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Impact of Financial Development and Trade Liberalization on Total Factor Productivity: Evidence from Export and Non-Export Firms of Pakistan

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	Abstract
<p>Usman Shaukat Khan PhD, Corresponding Author, Adjunct Assistant Professor, Department of Accounting & Finance, National University of Modern Languages, Islamabad</p>	<p>This paper examines the impact of financial development, trade liberalization and corporate tax on Total Factor Productivity (TFP) of the export and non-export industrial firms listed over the Pakistan Stock Exchange. The analysis used data for the post liberalization period from 1997 to 2017 using System Generalized Method of Moments (Sys-GMM).</p> <p>We used three proxies for financial development to analyze their impact on TFP. The Financial Development Index and Financial Institution Depth Index that capture multidimension effect had significant positive impact on TFP of both the export and non-export firms, however, the impact is stronger in case of exporting firms.</p> <p>Besides, trade liberalization proxied by average tariff rate, customs duty and sales tax, the results are statistically significant. The reduction in average tariff rate exerted positive impact on TFP for exporting firms while negative for non-export firms. The impact of customs duty is insignificant. Reduction in sales tax exerted positive impact on TFP of export-firms while negative for non-export firms. Reduction in corporate tax asserted significant positive influence on TFP growth of exporting and non-exporting firms, however, the impact is greater for export-firms.</p>
Keywords:	Financial Development, Trade Liberalization, Total Factor Productivity, Corporate Tax, Export and Non-Export Firms

Introduction

Industrial sector plays vital role in the economic growth through increase in income, investment, employment, and exports. The sustained development of a country is based on the performance of the industrial sector. Industrialization is so important that countries like India and China have been able to break their vicious circle of underdevelopment by raising the productive capacity of their labor and capital. The rapid economic growth of many southeast Asian countries during the second half of the twentieth century can be attributed to export-driven growth strategy. The proponents of export-driven growth strategy argue that when firms are exposed to foreign competition, they learn from the international market of the ways to increase their TFP.

Growth is driven by two sources viz-a-viz input driven growth and productivity driven growth. The input driven growth is attributed to that part of output which can be explained by factor inputs such as capital, and labor. The productivity driven growth is attributed to improvement in knowledge, technology transfer, level of financial development and trade liberalization (Sehgal and Sharma, 2012). Hence, TFP is that part of output put which cannot be explained by factor inputs and is attributed to knowledge and technology transfer.

The literature has identified various determinants of TFP at the industry level including investment in ICT, human Capital, trade liberalization, trade openness, international trade and research and development (R&D). Luintel (2010) identified R&D and human capital as key determinants of TFP growth, while Aghion and Howit (2006) considered technology transfer as key driver. Likewise, Zakaria (2014) considered trade openness as on the most important component of economic growth, while Ahmed et al., (2017) argued that trade liberalization is one of the key components of TFP growth of the Industrial sector of Pakistan. In a recent study (Khan et al., 2020) identified trade liberalization and corporate tax as important components in determining TFP growth at firm-level in case of Pakistan.

The studies on the determinants of TFP growth can be classified in to two main groups viz-a-viz micro-level determinants and macro-level determinants. The micro-level determinants include ownership, firms' size and its location, age of firms that affect TFP growth (Coad et al., 2013; Abou-Ali and Rizk, 2015). On the other hand, macro-level determinants include (few among others) fiscal policy, monetary policy, trade policy, trade liberalization, trade openness, human development, research and development (see for instance, Saleem and Zaki, 2018). Likewise, Kim and Loayaza (2019) analyzed four components of TFP growth that are institutions, infrastructure, education and market efficiency. All these components enhance TFP growth at both micro and macro-level.

Although, the role of various determinants of TFP have been largely discussed in literature, however, financial development as a determinant of TFP growth received little attention despite of being a main source of all kinds of innovations, human development, technology transfer, R&D and trade. Due to this reason, evidence regarding the role of financial development in TFP growth are mixed.

To this end, the industrial sector of Pakistan is facing low TFP due to lack of industrial credit, energy crisis, weak infrastructure, and obsolete technology. TFP is one of the basic elements in the economic growth of any country, therefore, enhancing TFP can lead to increase the pace of economic development. Pakistan has undergone various trade (trade liberalization) and financial sector reforms (financial development) which are vital determinants of TFP of industrial sector at firm-level. Therefore, it is important to investigate the impact of these variables on TFP of Pakistan's industrial sector.

Moreover, the literature lacks in analyzing joint impact of Financial Development, Trade Liberalization and Corporate Tax on TFP of both the export and non-export industrial firms. The rest of the study is organized in five sections. Section 2 presents brief literature and contribution of the study, section 3 elaborates research methodology, model and definition of variables. Section 4 represents results followed by section 5 which presents conclusion.

1. Literature Review and Hypothesis

The benefits of financial development in enhancing TFP growth are inconclusive. One strand of literature argues that financial development enhances economic growth through mobilization of capital, technological innovations, and investment (Baghot, 1773 and Hicks, 1969). The second strand of literature asserted that finance has no role in economic growth and finance follows growth (Robinson, 1952). This implies that economic growth can create demand for financial services and well-developed financial system automatically responds to this demand.

The financial sector augment economic growth through investment and saving function. Both financial markets and financial institutions can enhance TFP through financial access, financial depth, financial inclusion and financial efficiency. Therefore, it can be argued that financial development has a significant role in the economic growth of a country through TFP channel. However, the role financial development in TFP has received little attention and as a result, we found mixed evidence relating to the impact of financial development on TFP.

The literature highlights two sets of doctrine regarding the finance-growth nexus. The first doctrine supported by Keynesian economists who argued that financial development is a consequence of growth. The change in demand and supply in the real sector boosts financial development. Hence, this doctrine considers finance less important in economic growth. The second set of doctrine considers financial development as significant in economic growth. Schumpeter (1935) argues that business development requires allocation of capital through financial intermediaries that are the source of savings for investors. Hence, financial development assists savings and risk management through reduction in costs of information and transactions (King and Levine, 1993).

Various studies (Goldsmith, 1969; McKinnon, 1973; Greenwood and Javanovic, 1990; Bencivenga and Smith, 1993, among others) argued that a weak financial system handicaps financial development which could result in misallocation of resources causing a decline in TFP. Therefore, better developed financial system could enhance productivity at micro as well as macro level. Likewise, financial development allows firms to appropriate new business through investment and research activities. In the same vein, few other studies such as Levine, 2005 and Beck et al., 2005) found that financial constraints (access to credit and other financial sources) could diffuse growth prospects at firms' level.

Financial development works through several channels, for example, McKinnon (1973), Shaw (1973) and Levine (2004) argued that cross country flow of capital enables savings for investment ensuring efficient allocation of financial resources among various industries. The empirical literature found two divergent views on role of finance in TFP growth. The first views (Schumpeter, 1935; McKinnon, 1973 and Shaw, 1973) attributed the difference in growth rates of various countries to the quantity and quality of financial services being rendered by financial sector. The second group (King and Levine, 1993; Levine and Zervos 1998) found that higher level of financial development has positive impact on economic growth. Therefore, it can be argued that financial development operates through savings, investment, technology transfer and productivity gains which in turns increases TFP.

Regarding the role of financial development, the neo classical theory views financial development as an accelerator to economic growth process through capital accumulation, saving and investment channel (Goldsmith, 1969; McKinnon and Shaw, 1973). Whereas, the endogenous growth theory says that sustainable growth can be achieved through technological transfer (Romer, 1986) and technology transfer needs financial resources. To this end Aghion et al., (2005) argued that credit constraints reduce long term investment of firms which in turn has adverse impact on their TFP growth. Likewise, Gatti and Love (2008), Ferrando and Ruggieri (2015) and Cagese (2019) examined the impact of financial frictions on TFP growth citing adverse effects of TFP growth. Likewise, Manaresi and Pierri (2018) argued that financial frictions in terms of credit supply results in reduced output and TFP growth. Similarly, Levine and Warusawitharana (2019) found that financial frictions slow down productivity growth. Various studies, inter alia by Muhammad and Abdul (2006), Yao and Wei (2007), Rahim and Abedin (2013), Altea et al. (2014), Mitra et al (2014), Levine and Waruswitharana (2019) examined the relation between financial development and TFP and found that financial development had positive impact on TFP and economic growth.

The literature is quite rich regarding the effects of trade liberalization on not only on economic growth but on TFP growth as well. However, the joint impact of financial development, trade liberalization and corporate tax on TFP has received little attention. One important study by Kar et al. (2013) examined the causal relationship between trade liberalization, financial development, and economic growth in the context of Turkey and found that financial development is caused by trade liberalization, and both contribute to economic growth. Likewise, various other studies, for example, Chaudhary et al. (2010), Saini et al. (2010), Rahim and Abedin (2013) among others examined the benefits of financial development and trade liberalization on economic growth. They found that trade liberalization benefits the domestic economy through improved market access which results in surplus for the overall economy. However, Shahbaz and Rehman (2014) argued that trade liberalization coupled with financial development supports technology transfer and efficient human capital increases industrial productivity. In most recent studies (khan et al., 2020) found that trade liberalization has positive impact of TFP growth at firm-level in context of Pakistan's industrial sector.

Based on the above cited literature, joint impact of financial development, trade liberalization and corporate tax on TFP has received little attention, therefore this study contributes to the existing literature by incorporating joint impact of financial development, trade liberalization and corporate tax on TFP growth of export and non-export firms for Pakistan's industrial sector. Against these backdrops, the present study tries to address following research questions;

- i. How financial development, trade liberalization and corporate tax lead to increase in TFP for export and non-export firms?
- ii. How corporate tax as fiscal measure impacted the TFP of export and non-export firms?

Based on the cited literature, we formulated the following alternate hypothesis;

H_{1a} ; Financial development asserts disproportionate effect on TFP of export and non- export firms.

H_{1b} ; Trade Liberalization has disproportionate impact on TFP of export and non-export firms.

H_{1c} ; Higher corporate tax exerts disproportionate effect on TFP of export and non-export firms.

2. Methodology and Model:

We used a semi parametric approach following Khan et al., (2020) which is an extension of Olly and Pakes (1996). This method considers more realistic assumptions about firms' behavior than standard techniques like Ordinary Least Squares (OLS). This study estimated TFP of exporting and non-exporting firms listed industrial firms employing system Generalized Method of Moments (sys-GMM) because this approach is more efficient in handling the issues of heterogeneity, simultaneity, and selection bias. We estimated production function for export and non-export firms using and augmented Cob Douglas Production Function what relates output of production to factor of production (capital, labor, raw material and energy) using Levisohn-Petrin (2003), Ahmed et al., (2017) and Khan et al, (2020) approach. The augmented industrial production function is given by:

$$Y_{i,t} = A_{i,t} K_{i,t}^{\alpha} L_{i,t}^{\beta} RM_{i,t}^{\gamma} EN_{i,t}^{\delta} E^{u_i} \quad (2.1)$$

Where Y is industrial value added, A is total factor productivity, K is capital, L is labor engaged in the industrial sector, RM is industrial raw material and EN is energy consumption in the industrial sector. This study uses raw material as proxy for unobserved productivity shock. Following Khan et al, 2020, the TFP is calculated as;

$$a_{it} = y_{it} - \alpha k_{it} - \beta l_{it} - \gamma m_{it} - \delta en_{it} + u_{it} \quad (2.2)$$

After calculating TFP using equation (2.2), we used it as dependent to variable as a function of Financial Development (FD), Trade Liberalization and Corporate Tax. The relation in functional form can be expressed as;

$$TFP_{i,t} = \beta_0 + \beta_{FD} FD_{i,t} + \beta_{TL} TL_{i,t} + \beta_{CRT} CRT_{i,t} + \beta_{GE} GE_{i,t} + \beta_{INF} INF_{i,t} + \beta_{REER} REER_{i,t} + \beta_{RD} RD_{i,t} + \beta_{HD} HDI_{i,t} + \varepsilon_{i,t} \quad (2.3)$$

Where FD is financial development proxied by Financial Development Index, Financial Institutions Depth Index and Bank Credit to private sector. TL is trade liberalization proxied by Average Tariff, Customs Duty and Sales Tax while CRT is corporate tax. GE is government expenditure; RD is research and development and HDI is human development index.

2.1 Data Description and Sample Selection Criteria:

This study focused on the industrial sector of Pakistan and utilizes the data comprising of one hundred and fifty-three (153) firms which remained listed on Pakistan Stock exchange during the period 1997-2017. The industrial sector has significant role in the economic growth process of country through TFP channel. We have selected industrial sector as it is considered as the backbone of the economy. The stability of industrial sector is vital determinant of the sustained growth in countries like Pakistan. The industrial is selected as it can be considered as the backbone of Pakistan's economy being a significant source of foreign exchange and its contribution towards employment (24.3%) and GDP (20.88%). Further the firms working in various sectors of the economy and even within the same sectors of the economy have heterogeneous characteristics and their performance is likely to vary.

The present study focused on the industrial sector of Pakistan at firm-level, while previous studies analyzed the industrial sector at aggregated level by relying on the data of Census of Manufacturing Industries (CMI) which were available up to 2005. However, we compiled data of various variables at firm-level over the period 1997-2017 by adapting the definitions used in CMI. The data is extracted from audited financial statements, Pakistan Stock Exchange (PSX) and official websites of the sample firms.

We based our sample selection on two conditions. Firstly, those firms were selected which remained listed for 15 years or more, secondly, remained complaint to regulations of Securities and Exchange Commission of Pakistan (SECP). Hence from a total population of 370 firms we compiled data of relevant variables for 153 listed firms which is about 42% of total industrial firms listed on PSX. We used unbalanced panel data which is useful in collecting a good representative sample from the total population by increasing the sample size.

2.2 Variables Definition and Measurement:

To estimate firm-level production function, firm's value added proxied by total sales is used as a dependent variable, while physical capital, labor force, raw materials and energy inputs are utilized as dependent variables. The capital stock is defined as the sum of property, plant and equipment as shown on the balance sheet of the sample firms following CMI (2005). Labor is taken as wages of work force directly involved in the production process, while energy inputs are the costs associated with production process including energy and alternate sources, such as in house energy generation. Raw material is the cost of raw material used in manufacturing of the product. We used the wholesale price index (WPI) with 2010 as a base year to deflate all the variables for capturing the effect of price changes. The rest of the variables under investigations are explained as:

2.2.1 Total Factor Productivity (TFP)

TFP is that level of output which is not attributable to factor inputs such as capital, labor, raw materials and energy inputs. In other words, the level of output which is attributed to efficiency levels and technical progress (Krugman, 1994; Law, 2000 and Coelli., 2005). For calculating TFP, we estimated a variant of Cobb-Douglas production function comprising of raw materials, labour force, capital stock and energy inputs following Olly and Pakes (1996), Levinsohn and Petrin (2003), Ahmed et al. (2017), Bournakis and Mallick (2018) and Khan et al., 2020. TFP is calculated using the following equation:

$$\widehat{TFP} = y_{it} - \hat{\alpha}k_{it} - \hat{\beta}l_{it} - \hat{\gamma}m_{it} - \hat{\delta}en_{it}$$

2.2.2 Financial Development

Financial development can be referred to as size, efficiency, stability and access to the financial systems. It allows firms to conduct research activities and investment to attain higher TFP growth. Hence, a firm's TFP can be a vital indicator in transforming the benefits of financial development at macro-level. Literature used different proxies as measure of financial development, for example, private credit to GDP ratio and stock market capitalization to GDP ratio. Few others have measured financial development as private loan ratio and financial interrelation ratio (Han and Shen 2015), financial inclusion (Dabla-Norris, 2020), index comprised of domestic credit, number of ATMs, M2 ratio and number of bank branches (Ezzahid and c, 2019) and financial frictions (Levine and Warusawitharana, 2019). However, these measures capture only one or few dimensions of financial sector development, however, overlooked the broader dimensions of depth, access and efficiency for financial institutions and financial markets. Therefore, the present study uses newly constructed financial development index by Svirydzhenka (2016) and updated up to 2017 by IMF. This index has the advantage of measuring the overall development level of financial institutions and financial markets in terms of their depth (size and liquidity), access (individual and firms' access to financial services) and efficiency (providing low-cost finances). Therefore, we used financial development index (aggregation of financial institutions and financial market index) and financial institution depth (bank credit to private sector in percent of GDP, pension fund assets to GDP, mutual fund's assets to GDP, life insurance premium and non-life insurance premium) as measures of financial development to examine their impact on firm-level TFP.

2.2.3 Trade Liberalization

Trade liberalization means reduction in tariff and non-tariff barriers to international trade (Ahmed et al., 2017). Various proxies have been used in the literature as measures of trade, for example, sum of exports and imports as percent of GDP (Zakaria and Ahmed, 2013), technological spillover (Grossman and Helpman, 1992), the share of imports plus share of exports as a percentage of income and tariffs, export to GDP ratio, import to GDP ratio, share of imports in total production. However, all of these proxies are indirect measures of trade liberalization. Few other studies such as Ahmed et al. (2017) used effective rate of protection as a new and alternate measure of trade liberalization along with average tariff and import duty being the direct measures of trade liberalization. The present study uses three proxies comprising of Average Tariff Rate, Customs Duty and Sales Tax relative to firm to as measures of trade liberalization.

2.2.4 Average tariff rate

The average tariff rate is defined as an un-weighted average of effectively applied rates for all products subject to tariffs (World Development Indicators, 2017). The data for average tariff are collected from World Bank's staff estimates (WITS-World Integrated Trade Solution System), Trade and Development's Trade Analysis and Information System (TRAINS) database and the World Trade Organization's (WTO) Integrate.

2.2.5 Customs Duty Rate (CD)

Customs duty is defined as an import duty collected from importer on the value of imported goods. The effective rate of customs duty is calculated using the following formulae:

$$\text{Customs Duty Rate} = \frac{\text{Total Customs Duty Collection}}{\text{Total Imports Value}}$$

The data for yearly customs duty collection and total yearly imports are taken from FBR and SBP. The effective rate of customs duty is considered as a direct measure of trade liberalization.

2.2.6 Sales Tax (ST)

Sales tax is a tax imposed on import and local supply of goods and services. Its standard rate has ranged from 15% to 17% during the last decade in Pakistan. This is a type of tariff whose incidence is born by the final consumers. To this end, Ring (1999) found that sales tax led to loss in productivity due to the difficulty in distinguishing the final sales. However, few sectors of the economy have been given incentives in the shape of reduced and concessionary sales tax rates on import of raw materials, exports and manufacturing

of specific goods. This variable is selected as a measure of trade liberalization to analyze its impact on firm-level TFP. Data on sales tax are collected from Yearly Book of FBR (various issues).

2.2.7 Corporate Tax (CRT)

Corporate tax (CRT) is a tax imposed on corporate profits. A higher corporate tax rate can generate distortive effects on firms' performance as it can increase firm's cost of capital (Bournakis and Mallick, 2018). Since, trade liberalization may cause fiscal imbalance due to decline in revenue collection. Therefore, government can impose tax, say corporate tax on firm-level profits to control the fiscal imbalance. Hence, the present study also incorporates the effect of corporate tax as a fiscal policy measure on firm's TFP growth. Data on corporate tax rate are collected from Yearbook of FBR (various issues).

2.2.8 Government Development Expenditure as percent of GDP (GE)

Government expenditure refers to the development expenditures incurred by the government to support economic development and increase production. It is calculated as the ratio of development expenditure to GDP on yearly basis. The formula used for calculating this ratio is:

$$GE = \frac{\text{Development Expenditure}}{\text{GDP}}$$

The data for development expenditure are collected from yearly budget documents available on website of SBP, while the data on GDP is downloaded from World Bank's WDI. The government expenditures expected to affect TFP growth positively (Gong, 2018).

2.2.9 Inflation Rate (INF)

Inflation rate reflects the annual percentage change in the cost of purchasing a basket of goods and services based on the consumer price index. The data for inflation are collected from the WDI with 2010 as base year. The relationship between inflation and growth is directed by the distortive effects of inflation which results in relative price rise (Fisher, 1993). We used inflation as control variable to capture its impact on firm-level TFP.

2.2.10 Real Effective Exchange Rate (REER)

Real effective exchange rate is the nominal effective exchange rate that measures the value of a currency against a weighted average of several foreign currencies divided by a price deflator or index of costs (WDI, 2017) with 2010 as base year. Mathematically the formulae adopted for the calculation of real effective exchange rate can be written as:

$$\text{Real effective exchange rate} = \frac{\text{weighted average of several foreign currencies}}{\text{Price deflator or Index of costs}}$$

The data are collected from the World Bank's WDI.

2.2.11 Human Development Index (HDI)

Human development highlights the key dimensions of human life such as health, education, knowledge, self-esteem, human rights including social, cultural and economic freedom and income levels. United Nations Development Program (UNDP) used this index as standard measure of human development since 1990. It measures the degree of social and economic development of countries. HDI is widely adopted as human development indicator which reflects the wellness of human across various countries (Klugman et al., 2011 and Shang et al., 2019).

Further, this index measures the achievements of a country made in the area of health, education and income levels (United Nations Development Program, 2015). We used HDI as a proxy for human development to measure its impact on firm-level TFP.

2.2.12 Research and development (R&D)

Research and Development (R&D) commonly describes the activities undertaken by firms to innovate goods and services or produce improved goods. The R&D expenditure is widely used to measure the innovative performance of firms, industries, and countries (Bournakis and Mallick, 2018). We have chosen the categorical variable for research and development. A value of 1 has been assigned to the firms which undertook R&D and 0 for firms who did not invest any funds in R&D. The summary of variables, their abbreviations and data sources are elaborated in appendix A.

3. Results

This section discussed the relationship between TFP growth and exports. The results are in conformity with the literature and there is evidence that increase in TFP growth has positive impact on exports. There exists a bidirectional relationship between TFP and exports (Yasar and Nelson, 2003). Therefore, we investigate joint impact of financial development, trade liberalization and corporate tax along with control variables namely government expenditure (GE), inflation (INF), real effective exchange rate

(REER), human development measured by human development index (HDI) and research and development (R&D) on exporting firms and non-exporting firms. The results are presented in Table 3.10.

3.1 Descriptive Statistics

Panel A of table 3.1-3.2 presents descriptive statistics for sample exports and non-exports firms which shows that average TFP_{it} for the export-oriented firms is positive, while that of non-exporting firms has negative average TFP. This indicates that the export-firms are more productive than the non-export firms. The TFP for non-exporting firms is more volatile which is evident from the standard deviation of 0.417 as compared to exporting firms having standard deviation of 0.268.

With regards to financial development, the mean value of BCPS and FIDI is also higher for export-firms than the non-exporting firms which shows more credit availability for exporting firms. However, FDIX is higher in non-exporting firms. The mean value of trade liberalization proxied by AVT, CD and ST are also lower for the exporting firms as compared to non-exporting firms. The export firms have higher average HDI and R&D than non-export firms. The higher average of HDI for export-firms suggest that they have better work force in terms of skills. Likewise, the higher average R&D shows that the exporting firms have more focus on R&D which is vital for the sustainable growth of firms. All the variables are positively skewed and leptokurtic revealing that that distribution has longer and flatter tails. The Jarque-Bera test is significant at 1% level of significance confirming that variables are non-normal distribution exporting-firms and non-export firms.

The correlation analysis (Panel B of Table 3.1) for the export-firms shows that financial development index (FDIX), financial institution depth index (FIDI), customs duty (CD), sales tax (ST), corporate tax (CRT), inflation (INF), human development index (HDI) and research and development (R&D) are positively correlated with TFP, while BCPS, AVT, GE and REER shows negative correlation with TFP.

The correlation matrix for non-exporting firms is presented in Panel B of Table 3.1. It shows that FDIX, AVT, CD, CRT, and R&D have negative correlation with TFP, while FIDI, BCPS, ST, GE, REER and INF are positively correlated with TFP_{it} .

Table 3.1: Descriptive Statistics and Correlation Analysis -Exporting Firms

Panel A	TFP_{it}	FDIX	FIDI	BCPS	AVT	CD	ST	CRT	GE	INF	REER	HDI	R&D
Mean	0.022	26.770	7.810	2.457	0.130	0.382	0.149	0.357	0.026	2.046	4.644	0.505	0.021
Maximum	4.304	37.737	10.692	2.828	0.510	1.707	0.510	0.460	0.078	2.369	4.800	0.558	1.000
Minimum	-1.224	17.093	6.621	1.971	0.000	0.052	0.000	0.310	0.002	1.890	4.557	0.436	0.000
Std. Dev.	0.268	6.765	1.123	0.242	0.029	0.479	0.039	0.038	0.021	0.134	0.076	0.039	0.145
Skewness	9.215	0.268	1.200	-0.265	10.456	1.161	-0.334	1.702	0.779	1.018	0.715	-0.413	6.598
Kurtosis	126.859	1.766	3.396	2.095	128.006	3.088	28.369	4.986	2.800	2.904	2.252	1.878	44.535
Jarque-Bera	1185203.00*	136.902*	446.853*	83.264*	1214158.00*	408.31*	48678.94*	1174.02*	186.59*	314.06*	196.65*	146.60*	143553.80*

Panel B: Correlation Analysis													
TFP_{it}	1.000												
FDIX	0.011	1.000											
FIDI	0.001	0.760	1.000										
BCPS	-0.022	-0.652	-0.196	1.000									
AVT	-0.016	0.032	-0.029	-0.067	1.000								
CD	0.022	0.672	0.201	-0.823	0.105	1.000							
ST	0.020	-0.365	-0.143	0.453	0.044	-0.423	1.000						
CRT	0.005	0.279	-0.212	-0.787	0.081	0.680	-0.356	1.000					
GE	-0.071	-0.403	-0.241	0.543	-0.048	-0.393	0.300	-0.346	1.000				
INF	0.001	0.760	0.998	-0.186	-0.028	0.193	-0.143	-0.231	-0.236	1.000			
REER	-0.016	-0.079	-0.103	0.048	-0.008	0.002	0.049	0.022	0.019	-0.105	1.000		
HDI	0.039	-0.054	-0.054	0.073	0.026	-0.040	0.071	-0.034	0.040	-0.053	0.233	1.000	
R&D	0.001	0.029	0.001	-0.043	-0.024	0.054	-0.141	0.044	-0.036	0.000	0.037	-0.061	1.000

Note: * represents significance at 1% level of significance.

Table 3.2: Descriptive Statistics Non-Exporting Firms

Panel B	$TFP_{i,t}$	FDIX	FIDI	BCPS	AVT	CD	ST	CRT	GE	INF	REER	HDI	R&D
Mean	-0.005	27.513	7.705	2.392	0.142	0.520	0.137	0.369	0.023	2.033	4.648	0.506	0.010
Maximum	4.086	37.737	10.692	2.828	0.510	1.707	0.510	0.460	0.078	2.369	4.800	0.558	1.000
Minimum	-2.714	17.093	6.621	1.971	0.000	0.052	0.000	0.310	0.002	1.890	4.557	0.436	0.000
Std. Dev.	0.417	6.412	1.072	0.264	0.057	0.556	0.051	0.046	0.020	0.129	0.075	0.039	0.101
Skewness	2.375	0.041	1.367	0.022	5.126	0.705	-1.049	1.030	0.894	1.167	0.618	-0.466	9.686
Kurtosis	39.127	1.818	3.972	1.747	30.975	2.082	11.423	2.565	2.962	3.358	2.157	1.880	94.810
Jarque-Bera	26776.55*	28.31*	169.86*	31.68*	17901.67*	57.13*	1519.69*	89.47*	64.53*	112.47*	45.09*	42.807*	177555.40*

Panel B: Correlation Analysis

$TFP_{i,t}$	1.000												
FDIX	-0.014	1.000											
FIDI	0.023	0.656	1.000										
BCPS	0.045	-0.649	-0.018	1.000									
AVT	-0.016	0.081	-0.096	-0.241	1.000								
CD	-0.043	0.635	0.021	-0.846	0.336	1.000							
ST	0.208	-0.214	0.009	0.309	-0.017	-0.271	1.000						
CRT	-0.053	0.311	-0.336	-0.828	0.290	0.729	-0.261	1.000					
GE	0.030	-0.466	-0.152	0.621	0.024	-0.490	0.271	-0.429	1.000				
INF	0.023	0.653	0.998	-0.005	-0.097	0.012	0.010	-0.356	-0.145	1.000			
REER	0.035	-0.117	-0.111	0.083	0.008	-0.003	0.069	-0.008	0.093	-0.109	1.000		
HDI	0.050	0.082	-0.096	-0.193	-0.008	0.222	-0.014	0.184	-0.073	-0.094	0.243	1.000	
R&D	-0.062	0.090	0.016	-0.098	-0.029	0.125	-0.276	0.073	-0.083	0.018	0.071	0.037	1.000

Note: * represents significance at 1% level of significance

3.1.1 Impact of Financial Development, Trade Liberalization and Corporate Tax on TFP of Export & Non-exporting Firms

This section provides detailed discussion on the impact of financial development, trade liberalization & corporate tax on TFP_{it} of both the export-firms and non-export firms. The results are presented in Table 3.3. The instruments used in the estimation are valid as confirmed by insignificance of p-Value of J-statistic, while the p-value of AR_2 reveals no problem in the estimated residual regarding second order autocorrelation. These statistics confirm the appropriateness of estimated model.

Column 1 and Column 2 (see Table 3.3) shows the results for Sys-GMM for the export-firms and non-export firms, respectively. FDIX & FIDI exert significant positive impact on $TFP_{i,t}$ on export and non-export firms. However, this impact is higher in case of non-export firms with a magnitude of 0.008% as compared to 0.005% for export-firms. The result shows that a 1% increase in level of financial development could increase TFP by a 0.008% and 0.005% respectively for export and non-export firms. This implies that financial development can affect firms-level TFP_{it} through increased capital accumulation and hence the firms are encouraged to invest in the potential growth areas. However, smaller coefficients indicate lower level of financial development in Pakistan considering the financial needs of the industrial firms. Moreover, the current level of financial development is insufficient for the competitive requirements for export and non-exports firms.

Conversely, with a higher level of financial development, firms would be able to finance their competitive requirements, which would enable them to catch up with technology transfer and knowledge which could lead to growth in firm-level TFP. Our findings are consistent with Arizala et al. (2013), Fang et al. (2018) and Ito and Kawai (2018) who found positive relationship between financial development and TFP_{it} . However, these studies incorporated single or few proxies for financial development, but we used financial development index constructed by IMF that captures the broader aspects of financial development.

Trade liberalization proxied by CD and ST discloses significant positive effect on TFP of the sample firms. However, the magnitude of the effect is relatively stronger with reference to AVT (-0.576) in the case of export-firms. This can be attributed to reduction in rate of tariff over the period of 1997 to 2017. Further, lower rate of tariff barriers on

the exporting firms in terms of export rebates and duty drawback. This reduces cost of production to some extent. However, such rebates or concessions are usually not available to the non-exporters. The non-exporting firms face high rate of average tariff, customs duty and sales tax which adversely affected their TFP. However, the impact of customs duty is insignificant for exporting-firms, while for non-exporting-firms, customs duty exerts significant positive impact on their TFP with a magnitude of -0.151.

With reference to the impact of sales tax (ST), the results (see column 1 and 2 of Table 3.3) suggest that reduction in rate of sales tax exerts significant positive impact on TFP of the exporting-firms, while its impact is negative in case of non-exporting firms. The export-firms enjoy concessionary rates on raw material and other inputs spurred with zero rating of sales tax on electricity and gas consumption in case of manufacturing for export purpose. This facilitates the firms in reducing their cost of production, which in turn increase their TFP growth. The impact of sales tax is significantly negative for non-exporting firms with magnitude of -0.543. This could be attributed to higher rate of sales tax (17%) for non-exporting firms that may adversely affect their TFP. These findings are consistent with those of Topalova & Khandelwal, (2011), Jiang (2014) and Ahmed et al. (2017) to the extent of benefits of trade liberalization. Overall results confirm that financial development and trade liberalization exerts significant impact on firms-level TFP_{it} . The benefits of trade liberalization are increased trade spurred with transfer of knowledge and technology, however without financial development such benefits are harder to achieve. Therefore, we deduce that trade liberalization and financial development have joint significant impact on firm-level TFP of the industrial sector.

The analysis of the impact of corporate rate tax (CRT) on TFP_{it} depicts that a decline in corporate tax rate would increase TFP_{it} for both export-firms and non-export firms (see column 1 and 2 of Table 3.3). However, the magnitude of coefficient is larger in case of exporting firms which suggests that a 1% decline in CRT rate would enhance TFP by 1.391% and vice versa. The magnitude of coefficient for non-exporting firms is relatively smaller indicating 1.006% increase in TFP_{it} due to a 1% reduction in corporate tax rate. This positive growth is associated with gradual reduction in the rate of corporate tax by the tax authorities of Pakistan from 46% to 31% over the period of 1997 to 2017. This implies that a higher rate of corporate tax creates distortive effects on firm's performance.

Table 3.3: Impact of Financial Development and Trade Liberalization on TFP

Dependent Variable: TFP_{it}		
	Sys-GMM	
	Export-Firms	Non-Export Firms
	(1)	(2)
TFP_{it-1}	0.225*(95.717)	-0.159*(-38.157)
FDIX	0.005*(7.164)	0.008*(5.756)
FIDI	0.141*(12.581)	0.371*(4.182)
BCPS	-0.250*(-20.347)	-0.026 (-0.398)
AVT	-0.576*(-2.761)	0.452**(1.717)
CD	0.004(-8.898)	-0.151(-11.833)
ST	-0.221*(-3.407)	0.543*(4.119)
CRT	-1.391*(-27.158)	-1.006*(-8.477)
GE	1.854*(25.547)	-1.120*(-2.644)
INF	-1.491*(-14.150)	-3.131*(-4.026)
REER	-0.506*(-27.452)	-0.286*(-4.074)
HDI	0.157*(3.304)	-0.085 (-0.413)
R&D	-0.133(-1.461)	0.196*(6.017)
J-Stats	114.091 (0.375)	22.669 (0.539)
AR ₁	3.399 (0.001)*	-1.815 (0.069)**
AR ₂	0.628 (0.529)	-1.481 (0.137)

Note: (.) represents t-statistics whereas * and ** indicate significance at 1% and 5% significance-level respectively. Whereas sys-GMM is system generalized method of moments. While AR1 and AR2 shows Arellano and Bond test used to check for first order autocorrelation and second autocorrelation

When the corporate tax rates are higher, the firms are left with lower profits to be retained in business for growth prospects. This means that the firms have lesser amounts of profit to capitalize in innovative projects. Further, higher rate of corporate tax results in increasing the firms' cost of capital and reduces the resources to invest in technology. This can adversely affect the overall productivity at firms-level. On the other hand, lower corporate tax encourages investment in innovative projects which enhances firms-level TFP. Our findings are consistent with those of Bournakis and Mallick (2018) and Romero-Jordan et al. (2019) and Khan et al., (2020) who found negative association between higher corporate tax and productivity at firm-level.

Our control variables, inflation (INF) and real effective exchange rate (REER) exerted significant negative impact on TFP_{it} of export-firms and non-export firms. However, this magnitude of the adverse effect of REER is more for non-export firms than export firms. In theory, inflation and exchange rate are closely associated with each other hence continuous depreciation in currency value pushes the inflation upwards creating more negative effect of productivity of firms. As both the inflation and real effective exchange rate in Pakistan are adverse, therefore, this adversely affected firms' TFP growth. In addition, it can be argued that the higher rate of inflation clubbed with volatile rate of exchange resulted decline in TFP growth. Our findings are consistent with theoretical as well as empirical studies (few among others, Samadi et al., 2012; Akinlo and Adejumo, 2016 and Vogiazas et al., 2018). On one hand, devaluation of currency may increase exports, while on the other hand it also increases cost of production for exporters due to increases in prices of imported raw material. Hence, it can be argued that more productive firms try to respond to possible adverse effects of volatile exchange rate by increasing their quantum of exports.

Another important factor is the productivity growth is human development proxied by human development index (HDI). The results show that HDI had significant positive impact on TFP of the exporting-firms with coefficient value of 0.157, while its impact on TFP of non-exporting firms is significant but negative with a magnitude of -0.085. The positive effect of HDI in case of exporting firms could be due to better quality of workforce. Alternatively, it can be argued that exporting firms have invested more on human development that increased the productivity of workforce. Resultantly, TFP growth for exporting firms is positive. While, the negative effect of human development in case of non-exporting firms could be associated with unskilled workforce that adversely affected productivity of workforce in non-exporting firms. Resultantly, their TFP growth declined. We conclude that exporting-firms have relatively more advantage from skilled work force as compared to non-exporting firms. Our findings are consistent with those of Dzeha et al., (2018), Mannaso et al., (2019) and Yiu et al., (2019) who concluded that higher levels of human development is associated with positive growth in TFP.

The impact of research and development (R&D) are insignificant in case of exporting firms; however, R&D had significant and positive impact on non-exporting-firms TFP growth. This suggests that firms investing in R&D activities have higher TFP. This could be attributed to "learning by exporting" hypothesis. Based on this hypothesis, it is argued that international trade between developing and developed countries assist the firms to boost their absorptive capacity (learning effect) which in turn improves their productive capacity resulting in increased quantum of exports in the subsequent years (Rehman, 2017). Learning by exporting hypothesis also implies that a well drafted export policy can enhance export performance through export subsidies due to which firms have more resources to invest in R&D for improvement in TFP growth. Hence, we conclude that exporting-firms have higher TFP due to their participation in foreign competition as compared to non-exporters. The results are consistent in accordance with the findings of Bournakis and Mallick (2018); Apokin and Ipatova (2016) and Rehman (2017).

4. Conclusion

Our results indicate that both trade liberalization and financial development have a significant and positive effect on TFP of both the exporting-firms and non-exporting firms. Financial development Index and financial institutions depth index exerted significant positive impact on both the export and non-export firms. However, this impact is higher and positive in the case of export-firms when compared with non-export-firms. To this end, it can be deduced that export-firms have the benefits of in the form of zero-rating regime, reduced and concessionary rates, duty drawback and subsidies. The smaller coefficients of for financial development suggests lower levels of financial development in Pakistan with increased costs of financial services. The current level of financial development seems to be insufficient in fulfilling the financial needs of the industrial sector. Therefore, with higher level of financial development, firms would be able to finance their competitive requirements. This would enable firms to catchup with technology and knowledge.

Regarding trade liberalization, we found that reduction in average tariff rate over time exerted positive impact on TFP of exporting as well as non-export firms, however, this impact is greater in case of export firms. This can be attributed to reduced import tariff on raw material for export-firms. Such rebates are not available to the non-export sectors. The Impact of customs duty is insignificant for both the export and non-export firms.

Findings with respect to real effective exchange rate revealed that depreciated currency exerted significantly a negative impact on TFP growth for exports and non-exports firms. This implies that decline in value of rupee increased the cost of imported raw material thereby increasing cost of production. The benefits in forms of trade liberalization is affected badly due to currency deterioration.

This paper is expected to provide insight to policy makers and benefit the industrial sector in identifying the determinants of TFP. From firms' perspective, it should be realized that TFP is vital for long run and sustained growth. Secondly, from the government perspective, there is a need to enhance the level of financial development to cater the requirements of the industrial sector. Regarding trade liberalization, the government should remove the tariff and non-tariff barriers on the raw material and technology for the manufacturing sector to reduce their costs of production. Ideally, there should be zero taxes at import stage for raw material of the manufacturing sector.

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