



A Comprehensive Assessment of Pakistan's Sectoral Export Via Inward Foreign Direct Investment: An Operational Implications

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ABSTRACT

This study comprises a panel of nine sectors and has been analyzed for monthly data for 108 months for the period from 2006 to 2022 by using the statistical packages of STATA. In monthly analysis panel unit root tests of Fisher Dicky Fuller, Pesaran and Shin and Breitung are conducted which infer that exports, foreign direct investment, domestic investment, exchange rate, terrorism, production, scale economy and labor productivity are stationary at level 'I(0)' while exchange rate is stationary at order one 'I(1)'. This reveals that the problem of non-stationarity is not very serious. So pooled regression, Least Square Dummy Variable, fixed effect and random effect models have been used. Results show that in analysis across sectors, lag exports, domestic investment, exchange rate, terrorism and labor productivity have an influential effect on exports in the many sectors. However, foreign direct investment has no significant effect on exports in the sectors of food, chemicals, textile and machinery and equipment. While in overall sector analysis, lag exports, foreign direct investment, domestic investment and exchange rate have significant positive effect on export. This shows that food, chemical, textiles and machinery sectors are favorable sectors for foreign direct investment.

Introduction

Exports play a vital role in the development of an economy. Export led growth hypothesis states that exports promote growth of an economy (Feder, 1982; Krueger, 1990; Tyler, 1981; Balassa, 1985). Domestic investment, labor productivity, economy of scale and exchange rate influence export promotion (Mottaleb & Kalirajan, 2010). Foreign Direct Investment (FDI) is also considered another important factor for export enhancement of developing countries because it helps in innovation of technology of the host country, generates employment and increases foreign capital inflow (Mottaleb & Kalirajan, 2010). FDI also increases saving of developing countries consequently affecting economic growth (Hussain & Kimuli, 2012).

Thus, the role of exports in promoting growth potential of a country is also obvious from numerous empirical studies including Vamvoukas (2002), Ahmad et al (2003), Abual-Foul (2004), Awokuse (2004), Khan and Khan (2011) and Devajet (2012) among others, which have recorded a staunch direct relation between export and economic growth. The underlying literature evidently shows a positive relationship of exports and economic growth. In order to promote exports, we need to

find all those factors which influence exports. Empirical studies reveal many factors which determine exports of a country. Majeed and Ahmad (2006) identify two external factors FDI and real exchange rate which basically determine exports growth. However according to them exports are also affected by internal factors like labor force, industrialization, GDP, GDP growth rate, saving, indirect taxes, communication facilities, and official development assistance.

Nowadays foreign direct investment is being given more concentration. It is believed that FDI plays prominent role in economic development of all countries especially developing countries. In the perspective of macroeconomic analysis, it is regarded as generator of employment, competitiveness, higher productivity and technology advancement. Similarly, FDI leads to enhance exports and brings international markets in close contact with host countries. However, several empirical works examine multifarious effect of foreign direct investment. Economists have dichotomous view towards FDI, supportive and non-supportive. Friendlay (1978), Blomstrom (1994), Caves (1996) and Borensztein (1998) support that FDI is a way of accruing technology spillover with huge contribution to the economic growth. On the other side Hanson (2001), Greenwood (2002) finds that FDI may have adverse effect on economic development by crowding out local enterprises. Similarly, Lipsey (2002) infers the positive effects of foreign direct investment with no steady state relationship between FDI stock and economic growth. Ahmad et al (2024) investigate the relation of exports, FDI and renewable energy with economic growth of Singapore for the period from 1989 to 2022. A typical Cobb-Douglas production function was used and ARDP approach was applied for empirical results. The study infers that FDI, exports and renewable energy has significant impact on the economic growth. Nature of the sector in which FDI takes place is also considered a cause for the potential positive or negative effect of FDI on the economy. The positive impact of FDI is limited in agriculture and mining sectors (Hirschman, 1958). Some of the economists like Hymer (1976) believe that FDI would no longer exist. It is because local firms, characterized by an economy of perfect competition and trade liberalization, would properly manipulate the environ of local economy environment than foreign competitors. However, if we cast our attention to the theory of FDI in the perspective of its effects on exports, we find that FDI has dual effects on exports. That are direct effects and indirect effects. A glance argument regarding these effects is sketched in the succeeding words. Luttermann and Kotzab (2020) examine the impact of logistics performance (LP) on trade and FDI of 20 Asian countries by using panel data over the period from 2006 to 2017. A positive significant impact was found of LP on trade and LP on FDI. Multinational enterprises (MNEs) take decision to incur FDI by keeping a vigilant eye on favorable conditions. Input intensities variate country to country and in the host and home country as well. Cost expenditure and trading cost of the host country will be comparatively minimum than the home country. Technology level of the host country must be low as compared to the home country. Time shortage of host country is also a favorable condition which inclines MNEs to make FDI in host country. MNEs or home countries take decisions for FDI after examining the feasibility. Consequently, these decisions may lead to boost the host countries' exports that predict FDI-exports nexus. For instance, in the case of different factor intensities in host and home countries MNEs build a segment of its production process in the host countries and exports these intermediate products back to the home countries and other countries as well. This is called vertical FDI. In this case the effects of inward FDI may be positive on a host country's exports.

Likewise, low-cost expenditures and low cost of trade of the host country may attract MNEs to make FDI and to use host countries as exports platform for their home markets as well as other markets. All firms can never become MNEs. MNEs have certain advantages over other firms. Ahmad et al (2024) investigate the relation of exports, FDI and renewable energy with economic growth of Singapore for the period from 1989 to 2022. A typical Cobb-Douglas production function was used and ARDP approach was applied for empirical results. The study infers that FDI, exports and renewable energy has significant impact on the economic growth.

According to Dunning (1993) these advantages are ownership advantage, location advantage and Internalization advantage. In ownership advantage, MNEs have a product or a production process that provides market power to the MNEs in international markets. In location advantage, MNEs must have to maintain its competition abroad by producing that specific product there. In internalization advantage, MNE has a benefit to utilize its ownership advantage internally. Effects of FDI on exports can better be understood by knowing types of FDI. That is vertical FDI and horizontal FDI. In vertical FDI, as mentioned above, different segments of production process are prepared in different countries for ultimate use in the home countries. So, this type of FDI is a major source for the creation of export opportunities. While on the other hand in horizontal FDI similar products are produced in multiple plants located in various countries. Which is deemed to be arisen in case of trade barriers or high transport costs and is used internally in the host countries (Markusen and Venables, 1998; Markusen, 2002, p. 103). From the above discussion it is expected that both vertical and horizontal FDI has a direct impact on host country's exports. It is because that foreign subsidiaries can also attempt to supply goods of the production site to third countries from the platform of the host country and hence exports of host country would increase (Ekholm et al, 2003).

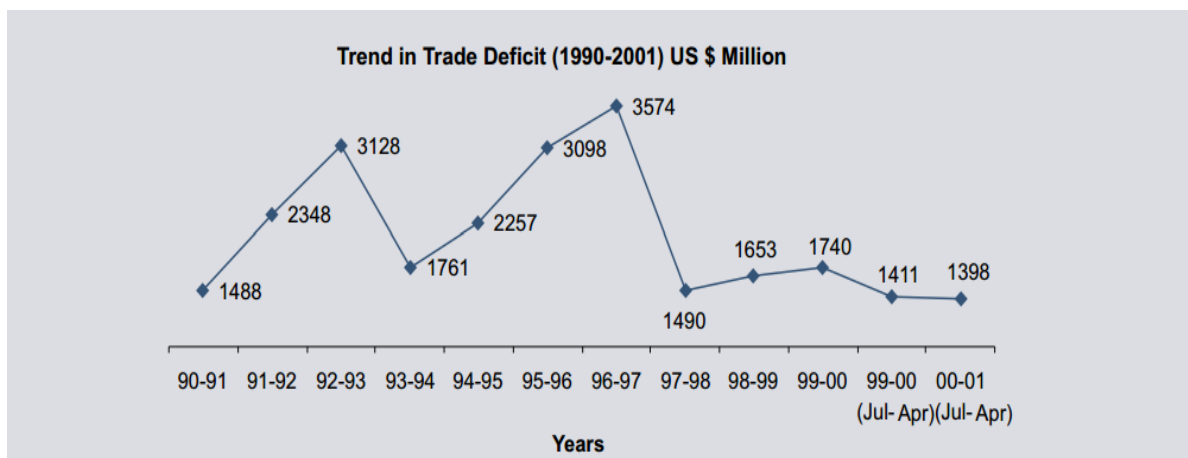
In this section all those indirect routes through which FDI can affect a host country's exports are indicated. We would illustrate all those significant externalities which may bring positive changes in the export performance of host countries.

MNEs, characterized by advance knowledge and technology, transfer their competitive assets to their affiliates in the host country for producing competitive goods and supplying them in the host market and other markets as well. So, when MNEs transfer their technology to their affiliates in the host country. Chances of knowledge spillover are created to the firms of host country. MNEs already train host country's workers in the MNEs' affiliates which may be transferred by their mobility in other domestic industries. Skills of these workers can be implied by domestic firms in the host country. So, it is due to FDI spillover effect that now domestic firms have the competency to compete with foreign affiliates and produce standard products either for domestic use or exports (Girma et al., 2007; Barrios et al., 2005). This is a specific way owing to which domestic firms may enhance their export competitiveness and productivity in tradable market by simply imitating the production process of MNEs. Secondly when foreign firms enter into domestic markets with relatively cheap and quality goods and services. Domestic firms fall into the risk of survival. The only way to exist in the market, they try their level best to come into competition with foreign companies with more staunch efforts. Again, it is the spillover effect of FDI that domestic firms become motivated and start competition for the sake of their survival. Nevertheless, some of the domestic companies, which cannot compete may leave the market (Markusen and Venables, 1999; Barrios et al., 2005). This effect does not reflect export-oriented MNEs but in this case inward FDI may have negative effects on exports of the host countries. Additionally, the presence of MNEs in the host country may create more demand for domestic inputs which ultimately strengthen the supply market of the host country (Markusen and Venables, 1999). The indirect positive effect may prevail because negative effect by the initial entry of MNEs may not stay for long and domestic firms would compellingly begin to enter into competition along with the entrance of other firms as well (Barrios et al, 2005).

Literature Review

Pakistan, since its inception, experienced a blend of fluctuations in the perspective of its economic and social outcome. Through the first four decades of the country's existence the economy grew at a sustainable rate of 6 percent per year, which was merely attained by many nations. Irrespective of the swift population growth, several wars and military coupe during this period, per capita income doubled, inflation rate reduced and poverty decreased from 46% to 18% by 1980s but in the later decades of 1990s, 2000s and 2010s the interplay of terrorism, sectarianism, ethnic gaps and regional economic disparities made the country more volatile and unstable. Various East Asian countries that were lagging Pakistan in the decade of 1960s surpassed ahead in most indicators of economic and social sectors. The best example of this case was South Korea that was at the same economic position with Pakistan but the inappropriate implementation of economic plans widened the gap in favor of South Korea. Similarly, in spite of sharing a common historical, cultural and social milieu India appeared as a steady and stable democracy while Pakistan entangled in military dictatorship and political insurgency. Owing to these reasons the country lost its economic credibility among the international community. The sudden freezing of foreign currency deposits of Pakistan also eroded the confidence of local investors. Consequently, GDP growth rate declined to 4 percent. Growth in manufacturing sector was recorded as low. The investment ratio fell to 13.9 percent during 1998 and 1999. In the trade sector, around which this study revolves, the following trade deficit was recorded in the decade of 2000.

Figure 1. Trend in trade deficit (1990-2001) \$ Million



Similarly, regarding exports, a number of studies (Khan and Saqib 1993, Khan et.al. 1995, Mutairi 1993, Akbar and Naqvi 2000, Afzal 2004, Shirazi and Manap 2005, Afzal 2006a) have estimated the association between exports and economic growth in Pakistan. Some have advocated export led growth hypothesis. Other studies (Anwar and Sampath 2000, Ahmed et. al. 2000, Kemal et. al. 2002, Bahmani-Oskooee and Alse 1993, Dutt and Ghosh 1996) have not advocated the export led

growth. These studies have estimated deviating results and generally have not examined the historical context of export-growth.

In the early decades of its independence, Pakistan had advocated a firm import substitution (IS) strategy. Exports had not been clearly figured in the economic growth and development of Pakistan's economy. Nevertheless, Government of Pakistan gave more preference to international trade and made a number of market-based reforms in the early 1980s and later-on in 1990 (Rahman et al, 2011). These reforms included trade liberalization and exports promotion. The country provided various trade incentives included credit facilities, tax rebate, tariff concession and soft foreign exchange control. Furthermore, Pakistan opened agriculture, insurance, energy and telecommunication sectors to FDI (Rahman et al, 2011). A decade-wise trade policy with special reference to exports is summarized as under for an easy grasping of the scenario.

Exports are affected both by national and international factors. Internationally, economic condition of the world plays a vital role in the export potential of a country.

It is the world economy which can increase trade barriers or can provide market opportunities. Similarly developed human resource, capital, natural resources and level of technology of a nation can determine comparative advantage and exports of a country. Export incentives and exchange rate also influence the export performance of a country. In the decades of 1970s and 1980s demand factors in the international market were not favorable which hugely affected the export performance of Pakistan. During the period of 1970s-1980s, recession spread in the developed countries owing to which unemployment rate increased from 3% in 1963-73 to 8% in 1981-82 and growth rate in the world economy decreased from 6% during 1963-73 to 3% during 1974-81 (Adam and Iqbal 1987). Consequently, trade share of Pakistan in the world trade diminished from 0.17% in 1972 to 0.10% in 1977 (Ahmed 1980). Later on, during the period of 1990-95, Pakistan's share in the world exports slightly enhanced to 0.19% (GOP 1997-98, 88) against 0.17% in 1970s. Alternatively, exports share of a country also depends upon comparative export prices while export prices arise from factor costs of production which further depend upon productivity and price inflation. Pakistan experienced quite high inflation during 1970s and 1990s. Furthermore, labor productivity of Pakistan is very low as compared with other Asian countries. Higher inflation rate coupled with low labor productivity greatly affect macroeconomic stability and international competitiveness of the country (Ahmed 1980).

Since the last two decades, Pakistan is considered an attractive place for foreign investors because of many reasons. Firstly, Atomic explosions of Pakistan in the year, 1998, the event of 9/11, 2001 and subsequent USA-Afghanistan war, attack on India's parliament, 2001, Karachi stock exchange crisis and severe earthquake of 2005 create shocks in the country's economy. As a result, best opportunities for foreign investment were created to meet the exogenous shocks and to minimize the risk to the local economy. However, terrorist's insurgency created the possibility of security lapses in the country. A study empirically investigated the causal relationship between export, remittances and foreign direct investment via economic growth. The result revealed that the remittances and export have a substantial and statistically significant impact while, the variable foreign direct investment have an adverse impact at all. Similarly, the concern study emphasized for further research in the dimension of export and foreign direct investment (Mamun & Kabir 2023).

Owing to which the country was not benefited much from foreign investment. Thus, surety to foreign investors was needed that they would be provided a stable and peaceful environment for their investment. Secondly, more than 180 million population of Pakistan, with growing middle class, provides an extensive market for consumer's goods which ultimately instigated foreign investors. Thirdly, low-cost labor reduces the cost of production is a gesture for foreign investors. Fourthly, the strategic geographical location of Pakistan, in Central and South East Asia, produces an extensive environment for foreign investors. Fifthly, the adequate physical infrastructure of Pakistan instigates foreign investors to the country. Finally, export led growth policy and structural reforms adopted by the country since the last two decades provides a suitable environment for intra-country investment (Hussain, 2003). The above reasons reflect good news for Pakistan to be the hub for foreign investors. Some glimpses in favor of foreign investment could be found as well but the obstacles in the form of terrorism, militant group and political instability have strong influence on the incoming capital of foreigners. Statistics show that during the financial year of 2006-07 foreign investment boosted to \$ 6.0 billion. This figure was 48 percent higher as compared with the then lags year. During the same year of 2006-07, foreign direct investment also increased to \$4.16 billion, almost 37 percent greater than the previous year of the then time (GOP, 2006-07). Over 80 percent of FDI inflow was taken in the areas of food and beverages, energy, banking and finance and telecom (GOP, 2006-07). Similarly other areas of FDI inflow were textile, chemicals, automobiles and constructions (GOP, 2006-07).

As mentioned earlier that the country made a number of market-based reforms in the early 1980s and later-on in 1990s to promote trade and attract FDI, (Rahman et al, 2011). These reforms were various trade incentives included credit facilities, tax rebate, tariff concession and soft foreign exchange control. Furthermore, Pakistan opened agriculture, insurance, energy and telecommunication sectors to FDI (Rahman et al, 2011). Consequently, FDI net inflow enhanced from \$716.3 million in

1997 to \$5590 million in 2007, an increase of 7.8 times. However, the trend reversed in next couple of years and FDI net inflow reduced to \$2018 million in 2010 because of war on terror in the country (World Bank, 2012). Similarly, the structure of country's exports changed from primary based (17%) to manufacture based (83%) in the year 2009-10 (Ayaz et al 2013). The changes in reforms coupled with changes in the structure of exports of the country has again increased interest in the impact of FDI on exports, especially at sectoral level.

A number of studies have estimated the effects of FDI on exports. Sharma (2012) in his study, claims that FDI has statistically insignificant effect on export performance of India. He further says that the role of FDI in exports totally depends on the motive. If the motive is to capture domestic market it may not contribute to export growth. If the motive is to trap export market by taking benefit of country's comparative advantage, then FDI may contribute to export growth. In this way Majeed & Ahmad (2007) suggest that the government should adopt FDI led Exports strategies with twin objectives of capturing the benefits of both FDI inflow and exports growth. Similarly, Zhang (2005) claims that FDI has had a positive impact on China export performance. Sultanuzzaman, et al. (2018) examine the impact of export and FDI inflow toward the growth rate of in case of Sri Lanka using the time series data from 1980-2016 respectively. The signifies that FDI inflow have positive and significant impact both in short-run and long-run via economic growth, while, the contradictory association found between export and economic growth this is because of dependency on primary goods. The main outcomes of this study is to remarkably represent the importance of both macroeconomics variables in the prospect of economic growth.

However, these studies have used annual value and aggregated data of trade and FDI losing the vital information in disaggregated data (Sun, 2001; Wang et al, 2002; Yao, 2006; Zhang and Song, 2000). This may ultimately produce biased conclusion because of the fact that it unreasonably and perhaps wrongly assumes identical weightage of all sectors for both exports and FDI, ignoring the market-based export-oriented motive, which likely to decrease the plausibility of getting accurate empirical results (Weishi et al, 2008). Farah, (2024) tried to assessed the level of foreign direct investment (FDI) toward export of Somalian using data for the period of 1977-2017. The study outlined weak but surprisingly positive outcomes between FDI and performance of export while the controlled variables like exchange rate and GDP have contrary impact on the performance of export. The granger association highlighted that Somalian FDI does not exist the influential impact on the performance of export due to substantial reasons like lack of human capital, civil war, macroeconomic instability, sectoral corruption and currency depreciation. Similarly monthly based disaggregated data is highly significant by virtue of incorporating higher frequency data with plausibly reduced dispersion. Owing to this fact it gives more accurate results for more volatile data, such as investment and trade. Furthermore good and consistent short-term forecasts can be made by monthly based disaggregated analysis (Weishi et al, 2008; Perevalov & Maier, 2010). No monthly based study has ever been conducted in Pakistan to examine FDI-export nexus. This study would bridge this gap by firstly analysing monthly impact of FDI on monthly exports. Then to compare the effects of FDI on exports across product sectors. This would inkle that in which sectors the foreign direct investment affects export meaningfully and in which sectors foreign direct investment has no effect or has regressive effect on exports. Majumder & Rahman, (2021) examined the degree of FDI on Export Processing Zone in case of Bangladesh. The results indicated that FDI and EPZ have a positive impact both in the long -run and the short-run.

Conceptual Framework

FDI has direct and indirect effects on exports. The direct effect is that foreign investors incur investment in host country for producing intermediate goods and make exports back to the home countries for manufacturing final goods (Caves, 1996; Helleiner, 1989). This is called vertical foreign direct investment. In this situation, host country (where foreign direct investment takes place) provides feasible environment in the shape of factor inputs etc. Similarly, home countries also incur investment for preparing final goods in host countries for the purpose of intra-country use and inter countries trade as well. This is called horizontal foreign direct investment. However foreign direct investment in all product sectors may not be equally affective. The indirect effect is that domestic industries have two options. The one option is that they come into competition with foreign investors by producing more qualitative goods and services, which ultimately extend the market of domestic investors. Similarly foreign direct investors bring innovative technology and train the host-country workforce which again brings spillover effect on domestic investment because this innovative technology and the trained workers are not out of the grasp of domestic investors. This indirect effect produces the atmosphere of competition. As a result, domestic investors may begin to launch export goods as well tantamount to enhance exports of a country. Luttermann and Kotzab (2020) examine the impact of logistics performance (LP) on trade and FDI of 20 Asian countries by using panel data over the period from 2006 to 2017. A positive significant impact was found of LP on trade and LP on FDI. The other option is that domestic investors may not withstand on firm footing vis-à-vis to foreign investors and shut down their firms. However, this would not be a permanent phenomenon because every investor tries his level best to proceed further by utilizing all available resources, innovative technology and skilled workers. Leaving the industry is not an ultimate solution for these investors. In this manner the entry and exit ratio would probably be equal to one which would no deteriorate domestic market. In short

domestic investors may increase their exports owing to competition with MNCs, technology advancement, communication and infrastructure facilities. (Haddad & Horrison, 1993). Similarly host country exports can also be increased if export oriented foreign affiliates increase their purchase of inputs from host countries (Din, 1994). Furthermore, MNCs also provide access to domestic producers for export by giving them information about international economies (UNCTAD, 1999, p. 240) All this reveals that foreign direct investment has influential effect on exports of a country.

Methods and Techniques

Researchers usually use three types of data namely cross sectional, time series and panel data. In cross sectional data values of variable(s) are collected for many entities or units in the point of time. Point of time may be an hour, day, week, month or a year. In other words, we can say that in cross sectional data we have no concern with time. In time series, time factor is of great concern and data containing many variables are collected over a period of time. Period of time may be a range of hours, days, weeks, months or years. Similarly, panel data is supposed to be a combination of both time series and cross sections. Khan et al (2018) investigated the barriers to FDI inflow in Pakistan. Non-empirical evidences show that cultural values, corruption, mismanagement etc are the main obstacles to FDI inflow. No empirical relation has been established in this study. Data for various variables are collected for many entities or units over a period of time. Sometimes units or entities of the issue concerned have the same nature and same variation throughout the observations. In this case pooled regression analysis is meaningful and appropriate for the estimation of the data. For the pooled regression analysis, we use the general multiple classical linear regression model (MCLRM). However, if data varies across panels and have no rhythmic variation, pooled regression analysis is considered nonsensible beyond of the fact if variables give rise significant results. This is called spurious regression. In this case either least square dummy variable (LSDV) regression model (fixed effect model FEM) or error components model (ECM), also called random effect model (REM) is used for the appropriate analysis of the data. The best selection between fixed effect model and error correction model is done with the help of many post-estimation tests. The popularly known test is Hausman's test. All the aforementioned analysis is called static analysis. Sometimes the story does not end here. Mohanty and Sethi (2021) examine sectoral analysis of inward FDI and Exports in India over the period from 1980 to 2017. By applying Augmented Dicky Fuller and Phillip Perron Unit Root Test it was found that all variables are non-stationary at the first difference. Analyzing the data via ARDL (Auto Regressive Distributed lag) model was used to determine an insignificant negative impact of FDI on exports in the long run. However, the Granger Causality Test confirms that FDI has unidirectional granger causal relationship to export in the short run but FDI is not effective uniformly in all sectors. There is the possibility that all or many variables are non-stationary having unit roots. Weakly stationary data of the series has constant variation and systematic mean without being concern with time factor. The vice versa condition is called not-stationary or unit root. Panel unit root tests, like Hadri, Im pesaran and shin, Levin Lin chu and Breitung etc., are conducted for the existence of unit roots. So if the data is not stationary at level 'I(0)'. Random effect model and error components model are probably believed to be untrusted. In this scenario the story of dynamic analysis, in the form of short run and long run effects, takes initiation of its existence. So, co-integration tests for long run relationship are conducted. Thereafter, vector error correction model (VECM), vector autoregressive (VAR) model are used in the case when all variables are stationary at the same level. Nevertheless, if the variables are not stationary at the same level, autoregressive distributed lag (ARDL) model and generalized method of moment (GMM) are used for data analysis (Gujrati, 2010).

Empirical Models of this study

This study comprises nine sectors. Each sector consists of one hundred and eight observations of even months for the period from 2006 to 2014. Keeping in view the above cited discussion in section 3.2.1, the first pooled model has been estimated. Pooled regression analysis is actually done on multiple classical linear regression model (MCLRM). The empirical form of this model is given as under.

$$\ln Ex = \alpha_0 + \alpha_1 \ln lex_{it-1} + \alpha_2 \ln fdi_{it} + \alpha_3 \ln di_{it} + \alpha_4 \ln er_{it} + \alpha_5 \ln ter_{it} + \alpha_6 \ln prod_{it} + \alpha_7 \ln se_{it} + \alpha_8 \ln lp_{it} + u_{it} \dots \dots \dots (1)$$

Where i stands for sector from 1.....9 and t for the months from 1.....108. α 's indicates intercept and coefficients respectively. *Ex, lex, fdi, di, er, ter, prod, se, lp* and *u* represent exports, lag exports, foreign direct investment, domestic investment, exchange rate, terrorism, production, scale economy, labor productivity and white noise or residual term respectively. All variables are taken in log-log form.

Fixed Effect Model

Panel data (longitudinal data) comprises both panel units and series. Usually, all panel units are not similar, and series differ across units but have no relation with time trend. In this scenario we can use a fixed effects regression model. This model is

actually an extension of the multiple classical linear regression model. The fixed effects regression model for this study, which is an extension of the classical linear regression model, is given as under:

$$\ln Ex = \alpha_0 + \alpha_1 \ln lex_{it-1} + \alpha_2 \ln fdi_{it} + \alpha_3 \ln di_{it} + \alpha_4 \ln er_{it} + \alpha_5 \ln ter_{it} + \alpha_6 \ln prod_{it} + \alpha_7 \ln se_{it} + \alpha_8 \ln lp_{it} + v_i + \varepsilon_{it} \dots \dots \dots (2)$$

Where $\mu_{it} = v_i + \varepsilon_{it}$

Variables and their subscripts are similar as explained for equation one. The error term is decomposed into two components.

Component v_i indicates all those unobserved factors that vary across units but do not change over time. Similarly, the component ε_{it} vary over time and units as well v_i in more extensive form can also be written as fixed parameters as depicted in the following model.

$$\ln Ex = \alpha_0 + \alpha_1 \ln lex_{it-1} + \alpha_2 \ln fdi_{it} + \alpha_3 \ln di_{it} + \alpha_4 \ln er_{it} + \alpha_5 \ln ter_{it} + \alpha_6 \ln prod_{it} + \alpha_7 \ln se_{it} + \alpha_8 \ln lp_{it} + \alpha_1 + \alpha_2 + \dots + \alpha_9 + \varepsilon_{it} \dots \dots \dots (3)$$

Here the fixed component factor is replaced with a set of fixed parameters $\alpha_1 + \alpha_2 + \dots + \alpha_9$, one for each of the 9 sectors in the sample. For instance, α_1 indicates the net effect on exports of unobservable factors that are constant over time for food sector. Intuitively, we are using each unit as a control for itself. For the least square dummy variable estimators we add dummies for each unit and for fixed effect estimator we use reduced form of the variables.

Random Effects Model or Error Components Model

If dummy variables represent a lack of knowledge about the true model, then this lack of knowledge can be represented through the error term μ_{it} the proponents of this methodology call it error components model or random effects model. This model can be delineated in term of this study and is given by the following basic idea:

$$\ln Ex = \alpha_{0i} + \alpha_1 \ln lex_{it-1} + \alpha_2 \ln fdi_{it} + \alpha_3 \ln di_{it} + \alpha_4 \ln er_{it} + \alpha_5 \ln ter_{it} + \alpha_6 \ln prod_{it} + \alpha_7 \ln se_{it} + \alpha_8 \ln lp_{it} + u_{it} \dots \dots \dots (4)$$

Where α_{0i} is not considered as fixed intercept but deemed as random variable with mean value of α_0 and random error term ε_i . This expression is presented as follow:

$$\alpha_{0i} = \alpha_0 + \varepsilon_i \quad (i = 1, \dots, 9) \dots \dots \dots (5)$$

By substituting equation in equation four we get the following equation.

$$\ln Ex = \alpha_{0i} + \alpha_1 \ln lex_{it-1} + \alpha_2 \ln fdi_{it} + \alpha_3 \ln di_{it} + \alpha_4 \ln er_{it} + \alpha_5 \ln ter_{it} + \alpha_6 \ln prod_{it} + \alpha_7 \ln se_{it} + \alpha_8 \ln lp_{it} + \varepsilon_i + u_{it} \dots \dots \dots (6)$$

If we take $\vartheta_{it} = \varepsilon_i + u_{it}$ then equation six will be modified as under:

$$\ln Ex = \alpha_{0i} + \alpha_1 \ln lex_{it-1} + \alpha_2 \ln fdi_{it} + \alpha_3 \ln di_{it} + \alpha_4 \ln er_{it} + \alpha_5 \ln ter_{it} + \alpha_6 \ln prod_{it} + \alpha_7 \ln se_{it} + \alpha_8 \ln lp_{it} + \vartheta_{it} \dots \dots \dots (7)$$

The above equation is the standard form of random effect model or error component model.

Panel Unit root tests

For the dynamic analysis at first panel unit root tests are conducted for checking non-stationarity in the data. Tests as conducted for this study are the tests of Fisher Dicky Fuller, Im pesaran & Shin and Breitung tests. The starting point of any unit root test is the random walk equation with drift or without drift for any explanatory or explained variable is given as under: For export of this study random walk equation with drift will be:

$$Ex_t = \gamma_t + \rho Ex_{t-1} + \mu_t \dots \dots \dots (8)$$

$$-1 \leq \rho \leq 1$$

Where γ_t is called the drift of the equation, ρ is the coefficient of lag exports and μ_t is the white noise error. So, if ρ is equal to 1, the variable will have unit root. Alternatively in case of first difference the equation with drift is written as follow:

$$\Delta Ex_t = \beta_t + \delta Ex_{t-1} + u_t \dots \dots \dots (9)$$

$$\delta = (\rho - 1)$$

Where ' δ ' depicts the coefficient of lag export. In this scenario the variable will have unit root when δ is equal to zero. Similarly random walk equations without drift and with drift and trend are also used for testing unit roots.

Data

The study consists of eight variables namely exports, foreign direct investment, domestic investment, exchange rate, terrorism, production, scale economy and labor productivity. At first, it was intended that analysis of the study would be conducted for the period from 2001 to 2015. Owing to unavailability of monthly and sectoral data the study is constrained to nine years for the period from 2006 to 2014. Similarly monthly data on domestic investment at sectoral level is not available at all. Therefore, according to Askari (2015) credit-loan can be used as proxy variable for domestic investment. So, data of credit-loan is used as proxy for domestic investment. Scale economy and labor productivity are derived variables calculated from the ratio of production to number of firms and production to wage rate, respectively. Each series comprises the data of nine sectors for 108 months for the period as mentioned in the preceding line. Data are derived from various agencies of Pakistan as follow:

Variables	Agency
Exports	The State Bank of Pakistan
Foreign direct investment	The State Bank of Pakistan
Domestic Investment	The State Bank of Pakistan
Exchange rate	The State Bank of Pakistan
Terrorism	The Global Terrorism Database (GTD)
Production	Pakistan Bureau of Statistics

Sectors and Variables of the Study

The purpose of this study is to analyze the monthly effect of foreign direct investment on monthly exports. Some other controlled variables, as mentioned in the above table 3.1, are also included in the study. Each variable is decomposed into those sectors, for which monthly data could be available. Monthly data regarding Pakistan is in short supply. Tabassum et al (2023) uses heterogeneous procedure for panel data of South Asian countries for the period from 2000 to 2020. Augmented Mean Group (AMG), Common Correlated Effect Mean Group (CCEMG) and Mean Group (MG) techniques were used. Ultimately, significant and positive effects of FDI, economic growth and energy were found on the service sector. As data comprises of sectors, however, sectors provided for one variable are not totally matched with the sectors of another variable. Therefore, sectors of each variable are thoroughly scrutinized and common sectors and sub-sectors in all variables are picked up. Many sub-sectors are summed up to get one sector. In this manner nine sectors were chosen as common sectors for all variables. Most of the sectors belong to the manufacturing area. Names of these common sectors are sketched in the following table 2.

Table 2. Name of Sectors selected for the study

S/No	Selected Sectors
1	Food
2	Mining and Quarrying Metal and Metal Products
3	Oil and Petroleum Exploration and Refining
4	Chemical and Petrochemicals
5	Rubber and Rubber Products
6	Leather and Leather Products
7	Textiles
8	Cement and Ceramics
9	Machinery and Equipment

Source: Author's own selection of sectors based on available data

There are eight variables for the analysis of the study. Export is a dependent variable whereas foreign direct investment, domestic investment, exchange rate, terrorism, production, scale economy and labor productivity are explanatory variables. Data on exports, foreign direct investment, domestic investment and exchange rate is taken from the State Bank of Pakistan while data on production, number of firms and wage rate is taken from Pakistan Bureau of Statistics. Similarly, data on terrorism is derived from global terrorism database (GTD). While scale economy and labor productivity are calculated by the following formula.

$$\text{scale economy} = \frac{\text{production per sector}}{\text{number of firms in that sector}}$$

$$\text{Labor Productivity} = \frac{\text{production per sector}}{\text{Monthly Average Wage rate}}$$

The description of these variables is given in the following table 3.

Table 3. The description of dependent and independent variables used in the analysis

S/N	Variable	Symbol	Definition
1	Export (Dependent)	E_{st}	Per month Export of a Sector in Million Dollar
2	Domestic Investment (Independent)	DI_{st}	Per month Domestic Investment of a Sector in Million Dollar.
3	Exchange Rate (Independent)	ER_{st}	Per month Exchange Rate of a Sector (PKR/US\$)
4	Foreign Direct Investment (Independent)	FDI_{st}	Per month Foreign Direct Investment of a Sector in Million Dollar
5	Labor Productivity (Independent)	LP_{st}	Per month Labor Productivity of a Sector
6	Lag Exports (Independent)	LE_{st}	Per month Lag Export of a Sector in Million Dollar
7	Terrorism (Independent)	Ter_{st}	Per month Events of Terrorism in a sector
8	Scale Economy (Independent)	SE_{st}	Per month Scale Economy of each firm in a Sector

Source: Author's own description based on literature review

Results and Discussion

Aims of this study are first to estimate the effect of FDI on exports of Pakistan using monthly and annual data for various product sectors. Then to compare the effects of FDI on exports across product sectors and finally to match annual and monthly overall estimates of the effects of FDI on exports. Rahman and Noman (2020) explore a significant positive relation between outward FDI and exports in total sample with the partner countries. Panel data has been used during the period from 2003 to 2017 by applying Poisson Pseudo maximum likelihood approach based on gravity model. Therefore, at first monthly analysis of the sectors both at overall level and individual level is made for all variables and the effect of FDI, along with other explanatory variables, on exports is compared across the sectors. Then annual analysis of the sectors for all variables is conducted. Finally, a comparison is made between the results of monthly analysis and annual analysis. The data of this study comprises panel data. Sometime time series and panel data show distinct relationship with time trend which is frivolous and unwanted in the model. In this case, variables are at random walk and have no systematic mean and variance. This situation is called non-stationarity and static estimations like t-statistics, F-statistics and R-square are not trustable if the problem is more serious. In this scenario dynamic estimations are needed to rule out the non-stationarity at first and then to find the results in the short run as well as in the long run. The time trend relationship is diagnosed in time series and panel series separately by many unit roots tests. Arsalan et al (2018) attempted to investigate the causal relationship between FDI and Export by using annual data for the period from 1980 to 2015 of 19 developing countries. Granger Causality Test was used investigated for this purpose. The study investigated that many countries have causality at significant level from FDI to export while some other countries have causality from Exports to FDI.

Panel Unit root tests

The panel unit root tests of Fisher Dicky Fuller, Im Pesaran and Shin and Breitung infer that exports, foreign direct investment, domestic investment, exchange rate, terrorism, production, scale economy and labor productivity are stationary at level 'I(0)' while exchange rate is stationary at order one 'I(1)'. The following table 4 sketches the results of all the three tests.

Table 4: Unit roots tests of Fisher D. Fuller, Im Pesaran & Shin and Breitung

Variables	Level	First Difference				
	Fisher Fuller	D.	Im Pesaran & Shin	Breitung	Fisher Fuller	D. Im Pesaran & Shin Breitung
Export	-14.21***		-15.07***	-6.58***		
FDI	-24.32***		-28.37***	-18.34***		
Domestic investment	-5.07***		-5.02***	-1.34*		
Exchange Rate	4.15		3.99	8.11	-20.16***	-12.37*** -19.02***
Terrorism	-22.13***		-23.42***	-12.18***		
Production	-12.74***		-13.19***	-4.98***		
Scale Economy	-12.37***		-12.86***	-5.06***		
Labour Productivity	-10.44***		-10.67***	-2.23***		

Author's own calculations-----*, **, *** indicate 10%, 5%, 1% significance level respectively. Furthermore the values in the table 4 reflects Inverse normal(Z) statistics for Fisher type Dicky Fuller, W-t-bar for Im Pesaran & Shin and Lambda for Breitung.

The above table 4 indicates that the problem is not too much serious because all variable are stationary at level 'I(0)', except exchange rate which is stationary at order one 'I(1)'. This situation reflects that static analysis would also be sensible. However, for more precise results the study does not bolster upon static analysis only and dynamic analysis is also included in the study. Panel date is analysed in three ways in the static form viz pooled regression analysis, fixed effect and random effect analysis. The underlying data is also analysed using these three ways.

Sectoral wise analysis of data

The data is analyzed sector by sector using pooled regression and it was found that lag export significantly influences its lead export in many sectors. Lag export has positive coefficients in the sectors of food, mining and quarrying, rubber, leather, paper and pulp, textile, cement and transport which are significant at 1% level of significance. The research exhibited from the empirical analysis that imports and exports both have meaningfully affected by the volatility in exchange rate and further states that the policy makers must consider volatility of the exchange rate, and its impact on some macroeconomic variable while formulating trade policies, as a result it will help in boosting domestic and foreign investment (Rukh et al. 2023). This inkle that exports of previous month play vital role to enhance export of the current month and random boost in export would not be sustainable. In this way domestic investment has significant and influential effect on exports in the sectors of food, chemicals, leather, textile and cement. Which reflects that foreign market of the country can be extended in these sectors by increasing the level of domestic investment. Exchange rate also has significant results in the sectors of chemicals, leather, textile and transport, indicating that when exchange rate of the country (PKR/US\$) increases, depreciation of domestic currency occurs, owing to which prices of domestic goods decrease in the foreign market and ultimately exports of the country increase to the rest of the world. Terrorism statistically influences exports in the sectors of mining and quarrying, leather, textiles and machinery and equipment with appropriate negative signs of coefficients, meaning that industrialization of these sectors is adversely influenced by militancy of terrorists in the country. Although, production significantly influence exports in the sectors of oil and petroleum, chemicals and cement but the signs of coefficients are inappropriately negative in the sectors of oil and petroleum and chemicals. Similarly Scale economy significantly and negatively influence exports in the sectors of textile and cement. This can be justifiable by the fact that when exports prices, exports quantity and exports markets are instable, it has insignificant negative effect on economic growth in the form of production and vice versa (Farhat et al, 2012). Labor productivity has statistically significant effect on exports in oil and petroleum, chemicals and cement, revealing that greater the labor productivity, greater would be the production and exports of the country. This study examined the relationship between export performance of manufacturing and agriculture sector with (TFL) total factor productivity in both long and short run. The results indicated that the TFL affect the export performance positively similarly, GDP also affect the export performance positively while exports costs, exchange rate and foreign direct investment are negatively related with the export performance of manufacturing and agricultural sectors (Saeed et al, 2018). The impact of explanatory variables on exports in the remaining sectors is insignificant because of many reasons. Likewise, instable export market may lead to deteriorate the statistical effects of other variable in developing countries as explained by (Farhat et al, 2012) that instable exports gives rise no significant impacts for economic growth and other variables in SAARC countries including Pakistan. Statistical results of this analysis is sketched in the following table 5.

Table 5: The effect of different factors on exports using monthly data

Variables	Food	Mining & Quarrying	Oil & Petroleum	Chemicals	Rubber	Leather	Textile	Cement	Machinery & Equipment
Lag Export	0.675** * (0.079)	0.678*** 0.102 (0.102)	0.421** * (0.091)	0.165 (0.100)	0.628** * (0.094)	0.578** * (0.099)	0.437*** (0.102)	0.370** * (0.370)	0.166 (0.108)
FDI	0.018 (0.013)	-0.011 (0.018)	-0.075 (0.059)	-0.007 (0.028)	-0.006 (0.020)	-0.005 (0.011)	-0.010 (0.011)	0.038 (0.030)	0.012 (0.020)
Domestic Investment	0.271** (0.117)	0.249 (0.329)	0.147 (0.222)	0.411*** (0.158)	0.276 (0.274)	0.347* (0.182)	0.423** (0.188)	0.212** (0.088)	0.115 0.495
Exchange Rate	0.259 (0.161)	0.168 (0.286)	-0.529 (0.456)	0.929*** (0.231)	0.048 (0.307)	0.155* (0.084)	0.399* (0.223)	0.283 (0.315)	-0.328 (0.437)
Terrorism	-0.0306 (0.021)	-0.055* (0.028)	0.018 0.049	0.014 (0.032)	0.014 (0.042)	-0.034* (0.017)	-0.024* (0.013)	0.012 (0.040)	-0.085* (0.050)
Production	-5.933 (3.761)	-0.213 (0.384)	2.482** * (0.699)	-1.808*** (0.363)	-0.216 (0.452)		0.294 (0.236)	7.605** (2.965)	-0.144 (0.514)
Scale Economy	5.678 (3.831)					-0.1920 (0.149)	-0.399** (0.156)	-7.164** (2.749)	-0.091 (0.254)
Labor Productivity	0.271 (0.211)	0.201 (0.382)	1.658** * (0.571)	1.832*** (0.357)	0.227 (0.455)	0.218 (0.154)	0.172 (0.121)	-0.426 (0.363)	0.028 (0.680)
Quarterly Dummy	0.049 (0.052)	0.058 (0.048)	0.036 (0.084)	0.005 (0.057)	0.079 (0.072)	0.008 (0.029)	-0.017 (0.023)	0.013 (0.069)	0.078 (0.080)
Variable I Quarterly Dummy	-0.021 (0.045)	0.076 (0.049)	0.213** (0.090)	0.126** (0.059)	0.066 (0.076)	0.028 (0.030)	0.012 (0.025)	0.049 (0.072)	0.321*** (0.094)
Variable II Quarterly Dummy	-0.053 (0.040)	0.031 (0.051)	0.054 (0.090)	0.113* (0.059)	0.037 (0.075)	0.049 (0.031)	0.048 (0.031)	-0.019 (0.069)	0.238** (0.093)
Variable III Constant	71.43 (45.06)	4.343** 1.727	47.760** ** (14.879)	18.360*** (3.162)	4.372 (4.044)	2.390 (1.947)	-1.198 (5.779)	68.302* * (29.177)	17.503*** (5.737)
F-Statistics	51.36***	43.35***	9.200** *	13.34***	12.87***	24.20** *	23.55***	9.24***	3.21**
R-Square	0.876	0.871	0.519	0.628	0.638	0.740	0.761	0.606	0.326
Observations	92	75	96	90	84	96	93	78	85

Author's own calculations.....*, **, *** show significance level at 10%, 5% and 1% respectively. Figures in parenthesis show standard error figures, without parenthesis show coefficients of variables.

Overall analysis of data

In this section the data is analysed in three ways viz pooled regression analysis, fixed effect analysis and random effect analysis. All variables are estimated by their natural log values. Three dummies, for four quarters of a year, are also created in all three ways of analysis. Results of the pooled regression depict that the model is best fitted because the value of R-Square is 0.95 and F-statistics significantly determines the model. Explanatory variables like lag exports, foreign direct investment and domestic investment significantly and positively influence exports in all sectors. Scale economy also significantly affects export but its sign is inappropriately negative, which, according to (Farhat et al, 2012) may occurs

because of inconsistent export markets. Eissa and Elgammal (2019) investigate the determinants of foreign direct investment in six countries of Gulf Cooperation Council (GCC) namely Saudi Arabia, United Arab Emirates, Qatar, Oman, Kuwait and Bahrain by using panel data over the period from 1990 to 2015. It was found that growth, trade, inflation, infrastructure and oil prices have positive effect on FDI, nevertheless oil reserves have negative effect on FDI.

The estimates of fixed effect model reveal that lag export, foreign direct investment, domestic investment and exchange rate have statistically significant impact on exports. Similarly dummy variables for quarter two and quarter three of this model indicate a significant impact on exports. Which means that intercept of exports is increased by 9.6% and 9.9% in the second and third quarter respectively. In this manner, the analysis of random effect model reflects that R-square of the model for between and overall variation is satisfactorily high. Wald statistics is significant at the level of 1% which reveals that the model is good fit. Variables like Lag export, foreign direct investment, domestic investment and exchange rate have statistically significant impact on exports. The appropriate model for the analysis can best be judged by the tests of Breusch Pagan and Hausman. Breusch Pagan Lagrangian Multiplier test is used for choosing appropriate model between pooled regression and random effect model while Hausman's test is used to choose optimal model between fixed effect and random effect models. In this analysis Breusch Pagan LM test indicates that random effect model is the appropriate model while Hausman's test infers that fixed effect model is the best model for the analysis. In this manner fixed effect model is assumed the best model for analysis. A sketch of results for these three models is depicted in the following table 6 respectively.

Table 6: Parameter Estimates of Pooled OLS Model with Quarter Dummies

	Pooled OLS Model	Fixed Effect Model	Random Effect Model
Variables	Export	Export	Export
Log of Lag Export	0.836*** (0.018)	0.640*** (0.027)	0.836*** (0.018)
Log of FDI	0.030*** (0.005)	0.002 (0.007)	0.030*** (0.005)
Log of Domestic Investment	0.045*** (0.007)	0.081** (0.039)	0.045*** (0.007)
Log of Exchange Rate	0.122** (0.057)	0.198*** (0.064)	0.122** (0.057)
Log of Terrorism	-0.022* 0.012	-0.015 (0.011)	-0.022* 0.012
Log of Production	-0.045 (0.093)	-0.284** 0.118	-0.045 (0.093)
Log of Scale Economy	-0.155*** (0.019)	0.007 (0.083)	-0.155*** (0.019)
Log of Labor Productivity	0.230** (0.091)	0.278*** 0.091	0.230** (0.091)
Quarterly Dummy Variable one	0.051** (0.021)	0.044*** (0.020)	0.051** (0.021)
Quarterly Dummy Variable two	0.040* (0.022)	0.068*** (0.021)	0.040* (0.022)
Quarterly Dummy Variable three	0.006 (0.022)	0.029 (0.021)	0.006 (0.022)
Constant	0.805 (0.591)	6.707*** 1.185	0.805 (0.591)
F-Statistics	5981.04***	84.73***	48141.85***
R-Square (Within)		0.547	0.533
(Between)		0.991	0.999
(Overall)	0.983	0.975	0.984
Observations	789	789	789

Breusch Pagan LM test	2.92
Hausman's Test (Chi-2)	100.53***

Author's own calculation.....*, **, *** show significance level at 10%, 5% and 1% respectively. Figures in parenthesis show standard error figures without parenthesis show coefficients of variables.

Dynamic analysis of the panel data is made by using vector error correction model (VECM), vector autoregressive (VAR) model subject to the condition that all variables are stationary at the same level. However, when variables are not stationary at the same level, autoregressive distributed lag (ARDL) model and generalized method of moment (GMM) are used for the data analysis. Panel unit root tests of this study infer that seven variables are stationary at level while one variable is stationary at order one. So they are not integrated at the same level. Therefore, panel ARDL is the suitable solution for data analysis. Panel ARDL reflects both short run and long run steady state growth. Stata provides pooled mean group (PMG), mean group (MG) and dynamic fixed effect (DFE) models as counterparts of panel ARDL while EVIEW offers a comprehensive kit for panel ARDL. Both methods have been adopted in this study for the dynamic effect of the model.

Conclusion

This study aims at first to find the effect of foreign direct investment on exports of Pakistan using monthly and annual data for various product sectors. Then to compare the effects of foreign direct investment on exports across production sectors. Finally, to compare annual and monthly overall estimates of the effects of foreign direct investment on exports across product sectors. The data contains panels of nine sectors. Each sector comprises one hundred and eight observations for even months.

This study has been conducted for monthly analysis by using the packages of STATA. In monthly analysis panel unit root tests of Fisher Dicky Fuller, Im Pesaran and Shin and Breitung are conducted which infer that exports, foreign direct investment, domestic investment, exchange rate, terrorism, production, scale economy and labor productivity are stationary at level 'I(0)' while exchange rate is stationary at order one 'I(1)'. This reveals that the problem of non-stationarity is not very serious. So static procedure of panel data has been used for data analysis. In static analysis pooled regression, fixed effect and random effect models have been used

The pooled regression analysis for each sector reveals that lag export significantly affect its leading exports in all sectors. In this way domestic investment has significant impact on exports in the sectors of food, chemicals, leathers, textiles and cement. Similarly exchange rate (PKR/US\$) significantly and positively affect exports in the sectors of chemicals, leathers, textiles and transport. Terrorism has significant and negative impact on export in the sectors of mining and quarrying, leather, textiles and machinery and equipment. Similarly labor productivity positively determines exports in oil and petroleum and chemicals. So, we can conclude that lag exports, domestic investment, exchange rate, terrorism and labor productivity have influential effect on exports in the many sectors. However, foreign direct investment has no significant effect on exports in any sector.

Furthermore, the aggregate pooled regression analysis of explanatory variables on exports in overall sectors reflects satisfactory results. Lag exports, foreign direct investment, domestic investment and scale economies have positive elasticities (log analysis) and significantly determine exports. Breusch Pagan Langrangian Multiplier Test is used to find appropriate model between aggregate pooled regression and random effect model. So, this test indicates that random effect model is more appropriate than pooled regression.

The fixed effect analysis was conducted by using log-log form. Quarter dummies are also included in this study. Lag of exports, foreign direct investment and exchange rate have significant positive effect on exports. Similarly, analysis of random effect model reveals that elasticities of lag exports, foreign direct investment and domestic investment are positive and significantly influence exports in overall sectors. Hausman's test for choosing appropriate model among fixed effect and random effect models indicates that fixed effect model is better than the random effect model. So, the trustable results are the results of fixed effect model which shows that foreign direct investment, lag exports and exchange rate have significant impacts on exports.

The overall story of the static analysis shows that in analysis across sectors, lag exports, domestic investment, exchange rate, terrorism and labor productivity have influential effect on exports in the many sectors. However, foreign direct investment has no significant effect on exports in any sector. While in overall sector analysis, lag exports, foreign direct investment, domestic investment and exchange rate have significant positive effect on export in fixed effect, random effect as well as pooled OLS models.

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