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Abstract

The empirical analysis of the causal nexus among financial development and the manufacturing sector in Pakistan provides significant insights into the elaborate association among these two critical components of the economy. Besides, fiscal policy is used as a control variable. The study used unit root tests to identify the level of integration of the data and concluded that all variables are integrated at first difference which allow use to employ Johansen cointegration test to detect the long run cointegration among variables. Furthermore, the study utilized the VECM to examine the casual association among variables and concluded that the two-way causality among financial development and manufacturing sector in long run as well as in short run. Similarly, fiscal policy is granger causing financial development and manufacturing sector in long run only while fiscal policy is not causing financial development and manufacturing sector in short run. Moreover, financial development and manufacturing sector is granger causing fiscal policy in short run only. The results of the study suggested that to enhance the manufacturing sector's growth, it is crucial to strengthen the financial sector through targeted fiscal policies that promote long-term stability and access to credit.

Keywords: Financial development, Manufacturing Sector, Fiscal Policy, Vector Error Correction Model

1. Introduction

Mobilizing domestic savings and investment through a robust financial sector can improve production growth (Wang & Besci, 1997). In addition, it may assist in moving enough money from the extra funds to deficit sectors, making money for accessible production processes for different affordable costs (Gokmenoglu et al., 2015). According to Liu and Calderon (2003), a well-organized financial sector can offer financial services that promote innovation in the manufacturing industry, making it possible to create new opportunities for investors. (Zingale & Rajan, 1996) for example, the related benefit theory of economic growth confirms the growth of the financial sector assists companies in avoiding the issue with moral hazard and hostile assortment and increasing export growth support by external businesses. Liu and Calderon (2003) and Kiran et al. (2009) both agreed that an efficient economic sector specifically the banking system and finance markets-promote technical progress by assisting and identifying funds to business owners that own the finest chances of obtaining cutting-edge goods and manufacturing techniques to the market. Several more studies, such as Shahbaz (2009) and Wang and Besci (1997), demonstrate that a strong financing industry has a beneficial effect on exports, along with real growth in production, investment, and saving.

The development of economies has drawn attention to production, which is seen as the planned arrangement and constant implementation of adequate infrastructure, technologies, knowledge of management, and other important assets. On other side, manufacturing has assisted developed nations gain their present, envied condition and many nations that are developing want to imitate developed countries especially in their financial success. The government has implemented various sensible and useful policies, as well as fiscal policy, leading to long run financial growth and expansion via industrialization. The intentional control of significant financial aspects, like borrowing by the government, spending, and taxes, to impact the financial market is known as fiscal policy. According to Okafor (2012), the Nigerian manufacturing sector's performance will only be worsen amid of limited government budget the execution and difficulty analyzing basic materials. While Okafor (2012) asserted with confidence because the performance of the Nigeria manufacturing industry is meeting expectation determined by environmental realities, which is widely acknowledged, is to means concern are without basis. The underperformance of the manufacturing industry is largely due to a low-level fundamental facility, especially the accessibility of electrical energy and the maintained properly transport system. Macroeconomics variable volatility is also taken into account particularly exchange rate volatility and inflationary tendencies. The government has attempted to improve the manufacturing sector in the past implementing by different measures to rise capacity, create jobs distributing income. However, despite these efforts, the sector has constantly underperformed expectations (Ananwude & Echekeoba, 2016).

Most of the previous researchers studied the different factors with financial development (FD) and manufacturing sector (MS), e.g. ur Rahman (2018) researched the effect of FDI on MS in case of Pakistan. Hamid and Pichler (2009) studied the association among productivity, Human capital and growth in manufacturing sector while Ali (2015) investigated the factors affected public investment in manufacturing sector. There is no study which observed the nexus among FD and manufacturing sector in case of Pakistan by using causal association among variables.

The following is the paper's outline: it begins with an "Introduction" and then proceeds to review prior studies. In addition, the "Methodology" section provided an explanation of the data sources and technique used in the study, while the "Empirical Results" section presented the findings of the study. The investigation concludes with a final analysis and the subsequent implementation of policies.

2. Literature Review

Supply-leading theory describes the association between financial sector and manufacturing sector development. The financial sector develops before the MS does, as the supply-leading hypothesis portrays. Odhiambo (2008), pointed out that supply-leading response recommend that growth of the FD propels manufacturing sector. That is to say, by transferring small saver to larger investor for

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investment intention to taking the proportionate rate of return while considering the limited business resources available. Patrick, (1966) discussed the supply- leading theory hypothesis as the monetary sector grows, saving will rise and later be converted into investments through a Variety of financial institution, which will improve the effective distribution of funds and significantly boost growth over multiplier effect.

The demand following hypothesis presents an opposing alternative perspective to the supply- leading theory regarding the association among the industrial sector and the FD. As per this theory hypothesis the extension of the financial sector is prompted by the sector, in which manufacturing is a subsector. The demand- following theory describe the creation of financial companies in an economy is promoted to the actual sector required of financial resources. The concept is the rate of expansion on the real sector influences the financial sector growth is supported by (Demetriades & Arestis, 1997). It means that growth to the manufacturing sector promotes expansion in the fiscal sector. The production of fresh financial organization satisfies the demand of economic services produced through growth in the industry Odhiambo (2009). According to the demand-following theory, as an economy grows, its different sector inevitably will have a greater demand for financial institutions, that will lead the financial sector to keep grows.

The neo-classical theory was criticized, leading to the development of the endogenous growth model. The endogenous growth model supersedes the exogenous aspects of the neo-classical growth theory in describing an economy's long-term development. Economists such as (Arrow, 1962; Romer,1986) have connected endogenous growth to the economy. The idea emphasizes the role that investment, capital stock size, and human capital accumulation have in propelling technological advancement. According to the endogenous theory these factors are crucial in determining an economy's long-term growth. This theory's applicability to the research can be assessed through various ways that financial expansion influences the real growth of output. The depth of the economic system impacts how easily, investors can access investible capital. The intermediation activity that financial organizations conducted out determines the amount and capacity of capital stock which is accessible in economy. Consequently, the readiness and accessibility of ample investible money impact savings, that in turn impacts the establishment of capital stock. At such a way, the manufacturing industries can profit from it and raise development.

The influence of Nigeria financial sector's growth on real sector production in the 21st century was examined by (Aluko & Adeusi, 2015). The study used (King & Levine's 1993), financial sector growth indicator to predicate the MS output in production. The study directed a strong direct connection between the real and financial sectors' productivity. The study's revealed that developing the financial industry is an achievable way to increase productivity in the real sector economy. An associated study (Yusuf & Aliyu, 2013) estimated the influence of financial inclusion on real sector expansion in case of Nigeria. Additional studies demonstrated that the Nigeria's real sector growth is greatly affected by the growth of the financial industry. Yet the result of the research also shows that, though liabilities and the variety of financial intermediaries have a useful effect on real sector growth, credit assigned to the private sector revealed an important effect. Chukwunonso and Chukwuedo (2016) observe the association among FD and investment in Nigeria from 1970 to 2013. A unidirectional causal relationship among FD and investment in Nigeria was found by the study. The study also demonstrated that financial expansion has a major impact on domestic capital investment in Nigeria. Using the industry sector as an indicator of manufacturing output for the years 1981 to 2016, Mounde's (2017) examined the direct association among FDI and manufacturing production in Nigeria. The study used an ex-post facto inquiry approach, and the 176 listed industrial businesses made up the sample size. The study found a long-term association among the manufacturing sector's performance and FDI in the context of industrial output. The study also showed a unidirectional association between manufacturing in Nigeria and FDI. In both the short and long-term, there is a causal connection between manufacturing output and FDI. Nwakoby et al. (2016) investigated at how Nigeria's industrial sector functioned in connection with economic liberalization policies. The study emphasized on the link between the trend in the productivity of the Nigerian manufacturing industry in the period following the reform and the dynamic nature of several crucial macroeconomics factors, like as the rate of exchange, financial depth, openness to trade, an interest rate. In order to accommodate these vector errors, the study utilized data from 1986 to 2014. The outcomes found that there is an insufficient causal connection amongst economic grow deeper and manufacturing output, with trade openness and manufacturing production showing a bi-directional causal relationship. The finding of the study confirmed that FD exerts a significant beneficial effect on industrial output. Uchenna et al. (2016) studied the multifaceted financial inclusion and the performance of industrial businesses in developing countries, focusing on the Nigerian economy. The study demonstrated that the effect of financial inclusion on performance of Nigeria industrial businesses adopting the matching method. The conclusion of the matching estimates indicated that while businesses gain benefits from having access to financial services, the level of that benefits differ depending on the type of availability. This states, according to the study, which the type of financial inclusion that is occurring determines how substantially the performance of organization enhances as a result of financial depth.

Ekundayo, Ndubuisi and Ismaila (2018) investigated Nigeria's manufacturing performance and the financial growth of service sector during 1981 to 2015. Three variables were utilized in the research namely capacity for manufacturing utilization, output of manufacturing, and the value of manufacturing added. The research revealed that the private sector receives credit, and the supply of money experienced a minor but beneficial effect on production and capacity use, they had an adverse effect on the value addition of the short-term manufacturing industry. While both money supply and loans to the private sector have a beneficial effect in manufacturing production, some progress in the long-term has been observed. As a result, it is important for commercial banks to allocate a particular proportion of their revenue towards growth in industry, in order to establish link between the two indicators.

Tzouvanas et al. (2020) observed the linkage among environmental performance and financial performance in this study. Their viewpoint environmental performance demonstrates varying impacts on companies with divergent profitability degree. They evaluate the previous mentioned link within the financial flexibility hypothesis and the competing models of neoclassical and instrumental theory of stakeholder utilizing data for 288 European manufacturing companies during the period of 2005-2016. To more accurately predict environmental performance a quantitative regression model strengthened with a set of instrumental parameters is utilized. They typically observe that businesses with exceptional environmental performance often exhibit higher level of profitability. Moreover, the link amongst environmental performance and financial performance can be described as exhibits

variability throughout different level of profitability. Additionally, when focusing on businesses with significant profitability, we can observe that both financial and environmental performance are interconnected.

Rodríguez and Chávez (2023) the main goal of this paper is to determine the influence of commercial bank lending on economic activity in the entire manufacturing sector, and in seven particular manufacturing sectors in Mexico. Using ARDL-bounds models, this study provides evidence of the optimistic and major effects of bank lending on output for the sector as a whole. Additionally, the real interest rate and the significant effects of fixed investment. Furthermore, we did not find any evidence showing that the concentration of loans has an influence on the output of manufacturing. The result obtained the study's hypothesis that bank lending performs a crucial part in encouraging manufacturing activity, and that it could be valuable to establish policy that improve and broaden these benefits.

Effiong et al. (2024), several research studies including Ekong et al. (2019), Effiong et al. (2021), Arinze & Okon (2022), have studied the consequence of fiscal policy on macroeconomic indicators. This study evaluated the effect of economic policy and interest rates as they pertain to the industrial sector. While several of our indicators were included at level of differentiation, the research applied the ARDL model. The constraint of the test revealed the inclusion of a long-term connection in the theoretical framework. The result of the study demonstrated that, in the short run, government spending and its had a negative and important outcome on the performance of the manufacturing industry. Meanwhile the value addition tax had a positively and important effect on the manufacturing industry performance. Additionally, the interest rate had a optimistic and major effect on the output of the manufacturing industry. Over the long-term government spending had a negligible but negative influence on the performance of manufacturing industry, but tare of interest and value added tax (VAT) had a positive and significant influence. In the decomposed model, ongoing expenses displays an adverse and substantial influence, capital expenditure has a beneficial and major influence on the performing of the industrial sector. Additionally, VAT has a adverse and statistically significant influence, and interest rate exerts a plus and noteworthy effect on the same. The research emphasized the importance of decreasing the expense of governance while a significant portion of public revenue are devoted to operating the government instead of investing in essential sectors that could stimulate the growth of the manufacturing industry.

3. Methodology

The aim of the study is to examine the nexus between financial development and manufacturing sector in case of Pakistan. The selected main variables are FD and manufacturing sector while the fiscal policy is treated as a control variable where domestic credit to private sector percentage of GDP is taken as proxy for financial development, manufacturing sector is measured as percentage of GDP and fiscal policy is measured as public spending as a percentage of GDP. Data on variables of the study is collected from World Bank (2024) from 1974 to 2023. This is a time series study, thus, stationarity is crucial in the analysis of time series data since many statistical approaches depend on the assumption of data stationarity. Stationarity is the degree of reliability of a time series where its statistical properties are consistent and do not change over time (Shafiq et al., 2012; Gasimli et al., 2022; Primbetova et al., 2022; Khan et al., 2022). Time series studies frequently uses the Augmented Dickey-Fuller (ADF) and Phillips and Perron (PP) unit root tests, which were established by (Dickey & Fuller, 1979; Phillips & Perron, 1988). These tests are used to assess the stationarity of a given variable (Khalid et al., 2022; Azra et al., 2023). The main objective of the ADF and PP tests are to detect the existence of a unit root in a given time series. Unit root signifies that the data series follows a random walk model and does not exhibit mean-reverting properties. Put simply, this means that the variable is not stable and tends to change from a fixed value as time goes on. The ADF and PP tests are conducted by regressing the variable of interest against its past values and other potentially significant variables. The examination produces a statistical measure, sometimes referred to as the test statistic. If the computed test statistic beats the critical values, it results in the rejection of the null hypothesis, indicating that the variable being examined demonstrates stationarity. The ADF and PP tests determine the level of unit root problem of variables, which is a necessary condition for accurate modeling and forecasting in the field of time series analysis. The Johansen co-integration test, introduced by Johansen in 1988, is highly important in the fields of econometrics and time series analysis, particularly in macroeconomics, finance, and related disciplines. It is used to understand the long run relationships among many variables. The Johansen co-integration test is a statistical technique used to reveal whether there is cointegration among variables. Cointegration refers to the process of forming a long-lasting association among non-stationary variables, which means that their combination becomes stationary even if the individual variables are not stationary.

The VECM (vector error correction model) is a reliable analytical method used in time series analysis to represent the associations between multiple variables that exhibit co-integration. Co-integration is a theoretical framework that proposes the presence of enduring, steady equilibrium linkages between non-stationary variables, even when there are temporary fluctuations. The VECM is a modified version of the vector autoregressive (VAR) model that is specifically designed to handle time series data that exhibit co-integration. The model accurately captures both the rapid changes and the simultaneous interconnections among the variables. The VECM for the study is represented by Equation 1 to 3.

$$\Delta FD_t = \beta_0 + \sum_{i=1}^p \beta_i \Delta FD_{t-i} + \sum_{i=0}^q \beta_1 \Delta MS_{t-i} + \sum_{i=0}^r \beta_2 \Delta FP_{t-i} + \gamma_1 FD_{t-1} + \gamma_2 MS_{t-1} + \gamma_3 FP_{t-1} + \delta_1 ECT + \varepsilon_t \quad (1)$$

$$\Delta MS_t = \beta_0 + \sum_{i=1}^p \beta_i \Delta MS_{t-i} + \sum_{i=0}^q \beta_1 \Delta FD_{t-i} + \sum_{i=0}^r \beta_2 \Delta FP_{t-i} + \gamma_1 MS_{t-1} + \gamma_2 FD_{t-1} + \gamma_3 FP_{t-1} + \delta_1 ECT + \varepsilon_t \quad (2)$$

$$\Delta FP_t = \beta_0 + \sum_{i=1}^p \beta_i \Delta FP_{t-i} + \sum_{i=0}^q \beta_1 \Delta MS_{t-i} + \sum_{i=0}^r \beta_2 \Delta FD_{t-i} + \gamma_1 MS_{t-1} + \gamma_2 FD_{t-1} + \gamma_3 FP_{t-1} + \delta_1 ECT + \varepsilon_t \quad (3)$$

In above equations β_0 shows the intercept, where β_i shows the slope of the variables in short run where γ_i shows the slope of variables in long run. ECT shows the error correction term and ε_t shows error term of the model. Whereas MS, FD and FP represent Manufacturing sector, Financial Development and Fiscal policy respectively.

4. Empirical Results

Table 1 exhibits the outcomes of the ADF unit root test. The unit root is present at the level of the variables in the study; however, when the first difference is taken into account, it is discovered that all of the variables are free from this issue and concluded that all

variables are integrated at first difference. Table 2 also shows the results of PP test. This test is also used for examining the level of stationarity of the data where it confirmed and consistent with the results of ADF and concluded that all variables are stationary at first difference. All variables are integrated at same level. Given these results, it is clear that we need to do a cointegration test in order to accurately assess the long-term association among the variables.

Table 1: ADF Results

Variable	t-statistics	Variable	t-statistics	Conclusion
<i>logFD</i>	-0.55	$\Delta \log FD$	-5.81*	I (1)
<i>logMS</i>	-2.29	$\Delta \log MS$	-6.65*	I (1)
<i>logFP</i>	-2.00	$\Delta \log FP$	-7.16*	I (1)

* detects significance at the 1% level

Table 2: PP test Results

Variable	Adj. t-statistics	Variable	Adj. t-statistics	Conclusion
<i>logFD</i>	-0.69	$\Delta \log FD$	-5.81*	I (1)
<i>logMS</i>	-2.42	$\Delta \log MS$	-6.75*	I (1)
<i>logFP</i>	-2.16	$\Delta \log FP$	-7.15*	I (1)

* Represents 1 % level of significance

It is important to determine lag length as lag length can vary results of cointegration test. For this purpose, we have to find out the optimal level of lag length through Akaike information criterion (AIC), Schwarz information criterion (SIC) and Hannan-Quinn information criterion (HIQ). The results are provided in Table 3 below. The results of these criteria indicated that optimal lag length level to be one.

Table 3: Lag Length Selection Results

Lag	AIC	SIC	HIQ
0	6.24	6.81	6.73
1	0.11*	1.01*	0.38*
2	-0.12	1.53	0.66

* Specifies the criterion-selected lag order

Table 4 displays the results of the Johansen cointegration test, which were used to reveal the long run association among the variables. In the findings, the trace statistics and maximum Eigen statistics indicate that there is a single cointegration vector among the variables that were investigated. Therefore, there is a linkage between the FD, manufacturing sector, and fiscal policy.

Table 4: Trace Statistic Test Results

No. of CE(s)	Trace Stat.	Critical Value	Max-Eigen Stat.	Critical Value
None *	53.61	47.85	53.61*	47.85
At most 1	18.02	29.79	18.02	29.79
At most 2	5.14	15.49	5.14	15.49

* The null hypothesis is rejected at the 0.05 level.

The next step, after determining long run relationship, is to explore the direction of causality between the studied variables. These results, which are based on the VECM, are provided in Table 6. This Table has two parts illustrating the short and long run causality. These results documented the two way causality between FD and MS in the short run and in the long run as well. Similarly, fiscal policy is granger causing FD and MS in long run only while fiscal policy is not causing FD and MS sector in short run. Moreover, FD and MS is granger causing fiscal policy in short run only.

Table 6: Results of causality test based on VECM

Variable	Short Run Results (F-stats)			ECT (t-stats)
	$\Delta \log FD$	$\Delta \log MS$	$\Delta \log FP$	
$\Delta \log FD$	-	3.66**	1.39	-3.4***
$\Delta \log MS$	3.15**	-	2.71	-2.13*
$\Delta \log FP$	3.27*	3.74**	-	-1.29

***, ** and * at the 1%, 5%, and 10% levels of significance, respectively.

5. Conclusion

The empirical analysis of the causal nexus between the manufacturing sector and financial development in Pakistan offers substantial insights into the complex relationship between these two critical components of the economy. The selected main variables are financial development and manufacturing sector while fiscal policy is treated as control variable. The study employed the PP test and the ADF tests to determine the level of integration in the data. It concluded that all variables are stationary at the first difference,

which enables the use of the Johansen Cointegration test to determine the long-term cointegration among the variables which confirmed that there is a single cointegration vector among the variables of the study, and it is concluded that there is a long-term association among the variables. Additionally, the study employed the VECM to investigate the incidental association between variables and determined that the bidirectional causality between financial development and the manufacturing sector is observed not only in the short term but also in the long term. In the same vein, fiscal policy is only causing financial development and the manufacturing sector in the long term, while it is not causing these sectors in the short term. Moreover, financial development and manufacturing sector is granger causing fiscal policy in short run only. The results of the study suggested that to enhance the manufacturing sector's growth, it is crucial to strengthen the financial sector through targeted fiscal policies that promote long-term stability and access to credit. Policymakers should focus on aligning fiscal measures with financial sector developments, particularly by supporting small and medium-sized enterprises. Additionally, promoting public-private partnerships and ensuring financial inclusion will help sustain growth.

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