. (2011). *Productivity pathways: climate-adjusted production frontiers for the Australian broadacre cropping industry* (No. 422-2016-26937).

Hussain, A., Saboor, A., Khan, M. A., Mohsin, A. Q., & Hassan, F. (2012). Technical efficiency of wheat production in rain-fed areas: A case study of Punjab, Pakistan. *Pakistan Journal of Agricultural Sciences*, *49*(3), 411–417.

Javed, M. I., Khurshid, W., Adil, S. A., Hassan, I., Nadeem, N., Ali, A., & Raza, M. A. (2011). Analysis of technical and scale efficiency of smallholder farms of rice-wheat system in Punjab, Pakistan. *Journal of Agricultural Research*, *49*(1), 125-137.

Javed, M. I., Adil, S. A., Hassan, S., & Ali, A. (2009). An efficiency analysis of Punjab's cotton-wheat system. *The Lahore Journal of Economics*, *14*(2), 97.

Jayne, T. S., Yamano, T., Nyoro, J. K., & Awour, T. (2001). *Do farmers really benefit from high food prices? Balancing rural interests in Kenya's maize pricing and marketing policy* (No. 680-2016-46722).

Kariuki, D. K. (2010). *Analysis of the effect of land tenure on technical efficiency in smallholder crop production in Kenya* (Doctoral dissertation, University of Nairobi).

Khan, R. E. A., & Shoukat, G. (2013). Technical efficiency of tomato production: A case study of district Peshawar (Pakistan). *World Applied Sciences Journal*, *28*(10), 1389–1392.

Kibaara, B. W. (2005). *Technical efficiency in Kenyan's maize production: An application of the stochastic frontier approach* (Doctoral dissertation, Colorado State University).

Kumbhakar, S. C. & Lovell, C. A. (2000). Knox. *Stochastic Frontier Analysis*.

Makhura, M., Kirsten, J., & Delgado, C. (2001). Transaction costs and smallholder participation in the maize market in the Northern Province of South Africa. In *Integrated Approaches to Higher Maize Productivity in the New Millennium, Proceedings of the Seventh Eastern and Southern Africa Regional Maize Conference, Nairobi, Kenya, 5–11 February 2002*. CIMMYT (International Maize and Wheat Improvement Center): El Batan, Mexico.

Marcel, R., Agnès, B., & Rimet, F. (2013). Influence of herbicide contamination on diversity and ecological guilds of river diatoms. *Cryptogamie, Algologie*, *34*(2), 169–183.

Martey, E., Al-Hassan, R. M., & Kuwornu, J. K. (2012). Commercialization of smallholder agriculture in Ghana: A Tobit regression analysis. *African Journal of Agricultural Research*, *7*(14), 2131-2141.

Mekonnen, M. T. (2017). *Impact of agricultural technology adoption on market participation in the rural social network system* (MERIT Working Papers 008). UNU-MERIT

Mukasa, A. N., Simpasa, A. M., & Salami, A. O. (2017). Credit constraints and farm productivity: Micro-level evidence from smallholder farmers in Ethiopia. *African Development Bank*, *247*.

Olwande, J., & Mathenge, M. (2012). *Market participation among poor rural households in Kenya*. Paper presented at the International Association of Agricultural Economists Triennial Conference, Foz do Iguaçu.

Oyewo, I. O., Oladeebo, J. O., Adesope, A. A., & Raufu, M. O. (2018). Farm Level Indicators of Sustainable Land Management: Effect on Agricultural Production in Oyo State, Nigeria.

P&DD (2020). Planning and development department. *Statistical Year Book*, 2020.

Strasberg, P. J., Jayne, T. S., Yamano, T., Nyoro, J. K., Karanja, D. D., & Strauss, J. (1999). *Effects of agricultural commercialization on food crop input use and productivity in Kenya* (No. 1096-2016-88433).

Pavelescu, F. M. (2011). Some aspects of the translog production function estimation. *Romanian Journal of Economics*, *32*(1), 41.

Renkow, M., Hallstrom, D. G., & Karanja, D. D. (2004). Rural infrastructure, transactions costs and market participation in Kenya. *Journal of development economics*, *73*(1), 349–367.

Rios, A. R., Shively, G. E., & Masters, W. A. (2009). Farm productivity and household market participation: Evidence from LSMS data.

Rios, A. R., & Shively, G. E. (2005). Farm size and nonparametric efficiency measurements for coffee farms in Vietnam.

De Salvo, M., Begalli, D., & Signorello, G. (2013). Measuring the effect of climate change on agriculture: A literature review of analytical models. *Journal of Development and Agricultural Economics*, *5*(12), 499-509.

SDG (2021), Sustainable Development Goal Mapping. The Annual Development Programmes 2016-17 to 2020-21 with the SDGs

Sigei, G., Bett, H., & Kibet, L. (2014). Determinants of market participation among small-scale pineapple farmers in Kericho County, Kenya.

Siziba, S., Kefasi, N., Diagne, A., Fatunbi, A. O., & Adekunle, A. A. (2011). Determinants of cereal market participation by Sub-Saharan Africa smallholder farmers. *Journal of Agriculture and Environment Studies, 2*(1), 180–193.

Sohail, N., Latif, K., Abbas, N., & Shahid, M. (2012). Estimation of technical efficiency and investigation of efficiency variables in wheat production: A case of district Sargodha (Pakistan). *Interdisciplinary Journal of Contemporary Research in Business*, *3*(10), 897–904.

Strasberg, P. J., et al. (1999). Effects of agricultural commercialisation on food crop input use and productivity in Kenya. Michigan State University. (MSU International Development Working Paper No.71).

Strauss, J. (1984). Marketed surpluses of agricultural households in Sierra Leone. *American Journal of Agricultural Economics*, *66*, 321–31.

Thiam, A. & B. E. Bravo-Ureta (2001). Technical efficiency in developing country agriculture: A meta-analysis. *Agricultural Economics* 25, 235–243.

Thiruchelvam, S. (2005). Agricultural production efficiency of bethma cultivation in Mahaweli System H. *Sri Lankan Journal of Agricultural Economics*, *7*, 1–20.

Vakis, R., Sadoulet, E., & De Janvry, A. (2003). Measuring transactions costs from observed behavior: Market choices in Peru.

Yin, R. K. (2003). Case study research: Design and methods. 3rd Edition, Sage. *Thousand Oaks*.

Zahid, K. B., & Ahmed, M. (2018). Climate change and profit efficiency in Punjab, Pakistan: Evidence from household-level panel data. *Journal of Economics Library*, *5*(1), 85–98.

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Estimating the Distributional Burden of General Sales Tax in Pakistan

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Pakistan's tax regime heavily relies on indirect taxes, constituting 60 percent of total tax receipts, of which general sales tax (GST) is a major component. This paper assessed who bears how much burden of GST levied on domestic production and sales by examining its incidence and distributional burden across household deciles for the year 2018-19. The paper maintained that even if the final product is exempted from tax, it incorporates the impact of taxes levied on intermediate inputs it uses. In order to trace these cascading effects of taxes, the paper used an input-output model-based approach. The results showed that the overall incidence of GST was, on average, 6.7 percent. The distribution of incidence was found to be regressive across the board as well as in rural and urban areas. Analysis by commodity groups indicated that basic food items bore the highest incidence and displayed the highest extent of regressivity across all deciles. This suggests that the poorer segments of society bear a relatively greater burden of GST in Pakistan.

JEL Classification: H220
Keywords: Incidence, Tax Burden, Tax Incidence, General Sales Tax, Pakistan, Distributional Burden of Tax, Input Output Table

1. INTRODUCTION

The literature suggests that the burden of indirect taxes often is not evenly distributed. Who bears a higher and who bears a lower burden in proportion to their income depends on the design of the tax regime. Investigating who actually bears the burden of a tax requires studying the incidence of taxation across different tiers of economic groups. This paper is an attempt in this direction.

The structure of federal taxes in Pakistan heavily relies on indirect taxes, which constituted 63 percent of total tax receipts in 2021-22, whereas direct taxes constituted 37 percent (Table 1). Of the 63 per cent of indirect taxes, general sales tax (GST) dominated with a share of 41 percent, whereas customs duties (CD) and federal excise duty (FED) constituted 16 percent and 5 percent, respectively.

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Table 1

Composition of Federal Taxes (% Share)

Tax Head	2000-01	2004-05	2009-10	2014-15	2018-19	2021-22
A. Direct Taxes	**31.8**	**31.1**	**39.6**	**39.9**	**37.8**	**37.2**
B. Indirect Taxes	**68.2**	**68.9**	**60.4**	**60.1**	**62.2**	**62.8**
General Sales Tax (GST)	39.1	40.4	38.9	42.0	38.1	41.2
Customs Duty (CD)	16.6	19.5	12.1	11.8	17.9	16.4
Federal Excise Duty (FED)	12.5	9	9.4	6.3	6.2	5.2
Total (A+B)	**100**	**100**	**100**	**100**	**100.0**	**100**

Source: Federal Board of Revenue (FBR) Annual Report (Various Issues).

Since indirect taxes are levied on goods and services that are (ultimately) consumed, they can be shifted forward (to consumers). Hence, they place an economic burden on taxpayers. Incidence analyses generally focus on economic incidence as it tells who bears the final burden of taxes that are shifted forward. A tax is progressive if the final tax burden as a percentage of income is higher on high-income individuals relative to low-income individuals, regressive if it is higher on low-income individuals relative to high-income individuals, and it is proportional if the burden is the same percentage on all individuals relative to their income. [1]

The literature on the incidence of taxation advocates that direct taxes (such as income tax) impose a relatively greater burden on the richer segments and, hence, are generally considered progressive. On the other hand, indirect taxes (such as taxes levied on goods and services) impose a relatively greater burden on the poorer segments of society as a large part of the income of the poor is spent on consumption, particularly food, hence, are generally considered regressive.

Studies, generally, have examined the distribution of incidence of taxes or the distributional burden of taxation by employing the approach of average rate of progression. This approach uses a priori assumptions from economic theory to ascertain who bears the final burden of taxes and employs household survey data to compute average tax rates (ATRs) for each household (total tax liability of each household as a proportion of its total income/expenditures). It then compares the ATRs across households based on a welfare scale (income or expenditures) to examine the progressivity, regressivity or proportionality of a tax.

The work by Pechman & Okner (1974) is considered the standard analysis of computing ATRs using microdata to assess the burden of taxation on the US economy. Their result showed that the US tax system was nearly proportional. Later studies followed the same approach to examine the distribution of tax burden for the US economy, such as Musgrave, et al. (1974) & Browning (1978, 1985).

Lovejoy (1963); McLure (1977); Wasylenko (1986); Sjoquist & Green (1992); Alleyne (1999); Alleyne, et al. (2004) assessed the incidence of direct and indirect taxes

[1]A progressive tax is considered equitable because those with a greater ability to pay would pay a higher proportion of their income in the form of taxation. However, a proportional tax may also be viewed as equitable to the extent that all taxpayers would pay the same proportion of their income as tax. Consequently, higher-income taxpayers would be paying a higher absolute amount of tax than lower-income taxpayers (Jamal & Javed, 2013).

in Jamaica using average rate of progression. All these studies found indirect taxes to be proportional. Some studies found taxes to be slightly progressive for the lower-income groups and slightly regressive for the upper-income groups, while some found the opposite results. Kaplanoglou & Newbery (2003) studied the distributional impact of indirect taxation in Greece. They found that poorer households paid a higher proportion of their total expenditure in indirect taxes, while richer households paid a lower proportion.

Studies undertaken in Pakistan have also considered average rate of progression approach to examine the distributional burden of indirect taxes. One of the earliest studies was conducted by Jeetun (1978), who estimated the distribution of tax burden across different income groups by rural and urban areas for the year 1972-73. His results showed that the total incidence of all taxes exhibited slight progressivity. Rural-urban comparison indicated that higher-income groups in rural areas were greatly undertaxed compared to their urban counterparts.[2]

Malik & Saqib (1989) showed a regressive tax system in rural areas, where all components of indirect taxes (import duties, sales taxes, and excise duties) exhibited a regressive pattern. However, in urban areas, import duties and excise duties were regressive, while sales tax was slightly positive. SPDC (2004) also showed that all components of the indirect tax system along with the overall system of indirect taxes portrayed regressive patterns.

Refaqat (2008) while analysing the distributional considerations of the GST as a result of tax reforms initiated in the 1990s, illustrated that the progressivity of GST in 1990-91 (pre-reform era) turned to proportionality in 2001-02 (post-reform era), despite exemptions for basic food items. Commodity-wise results showed the regressivity of GST on food items, clothes, fuel and utilities, progressivity on durable items, and POL products, and proportionality on tobacco and personal care items. Ara (2022) found that the pattern of incidence of indirect taxes on essential food items, which cover a large share of the expenditures of poor households, was regressive across all household deciles. On the other hand, the pattern of incidence on non-essential food items, which constitute a larger share in the expenditures of the rich segment, is proportional for the bottom 40 percent household and progressive for the top 60 percent.

Wahid & Wallace (2008) indicated that the incidence of all indirect taxes combined was relatively proportional. Individually, the results suggested that the incidence of the GST and customs were proportional for the lower deciles and progressive for the upper deciles, while excise duty was regressive. Jamal & Javed (2013) indicated the proportionality of the GST structure, which was associated with progressivity for the upper end of deciles of per capita expenditure. The urban incidence of the GST was higher than the rural incidence.

Refaqat (2008) and Jamal & Javed (2013) while estimating the incidence of the GST considered taxes levied on final consumption only and did not incorporate taxes levied on intermediate inputs used in the production of the final output, which constitutes

[2]All studies discussed here considered households as a unit of analysis. They have analysed the distributional aspect of indirect taxes by estimating incidence across households belonging to different income groups by assuming that indirect taxes were to be borne, i.e., full forward shifting of indirect taxes by consumers who consume taxable commodities.

a substantial part of total tax revenue. Furthermore, since they did not consider the taxes on intermediate inputs, they did not account for the items that are exempted from tax in their analysis. It is argued that even if the final output is exempted from tax, its price includes an implicit tax, which is transferred through taxes levied on inputs that were used to produce it. Estimating the incidence of indirect taxes without capturing the impact of taxes on inputs is likely to produce misleading results.

Studies have incorporated taxes on inputs while assessing the incidence of taxes on final goods. In such cases, their analyses were not based on nominal tax but on tax rates computed by using the input-output framework. These include Ahmad & Stern (1989); Malik & Saqib (1989); Bahl (1991); Alleyne, et al. (2004); SPDC (2004); Wahid & Wallace (2008), among others.

Though Wahid & Wallace (2008) and SPDC (2004) accommodated the taxes levied on intermediate inputs, they did not estimate the incidence at a disaggregated level, i.e. by considering different consumption items such as food, utilities, etc. Analysing the distribution of incidence by item or commodity group helps understand the tax burden according to the consumption patterns of the poor and rich.

This paper has estimated the incidence and the distributional burden of GST levied at domestic production and sales in Pakistan as it the largest component of indirect taxes. For this, it has employed the average rate of progression approach. It has addressed the limitations of the studies discussed in the preceding paragraphs, i.e., it has taken into account the cascading effect of implicit taxes (indirect taxes levied on inputs) by using the latest available Input-Output Table (IOT) for the year 2010-11. It has used the latest Household Integrated Economic Survey (HIES) 2018-19 to obtain household expenditures. In addition, it has looked at the distributional burden of GST by commodity groups that households consume.

The paper is organised as follows. Section 2 lays out the methodology used to estimate the incidence of GST and its distributional burden. Section 3 presents the estimation results and their explanation. Finally, Section 4 concludes the discussion and presents recommendations.

2. RESEARCH METHODOLOGY

The study utilised an IOT that allows tracing the cascading effects of indirect taxes on intermediate inputs. Hence, it measures the income of a household that goes away because of both taxes on final consumption and intermediate inputs used to produce final items for final consumption.

To incorporate this feature, input tax adjusted effective tax rates (ETRs) for each sector in the IOT were computed by employing the IOT's input coefficient matrix (see Ahmed & Stern, 1991).

In the simple IOT model of production with perfect competition and constant return to scale, the equilibrium price condition can be written as:

$$P_s = P_b A + V \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

Where vector P_s represents the seller's price, i.e., the price received by producers for sales, P_b represents the buyer's price, i.e., the price paid by consumers on buying goods for final consumption as well as by producers for buying intermediate inputs, A is the

fixed coefficient matrix of IOT, and *V* is a vector of payments to factors of production or value added.

In the presence of taxes, the buyer's prices become:

$$P_b = P_s + T \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Or

$$P_s = P_b - T \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Substituting Equation 3 into Equation 1 gives:

$$P_b - T = P_b A + V \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

Or

$$P_b = T(I - A)^{-1} + V(I - A)^{-1} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

This indicates that the purchaser's price is the sum of two components. The component $T(I - A)^{-1}$ is the input tax adjusted ETR vector (product of statutory tax rates and inverse of the (I-A) matrix). The component $V(I - A)^{-1}$ is the per-unit resource cost vector (product of per-unit value-added and inverse of the (I-A) matrix), which is the basic price vector or prices in the absence of tax.

This ETR is based on the assumption of full forward shifting of indirect taxes, i.e., the burden of indirect taxes is borne by consumers in proportion to their expenditures.

The methodology employed to compute the incidence of GST and its distributional burden across households comprised of following steps.

(i) Computation of Nominal Tax Rates

The variable *T* in Equation (6) is the prevailing statutory GST rate. The question is whether to take statutory rate or nominal rates of GST. Nominal rates are based on revenue collection and gross value added (GVA). Studies have used both rates. However, the nominal rate helps overcome the issue of tax compliance and matching tax burden with revenue collection. The present study computed nominal rates for GST instead of taking statutory tax rates. Nominal rates were computed in the following manner.

(a) The mapping of revenue collections of GST was carried out with sectors in the IOT to acquire revenue collection from each sector, i.e., the mapping of the revenue collection of 882 commodities with 81 sectors in the IOT.
(b) The shares of GVA for each sector of were calculated from the IOT 2010-11. These shares were then applied to the total GVA (GDP at factor cost) for the year 2018-19 to obtain sector-wise GVA for 2018-19.
(c) Nominal GST rate of each sector was computed by dividing revenue collection of respective sector with its GVA.

(ii) Computation of Effective Tax Rate

Nominal rates and the IOT coefficient matrix, *A*, were then used to compute the ETR for each sector as specified in the following equation.

$$T_e = T(I - A)^{-1}$$

These ETRs are used to compute the tax payments of households to assess the incidence of GST.

(iii) Reference Unit

The household was taken as the unit of analysis because it was assumed that household members collectively make decisions regarding work, consumption, and saving, and they often pool their resources and share them equally (see Alleyene, 2004; Refaqat, 2005, 2008; Wahid & Wallace, 2008; Jamal & Javed, 2013).

(iv) Welfare Indicator

Households' total expenditures were taken as a measure of their well-being and an indicator was constructed that ranks them by welfare level. Representing consumption as a proxy of household welfare is justified because it reflects the capacity to pay, is less volatile than current income, and is less likely to be under-reported than income (see Deaton & Grosh, 2000; Refaqat, 2005, 2008; Wahid & Wallace, 2008; Cubero & Hollar, 2010).

(v) Tax Shifting Assumption

The final burden of indirect taxes was assumed to be borne by consumers based on the view that owners of factors of production have perfectly inelastic supplies and consumers have perfectly inelastic demand for commodities. The lack of reliable information on these elasticities tends to the widespread adoption of the full forward shifting of indirect taxes (Gemmell & Morrissey, 2003).

(vi) Computation of Household Tax Payment

The estimation of tax incidence requires tax payments of each household for each item. For this, household consumption items were mapped with the sectors in the IOT. The estimated input tax adjusted ETR for each sector was then assigned to each item according to its mapping with the respective sector.

Tax payment for each item was computed by applying the respective item's ETR to its expenditure in the following manner.

$$TP_{j,h} = EXP_{j,h} \times \frac{1}{1+ETR_j} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

Where *TP* is tax payment, *EXP* is a household expenditure, *j (=1…n)* is consumption item, *h (= 1…m)* are households.

(vii) Estimation of Tax Incidence

Tax incidence (INC) was computed by taking a percentage share of tax payment for a particular item in the household's total expenditures.

$$INC_{j,h} = \frac{TP_{j,h}}{EXP_h} \times 100 \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

The distribution of incidence or distribution of tax burden was assessed based on average rate of progression, which is comparison of the average rate of incidence across household expenditure deciles.

This allows for analysing the progressivity or regressivity of taxes. A tax is progressive when the ARP rises along with the rise in households' total expenditures, it is regressive when it falls, and it is proportional when it remains constant.

Data Sources

The following data sources were used.

- The latest available Household Integrated Economic Survey (HIES) 2018-19, Pakistan Bureau of Statistics, Government of Pakistan, for households' consumption expenditures. HIES data were assigned survey weights provided in HIES. As a result, the analysis was based on data that is both nationally and provincially representative.
- The Input-Output Table 2010-11, Federal Bureau of Revenue, Government of Pakistan, was used to trace the impact of taxes on intermediate inputs.
- Tax schedules of the Sales Tax Act 1990 (amended up to 11 March 2019), Federal Board of Revenue, were used to identify the taxable and exempted sectors/items.

3. RESEARCH FINDINGS AND DISCUSSION

This section presents the estimation results. It first displays the nominal and estimated ETRs for each component of indirect taxes. It then furnishes results for the incidence of taxes and their distribution across household deciles.

3.1. Nominal and Effective Tax Rates

Computed nominal rates and estimated input tax adjusted ETRs of the GST are presented only for those sectors in the IOT that are related to households' final consumption of goods (see Table A1: Annexure).

The statutory tax rate of GST is 17 percent, but, except for a few sectors, the computed nominal tax rate for each sector, based on its revenue collection, was less than the statutory rate. This indicates the presence of leakage in tax revenue collection. A comparison of nominal rates and ETRs indicates that all sectors were affected by GST-domestic levied on intermediate inputs, which is reflected by the higher ETRs compared to nominal rates (Table A1: Annexure). In other words, it means that the burden of taxes on households was higher than the tax rate that exists due to cascading effect of taxes on inputs. In particular, nine sectors associated with crops, livestock, fisheries and milled grains are exempted from GST. However, these sectors are taxed at varying rates, in the range of one to 3 per cent, depending on the type and share of, and the nominal tax rate on intermediate inputs they used.

3.2. GST Incidence and Its Distribution Across Households

The distributional burden of GST across household expenditure deciles is presented in Table 2. The first decile represents the households in the lowest income

group or with the lowest total expenditures, while the tenth decile represents the households in the highest income group or with the highest total expenditures. This section uses the terms income and expenditures interchangeably while explaining research findings.

Table 2

Overall Distribution of Incidence of GST (%) – 2018-19

Deciles of HH Expenditures	All Areas	Rural	Urban
1	6.90	6.93	6.71
2	6.88	6.95	6.72
3	6.90	6.93	6.62
4	6.81	6.92	6.59
5	6.74	6.85	6.57
6	6.65	6.85	6.54
7	6.61	6.71	6.44
8	6.57	6.66	6.47
9	6.47	6.59	6.32
10	6.34	6.50	6.29
Overall	**6.69**	**6.79**	**6.53**

Source: Author's estimates based on HIES 2018-19 and IO Table 2010-11.

According to Table 2, the overall incidence of GST was on average 6.7 percent in Pakistan. The distribution of incidence was found to be regressive as it declined for higher deciles. It ranged from 6.9 percent for the lowest decile to 6.3 percent for the highest decile. This suggests that households in the first decile or the poorest 10 percent households, on average, pay Rs.7 as GST on the expenditure of every Rs.100, while households in the tenth decile or the richest 10 per cent pay Rs.6, on average. The pattern of incidence of GST was also regressive in both rural and urban areas. The magnitude of incidence in rural areas was 0.2 to 0.3 percentage points higher in rural areas compared to urban areas.

3.3. Distribution of Incidence: Comparison with Earlier Studies

Before providing the distributional pattern of incidence of earlier studies, a few words on the structure of taxation in Pakistan, which has undergone several reforms over the last three decades, are in order. In 1990-91, indirect taxation was shifted away from CD and FED and moved towards GST, which is a variant of the Value Added Tax (VAT). The Sales Tax Act of 1990, introduced a GST at the rate of 12.5 percent on imported goods and value added at each stage of production on goods manufactured and sold in Pakistan. However, goods, such as agricultural products, petroleum, electricity, pharmaceuticals, and fertilisers, were exempted from GST. By the late 1990s, the GST net was broadened to include items such as petroleum products, electricity, and natural gas. Over time, the rate of GST increased to 17 percent and the exemptions were removed. At present, the GST net has been expanded to include food items (e.g., tea, sugar, beverages, etc.), essential consumer products, and fertiliser, among other products.

As a result of these reforms, the composition of federal indirect tax receipts kept changing. In 1990-91, of the total federal tax collection, the CD constituted 55 percent, sales tax 18 percent, and FED 27 per cent. In 2000-01, the GST constituted 57 percent, CD 24 percent, and FED 18 percent. In 2021-22, among the three components of indirect taxes, the GST dominated with a share of 66 per cent followed by CD at 26 percent, and FED at 8 percent.

The effect of the imposition of the GST on domestic production and sale with an expanded base and increased rate reflects on its distributional burden across different segments of society. A comparison of the results of the GST incidence of this study with those conducted earlier is given in Table 3.[3]

While comparing the incidence in the pre- and post-reform era, Refaqat (2008) indicated that the distribution of GST changed from progressive in 1990-91 to proportional in 2001-02. Jamal & Javed (2013) also found it to exhibit a proportional pattern associated with progressivity at the upper end of income in 2010-11. It can be said that as the coverage of GST increased, incidence changed from progressivity to proportionality. However, Refaqat (2008) and Jamal & Javed (2013) considered tax levied only on final consumption and did not incorporate taxes levied on intermediate inputs, i.e., the cascading effect of tax. Due to this, they excluded the items that are exempted from GST from their analysis. This might be the factor resulting in a proportional GST burden.

Table 3

Distribution of GST Incidence—Comparison with Earlier Studies

Monthly Income Class (Rs)	Malik & Saqib (1989) HIES 1978-79	HH Deciles	Refaqat (2008) HIES 1990-91	Refaqat (2008) HIES 2001-02	SPDC (2004) HIES 2001-02	Wahid & Wallace (2008) HIES 2004-05	Jamal & Javed (2013) HIES 2010-11	This Paper HIES 2018-19
up to 300	1.08	1	1.08	4.58	9.30	3.32	4.41	6.90
301 - 400	1.03	2	1.25	4.73	8.60	3.23	5.49	6.88
401 -500	0.95	3	1.25	4.70	8.30	3.20	4.62	6.90
501 -600	1.01	4	1.28	4.70	8.20	3.27	4.73	6.81
601 - 800	0.92	5	1.30	4.71	8.00	3.50	4.77	6.74
801 - 1000	1.00	6	1.31	4.68	7.70	3.58	4.95	6.65
1001 - 1500	0.87	7	1.34	4.69	7.40	3.30	4.97	6.61
1501 - 2000	0.83	8	1.35	4.58	7.10	3.65	5.02	6.57
2001 - 2500	0.78	9	1.39	4.70	6.70	3.39	5.26	6.47
2501 - 3000	0.76	10	1.52	4.65	5.90	3.72	5.49	6.34
3001 - 3500	0.77							
3501 +	0.88							
Average	**0.91**		**1.31**	**4.67**	**7.72**	**3.42**	**4.97**	**6.69**

Source: Studies mentioned in the Table.

On the other hand, Malik and Saqib (1989), SPDC (2004), and the present study showed the distribution of GST burden to be regressive in 1978-79, 2001-02, and 2018-19. All these studies took into account the cascading effect of the GST and, therefore, included all items even if the final consumption was exempted from the GST. And that could be one of the reasons that they found a regressive pattern of incidence. However, despite incorporating the impact of taxes on inputs, Wahid and Wallace (2008) concluded that the incidence was proportional.

[3] All studies used the Household Integrated and Economic Survey (HIES) corresponding to the year of their analyses and computed the average rate of progression to assess the incidence of the GST.

Although exempted items have zero tax, taxes paid on inputs used in producing these items are not adjusted by a refund. As a result, even in the case of exempted items, any tax on inputs is passed on to consumers based on the inputs' share in production as well as the ripple effect of these inputs in terms of the type-1 multiplier. For example, wheat flour is exempted from the GST, but taxes paid on inputs (electricity, petrol, etc.) are not adjusted. Therefore, incorporating these taxes through the IOT wheat flour is effectively taxed, which is included in the consumer price of wheat flour.

The household expenditure pattern shows that 30 per cent poorest households, on average, spent 48 per cent of their total expenditures on food, whereas 30 per cent of the richest households spent 37 per cent (HIES 2018-19). It shows that the effective tax on wheat affected poor households relatively more compared to rich households. Hence, the incidence of the effective tax rate on wheat was regressive. The literature points out that the results of the incidence analysis are different if taxes on inputs are incorporated or not. Generally, taxes are regressive if taxes on inputs are incorporated (see Rajemison, et al. 2003; Younger, et al. 1999).

3.4. Distribution of GST Incidence by Commodity Groups

The distribution of the incidence of the GST by commodity groups across deciles of household expenditures is given in Table 4.

Table 4

Distribution of Incidence of GST by Commodity Groups (%) – 2018-19

	Household Expenditures by Deciles									
Commodity Groups	1	2	3	4	5	6	7	8	9	10
Regressive										
Basic Food Items	1.634	1.505	1.382	1.303	1.225	1.139	1.057	0.961	0.824	0.582
Personal Items	1.360	1.333	1.334	1.304	1.281	1.271	1.223	1.218	1.183	1.087
Household Items	0.753	0.692	0.671	0.631	0.616	0.611	0.593	0.584	0.543	0.565
Transport Services	0.156	0.135	0.136	0.139	0.137	0.135	0.133	0.133	0.128	0.114
Pharmaceutics	0.503	0.442	0.412	0.419	0.395	0.385	0.380	0.337	0.327	0.298
Tobacco & Products	0.146	0.111	0.109	0.102	0.095	0.080	0.076	0.071	0.060	0.045
Proportional										
Communication Services	0.031	0.031	0.031	0.031	0.030	0.031	0.031	0.033	0.035	0.037
Progressive										
Non-Basic Food Items	0.828	0.822	0.844	0.793	0.816	0.820	0.860	0.884	0.957	0.994
Durable Goods	0.142	0.151	0.166	0.171	0.183	0.192	0.224	0.240	0.259	0.461
Utilities	0.979	1.037	1.046	1.051	1.069	1.065	1.081	1.107	1.126	1.100
Transport Fuel	0.335	0.567	0.694	0.785	0.797	0.828	0.851	0.898	0.919	0.950
Books & Stationery	0.035	0.059	0.073	0.079	0.092	0.097	0.101	0.105	0.113	0.110

Source: Author's estimates based on HIES 2018-19 and IO Table-2010-11.

Basic food items had a highly regressive pattern of tax incidence across all deciles with the highest magnitude among all commodity groups.[4] For example, 10 percent of the poorest households paid 1.6 percent of their expenditures as GST when buying basic food items compared to 0.6 percent paid by the 10 percent richest households.

Other commodity groups that had regressive patterns across all deciles include transport services and tobacco products. Some groups, though, depicted an overall

[4]Items such as wheat flour, rice, pulses, vegetables, spices, fresh dairy, ghee, sugar, tea were considered basic food items in this study. The remaining food items were included in non-basic food group.

regressive pattern but a proportional pattern for the bottom deciles. These include personal items, household items, and pharmaceutics. The incidence of GST on transport services showed proportionality associated with regressivity for the bottom deciles.

Commodity groups that had a progressive incidence of GST include transport fuel and durable goods. The highest progressivity was in transport fuel where the poorest 10 percent of households' 0.3 percent expenditures were on GST, while the richest 10 percent paid one per cent. Other commodity groups, such as utilities, non-basic food items, and books and stationery, had an overall progressive pattern accompanied by a proportional pattern for some deciles. For instance, the incidence for utilities was progressive for the bottom two deciles, proportional to the sixth decile, and progressive thereafter. The incidence of tax for communication services was proportional across all deciles.

4. CONCLUSION AND RECOMMENDATIONS

This paper examined the incidence of GST in Pakistan and its distribution across deciles of household expenditures. The findings indicate that the overall incidence of GST, on average, was 6.7 percent. The distribution of incidence portrayed an overall regressive pattern across all deciles and in rural and urban areas.

Analysis by commodity group shows the highest rate of incidence as well as the highest extent of regressivity for basic food items. Other commodity groups that indicated regressivity include personal and household items. Commodity groups indicating a progressive pattern of incidence included non-basic food items, utilities and transport fuel.

The marked regressivity of incidence for basic food items primarily occurred on account of household spending patterns on food items. The HIES 2018-19 data revealed that 30 percent poorest households, on average, spent 48 percent of their total expenditures on food, whereas 30 percent of the richest households spent 37 percent.

Food inflation has often been a major public policy challenge for the governments in Pakistan and numerous measures are undertaken to control basic food prices to provide relief for the poor. For example, major basic food items have been exempted from indirect taxation over several years. However, indirect taxes levied on inputs used to produce these items act as implicit taxes, which are transferred to the final prices of these items and cause an increase in prices. On the other hand, to raise revenues, governments often increase taxes on necessities, which have inelastic demand, such as utilities, which put a burden on households' budgets, particularly on the poor.

Regressivity affecting the poor segment needs to be addressed, albeit without causing secondary distortions. For example, exempting selected essential items as well as their inputs from taxes would not only cause revenue losses but would also benefit the items not in the consumption basket of the poor.

An alternative way to avoid secondary distortions and support low-income groups is transfer payments, which can minimise the impact of taxes on them. Practices from other countries also demonstrate the use of transfer payments. Karageorgas (1973) pointed out a decline in inequality after the initiation of transfer payments in Greece, with the highest benefit received by the lowest income groups. Ruggeri, et al. (1994) reported the progressivity of general sales tax at the lower end of the income scale due to transfer payments to these income classes in Canada. Crisan, et al. (2015) also highlighted the progressive tax and transfer system in Canada, where the bottom two quintiles of the income distribution were net recipients of government transfers, while the middle and top two quintiles were net taxpayers.

The transfer payments program in Pakistan, for example Benazir Income Support Program (BISP), is such initiative that provides income support to the recipient households in the bottom three deciles approximately. Yet, its coverage is not perfect due to which many lower income households remained overlooked.

ANNEXURE

Table A1

Nominal and Estimated Effective Tax Rates of GST 2018-19

Sectors From IOT	Nominal Rate	Effective Rate
Rice	0.016	3.375
Wheat	0.000	3.270
Sugarcane	0.000	2.609
Pulses	0.003	0.810
Potatoes	0.000	2.962
Vegetables & Condiments	0.113	2.919
Fruits	0.025	2.395
Livestock & Slaughtered Products	0.091	1.246
Fisheries	0.000	6.880
Coal	16.944	19.257
Crude Oil & Natural gas	4.936	6.691
Vegetable Oils	0.827	5.256
Milled Grains	0.003	3.019
Bakery Products	8.572	12.663
Sugar	8.098	10.123
Other Food	17.000	19.879
Beverages	17.000	21.943
Cigarettes & Tobacco	5.325	6.739
Cotton Cloth	0.055	5.160
Art Silk	0.330	6.495
Made-up Textile Goods	0.036	3.725
Knitwear	0.551	4.916
Carpets	0.434	4.674
Garments	3.827	7.966
Other Textile Products	11.932	16.907
Leather & Leather Products	2.048	5.471
Footwear	6.400	9.342
Paper & Printing	4.458	10.531
Pharmaceuticals	7.078	14.964
Chemical Consumer Products	17.000	25.384
Refined Petroleum	17.000	23.519
Rubber & Plastic Products	4.578	13.209
Bricks	0.033	5.901
Cement	8.728	15.421
Metal Products	16.994	23.151
Non-electrical Machinery	5.887	14.937
Electrical Equipment	13.120	22.596
Transport Equipment	9.714	23.671
Handicrafts	0.328	3.986
Sports Goods	0.544	6.361
Jewelry & Precious Metals	0.177	5.509
Other Manufacturing Products	16.967	22.725
Electricity, Waterworks & Supply	11.796	19.320
Gas Supply	5.644	9.826
Transport - Railway	0.000	13.007
Transport - Road	0.000	4.748
Communication	0.206	1.595

Source: Author's estimates based on IOT 2010-11.

REFERENCES

Ahmad, E. & Stern, N. (1986). Tax reform in Pakistan overview and effective tax rates for 1975-76. *The Pakistan Development Review, 25*(1).

Ahmad, E. & Stern, N. (1991). *The theory and practice of tax reform in developing countries.* Cambridge University Press.

Alleyne, D., Alm, J., Bahl, R., & Wallace, S. (2004). Tax burden in Jamaica, Andrew Young School of Policy Studies, Georgia State University. (Working Paper 04-34).

Alleyne, D. (1999). *Taxation and equity in Jamaica 1985-1992: Who bears the burden?* University of the West Indies. Canoe Press.

Ara, I. & Ahmed, Q. M. (2022). Differential impact of taxation on food items. *Lahore Journal of Economics, 27(1).*

Bahl, R. (Ed.) (1991). *The Jamaican Tax Reform*. Lincoln Institute of Land Policy. Cambridge.

Crisan, D., McKenzie, K. J., & Mintz, J. M. (2015). The distribution of income and taxes/transfers in Canada: A cohort analysis. (Research Paper Vol. 8, No. 5), the School of Public Policy, University of Calgary.

Gemmell, N. & Morrissey, O. (2003). Tax structure and the incidence on the poor in developing countries. (Research Paper, No. 03/18). Centre for Research in Economic Development and International Trade (CREDIT), the University of Nottingham.

Jamal, H. (2017). Poverty and vulnerability estimates: Pakistan, 2016. (Research Report No. 99). Social Policy and Development Centre (SPDC), Karachi.

Jamal, H. and Javed, S. (2013). Incidence of general sales tax in Pakistan: Latest estimates. *Pakistan Journal of Applied Economics, 23*(2).

Jeetun, A. (1978). Incidence of taxes in Pakistan. (Research Report No.10). Applied Economics Research Centre (AERC), University of Karachi.

Kaplanoglou, G., and Newbery, D. M. (2003). The Distributional impact of the proposed tax reform on Greek households. Centre of Planning and Economic Research, Athens.

Karageorgas, D. (1973). The distribution of tax burden by income groups in Greece. *The Economic Journal, 83* (330).

Lovejoy, R. M. (1963). The burden of Jamaican taxes 1958. *Social and Economic Studies, 12*(4).

Malik, M. H., & Saqib, N. (1985). Tax incidence by income classes in Pakistan. *The Pakistan Development Review, 28*(1).

Pechman, J. A. & Okner, B. (1974). Who bears the tax burden? Brooking Institute, Washington D.C.

Refaqat, S. (2008). Social incidence of indirect taxation in Pakistan – (1990 – 2001), Thesis submitted for the degree of Doctor of Philosophy, University of Bath, UK.

Ruggeri, G. C., Wart, D. Van, & Howard, R. H. (1994). The redistributional impact of taxation in Canada, *Canadian Tax Journal, 42*(2).

Sjoquist, D. L. & Green, D. (1992). Distribution of tax burdens. (Jamaica Tax Review Project Report No. 3). Policy Research Center, College of Business Administration, Georgia State University.

SPDC (2004). Social development in Pakistan. *Annual Review*. Karachi: Social Policy and Development Centre.

Wahid, U. & Wallace, S. (2008). Incidence of taxes in Pakistan: Primer and Estimates. (Working Paper 08-13). International Studies Programme, Andrew Young School of Policy Studies.

Wasylenko, M. (1986). The distribution of tax burden in Jamaica: Pre-1985 reform. (Staff paper No.30). Jamaica Tax Structure Examination Project. Metropolitan Studies Program, Syracuse University, Board of Revenue, Government of Jamaica.

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Firms Financial Inclusion and Export Performance: Evidence from Manufacturing Sector Firms in Pakistan

FAREEHA ADIL and RABIA NAZIR

Financial inclusion of firms is crucial to create jobs, boost economic growth, and promote sustainable development. The study examines how financial inclusion affects enterprise export performance based on access to finance ratios. The study analyses the effects of firms' financial inclusion determinants and macro environment factors on firms' export values. The data comes from Pakistan's manufacturing sector covering 400 firms listed on Pakistan Stock Exchange from 1999-2021. Driven by the nature of the data, the Method of Moment Quantile Regression is employed to assess the below and above mean regression estimations, and a two-step system GMM approach is used to address endogeneity concerns. The results of the study are robust against different specifications. The study reveals that assets positively impact a firm's export performance, emphasising the importance of asset investment for foreign market competition. Asset tangibility negatively impacts export performance, except for low-gearing corporations, and fixed assets dominate. A balanced asset mix is crucial for improving exports. Debt-to-equity ratios, except for high-gearing firms, boost export performance, but domestic firms with high leverage ratios are more likely to fail. To avoid excessive leverage risks, firms must balance debt and equity. Diversifying the asset mix to include liquid and intellectual property can boost export success. Gearing affects export performance differently depending on a firm's debt levels. Low-geared enterprises can leverage assets and debt to boost exports, while high-geared enterprises may be financially constrained and face challenges from excessive debt. Therefore, enterprises must carefully examine their gearing levels and make informed decisions on optimising their asset composition for optimal export performance. The study also opens up the possibility of further research on the role of exchange rates and firms' investment in line with export performance.

JEL Classification: M10, M14, M19

Keywords: Financial Inclusion, Exports, Manufacturing Firms, MMQR, Balance Sheets

1. INTRODUCTION

The post-1990s literature, both theoretical and empirical, shows a positive association of financial development with economic growth and firms' performance

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through innovative and productivity-enhancing investment and by minimising transaction costs, better allocation of resources, and risk management. (King & Levine, 1993). Better financial intermediation positively influences aggregate income and productivity (Ginie & Townsend, 2004; Jeong & Townsend, 2007, 2008; Amaral & Quintin, 2010; Buera, et al. 2011). Financial indicators and financial access of firms enhance economic growth, innovation, and job creation as well as help reduce poverty and income inequality (Beck, et al. 2005; Ayyagari, et al. 2008; Beck, et al. 2007; Clarke, et al. 2006). The empiricists claim that firms' improved financial access to formal financial institutions address medium-plus long-term financial constraints and increase firms' profitability and production in developing countries. (Allen, et al. 2020; Triki & Gaj Igo, 2014).

It is imperative in emerging economies to investigate the impact of "not enough finance" in the less developed financial sector where usually the banking sector plays little or an insignificant role in the development of the financial sector and economic growth (Henderson, Papageorgiou, & Parmeter, 2013; M'eon & Weill, 2010; Deidda & Fattouh, 2002), particularly in the economies with low financial development and credit-to-GDP ratio lower than 14 percent, financial development plays little role in determining economic growth (Rioja & Valev, 2007). Chauvet & Jacoline (2015) argue that financial development plays a significant role in a firm's economic growth conditioned to high financial inclusion. And that firms' access to finance is positively associated with firms performance and growth (Chauvet & Jacoline, 2017).

A firm's financial inclusion has a serious implication on the firm's export potential. Studies have investigated the role of different financial factors that affect a firm's export orientation, performance, and survival of exporter firms (Pinto, et al. 2017; Vu, et al. 2020; Federici & Parisi, 2012; Peluffo, 2016; Greenaway, et al. 2007; Shivaswamy, et al. 1993; Salchenberger, et al. 1992). Ayesha & Khatoon (2021) argue that financial inclusion has positive implications for export market penetration and that export market penetration alters economic growth in developing Asian and African countries.

There is limited available empirical literature on firms' export performance in Pakistan. The studies include Memon, et al. (2012); Awan & Bashir (2016); Ullah, et al. (2017); Safeer, et al. (2019); Ahmad & Siddiqui (2019). These studies have investigated the association between a firm's capital structure and growth performance and have established a positive link. Higher exports show a country's global competitiveness, gear up resource allocation more efficiently, enhance foreign exchange reserves, improve competition, and increase employment and domestic innovation (Malik, et al. 2017). However, Pakistan's export performance has remained low despite remedial measures. Moreover, export statistics show that Pakistan' exports persistently lag behind other regional and developing countries. The imbalance in the trade deficit and the decline in export performance have been areas of concern over time. According to the World Bank Report (2021), the limited and restricted availability of external financing, especially long-term financing for business enterprises that increase a firm's export capacity, is one of the key impediments to the country's export performance.

For business enterprises, financial inclusion implies acquiring loan from commercial banks which can boost firm's production and exports. Similarly, the financial inclusion of SMEs enables them to exploit formal financial resources to finance

their economic activities, which eventually increases their performance in terms of production and export (Ayesha & Khatoon, 2021). In addition, the financial inclusion of firms in developed and developing economies is different. In developed economies where financial development level is high, firms use intangible assets, such as property rights, to secure external loans for better firm performance. while, in developing countries where financial development level is low, firms rely more on tangible assets to access external finance, which eventually improves the firm's economic activities (Hur, Manoj, & Riyanto, 2006). Given the context, it is plausible that the financial inclusion of a firm is an important determinant of its export performance. However, it may not be the one-size-fit-all- solution for firms export.

The study attempts to evaluate and quantify the impact of a firm's financial inclusion on the export performance of Pakistan's manufacturing sector. To the best of our knowledge, there is scant literature concerning firm export performance and financial inclusion with a focus on Pakistan. Prior studies have used limited financial variables and observations to investigate firms' export performance. The present study is unique in the sense that its empirics are based on a rich panel data set of 8,400 balance sheets and around 6,000 observations from more than 400 firms in Pakistan's manufacturing sector for the period 1999-2020 to assess the export performance of Pakistan's manufacturing sector conditioned on access to finance. The study employs robust econometrics techniques to quantify the impact of firms' financial health and export performance.

The study has important implications for policymaers. Firms greater access to formal financial institution services can potentially boost up firms export performances, and that could envetually improves the current account balance and export-led economic growth of a country. The objectives of the study are to investigate the impact of financial inclusion of large-scale manufacturing sector firms on their export performance, to quantify the impact of firm financial determinants and macro environment on a firm's export values, and to quantify the association between a firm's financial inclusion and export performances in terms of the firm's size, sector, and capital structure.

Firms' internal and external factors, including financial inclusion indicators, determine the firm's performance and growth sustainability level. A firm's access to external finance is noted as a key determinant of a firm's sustainable growth, which, eventually, contributes to economic growth at the macro level. However, empirical evidence regarding the interplay between a firm's financial inclusion and export performance at a larger scale in Pakistan is limited so far. The study exploit large panel dataset comprised 6,000 observations from 400 firms listed on Pakistan Stock Exchange, covering time period 1999-2020.

Since Pakistan's financial system has passed through several developmental phases, the proposed study is relevant and contributes at the policy level. The study highlights the impediments to Pakistan's larger manufacturing sector's exports. Pakistan's manufacturing sector's export and overall performance have been in-impressive and below its potentials for years. The manufacturing sector has further linkages with other sectors and has greater implications for the overall macroeconomic indicators. Hence, evidence-based policy is required to address the 'haves not' of firm operating in the manufacturing sector of Pakistan. Secondly, contribution of the study at the policy level is that the entire focus of the ongoing National Financial Inclusion

Strategy initiated by the State Banks of Pakistan in 2014 mainly targets individual financial inclusion. Therefore, the study highlights the significance of firms' financial inslucion and firms' export performance at policy level.

The rest of the paper includes sections on literature review, data and methods, results and conlusion.

2. LITERATURE REVIEW

Export and firm performance literature depicts several factors determining firms' export performance in general and particularly in developing economies. The determinants of firms exporting are categorised under different themes. The themes are such that they cover different aspects of firms' export experience, for instance, firms' supply-side factors and firms' demand-side determinants. At the same time, some studies have accounted for both the supply and demand sides of firms' export experience. In addition, other studies have investigated internal and external factors affecting firms' exporting behaviour.

Notwithstanding a firm's financial health, access to finance and firm exporting orientation in developing economies have emerged as important debates in the literature on finance. The following is a brief review of the existing related literature which conceptualises the relationship between a firm's financial health and export. It also covers recent empirical debates on the topic in the context of Pakistan.

Factors determining the demand side of a firm's export include real effective exchange rate, nominal exchange rate, production capacity, and relative export price. The determinants that impact firm's export supply side are domestic investment, gross capital formation, domestic production, foreign direct investment, and relative price (Gul & Rehman, 2014). Both suplly and demand side determinents paly significant role in firm's export performance (Rahmaddi & Ichihashi, 2012; Jongwanich, 2010; Roy, 2007; Funke & Holly, 1992).

The internal and external factors affecting firms' export performance are broadly categorised as resource-based paradigms and contingency paradigms (see Carlos M.P. Sousa, Francisco J. Martínez-López & Filipe Coelho, 2008). The internal factors, based on resource-based theory, suggesting that a firm's export performance is based on a firm's internal factors, such as firm size, firm experience, international experience of the firm, competence, such as resource commitment, customer relationship, product uniqueness, product quality, resilience, and managerial characteristics (see Aaby & Slater, 1989; Zou & Stan, 1998; Moen, 1999). On the other hand, the external factors are, based on the contingency theory, suggests that foreign market instincts, such as cultural similarities, government regulations, market competitiveness, and local business impact firms' export performance (see Erramilli & Rao, 1993; Styles & Ambler, 1994). Other factors affecting firm's export performance including financial constraints, exporting tendency, competitiveness, foreign market penetration, and export incentives have been thoroughly investigated globally.

In international trade literature, sunk costs (financial constraint) and other vital factors are noted as factors affecting firms' export decisions. Firms bear sunk costs to obtain foreign market information, develop the foreign market channel, and innovate the cost of goods quality in line with international standards. Thus, financially constrained

firms are less likely to bear the sunk cost. Financial constraint was a significant factor affecting the exporting decisions and export tendency in Pakistan (Qasim, Rizov, & Zhang, 2020; Kazmi, Imran, & Khan, 2020)

To offset barriers that impede enterprise's international trade, governments in developing countries introduce several incentives that induce trade across countries, regions, and continents. Emerging economies seek policies that encourage and promote exports as they are considered a linchpin of sustainable economic growth. For this purpose, incumbent governments extend the range of export incentives to encourage the export performance of enterprises. The range of export incentives varies across countries, including lower income tax, export finance incentives, zero rating sale tax, exemption from customs duties, etc. Ahmad, Salman, & Shamsi (2015) investigated the textile sector and compared the government's tax incentives in Bangladesh, India, and Pakistan. The study documented that Bangladesh's textile sector is the most export-oriented comparatively and has the highest export incentive among the three countries.

Scores of studies have documented the impact—direct and indirect—of a firm's financial inclusion on a firm's growth and firm's export performance. Chauvet & Jaclin (2015) analysed the impact of access to external finance on a firm's economic growth, productivity, and export performance in countries with low financial development.. Likewise, Harrison, Lin, & Xu (2013) addressed key factors explaining Africa's economic performance. Efobi, Orkoh, & Atata (2018), using World Bank Enterprise data for Nigerian manufacturing firms, found through a quasi-experimental approach that using formal financial services increase firms' export. Silva (2011) analysed the effect of international trade on firms' financial health. Arguing that international trade is a smooth path for exporting firms to enhance their financial health compared to non-exporter firms.

Kumarasamy and Singh (2018) study indicated that access to formal finance enables enterprises to enter the international market.. Ayesha and Khatoon (2021) study found that financial inclusion has a considerable impact on export market penetration. Greenaway, Guariglia, & Kneller (2007) study reported that firms engaged in international trade had better financial health than non-exporter ones. In addition, the study reported that participation in the international market improved firms' financial health significantly. Stiebale (2011) reported no evidence that financial constraint mattered for a firm's exporting decision. In line with former studies, Bridges & Guariglia (2008) repored results show financial indicators either did not have a significant or a minimal impact on internationally engaged firms.

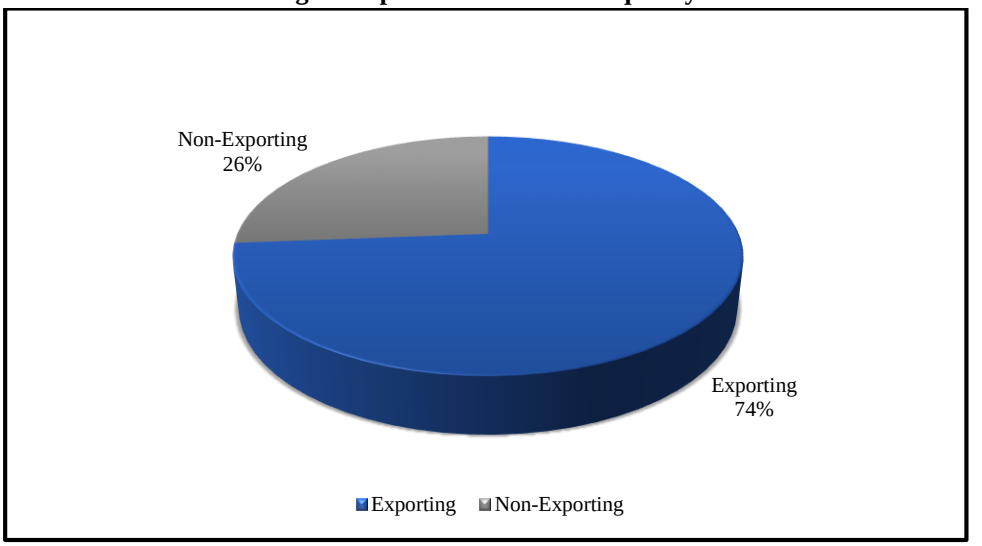
The documented literature pertinent to the linkages between firms' financial health and export performance exhibits contrasting results and conclusions. Studies that have used firm-level data for developed countries report either a significant or insignificant impact on a firm's financial health variables, such as liquidity ratio, leverage ratio, and collateral ratio on their export performance (for details, see Greenaway, Guariglia, & Kneller, 2007; Bridges & Guariglia, 2008); Stiebale, 2011, etc.). On the other hand, literature emerging from developing economies noted financial constraint as a key factor affecting firm's economic growth, performance, and export performance of fimrs, details, see Chauvet & Jaclin (2015); Harrison, Lin & Xu (2013); Silva (2011); Kumarasamy & Singh (2017); Kazmi, Imran, & Khan (2020).

3. DATA

3.1. Data Description

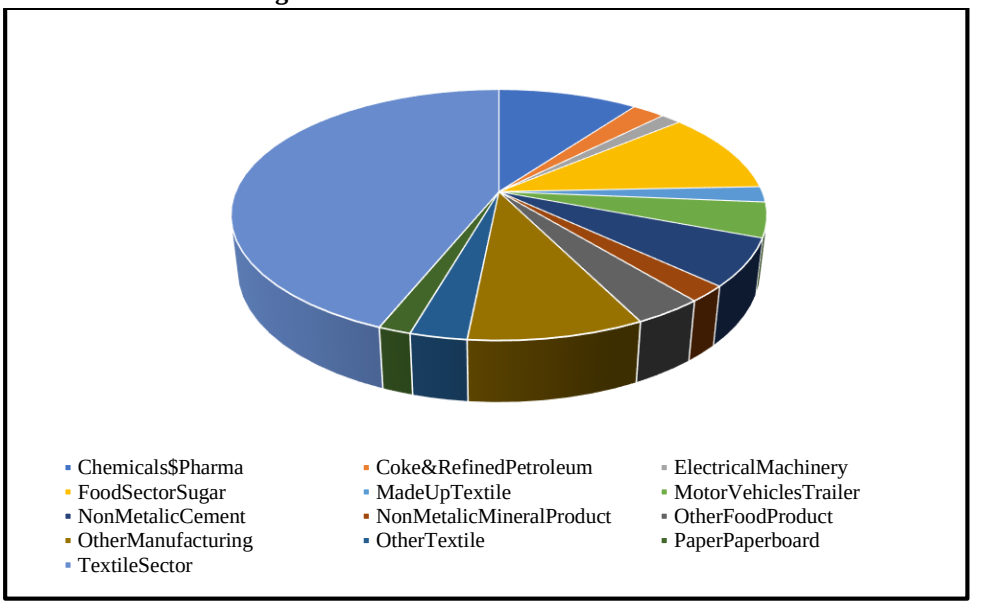
The section presents the essential features of the data. We initially digitalised data of 427 firms from 1999 to 2020. Out of 427 firms, 319 firms had positive export sales, see Figure 1. Therefore, we picked the firms exporting in any of the years for our analysis.

Fig. 1. Export-wise Firm's Frequency



Source: Authors' calculation.

Fig. 2. Sector-Wise Distribution of Firm.



Note: Author Calculations.

Figure 2 presents the sector-wise distribution of our dataset. The 315 firms broadly belonged to 15 sectors. Textile was the largest sector with almost 44 percent of the firms belonging to this sector. Chemical and pharma was the second largest sector with 10 percent firms, and the food sector—sugar was the third largest. On the other hand, electrical machinery was the smallest sector with only 1.46 per cent of firms in this sector. We used the log of export sales of the firms measured in Pak Rupees as our dependent variable in the study. The export sales revenue of the firms depicted their export performance in the studied period.

The study aims to measure the impact of financial inclusion indicators on the export performance of firms in Pakistan. Four proxies are used, including total assets, asset tangibility, debt-to-equity ratio, and gearing. The first indicator is the firm's total assets taken from its balance sheets in Pak Rupees. The second indicator is asset tangibility, which is the ratio of tangible assets to the firm's total assets. The third indicator is the debt-to-equity ratio, which is the ratio of total debt to total equity for companies using debt financing. The fourth indicator is gearing, which measures the degree to which a firm's activities are funded by owner funds versus creditor funds.

Two firm-level variables were used as control variables in the model: RETA (retained earnings to total assets ratio) and OINS (operating income to net sales ratio). RETA gauges accumulative profit over time, while OINS considers operating income and fixed expenses. The study also considered three macro-level controls: trade openness (the ratio of exports and imports to GDP) and the risk premium (the difference between low-grade government bond returns and long-term government bond returns).

The third macro-level control is the quantum index, which is the industrial production growth that may also affect the firm performance from a macro aspect. industrial production growth rate is measured by the following formula: $dip_t = ip_t - ip_{t-1}$, where DIP is the growth rate of industrial production, IP_t is the industrial production flow in year t, and its lagged value is Ip_{t-1}. Detail of variables' description is given in Table 1. And detail of variables construction is given in Table 2 (See Appendix).

Table 1

Description of Variables

Variable	Role	Measurement	Source
Export Sales	Dependent	Log of export sales measured in Pak Rupees	Balance Sheets
Assets	Financial Inclusion Indicators	Log of total assets of the firm measured in Pak rupees	
Asset Tangibility		Fixed Assets/Total Assets	
Debt to Equity Ratio		Total Debt/Total Equity	
Gearing		Gearing is the Total Debt to Total Capital Employed ratio	
RETA	Micro Controls	Retained Earnings to Total Assets	
OINS		Operating Income to Net Sales ratio	
Trade Openness	Macro Controls	Exports-imports/ GDP	WDI, World Bank
Risk Premium		Low-grade Govt bond return – long-term Govt bond return	State Bank of Pakistan
Quantum Index		Industrial production growth rate	

Note: Financial leverage variable divides firms into leveraged and non-leveraged for in-depth analysis.

3.2. Methodology

The study aimed to select the best estimation technique by testing data properties. Descriptive statistics are used to calculate the mean, median, and range of variables, as well as the standard deviation of values. The study also used skewness and Kurtosis to check for data normality, a method developed by Jarque & Bera in 1987. This test determines if data are normally distributed by examining skewness and excess Kurtosis, resulting in normality statistics.

$$JB = \frac{N}{6}\left(S^2 + \frac{(K-3)^2}{4}\right) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

The null hypothesis of Jarque-Normality Bera's test is that the data are normally distributed, which may be challenged by statistically significant estimates.

The study examines the impact of macroeconomic factors on firms, focusing on panel cross-section dependence and slope heterogeneity. Firms may become dependent on each other due to changes in laws or policies, leading to cross-sectional dependence. These factors can cause problems in econometric analysis. The study uses the Pesaran and Yamagata (2008) slope coefficient homogeneity (SCH) test and the Pesaran (2021) cross-sectional dependence test to determine if a phenomenon is homogeneous or heterogeneous.The SCH formula is:

$$\Delta_{SCH} = \sqrt{N(2k)^{-1}}\,(N^{-1}S - K) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (6)$$

Additionally, the above test provides estimated results for the adjusted SCH, which are as follows:

$$\Delta_{SCH} = \sqrt{N}.\sqrt{\frac{T+1}{2K.(T-K-1)}}\,.(N^{-1}S - 2K) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (7)$$

When significant estimates are established, the alternative hypothesis, which contradicts the null hypothesis, indicates heterogeneous slope coefficients. The recent study conducted the Pesaran (2021) cross-section dependence test between firms after estimating slope coefficients. If this issue is ignored, estimation bias may result (Campello, Galvao, & Juhl, 2019). The following is the formula used to evaluate cross-sectional dependency:

$$CD_{Test} = \frac{\sqrt{2T}}{[N.(N-1)]^{\frac{1}{2}}} \sum_{i=1}^{N-1} \sum_{K=1+i}^{N} T_{ik} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

The null hypothesis of the test implied the independence of firm cross-sections. An alternate cross-sectional dependence hypothesis can be accepted once significant estimates have been established. The variables in the dataset did not exhibit any cross-sectional dependence by the null hypothesis. Also supported by the alternative hypothesis is the cross-sectional dependence of the variables in the data set. The study utilised the Fisher test to confirm heterogeneous slope coefficients and cross-sectional dependency, which is simpler and easier to use than the IPS test. It does not require a balanced panel and can be applied to any derived unit root test. The Fisher test, proposed over 60 years ago by R. A. Fisher, is a simple and easy-to-use method, unlike the Levin-Lin and Im-Pesaran-Shin (IPS) panel data unit root tests.

Method of Moment Quantile Regression

First, a panel quantile estimation approach that assesses the dependent variance and conditional mean statistics was put forth by Koenker & Bassett Jr. (1978). Even with irregularly distributed variables, quantile regression produces reliable results. The current study used Machado & Silva's (2019) moment's quantile regression, which followed the properties of quantile regression. This approach evaluates distributional and heterogeneous quantile effects (Sarkodie & Strezov, 2019). Location-scale estimates typically take the following form:

$$Y_{it} + \vartheta X_{it} + \left(\delta_i + \rho \acute{Z}_{it}\right).\mu_{it} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (12)$$

The preceding equation shows $P.\left(\delta_i + \rho \acute{Z}_{it} > 0\right) = 1$, where p is the probability (.). Moreover, $\theta, \vartheta, \delta, and\ \rho$ are parameters to be estimated. The subscript I shows the fixed impact of $\theta_i\ and\ \delta_i$, i= 1, 2, 3…n and S exhibits the k-vector of predictable X elements that are variation conversions $\sim$ as follows:

$$Z_{\sim} = Z_{\sim}(X), \sim = 1, 2, 3 \ldots . k \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (13)$$

According to Machado & Silva (2019), in Equation (13), X is distributed independently for each l and t. l is orthogonal to X and can be distributed over fixed cross-sections and time, stabilising the other components and preventing excessive exogenic behaviour. Equations (2-4) then become:

$$Q_y\ (\tau\ X_{it}) = \left(\theta_i + \delta_i\ q(\tau)\right) + \vartheta X_{it} + p\acute{Z}_{\imath t}\ q(\tau) \quad \ldots \quad \ldots \quad \ldots \quad (14)$$

X is the vector of the independent variables, financial inclusion indicators, and micro and macro controls, as determined by Equation (14). The quantile distribution is also shown in the equation above. The dependent variable is export sales and its estimate depends on where those variables are located. Moreover, $-Q_y\ (\tau)\ \equiv\ \theta_i + \delta_i\ q.(\tau)$ is a scalar coefficient of quantile τ for each cross-section (i). Individual effects do not control intercept shift, unlike least square fixed effects. Due to variables' time-invariance, heterogeneous influence can shift across quantiles. Q (τ) also shows the $\tau - th$ quantile sample: the 25th, 50th, 75th, and 90th. Each quantile's equation is as follows:

$$min_q\ \sum_i \sum_t \gamma_t (R_{it} - \left(\ \delta_i + \ \rho \acute{Z}_{it}\right) q) \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (15)$$

Where

$$\gamma_t(A) = (\tau - 1).AI\ \{A \leq 0\} + TAI\{A > 0\} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (16)$$

Specifies check function.

To determine the impact of financial inclusion variables on the export value of the firms, we specify the following model:

$$Export\ Value_{it} = \alpha + \beta\ Financial\ Inclusion\ Indicators_{it} + \gamma Firm\ Level\ Controls_{it} + \delta\ Macro\ Level\ Controls_t + \epsilon_{it} \quad \ldots \quad (17)$$

Here, Export $Value_{it}$ stands for a log of export sales. Financial Inclusion indicators include total assets, asset tangibility, debt-to-equity ratio, gearing, and Firm-Level $Controls_{it}$ includee RETA and OINS. Macro Level $Controls_{it}$ include industrial production growth rate, trade openness, and risk premium.

The estimations are done on the full sample and then by disaggregating the sample by leverage structure, gearing, equity, sise, and sectors. The firms are divided according to their leverage capital structure. We grouped firms based on their financial leverage ratio. Category 1 is for firms with more than a 40 percent leverage ratio and Category 2 includes firms with less than 40 percent leverage. We grouped firms based on their gearing ratio with a 40 percent cut-off and termed them high-gearing and low-gearing firms. Then, firms were grouped based on their equity ratio, with an equity ratio of more than 40 per cent in one group and less than 40 percent in the second group.

Next, we have divided firms into four groups based on their sise. We have four categories of firms in terms of sise. The first category consisted of firms having assets worth PKR 300 million or less. The next category was large firms with assets from PKR 300 million to PKR 1,625.6 million (the 50th percentile). The third category included firms from the 50th to 75th percentile having assets between PKR 1,625.7 to 5,318.8 million. Moreover, the fourth category included firms above the 75th percentile in terms of assets.

Next, we created subsamples of firms based on sectors. The first sub-sector is textile, which comprises almost 43 percent of the firms and the second is the other manufacturing consisting of 10 percent of firms in the dataset. The third subgroup is the food sector and sugar, with 10 percent of firms, and the fourth is chemical and pharma, which comprises 8 percent of firms in our data set. The fifth group consists of all other firms.

Endogeneity is a significant issue in business and management research that relies on regression analysis for causal inferences. It can occur due to the omission of explanatory variables, causing the error term to be correlated with the explanatory variables, or due to the dependent variable being influenced by one or several explanatory variables (Abdallah, et al. 2015).We employed a two-step system GMM approach to address this issue to minimise endogeneity issues

4. RESULTS AND DISCUSSION

This section presents the study findings starting from descriptive statistics and data diagnostics to determine the correct type of estimation technique for our data. In descriptive statistics (Table 3), the mean values of all variables except OINS, risk premium, and trade openness are positive.

Table 3

Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Log of Export Sales	6,025	8.358	6.291	0.000	17.686
Log of Assets		14.321	1.988	-0.415	19.920
Financial Leverage		8.455	181.407	0.001	5,689.051
Asset Tangibility		0.519	0.239	0.000	3.658
Debt to Equity Ratio		0.895	39.256	-1,649.833	1,043.087
Gearing		2.407	92.761	-428.319	6,593.232
RETA		0.163	0.857	-5.467	35.954
OINS		-1.167	13.613	-572.213	3.902
Quantum Index		123.865	17.628	100.000	173.000
Trade Openness		-0.093	0.025	-0.133	-0.048
Risk Premium		-0.952	1.143	-4.067	1.820

Source: Author calculations.

The study used skewness and Kurtosis tests to confirm the normality of each variable. The normality test results are presented in Table 4. The joint test of skewness and Kurtosis, Jarque & Bera (1987) provide significant estimates for all variables, considering excess Kurtosis and skewness. The null hypothesis of normality is rejected, as the variables' prob>chi (2) values were less than 0.05.

Table 4

Normality Test

	Skewness	Kurtosis	Jarque-Bera Test	
Variable	Prob>chi2	Prob>chi2	chi2(2)	Prob>chi2
Log of Export Sales	0.00	0.00	7.83.7	0.00
Log of Assets	0.00	0.00	4.20E+04	0.00
Asset Tangibility	0.00	0.00	8529	0.00
Debt to Equity Ratio	0.00	0.00	1.90E+08	0.00
Gearing	0.00	0.00	4.70E+09	0.00
RETA	0.00	0.00	2.50E+08	0.00
OINS	0.00	0.00	2.40E+08	0.00
Quantum Index	0.00	0.00	903.3	0.00
Trade Openness	0.0025	0.002	405.7	0.00
Risk Premium	0.00	0.00	710.4	0.00

Source: Authors' calculations.

A firm's dependence on other firms for economic and non-economic reasons leads to similarities and differences. The Pesaran and Yamagata (2008) SCH test results, given in Table 5 that slope heterogeneity or homogeneity may lead to inefficient estimation. Both SCH (delta) and adjusted SCH (delta adjusted) are indicating the possibility of rejecting the null hypothesis and slope coefficient homogeneity.

Table 5

Testing for Slope Heterogeneity

Slope Heterogeneity Test	Statistics
Delta	2.639.487***
Delta Adjusted	5.060***

Source: Authors' calculations.
Note: *** p<0.01, ** p<0.05, * p<0.1

Next, as Campello, et al. (2019) claimed, estimation bias in panel data results from cross-sectional dependency. The Pesaran (2021) CD test was used (Table 6). The null hypothesis of cross-sectional independence was rejected because all variables had high statistical significance.

Table 6

Cross-sectional Dependence

Variable	Statistics
Log of Export Sales	37.76***
Log of Assets	343.913***
Asset Tangibility	7.428***
Debt to Equity Ratio	19.314***
Gearing	34.865***
RETA	21.484***
OINS	364.86***
Quantum Index	866.449***
Trade Openness	869.256***
Risk Premium	873.565***

Source: Authors' calculations.
Note: "*** p<0.01, ** p<0.05, * p<0.1"

Only the Fischer-type Dickey-Fuller and Phillip Perron unit root tests could be used to check for the presence of unit roots in the data because the data set was unbalanced. Table 7 presents the test results. Under mixed-order integration, all variables were found to be stationary.

Table 7

Unit Root Testing (Fischer-Type Phillips Perron Panel Unit Root Test)

Order of Integration	Level				First Difference			
Variables	Inverse chi-squared P	Inverse normal S	Inverse logit t) L*	Modified inv. chi-squared-Pm	Inverse chi-squared P	Inverse normal S	Inverse logit t) L*	Modified inv. chi-squared-Pm
Log of Export Sales	1,033.6	-1.14	-6.08	11.59	2,820.56***	-34.3***	-45.1***	62.49***
Log of Assets	858.397**	5.3899	2.1881	6.235***	2,571.2***	-31.9***	-39.6***	54.4***
Asset Tangibility	1,280.7***	-6.9	-11.1***	18.1	3,537.9***	-42.6***	-56.1***	81.6***
Debt to Equity Ratio	2,328.5***	-20.0	-31.0***	47.5***	4,494.4***	-49.2***	-71.4***	108.4***
Gearing	1,935.8***	-16.9***	-24.1***	36.4***	4,092.0***	-46.4***	-64.9***	97.1***
RETA	1,165.7***	-2.0	-7.5	14.9***	2,749.4***	-35.4***	-44.0***	59.4***
OINS	1,483.4***	-12.3***	-17.1***	23.7***	7,351.9***	-70.6***	-113.4***	188.3***
Quantum Index	1,571.5***	-18.5***	-17.6***	26.1***	6,226.4***	-63.3***	-94.6***	156.7***
Trade Openness	704.54***	-5.94***	-5.27***	1.86	3,575.2***	-46.5***	-54.9***	82.4***
Risk Premium	2,717.13***	-32.24***	-40.55***	58.20***	11,900.0***	-96.1***	-182.5***	314.4***

Source: Authors' calculations.
Note: "*** p<0.01, ** p<0.05, * p<0.1"

The Jarque and Bera (1987) test found that the variables were not normally distributed. Therefore, we used the method of moment quantile regression (MMQREG), which handles non-normal variables. Table 8 shows the approach's estimated results. Results show that assets positively impact export sales, with the impact increasing as the quantiles increase. Asset tangibility negatively affects export sales, but weakens as the quantiles increase. Equity debt is insignificant for lower quantiles but positive and significant for upper quantiles. Gearing has overall positive signs and strengthens its impact as the quantiles increase.

Table 8

Quantile Regression Estimates (Full Sample)

Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	0.826***	0.979***	1.017***	1.032***
	(0.061)	(0.028)	(0.023)	(0.022)
Asset Tangibility	-4.142***	-1.623***	-0.991***	-0.742***
	(0.559)	(0.253)	(0.210)	(0.203)
Debt to Equity Ratio	-0.000	0.001	0.002	0.002*
	(0.003)	(0.001)	(0.001)	(0.001)
Gearing	0.009	0.015*	0.016**	0.017***
	(0.018)	(0.008)	(0.007)	(0.006)
RETA	-0.167*	-0.306***	-0.340***	-0.354***
	(0.087)	(0.039)	(0.033)	(0.031)
OINS	0.018***	0.027***	0.029***	0.030***
	(0.006)	(0.003)	(0.002)	(0.002)
Quantum Index	-0.007	-0.012***	-0.014***	-0.014***
	(0.008)	(0.003)	(0.003)	(0.003)
Trade Openness	21.714***	12.869***	10.646***	9.773***
	(5.527)	(2.495)	(2.080)	(2.012)
Risk Premium	-0.037	-0.112**	-0.131***	-0.138***
	(0.120)	(0.054)	(0.045)	(0.044)
Constant	0.992	7.239***	8.808***	9.425***
	(1.345)	(0.608)	(0.506)	(0.490)
Observations	6024	6024	6024	6024

Source: Authors' calculations.

Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. All equations include RETA, OINS, risk premium, trade openness, and quantum index as control variables.

Table 9 shows that assets positively impact exports in all quantiles of leveraged and non-leveraged firms, with stronger effects from low to top quantiles. Non-leveraged firms have larger coefficients, and assets have a greater impact if less leveraged. Asset tangibility harms both firms, with weaker effects from lower to higher quantiles. The debt-to-equity ratio is significant and positive only for leveraged firms, while gearing positively impacts export sales, with a more pronounced effect for non-leveraged firms.

Table 9

Quantile Regression Estimates

	Leveraged Firms				Non-Leveraged Firms			
Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	0.821***	0.965***	1.000***	1.012***	0.890***	1.015***	1.047***	1.065***
	(0.071)	(0.031)	(0.026)	(0.025)	(0.125)	(0.063)	(0.054)	(0.052)
Asset Tangibility	-4.273***	-1.566***	-0.924***	-0.69***	-3.46***	-2.28***	-1.97***	-1.81***
	(0.665)	(0.292)	(0.244)	(0.237)	(1.063)	(0.535)	(0.461)	(0.444)
Debt to Equity Ratio	-0.001	0.001	0.002*	0.002*	0.089	0.108	0.112	0.115
	(0.003)	(0.001)	(0.001)	(0.001)	(0.275)	(0.138)	(0.119)	(0.115)
Gearing	0.007	0.012	0.014**	0.014**	2.317**	2.215***	2.189***	2.174***
	(0.018)	(0.008)	(0.007)	(0.006)	(1.048)	(0.527)	(0.454)	(0.437)
Constant	3.719**	8.214***	9.281***	9.662***	-8.62***	2.792**	5.719***	7.380***
	(1.548)	(0.678)	(0.569)	(0.553)	(2.637)	(1.349)	(1.148)	(1.101)
Observations	4698	4698	4698	4698	1326	1326	1326	1326

Source: Authors' calculations.

Note: See note of Table 8.

Table 10 presents the same finding for assets positively impacting sales, with the effect being strong in the firms' low gearing and upper quintiles. Asset tangibility harmed sales for all quantiles of the high and low-gearing firms, with the effect getting weaker from lower to higher quintiles. Gearing had a strong negative impact on the export sales of high-gearing firms. If firms already used more than 40 percent gearing, further increases in gearing impacted their exports negatively.

Table 10

Quantile Regression Estimates

	High Gearing Firms				Low Gearing Firms			
Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	0.702***	0.883***	0.922***	0.935***	0.729***	0.961***	1.083***	1.145***
	(0.086)	(0.033)	(0.026)	(0.025)	(0.068)	(0.061)	(0.059)	(0.062)
Asset Tangibility	-4.48***	-2.83***	-2.47***	-2.35***	-3.14***	-0.121	1.466**	2.275***
	(0.731)	(0.280)	(0.224)	(0.21)	(0.687)	(0.638)	(0.601)	(0.630)
Debt to Equity Ratio	-0.002	0.001	0.001	0.002*	0.022**	0.031***	0.036***	0.039***
	(0.003)	(0.001)	(0.001)	(0.001)	(0.009)	(0.008)	(0.008)	(0.009)
Gearing	-0.120**	-0.09***	-0.09***	-0.08***	-0.002	0.004	0.008	0.010
	(0.049)	(0.019)	(0.015)	(0.015)	(0.014)	(0.011)	(0.012)	(0.012)
Constant	4.390***	9.304***	10.352***	10.716***	-7.01***	0.044	3.750**	5.640***
	(1.695)	(0.650)	(0.522)	(0.501)	(1.819)	(1.625)	(1.591)	(1.668)
Observations	4,842	4,842	4,842	4,842	1,182	1,182	1,182	1,182

Source: Authors' calculations.
Note: See note of Table 8.

Table 11 shows that assets have a stable positive impact on export sales of low-equity and high-equity firms. Equity-based firms have a slightly increased impact, while low equity firms experience a decrease. Assets tangibility is mostly negative. High-equity firms have a positive debt-to-equity ratio, while low-equity firms have an insignificant impact. Gearing is positive and significant for high-equity firms, increasing export sales of equity-based firms but negatively impacting low-equity firms. Equity-based firms gain more from debt and gearing.

Table 11

Quantile Regression Estimates

	High EquityFirms				LowEquity Firms			
Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	0.788***	0.970***	1.011***	1.027***	0.885	0.819**	0.791***	0.780***
	(0.068)	(0.027)	(0.022)	(0.022)	(1.093)	(0.330)	(0.135)	(0.206)
Asset Tangibility	-2.92***	-0.72***	-0.213	-0.014	-5.558	-3.210	-2.224**	-1.829
	(0.658)	(0.265)	(0.215)	(0.208)	(8.412)	(2.550)	(1.039)	(1.590)
Debt to Equity Ratio	0.041*	0.041***	0.040***	0.040***	-0.002	0.000	0.001	0.001
	(0.023)	(0.009)	(0.008)	(0.007)	(0.013)	(0.004)	(0.002)	(0.002)
Gearing	0.029	0.026***	0.025***	0.024***	-0.003	-0.039	-0.054**	-0.060*
	(0.024)	(0.010)	(0.008)	(0.008)	(0.176)	(0.053)	(0.022)	(0.033)
Constant	0.305	7.017***	8.550***	9.156***	4.130	10.065*	12.557***	13.555***
	(1.526)	(0.614)	(0.501)	(0.483)	(18.613)	(5.634)	(2.295)	(3.515)
Observations	5,185	5,185	5,185	5,185	839	839	839	839

Source: Authors' calculations.
Note: See note of Table 8.

Tables 12 and 13 below, present the results for firms segregated according to their sise. The study found that assets significantly impacted export sales of firms of all sises, with the effect being greater for firms within the 25th to 75th quintiles. Asset tangibility decreased export sales of medium-sised and large-sised firms up to the 75th quantile. Asset tangibility was positive for large firms above the 75th quantile. The debt-to-equity ratio was mostly insignificant. Gearing positively impacted export sales of bottom and top firms, while negatively impacted firms in the 50-75th quantiles.

Table 12

Quantile Regression Estimates

	Medium-sised firms with assets less than 300 million Rs				Large-sised Firms in 25- 50% quintiles			
Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	0.177**	0.144*	-0.082	-0.151	2.404***	2.182***	2.093***	2.062***
	(0.069)	(0.075)	(0.127)	(0.147)	(0.365)	(0.229)	(0.201)	(0.197)
Asset Tangibility	-1.24***	-1.220**	-1.082	-1.040	-3.97***	-3.54***	-3.36***	-3.30***
	(0.474)	(0.506)	(0.873)	(1.011)	(0.744)	(0.467)	(0.410)	(0.403)
Debt to Equity Ratios	0.006	0.004	-0.004	-0.007	-0.001	0.001	0.002*	0.003**
	(0.008)	(0.009)	(0.015)	(0.017)	(0.002)	(0.001)	(0.001)	(0.001)
Gearing	0.026**	0.030**	0.058***	0.067***	0.017	0.010	0.007	0.006
	(0.011)	(0.012)	(0.020)	(0.024)	(0.028)	(0.018)	(0.015)	(0.015)
Constant	1.594	3.434*	16.068***	19.965***	-12.8***	-0.158	4.916***	6.672***
	(1.529)	(1.822)	(2.837)	(3.271)	(3.094)	(1.968)	(1.702)	(1.671)
Observations	867	867	867	867	2,145	2,145	2,145	2,145

Source: Authors' calculations.
Note: See note of Table 8.

Table 13

Quantile Regression Estimates

	Large-sised Firms in 50-75% quintiles				Large-sized Firms in Above 75% quintiles			
Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	1.667**	1.288***	1.184***	1.141***	-0.554*	0.174	0.528***	0.670***
	(0.738)	(0.282)	(0.212)	(0.206)	(0.330)	(0.133)	(0.092)	(0.093)
Asset Tangibility	-8.06***	-4.05***	-2.951***	-2.492***	1.538	0.439	-0.095	-0.308
	(1.387)	(0.514)	(0.380)	(0.367)	(0.991)	(0.448)	(0.312)	(0.317)
Debt to Equity Ratio	0.003	-0.000	-0.001	-0.002	-0.003	-0.002	-0.001	-0.000
	(0.010)	(0.004)	(0.003)	(0.003)	(0.007)	(0.003)	(0.002)	(0.002)
Gearing	-0.066	-0.06***	-0.059***	-0.058***	0.136	0.126***	0.121***	0.119***
	(0.045)	(0.017)	(0.013)	(0.013)	(0.084)	(0.039)	(0.027)	(0.028)
Constant	7.858	9.968***	10.547***	10.788***	14.348***	12.311***	11.322***	10.926***
	(6.248)	(2.386)	(1.795)	(1.744)	(3.242)	(1.492)	(1.041)	(1.059)
Observations	1,506	1,506	1,506	1,506	1,506	1,506	1,506	1,506

Source: Authors' calculations.
Note: See note of Table 8.

Tables 14 and 15 present results for sectoral analysis. Assets positively and significantly impacted the export sales of all the firms except for chemical and pharma firms. Asset tangibility affected export sales of the other small sectors positively, while it negatively affected all other sectors. The debt-to-equity ratio had mostly an insignificant effect in the sectoral analysis. Gearing had a positive impact on the majority of sectors, but the coefficient was insignificant in most specifications.

Table 14

Quantile Regression Estimates

	Textile Sector				Other Small Sectors			
Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	1.975***	1.509***	1.376***	1.302***	0.956***	1.117***	1.153***	1.179***
	(0.107)	(0.043)	(0.034)	(0.034)	(0.112)	(0.074)	(0.076)	(0.079)
Asset Tangibility	-9.39***	-6.05***	-5.10***	-4.56***	3.084***	1.249**	0.835	0.543
	(0.850)	(0.347)	(0.275)	(0.271)	(0.926)	(0.616)	(0.627)	(0.657)
Debt to Equity Ratio	0.001	0.001	0.002	0.002*	0.015***	0.004	0.002	-0.000
	(0.003)	(0.001)	(0.001)	(0.001)	(0.004)	(0.003)	(0.003)	(0.003)
Gearing	-0.017	0.002	0.007	0.011*	0.020	0.031	0.033	0.035
	(0.017)	(0.007)	(0.006)	(0.006)	(0.035)	(0.024)	(0.024)	(0.025)
Constant	3.291*	7.982***	9.322***	10.073***	-4.228*	5.260***	7.404***	8.914***
	(1.718)	(0.715)	(0.571)	(0.566)	(2.260)	(1.506)	(1.527)	(1.601)
Observations	2,642	2,642	2,642	2,642	1,606	1,606	1,606	1,606

Source:Authors'calculations.

Note: See note of Table 8.

We have conducted robustness analysis of the estimates by using GMM approach and attached thei findibgs as a supplementary file due to word limit to this paper. All the estimations using alternative approach are reobust and endorse the MMQR findings.

Discussion

The positive impact of assets suggests that firms with larger resources tend to increase exports, despite bearing fixed costs for enabling factors like licenses and shipping. Small firms, however, are less likely to export due to financial constraints. (Williams, 2011). The study by Souza, Martínez-López, and Coelho (2008) suggests that firms with larger fixed assets are more likely to acquire external loans from commercial banks. This is due to the need for collateral to ensure debt backup and returns. The study also highlights the comparative advantage of tangible assets in developing economies, where financial development is less developed, in determining international trade.

Tangible assets are crucial in availing external financial resources and protecting financiers against potential default on the debtor's end (Braun, 2003). In the case of advanced economies with higher levels of financial development, intangible assets play a significant role in determining firms' export performances instead of tangible assets (Hur & Raj, 2006). One plausible explanation can be that firms in advanced economies use intangible assets to secure loans, which leads to higher exports. An enterprise invests more in intangible assets to secure external loans in a country with higher financial development and an effective legal system (Giannetti, 2003).

The study reveals that a firm's capital formation of fixed assets can negatively impact export performance. This can lead to a firm diverting its financial resources from financing export activities to larger fixed asset development. The research focuses on Pakistan's larger manufacturing sector firms, listed on the Pakistan Stock Exchange, operating in a developed economic environment. Firms relying on fixed assets may be more costly to secure external loans than intangible assets. The study suggests that firms relying more on external debt to finance assets and activities are more likely to enhance exports (Qasim, Rizov, & Zhang, 2020). The study reveals that financial constraints significantly impact Pakistani firms' export decisions, influencing their exporting tendencies and the decision-making process. It suggests that gaining access to finance can enhance exports, highlighting the importance of understanding and addressing financial constraints in business operations.

Table 15

Table 15

Quantile Regression Estimates

	Other Manufacturing				Food Sector and Sugar				Chemical and Pharma			
Variables	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90	Qtile_25	Qtile_50	Qtile_75	Qtile_90
Log of Assets	0.162	0.803***	0.962***	1.041***	1.546***	0.812***	0.548**	0.418*	-0.68***	-0.42***	-0.32***	-0.27***
	(0.209)	(0.095)	(0.077)	(0.072)	(0.336)	(0.252)	(0.230)	(0.230)	(0.135)	(0.089)	(0.080)	(0.081)
Asset Tangibility	-5.8***	-5.96***	-5.98***	-5.99***	-9.58***	-8.23***	-7.7***	-7.5***	-8.25***	-4.66***	-3.29***	-2.65***
	(1.722)	(0.791)	(0.654)	(0.622)	(1.717)	(1.241)	(1.178)	(1.180)	(1.400)	(0.955)	(0.829)	(0.836)
Debt to Equity	0.023	-0.004	-0.011	-0.015	0.002	0.006	0.008	0.009	-0.005	-0.008	-0.009*	-0.009**
	(0.042)	(0.019)	(0.016)	(0.015)	(0.013)	(0.009)	(0.009)	(0.009)	(0.008)	(0.005)	(0.005)	(0.005)
Gearing	0.032	0.046**	0.050***	0.051***	-0.046	-0.033	-0.028	-0.026	0.002	0.031	0.042	0.047*
	(0.046)	(0.021)	(0.018)	(0.017)	(0.071)	(0.051)	(0.049)	(0.049)	(0.044)	(0.028)	(0.026)	(0.026)
Constant	-1.384	6.169***	8.056***	8.987***	-16.8***	1.238	7.763***	10.957***	17.069***	18.978***	19.709***	20.047***
	(3.937)	(1.806)	(1.488)	(1.412)	(3.560)	(2.993)	(2.421)	(2.407)	(3.142)	(2.023)	(1.874)	(1.882)
Observations	540	540	540	540	630	630	630	630	606	606	606	606

Source: Authors' calculations.
Note: See note of Table 8.

The debt-to-equity ratio, a measure of a firm's total debt relative to shareholder equity, suggests that firms with higher debt than shareholder equity can enhance export performance. Harrison, Lin, & Xu (2022) reported that other key factors, such as lack of infrastructure, political competition, and firms' access to finance, define firms' growth and export performance. Efobi, Orkoh, & Atata (2018) found through a quasi-experiment that formal financial services increased firms' exports. In addition, the study argued that access to formal debt enhanced firms' export capacity.

5. CONCLUSION AND POLICY RECOMMENDATIONS

For businesses to provide employment, accelerate economic growth, and advance sustainable development, they must be financially included. Businesses can invest in growth, hire more staff, and spur innovation when they have access to inexpensive finance and financial services. Financial inclusion helps create a more inclusive and fair society by ensuring that small and medium-sized enterprises have equal access to resources and opportunities. Addressing problems including insufficient infrastructure for digital finance, a lack of financial awareness, and restricted access to formal banking services are part of this. By doing so, we can create an environment that fosters entrepreneurship, creates jobs, and drives economic growth, ultimately leading to a more sustainable and prosperous future for all.

The study examines how financial inclusion affects enterprise export performance based on access to finance ratios. The study examines the impact of financial inclusion determinants and macroenvironmental factors on export values in Pakistan's manufacturing sector. Data from 400 firms listed on the Pakistan Stock Exchange from 1999 to 2021 is used to analyse the data. The results show that assets positively influence export performance, emphasising the importance of asset investment for foreign market competition. Asset tangibility negatively impacts export performance, except for low-gearing corporations where fixed assets dominate. A balanced asset mix is crucial for improving exports. Debt-to-equity ratios boost export performance, but domestic firms with high leverage ratios are more likely to fail. To avoid excessive leverage risks, firms must balance debt and equity. Diversifying the asset mix to include liquid and intellectual property can boost export success. Gearing affects export performance differently depending on a firm's debt levels. Therefore, enterprises must carefully examine their gearing levels and make informed decisions on optimising their asset composition for optimal export performance.

Firms, especially manufacturing firms, need to enhance their assets and resources, which significantly impacts firms' export performance. The findings suggest that the composition of assets in the LSM sector should consider the development of intangible assets, as they play a significant role in firms' export performance in developed countries with high financial development. The capital structure of Pakistan's LSM should be leverage-based for export orientation, as ratios for leverage and debt significantly improve export sales performance, and a formal line of credit can facilitate this.The National Tariff Policy, which imposes high tariffs on imported inputs, has an anti-export bias. To introduce textile-sector dyes, tariffs must be at Bangladesh's level. The study contributes by analysing the large-scale manufacturing sector in Pakistan, focusing on thousands of balance sheets and firms' export performance. It goes beyond assessing the capital structure of the LSM sector and uses holistic debt ratios to capture the debt burden relative to firms' equity and total capital employed.

APPENDIX

Table 2

Variable Construction

DETERMINANTS OF FIRM'S FINANCIAL INCLUSION	
VARIABLES	**CONSTRUCTION**
Firms' Export	Log of firms' export values
Total Assets, Total Assets Growth	TA=B+A3, TAG=DLOG(TAM)
Total Assets Growth/ GNP price deflator	**SIZE= TAG/GNP DF 1974**
ASSET TANGIBILITY	FIX.A/TA=A3/B+A3
Fixed Assets/Total Assets	**ATNG = FIX.A/TA**
DEBT TO EQUITY RATIO	CL+TFL/SH.HLDR.EQ=C+D/E
Total Debt/Total Equity	**DBERM= CL+TFL/SH.EQ**
Current Lib+Total Fixed Lib/Shareholder's Equity	
GEARING	CL+TFL/TCAP EMP=C1+C2+D1+D3/E+D
Current Liabilities+Total Fixed Liabilities/Total Capital Employed	**GEAR = CL+TFL/TCAP EMP**
DUMMY VARIABLES	
GEAR%	**One if GEARING > 20-40%** (High Gearing)
Dummy Variable	**0 otherwise** (Low Gearing)
EQUITY%	**One is EQ.FINAN > 40%** (High Equity Fin)
Dummy Variable	**0 otherwise** (Low Equity Fin)
SPECIFIC DETERMINANTS FOR FIRMS: CAMEL CATEGORY	
***RETA (Assets)**	SURPLUS/TA= E3/B2+A3
Retained Earningotal Asset ratio	**RETA= SURPLUS/TA**
***OINS (Management & Earnings)**	GR.PROF-EXP/SALES= F3-F8/F1
Operating Income to Net Sales ratio	**OINS = GR.PROF-EXP/SALES**
CONSTRUCTION OF MACRO VARIABLES	
IP	Industrial Production Growth rate
DIP = DLOG (IP)	$DIP_t = \log IP_t - \log IP_{t-1}$
	Industrial Production: *Industrial Production Growth rate*
Trade Openness:	**Export-Import/Gdp**
	$INFT_t = \log CPI_t - \log CPI_{t-1}$
Risk Premium	***Risk Premium*: RP_t = LOW GB_t – LGB_t**
Low-Grade Govt Bond Return – Long-Term Govt Bond Return	

Robustness Check: GMM Estimates

Table 16

GMM Estimates

Explanatory Variables	**Full Sample**
Lagged Export Sales	0.388***
	(0.005)
Log of Assets	1.013***
	(0.032)
Asset Tangibility	-7.897***
	(0.094)
Debt to Equity Ratio	0.014***
	(0.001)
Gearing	-0.103***
	(0.005)
RETA	-0.071
	(0.047)
OINS	0.009***
	(0.002)
Quantum Index	0.146***
	(0.008)
Trade Openness	15.179***
	(4.086)
Risk Premium	1.110***
	(0.310)
Observations	5,370
Number of IDs	319
Year Dummies	Yes
F test	5036.6***
AR1/prob.	-0.10.06/0.00
AR2/prob.	1.39/0.165
Sargan/prob.	237.83/0.126
Hansen/prob.	238.40/0.12

Note: (i) Robust standard errors are reported in parenthesis; (ii) *** denotes p<0.01, ** p<0.05, and * p<0.1, respectively; (iii) F is a Wald test of the joint significance of the reported coefficients; iv) AR(1) and AR(2) are serial correlation tests of order 1 and 2 using residuals in first differences, asymptotically distributed as *N(0,1)* under the null of no serial correlation; (v) Hansen is a test of the over-identifying restrictions, asymptotically distributed as under the null of no correlation between the instruments and the error term, the p-value is given after /; (vi) all equations include RETA, OINS, risk premium, trade openness, and quantum index as control variables.

Table 16 presents the results of the system GMM. Lagged export sales were positive and significant in all the equations. The assets-related financial inclusion proxies positively and significantly impacted the firms' exports. A one percent increase in assets brought 176 ($e^{1.013*\log(1.01)}$ = 1.76) percent increase in the export sales of the firms. It implies that firms with larger resources/assets tend to export more. Asset tangibility had a negative and significant impact on export sales. One per cent increase in tangible assets brought a 99 percent decrease in sales. From debt-related proxies of financial inclusion, gearing had a negative and significant impact on export sales.

The study reveals that a 10 percent increase in the proportion of creditor funds compared to a firm's owner fund to finance activities can decrease a firm's export performance by 10 percent. The debt-to-equity ratio, measured as total debt to total shareholder equity, has a positive and significant impact on export sales, with a one-unit increase bringing a 1.40 percent increase in export sales. Control variables all positively impacted export sales. A one-

percent increase in a firm's self-financing ratio tended to enhance export performance by 2 percent. A higher RETA ratio suggests that a firm has the potential to self-finance its capital expenditure rather than relying on external sources of finance.

Similarly, a one-percent increase in a firm's operational efficiency was associated with a one-percent increase in export performance. The quantum index, which shows national industrial production potentials, shows that a unit change in the industrial production Quantum Index brings about a 12-unit positive change in the firm's export performance. In Bangladesh's manufacturing sector, a 1.01 percent increase in exports was associated with a 1 percent increase in industrial production. Overall, these findings suggest that a firm's financial inclusion, self-financing, operational efficiency, and quantum index can significantly impact export performance. (Rehman, 2017).

In Table 17, the firms are divided according to their leverage capital structure. In Columns 2 and 3, we have grouped firms based on their financial leverage ratio. In Column 2, results for the firms with more than 40 percent leverage ratio are presented and In Column 3, the firms with less than 40 percent leverage are presented. Similarly, we have grouped firms based on their gearing ratio with a 40 percent cut-off and findings are presented in Columns 4 and 5.

Table 17

GMM Estimates for Leveraged versus Non-Leveraged Firms

Explanatory Variables	Leveraged Firms	Non-Leveraged Firms	Gearing 40% and Above	Gearing less than 40%
Lagged Export Sales	0.353***	0.169***	0.316***	0.260***
	(0.004)	(0.002)	(0.003)	(0.003)
Log of Assets	0.736***	0.919***	1.209***	0.814***
	(0.022)	(0.013)	(0.024)	(0.012)
Asset Tangibility	-6.295***	-8.096***	-3.924***	-0.835***
	(0.109)	(0.128)	(0.092)	(0.075)
Debt to Equity Ratio	0.016***	0.143***	0.014***	0.013***
	(0.001)	(0.016)	(0.001)	(0.001)
Gearing	-0.101***	0.503***	-0.131***	0.006***
	(0.003)	(0.018)	(0.005)	(0.002)
Observations	4136	1234	4264	1106
Number of IDs	311	197	311	187
Year Dummies	Yes	Yes	Yes	Yes
F test	7305***	310006***	4877***	577014***
AR1/prob.	-8.4/0.00	-5.20/0.00	-7.06/0.00	-5.01/0.00
AR2/prob.	1.23/.22	0.75/0.45	1.11/.26	1.49/0.13
Sargan/prob.	242.65/0.08	142.67/0.99	225.92/0.275	138.67/0.99
Hansen/prob.	243.49/0.08	160.78/0.99	255.5/0.029	155.7/0.99
Controls	Yes	Yes	Yes	Yes

Note: See note of Table 16.

Assets positively impacted export sales for all types of firms, leveraged or non-leveraged, low gearing or high gearing, While Asset tangibility negatively impacted export sales of all types of firms. Gearing hurt the exports of highly leveraged and high-gearing firms, while it positively impacted low-leveraged and low-gearing firms. The debt-to-equity ratio had a positive impact on all types of firms.

Table 18 captures the capital structure of the firms in terms of equity. The firms are grouped based on their equity ratio, with an equity ratio of more than 40 percent in one group and less than 40 percent in the second group. The majority of the coefficients were significant with previous signs. Gearing was negative for high-equity firms.

Table 18

GMM Estimates Equity versus Non-equity Based

Explanatory Variables	Equity More than 40%	Equity Less Than 40%
Lagged Export Sales	0.414***	0.009
	(0.004)	(0.011)
Log of Assets	0.781***	2.621***
	(0.029)	(0.075)
Asset Tangibility	-5.440***	-3.690***
	(0.075)	(0.336)
Debt to Equity Ratio	0.018***	0.004***
	(0.002)	(0.000)
Gearing	-0.123***	-0.010
	(0.005)	(0.006)
Observations	4,667	703
Number of IDs	314	154
Year Dummies	Yes	Yes
F test	7657***	988067***
AR1/prob.	-9.26/0.00	-3.18/0.00
AR2/prob.	1.13/0.25	0.01/0.92
Sargan/prob.	230.28/0.21	77.68/0.99
Hansen/prob.	251.02/0.042	108.4/0.99
Controls	Yes	Yes

Note: See note of Table 16.

In Table 19, we have divided firms into four groups based on their size. The firms' assets measured in million PKR were used for this breakdown. The State Bank of Pakistan specifies firms as medium-sized if they have assets worth PKR 300 million or less, while firms with more than PKR 300 million assets are termed large-sized firms. In our dataset, the majority of the firms were large-sized, with 86 per cent of them having assets of more than PKR 300 million. Therefore, we further categorised large-sized firms into three categories to dig deeper into the dynamics of firm size. The first category consisted of firms having assets worth PKR 300 million or less. The next category was large firms with assets from PKR 300 million to PKR 1,625.6 million (the 50th percentile). The third category included firms from the 50th to 75th percentile having assets between PKR 1,625.7

to 5,318.8 million. Moreover, the fourth category included firms above the 75th percentile in terms of assets.

Assets had a positive impact on export sales of all-sized firms. At the same time, asset tangibility was negative for the first three categories and positive for the top firms. The debt-to-equity ratio had a positive impact on sales of firms of all sizes. Gearing harmed the sales of firms medium-sized firms and had a positive impact on the bottom and top firms but it turned positive for the top quantile. This result coincides with the financial leverage result. Moreover, similar logic may be proposed for this finding as well.

Table 19

GMM Estimates (Size-Wise)

Explanatory Variables	Medium-sized Firms with assets less than 300 million Rs	Large-sized Firms in 25- 50% quintiles	Large-sized Firms in 50-75% quintiles	Large-sized Firms in Above 75% quintiles
Lagged Export Sales	0.253***	0.087***	0.241***	0.262***
	(0.019)	(0.004)	(0.001)	(0.004)
Log of Assets	0.172***	1.809***	0.315***	0.396***
	(0.056)	(0.036)	(0.029)	(0.044)
Asset Tangibility	-0.658***	-3.210***	-10.417***	2.294***
	(0.184)	(0.185)	(0.099)	(0.208)
Debt to Equity Ratio	0.007***	0.004***	0.016***	0.002***
	(0.002)	(0.000)	(0.001)	(0.000)
Gearing	0.021**	-0.017***	-0.020***	0.047***
	(0.010)	(0.004)	(0.002)	(0.008)
Observations	701	1,799	1,412	1,458
Number of IDs	110	217	194	143
Year Dummies	Yes	Yes	Yes	Yes
F test	297423***	218777***	220006***	329109***
AR1/prob.	-3.35/0.00	-6.78/0.00	-5.19/0.00	-4.38/0.00
AR2/prob.	1.24/0.21	1.59/0.11	0.55/0.58	0.70/0.84
Sargan/prob.	100.73/0.99	139.5/0.99	211.19/0.54	167.7/0.99
Hansen/prob.	72.19/0.99	159.5/0.99	157.5/0.99	121.69/0.99
Controls	Yes	Yes	Yes	Yes

Note: See note of Table 16.

Next, we created sub-samples of firms based on sectors the results of which are given in Table 20. The first sub-sector is textile, which comprised almost 43 percent of the firms, and the second is the other manufacturing consisting of 10 percent of firms in the dataset. The third sub-group is the food sector and sugar, with 10 percent of firms, and the fourth is chemical and pharma, which comprised 8 percent of firms in our dataset. The fifth group consists of all other firms. The results remain consistent with the previous results for the first two sectors. However, the financial inclusion indicators became insignificant in the next three sectors.

Table 20

Sector-Wise GMM Estimates

Explanatory Variables	Textile	Other Manufacturing	Food Sector and Sugar	Chemical and Pharma	Others
Lagged Export Sales	0.404***	-0.207	-0.247	-0.806	0.186***
	(0.004)	(0.490)	(0.794)	(0.904)	(0.033)
Log of Assets	1.197***	8.938	1.244	-1.465	0.925***
	(0.018)	(10.598)	(1.241)	(1.270)	(0.176)
Asset Tangibility	-6.745***	-65.638	29.204	-0.752	-0.662
	(0.119)	(60.164)	(39.294)	(10.879)	(1.462)
Debt to Equity Ratio	0.001	13.123	-0.406	-0.249	0.000
	(0.001)	(8.574)	(0.374)	(1.009)	(0.002)
Gearing	-0.050***	-23.543*	-0.433	-0.191	0.004
	(0.002)	(13.570)	(1.448)	(0.267)	(0.035)
Observations	2,338	486	568	538	1,440
Number of IDs	147	27	31	33	81
Year Dummies	Yes	Yes	Yes	Yes	Yes
F test	49802***	94.18***	232.79***	149.8***	2475***
AR1/prob.	-7.02/0.00	-1.11/0.26	-1.05/0.29	-0.51/0.61	-5.01/0.00
AR2/prob.	0.84/0.39	0.06/0.95	-0.79/0.432	-0.61/0.54	1.44/0.15
Sargan/prob.	241.08/0.08	88.2/0.99	113.23/0.99	111.4/0.99	118.77/0.99
Hansen/prob.	125.18/0.99	0.00/1.0	3.58/0.99	7.78/0.99	64.26/0.99
Controls	Yes	Yes	Yes	Yes	Yes

Note: See note of Table 16.

REFERENCES

Aab, N. E., & Slater, S. F. (1989). Management influences on export performance: a review of the empirical literature 1978–1988. *International Marketing Review*, 6, 7–26.

Ayesha, S., & Khatoon, A. (2021). Financial inclusion leads to export market penetration: A panel study on Asian and African countries. In M. Shahbaz, A. Soliman, & S. Ullah, Economic *Growth and Financial Development.* Springer.

Abdallah, W., Goergen, M., & O'Sullivan, N. (2015). Endogeneity: How failure to correct for it can cause wrong inferences and some remedies. *British Journal of Management*, 26(4), 791–804. https://doi.org/10.1111/1467-8551.12113

Ahmad, F. & Siddiqui, D. (n.d.). Impact of debt financing on performance: evidence from the textile sector Pakistan.

Ahmad, N., Salman, A., & Shamsi, A. (2015). Impact of financial leverage on firms' profitability: An investigation from cement sector of Pakistan. *Research Journal of Finance and Accounting, 6*, 222–1697.

Allen, F., Carletti, E., Cull, R., "QJ" Qian, J., Senbet, L. W., & Valenzuela, P. (2020). Improving access to banking: Evidence from Kenya. Forthcoming, *Review of Finance.*

Amaral, P. S., & Quintin, E. (2010). Limited inforcement, financial intermediation, and economic development: A quantitative assessment. *International Economic Review*, 51(3), 785–811.

Awan, A. G., & Bashir, S. (2016). Determinants of capital structure of textile industry in Pakistan. *Industrial Engineering Letters*, 6.

Ayyagari, M., Demirguc-Kunt, A., & Maksimovic, V. (2008). How important are financing constraints? The role of finance in the business environment. *The World Bank Economic Review*, 22(3), 483–516.

Bank, W. (2021). Pakistan development update reviving exports. World Bank.

Beck, T., Demirgüç-Kunt, A., & Levine, R. (2007). Finance, inequality and the poor. *Journal of Economic Growth*, 27–49.

Beck, T., Demirguc-Kunt, A., & Levine, R. (2005). SMEs, growth, and poverty: Cross-country evidence. *Journal of Economic Growth, 10*, 199–229.

Boa, W. (2020). COVID-19 and Online teaching in higher education: A case study of Peking University. *Human Behaviour and Emerging Technologies*, 113–115.

Braun, M. (2003). Financial contractibility and asset hardness. Harvard University.

Bridges, S. & Guariglia, A. (2008). Financial Constraints, Global Engagement, and Firm Survival in the United Kingdom: Evidence from micro Data. *Scottish Journal of Political Economy, 55*(2), 444–464.

Buera, F. J., Kaboski, J. P., & Shin, Y. (2011). Finance and development: A tale of two sectors. *American Economic Review, 101*(5), 1964–2002.

Campello, M., Galvao , A., & Juhl, T. (2019). Testing for slope heterogeneity bias in panel data models. *Journal of Business & Economic Statistics*, 749–760.

Chauvet, L., & Jacoline, L. (2015). Financial inclusion and firms performance. Hal Open Science, pp. 24.

Chauvet, L., & Jacoline, L. (2017). Financial inclusion, bank concentration, and firm performance. *World Development*, 97, 1–13.

Clarke, S. C., McAllister, M. K., Milner-Gulland, E., Kirkwood, G., Michielsens, C. G., & Agnew, D. J. (2006). Global estimates of shark catches using trade records from commercial markets. *Ecology Letter*, 1115–1126.

Coelho, F., Martínez-López, F. J., & Sousa, C. M. (2008). The determinants of export performance: A review of the research in the literature between 1998 and 2005. *International Journal of Management Reviews.*

Deidda, L., & Fattouh, B. (2002). Non-linearity between finance and growth. *Economics Letters*, 339-345.

Efobi, U. R., Orkoh, E., & Atata, S. (2018). Financial inclusion and foreign market participation of firms: A quasi-experiment from Nigeria. In U. R. Efobi, & S. Asongu, *Financing Sustainable Development* in Africa. Palgrave Macmillan, Cham.

Erramilli, M. K., & Rao, C. P. (n.d.). Service firms' international entry mode choice: A modified transaction cost approach. Journal of Marketing, 57, 19–38.

Fatima, S., Chen , B., Ramzan , M., & Abbas, Q. (2020). The Nexus between trade openness and GDP growth: Analysing the role of human capital accumulation. SAGE Open, 1–18.

Federici, D., & Parisi, V. (2012). Corporate taxation and exports.Funke, M., & Holly, S. (1992, September). The determinants of West German exports of manufactures: An integrated demand and supply approach. 128, 498–512.

Giannetti, M. (2003). Do better institutions mitigate agency problems? Evidence from corporate finance choices. *Journal of Financial and Quantitative Analysis*, 185–212.

Giné, X., & Townsend, R. M. (2004). Evaluation of financial liberalisation: A general equilibrium model with constrained occupation choice. *Journal of Economic Development*, 74(2), 269–307.

Greenaway, D., Guariglia, A., & Kneller, R. (2007). Financial factors and exporting decisions. *Journal of International Economics*, 73(2), 377–395.

Gul, S., & Rehman, S. U. (2014). Determinants of Pakistan's export performance. *Pakistan Business Review*.

Harrison, A. E., Lin, J. Y., & Xu, C. L. (2013, January). Explaining Africa's (Dis)advantage. *World Development*, Elsevier, 63, 59–77.

Henderson, D., Papageorgiou, C., & Parmeter, C. (2013). Who benefits from financial development? New methods, new evidence. *European Economic Review*, 47-67.

Hur, J., Manoj , R., & Kiyanto , Y. E. (2006). Finance and trade: A cross-country empirical analysis on the impact of financial development and asset tangibility on international trade. *World Development*, 1728–1741.

Jarque, C., & Bera, A. (1987). A test for normality of observations and regression residuals. *International Statistical Review*, 163–172.

Jeong, H., & Townsend, R. M. (2007). Sources of TFP growth: occupational choice and financial deepening. *Economic Theory*, 179-221.

Jongwanich, J. (2010). *Determinants of export performance in East and Southeast Asia*. 33(1), 20-41.

Kazmi, S. A., Imran, S. M., & Khan, R. A. (2020, September). Firms' financial constraints and exporting tendency in Pakistan. *Pakistan Social Sciences Review*, 4(III), 168–178.

King, R. G., & Levine, R. (1993). Finance and growth: Schumpeter might be right. The Quarterly Journal of Economics, *108*(3), 717–737.

Koenker, R. & Bassett, G. J. (1978). Regression quantiles. Econometrics, 33–50.

Kumarasamy, D., & Singh, P. (2018). Access to finance, financial development and firm ability to export: Experience from Asia–Asia-Pacific countries. *Asian Economic Journal*, 32(1), 15–38.

Machado, J. A., & Silva, J. S. (2019). Quantiles via moments. *Journal of Econometrics*, 145–173.

Maddala, G., & Wu, S. (1999). A Comparative study of unit root Tests with panel data and a new simple test. *Oxford Bulletin of Economics and Statistics*, 631–652.

Malik, A., Ghani, E., & Din, M. U. (2017). An assessment of Pakistan's export performance and the way forward.

Memon, F., Bhutto, N. A., & Abbas, G. (2012). Capital structure and firm performance: A case of textile sector of Pakistan. *Asian Journal of Business and Management Science*, 1.

Méon, P.-G., & Weill, L. (2010). Does financial intermediation matter for macroeconomic performance? *Economic Modelling*, 296–303.

Moen. (1999). The relationship between firm size, competitive advantages export performance revisited. *International Small Business Journal*, 18, 53–72.

Peluffo, A. (2016). The role of investments in export growth: Evidence from a middle-income country. Small Business Economics.

Pesaran, M. (2021). General diagnostic tests for cross-sectional dependence in panels. *Empirical Economics*, Springer, 13-50.

Pesaran, M., & Yamagata, T. (2008). Testing slope homogeneity in large panels. *Journal of Econometrics*, 50-93.

Pinto, P., Hawaldar, T., Quadras, M., & Joseph, R. (2017). Capital structure and financial performance. *Int. J. Appl. Bus. Econ. Res.*

Qasim, S., Rizov, M., & Zhang, X. (2021). Financial constraints and the export decision of Pakistani firms. *Int J Fin Econ., 26*, 4557–4573.

Rahmaddi, R., & Ichihashi, M. (2012). The impact of foreign direct investment on host country exports: Sector-based evidence from Indonesian manufacturing.

Riedel, J. (1988). The Demand for LDC Exports of Manufactures: Estimates from Hong Kong. *Economic Journal*, *98*(389), 133–48.

Rioja,, F., & Valev, N. (2007). Finance and the Sources of Growth at Various Stages of Economic Development. *Economic Inquiry.*

Romer , D., & Frankel , J. (1999). Does trade cause growth? American Economic Review, 379-399.

Roy, S. S. (2007, May). Demand and Supply Factors in the Determination of India's Disaggregated Manufactured Exports: A Simultaneous Error-Correction Approach. MPRA.

Safeer, A. A., He, Y., Abrar, M., & Ullah, A. (2019). Diagnostics of the Challenges and Potential Solutions to Improve Export Competitiveness In international markets: The case of Pakistani readymade garments industry. *Journal of Competitiveness, 13,* 128–143.

Salchenberger , L. M., Cinar, M. M., & Lash , N. A. (1992). Neural networks: A new tool for predicting thrift failure. *A Journal of the Decision Science Institute, 23*(4), 899–916.

Sarkodie, S., & Strezov, V. (2019). A Review on Environmental Kuznets Curve Hypothesis Using Bibliometric and Meta-Analysis. *Science of the Total Environment*, 128-145.

Shivaswamy, M., Hoban, J. P., & Matsumoto, K. (1993). A behavioural analysis of financial ratios. *Mid-Atlantic Journal of Business, 29*(1).

Silva, A. (2011). Financial constraints and exports: Evidence from Portuguese manufacturing firms. *International Journal of Economic Sciences and Applied Research, 4*(3), 7-19.

Sousa, C., Martínez-López, F., & Coelho, F. (2008). The determinants of export performance: A review of the research in the literature between 1998 and 2005. *International Journal of Management Review.*

State Bank of Pakistan. (2016). *Annual Report 2015-16.* State Bank of Pakistan.

Stiebale , J. (2011, January). Do Financial Constraints Matter for Foreign Market Entry? A Firm-level Examination. *The World Economy, 34*(1), 123-153.

Styles, C., & Ambler, T. (1994). Successful export practice: the UK experience. *International Marketing Review, 11,* 23-47.

Triki, T., & Gajigo, O. (2014). Credit Bureaus and Registries and Access to Finance: New Evidence from 42 African Countries. *Journal of African Development,* 73–101.

Ullah, A., Kashif, M., & Ullah, S. (2017). Impact of capital structure on the financial performance of the textile sector in Pakistan. *KASBIT Bus. J., 10,* 1-20.

Ullah , A., Pinglu , C., Ullah , S., Zaman , M., & Hashmi , S. H. (2020). The nexus between capital structure, firm-specific factors, macroeconomic factors and financial performance in the textile sector of Pakistan.

Usman, A. (2014). Impact of trade openness on export performance: Case study of Pakistan. The Research Institute of Nursing Science, Seoul National University (KAMJE).

Vu, T., Le, T., & Nguyen , T. (2020). The impact of capital structure on the performance of construction companies: a study from Vietnam stock exchange. *Accounting, 6*, 169-176.

Williams, D. A. (2011). Impact of firm size and age on the export behaviour of small locally owned firms: Fresh insights. *Journal of International Entrepreneurship volume*, 152–174.

Zou, S., & Stan, S. (1998). The determinants of export performance: A review of the empirical literature between 1987 and 1997. *International Marketing Review*, *16*, 333–356.

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Rain Rain Go Away: A Snapshot of the Flood 2022 and Way Forward

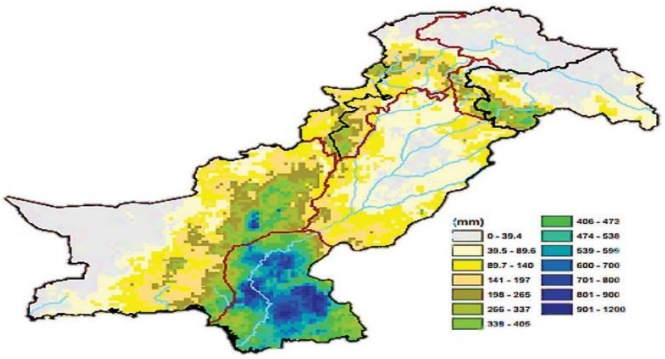
SOBIA ROSE and ABEDULLAH

The devastations caused by the recent floods in Pakistan are the result of poor management. Despite several warnings of an unusual rainfall during the months of July and August, a lack of preparedness resulted in a huge catastrophe. The knowledge brief in hand provides a snapshot of the extent of rainfall and subsequent floods, as well as the losses that occurred after the disaster. The major threats from the recent floods include the threat to the food security of an already deprived population; loss of education and health; and an increase in social unrest due to more criminal activity. To tackle the issue in future both structural and non-structural measure should be adopted. Structural measures are long-term development interventions while non-structural measures are based on short-term response to build community resilience. We are compelled to live with the floods due to our topographic situation. Better management and adaptation stratifies can help to minimise the losses in case of next disaster.

WHAT CAUSED FLOODS?

The already fragile economy fighting with inflation and political instability plunged in confronting the worst flood of its history, which testifies the fact that climate change has become a menace for Pakistan. The year 2022 is quite an unusual year for Pakistan as rainfall in majority of the areas remained quite abnormal (Figure 1; ICIMOD, 2022).[1]

Fig. 1. Rainfall in August 2022



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[1]ICIMOD, 2022, The 2022 Pakistan Floods: Assessment of crop Losses in Sindh Province using Satellite Data, https://lib.icimod.org/re- cord/35984

During sizzling months of heatwave people pleaded for a relief in terms of rain but quite contrarily to heatwave the monsoon rains in summer dumped almost 243 percent more than average making it the wettest month of August since 1961. The rain poured only in the month of August was 37 percent higher than average seasonal monsoon rainfall. Even at one point, it rained for continuously 72 hours.[2] The Table 1 explains the extent of rainfall received during the month of August in different provinces of Pakistan and compares it with the normal rainfall.

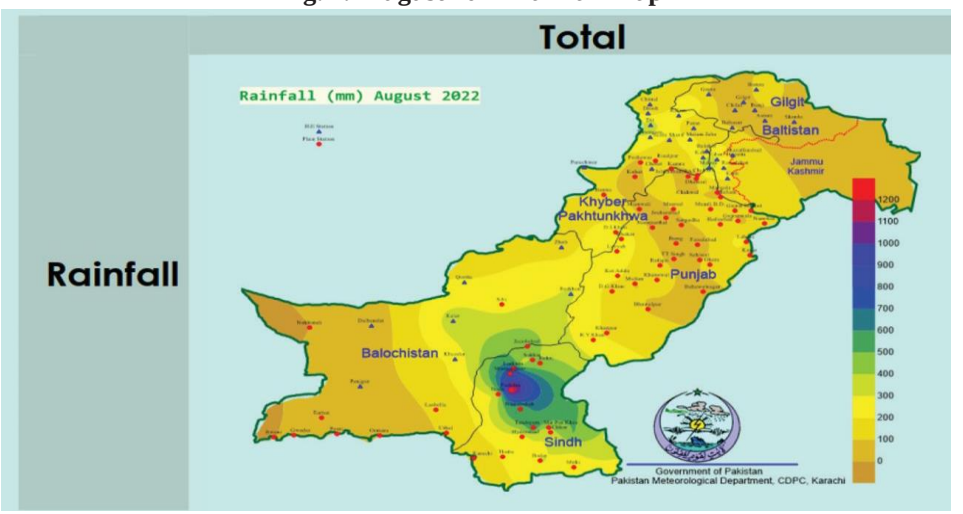
Table 1

Distribution of rainfall across provinces during August (PMD, 2022)[3]

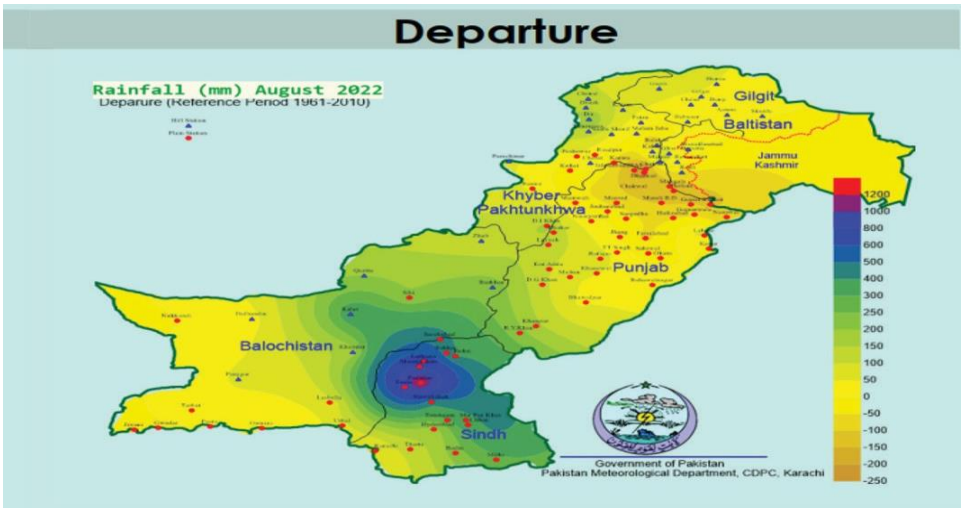
	Normal (mm)	Average (mm)	Departure (percent)	Comment
Pakistan	56.2	192.7	243	1st highest (previous record 116.7 mm in 2020)
Azad Jammu & Kashmir	150.7	146.1	-3	29th highest (record 308.2 mm in 1997)
Balochistan	22.4	154.9	590	1st highest (previous record 83.3 mm in 2020)
Gilgit Baltistan	16.7	55.7	233	2nd highest (record 89.1 mm in 1997)
KPK	103.6	163.9	58	4th highest (record 225.4 mm in 2010)
Punjab	93.3	141.7	52	10th highest (record 282.6 mm in 1973)
Sindh	53.6	442.8	726	1st highest (previous record 247.9 mm in 2020)

Sindh and Balochistan received first highest level of precipitation since 2020 with 590 and 726 percent extra rains respectively. However, overall in South Asian region an above normal rainfall was predicted during the month of June to September 2022. This nonstop rainfall in the month of August resulted in history's biggest riverine floods in Pakistan(Figure 2, ICIMOD, 2022).[4]

Fig. 2. August 2022 Rainfall Map[5]



[2]https://news.climate.columbia.edu/2022/09/12/the-flood-seen-from-space-pakistans-apocalyptic-crisis/
[3]PMD, 2022, Pakistan Metrological Department, Monthly weather report of August 2022
[4]ICIMOD, The 2022 Pakistan Floods, Assessment of Crop Losses in Sindh Province using Satellite Data.
[5]Pakistan Meteorological Department, Pakistan's monthly climate summary, August,2022.



The impact of climate change and resultant natural disasters is different across regions. In developed regions, its affect is less prominent because of heavy investment on infrastructure, while in developing regions generally and specifically in the less developed countries near equator impact is severe because of two reasons; soil compaction due to which water takes long time to seep into the land and this is what happened in the recent floods. The country faced long dry spell as that took all the moisture from the soil causing compaction and that is the reason flood water is still standing in the lower parts of Sindh and Punjab. Secondly communities are not much resilient to cope up the damages. Further measuring damages of floods is another fundamental challenge for a developing country like Pakistan because the cost of rehabilitation becomes exponentially higher as compared to the actual damages.

Fig. 3. Number of People Affected Due to Flood Across Pakistan

Source: USAID, 2022.

The primary challenges that we face in short term are in fact centred on relief and rescue: health, disease outbreak, accommodation for the millions displaced, drainage of water, and infrastructure, immediate housing demand, loss of education and loss of standing crops. In the absence of immediate responses, the drag on economic productivity in subsequent years will put the affected regions of Sindh and Balochistan on sever poverty. The estimates indicate that 33 million people are affected. According to the national disaster management authority (NDMA), 664,000 people are dislocated and are compelled to reside in flood relief camps while out of this 87 percent are only in Sindh Province, indicating that the intensity of flood affects in Sindh Province is alarming. Figure 3 also testifies this fact that most of the affected population belongs to the Sindh province (USAID, 2022).[6] However, the severely flood-hit communities are more likely to fall into the small farmer categories but they belong to the districts where the poverty indicators were already very high. Although it is claimed that the majority of these are subsistence farmers with little contribution to the overall economic activity but, it's multidimensional affects in terms of health, education and economic loss in near future are hard to quantify right now. It is very alarming that almost 650,000 girls and pregnant women were also among the flood victims out of which 11 percent were due to deliver in the month of September (UNFPA, 2022).[7] Infrastructure and loss of connectivity is still proving to be the biggest hindrance in the way of provision of health care facilities to affected people.

POST-FLOOD ISSUES AND CHALLENGES

Along with the immediate damages as direct results of a disaster, the migration in search of safe living leads to urban sprawl (Boustan, et al. 2012) because it is less likely that migrated population will return to their previous residences. Although people relocate to the safer places but economic activity slows down as at new place it takes time to settle down and get economically active. The problem of increased congestion twins with a surge in criminal activity that we noticed right after the floods of 2010 when only the cases of murder & homicide increased by 3.3 percent (World Bank, 2021).[8] that was higher than usual pattern of crime data and same is expected to happen after the floods of 2022.

According to the Ministry of Foreign Affairs (MOFA), 2 million acre of cropland has been damaged which has badly affected the supply chain of agriculture commodities particularly for tomato and onion. This lead to increase the prices of these commodities exponentially and thus flood is considered as one of the major source of food inflation. Similarly, Sindh is contributing 30 percent in Pakistan's total cotton production which has also badly affected due to flood—threatening the future export of textile from Pakistan. Almost 20 percent of wheat production comes from Sindh. It is anticipated that if proper agronomic measures are not adopted the land in Sindh will not be usable for crop production within the next few months. Pakistan will need to import more food, which could raise costs and worsen the country's balance of payments crisis. Before the floods, food inflation was at 26 percent, and in recent days, prices of some commodities has surged

[6]USAID, 2022, United States Agency for International Development. Fact Sheet No. 1, Pakistan Floods. [https:// reliefweb.int/report/paki- stan/pakistan-floods-fact-sheet-1-fiscal-year-fy-2022].

[7]UNFPA, 2022, United Nations Population Fund, Women and Girls bearing the brunt of Pakistan Monsoon Flood.

[8]https://www.macrotrends.net/countries/PAK/pakistan/murder-homicide-rate

by as much as 500 percent. These high costs will be felt heavily in cities, which are home to large poor and working-class populations. In the longer term, this could exacerbate a public health challenge: stunting in children attributed to poor nutrition. According to an estimate by Food and Agriculture Organisation, almost 40 percent of flood-affected population in Balochistan is unable to access medicines and health care. Besides supply chain the cold chain is also badly disrupted leading to low immunisation that will ultimately lead to disease outbreaks in the long run.

After any disease outbreak and natural calamity, the number of the school dropouts and number of out of school children increase along with more early childhood marriages specially girls belonging to far flung rural areas because once they are out of school it is less likely that the family will send them again to the school. According to provisional data from provincial Education Departments on children dropout rate indicates highest dropout in Sindh (19,750) followed by Balochistan (2,859), Punjab (2,158), and Khyber Pakhtunkhwa (420). In addition, at least 7,062 schools are being used as temporary shelters for people who have been displaced. Besides being affected the schools with intact infrastructure also being used for the provision of shelter making the situation more gruesome for the flood affected communities.

WHAT IS THE WAY FORWARD?

There are two measures to protect people after the flood and as a preparatory measure for the next flood:

(1) Keep the floodwater away from communities through structural measures
(2) Keep communities away from floodwater through non-structural measure

Finances are the pre-requisite to make the system ready for any future disaster. Pakistan although not contributing much in the global CO2 emissions but it is one of the biggest victim of climate change damages. Regarding climate reparation funds approved by the UN in which high CO2 emitting countries owe a reparation fund to the global South. Although this can be a major source of money to work on mitigation and adaptation strategies for the future but the lack of trust in the utilisation of these funds is one of the major concerns by the international communities. Firstly, to avail the reparations, internal political and economic instabilities need to be settle down and secondly we need to present a national fund utilisation account in the form of disbursement linked indicators where ministry of foreign affairs can play a central role by keeping in liaison with the Ministry of Climate Change and other relevant provincial departments. Taking the following structural and non-structural measures can help in minimising the effects of flood in future.

STRUCTURAL MEASURES

Better early warning systems are frequently claimed to reduce losses; however, inadequate backup equipment combined with a lack of proper hydrological network coverage at river basins limits forecast accuracy in developing countries. In the post-2010 flood scenario, the UNESCO developed the capacity of the Flood Forecasting Division of Pakistan Meteorological Department (PMD) through technological improvement, and this system is working excellently for the forecasting of floods. The purpose of these early warning systems is to enhance the response time of communities and institutions to

stimulate flood protective measures. Even if we consider that early warning systems have been installed with full utilisation of the latest technology, the reluctance at the community level is the biggest issue to tackle. No early warning system functions well without an effective flood response strategy, which history shows that we do not possess. Therefore, it is important to understand the climate scenario of Pakistan and to establish more rainfall monitoring networks at district and tehsil levels. The current 100 stations of PMD are not sufficient to cover 540 tehsils of Pakistan where the rainfall patterns vary to a greater extent. Along with this, media campaigns must be launched with area-specific evacuation plans to communicate losses in case people refuse to relocate (this happens in most cases, as people are less likely to leave their residences). In flood-hit areas, early warning responses at the community level can be taught in school curriculums to minimise the losses in the event of the next hazard like this. Duplication of information provided by different departments also leads to mistrust at the community level. Therefore, the warning system must be highly centralised, and the responsible institute should play an active role to evacuate and shift the people to safe places in the future. To make it happen an district level online portal can be generated where existing players e.g. DDMA, PDMA, NDMA, non-government organisations and other civil society organisations can register themselves so that a central coordination mechanism can be developed to intervene in more effective way.

The floods of 2022 cannot be compared with the floods of 2010, as the basic reason for this flood was the unusual rainfall in non-catchment areas that is the result of longer dry period before the floods as temperature and rainfall patterns are changing as a result of climate change. Quite interestingly, the recent floods have not raised the water level in our biggest water reservoirs, i.e., Tarbela and Mangla.[9] In addition to this, quite ironically, there will be a water shortage in the upcoming Rabi crop season, which makes it clear that despite continuous hazards in the past, we were not well prepared. Even the Disaster Response and Coordination Center was established belatedly on August 30th, 2022 (Bhutta, et al. 2022).[10]

The water storage structures are required according to the topography of the area. For example, in Balochistan, groundwater recharge techniques such as water banking should be adopted, as surface water storage cannot be utilised in the long term due to the harsh and dry weather conditions of the province. If the recent floodwater was flowing from Balochistan to Sindh, it means that minimising the flow of water through check/gabion structure could have been made earlier that would have led to increased ground water absorption (seepage) by turning a curse into a blessing. Keeping it as a lesson in our policymaking can lead to exploiting the potential of hill torrents in the future.

The Public Sector Development Plan (PSDP) of 2021 reveals that even after 12 years, there are still some development schemes being initiated to recover from the damage caused by the flood of 2010. Along with these recovery schemes, given the hydrology of Balochistan province, a number of federally funded small dam projects were launched in the province.[11] There is a need to undertake satellite-based assessment of such schemes

[9]https://ffd.pmd.gov.pk/maf-forecast

[10]Bhutta, Z. A., Bhutta, S. Z., Raza, S., & Sheikh, A. T. (2022). Addressing the human costs and consequences of the Pakistan flood disaster. The Lancet, 400(10360), 1287-1289.

[11]https://100dams.org/

with respect to floodwater preservation and drought protection. Likewise, in order to improve water use efficiency in agriculture, there were some parallel projects in Sindh, Balochistan and Punjab with the names of Punjab Irrigated Agriculture Productivity Improvement Project (PIPIP), Sindh Irrigated Agriculture Productivity Enhancement Project (SIPEP), and Balochistan Integrated Water Resource Management. The evaluation of these projects is the need of the hour as similar projects were launched in Bangladesh also such as Water Management Improvement Project, Bangladesh weather and Climate Services Regional Project and Bangladesh has appeared as a success story in managing the risk of flood.[12]

To avoid the damage of floods in the future, a strong local government structure with better support from provincial and national governments is required.

The Federal Flood Commission has made huge investments over the years in effective flood plain management plans, but such strategies were never materialised due to a lack of ownership on the part of provincial and local governments. The FFC prepares activated flood plain maps and flood inundation maps that are shared with provincial and local governments. Unfortunately, due to poor enforcement, such plans are rarely consulted while giving permits to establish new housing societies for urban expansion. The lack of compliance is also visible in recent events of urban flooding in major cities in Pakistan.

Pakistan is at nature's disposal in terms of the impact of climate change and resultant floods. To avoid the losses in education instead of using schools as immediate shelters the special flood shelter homes must be constructed. In this regard, Bangladesh shelter home specifically designed for the disaster victims can serve as a benchmark to minimise the impacts of floods in terms of education of already poor chunk of populations.

NON-STRUCTURAL MEASURE

A unified management of water resources is required. There are more than 15 institutes dealing directly or indirectly with the floods, such as the National Disaster Management Authority (NDMA), Ministry of Climate Change, Federal Flood Commission, and Pakistan Commission for Indus Waters, along with Provincial Irrigation Departments, the Pakistan Army, and many relief and social protection departments, as well as a number of non-government and local organisations that provide relief after the floods. The inclusion of too many institutes also creates problems in decision-making. Any development activity to avoid floods and even relief activities after the flood also becomes slow due to the increased footprint of the institutions lacking coordination. Further- more, it also leads to the duplication of activities. Therefore, it is required to streamline the efforts under one umbrella at the local level using local knowledge and local experts with vertical integration in disaster governance. Historically civil society organisations have proven themselves to penetrate deeply in disaster hit areas. Disaster management should be bottom up approach with more organised local government structures with multi sector collaborations at federal level. But, this collaboration should be long lasting, and not be limited to immediate disaster relief.

To revive the economy there must be grants and loans for the affected businesses because without financial support these businesses are less likely to regain their existence

[12]https://www.economist.com/the-economist-explains/2022/06/23/how-does-bangladesh-cope-with-extreme-floods?

as they bear significant losses in terms of income and damages to the local infrastructure. Although financial aid of Rs.25,000 under the Flood Relief Cash Assistance through Benazir Income Support Programme (BISP) is being provided to every flood-affected family in the flood-hit areas using the BISP database. It will lead to the wastage of resources as the scope and eligibility of the cash transfer recipients has not been clearly defined and for this purpose a targeted approach, the scope and eligibility must be defined during the ex-ante studies related to flood risk management and funds must be conditional cash transfers to revive the local businesses.

In the short term, the situation can be turned the other way round by proper management and planning. Most of the rain fell on agricultural land across the country. Due to excessive rainfall in the preceding months, soils will hold enough moisture which permit timely sowing and assures healthy crop production.[13] However, educating farmers on the proper use of weedicides must avoid potential weed threats due to the availability of moisture. To retain moisture, proper tillage practices must be carried out (e.g., deep ploughing and Suhaaga).

CONCLUSION

Amid to agro-based nature of Pakistan's economy, for a long time it was believed that the climate of the country is quite suitable for agriculture, since there are four seasons, therefore, we can get variety of crops and reap economic benefits in diversified ways. However, the situation is not same now, the four seasons, once believed to be a blessing could be detrimental without proper adaptation strategies and the recent floods prove to avail the reparations from the global north we need to improve our environmental governance. Some short run measures can be adopted to recover from recent floods i.e. measuring exact flood damages as the first step, cash transfers to the targeted populations to rehabilitate the most affected people, and release of soft credit to support the local small businesses to bring the economic activities back to normal. In the long run to avoid, such damages there should be better early warning systems with community engagement plans. The early warning systems should be centralised to increase the trust of general public. Disaster resilient structures such as checks in the way of hill torrents should be constructed and area specific water conservation techniques should be adopted to address the future threat of water scarcity. Local populations should be trained to conserve water in natural ways to utilise this water during dry spells. With the investment to improve the adaptation ability will help to minimise the flood losses in the future.

[13]Pakistan Meteorological Department, Seasonal Outlook for November 2022-January, 2023.

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Unveiling the Myth of Import Substitution Policy in Pakistan

MUHAMMAD ZESHAN

Due to the import substitution policy, domestic firms and end users have to pay a higher price for the imported intermediate inputs, and final consumption items compared to the international market prices. The data show that the use of imported intermediate inputs has increased in agriculture, manufacturing, and services sectors over the last two decades in Pakistan. Clearly, the import substitution policy is unable to meet its primary objectives of substituting expensive imported items for cheaper domestic intermediate and final consumption items rather it is leading toward an unsustainable economic environment for domestic and international trade.

Key Takeaways

- Gradual elimination of the import tariffs and export subsidies for competitive domestic and international trade.
- Import policy should be implemented through a tariff code than SROs.
- Provide domestic industries with an enabling research environment.

Analysis of Pakistan's foreign trade shows that the incentive structures mostly favor import substitution industries in the country. Historically, many countries opted for import substitution policies, such as East Asian countries, but the import substitution policies in these countries did not lead towards an anti-export bias unlike Pakistan (State Bank of Pakistan, 2015). Due to the import substitution policy, domestic firms and end users have to pay a higher price for the imported intermediate inputs, and final consumption items compared to the international market prices (Ul Haque, and Siddiqui, 2007).

Qadir and Hina (2020) find that the government protects the domestic industry by restricting imports through tariff and non-tariff barriers. As a result, the expensive domestic output becomes less competitive in the international market. Further, Najib (2022) finds that the government implements its import policy mainly through SROs. On the other hand, PIDE RAPID (2022) argues that the import policy is more effective if implemented through a tariff code than SROs. Since higher import tariffs make exports less competitive, the government has to subsidize key industries such as textiles and agriculture to earn foreign exchange.

Primarily, a tariff rationalization policy has two objectives. First, it aims to achieve domestic sustainability such that a country has the least reliance on expensive imported raw materials and consumer items. Second, it aims to reduce the reliance on large stocks

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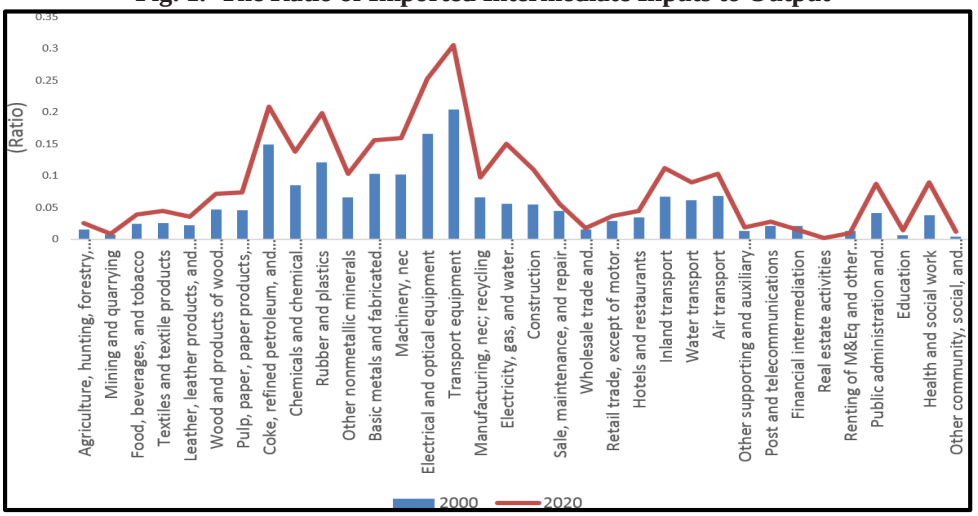
of foreign exchange reserves for imported items. To support these objectives, the import substitution industries in Pakistan promise to provide cheaper substitutes for expensive imported raw materials and consumer items to domestic firms and consumers after securing a favorable tariff policy from the government.

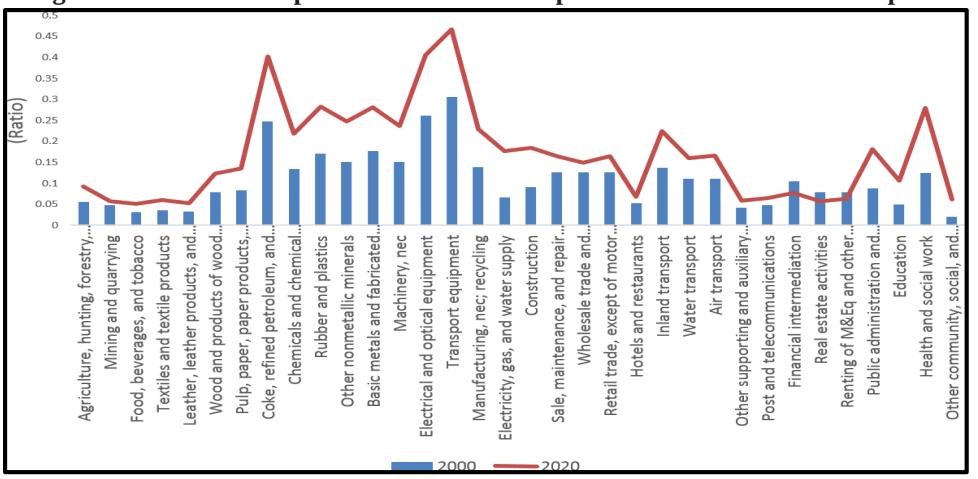
However, the import substitution policy in Pakistan did not work so well historically, and there is no empirical evidence. The data show that the use of imported intermediate inputs has increased in the total intermediate inputs in all the agriculture, manufacturing, and services sectors over the last two decades. Two indicators are used for this analysis, a. the ratio of imported intermediate inputs to the total output of an industry (Figure 1), and b. the ratio of imported intermediate inputs to the total intermediate inputs used in an industry (Figure 2).

Fig. 1. The Ratio of Imported Intermediate Inputs to Output



Source: Own calculations, based on data from the Asian Development Bank (2022).

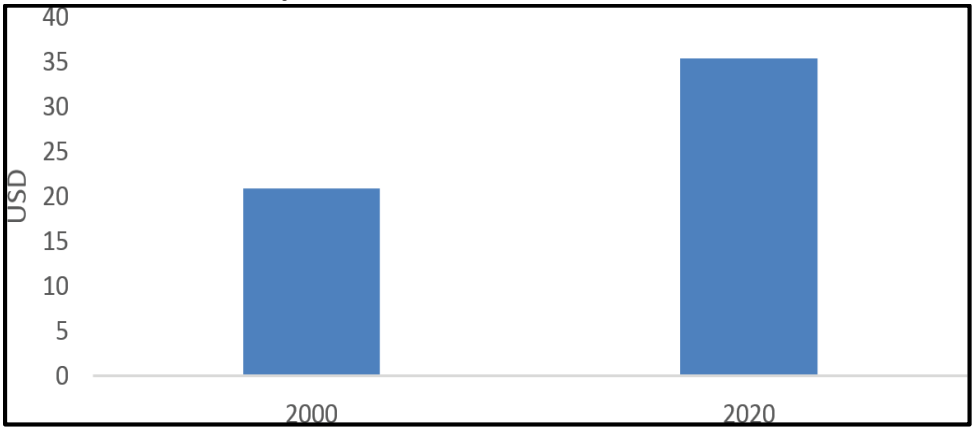
Fig. 2. The Ratio of Imported Intermediate Inputs to Total Intermediate Inputs



Source: Own calculations, based on data from the Asian Development Bank (2022).

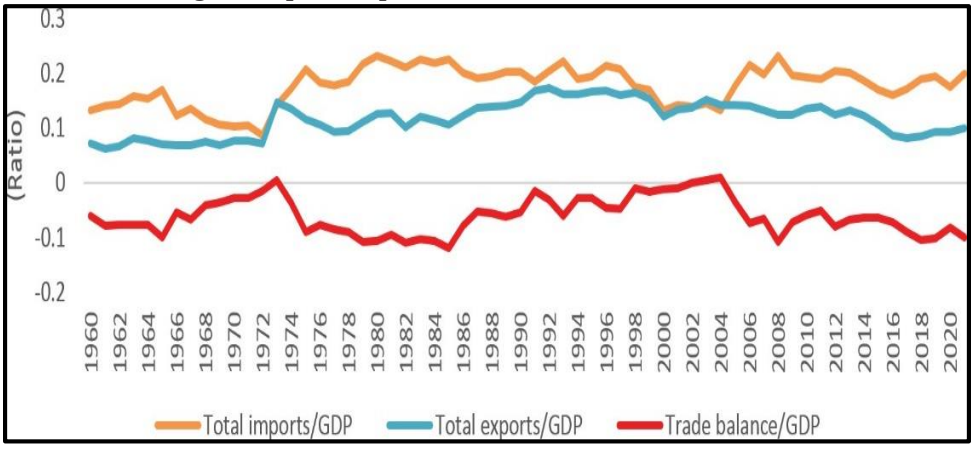
On the other hand, per capita final consumption expenditure on imported items by households has increased by around 70 percent during the last two decades, increasing from 20.9 USD in 2000 to 35.4 USD in 2020 (Figure 3). One may argue that it is consistent with the rising per capita income level in Pakistan. In other words, households now can afford more imported products since their income levels have increased over time. However, this argument is weak for two reasons if analyzed from the perspective of the prevailing import substitution policy. First, the domes- tic industry is unable to provide suitable domestic substitutes for the imported intermediate and final consumption items over time. Second, the country faces a persistent and unsustainable trade deficit historically (Figure 4). Clearly, the import substitution policy is unable to meet its primary objectives of substituting expensive imported items for cheaper domestic intermediate and final consumption items rather it is leading toward an unsustainable economic environment for domestic and international trade.

Fig. 3. Per Capita Final Consumption Expenditure on Imported Items by Households



Source: Own calculations, based on data from the Asian Development Bank (2022).

Fig. 4. Import, Exports and Trade Balance in Pakistan



Source: The World Bank (2022).

POLICY IMPLICATIONS

- Gradual elimination of high import tariffs to provide cheaper intermediate and final consumption items to firms and consumers at the affordable international market price.
- Gradual elimination of export subsidies to enable firms gain competitiveness in international trade.
- Encourage domestic industries towards a research agenda that enables them meet their domestic as well as export demands, along with aiming to gain product and market diversity abroad.

REFERENCES

Asian Development Bank (2022). Pakistan: Input-Output Economic Indicators. https://data.adb.org/dataset/paki- stan-input-output-economic-indicators, accessed on Oct 10, 2022.

Najib, Mohammad Shaaf (2022). Will The Import Ban Prove Its Effectiveness? (PIDE Policy Viewpoint).

Qadir, U. & Hina, H. (2020). *Competitive import substitution: Can industry be protected in Pakistan*. Islamabad: Pakistan Institute of Development Economics.

PIDE RAPID (2022). Pakistan one year growth strategy. Reforms for Accelerated Prosperity and Inclusive Development, PIDE.

State Bank of Pakistan (2015). Special Section 3: What has Caused Stagnation in Pakistan's Exports. https://www.sbp.org.pk/reports/annual/arFY15/Special-Section3.pdf, accessed on Oct 7, 2022.

The World Bank (2022). https://data.worldbank.org/indicator/BM.GSR.GNFS.CD, accessed on Oct 11, 2022.

Ul Haque, N. and Siddiqui, R. (2007). Nominal and effective rates of protection by industry in Pakistan: a tariff based analysis. *NUST Journal of Social Sciences and Humanities*, *3*(1), 1–45.

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What are the Factors Making Pakistan's Exports Stagnant? Insight from Literature Review

GHULAM MUSTAFA & SAQIB HUSSAIN

BACKGROUND & MOTIVATION

Lowering exports is considered as one of the paramount reasons of widening trade deficit of Pakistan, which has become a long-standing challenge that country is facing since the beginning of the century. During the last two decades, the contribution of exports in GDP has been declined from 16 to 10 percent (World Bank, 2021). If we look at Pakistan's share in global trade, it is dropped from 0.15 percent in 2005 to 0.12 percent in 2021. Export competitiveness of Pakistan is shrinking, while the competitors like Bangladesh, India, and Vietnam are experiencing expansion in export competitiveness. The stagnancy in Pakistan's exports brings about a number of challenges like increasing current account deficit, burden of foreign debt, exchange rate, and other macroeconomic problems (Government of Pakistan, 2021-22; Defever, et al. 2020). Various reasons of declining export are suggested by the economists and researchers. To gather concrete evidence, a comprehensive desk review or literature review is required to unleash what factors are bringing down Pakistan' exports. For that purpose, the underlying piece of research aims to weave up a review of existing literature on exports and unfolds the significant factors which influence exports.

Low productivity of firms, weak export competitiveness, lack of value addition & innovation, complex & inefficient incentive mechanism, limited export destinations, and low R&D at the firm level are the key causes for stagnant exports. During the ongoing economic crisis, quick and rigorous strategies are required to find out the potential markets considering a match with exportable products.

CAUSES FOR LOW EXPORTS

Available literature regarding export determinants demonstrates the several factors. The key factors includes low productivity of firms, real exchange rate, lack of export competitiveness & diversification, lacking in value addition, lack of Research and Development (R&D) at firm level, limited access of firms to global markets, high import duties act as export taxes, incentive schemes for existing exporters tend to focus on established firms/sectors, costly free trade agreements and access to credit & information

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(e.g. Zia, 2022; Zeshan, 2022; World Bank, 2021; Lavo and Varela, 2020; Mahmood & Ahmed, 2017; Niepmann and Schmidt-Eisenlohr, 2017; Paravisini, et al. 2015; Mahmood, 2015; Amiti and Weinstein, 2011). A detailed discussion on these factors is weaved up with help using data, which is given as follows.

EXPORT COMPETITIVENESS

Available literature has demonstrated that lack of export competitiveness is also considered as one of the prominent reasons of Pakistan's stagnant exports (e.g. Siddique, et al. 2022; Kausar, 2015; Paravisini, et al. 2015; Amiti and Weinstein, 2011). Export competitiveness is measured in different ways such as export share in global trade and revealed comparative advantage which is provided by United Nations Conference on Trade and Development (UNCTAD)[1] has computed index to measure export competitiveness by product groups. So, we discuss the trends obtained from these two measures to see through the export competitive- ness of Pakistan on the whole and by product as well.

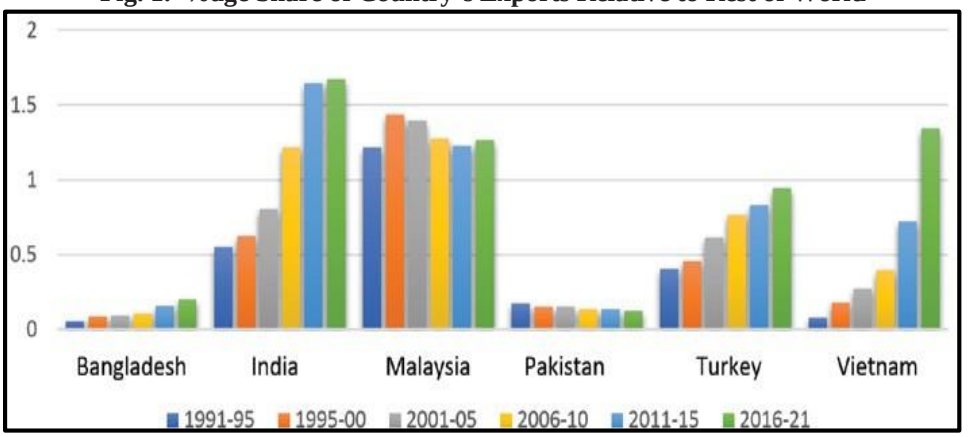
Key Takeaways

- Value addition in Pakistani exporting products is needed since the quality rank of products are decreasing over the time. Moreover, we are exporting more products than Bangladesh, while export values of Bangladesh are higher than Pakistan
- Competiveness of Pakistan's exports is declining. Even, we are losing comparative advantage in textile sector due to Bangladesh and Vietnam's increasing comparative advantage in global markets
- Firm's productivity is lower relative to India, USA etc. Pakistan's old firms are as productive as newcomer is productive, while India's old firms are virtually 50 percent more productive than newer firms.
- Lower investment in research and development (R&D) to have innovation in exported products.

Figure 1 presents the comparative analysis of Pakistan's export competitiveness. It is evident that Pakistan's export share to the global export is declining, which is already the lowest in her peer group countries such as Bangladesh, India, Vietnam, and Malaysia. India stands at the top of the list of these countries who is also witnessing increasing trend. Likewise, Vietnam which has relatively lower share of exports in global trade during 1991-1995 (0.088 percent) as com- pared to Pakistan (0.17 percent), but after that Vietnam has been experiencing massive increase (1.34 percent during 2016-21) while Pakistan is experiencing (0.12 percent during 2016-21. Hence, these estimates are evidently showing enormous failure in enhancing Pakistan's export competitiveness as compared to other emerging economies.

[1]https://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?sCS_ChosenLang=en

Fig. 1. %age Share of Country's Exports Relative to Rest of World



Source: UNCTD.

Table 1 encompasses export competitiveness which is measured by revealed comparative advantage (RCA). Pakistan's export competitiveness in food & live animals is increased over the last twenty-five years (as evident by green-highlighted cells). Nonetheless, beverages & tobacco group of commodities are not having export competitiveness.

Table 1

Pakistan's Export Competitiveness (Revealed Comparative Advantage)

Sector	1995-1999	2000-2004	2005-2009	2010-2014	2015-2020
Food and live animals	2.45	2.77	3.44	3.76	3.72
Beverages and tobacco	0.09	0.33	0.36	0.52	0.53
Crude materials, inedible, except fuels	1.15	1.19	0.99	1.19	1.15
Mineral fuels, lubricants, and related materials	0.14	0.17	0.35	0.12	0.07
Animal and vegetable oils, fats and waxes	0.64	1.68	3.44	2.74	0.65
Chemicals and related products	0.07	0.22	0.32	0.51	0.51
Manufactured goods	3.72	3.92	3.87	3.92	0.07
Machinery and transport equipment	0.03	0.07	0.10	0.09	0.08
Miscellaneous manufactured articles	2.61	3.01	3.18	2.80	3.24
Commodities and transactions	0.0002	0.0003	0.0002	0.0001	0.002

Note: A value greater than 1 demonstrates export competitiveness (green-highlighted cells), while a less than 1 value demonstrates no-competitiveness (red-highlighted cells).

Manufacturing goods have demonstrated export competitiveness from 1995-2014, while during the last five years (2015-2020), we have lost our export competitiveness. In addition, miscellaneous manufactured articles, export competitiveness is increasing. Moreover, Pakistan does not have export potential in machinery & transport equipment, commodities & transaction, chemical & related-products, and mineral fuels, lubricants, & related materials.

By summing up, although we have potential in manufacturing sector, but during last five years we are heading to lose this potential as well due to firm's low productivity, lack of firm level R& D, energy sector inefficiencies, and lack of value addition (World Bank,

2021). Nonetheless, table 01 also demonstrates that there are some other sectors where Pakistan can increase the export competitiveness and enhance its export share in global trade such as crude materials & inedible (except fuels), and animals & vegetable oils, fats & waxes. Aforementioned sectors have the export potentials for Pakistan.

Success Story of Bangladesh

Being the poorest nation in 1971, an economy with challenges and hardships that every lower-income country has, was perceptible for Bangladesh. However, it outperformed and graduated from lower income group to lower-middle income in 2015 and is expected to move from the UN's list of LDCs by 2026 (Ender- le, 2021). Despite the onslaught of coronavirus, its economy had a very impressive growth rate of over 6 percent in the last five years which was under-predicted by the World Bank (5 percent, International Monetary Fund 4.6 percent, and Asian Development Bank 5.5 percent during 2021 (Rahman, 2021). The recent wave of its growth is mainly associated with its industry, exports, and inward remittances.

During the mid-eighties, with the collaboration of the WB, ADB & IMF, Bangladesh has taken a number of reforms in its economic and trade policies with a special focus on export-led growth and industrialisation.

A major share of its exports is fuelled by ready-made garments which are 84 percent of its global goods exports. In addition to that, the diversity of exports is concentrated in European Union countries since it has duty-free access there, on the other hand, it has no duty-free access to the United States (US).

Growing exports are significantly associated with two factors (1) duty-free access to most of the markets in the European Union (EU) countries, and (2) generous supply of cheap labour within the country. Since Bangladesh has an edge of cheap labour relative to the other countries, it has utilised its cheap labour in expanding the ready- made garments industry. Though Bangladesh has a competitive advantage in other products, for instance, jute goods, leather, seafood, and tea, however, the growth of these competitive products are stagnant except readymade garments industry (Sarker, 2018). It shows their significant interest in readymade garments industry.

The export regime is a nationwide priority and lifeline of Bangladesh, in fact, it is the backbone of the economy. According to Chief Economist's Unit Bangladesh Bank, during 2021, the Prime Minister Vision aimed exports worth 50 billion US dollars, but the exporters exceeded the target and achieved a total of 61 billion dollars including the services sector, in addition, the foreign inward remittances remitted 22 billion dollars which is the highest in history of Bangladesh.

By 2030 the Garment Manufacturers and Exporters Association of Bangladesh (GMEAB) set up a target of 100 billion dollars of exports. The core reason behind the higher exports of ready-made garments is a shift of clientele countries from China and others to Bangladesh. A major part of readymade garments includes mid-priced products, handmade fibre items, and technical garments like uniforms. The handmade garments export sector employed over 4.5 million people in which most are women.

Similarly, Pakistan is exactly like Bangladesh in a number of characteristics, for instance, cheap labour, culture, environment and so forth. We also have a higher unemployment rate which can be utilised in manufacturing sectors, especially the readymade products.

LACKING IN VALUE ADDITION

World Bank (2021) has revealed that Pakistan is exporting conventional products which are lacking value addition. Figure 2 demonstrates that Pakistan's exported products

during 2003-04 have been 2311, while it has recorded 2792 products during 2017-18. These estimates indicate that there is no significant increase in number of products exported over the last 16 years. The comparisons between India, Pakistan, and Bangladesh indicate that on the whole India is exporting quite larger number of products as compared to Bangladesh and Pakistan. Moreover, Bangladesh is exporting relatively lower than Pakistan.

However, this does not present a meticulously meaningful picture. For that purpose, we need further look into the ratio of exported products to imported products. The ratio equal to 1 shows the country is experiencing same number of exported products as the imported products. The ratio greater than 1 demonstrates that country is exporting larger number of products than imported ones, vice versa. Figure 03a indicates that India has ratio greater than 1, while Pakistan and Bangladesh are experiencing less than 1.

These estimates establish that Pakistan is still importing 40 percent to 33 percent more products than exporting. In terms of export to import ratio, Pakistan (0.67 points during 2017-18) is below India (1.02 points during 2017-18), while ahead Bangladesh (0.41 points during 2017-18). Nonetheless, if see through the export values, Pakistan is below India and Bangladesh during 2003-17 respectively (see figure 03b). The low export values of Pakistan evidently display the lack of value addition. Moreover, Bangladesh is about to converge to India 2015-17 in terms of export values (World Bank, 2021).

Fig. 2. Number of Exported Products

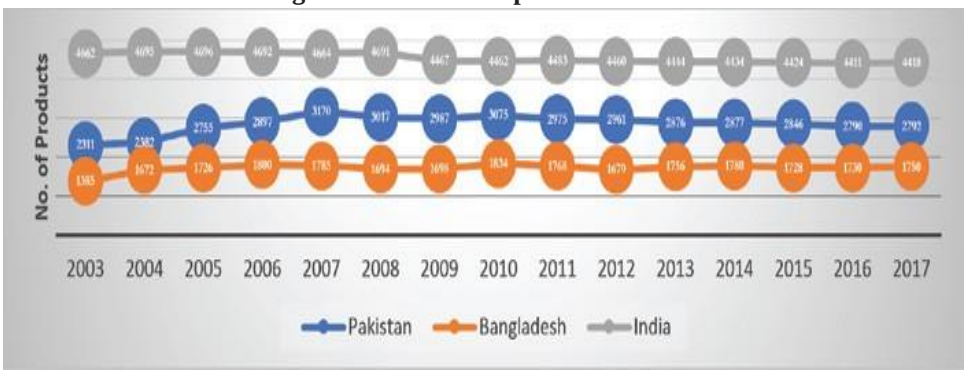


Fig. 3a. Ratio of Number of Exported to Imported Products

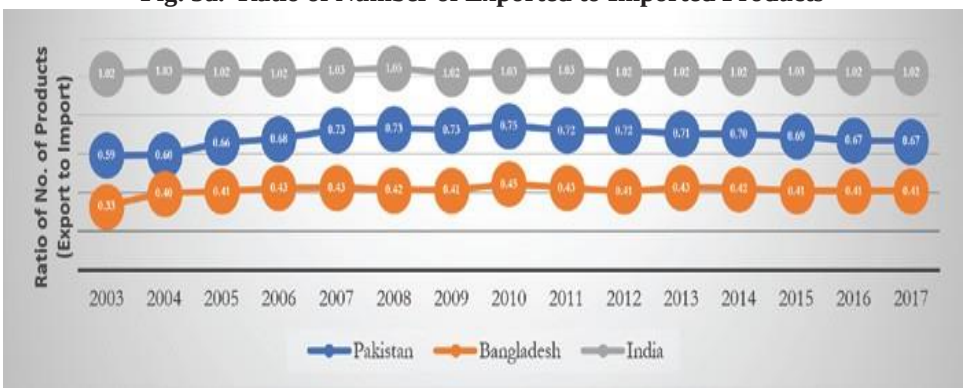
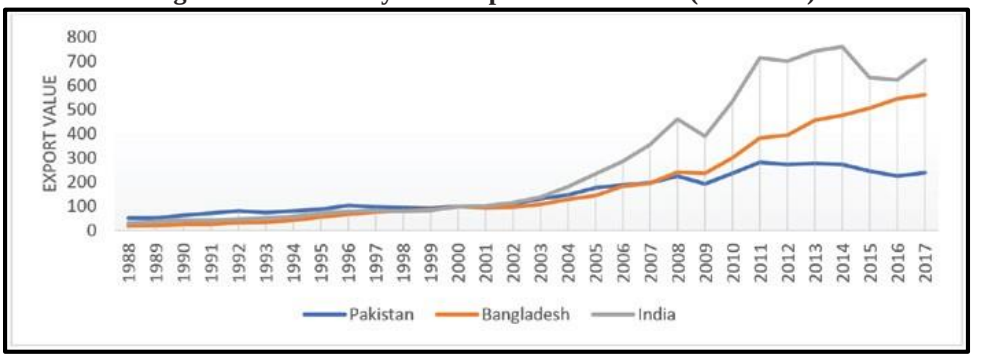


Fig. 3b. Trend Analysis of Export Value Index (2000=100)



Source: WITS.

Pakistan's low export values are due to low-quality products and lack of innovation in exported products which leads to the lack of value addition. The literature (e.g.; Zia, 2022; World Bank, 2021; Government of Pakistan, 2021-22; Lovo & Varela, 2020; Defever, et al. 2020) has suggested the reasons which impede country's lacking of ability to value addition in export product, which are outlined as follows.

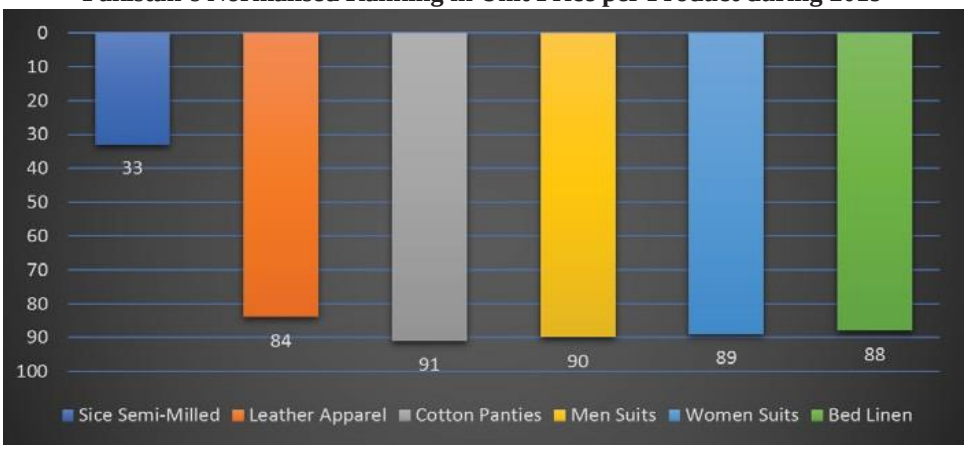
(a) Firms have limited research & development (R&D). Pakistani firms are engaged in producing the conventional product varieties and non-involvement in spending on R&D to innovate their products.

(b) Incentives schemes for existing exporters tend to focus on well-established sectors

(c) Low entry and exit rates in exporting are revealing of frictions that discourage firms from exporting in Pakistan. Low rate of entry rates is demonstrative of an environment with entry friction in export markets. These frictions bring down the scope for churning especially linked with expansions in allocative efficiency. These may be linked with a set of incentives in practice that reward incumbents rather than innovators.

(d) World Bank (2021) has suggested that low quality is also one of the paramount reasons of lowering value addition in export products by Pakistan. Since the export value depends on the quality of products, for instance, high quality products create more value. The major exporting segments of Pakistan, textile & apparel, have low quality products comparative to their competitors. Pakistan ranked 90 and 89 in exporting men and women suiting, similarly, 30 in quality of rice. This is significant impact on the export since these products have a major contribution in exports. The quality of Pakistani products is one of a key driver to contribute in exports in terms of number of products exported as well as number of export partners. According to WITS the ranking of Pakistani number of products exported has been decreased in last 15 years as well as the ranking in number of exports partners also decreased in last 15 years. We can see in figure given below that the ranking of highest exported products of Pakistan is also not competitive in global market. The value addition and quality of products is not enough to compete with other countries. Therefore, the price rank of Pakistani products is low.

Pakistan's Normalised Ranking in Unit Price per Product during 2019



Source: World Bank (2021).

Vietnam has Worked Wonders in Export Sector

In terms of exports, Pakistan and Vietnam were on some- what uniform grounds two decades ago (Nguyen, 2020). However, in 2021, exports of Vietnam crossed 368 billion dollars which is more than the GDP of Pakistan. On the contrary, the exports of Pakistan are around 30 billion dollars, which is under pining question for economists. So, what happened in last two decades?

To understand the core reasons behind the mystery, we need to deep dive into the exported product composition of both countries. In 2000, the major share of the exports of Pakistan consisted of textiles, for instance, non-retail cotton 14 percent, house linens 10 percent, woven cotton 4.5 percent, cotton fabric 4 percent & knitwear 4 percent, in fact over 50 percent of export share was coming from textile, 10 percent from leather products and 5 percent from rice. Aker two decades the product composition was absolutely similar, for instance, 13 percent house linens, 7 percent knitwear, 4 percent pure cotton, 3.5 percent women's suits, 3.5 percent woven cotton & 3 percent know sweaters, in fact, the 50 percent share is still coming from textile, 10 percent from rice and 3 percent from leather.

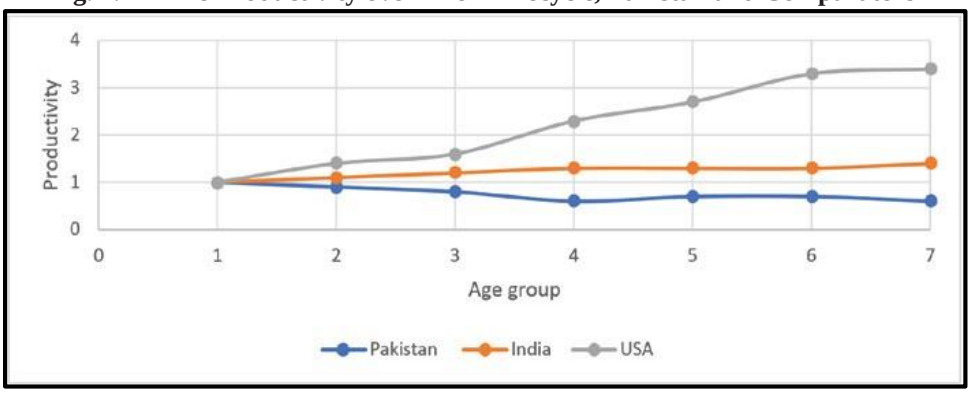
On the other hand, in 2000 the export composition of Vietnam consisted of petroleum products at 25 percent, textiles at 12 percent, leather at 5 percent, & footwear at 9 percent. However, after two decades, the product composition of exported products has significantly changed and shifted to new technology-oriented products, and they have moved to value-added products. First, the most share of Vietnam's current export consisted of information technology products which are over 45 percent, and it was just 6 percent twenty years. Their IT products include broadcasting equipment, telephones, integrated circuits, and office machinery, all these products are technology-driven and will have significant scope in future. Second, the consumer products in the textile industry which their share is over 8 percent.

The emergence of exports in Vietnam is purely associated with electronic products including the takeover of electric and electronic products on coffee, rice, and textile (Athukorala and Nguyen, 2022). The major export of Vietnam is attributed to tech countries such as the Republic of Korea, Japan, and China. Since the governments provide an easy platform for exports, but governments themselves do not export but firms do, the major credit for shifting exports from traditional and non-tech items to electronic items goes to the industry and firms. In addition to that, 95 percent of electronic products exported in Vietnam are associated with foreign investment businesses also the tech exports of Vietnam are linked with the imported equipment (Koo and Kim, 2022) and machinery from Japan, the Republic of Korea, and China. A big lesson for Pakistan is to just learn how to utilise the potential of youth, and cheap labour and how we can import machinery & equipment to manufacture end-user products for exporting.

FIRM LEVEL LOW PRODUCTIVITY

Increasing productivity at firm level is one of the paramount requirements to scale up participation of the firms in global markets. The available literature is suggestive of the low productivity of Pakistani firms. Lovo & Varela (2020) has revealed that productivity of the Pakistani firms is estimated as sluggish. These firms are failed to grow as productive ones with the passage of time, but rather the opposite—A forty-year-old firm is 87 percent as productive as a young firm of less than 10 years. Comparing it with India, the older firm is between 30 percent to 40 percent more productive than younger firms. Likewise, old firms from the USA are 341 percent more productive, on average, than younger ones (see figure 04). Moreover, World Bank (2021) have suggested that Pakistani SMEs are not performing at their optimal level, the contribution of more the 50 percent of business in exports is zero. Pakistan must develop effective policies for SMEs that can enable them to enhance their capacity of productivity, for instance, units produced, improvement in quality and reducing time and cost coupled with market intelligence to boost their business at international level.

Fig. 4. Firm's Productivity over Their Lifecycle, Pakistan and Comparators



Source: World Bank (2021).

This low productivity mainly because of the limited integration of Pakistan into global marketplace (World Bank 2021). Defever, et al. (2020) have demonstrated that foreign-owned or exporting Pakistani firms are found more productive than domestic-owned. Foreign investors target more productive firms, and their productivity grows after being acquired. Exporters tend to exhibit productivity growth after becoming exporters. In addition to this, increased import duties on intermediates, or reduced levels of foreign direct investment in upstream services sectors, are associated with decreases in the total factor productivity of firms downstream. Gains from lower input tariffs accrue to those that do not secure duty exemption schemes— domestic-oriented firms or smaller exporters. Gains from upstream services foreign direct investment accrue mostly to firms that are further from the productivity frontier.

Other reasons of low productivity of the Pakistani firms include limited foreign direct investment, and presence of multinational firms in export-oriented sectors is significantly low, security concerns, complex investment environment, and highly protectionist law of 1976 have contributed to the outcome of low productivity, and firms' low capabilities, (World Bank, 2021; Lovo & Varela, 2020).

Success Story of South Korea

South Korea was ranked one of the poorest nations back at its independence. Since it was an agricultural country, during 1960 with low per capita income. Before the independence, the major industrialised areas were in the north of the country. When the Soviet Union and the United States partitioned the Republic of Korea in the south and the Democratic People's Republic of Korea (DPRK) in the north, most of the industry and electric power generation goes to North Korea. Aside from having challenges and hardships, South Korea has made a magnificent performance since its independence. In addition, the country has converted and shifted from an agricultural country to a tech country.

The most share of the exports of South Korea is also based on tech-oriented products. The total exports of South Korea crossed the figure of 644 billion dollars in 2021. The major exported products include electrical & electronic equipment 31 percent, machinery & nuclear reactors 12 percent, vehicles 10 percent, plastic 6.7 percent, and minerals fuels 6.2 percent.

Aker producing the first radio in 1959, the focus of Korea's industry remained on inward-oriented import substitution and the government was also less supportive of developing the industry. However, nominating electrical devices and radios as one of the specialised products for exports in 1965, the government started preparing and finalised a policy for the development of an export-led electronic industry in 1966 (Lim, 2016). During the late sixties and seventies, the focus of Korea's government was on the protection of domestic markets in terms of producing electronic items and export promotions. Aside from these priorities government welcomed a number of industries to set up electronic industries to develop rigorous competition. This competition benefited Korea in developing coloured televisions and core electronic components like semiconductors.

During the eighties, the government shifted its focus from developing industry competitiveness to consumer-oriented products. Korea's electronic industry started research and development (R&D) and bring its focus on information communications technology (ICT). This was a period of extensive R&D in the public as well as the private sector. Korea at the government level as well as the industry level. As a result, Korea has developed a digital switching system and 64K DRAM (Kim, Shi, and Gregory, 2004).

Aker extensive R&D the electronic industry of Korea is now competing with the world including US and Japan in technology. In 1993, the Korean government started providing a platform to the private sector to grow new avenues of technology (Lee, O'Keefe, and Yun, 2003; Oh, 2011). Though US and Japan have manufactured smartphones, flat panel displays, and mobile phones prior to Korea, however, Korean firms developed them shortly afterward.

Based on the strong policies, research & development, and competitive firms, Korea's electronic industry has improved its rank in the global market. For instance, during the late sixties, Korea produced electronic products for 55 million dollars which was 1/400th of the US and 1/67th of Japan. Whereas now it is producing 40 percent and 60 percent respectively, and ranked 4th in electronic production after China, the US, and Japan (KDI, 2022). Slowly and gradually, Pakistan can start and promote tech industries to have a better position.

OTHER FACTORS

The available literature has shown some other factors which are contributing in downscaling of Pakistani export sector. Such factors include exchange rate volatility, over-

regulation which discourages the businessmen and exporters to expand their activities, institutional barriers, and massive decline in cotton production, and lack of innovation, and etc. (Azam and Shafique, 2017; Khan and Koondar, 2020; Sadaf, et al. 2021; World Bank, 2021; Burn, et al. 2022; Phan, et al. 2022; Kumar, et al. 2022; Qamruzzaman, 2022; Zheng, et al. 2022).

CONCLUDING REMARKS

The major reasons include low productivity of firms, weak export competitiveness, failing to bring about value addition & innovation in exporting products, complex & inefficient incentive mechanism, limited export destinations, and low R&D at firm level. During the ongoing economic crisis, a quick remedy is essential through building an engaged and collaborative environment among government agencies, exporters and economists to find out the potential markets considering a match with exportable products.

The findings of the underlying literature review recommend that a comprehensive study is required by conducting a firm-level survey which maintains focus on identifying the factors which impedes firms' productivity, and export competitiveness.

REFERENCES

Amiti, M., & Weinstein, D. E. (2011). Exports and financial shocks. *The Quarterly Journal of Economics*, *126*(4), 1841–1877.

Athukorala, P. C., & Nguyen, T. K. (2022). Vietnam's Foreign Direct Investment and Export Performance. In Routledge Handbook of Contemporary Vietnam (pp. 149–163). Routledge.

Azam, A., & Shafique, M. (2017). Agriculture in Pakistan and its impact on economy. A review. *Inter. J. Adv. Sci. Technol*, *103*, 47–60.

Brun, M., Gambetta, J. P., & Varela, G. J. (2022). Why do exports react less to real exchange rate depreciations than to appreciations? Evidence from Pakistan. *Journal of Asian Economics*, 101496.

Defever, F., Riano, A., & Varela, G. J. 2020. Evaluating the impact of export finance support on firm-level export performance: Evidence from Pakistan. World Bank, Washington, DC. (Policy Research Working Paper; No. 9362).

Enderle, G. (2021). *Corporate responsibility for wealth creation and human rights*. Cambridge University Press.

Government of Pakistan. (2022). *Pakistan Economic Survey 2021-22*. In Economic Adviser's Wing, Finance Division.

KDI. (2022). The development of Korea's electronics industry during its formative years (1966–1979). (2022). Retrieved 27 November 2022, from https://www.kdevelopedia.org/Development-Topics/themes/--39

Khan, Z. A., Koondhar, M. A., Aziz, N., Ali, U., & Tianjun, L. (2020). Revisiting the effects of relevant factors on Pakistan's agricultural products export. *Agricultural Economics*, *66*(12), 527–541.

Kim, W., Shi, Y., & Gregory, M. (2004). Transition from imitation to innovation: Lessons from a Korean multinational corporation. *International Journal of Business*, *9*(4).

Koo, Y., & Kim, S. (2022). 'Follow sourcing' and the transplantation and localisation of Korean electronics corporations in northern Vietnam. *Area Development and Policy*, 1–24.

Kumar, L., Nadeem, F., Sloan, M., Restle-Steinert, J., Deitch, M. J., Ali Naqvi, S., ... & Sassanelli, C. (2022). Fostering green finance for sustainable development: a focus on textile and leather small medium enterprises in Pakistan. *Sustainability*, *14*(19), 11908.

Lee, H., O'Keefe, R. M., & Yun, K. (2003). The growth of broadband and electronic commerce in South Korea: contributing factors. *The Information Society*, *19*(1), 81–93.

Lim, W. (2016). The development of Korea's electronics industry during Its formative years (1966-1979). Knowledge Sharing Programme KSP Modularisation.

Lovo, S., & Varela, G. (2020). Internationally linked firms, integration reforms and productivity.

Mahmood, A., & Ahmed, W. (2017). *Export performance of Pakistan: Role of structural factors*. Karachi: State Bank of Pakistan.

Nguyen, H. H. (2020). Impact of foreign direct investment and international trade on economic growth: Empirical study in Vietnam. *The Journal of Asian Finance, Economics and Business, 7*(3), 323–331.

Niepmann, F., & Schmidt-Eisenlohr, T. (2017). International trade, risk and the role of banks. *Journal of International Economics*, *107*, 111–126.

Oh, M., & Larson, J. (2011). *Digital development in Korea: Building an information society*. Routledge.

Paravisini, D., Rappoport, V., Schnabl, P., & Wolfenzon, D. (2015). Dissecting the effect of credit supply on trade: Evidence from matched credit-export data. *The Review of Economic Studies*, *82*(1), 333–359.

Phan, T. H., Stachuletz, R., & Nguyen, H. T. H. (2022). Export Decision and Credit Constraints under Institution Obstacles. *Sustainability*, *14*(9), 5638.

Qamruzzaman, M. (2022). Nexus between Economic Policy Uncertainty and Institutional Quality: Evidence from India and Pakistan. *Macroeconomics and Finance in Emerging Market Economies*, 1–20.

Rahman, T. (2021). Impact of COVID-19 on Major Macroeconomic Variables of Bangladesh: An ARIMA Model. *JnU J. Econ.*, *3*, 61–76.

Sadaf, T., Kousar, R., Din, Z. M. U., Abbas, Q., Makhdum, M. S. A., & Nasir, J. (2021). Cotton production for the sustainable livelihoods in Punjab Pakistan: A case study of district Muzaffargarh. *International Journal of Ethics and Systems*.

Sarker, R. (2018). Trade expansion, international competitiveness, and the pursuit of export diversification in Bangladesh. *The Bangladesh Development Studies, 41*(2), 1–25.

Siddique, M., e Ali, M. S., & Irshad, M. S. (2022). Revealed comparative advantage and Pakistan's global leather products potential among selected leather exporters: New evidence from Kaplan-Meier survival function. *Annals of Social Sciences and Perspective*, *3*(1), 23–41.

World Bank (2021). Reviving Exports. In Pakistan Development Update. https://thedocs.world-bank.org/en/doc/4fe3cf6ba63e2d9af67a7890d018a59b-0310062021/original/PDU-Oct-2021-Final-Public.pdf

Zeeshan (2022). Is a multilateral full trade liberalisation policy effective in Pakistan? (PIDE Knowledge Brief, 87:2022).

Zheng, L., Abbasi, K. R., Salem, S., Irfan, M., Alvarado, R., & Lv, K. (2022). How technological innovation and institutional quality affect sectoral energy consumption in Pakistan? Fresh policy insights from novel econometric approach. *Technological Forecasting and Social Change, 183,* 121900.

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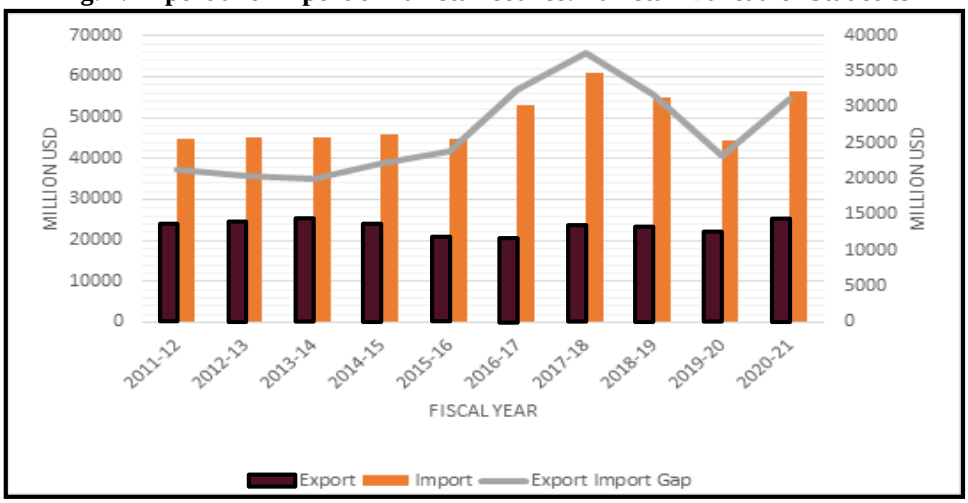
Will the Import Ban Prove Effective?

MOHAMMAD SHAAF NAJIB

INTRODUCTION

Pakistan has for decades now been facing a financing crisis. The expenditures have always remained significantly higher than the revenues making the governments look to various sources to finance this gap. One major reason for the country's lackluster performance in managing its expenses stems from the import dependency of the economy. Not only do we import the raw materials for our industries, but the local demand for commodities, agricultural and manufactured, is met through imports. While Pakistan's import per capita remains lower than other regional countries,[1] the low export value which has remained rather stagnant over years is a major cause of concern. Figure 1 below depicts Exports and Imports of Pakistan during the last decade.

Fig. 1. Export and Import of Pakistan source: Pakistan Bureau of Statistics



This graph explains why Pakistan has knocked on the doors of IMF over 20 times while also taking loans from various other countries. Recently, Pakistan has plunged into a similar crisis once again. The reserves continued to fall while arranging external finance

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[1]Prof. Dr. Abdul Jalil's calculation, presented at PIDE Webinar 'A Vision for the Unforgotten Economy' dated: April 12, 2022 https://fb.watch/dhVz04Tr3Q/

for the impeding currency crisis was become a difficult task. Subsequently, the threat of default and bankruptcy started looming over Pakistan's economy. In this scenario, the government along with other steps to put brakes on the financial crisis decided to ban various imports. Through the S.R.O. 598(I)/2022,[2] the ministry of commerce amended the Import Policy Order, 2022[3] by including 33 more product lines to the Import Policy Order Appendix A and thus adding them to list of commodities placed under an import ban. It is important to note that not all sub-categories of these 33 product lines have been banned, instead mostly selective categories falling under these have been placed on the import ban list. The total number of different product categories banned though totals just over 450. This policy viewpoint aims to analyze whether the policy will be effective in achieving the goals set out by the government or not using last year's import data.

SITUATION AT HAND

During the fiscal year 2020-21,[4] Pakistan's total commodity imports stood at PKR 8.9 trillion (USD 56 billion). In the same time, the value of the over 450 product categories recently placed under import ban was almost PKR 383 billion (USD 2.3 billion, assuming a constant ER of USD 1 = PKR 160, the average ER of FY 2020-21). In percentage terms, the now banned products formed 4.3 percent of the total commodity import values (See Table 1). This means that the products banned under the tag of luxury imports constitute a very small amount of our total import bill and is neither a driving force behind the import crisis nor is making any secondary but significant contribution to it.

Table 1

Share in Total Imports (All values in Million PKR)

Total Imports 2020-21		PKR 8,982,441
Import Value of products banned through S.R.O. 598(I)/2022	PKR 382,868	USD 2393 (at constant ER of USD 1 = PKR 160, average ER of FY 2020-21)
Share in total imports (%)	4.26%	4.26%

Source: Pakistan Bureau of Statistics.

Table 2 below shows the impact of banning these imports in dollar terms at varying exchange rates.

Table 2

Import Value of Banned Products in FY 2020-21 (in Billions)

PKR	USD, If USD 1 = PKR 150	USD, If USD 1 = PKR 175	USD, If USD 1 = PKR 180	USD, If USD 1 = PKR 190	USD, If USD 1 = PKR 200	USD, If USD 1 = PKR 210	USD, If USD 1 = PKR 220
382.862	2.552	2.188	2.127	2.015	1.914	1.823	1.740

Author's own calculations.

[2]https://www.commerce.gov.pk/wp-content/uploads/2022/05/SRO-Ban-on-Import-of-Luxury-and-N_essential-Items.pdf

[3]https://www.commerce.gov.pk/wp-content/uploads/2022/04/IPO-2022-SRO-No.-545I-2022-dt.-22.4-2022.pdf

[4]External Trade Statistics Data at 8-digit level (Pakistan Bureau of Statistics)

As the Table 2 shows, the ban on these products based on varying exchange rate would have saved not more than USD 2.552 billion in import bill at an exchange rate of USD 1 = PKR 150. To put this into context, during the Fiscal Year 2020-21, the least monthly import bill was USD 3.3 Billion[5] during the month of August, 2020. Subsequently, the dollars saved by an annual ban on import of these products will not finance even a single month's import bill.

At this point, it is essential to highlight that Pakistan's import bill though has varied during the course of last decade, but has on average increased by 3.425 percent per annum. Considering this, we run a few scenarios (see Table 3) regarding the growth in import value of the now banned products and its impact on the overall import bill. Unlike Table 2, we use exchange rate ranging between USD 1 = PKR 180 and USD 1 = PKR 220 as this is the most likely range for the exchange rate to vary between during the coming months.

Table 3

Dollars Saved with Varying Growth in Import Value of Banned Products (All Values in Billions)

Growth in Import Value (%)	PKR	USD, If USD 1 = PKR 180	USD, If USD 1 = PKR 190	USD, If USD 1 = PKR 200	USD, If USD 1 = PKR 210	USD, If USD 1 = PKR 220
3	394.354	2.191	2.076	1.972	1.878	1.793
3.425 (average)	395.981	2.20	2.084	1.98	1.886	1.80
5	402.011	2.233	2.116	2.01	1.914	1.827
10	421.155	2.34	2.217	2.106	2.001	1.914
15	440.298	2.446	2.317	2.201	2.097	2.001
20	459.442	2.552	2.412	2.297	2.188	2.088

Author's own calculations.

Table 3 shows that if the import value of all the now banned products is increases by 3.425 percent, the average increase in import value in Pakistan, then with varying exchange rate the government will be able to save between USD 1.8 to 2.20 billion over the period of one year. This value again will not be enough to finance the import bill of even a single month. Based on different scenarios as displayed in table 3, even with a 20 percent increase in import value of these products and the exchange rate being brought down to USD 1 = PKR 180, the government will be able to save less than even USD 2.6 Billion, which would be same as the total annual import bill of these products during the fiscal year 2020-21.

An interesting statistic to come out of the import data tells us that products banned belonging to 5 product lines contribute to 86 percent of the total import value of these banned products. These are Mobile Phone CBUs, Fruits and Dry Fruits, Auto CBU, Home Appliances CBU, and Cosmetics and Shaving Items. Together these five had share of just 3.67 percent in the total commodity imports during the FY 2020-21.

[5]Annual Analytical Report on External Trade Statistics of Pakistan FY 2020-21 (Pakistan Bureau of Statistics)

Table 4

High Share of Import Value among Banned Products

Product Description	Import Value (PKR in 000s)	Share in Total Imports (%)
Mobile Phone CBU	229,269.983	2.55
Fruits and Dry Fruits	36,856,487	0.41
Auto CBU	33,040,348	0.37
Home Appliances CBU	20,414,751	0.23
Cosmetics and Shaving Items	9,628,581	0.107
Total	329,210,150	3.67

Source: Pakistan Bureau of Statistics.

Furthermore, the import value of Automobile CBU is equal to the amount of own money[6] that consumers pay annually in Pakistan to purchase a car. PIDE Policy Viewpoint 32:2021[7] concludes that in the last 5 years consumers have paid PKR 150-170 billion in own money, making it PKR 30-34 billion annually. This represents that high import dependency in multiple products, especially such CBU products is also down to the inefficiencies of the local market and the right way to curb imports of these products is not to ban them but to improve the local market structures and making them more efficient which will automatically draw imports out of the picture. The policy of banning imports of CBU products which are already being sold on own in the local market will increase the own on these products thus increasing the cost to consumers of products in local market by furthering the demand and supply gap.

It must also be noted that goods that fall under these categories but if imported in Pak Rupees or through a barter system will be exempted from this ban. The ban also is not applicable on goods falling under these categories for which the LCs were opened prior to the ban imposition or those that were en-route at the time of ban imposition. This means that in the immediate short run, the products will be available in the local markets while the policy will be unable to achieve its objectives of saving reserves immediately as is the need of the hour.

The government must also realize that such regulatory bans have an adverse impact by creation of an alternate route and market for these products through smuggling. In case of smuggling, not only will the products still be reaching the local market, but the dollars will continue to be used through the private forex market thus creating a completely parallel system for the import of these products. The only loss would be to the government in case of lost revenue from the custom and import duties on these products while they continue to be sold after being smuggled in while the dollars will not be saved either. Moreover, additional administrative measures to control smuggling will only increase the expenses of the government.

[6]PIDE Knowledge Brief No. 41:2021 https://pide.org.pk/research/the-nuisance-of-own-money-in-automobile-purchases/

[7]https://pide.org.pk/research/the-issue-of-own-money/

POLICY RECOMMENDATION

As shown above, not only will this ban prove to be highly insignificant in making an impact on the import bill and will not save any noteworthy amount of dollars even if the ban continues for the entire year, it will lead to an increase in smuggling and force the government to bear additional expenses of controlling smuggling while losing revenue in form of custom duties.

> *The government henceforth must immediately take back its decision to ban these imports, and instead look for alternate measures to manage the export-import gap.*

The ban intends to protect the dollar reserves from falling as well as restricting the currency depreciation. While the policy seems to be not effective in saving reserves as shown through data above, curtailing depreciation through import bans is not a wise approach. Instead, the government must allow the currency to depreciate as per the market forces as such a depreciation will eventually play some role in curtailing imports itself without establishing any parallel market through smuggling of goods. Significant protection through import bans and/or high duties have already been provided to local industries of electronics, mobile phone and automobiles which though might have to some extent restricted the import of these CBUs, but the industry overall has failed to take benefit of this protection to meet local demand in terms of quantity and quality both. Any such import ban will only put the consumers at a worse position due to the inability of local industry to uplift itself to a competitive state against any imported products and the ban will make local industry even less competitive.

RESEARCH FOR SOCIAL TRANSFORMATION AND ADVANCEMENT

2021 RASTA Competitive Grants Programme for Policy-oriented Research

The Pakistan Institute of Development Economics (PIDE) has launched a multi-year competitive grants programme for policy-oriented research in Pakistan titled **'*Research for Social Transformation and Advancement*'** (RASTA) under the Public Sector Development Programme (PSDP) of the Ministry of Planning, Development and Special Initiatives, the Government of Pakistan. RASTA's mission is to develop a research network of academia, think tanks, policymakers, practitioners and other stakeholders across Pakistan producing high-quality, evidence-based policy research to inform Pakistan's public policy process.

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Call for the second round coming soon.

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EXTRACTS FROM THE CONSTITUTION OF THE PAKISTAN SOCIETY OF DEVELOPMENT ECONOMISTS

ARTICLE 5

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(a) Previous *ex-officio* membership of the society;

or

(b) Master's degree in Economics, Business Administration, Public Administration, Agricultural Economics, Statistics Econometrics or Economic Demography and/or an evidence of proven scholarship in these areas of specialisation.

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Editor: **Nadeem Ul Haque**

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