HAVE COVID-19 CHANGED THE TRADE GRAVITY OF PAKISTAN?

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CERTIFICATE

This is to certify that this thesis entitled: **"Have COVID-19 changed the trade gravity of Pakistan"** submitted by **Ms. Zahra Arshad** is accepted in its present form by the School of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree in Master of Philosophy in Economics.

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Author's Declaration

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Zahra Arshad

Dedication

My research thesis is devoted to my beloved parents who always supported me through thick and thin. They truly deserve all the respect and dedication of my dissertation.

Acknowledgment

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List of Abbreviations

WTO	World Trade Organization
CC	Confirmed cases of COVID-19
HS	Harmonized System
UNCTAD	United Nations Conference on Trade and Development
DC	Death cases caused due to COVID-19
WC	Closure of job area
IF	Ban on international flights
IMF	International Monetary Fund
PC	GDP per capita
Ex	Real effective exchange rate
D	Distance
SH	Requirement to stay at home
CT	Suspension of transport
AF	Contract tracing of virus
TP	Testing Policy
IR	Infection rate
CE	Cancellation of Events
LPD	Dummy variable for lockdown in Pakistan
COVID-19	Coronavirus disease of 2019
WHO	World Health Organization
SPTF	Strategic Trade Policy Framework

Abstract

Pakistan's trade is concentrated to few destinations and in few products. Exploring new trade markets has always been a point of concern to the policy makers. The outbreak of pandemic COVID-19 has disrupted trade among many countries, it has also created trade opportunities for the countries where disease condition was not worst. The low-high influence of pandemic has changed the gravity of trade between many countries. It forced countries to find new markets for their exports and imports. This study aims to examine the changing trade gravity during pandemic in Pakistan with bilateral countries such as Turkey, Bangladesh, South Africa, Kenya, Madagascar, Egypt, Tanzania, Brazil, Spain, France, Japan, India, Italy, China, Australia, Germany, United Kingdom, United States of America, and Switzerland for the span of 2018-2020. We use monthly panel data and fixed effect model to analyse the trade export and import across the countries and products. Death and confirmed cases show negative impact on total bilateral exports, and death cases along with infection rate exhibits negative impact on total imports. The momentum of contacting virus and ban on international flights shows negative effects on total exports. While the lockdown proxies show insignificant effect on total imports. On one hand, death cases show negative and significant effect on the bilateral exports of manufacturing group, metallic group, miscellaneous group, and pharmaceuticals. On the other hand, confirmed cases shows significant and negative impact on bilateral imports of metallic group and miscellaneous group. Whereas death cases exhibit negative impact on bilateral imports of primary food group and processed food group. Lockdown proxies such as contact tracing negatively shows effects on primary food group exported from Pakistan. International flights ban shows negative repercussions on the metallic groups exported from Pakistan. The momentum of contact tracing has negative and significant effect on the pharmaceuticals and manufacturing group imported to Pakistan. Overall, it is deduced that COVID-19 hit the bilateral exports the most as compared to total bilateral imports. Because the variable of lockdown situation in Pakistan is significant and negatively related to total exports.

Keywords: COVID-19; Panel data; Gravity model

JEL Classification: C33, G15, B14

CHAPTER 1

INTRODUCTION

The economic sectors of Pakistan are adversely influenced by external shock of COVID-19. Social distancing measures along with smart lockdown and micro lockdown were imposed by the government of Pakistan to break the chain of infection (Caggiano et al., 2020). The government regulatory of Pakistan suspended the flights, restricted borders, and disrupted the supply chains domestically (Gourinchas, 2020). Such measures led disruptions in domestic and international trade markets. These disruptions resulted in distortions of demand and supply, which further led to market disequilibrium accelerated by disruptions in supply sectors. The intensity of COVID-19 can be look forward that distortions of pandemic is widely spread in domestic trade market of Pakistan and also hit the international trade market (Bontempi & Coccia, 2021). Internationally various areas including businesses sector, tourism sector, production sector, transport sector, travel industries, and trade sectors were severely impacted by COVID-19. As (Kazunobu & Hiroshi, 2020) describes that these eventual restrictions as regulated by government authorities resulted in deceleration of the economic growth.

The preventive measures including lockdown and social distancing implemented globally adversely affected the international trade followed by the restrictive trade impositions, marginalization of the economic activities on ports, and delaying of export orders (McKibbin & Fernando, 2020). Due to pandemic, the chain of circulating money in the economy got disrupted which resulted in disruption of demand and supply (Iqbal et al., 2020). Globally, these disturbances resulted in bankruptcy of financial markets, along with production and trade sectors. This infection adversely affected the attitudes of both households and investors resulting in global economic crisis. The increase in uncertainties about the prospects of the economy inferred a common impulse in individuals living in economy which was to cut down

their spending further (Walmsley et al., 2021). The cycle continuously affected the firm production resulting in piles of inventories. The retailers tried to wind up their stocks of inventories by advertising through e-commerce with discounted prices in various other countries as well as in Pakistan. It ultimately resulted in hurting the sentiments of the suppliers (Shafi et al., 2020). Likewise, it is suggested that international trade is the complex factor for the determination of the intensity of pandemic. The dynamics of trade can be a reason for transmission of pandemic outside the boundary of nation (Bontempi et al., 2021).

The developing countries such as Pakistan, is directly connected and solely dependent on major trading partners. The interconnectedness of Pakistan to international trade is solely based on the purpose of importing the intermediate goods, raw materials and capital goods which are required by international traders for the manufacturing of the finished goods and exports. China, Japan, USA, UK, France, Italy, and Germany have the major share in international trade market and got badly hit by the external shock (Liu et al., 2021). These major supplier chains were badly hit by COVID-19 which resulted in contractions of imports and exports of Pakistan. Pakistan's total imports declined by 16.2% in the period of July-April FY20. The reasons for the deceleration of imports in Pakistan are as following: import restrictions, increase in commodity prices, and dampened production demand (Khan et al., 2020). Pakistan's total exports dropped by 3.9%, for period of July-April FY20. Exports of Pakistan witnessed a steep decline of 19% for the period of August FY20. Because of all these above-mentioned episodes, the situation got worsen which led to deterioration of exports for the period of July-December accelerated by the trade deficit of 6.44% (Reporter, 2020).

Taking the broader view of international trade, one can assume that Pakistan's trade is most likely dependent on the countries which severely faced the calamity of the pandemic. Western countries comprise of 40 percent of Pakistan's exports, while China comprise 9 percent of

Pakistan's total exports (Sareen, 2020). It is evidently clear that repercussions held in these countries such as China, USA, UK, France, Italy, and Spain during pandemic directly affected the trade of Pakistan. For example, the export of Pakistan comprises of 60 percent of textile and textile related products which are further depended on China about 70 percent which includes the import of raw materials from there. Pakistan's exports stood at $960 million as compared to the period of 2019 following a deceleration of 54 percent for the span of April 2020 (Zhongxiu & Shahzad, 2020).

Pakistan's bilateral products were adversely hit by the shock of COVID-19 which led an increase in some of the products[1] and decrease in some of the products. Pakistan's trade has increased for the first three months FY20, but it decelerated in lockdown of April-May. The sectors of products[2] which severely got hit by the outbreak of the pandemic includes fruits and vegetables basket, rice, exports of spices, fish and fish product, tobacco, meat products which decelerated for the span of July-September FY20. The imports of following sector products such as machinery, agriculture and textile have been decelerated for the period of April-May 2020. The severity of pandemic created episodes of lockdown in some countries (Albertoni & Wise, 2021). The situation of lockdown emulated the shortage in supply of inputs which were essential for the process of making products. Due to potential threat of pandemic, the demand for exports decreased due to cancellation of export demands and fortifying restrictions on ports. Pakistan's exports and imports to world market declined by 9.9% and 4.9% for the period of March-April FY20 (Khan et al., 2020).

Pakistan is counted on for the import of intermediate goods, raw material, and capital goods from the major import partners such as USA, China, and United Kingdom. The imported goods are used to boost exports and domestic consumption by utilizing it in the manufacturing of the

[1] Detail of Products with codes and product names is explained in tabular form in the section of appendix 1.
[2] The detail of facts and figures for the sector of products is also elaborated in appendix 1 under table 1.

finished goods. All these instances proves that the intensity of outbreak in the import-oriented countries indirectly affected the trade sector of Pakistan (Hassani & Shahwali, 2020). Trade deficit of Pakistan increased by 7.89% by November 2020 because of abolition of import restrictions duties on import bills and products.

The pandemic additionally brought up issues about the expenses and advantages of the worldwide inventory chains for the organizations which recently got risen over some years. The occurrence regarding present development in supply anchors had eased back before the pandemic, however there is a little agreement on the drawn-out effect of the crisis (Alfano & Ercolano, 2020). In a few cases, organizations have been rethinking about their openness to the dangers presented by broad stockpile chains that are possibly powerless against various places of interruption. Additionally, a few government regulatory body involves in surveying the dangers supply ties posture with the public stores of goods which is viewed as essential to public safety because of some firms which are finding and shifting the dimension of the production (Aycock & Chen, 2021). For global organizations, changing providers and moving creation areas can be particularly expensive for certain organizations and can present extra risks. Furthermore, organizations might be hesitant to move from creation areas, like China, that fill in as creation stages, but at the same time there are significant business sectors for their production. According to the report of DHL initiative on globalization (Globalization, 2020), it concluded that the effects of travel and restrictions imposed on trade culminated the global trade (Sarkis et al., 2020). This research focuses on trade sector of Pakistan and analyses the trade gravity during pandemic. This paper will be helpful in introducing the new markets along with increase or decrease of several products. This study will provide analysis of bilateral products of Pakistan in outbreak of COVID-19 shock.

1.1 Problem Statement

COVID-19 has caused the demand and supply shock to the international trade. It has caused disruptions in global demand and supply which resulted in disequilibrium in the market (Gereffi, 2020). The labor market, equity market, financial market disruptions ultimately worsen the trade of Pakistan. Such disruptions adversely affected the economic activities. At one hand, decrease in global demand led to decrease in imports. On the other hand, decrease in global supply led to decrease in exports (Baldwin & Freeman, 2021). The import and export experiences declined and then increased substantially in first 6 months after the outbreak. It has affected the overall gravity of product and bilateral trade of Pakistan. This research focuses on Pakistan and analyze the trade gravity during pandemic. It might introduce the new markets as well as increase or decrease of several products. Many researchers have studied different economic and industrial sectors for calculating the external shock of COVID-19, but this research study would pinpoint the shocks of COVID-19 and lockdown on bilateral trade of Pakistan. This research will also evaluate the product wise bilateral trade data of Pakistan with its major trading partners and will provide evidence for its repercussions.

1.2 Research Questions

- How COVID-19 outbreak shock has affected the total exports, and total imports of Pakistan?
- How product wise bilateral trade data has affected the gravity trade of Pakistan with respect to its trading partners?

1.3 Research Objectives

This research will aim:

- To analyze the impact of COVID-19 on exports, imports, and its repercussions on total trade of Pakistan.
- To evaluate the product wise bilateral trade data of Pakistan with its major trading partners.

1.4 Significance of Study

This study will provide evidence whether COVID-19 is reinforcing the international trade. It will also show the impacts of COVID-19 on bilateral trade of Pakistan for all 2-digits HS 99 commodities with respect to China, Italy, India, United States of America, United Kingdom, Iran, Japan, Germany, France, Spain, Australia, Brazil, and South Africa. The trade between two countries is significantly related to the economic size, and economic development. It is inversely related to trade cost including transportation cost, maritime cost, distance, political differences, common language, lockdown, and ethnicity. By inclusions of following variables such as COVID-19 and lockdown, it will capture the outbreak of COVID-19. The situation of lockdown was not found same everywhere, so lockdown variable is important because it has affected the economic activities of affected countries. These variables in model will capture the shocks of COVID-19 on trade of Pakistan and will analytically illustrate that how exports and imports of Pakistan are disturbed by the amalgamation of COVID-19. For the investigation of data, fixed effect model is used to evaluate the individualistic effects of a country. It will also fill the gap of limited literature available on the total trade of Pakistan following the repercussions of COVID-19.

1.5 Organization of the Study

The remainder of this dissertation is divided in the following manner: As chapter one is allocated for the introduction of the study. Chapter two presents the previous literature related to this research. Furthermore, Chapter three discusses the methodology and techniques

employed in the study to empirically evaluate the gravity model. Chapter 4 discusses the nature of data and data sources with description of variables. Chapter 5 describes the results of the fixed effect model. The detail of loopholes in trade policy and interviews of relevant institutions is presented in chapter 6. The detail of products and its trend for certain period is also provided in appendix.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This section will explain the influence of COVID-19 and its obliteration across countries. It will also provide the analysis for different products to demonstrate its trend in pandemic by WTO and UNCTAD. It will also point out the situation of lockdown at global level. It will also provide brief literature available for the methodology implied in this study. It will also provide literature for using the variable in this study.

As demonstrated by Baldwin and Tomiura (2020) that COVID-19 has devastating consequences in the exchange of goods and services. The government orders the regulatory authorities to shut down the entities, vendors, and other economic activity institutions to implement the social distancing process across the economies. In all the process, the pandemic has hit the economies in aspect of macroeconomic stability, trade balance, economic growth, services sector, and manufacturing sector. For accelerating the economic growth of developed and developing countries the prospects of international trade demonstrates a pivotal role. Shrestha et al. (2020) emphasized that in the modern world, the collaborative trade has turned this world into globalization. Amidst of the ongoing COVID-19, the global trade has adversely affected disruptions in global supply and global demand**.**

Lai et al. (2020) explained that the direct economic effects of COVID 19 can be linked with previous epidemics and pandemics that halted the economic and trade activities in developed countries such as China. Indirect effects of COVID-19 resulted in contraction of employees from the working place in different sectors of that economy. The employers must face the paid leaves for the employees which result in decrease in firm's labor efficiency. COVID-19 outbreak also led world to Economic collapse as explicated by Baldwin and Di Mauro (2020)

that implies breakdown of a national, local, and regional economy that normally follows a period of emergency.

Romano (2020) examined the situation of COVID-19 across the globe that tends to be a wide scope of awful monetary conditions, delayed discouragement with high bankruptcy rates, high joblessness, (for example, the Great Depression of the 1930s), to a breakdown in ordinary trade brought about by hyperinflation, effected economy in many ways such as halting production by effecting production centers, and troublesome situation for financial entities (for example, Global Financial Crisis of 2008). Weiss et al. (2020) incubates that the macroeconomic impacts of pandemic in USA, China, and the rest of the world. The factors involved in this study was the depiction of shut down of business entities and reopening of entities. It evaluates 22.3% to 60.6% reduction of Gross Domestic Product in USA. It all happens due to dampened market demand and supply.

Zhang et al. (2020) illustrated that the market disruptions following the financial markets worsened the situation by directly effecting market supply chain. The chain of providers with an association in market depends on to deliver and transport of those materials (print, inventories, and retail location) to showcase their products and administrations. The extraordinary vulnerability of the pandemic and its related monetary misfortunes has made business sectors become exceptionally unstable and capricious. COVID-19 not only effected production centers but also had adverse financial effects on firms and markets. Pinzaru et al. (2020) showed that the financial interruptions due to external shock pressurized a few firms, production sectors resulted with liquidity constraints. The analyst in markets and firm accurately forecasted the cost and benefit analysis for the financial instruments and finance firm related products.

Sela et al. (2020) stated, COVID-19 was profoundly located in China which was efficiently involved in global trade, and virus transmitted to Japan, United States, Italy, and Korea. These countries are known to be global supply chains of manufactured goods. The production and efficiency of different industries and manufacturing sectors has fall across the world. For example, China been epicenter of COVID-19 have had shut their factories, industries, and shipping services. COVID-19 has evident impact on global demand resulting in negative demand shocks. Voth (2020) explained that globally, trade flows will be vulnerable to demand shocks resulting in decrease of purchases. For example, China being the pivotal source of demand for different goods and services across the world has led to decelerate the global consumption. Fear, uncertainty, and social distancing has also influenced the demand side. COVID-19 being pandemic declared by the World Health Organization, has created accelerated frenzy mental illness of individuals in different economies such as India (Jayasooriya, 2021). Amid of COVID-19 people visit stores only for necessary items and reduced the consumption of other goods and services (Balaji et al., 2020).

COVID-19 pandemic via its transmittable parameter has slowed domestic consumption, production capacity, and efficiency of manufacturing sector of developed countries. Bontempi and Coccia (2021) examined that COVID-19 has been supply shock which led to decelerate the exports and demand shock resulting in reduction of imports. These all studies show the negative impact of pandemic on exports, imports, and international trade. China alone covers 60% of market interest and center of export and import in Asia. COVID-19 could influence the Asia adversely so it very well may be inferred that pandemic could influence the China's exchange of goods by implication during the COVID-19 (Dhar, 2020).

Oldekop et al. (2020) examined that global value chains are adversely hit by pandemic. Expanded globalization diminishes in the worldwide and distorted the exchange of goods and services in times of COVID-19. Vidya and Prabheesh (2020) observed that the exchange of

goods and services across the world is affected in three ways which are as following: Firstly, through stock chains as diminished economic activity is spread from merchandise makers to wrap up product makers. Secondly, a drop in exchange of goods and services, which diminishes interest of profit for merchandise and producers. Thirdly, through decreased exchange of goods and services with exporters and supply makers, at the point of pandemic diminishes their imports and adversely influences exchange of goods and services and financial movement of exporters.

Similarly, Carreño et al. (2020) examined the situation of European Union to address the situation of pandemic by adopting Commission Implementing Regulation (EU) 2020/402, to restrict exports of medical products especially pharmaceuticals and personal protective equipment's (PPE). The product sector in China and other contemplated nations in Asia show the most regular impacts, and afterward come those in Europe and North America. Kheirallah et al. (2020) evaluated the negative impact of pandemic on its financial exchange is taken on account of all industrial sectors and manufacturing units especially in motor vehicles, machinery and equipment and apparel in some countries such as Germany, Spain, France, U.K, and Italy. Moreover, as identified by Yao et al. (2021) that the trade of energy endures, and medicinal services have the most noteworthy anomalous negative returns in nations including Canada, Italy, U.K., and U.S. It creates global crisis in terms of production, employment, and individual livelihood.

According to another paper Fernandes (2020) suggests that nations are confronting a new kind of infection in the form of emergency. It elaborates that Greece, Portugal, and Spain heavily rely on tourism, by imposition of social distancing measures resulted in distortion of demand, and consumer spending. The present emergency is additionally creating spill over impacts all through the supply chains. Correspondingly, Sulistiyani (2020) magnifies the situation of pandemic by following the method of qualitative methods such as virtual interviews with

several companies. It deduced that the manufacturing units are influenced by global major trading economies. Additionally, Uttama (2021) explained that in any case to anticipate the obliteration of virus which ultimately depends upon the precautionary measures to break the chain of infection as well as to mitigate the liquidity constraints of production sectors to boost the revenue sales.

This paper simulates the pandemic by using standard global computable general equilibrium model and inferred that the baseline utilization of capital and labor resulted in acceleration of international trade cost and induced in deceleration of economic activities (Maliszewska et al., 2020). They will likely lose their jobs due to shut down of factories and industries. And they might lose their position in the society too which will might create a life for them not lesser than a bizarre disaster. Kumar et al. (2020) investigated that one virus has almost destroyed the demand for numerous products all at once. Resulting in the huge impact of curbed imports and exports, through either plunging prices of the goods or destroying demand on the other hand. Laing (2020) illustrated that the crude oil is one of the commodities which is powerful enough to make the world revolves around it. The eventual fall in oil prices have reduced the global demand, and the demand for petroleum products have fall resulting in reduced global growth**.**

According to the report by World Trade Organization (2020), the merchandize trade fall by 5.3% as a whole for the span of 2020. The building construction and manufacturers of automobile shows lower productivity for the period of 2020 due to shortage of supply of raw materials and parts made of iron and steel drop by 17%. The services sector such as transport and travel were directly hit by pandemic. As reported by Bekkers et al. (2020) restrictions of lockdown were directly linked to constrict the mobility of the people from one geographic area to another. On one hand, the transportation sector falls by 19% at aggregated level. On the other hand, travel services constricted to reduce the contract of viruses from one individual to another individual and resulted in drop by 63% at world level. For example, due to closure of border at

global level as stated for the first quarter of 2020, the foreign flights dropped by 80% (World Trade Organization, 2020).

As explained by Jean (2020) that the Sub-Sahara Africa countries also face the situation of pandemic following weak revenue collection and insufficient public spending. The regulation of lockdown and its imposition is costly, and low-income countries of Africa are eventually in a trap of domestic supply shocks and global demand distortions. As extended by Espitia et al. (2020) the constrictions to screen out the shocks of pandemic including export delays, ban on imports, and port constrictions affected the trade in Africa. The countries of Africa depend on raw material imported from China, India, and USA. According to the report of World Trade Organization, the economies of Africa widely depend on the oil and crude oil which are export-oriented industry. Whereby, the crude oil price was hardly hit by pandemic, and so pandemic has negative effects on Africa trade markets.

On one side, the report issued by Azevedo (2020) shows the fall between 13% to 31% for aspects of international trade at global level. On the other side, the fall in global economy was recorded to drop by 3% for the span of 2020. A partial economic recovery was assumed by WTO in between the span of 2021 depicted as the pessimistic view. Furthermore, it explains that the drop in international trade would be more dampen as compared to the financial crises propounded for the period of 2007-2008. The commodities such as electronics, non-essential commodities, and automobile will be more effected by pandemic.

As reported by National Bureau of Statistics of China following estimation of International Labor Organization (ILO, 2021) for the span of first two months of 2020, the output of industrial entities decreased by 13.5 percent for China. Following the June 2020 report of International Monetary Fund (IMF, 2020a) the speculation regarding global economy was following the contraction of 4.9 percent and it extended that its three times more than global

financial crisis of 2008-2009. As stated by McKibbin and Fernando (2020) that the distortion in network of transportation, constriction on travel, resurgent lockdown measures dampen the situation of pandemic and resulted in delay of trade. Due to lockdown situation in different economies the shutdown of production units find difficulty in assessing their inputs, it was found both domestically and internationally. The shortage of assessing the inputs create demand shock (Mezghani et al., 2021).

According to the report of IMF (2020b) for the period of 2020 projected that the economies at global level will drop by 6 percent to 7 percent as negative economic shocks are preserved in 90 percent of the countries. One of the papers empirically stated through its results estimated in their study that export lost by 64 billion dollars and the United States of America lost export worth of 38 billion dollars as suggested for the span of 2020 (Hunter et al., 2020). Moreover, as examined by Pei et al. (2021) illustrating the effects of lockdown measures in the cities of China. They found that 34 percent of drop of exports related to different cities of China by using the difference-in-difference technique. This paper also assumed that the export of products which are mainly dependent on raw material imported from other countries and domestic production are in a scope of survival and shock.

This study uses the comparative analysis of two countries named as USA and Canada. They found the negative effects of bilateral trade and COVID-19 with sound distortion around 3.1 percent to 4.9 percent as total drop in exports for Canada (Cardoso & Malloy, 2021). Further, they explained that three sectors such as gas, mining, and oil production sectors for USA are on center hit approximately affected 60 percent of exports and imports. Respectively, other paper by May (2020) investigated that the lockdown measures frequently resulted in the negative relationship with international trade. They empirically evaluated the stringent of lockdown measures as increases in the daily reported cases for 149 countries.

The distortion of supply shock as depicted by Gruszczynski (2020) simultaneously distorted the demand side. Furthermore, the other paper by Lashitew and Socrates (2021) found negative relationship of confirmed cases and death individuals for different economies with respect to international trade and travel. The commodities of agriculture are equally hit by pandemic as explored by the study (Khan et al., 2020). The research shows that pulses such as Masoor and moong for the span of January 2020 to April 2020 shows a fall of 20.71 percent and 17.85 percent, while other food items including onion and tomato also shows decelerated demand. Gössling et al. (2020) explored that at global level the maritime shipment reduced and stood by 7.1 percent to 9.65 percent. They also empirically magnified that major trading countries having magnificent share in international trade market are equally hit such as China, Western countries, and Middle countries accounting for the loss of approximately 11.81 percent following the consequences of global value supply chain distortions (Kumar et al., 2020).

The research conducted by Alfano and Ercolano (2020) used the generalized least square method and random effect model. The hypothesis that the existence of lockdown genuinely breaks the chain of infection and make the survival of individual possible. Such measures follow the least disruptions in demand and supply for that economy. Additionally, the study by Ozik et al. (2020) on retail sectors focused that its eroded approximately by 40.1 percent due to erupting distortions in global demand and global supply. The report by World bank (WorldBank, 2021), entitled as Trade responses to Africa at time of COVID-19, indicates that the developing countries such as Africa are highly dependent on global trade. But their way to ban the exports such as for the products including masks, medical products, and beans. Also raising the import tariffs on certain products will make the international prices higher for goods related to COVID-19. Simultaneously, it will worsen the situation of global trade (Robinson, 2021).

For the study of bilateral trade gravity model is extensively used by researchers following the panel data techniques. Sultan and Munir (2015) employed the gravity model to study the trade potential of Pakistan by analyzing exports, imports, and total trade of Pakistan. They have empirically analyzed the exports, imports, and total trade of Pakistan with respect to 38 countries. Fitzpatrick (1984) has investigated the merchandize exports and imports for Irish by assessing the geographical patterns of foreign trade using gravity model. Takes (2020) examined the financial crisis of China exports with its major trading partners. The conclusion was drawn as the real economy and financial condition of the trading partners become worse which led in the deceleration of Chinese exports.

One of the papers by Xia and Liu (2021) illustrate the investment situation of China. They argue that Foreign Direct investment is important for the growth of economy as it give boost to investment and global supply chains. According to report of UNCTAD (2021a) the projected FDI fall turmoil and drop by 30-40% for the span of 2020-2021. Additionally, as stated by Chen et al. (2020) used the paradigm of truck loading as an aspect to explore intensity of COVID-19, where they deduced that policy measures were the culminating point in disaggregating the demand and supply. On one hand, it was a mere fact 60% shock based on exports that followed the outward shipments. On the other hand, 20% of the external shock translated into imports distortions that followed the inward shipments. These results stand for collaborating result of policy implications and monstrous restrictions of pandemic.

As explained by Kamdem et al. (2020) that confirmed cases and death cases have the negative correlation with commodity prices by using Granger Causality. Haphazard volatility was predicted for the commodities such as crude oil, wheat, and silver at time of COVID-19. Furthermore, stated by Borgards et al. (2021) that different commodities attempt to have different intensity of volatility. On one hand, soft and metals shows less volatility. On the other

hand, precious metal including silver and energy commodities shows much more volatility and variation in terms of their demand and supply at time of pandemic.

Jong et al. (2021) illustrated that the shock of pandemic on hotels is exclusively related to various other services and commodities such as tourism, and consumer goods. The influence of pandemic and restricting the borders to control pandemic shows distorting impacts on hotel services revenue. As reported by United Nations Conference on Trade and Development (UNCTAD, 2021b) the global trade for the second quarter decreases by 18%, and the international travel restrictions at global level decelerated the international travel service by 24%. Further they explored that the automotive and chemical industries were hit by pandemic for developed countries such as China, and United States. In the second quarter for the span of 2020, the port calls and restriction on ports accounts for the fall of 9% and 23% including the demands for ships, freights, and sea ferries for carrying goods and passengers with respect to global trade by sea and maritime port.

Numerous studies treated lockdown encompassed with different proxies such as the study by Liu et al. (2021) used duration of lockdown and its intensity for Tokyo and UK. The other study conducted by Kazunobu and Hiroshi (2020);Singh and Singh (2020); Ahmad et al. (2021) used the COVID-19 proxy as cumulative confirmed cases and new confirmed cases of COVID-19 to monitor the impact of COVID-19 while evaluating the influence of lockdown policies. The study used by Conyon et al. (2020) assess death of individuals as a proxy for COVID-19 to illustrate the lockdown intensity. Hayakawa and Mukunoki (2021) empirically used the lockdown proxies tempered as requirements to stay at home and constrictions of job area to excel the shocks of pandemic on exports and imports. On one side, they categorize that to remain at isolated place influence the demand, as they will demand less consumer goods and non-essential commodities. On the other side, they categorize that suspension of work job

influence the supply sectors of economies. As, the shutdown of industries and production sectors will affect the supply of commodities and items (CELEBIOGLU, 2020).

As illustrated by Jayasooriya (2021) using the gravity model for depicting the impacts of COVID-19. He exclaimed on that distance and the proxy of economic size is negative to bilateral trade in some parts of Asian economies. By economic point of view, the global economy will lose its share by $1 trillion along with the drop 2% of the gross domestic product as reported and presented by the UNCTAD (2021b) following the consequences of uncertain situations of pandemic. Additionally, as stated by Song et al. (2021) they deduced that negative relationship of pandemic to trade and GDP with aspects of all economies. As indicated by Szabo et al. (2021) China followed the consequences as their intermediate and capital goods were hit by pandemic and being a major trading country and highest share in global value chain at world level accelerated the uncertainty in international trade.

Guan et al. (2020) emphasized that to break the chain of infection, global lockdown was supported across the globe that resulted in shut down of production sectors. Domestic firms are critically disturbed with the influence of pandemic as the production firms rely on imports. Furthermore, as indicated in the forecast update by World Trade Organization (WTO, 2021) in the report of International Trade Statistics; the annual GDP growth rate at global level would drop with 2% to 3% followed with additional percentage loss for the span of 2021. It is because of the newly lockdown measures to combat the surveillance of spiral increase of COVID-19 cases for the span of 2020. These all measures affect the world trade in negative manner. The report summarizes all the events incurring across the globe in prevailing situation of pandemic by (Jackson et al., 2021). The estimates indicate that global trade could fall by an annual amount of 9.0% or slightly less in 2020 because of the global economic downturn. What is more, most importantly, it relies upon to what extent the present lockdowns will last.

Previous studies evidently assess the gravity equation to depict the situation of COVID-19. As examined by Saif et al. (2021) by assessing the variables such as GDP constant (2019), population, and distance to evaluate the impact of COVID-19 on bilateral trade. This study follows the general gravity trade model for assessing the bilateral trade of Pakistan with other countries prevailing in situation of pandemic. It will provide evidence on the disruption of the global pandemic on bilateral trade of Pakistan for total of all 99 chapters of HS code for 2 digits commodities by using fixed effect model. It might lead to explore new markets for product diversification as well as increase and decrease of products in case of Pakistan. This research will also fill the gap of limited literature available on the bilateral trade of Pakistan following the repercussions of global pandemic.

CHAPTER 3

METHODOLOGY AND DATA

3.1 Introduction

This chapter will provide the theoretical background for using the methodology in this study. It will further elaborate the analytical framework with diagram demonstration to depict the direct and indirect factors impacting the international trade and bilateral trade of Pakistan. It also focuses on the model that is based on the methodology which is general gravity model. It will also describe the econometric techniques used in this research.

3.2 Theoretical Framework

This study uses the general gravity model to describe the situation of exports, imports, and total trade of Pakistan with its trade partners under the prevailing outbreak of COVID-19. The concept of bilateral trade was first used by Jan Tinbergen (1962) using the gravity model and later by others (Anderson (1979) ; Anderson and van Wincoop (2001); Deardorff (2007). The important theoretical concept at back of gravity model is that it calculates the factors that may determine bilateral trade for the specific economy. Different factors such as the size of economy, common language, border, and distance of the origin country from destination country are important in analyzing the total trade. The size of economy can be measured with gross domestic product and gross domestic per capita. It explains the following factors such as the size of economy which includes the production and manufacturing sector of specific economy, distance of origin country from its trade partner possessing the transportation and information cost. Dummy variables are also included in gravity model for quantitative variables such as border, common language, shared values, and common origin. On one hand, the exchange of good and services can be deployed as per following the theories of Ricardian Equivalence model; it depicts the exchange of goods based on the specialization of technology

(Hatton and Williamson 2002; Ortega and Peri 2013). On the other hand, the trade patterns can be productively employed by assessing the Heckscher-Ohlin model where the countries trade by allocating the factors of production endowed plentifully. These models explain the factor of production and comparative advantage of bilateral trade but does not elaborately pinpoint the importance of distance involving in exchange of goods and services. So, to align the different variables affecting the bilateral trade, gravity model is used. Bergstrand (1989) develops microeconomic foundation for depiction of the theoretical background of gravity model. He deduced a reduced form of equation from a general equilibrium of demand and supply sectors. Demand of the specific importing countries depend on the constant elasticity of substitution for that country which follows the constraint of income (Zakariya et al., 2014). Whereas the supply side of trade for exporting countries can be linked with profit maximization which depend on the optimum utilization of the resources. The equilibrium of demand for importing countries and supply of exporting countries following the bilateral patterns can result in overall trade equilibrium. The reduced form of equations in calculating the demand and supply for general equilibrium of trade market which is known as 'generalized gravity trade equation.' The interconnectivity across the globe has created the immense basket of consumer goods which has increased the trade competitiveness (Dissanayake, 2021). This research paper will follow the gravity model to analyze the patterns of bilateral trade of Pakistan with respect to partner countries. Theoretical justification was first proposed by Linneman (1996) based on equating the equilibrium of demand and supply. This paper is uniquely designed inferring the depiction of COVID-19 and lockdown on the trade sector of Pakistan. The momentum of infection creates the worrisome situation for the government regulators. Different economies deployed several measures to impose lockdown such as workplace closures, international airplane ban, and port restrictions. These measures are included in the gravity model for analysis. Gravity trade model is important for this study because it is a helpful hand for

evaluation of bilateral trade of Pakistan with respect to different trade partners in the uncertain situation of COVID-19. The variables such as distance in the model calculates the logistics and transportation costs, it is the prime focus of the paper as the government regulators imposed different lockdown measures. These lockdown measures, momentum of infection, and distance play a crucial role in worsening the external shock of pandemic on trade sector (Gupta et al., 2020). Moreover, As the pandemic hit the globe, the economies had to shut their production sectors which resulted in loss of jobs of labors. In case of Pakistan, the government regulatory imposed the 'smart lockdown' on economy of Pakistan which halted the economic activities to some extent. The pandemic adversely affected the consumer spending patterns and producer investing patterns. The outbreak of infection increased the element of fear in the people living in Pakistan and decreased the demand for consumer goods. Due to closure of restaurants and hotels, the revenue sales generation for retail food outlets got decreased (Hunter et al., 2021). As the tourists play a key role in bulk purchases of domestic goods for the economies. But unfortunately, tourism industry got badly affected due to global ban. These all factors accumulatively resulted in reduction of spending, less production of innovative products, and decrease in the demand of goods and services. The reduction in demand of goods and services resulted in decrease of imports. This reduction ultimately led to increase of inventory stocks, where the producers abided the custom of bulk discount sales for clearance of inventories. It badly hurt the sentiments of producers and retail sector of Pakistan. This phenomenon led to decrease in supply of commodities. The deceleration in supply of goods and services resulted in decrease of exports (Javorcik, 2020). The process of demand and supply shocks created disequilibrium in trade market worsening the overall trade of Pakistan. Furthermore, the world after pandemic would be different, it might have certain changes in trade policies especially in

Figure 3.1: **Shocks of COVID-19**

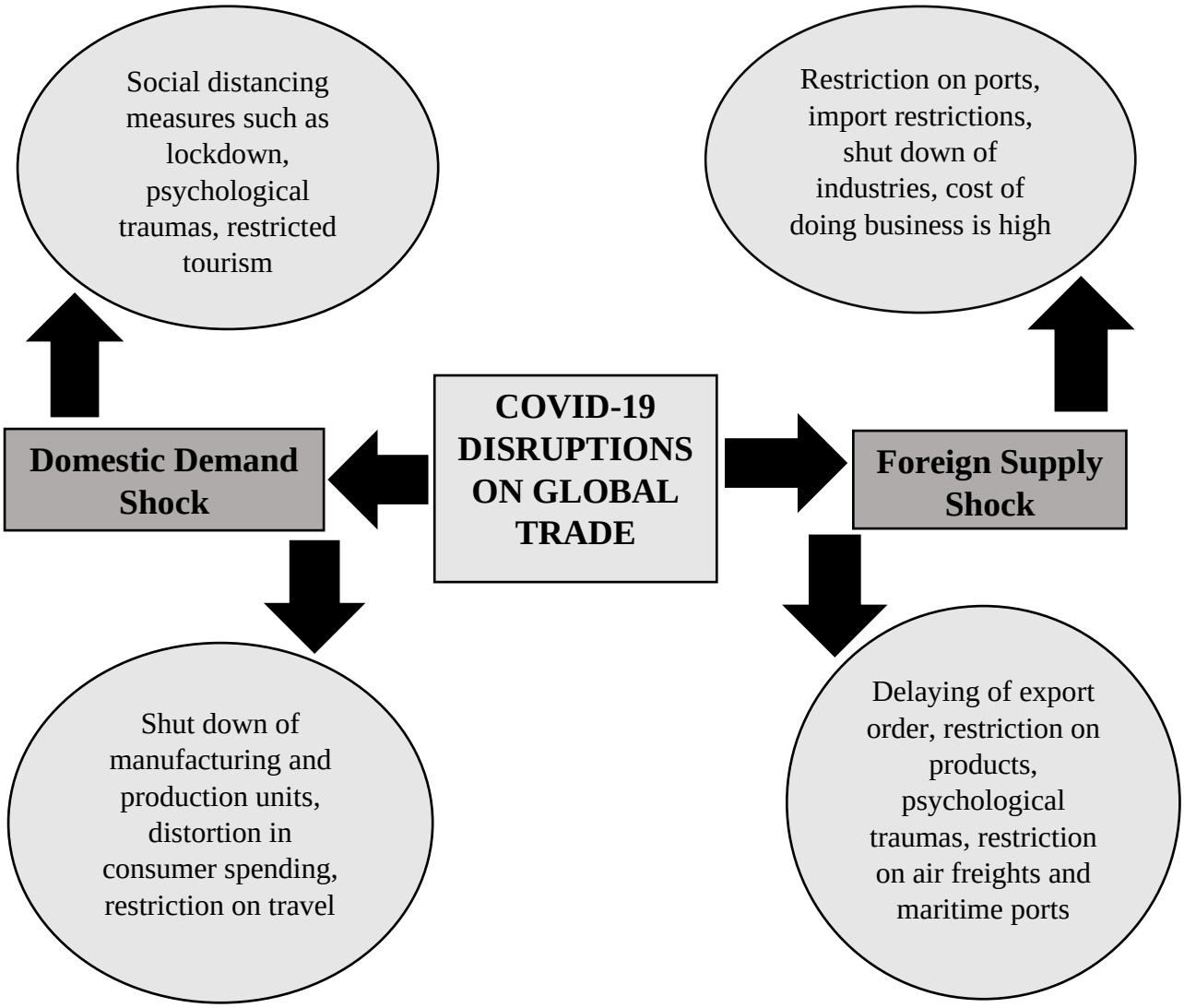
terms of dependency for goods on other major trading partner. It might focus on the domestic production and manufacturing unit for the surveillance of external shock in future.

3.3 Analytical Framework

According to the Worldometer statistics on 4th July 2021, the confirmed cases reported were 184,381,409, and the death toll which has been caused due to COVID-19 was 3,989,826. The previous other studies progressively concluded that COVID-19 turned to be affecting the economy in multiple ways which was directly and indirectly affecting the global trade and some of its ways are shown in figure 3.1 such as: 1. COVID-19 as a demand shock; 2. COVID-19 as a supply shock; 3. A psychological shock which influenced the behavior of consumer spending; 4. COVID-19 as social and economic spillover agent. Coronavirus is a worldwide pandemic, and it is making thump on impacts across supply chains given in headways of innovation, and increase in bilateral and multilateral agreements, these urges of coordination in world trade followed the pursuit of globalizations (Verschuur et al., 2021). Besides this, the world has seen propels in science, medication and designing. The humble number of margins on international travel during past pandemics and epidemics postponed the worldwide spread of the infection unlike the present situation where worldwide travel restrictions has expanded the infection massively. From a general economic point of perspective, it has created a misbalance between demand and supply (Ibn-Mohammed et al., 2020). The shock in demand chain translated in distortion of global imports, while the shock in supply chain translated in distortion of global exports. All the forementioned shocks are directly and indirectly related in distorting the international trade and domestic trade of Pakistan.

The countries with major shares approximately 65.5% in international trade markets such Japan, USA, UK, China, France, Italy, Korea, India were proportionally hit by pandemic (Evenett, 2020). The major trading countries were standing on a point lacking ventilator, medical equipment's, and the structural resilience of health care system. The industries and production sectors were the culminating point for the spillover effects of pandemic such as delay of exports, ban and restrictions of ports, and immobility of commodities (Gössling et al., 2020). The channel for disruption of trade gravity in Pakistan is elaborated in below figure 3.2.

Figure 3.2 : **Supply and demand Shock on bilateral Trade of Pakistan**



In reasonable terms, this implies that a liberal world in exchanging framework gives wellbeing services, emergency clinics, and other clinical benefits to suppliers to provide a wide scope to browse (Hall et al., 2020). The ways in which the COVID-19 pandemic had hit various countries at various occasions suggests that purchasers can switch among providers to decrease the dangers of relying upon any of them (Liu et al., 2021). This aspect of globalization ought to be viewed as a huge and danger moderation gadget. Yet, for worldwide exchange to convey its enchantment supply, courses should be kept open. An excessive number of governments turning internal situation would disappoint this, by worsening the coming breakdown in world exchange, and by addressing the uncertain shocks of pandemic (McKibbin & Fernando, 2020). These all are the examples of distortions in consumer spending, and it is directly related to distortion in demand chain.

The additional shocks such as psychological traumas assume a significant part in disorganizing the consumer spending at national and individual level. The situation of pandemic elevated the panic attacks of individuals due to instability and uncertainty of supply chains, and global value chains (Meehan et al., 2020). At national level, the pattern of consumer spending was unusual, the corresponding patterns of purchasing the personal hygiene products such as tissues, sanitary products, sanitizers, and certain immunity boosting drugs were enhanced. The health care system collapsed globally due to lack of essential health care tools such as ventilators, and personal protective equipment's (Roy & Ghosh, 2020).

The resurgent lockdown measures encompassing obliteration of pandemic and COVID-19 cases detached the urban societies from economic activities and public events such as international travel, tourism, retail marketing, entertainment including cinema, and malls (Ruiz Estrada et al., 2020). Similarly, the demand for certain products and items also fell simultaneously corresponding to services sector (Shingal, 2020). As reported by OECD (2020), the costs of international trade has increased for the dwelling situations such as shipping ports

decelerated by 10% to 20% for the span of February 2020, to unload the containers the requirement of labor cost increased due to resurgence of personal protective equipment's and sanitizers, and the increase in demand for sensitive medical goods and essential commodities such as high valued food trade, surged the prices of air cargo as air freight increased by 30% for China and North America.

Another paper by Sarkis et al. (2020) extended the dilemma by elaborating the research questions theoretically. It exhibited the dilemma of survival, by focusing on the international trade which was involving the uncertain behavior of suppliers and consumers. It emphasizes the importance of local production and manufacturing of products. The slogan of domestic production can curtail the unpredictable situation of COVID-19. Moreover, as stated by (Laing, 2020) mining industry is equally hit by pandemic. Industrial production and business entities are also at stake of surviving the external shock by procrastinating the risk.

3.4 Methodology

This study empirically evaluates the gravity of trade by calculation of product wise data with its trade partners. Product wise bilateral exports and imports has been collected for the period of January2018-December2020 for Pakistan (origin country) with respect to its destination countries which includes 19 trading partners. Fixed effect model is used to control unobserved heterogeneity, so the prevailing heterogeneity is constant over time. Furthermore, general gravity trade model includes two equations. Total trade which includes exports and imports of Pakistan is used as dependent variable in first equation, while in the second equation total of all 2-digits HS commodities for 99 chapters is used as dependent variable to capture the shocks of pandemic prevailing in Pakistan. This study confirms the gravity model of Tinbergen (1962) and Bergstrand (1989) with some additions given below.

3.4.1 Gravity Model: Bilateral Trade

$$log\ (Y)_{pjt} = \beta_0 + \beta_1 log(Pc)_{pjt} + \beta_2 D_{pjt} + \beta_3 COVID_{pjt} + \beta_4 Ex_{pjt} + \beta_5 LDP_{pjt} + \beta_6 Ld_{pjt} + \mu_{pjt} \quad \rightarrow \qquad (3.1)$$

Whereas,

t= monthly

p= origin country (Pakistan)

j= 19 j destination countries

Ypjt= Total trade include total bilateral exports and imports between Pakistan (country p) and country j

Pc= GDP per capita of countries

Dpj= Distance between Pakistan and country j

COVID= the outbreak of COVID-19 in Pakistan and partner countries

Lockdown= Proxies of lockdown measures

Ex= Real Effective Exchange rate

One dummy variable is used in equation as the dummies can take values of units or zeros.

The dummy variable (The situation of lockdown in Pakistan or not, Dt= 1, lockdown exists for Pakistan; Dt= 0, otherwise).

Ldp = Lockdown situation in country j (dummy variable),

μt: Error term

The notation of 'Y_{pj}[3]' presented as dependent variable above in equation 1 describes as total trade including total exports and total imports. Notation 'p' is used for Pakistan, and 'j' is used for destined trading partners. This basic equation analyzes the bilateral trade of Pakistan with

[3] Trade in products is between Pakistan and other countries, which is the dependent variable. It also shows total exports and imports (in value terms).

respect to 19 partners. Gravity model is used to depict the overall bilateral trade patterns. For that purpose, 'D_{pj}' is used to represent the distance of Pakistan with respect to other trading partners. This paper is uniquely designed to assess the influence of COVID-19 on product wise bilateral trade of Pakistan. So, to capture the overall consequence of COVID-19 infected individuals 'C_p' is introduced in the model which represents the infected population as a share of total population. Other variables such as confirmed cases and death cases on monthly basis is also used as a proxy of pandemic. These variables of pandemic encapsulate the intensity of COVID-19 which further intensify the situation by enacting restrictions. To demonstrate situation of COVID-19, the variable lockdown 'lc' is used to capture the effects of pandemic in Pakistan as well in other countries. Seven proxies are used as categorial variables for lockdown. When the pandemic hit the globe, the infection started to increase spirally. With the passage of time, the increase in number of infected individuals in Pakistan compelled the government authority to implement the 'lockdown' which resulted in immediate shutdown of industries, retail sectors, as well as production sectors (Shingal, 2020). The eventual reduction in production of goods led to decrease in economic growth of Pakistan. For depiction of severity of resurgent lockdown in Pakistan for bilateral trade between the countries 'LDP_{pj}' is used along with representation of the independent control variables such as exchange rate (Ex), and GDP per capita. 'U_{pjt}' is the error term on trade of Pakistan and the error term includes all other variables which have their impact on total trade.

3.4.2 Gravity Model: Bilateral Product Trade

The imposition of lockdown globally, resulted in worsening the total trade of Pakistan.

$$log\ (P)_{pjt} = \beta_0 + \beta_1 log(Pc)_{pjt} + \beta_2 D_{pjt} + \beta_3 COVID_{pjt} + \beta_4 Ex_{pjt} + \beta_5 LDP_{pjt} + \beta_6 Ld_{pjt} + \varepsilon_{pjt} \rightarrow \quad (3.2)$$

Whereas,

t= monthly

p= origin country (Pakistan)

j= 19 j destination countries

P_{pj}= Total Product of harmonized system of codes of 2 digits for 99 chapters at aggregate level between Pakistan (country p) and country j

Pc= GDP per capita of countries

Dpj= Distance between Pakistan and country j

COVID= the outbreak of COVID-19 in Pakistan and partner countries

Lockdown= Proxies of lockdown measures

Ex= Real Effective Exchange rate

One dummy variable is used in equation as the dummies can take values of units or zeros. The dummy variable (The situation of lockdown in Pakistan or not, Dt= 1, lockdown exists for Pakistan; Dt= 0, otherwise).

Ldp = Lockdown situation in country j (dummy variable),

μt: Error term

The notation 'P_{pj}' presented above in equation 2 is dependent variable which describes the bilateral products as total of all HS 2 digits 99 chapters. The impact of 2 digits 99 chapters is explored by incorporation of variables such as COVID-19 and lockdown proxies to pacify the broad picture of pandemic on bilateral trade of Pakistan. The proxies of lockdown such as closure of public transport, cancel public events, international travel control examine the impact of restrictions on the selected bilateral countries. These all proxies will monitor the impact of restrictions that restricted the trade of certain trade of products for different bilateral countries. Similarly, with advent of time, the infection rate increases which ultimately binds the economies with restrictions. As to combat the spread of infectious virus, the variable

distance between two bilateral countries increases which is negatively linked with trade. Moreover, distance increases the cost of logistics, port, and freight cost decreases with decreasing rate. All these costs were high due to restrictions on ports including delaying of exports for certain products, cancellation of intermediate goods to some extent, cancellation of capital goods to some extent depend upon the severity of pandemic (Stokes et al., 2020). However, these all factors contributed to deceleration of the trade of products and distorted the demand and supply of market.

3.5 Econometric Technique

Data has been collected for estimation of bilateral trade of Pakistan with monthly frequency for the span of January2018-December2020. For estimation, fixed effect model is used to control unobserved heterogeneity, so that the prevailing heterogeneity does not vary and associated with explanatory variables (Zakaria, 2014).

3.6 Regression Analysis

This analysis aids in exploration of the relationship between dependent and independent variable. It systemically illustrates the causal relationship of unexplained variables with explained variables. Unexplained variables are those variables which are the focused variables for which other variables are estimated and predicted. It also has a predictive power to avert the forecasting trend and behavior of the specific variables. it can manifest the strength of explained variables based on unexplained variables.

3.7 Fixed Effect Regression

Unobserved heterogeneity is controlled by using fixed effect in regression analysis. It sorts out the large variation across the cross sections and impede the selection bias in estimation. Fixed effect is important for this study because it fixed the time invariant characteristics and diminish the unobserved traits related to time mean. After fixing the unobserved

characteristics of all the variables in the model, it estimates the model through ordinary least square. After estimation, it makes easier to interpret the results. The two-tail p-value depicts the significance of the variables in the model. If the significance of the p-value is less than 0.05 following the significance level of 5%, then that variable has significant impact on the outcome variable. For prediction of the relationship between the outcome and predictor variable, the sign of coefficient is important to observe. The value of coefficients is important as it will also depict the change in the dependent variable due to one unit change in the independent variables. To affirm the strength of significance of variable, t-value is important; the higher t-value more is the relevance of that variable in the model.

Chapter 4

Description of Data and Variables

4.1 Introduction

This chapter will provide description of data by mentioning its time period and countries. It further also explains the variables and sources of the variables. Further it also provides the references of papers for using the variables in this research study. It also explains the descriptive statistics for the variables in this study. Total Bilateral exports and total bilateral imports is also analyzed by graphs.

4.2 Description of Data

This paper will examine the effects of COVID-19 on bilateral trade of Pakistan. The product wise bilateral monthly frequency data has been collected for the span of January2018-December2020. Furthermore, for in depth analysis of the total trade of Pakistan, general gravity trade model along with fixed effect model is used to analyze the impact of COVID-19 on total trade of Pakistan by inclusion of different variables such as GDP per capita, distance, exchange rate, and dummy variables.

4.3 Description of Variables

Gravity trade model is used for the depiction of analysis of COVID-19 for trade sector of Pakistan. The bilateral trade data is collected for 19 trading partners such as United States of America, United Kingdom, Japan, China, Kenya, South Africa, Madagascar, Tanzania, Switzerland, Turkey, Spain, Italy, Bangladesh, Australia, France, India, Egypt, Brazil, and Germany. Several studies have used the gravity models for depiction of exports and imports for different countries (Khan, 2020). There are two types of variables which are used in the model, 1. Independent variable 2. Dependent variable

4.3.1 Dependent variable

There are two equations which are following the gravity model. In first equation, total exports and total imports is a dependent variable. While in the second equations, total product dataset comprises of 99 chapters which are categorized, and each category of products is used as dependent variable. Those variables which frequently depend upon the independent variables and have correlation with explanatory variables. Such variables are called dependent variables.

4.3.2 Bilateral Exports and Bilateral Imports

The data of exports and imports is collected from UN Comtrade (International trade statistics database) and trade map (database of trade statistics) for 19 bilateral countries. Exports are those goods that are produced in one country, whereas purchased by another country which assists in accelerating the foreign income. Whereas imports are the goods bought in one's country and are produced in another country which assists other countries in expansion of consumer basket.

4.3.3 Product Wise Data

Harmonized system is used to label and classify the products with codes. HS code of 2 digits commodities means the products fall in the specific main chapter characterizing the main chapter. It is further divided into 4, 6, 8, 10 codes, it varies with the groupings which are based on related products to main products in the chapter.

Bilateral product is the second dependent variable of the model. Data for the 99 chapters of HS code 2-digits bilateral products is collected from UN Comtrade and Trade map. The range of products fall from 01-99 chapters. The span for the analysis is monthly frequency.

4.3.4 Independent variables

The variables which do not depend on other variables are classified as independent variables. These variables neither alter nor demonstrate any change by alteration of other variables.

4.3.5 Gross Domestic Product Per Capita

GDP per capita measures the exchange of goods and services produced within boundary and averaged with everyone who lives within the territory. GDP per capita is used as annual frequency because in gravity trade model, it will only depict the size of the economy. It manifests that availability of outputs are as per individual. Data of GDP per capita is collected from World Development indicators.

4.3.6 Real Effective Exchange Rate

Three types of effective exchange rates, nominal effective exchange rate, real bilateral exchange rate has been used in previous studies. The real exchange rate is important in this study because it compares the value of nation's currency with the other major currencies based on the weighted average (CPI based). Data for the effective exchange rate is collected from international financial statistics (IMF) at monthly frequency for the span of 2018-2020.

4.3.7 Distance

The location of origin country with respect to its destined country is called as bilateral distance. Distance is important in trade gravity model for evaluation of transport and logistics costs. As in the situation of pandemic, cost and benefit analysis of product is important due to lockdown restrictions along with ports and logistics limitations. Data for the distance is collected from the 'The Centre d'Études Prospectives et d'Informations Internationales (CEPII)'. Data for the distance resides under heading of geography with a file named as GeoDist.

4.3.8 Lockdown

The government regulatory authorities escalated the measures which restricted the borders and economic activities in order to break the chain of infection. Lockdown was visible with different dimensions in different economies such as complete lockdown which propels in certain economies that lead to shut down of industries and other economic activity points,

whereas other economies adopted cancelation of public events, closure of transport, and restrictions on workplace. Lockdown is important variable in trade gravity for pandemic situation as it will capture the impact of COVID-19 in countries and evaluate the intensity of pandemic in different selected countries. The data for the lockdown is collected with different proxies which depicts the situation of lockdown due to pandemic and affecting the trade directly and indirectly. Lockdown proxies which are used in this study are as following: 1. Workplace closure 2. Cancelation of Public Events 3. Suspension of Public transport 4. Stay at home restrictions 5. International travel Control 6. Testing Policy 7. Contact Tracing. The data for the proxies of lockdown is collected from the COVID-19 Government Response Tracker by university of oxford and Blavatnik school of government.

Study explored by Lashitew and Socrates (2021) also used all these proxies for the variable of lockdown. They have used this data to identify the impact of lockdown measures in Kenya for evaluation of international trade.

4.3.9 COVID-19

The number of people got infected with COVID-19 in 19 bilateral countries. It will ascertain that the individuals who got infected and expired in a country make the government regulatory authority to restrict the borders and ports which directly affected the trade of products between countries. Restrictions in certain economy depends on the health situation of people. The more people infected, a proportional increase in the new confirmed cases, and death of COVID-19 patients make the situation worst and probe the government to restrict and confine the borders and ports for minimal trade activity. COVID-19 is important variable in this research as the number of infected individuals will influence the trade and economic activity of that particular country. The proxies that have been used for COVID-19 are as following: 1. Death cases 2. Confirmed cases of COVID-19 3. Infected individual as a share of total population. The following paper by Zhang et al. (2021) also followed the proxy of COVID-19 variable as death

cases caused by pandemic along with confirmed new cases, analyzing the international trade insights of China and United States. They have also used the same sources for data collection of COVID-19 proxy. The other study by Topcu and Gulal (2020) used the variable of COVID-19 infected individual as share of total population by examining the impact of pandemic on stock exchange. Data for the proxies of COVID-19 is collected from Worldometer Statistics and our world in data at month wise frequency for the span of 2018-2020. Data for the population of selected countries is collected from the Worldometer statistics. Population data is used at annual frequency, because of the limited time.

4.4 Description of Statistics for Data

Table 4.1: **Summary Statistics**

Variables	Observations	Mean	Standard Deviation
GDP Constant LCU	19	4.838	1.231
Real Effective Exchange Rate	684	103	25.3
Distance	19	6433	2948.7
Confirmed cases	27225	85286	455532.6
Death cases	27225	1696	7101.689
Infection Rate	27225	0.0006	0.0022
Closure of workplace	27225	0.5024	0.95724
Cancelation of Public Events	27225	0.4723	0.827
Suspension of Public Transport	27225	0.1766	0.450
Stay Home	27225	0.3695	0.768
International Travel Controls	27225	0.7432	1.328
Testing Policy	27225	0.5963	1.047
Contact Tracing	27225	0.4337	0.748
Bilateral Exports	27225	1493892.15	7574279.97
Bilateral Imports	30329	1435784.84	7458324.89

4.4.1 Explanation of Descriptive Statistics

Descriptive statistics is important because it entails the diversion of the values in the data set. It explicitly determines the extreme values incorporated in the data set and pinpoints the deviation of the initial values for the specific variable from their mean (centered) value. It also inoculates the maximum and minimum values in order to figure out the extreme value which can result in dubious estimation. Skewness and kurtosis exhibit the extreme values in both tails and define the shape of tails. On one hand, skewness defines the relative values in both tails to exhibit the positive and negative tails. On the other hand, kurtosis outline the collaborative sizes of tails. Moreover, the table 4.1 shows the mean and standard deviation for the following variables such as GDP per capita, export, import, proxies for COVID-19, and proxies for lockdown. All the variables consist of 27225 observations, except for imports which consist of 30329 observations. As to curtail the problems in data set, the mean value of export is 1493892, and import is 1435784. Both these variables contain large values as they depict values for Harmonized system for 2 digits coding including 99 chapters. The mean value of exports and imports depend on the transaction for how much it took place between two bilateral countries. The average infection rate for the selected countries is around 0.0613%. The average individual deaths comprise of 1696. The individuals got infected month wise for the selected countries on average composed of 85286 cases. The selected countries show the centered value for GDP per capita 28865.8 following the mean value of real effective exchange rate as 103. The proxies for lockdown on average nearly approaches to 1, which means that specific restrictions were followed in different selected countries in order to break the infection chain of pandemic. Furthermore, to elaborate the deviation of the specified variables from their mean value, standard deviation is calculated. Exports deviated from their average value by 7574279 and imports by 7458324. It means that both exports and imports show large value of deviation from its centered value. It exhibits the large distance from its mean. It means there is lot of variability

in the dataset of exports and imports because of different trade value between different bilateral countries. The deviation for Death cases deviated 7101 and confirmed cases diverged from the centered value by 455532. Similarly, death cases and confirmed cases also shows great variability in dataset because of the deadly pandemic as infection rate increases at increasing rate, it starts infecting individuals living in different countries. The infection rate deviated from the mean value by 0.22%, it means that at average it shows variability and infected individuals with 0.22 rate. The proxies for lockdown such as restrictions on working place, certain ban on international flights, public ceremonies annulment, binding rules for public transport, the requirement of work at home and stay at home, the need for testing policy for infection, and the way virus contract others; all these proxies are concentrated nearby its mean value and does not show much variation.

4.5 Graphical Analysis of Exports and Imports

Average value of total exports and total imports of 19 bilateral countries is plotted below.

4.5.1 Explanation of Trend Analysis of Total Exports For 19 Bilateral Countries

Average values of exports are plotted in line graph to depict trend analysis of exports for the span of 2018-2020 based on monthly frequency. It shows that exports for 19 bilateral countries follows the pattern, first it increases and then decreases. The average value consistently follows this pattern. One of the unique aspects that can be observed in graph; most of the countries consist of deepened decrease of exports for the period of March 2020 to May 2020 especially for United States of America, China, United Kingdom, Spain, Italy, Germany, and Kenya. Moreover, other countries exports are slightly hit by pandemic such as Tanzania, Switzerland, Turkey, Madagascar, and France. The trend of total exports is shown in the figure 4.1.

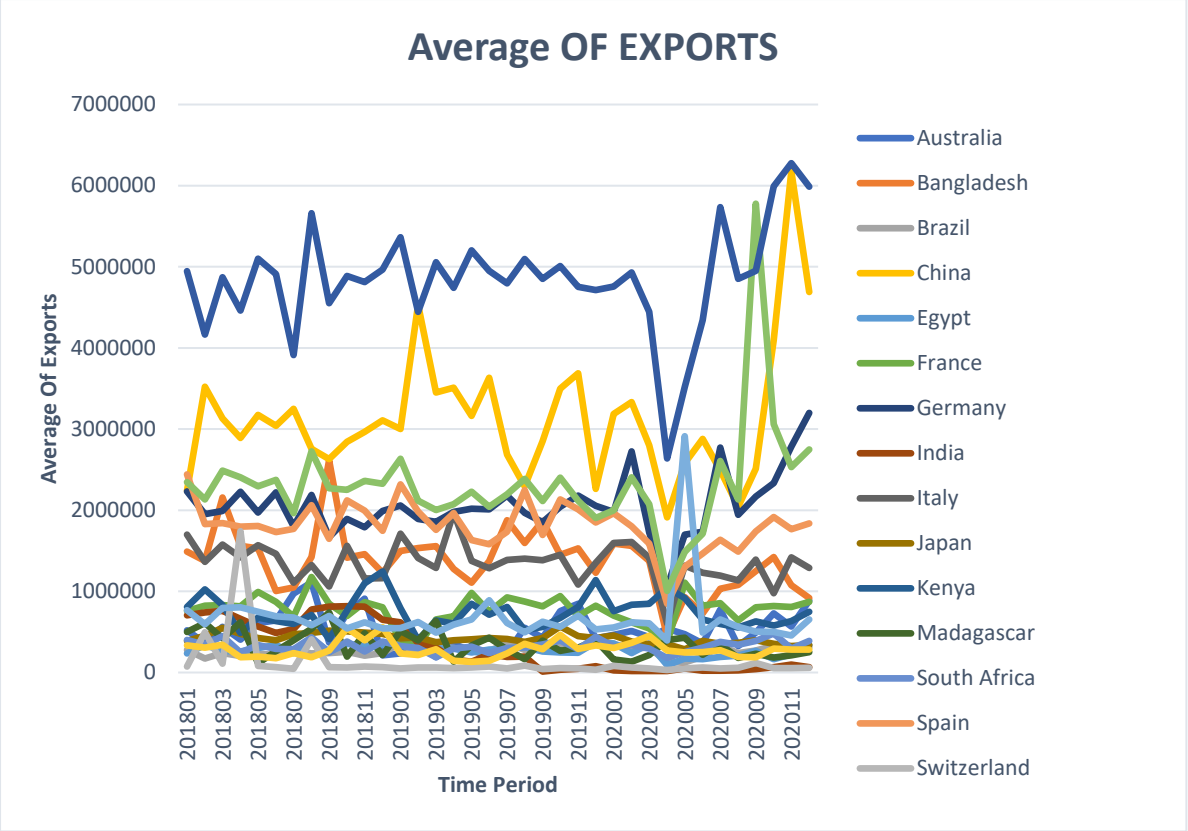


Figure 4.1: Line Trend Analysis for the Average of Exports

4.5.2 Explanation of Trend Analysis of Total Imports For 19 Bilateral Countries

For the span of 2018-2020, the average value of imports for 19 bilateral countries are plotted in the line graph in figure 4.2. The line graph depicts that it is following the pattern of increasing and decreasing order in consistent manner. The average value of imports decreased for the span of January 2020 to March 2020 especially for countries such as United States of America, China, Japan, South Africa, Kenya and, Switzerland. The imports not only hit but also shows deceleration for the span of May 2020 to July 2020 for countries such as United States of America, Tanzania, Japan, South Africa, Switzerland, Brazil, and Kenya. While other countries imports are slightly hit by COVID-19 such as Turkey, United Kingdom, Spain, India, Italy, and Germany.

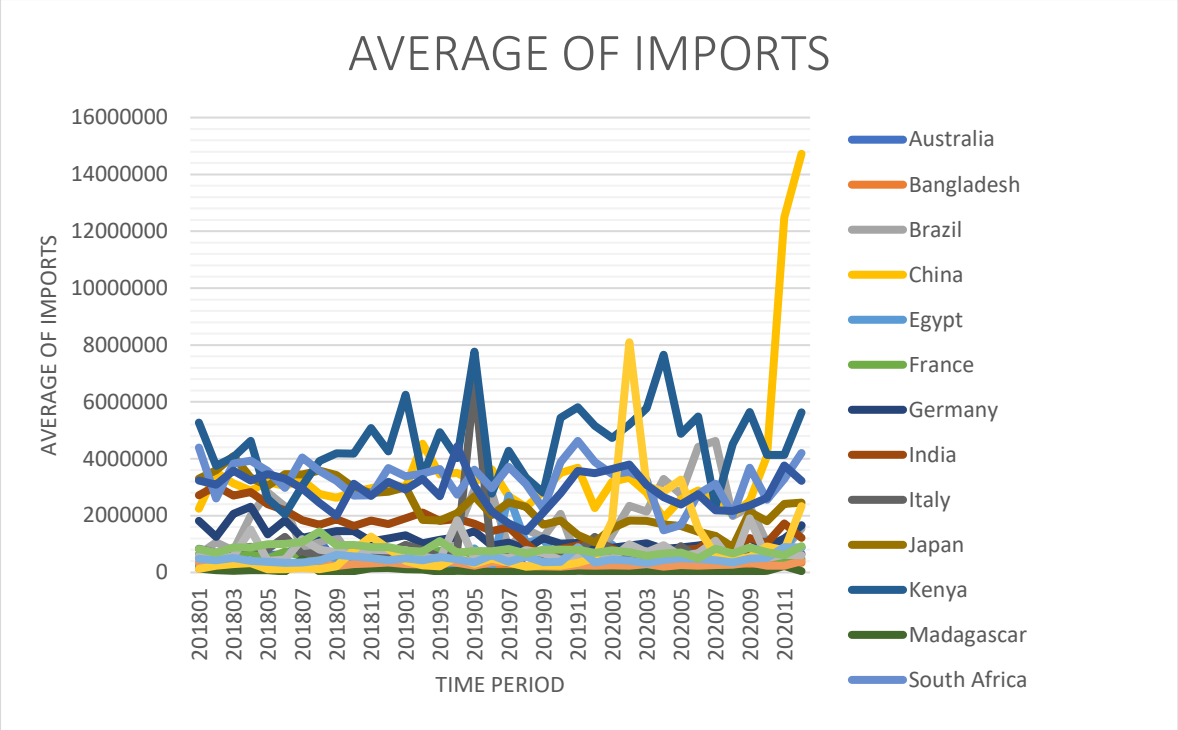


Figure 1.2 :Line trend Analysis for the Average of Imports

The average of total exports for 19 bilateral countries of Pakistan are strongly hit by COVID-19 and lockdown proxies as compared to average total imports assessing the trends with the passage of time in figure 4.1 and figure 4.2.

Chapter 5

Results

5.1 Introduction

This Chapter discusses the outcome of the results during the estimations. It is estimated by using fixed effect model. Regression is used to estimate the regression model, and results are shown in table 1. While fixed effect model is applied, and results are concluded in table 2 for total bilateral exports and bilateral imports. Further it will elaborate the categorization of products based on 99 chapters. It will also provide the explanation for categorization of products in 7 categories. It will exhibit the trend of different categories with the help of line graphs. Different regression models used in the study are also compiled in the table and explained below. Regression for total exports and total imports is shown in table 5.1.

Table 5.1: Regression Analysis

Independent Variables	**Coefficient**		**Standard Error**		**P > |z|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.3161	(omitted)	.0851	(omitted)	0.000	(omitted)
Closure of workplace	-.0553	-.0709	.0723	.0661	0.445	0.284
Event cancellation	-.0474	.1175	.0943	.0826	0.616	0.155
Transport suspension	-.3341	.0368	.0869	.0794	0.000	0.643
Stay home	.0445	-.0569	.0726	.0666	0.540	0.393
Ban on flights	-.1032	-.0520	.0418	.0361	0.014	0.151
Contract Policy	-.0628	-.0030	.0624	.0574	0.315	0.958
Death cases	-.0142	-3406	.0122	9.6844	0.244	0.000
Confirmed cases	-2.60		1.06		0.014	
Infection rate		-1595		6.7095		0.017
GDP constant	-.3035	-.1969	.2069	.3174	0.142	0.535
Distance	.5854	.455097	.5641	.74477	0.299	0.541
Real Effective Exchange rate	9.21	-.000070	4.27	.000022	0.031	0.002
5% significance level						

From table 5.1 and table 5.2, it is observed that closure of transport service, ban on international flights, death cases, and confirmed cases have a significant and negative influence on bilateral exports of Pakistan. It is interesting to note that death cases and infection rate has a significant and negative influence on bilateral imports. While other variables are negatively affecting bilateral exports and bilateral imports but insignificant manner except for lockdown proxy stay at home. Lockdown in Pakistan is significant for total exports, it shows that restrictions employed in Pakistan has negatively affected the bilateral exports. Because the increase in death and confirmed cases accelerated the spread and contact of virus which ultimately forced the regulators to shut down the manufacturing units and increased the stringent measures of lockdown. Perhaps, all these restrictions somehow affected the chain of trade in Pakistan through distortions in consumer demand and supply of products. Real effective exchange rate shows positive relationship with total bilateral exports. It means devaluation in currency can increase the exports of Pakistan. Gross domestic product, distance, and real effective exchange rate omitted due to collinearity for imports within regression. The results are also similar to the proxies of COVID-19 in paper cited (Zhang et al., 2021). The following paper also used the proxies of COVID-19 such as death cases and confirmed cases to evaluate the impact of COVID-19 on international trade for countries such as USA and China. They suggested that Death cases have direct causal relationship with exports and imports of China. Because death cases were reported at high rate in China. While death cases and confirmed cases also exhibit the direct causal relationship with total exports and imports of United States of America. Furthermore, they also assumed that the pandemic exhibits the heterogenous impacts on the total exports and total imports of China and USA.

Table 5.2: **Fixed Effect Model; Imports and Exports**

Independent variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.1467	(omitted)	.0946	(omitted)	0.122	(omitted)
Closure of workplace	-.0546	-.0713	.0726	.0661	0.452	0.282
Transport suspension	-.3338	.0370	.0872	.0795	0.000	0.641
Stay Home	.0428	-.0583	.0728	.0667	0.557	0.382
Ban on flights	-.1025	-.0512	.0420	.0362	0.015	0.158
Contract Policy	-.0649	-.0070	.0627	.0575	0.301	0.903
Death cases	-.0252	-3502	.0113	9.5980	0.026	0.000
Confirmed cases	-2.61		1.05		0.014	
Infection rate		-1577		6.6449		0.018
Real Effective Exchange rate	9.82	Omitted	4.25	Omitted	0.021	Omitted
5% significance level						

5.2 Categorization of Products

Data at aggregate level for products is used in this study. HS code for all 99 chapters is categorized into seven main categories. The categories of products are aligned in main categories such as chapters 01-16 commodities are specified in the primary food group. This group mainly consist of products such as fish, meat, wheat, vegetables, and plants. Chapters 17-24 commodities are allocated in the processed food group. The commodities falling in this group consists of vinegar, spirit, cocoa related products, and cereals. The commodities are specified in the food group mainly consists of food products. Furthermore, chapters 25-49 commodities are allotted in the manufacturing group except for chapter 30. Manufacturing group mainly consists of cement, organic chemicals, wood articles, rubber, glues, paints, essential oil, waxes, soaps, and inorganic chemicals. The chapter 30 specifically allotted in the category of pharmaceuticals. It only consists of pharmaceutic products. The commodity falling in chapters 50-64 is categorized into textile group. This group mainly consists of the products such as silk fiber, cotton, knitted fibers, rags, accessories of clothing, carpets, ropes, yarns, and

other products related to textile. The commodities ranging from chapters 65-93 are itemized in the metallic group. This group generally consists of the commodities such as pearls, precious stones, metallic bobs, jewelry, copper, iron and its articles, and musical instruments. The commodities falling in the range of chapters 94-99 are specified in the category of miscellaneous group. This group generally consists of toys, mattresses, games, and antiques.

It was important to make categories of 99 chapters to explain the impact of the proxies of COVID-19 and lockdown. It makes easy to comprehend the relationship between the product group with COVID-19 and lockdown proxies. Detail of the categorization of products is mentioned in the table 5.3.

Table 5.3: **Categorization of 99 Chapters**

Main Category	**HS 99 Chapters**
Primary food group	1-16 chapters
Processed food group	17-24 chapters
Manufacturing group	25-49 chapters except for 30 chapter
Pharmaceutical group	30 chapters
Textile group	50-64 chapters
Metallic group	65-93 chapters
Miscellaneous group	94-99 chapters
Author's categorization of products by consulting member of Ministry of Commerce	

5.3 Graphical Analysis of Products

Total value of different categories consists of different chapters are plotted in the line graph. It is notable that textile products constitute major part of total exports. Total exports of textile and metallic products decreased for the period of April2020-May2020. The graph is plotted in figure 5.1.

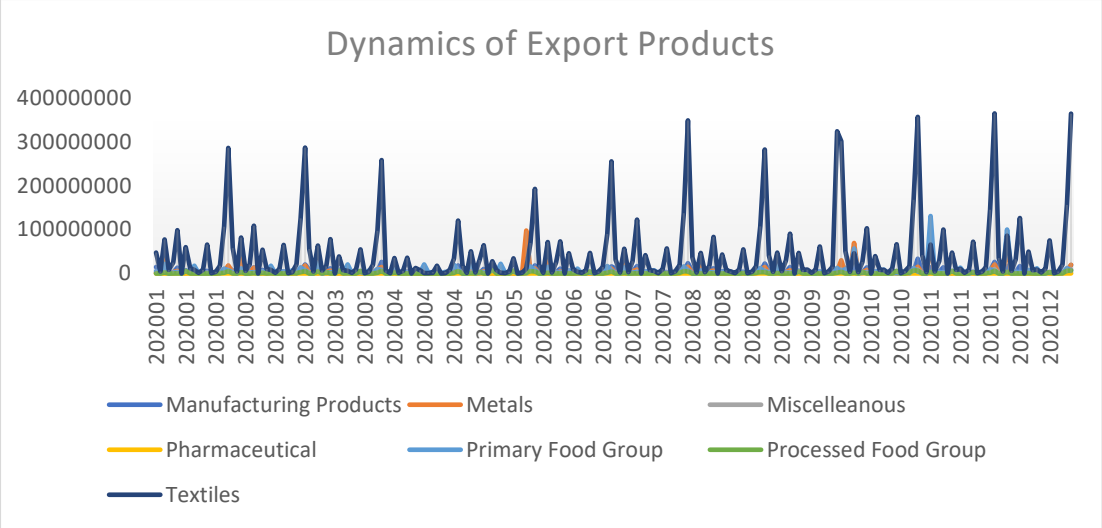


***Figure 2.1:*Graph of Export Products**

The Products that are imported to Pakistan shows minimal variation in times of COVID-19. It is noted that manufacturing group, metallic group, and textile shows minimum distortion for the period of July2020-August2020. It is clearly evident that total exports of Pakistan are more distorted as compared to the total imports. The graph is plotted in figure 5.2.

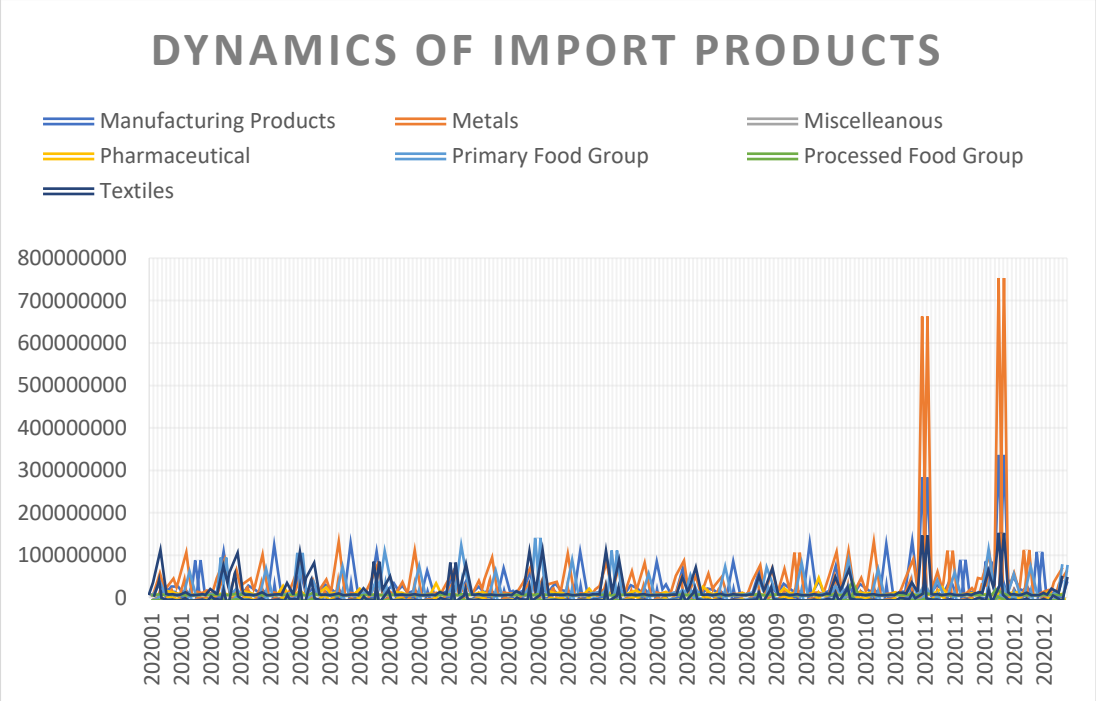


***Figure 5.2:* Graph of Import Products**

5.4 Regression Models

Total exports and total imports are estimated with fixed effect regression by using COVID-19 and lockdown proxies. Total products categorized into seven main categories are also estimated by using fixed effect within regression. Regression analysis is important for this study as it will depict the relationship of independent variables with dependent variables. The sign of coefficient of explained variable is important as it will show the relation between the variables. Regression models which are estimated in this study are given in table 5.4.

Table 1.4: **Regression Models**

Independent Variables	Estimated Fixed Effect Within Regression
Covid-19 Proxies	$log\ (Ex)_{pjt} = \beta_0 + \beta_1 log(GDP)_{pjt} + \beta_2 log(D)_{pjt} + \beta_3 CC_{pjt} + \beta_4 REER_{pjt} + \beta_5 LDP_{pjt} + \beta_6 Dc_{pjt} + \beta_7 IR_{pjt} + \mu_{pjt}$
Lockdown Proxies	$log\ (Ex)_{pjt} = \beta_0 + \beta_1 log(Pc)_{pjt} + \beta_2 log(D)_{pjt} + \beta_3 WC_{pjt} + \beta_4 REER_{pjt} + \beta_5 LDP_{pjt} + \beta_6 CD_{pjt} + \beta_7 CT_{pjt} + \beta_8 IF_{pjt} + \beta_9 SH_{pjt} + \beta_{10}\ TP_{pjt} + \beta_{11}\ AF_{pjt} + \mu_{pjt}$
Covid-19 Proxies	$log\ (Imp)_{pjt} = \beta_0 + \beta_1 log(GDP)_{pjt} + \beta_2 log(D)_{pjt} + \beta_3 CC_{pjt} + \beta_4 REER_{pjt} + \beta_5 LDP_{pjt} + \beta_6 Dc_{pjt} + \beta_7 IR_{pjt} + \mu_{pjt}$
Lockdown Proxies	$log\ (Imp)_{pjt} = \beta_0 + \beta_1 log(Pc)_{pjt} + \beta_2 log(D)_{pjt} + \beta_3 WC_{pjt} + \beta_4 REER_{pjt} + \beta_5 LDP_{pjt} + \beta_6 CD_{pjt} + \beta_7 CT_{pjt} + \beta_8 IF_{pjt} + \beta_9 SH_{pjt} + \beta_{10}\ TP_{pjt} + \beta_{11}\ AF_{pjt} + \mu_{pjt}$
Covid-19 and Lockdown Proxies	$ln(TP)_{pjt} = \beta_0 + \beta_1 log(Pc)_{pjt} + \beta_2 log(D)_{pjt} + \beta_3 WC_{pjt} + \beta_4 REER_{pjt} + \beta_5 LDP_{pjt} + \beta_6 CD_{pjt} + \beta_7 CT_{pjt} + \beta_8 IF_{pjt} + \beta_9 SH_{pjt} + \beta_{10}\ TP_{pjt} + \beta_{11}\ X_{pjt} + \beta_{12} CC_{pjt} + \beta_{13} DC_{pjt} + \beta_{14} IR_{pjt} + \mu_{pjt}$

5.5 Product Estimation

HS code 2-digits based all 99 chapters (at aggregated level) are categorized into seven main categories. They are as following; 1. Manufacturing Group 2. Metals group 3. Miscellaneous group 4. Primary food group 5. Processed food group 6. Pharmaceutical group 7. Textile group

The estimation for manufacturing group is illustrated in table 5.5 by using fixed effect within regression.

***Table 5.5:*Manufacturing Group, Fixed Effect Model**

Independent Variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.1491	-.2295	.1240	.1230	0.230	0.063
Death cases	-.0502	-.0295	.0145	.0196	0.001	0.133
Transport suspension	-.1348	-.2516	.1219	.0774	0.269	0.001
Stay home	-.0072	-.0407	.1044	.0983	0.945	0.679
5% significance level						

From table 5.5, we can illustrate that death cases have a significant and negative influence on the bilateral exports comprised of manufacturing products in Pakistan. The manufacturing products imported to Pakistan is negatively and significantly related to the suspension of transport. The manufacturing group exported from Pakistan is insignificant, while it is significant for bilateral imports. The manufacturing group includes machinery and capital which is primarily imported to Pakistan. This could be the reason that the restrictions implied in Pakistan has not distorted the supply of manufacturing goods. The other reason can be that the foreign countries had restricted the trade of manufacturing goods with Pakistan for the specific time to avoid the transfusion of pandemic. It means that the imports comprised of manufacturing products to Pakistan is affected with lockdown restrictions of bilateral countries. The results are according to the prepositions made by (Saif et al., 2021). They explained theoretically COVID-19 as an international trade shock. They assumed that the pandemic had

severely affected the export and import orders. Additionally, it also propagated the crisis of pandemic for trade partners. They provided the extensive study of gravity model and emphasize the importance of distance, COVID-19 proxies, and transportation costs as factors of COVID-19. These variables are also used in this research.

Table 5.6: **Metal Group, Fixed Effect Model**

Independent Variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.4137	-.2259	.1208	.1774	0.001	0.203
Death cases	-.0363		.0140		0.010	
Confirmed cases		-.0386		.0151		0.011
Infection rate	-.0205	.0081	.0096	.0155	0.032	0.602
Ban on flights	-.1119	-.2641	.0592	.0892	0.059	0.003
Stay home	-.1090	-.1764	.0747	.1348	0.145	0.191
5% significance level						

From table 5.6, it is interesting to note that the variables such as death cases, infection rate, and ban on international flights have a significant and negative effect on the bilateral exports especially for metallic group. While the variables such as confirmed cases and ban on flights have a significant and negative distortion effects on the bilateral imports mainly metallic groups. The variable lockdown in Pakistan is negatively related to metallic group exported from Pakistan. The stringent measures of lockdown in Pakistan have influenced the bilateral exports of metallic group.

Table 5.7: **Miscellaneous Group, Fixed Effect Model**

Independent Variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.5230	-.8978	.1498	.2788	0.001	0.001
Death cases	-.1094		.0558		0.051	
Confirmed cases		-.1118		.0577		0.053
Stay home	-.2552		.0868		0.003	
Ban on flights		-.2491		.1267		0.050
Suspension of transport	-.1093	-.3800	.1408	.2172	0.438	0.081
5% significance level						

According to table 5.7, death cases and the requirement to stay at home have a significant and negative influence on the bilateral exports composed of miscellaneous products. Furthermore, confirmed cases and restriction on flights also have negative distortions on bilateral imports composed of miscellaneous products. Lockdown in Pakistan is significantly affecting the bilateral imports and exports of miscellaneous group of Pakistan.

Table 5.8: **Pharmaceutical Group, Fixed Effect Model**

Independent Variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.0567	-.0604	.3260	.2207	0.862	0.784
Death cases		-.0735		.0342		0.032
Confirmed cases	-.0133		.0372		0.721	
Transport suspension	-.1898	-.3058	.2109	.1497	0.369	0.042
5% significance level						

Following table 5.8, it is concluded that death cases caused due to COVID-19 and the momentum of contraction of virus follows a significant and negative impact on the imports of pharmaceutical products. While confirmed cases and suspension of transport have insignificant but a negative influence on exports of pharmaceuticals. The reason for insignificancy of confirmed cases and suspension of transport can be as the government and the health care of Pakistan had played a great role in breaking the infectious contacting of virus. There were confirmed cases of COVID-19 in Pakistan, but it does not increase at exponential rate as it happened in Italy, and USA. The striking point to observe is that the pharmaceutics imported to Pakistan is not affected with restrictions employed in Pakistan. But affected with restrictions employed by other bilateral countries. It might be the reason that the essential pharmaceutical drugs important to survive pandemic fall under high import duties. Due to which imports of pharmaceutics is affected in Pakistan. Results are similar as depicted by Liu et al. (2021) by assessing different products for China. They had used proxies of COVID-19 and proxies of

lockdown for evaluating the impact of pademic on the imports of China. They suggested that the imports of China were badly hit as the trading partners had distortion in their demand due to transmission of COVID-19. They assumed the positive relationship of death cases with respect to bilateral imports of China. Further, they also presumed that work from home also distorted the exports and imports of China. As all these proxies are used in the research to culminate the impact of COVID-19 on the bilateral trade of Pakistan and results are also significant.

Table 5.9: **Primary Food Group, Fixed Effect Model**

Independent Variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.0856	-.4479	.1153	.2011	0.045	0.026
Death cases		-.0673		.0302		0.027
Confirmed cases	-.1189		.0284		0.000	
Contract tracing		-.0037		.1089		0.972
Cancellation of events	-.0472		.1288		0.714	
Transport suspension	-.5224	-.1025	.1269	.2022	0.000	0.612
5% significance level						

From table 5.9, it is found that exports of primary food group are negatively affected with confirmed cases and contraction of virus significantly. Additionally, death cases have negative influenced on the imports of primary food product. Lockdown in Pakistan is significant and negatively related to the primary food group exported from and imported to Pakistan. It means that restrictions employed in Pakistan to fight against virus has distorted the supply of primary food products. It might be the rigorous restrictions on production units which resulted in distorting the bilateral exports of Pakistan. One of other primary reason could be that the consumer spending changed at global level. People around the world are more interested to spend their money income to purchase essential commodities and products such as sanitizers, tissues, primary food products, defense, and the essentials to fight the pandemic. with this regard, the demand for non-essential commodities and products had decreased substantially.

Table 5.10: Processed Food Group, Fixed Effect Model

Independent Variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.3470	-.2068	.1931	.1691	0.073	0.222
Death cases		-.0568		.0165		0.001
Confirmed cases	-.1432		.0582		0.014	
Stay home	-.2556	-.2598	.1442	.1148	0.077	0.024
Ban on flights		-.0947		.0714		0.185
Testing Policy	-.2364		.1262		0.062	
5% significance level						

From table 5.10, it is evidently explained that the exports of processed food group are hit by confirmed cases of pandemic, requirement to stay at home, and screening test of COVID-19. Processed food group imported to Pakistan is significantly and negatively related to death cases of COVID-19 and stay at home. The variable of lockdown shows that processed food group is also affected with measures employed in Pakistan. It means that the restriction employed in Pakistan had restricted the bilateral exports of processed food group of Pakistan. It can be because of the changes in consumer spending of people at global level, as generally people were more worried about the essential goods such as sanitizers, gloves, tissue papers, masks, immunity boosting commodities, PPEs to survive pandemic.

Table 2 : Textile Group, Fixed Effect Model

Independent Variables	**Coefficient**		**Standard Error**		**P > |t|**	
	Exports	Imports	Exports	Imports	Exports	Imports
Lockdown in Pakistan	-.3898	-.1256	.1386	.2703	0.005	0.642
Infection rate	-.0018	-.0213	.0114	.0225	0.871	0.343
Ban on flights	-.0953	-.1077	.0599	.1255	0.113	0.391
Transport suspension		-.1186		.1914		0.535
Closure of workplace	-.2407		.0973		0.014	
5% significance level						

According to table 5.11, the exports of textile group is negatively hit by infection rate of pandemic and constriction of job area. The imports of textile products are also hit by infection rate, ban on flights, and constrictions on transport. The measures employed in Pakistan has affected the exports of textiles. It might be the reason that the manufacturing units of textile in

Pakistan faced the rigorous restrictions. And due to which the cost of doing business is increased while return for exports decreased. In this perspective, the exports of Pakistan can be affected with COVID-19.

CHAPTER 6

ANALYSIS OF TRADE POLICY AND CONCLUSION

6.1 Introduction

This chapter will explain the trade policies review. It will also illustrate the real issues that play a pivotal role in stagnant exports and acted as sparkle to worsen the trade in times of COVID-19. It will also explain the framework of institutions and its general issues. It also contains the qualitative analysis which include interviews from two different institutions that are National Tariff Commission of Pakistan and Ministry of Commerce. Further It will explain the issues that are demonstrated by interviewees. The last section is based on conclusion and recommendations.

6.2 Trade Policy Regulation and Institution

The head of federal government of Pakistan approves the trade policy of Pakistan. The head of federal government is called Prime Minister. National assembly is the lower house of parliament which selects the prime minister. After the approval of trade policy by prime minister, it is presented to cabinet for its approval. The announcement of trade policy is envisioned by Ministry of Trade Commerce. For vital purpose, Ministry of Commerce and Central Board of Revenue and Customs wave their responsibility as implementors of the trade policy. There are other subsidiary institutions such as State bank of Pakistan, Ministry of Finance, Ministry of Economic Affairs which regulate the trade practicing powers in Pakistan. The ultimate body for making of economic policy; is the National Economic Council. The head of this supreme body is prime minister. The plans related economically and socially are governed by NEC. Furthermore, for assurance of coordination of the economic policies 'The Economic Coordination Committee' of the Cabinet is working for acknowledgment of the policies issued by government agencies. It is headed by federal minister of Finance. For

regulation of tariff and import duties, National Tariff Commission is pioneered to work on it. Chambers of Commerce and Industry and Regional Chambers Associations is working to smooth the trade related matters and also as interconnector for the private investors.

6.3 General Issues related to Exports and Imports of Pakistan

6.3.1 Export Products are Concentrated

The core problem of trade deficit is the structural issue. The trade related institutions and domestic firms have low competitiveness. Low competitiveness translated into less value addition of commodities and products. The global market is highly technical in terms of trade. Products and commodities are highly concentrated in one dimension and with least product diversification. The situation of trade competitiveness can be explained with respect to Bangladesh. Bangladesh astonishingly involved accounting for 84% of total exports in the ready-made garments industry. By 2019, this industry has grown at compound rate of 7% with $33.12 billion of exports. Comparatively, Pakistan is a mere part of this industry accounting for $2.5 billion for RMG exports for the span of July-April 2021. It is dire need of today to reduce the dependency on foreign countries and to work on domestic trade markets to fight pandemic.

6.3.2 Minimal Product Diversification

The other problems of trade industry of Pakistan are the weak facilitation of the services and the least range of products. Pakistan's exports are more concentrated on agricultural products, on the other hand other products are least fraction of total exports. Resultantly, textile products and related products are the major part comprises of 56.24% of total exports for the span of 2020. Furthermore, other products such as jewelry, pharmaceuticals, chemicals, and machinery accounts for the least share in the domestic and international trade market. It's evident that trade sector of Pakistan endeavoring the minimal products diversification. With passage of

time, the sophistication of products reached at its utmost level, projecting, and demanding high valued exports. A prime focus on technology upgradation and product sophistication is a dire need for acceleration in exports of Pakistan.

6.3.3 Cost of Doing Business is High

Trade policies playing a trivial role in accelerating the cost of doing business in Pakistan. The tariff prolonged on products remained high. Additionally, the exporters of Pakistan heavily rely on the raw material and capital imported from other major trading partners. The imposition of high tariffs and restrictions undermine the export capacity of domestic firms and investors. The tax rate imposed on corporate sector is 29-30% incubating the 17% tax rate as general sales tax. This embarkation of taxes raised the cost of doing business in Pakistan. All these instances translated into ineffectiveness of products with low competitiveness losing its share in international trade and exacerbate the capacity of domestic firms in manufacturing of sophisticated products and appliances. This ineffectiveness exaggerated the worsening of trade in times of pandemic. To tackle the situation, Rs 1.3 trillion were injected in the market by the government authority of Pakistan.

6.3.4 Major Dependence on Imports

The accelerating trend of imports in Pakistan is the major issue for the trade deficit. The inelastic imports characterize petroleum products, raw materials, transport group, and capital. Furthermore, certain factors spirally increase the dimension of imports in Pakistan such as least product sophistication, high dependence on raw material and capital from USA and China to produce the finished goods, low competitiveness of domestic firms and production units, concentration of certain traditional products such as agriculture and textile, and minimal upgradation of technology simultaneously with low quality of research and development. All these factors accompany in haphazard trends in trade sector of Pakistan comprising ineffective outcomes. As reported by Ministry of Commerce in the report of National Tariff Policy 2019-

2024; On one hand, the share of Pakistan in international trade market decelerated with 19%. On other hand, 216% of the share in international trade has increased for the neighboring countries of Pakistan such as China, India, Afghanistan, and Iran.

6.3.5 Issue of High Import Tariffs

As reported in NTC 2019-2024 explaining the tariff trend globally. The tariff trend decreases at global level to encourage exports for some products. But import Tariff increases with 11% as compared to other economies. The principle of cascading is not used effectively. Additionally, the NTC report evidently explains that high taxes are levied on imports. On one hand, other countries such as India constitutes 12.81% and China constitutes 3.91% of revenue from Tariffs. On the other hand, Pakistan constitutes tax revenue from import tariffs by 48.1%. The motive of revenue collection from the aspect of tariffs distorted the sophistication of products and adversely affected the competitiveness of export-oriented institutions. An article in [4]Dawn empirically explains that a product known as jute fiber where 3 pc of import duties was withdrawn by the government that resulted in increase of export value by $7.82 million and also accelerated the import value by $50.2 million for the span of 2020-2021. Similarly. this empirical analysis develops the inverse relationship between the exports and import tariffs.

6.4 Strategic Trade Policy Framework 2015-2018

The government regulatory authority strategizes to tackle the structural and core issues related to trade sector of Pakistan in order to cope with the challenges. The Strategic trade policy framework 2015-2018, focuses on the effective measures to transform the traditional trade strategies into innovative and effective driven strategies. The prime focus is shifted on consistent policies and practices. The practices include the product diversification, product sophistication to excel the competitiveness of global trade market, institutional strengthening

[4] https://www.dawn.com/news/1628177

along with documentation, trade relating measures to decrease the cost of doing business, market expansion in order to explore different markets such as 'Look Africa Policy' to explore Africa markets. The domain of trade market relies on 61% of textile sector, on the other hand 39% comprises of another non-textile sector. Ministry of commerce interrogating by interfering with product policy diversification to boost the revenue sales by capturing the share of global value chain.

6.5 Proposed Draft of Strategic Trade Policy Framework 2020-2025

The proposed draft of strategic trade policy framework 2020-2025 by Ministry of commerce to withstand the challenges in trade institutions. The grinding elements include the paradigm shift focus on value added commodities to boost the market access of Pakistan. Certain basket of products such as engineering goods, pharmaceuticals, jewelry, surgical instruments, fruits and vegetables, chemicals and appliances are on the target list. Furthermore, the repeal of practices of tariff imposition on imports especially raw materials and capital are essential in manufacturing of finished goods. Additionally, to boost the exports, taxes and duties are not levied on exporters. These all measures can revive the market share of Pakistan by affirming the strategic practices to boost the export shares in global market. Increase in research and development will be ultimately translated into innovative driven products. Technology upgradation simultaneously with human capital demonstrates the productive share in the value addition following the pursuit of global value addition.

6.5.1 Comparative Analysis of SPTF 2015-2018 And SPTF 2020-2025

On one hand, the SPTF 2015-2018 accounts for 3 years only. On the other hand, the SPTF report 2020-2025 is for 5 years. The priority sectors are identified, as interviewee of Minister of Commerce exclaimed those 18 priority sectors are explored, dimensions and interventions are proposed which are acclaimed as future export-oriented exporters such as pharmaceuticals,

engineering goods, chemicals, electronic devices, and home appliances. The current report is more focused and depended upon the requirements of exporters.

6.6 Viewpoints of Esteemed Interviewees

Qualitative interviews were conducted with different members of Ministry of Commerce, Federal Board of Revenue, and National Tariff commission for outlining the importance of trade policies in different aspects and they are as; 1. The impact of SPTF 2020-2025 on exports and imports 2. The dimension of products that can be changed by action plans strategize in SPTF 2020-2025 3. Problem's identification in stagnancy of exports 4. Institutional framework and responsibilities to facilitate the trade 5. The impact of import tariffs on exports and imports 6. The criteria that are used is tariff reduction 7. Prospects of import tariff reduction 8. Comments on overall total trade in Pakistan.

- One of the interviewees stated that current SPTF 2020-2025 is more focused and practical. The report consists of action matrices following the timeline and distribution of tasks between the organization. The action matrices specify the categories for the purpose of product diversification, integration of global chain, and market access by assessing the responsibilities in different institutions. After determining 18 priority sectors, the plans and strategies are distributed among all institutions to smooth the process of implantation and achieve the fruitful outcomes. He exclaimed that, the effectiveness of all institutions working together for one motive that is to boost the exports which is the dire need of today and also to tackle the aftermaths of COVID-19.
- The other interviewee focused on the issues that are related to the stagnancy of exports. The main issue identified in trade policy are as following; 1. Ineffective exchange rate used in history 2. High import tariffs which are imposed for the purpose of revenue collection 3. Issue of policy fragmentation 4. Need for the economic specialist manager who can minimize the effects of external shocks such as COVID-19 5. Institutions are

not holding their responsibilities and corruption in institutions which is diverting the goals and targets.

- The interviewee commented that non-traditional markets such as Latin America, and Africa are explored in SPTF 2020-2025 which is important at times of pandemic. Besides, all the interventions in terms of trade policy. The essential requirement that is made by private investors by interviewing with 35-36 industrialists and investors are 1. the demand for subsidized credits and loans to support small and medium enterprises 2. Lower the input cost of raw material and machinery 3. Requirement of skilled labor and training institutes 4. Requirement of subsidized energy cost 5. An access to international trade market 6. Drawbacks of political environment inconsistency.

6.7 General structure of National Tariff Commission

There are two parts of tariff policy, one is admirative part and other is technical part. The technical part is governed by National Tariff Commission. The technical wing is based in NTC, while the meetings are held in Ministry of Commerce under Tariff Policy Board. Under the Business rule, tariff policy is under NTC. But it remained under the control of Federal Board of Revenue. Moreover, in 2019 the powers were retained and returned to NTC related to rationalization of tariffs instead of FBR. Due to distorted powers of tariffs under FBR with motive of revenue collection discouraged the trade facilitation. In the span of 2000, National Tariff Commission also became a regulator of three laws of trade defense instruments which are stated as; 1. Anti-dumping laws 2. Countervailing and subsidizing measures 3. Safeguard measures related to investigation in acceleration of imports.

- The interviewee also illustrates that; On one side, for [5]1638 tariff lines, the custom duty reduced to zero rate. On the other side, 1600 tariff lines reduced 3%, 2%, and 0% as

[5] https://download1.fbr.gov.pk/Docs/2021711172433265FirstScheduleofFA(TariffChanges).pdf
The report is available at the website of FBR under customs section.

compared to 5% in previous year for the products such as raw material, semi-finished goods, and machinery goods. The criteria for the decision of import tariffs on raw material has followed the pursuit whether the products and raw materials are produced locally or not. If not, those raw materials are allocated absolute zero import tariffs exempted of custom duty, additional custom duty, and regulatory duty. As in Pakistan, the raw material and machinery imported from foreign countries is used to manufacture the finished goods which are then exported to other countries and used domestically. The import tariffs are also reduced for industrial products such as steel, chemical, iron, pharmaceuticals, home appliances, textile, and engineering goods. For example, cooling towers are manufactured in Pakistan, the reduction in raw material for this engineering good might accelerate the exports. The other example is the allocation of zero import tariffs to testing equipment's, plants, and machinery, and 360 Active Pharmaceutical Ingredients and will reduce the cost of business for pharmaceutical to promote the export of pharmaceuticals. After the reduction of import tariff lines, these products can align and contribute to value addition in global markets. All these actions are taken irrespective of government revenue loss which can be ultimately compensated by revenue sales of exports. The purpose of reduction of Import tariff is to facilitate the trade and diversification of products in international trade market. The authority of Pakistan introduced the package of Rs 1.30 trillion to balance and revive the economic activity, to monetize the layoffs, rationalized the tariffs and taxes to support the exporters and importers.

6.8 Conclusion and Recommendations

This study uses the panel data to evaluate the effects of COVID-19 and lockdown proxies on bilateral trade of Pakistan for the span of 2018-2020. The lockdown variable was the direct precaution that was imposed by the regulators to counter the obliterate virus. So, this research

uses a technique known as fixed effect model. The logic behind using this technique is to control the unobserved heterogeneity across countries. Firstly, regression analysis is used to predict the relationship between the variables. Fixed effect model is also used simultaneously for finding the relationship of Covid-19 and lockdown on total products, total exports, and total imports. The equations used in this paper are aligned with methodology of General Gravity Model. Zhongxiu and Shahzad (2020) has also used the General Gravity Methodology to estimate bilateral trade of Pakistan.

Total exports are negatively related with death cases and confirmed cases of COVID-19. Ultimately, the total bilateral exports of Pakistan also got distorted by restrictions such as suspension of transport and ban on flights. The study portrays those total imports are also negatively related to death cases and infection rate of the virus. While the lockdown proxies have insignificant effect on total bilateral imports of Pakistan. One of the interesting aspects of this research is that the dummy variable specifically used to illustrate and capture the lockdown situation in Pakistan which depicts those total exports of Pakistan are hit by pandemic as compared to bilateral imports. Previous studies have also suggested the use of the lockdown and COVID-19 proxies to examine the economic influences of international trade of different countries during the outbreak of the pandemic. They also concluded the relationship of exports and imports by designing the proxies of COVID-19 and lockdown (Lashitew & Socrates, 2021).

HS code based all 99 chapters at aggregated level are synchronized into seven main categories for estimation of fixed effect model. The products in the category of exports such as manufacturing group, metallic products, miscellaneous group products, and pharmaceutical product shows negative relation with death cases. While, the exports of primary food group, and processed food group are negatively influenced by the confirmed cases of COVID-19. One of the exciting aspects of exported category of textile products is that it is not significantly

affected by COVID-19 proxies. Such proxies of COVID-19 are also used in the research paper by (Topcu & Gulal, 2020).

The Lockdown measure such as suspension of flights shows negative relationship on the bilateral exports comprising metallic products. While the exports of miscellaneous group and textile group is negatively affected by lockdown measures such staying home and closure of job area. The suspension of public transport has negative association with primary food group, whereas processed food group is negatively affected from the screening tests of COVID-19. The lockdown in Pakistan also significantly affecting the exports of textiles. All these restrictions cumulatively restricted the bilateral products exported from Pakistan except manufacturing and pharmaceutical products unit. These proxies of lockdown are also used in the paper by (Szabo et al., 2021).

The imports of Pakistan such as metallic group and miscellaneous group are negatively influenced by confirmed cases. Whereas the imports of primary food group and processed food group negatively relate to death cases caused by pandemic. It is noteworthy to observe that the COVD-19 proxies have insignificant impact on bilateral imports of Pakistan composed of manufacturing group, pharmaceuticals, and textile. Additionally, the manufacturing products and pharmaceutics imported to Pakistan are negatively affected by restrictions such as contraction of virus. While other products such as metallic group and miscellaneous group imported to Pakistan are negatively influenced by ban on international flights. It is striking that lockdown proxies do not have significant influence on the imports of Pakistan for primary food group and textile. The outbreak situation of COVID-19 at global level induces regulators to promote strict arduous measures of lockdown. All these measures affected the bilateral products of Pakistan either in exports or the imports. All these lockdown measures with appropriate proxies used here are employed by other research papers such as (Stokes et al., 2020). The intensity of lockdown on the trade of products depends upon the outbreak of

pandemic. The products that are exported from Pakistan are concentrated in few dimensions of traditional products. It's evident that trade sector of Pakistan endeavoring the minimal products diversification. With passage of time, the sophistication of products reached at its utmost level, projecting, and demanding high valued exports. A prime focus on technology upgradation and product sophistication is a dire need for acceleration in exports of Pakistan. Coronavirus pandemic is relied upon to prompt major underlying changes in the worldwide economy with a change in global exchange. Developing countries like Pakistan are expected to revitalize production of certain goods deemed essential to reduce dependence on foreign suppliers. Trade impacts depend on trade policy environment. External shock such as viral diseases can attack economy at any with passage of time. The economy should be moulded in a way that can absorb the impulse effects of external shocks in order to minimize its negative effects. Production sectors, consumer sectors, and government authority should prepare themselves in a way to combat the expected external shocks. E-commerce and digital trade system must be operated and practiced in developing countries like Pakistan to boost the retail sector in terms of supply and demand. The procurement regulatory authorities should also focus on e-procurement in order to smooth the transactions of goods and services in public institutions. The products that must be a part of export in Pakistan are vulnerable. The products are highly concentrated traditional products with sluggish growth. Improved market strategies, effective competitive strengths, restructuring of products, improvising economic and political environment can increase export growth in future.

Appendix

Table 7.1: **Detail of all 2-digits HS 99 commodities**

1	Live animals
2	Meat and edible meat offal
3	Fish and crustaceans, mollusks, and other aquatic invertebrates
4	Dairy produce; birds' eggs; natural honey; edible products of animal origin, not elsewhere specified or included
5	Products of animal origin, not elsewhere specified or included.
6	Live trees and other plants; bulbs, roots, and the like; cut flowers and ornamental foliage
7	Edible vegetables and certain roots and tubers
8	Edible fruit and nuts; peel of citrus fruit or melons.
9	Coffee, tea, mate, and spices
10	Cereals
11	Products of the milling industry; malt; starches; inulin; wheat gluten
12	Oil seeds and oleaginous fruit; miscellaneous grains, seeds, and fruit; industrial or medicinal plants, straw, and fodder.
13	Lac; gums, resins and other vegetable saps and extracts
14	Vegetable plaiting materials: vegetable products not elsewhere specified or included
15	Animal or vegetable fats and oils and their cleavage products; prepared edible fats; animal or vegetable waxes.
16	Preparations of meat, of fish or of crustaceans, mollusks, or other aquatic invertebrates
17	Sugars and sugar confectionery
18	Cocoa and cocoa preparations
19	Preparations of cereals, flour, starch, or milk; pastrycooks' products
20	Preparations of vegetables, fruit, nuts, or other parts of plants
21	Miscellaneous edible preparations
22	Beverages, spirits, and vinegar
23	Residues and waste from the food industries; prepared animal fodder
24	Tobacco and manufactured tobacco substitutes
25	Salt; Sulphur, earths, and stone; plastering materials, lime, and cement
26	Ores, slag, and ash

27	Mineral fuels, mineral oils, and products of their distillation; bituminous substances; mineral waxes
28	Inorganic chemicals; organic or inorganic compounds of precious metals, of rare-earth metals, of radioactive elements or of isotopes
29	Organic chemicals
30	Pharmaceutical products
31	Fertilizers
32	Tanning or dyeing extracts; tannins and their derivatives; dyes, pigments and other coloring matter, paints, and varnishes; putty and other mastics; inks
33	Essential oils and resinoids; perfumery, cosmetic or toilet preparations
34	Soap, organic surface-active agents, washing preparations, lubricating. preparations, artificial waxes, prepared waxes, polishing or scouring preparations, candles, and similar articles, modelling pastes, "dental waxes" and dental preparations with a basis of plaster
35	Albuminoidal substances; modified starches; glues; enzymes
36	Explosives; pyrotechnic products; matches; pyrophoric alloys; certain combustible preparations
37	Photographic or cinematographic goods
38	Miscellaneous chemical products
39	Plastics and articles thereof
40	Rubber and articles thereof
41	Raw hides and skins (other than fur skins) and leather
42	Articles of leather; saddlery and harness; travel goods, handbags, and similar container; articles of animal gut (other than silk-worm gut)
43	Fur skins and artificial fur; manufactures thereof
44	Wood and articles of wood; wood charcoal
45	Cork and articles of cork
46	Manufactures of straw, of esparto or of other plaiting materials; basket ware and wickerwork
47	Pulp of wood or of other fibrous cellulosic material; recovered (waste and scrap) paper or paperboard
48	Paper and paperboard; articles of paper pulp, of paper or of paperboard

49	Printed books, newspapers, pictures, and other products of the printing industry; manuscripts, typescripts, and plans
50	Silk
51	Wool, fine, or coarse animal hair; horsehair yarn and woven fabrics
52	Cotton
53	Other vegetable textile fibers; paper yarn and woven fabrics of paper yarn
54	Man-made filaments; strip and the like of man-made textile materials
55	Man-made staple fibers
56	Wadding, felt and non-woven; special yarns; twine, cordage, ropes and cables and articles thereof
57	Carpets and other textile floor coverings
58	Special woven fabrics; tufted textile fabrics; lace; tapestries, trimmings. Embroidery
59	Impregnated, coated, covered, or laminated textile fabrics, textile articles of a kind suitable for industrial use
60	Knitted or crocheted fabrics
61	Articles of apparel and clothing accessories, knitted or crocheted
62	Articles of apparel and clothing accessories, not knitted or crocheted
63	Other made-up textile articles; sets; worn clothing and worn textile articles; rags
64	Footwear, gaiters, and the like; parts of such articles
65	Headgear and parts thereof
66	Umbrellas, sun umbrellas, walking-sticks, seat-sticks, whips, riding-crops, and parts thereof
67	Prepared feathers and down and articles made of feathers or of down, artificial flowers; articles of human hair
68	Articles of stone, plaster, cement, asbestos, mica, or similar materials
69	Ceramic products
70	Glass and glassware
71	Natural or cultured pearls, precious or semi-precious stones, precious metals, metal clad with precious metal and articles thereof; imitation jewelry; coin
72	Iron and steel
73	Articles of iron or steel
74	Copper and articles thereof

75	Nickel and articles thereof
76	Aluminum and articles thereof
78	Lead and articles thereof
79	Zinc and articles thereof
80	Tin and articles thereof
81	Other base metals; cermet's; articles thereof
82	Tools, implements, cutlery, spoons, and forks, of base metal; parts thereof of base metal
83	Miscellaneous articles of base meta
84	Nuclear reactors, boilers, machinery, and mechanical appliances; parts thereof
85	Electrical machinery and equipment and parts thereof; sound recorders and reproducers, television image and sound recorders and reproducers, and parts and accessories of such articles
86	Railway or tramway locomotives, rolling stock and parts thereof; railway or tramway track fixtures and fittings and parts thereof; mechanical (including electro-mechanical) traffic signaling equipment of all kinds
87	Vehicles other than railway or tramway rolling stock, and parts and accessories thereof
88	Aircraft, spacecraft, and parts thereof
89	Ships, boats, and floating structures
90	Optical, photographic, cinematographic, measuring, checking, precision, medical or surgical instruments and apparatus; parts and accessories thereof
91	Clocks and watches and parts thereof
92	Musical instruments; parts and accessories of such articles
93	Arms and ammunition; parts and accessories thereof
94	Furniture: bedding, mattresses, mattress supports, cushions and similar stuffed furnishings; lamps and lighting-fittings, not elsewhere specified or included illuminated signs, illuminated nameplates and the like; prefabricated buildings
95	Toys, games, and sports requisites; parts and accessories thereof
96	Miscellaneous manufactured articles
97	Works of art, collectors' pieces, and antiques
98	Services (Federal Excise rates)
99	Special classification provisions

Table 7.2: **Detail of the Facts and figures of the products**

COVID-19 shock on bilateral products for the period of July-September FY20		
Fruits	Contracted	12.45%,
Rice	Contracted	12.58%
Exports of spices	Contracted	1.63%
Vegetables	Contracted	5.92%,
fish and fish products	Contracted	9.72%
Tobacco	Contracted	9.8%
meat products	Contracted	6.35%,
COVID-19 shock on the exports of bilateral products for the period of April-May 2020		
Textile	Decreased	-8%,
chemicals and pharmaceuticals	Decreased	-30.50%,
Leather	Decreased	-2.83%
Food	Decreased	-12.23%
Footwear	Decreased	-12.11%
carpets and rugs	Decreased	2.59%.
surgical and medical goods	Increased	25.24%
sports goods	Increased	5.21%
engineering goods	Increased	25.35%
COVID-19 shock on the imports of bilateral products for the period of April-May 2020		
Fruits	Increased	4.53%
Transport	Increased	18.54%,
Petroleum	Increased	11.25%
metal groups	Increased	13.58%
Machinery	Decreased	-24.88%,
Agriculture	Decreased	-5.59%,
Textile	Decreased	-20.04%

Source: [6]World Trade Organization report and [7]Dawn news

[6] https://www.un.org/ldcportal/covid19-and-the-ldcs/

[7] https://www.dawn.com/news/1562963

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