EXPORT-LED OR IMPORT SUBSTITUTION: A POLICY MIX SOLUTION TO GROWTH

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CERTIFICATE

This is to certify that this thesis entitled: **"Export-Led or Import Substitution: A Policy Mix Solution to Growth"**. submitted by **Ms. Umaima Khan** 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 Econometrics.

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Author's Declaration

I Ms. Umaima Khan hereby state that my MPhil thesis titled '**Export-led or Import Substitution: A Policy Mix Solution to Growth**' is my work and has not been submitted previously by me for taking any degree from the Pakistan Institute of Development Economics or anywhere else in the country/world.

If my statement is found to be incorrect at any time or even after my Graduation, the university has the right to withdraw my MPhil Degree.

Signature of Student

Umaima Khan

ACKNOWLEDGMENT

First and foremost, I express my sincere gratitude to Allah Almighty, the most compassionate and merciful, for bestowing upon me the ability to accomplish this task. Without His blessings, this achievement would have been beyond reach.

Secondly, I want to express my gratitude to my thesis supervisor, **Dr. Saud Ahmed Khan** from PIDE for guiding and encouraging me throughout this research. Their support and helpful feedback are crucial to my success, and I appreciate their expertise and guidance.

I also want to express my heartfelt appreciation to my family and friends for providing me with continuous encouragement throughout the process of research and writing this thesis. I hereby acknowledge the contribution of all the honorable teachers whom I happened to learn throughout my academic career. This accomplishment would not have been possible without them.

Thank you all for your support.

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LIST OF ABBREVIATIONS

Abbreviations	Full form
IS	Import Substitution
ELG	Export-led Growth
SIS	Step Indicator Saturation
IIS	Impulse Indicator Simulation
GDP	Gross Domestic Product
X	Exports of goods and services
MX	Merchandise Exports
EB	External Balance
EACI	Export as a capacity to Import
I	Imports of goods and Services
IND	Industrialization
TLS	Taxes less subsidies
INF	Inflation
ODA	Official development assistance
ER	Exchange rate
TRA	Tariff rate for all products
ARMA	Auto-regressive moving average
ARIMA	Auto-regressive integrated moving average
WDI	World bank indicator
WTO	World Trade organization
SE	Standard error
ACF	Autocorrelation function
PACF	Partial autocorrelation function
MAPE	Mean absolute percentage error
ADF	Augmented Dicky filler
KPSS	Kwiatkowski-Phillips-Schmidt-Shin

ABSTRACT

This study examines the importance of two approaches to development i.e. import substitution policy and export-led growth strategy. IS policy suggests the restriction on imports, while ELG strategy suggests increasing and diversifying exports. Twelve different variables from both approaches are taken for the time period of 1981 to 2022. The study aims to find the role of both policies in the development of Pakistan. The purpose of this study is to predict GDP for the next five years based on variable from long run static equations by taking IIS for each variable. It employs the theoretical ARDL model and creates a Generalized Restricted model (GUM) including the first lag of both the dependent and independent variable obtained by the ACF and PACF function of the residual of the static equation. ARDL model with auto metrics technique is used to get a restricted model of significant variables. For prediction, long-run static equation variables are projected for next five years using ARMA modelling. These prediction values of variables are combined with the coefficients of long run static equation to get GDP equation. The result shows none of the policies can be used in isolation while ignoring the other, suggesting a policy mix solution. The exports need to be value-added to contribute to development and imports of consumer goods should be restricted. GDP prediction based on industrialization, taxes less subsidies, exports, official development assistance, and tariff rate shows a positive increase till 2027 after a sudden decrease in 2023. Pakistan needs to work on its export side making more value-added and innovative goods while not restricting the imports of raw material and intermediate goods.

Keywords: Policy mix, Import substitution, Export-led growth, Tariff rate.

CHAPTER

1. INTRODUCTION

The trade deficit has become a major issue in most developing countries and is the prime target of many countries, that are working on developing their economy. One of the two approaches that are used to achieve the goal is an export-growth strategy and import substitution policy. When the growth of an economy is to be achieved, it is suggested to improve exports, which will increase goods and services production, it is called export-led growth (ELG) (Panas & Vamvouka, 2002).

Export-led growth is an economic strategy where a country focuses on increasing its exports as a primary means to achieve economic growth and development. Countries identify their comparative advantages, such as low labor costs, abundant natural resources, or technological expertise, and specialize in producing goods and services that capitalize on these advantages. Governments often play a significant role in promoting exports by providing incentives such as tax breaks, subsidies, infrastructure development, and streamlined regulations for exporters. Negotiating trade agreements and reducing barriers to international trade, such as tariffs and quotas, is crucial for export-led growth. Exchange rate policies can influence export competitiveness by affecting the relative prices of goods in international markets. Governments may pursue exchange rate management strategies, such as maintaining a competitive exchange rate or intervening in currency markets, to support export-led growth.

Import substitution (IS) occurs when the identical domestic good is replaced by the foreign supply of this particular identical good in the desire to structure domestic market production. The policy implements import substitution by the varying mix of tariff rates, quota restrictions, overvalued exchange rates, and exchange controls (Ahmad J. , 1978). IS policy was implemented in the 1950s to 1970s after which the ELG strategy gained importance in the world (Kollie, 2020).Applying tariff rates and restricting imports raise the price gap in both countries causing an increase in supply by more production and a decrease in consumption. Industrial development is the primary target of implementing tariff in most of the countries. A decrease in consumption lowers the expenditure causing the budget deficit to decrease. Moreover, the increase in the price of imports also shifts the demand of investment and consumption to domestic goods. if a small country implements tariff rate, development or progress is not necessary as it causes redistribution of income. The consumer bears the loss, but receivers of government spending and producers earn. Import substitution has

a small minor effect on trade surplus. Its effect is large if it is implemented in advanced countries and tariff is increased at the time of expansion

A large number of studies have been done to test the Hypothesis of ELG in different countries. Export-led growth is a strategy in which an increase in growth is aimed at increasing exports and trade openness, so that competition can increase and export industries can produce goods and services more efficiently. Some of the studies found a significant effect of exports on the growth of the economy (Alimi & Muse, 2013; Agrawal, 2015). While Johnson and Olayiwola, (2020); Kubo, (2011) studies concluded that there is no relationship between the two. Many also argued that it is growth that impacts export and not vice versa causing reverse causality, mostly measured by the test of Ganger Causality (Johnson & Olayiwola, 2020; Alimi & Muse, 2013). This strategy was first implemented by Japan and Germany after the crisis of 1929 in which demand fell and trade decreased by 66%. By devaluing their currency, they increased demand for their goods in the international market and amid all these become more inclined toward technological diffusion. According to export base theory, the direction and pace of growth of an economy are dependent on the external demand for its products.

On the other hand, tariff rates, controlled exchange, quotas, and overvalued exchange rates are used as tools to implement the policy of import substitution, and results are measured by an increase in domestic production (Ahmad J. , 1978). According to the theory of Mercantilism, growth is dependent on how the economy manages its exports and imports. It should increase exports and decrease imports through taxes. It was implemented for industrialization by most of the developing countries mostly in the post-war era (Mendes, Bertella, & Teixeira, 2014). But studies by Baer, (1972); Felix, (1989) showed that import substitution does not work for developing countries as a result of administrative and political issues inside the economy reducing employment and decreasing industrial growth. Most countries failed due to low investment and low efficiency of infant industries to meet the demand. Protection is given in such cases by the government to provide incentives for the industries but, Gafar, (1979) concluded protectionism to be the main cause of the failure of IS and can increase dependence on foreign goods.

Trade Scenario in Pakistan

Pakistan has always seen an uneven growth pattern of GDP which was positive and above 5% in the period of 1980 to 1992 after that it was below 5%. Pakistan’s GDP growth had used to gain

momentum for 8 to 9 years after which it was cut off due to some crises such as the 2008 crisis of oil prices and 2020 the pandemic. The biggest share of the GDP of Pakistan is consumption which is growing with the increase of population with the growth capacity of Pakistan being stagnant and not proving beneficial to Pakistan. Pakistan has the lowest trade-to-GDP ratio comparatively, which shows that trade contributes to a small portion of GDP. In 2019, Pakistan had 30% trade as a percent of GDP while Bangladesh had 29%. Countries with GDP more than Pakistan like India also have a ten-time greater trade proportion in GDP. It shows that our GDP growth is mostly due to more consumption rather than trade showing a low level of progress, development, and productivity.

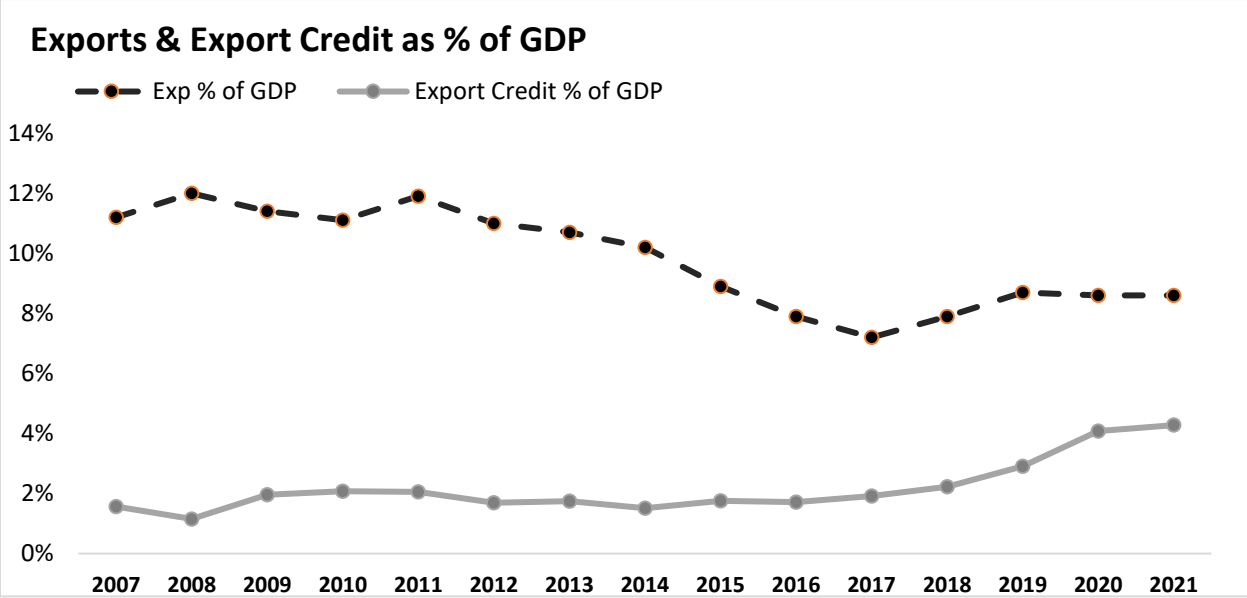

Figure 1.1 : Exports and export credit as percentage of GDP

Pakistan faces the problem of export diversification, which means that it only exports a limited variety of things to a limited number of countries. Major trading partners in Pakistan are the USA, China, the UK, and some European countries. Pakistan, due to unhealthy relations with neighbors has to export and import goods from distant countries which may increase the cost of trading and as well as may lead to compromise on some goods e.g., the 2020 trade policy has imposed a ban on the import of goods from India and Israel. Some of the major exports of Pakistan are textiles, leather, and eatables (Amjad, Ghani, Din, Mahmood, & Tariq, 2019)

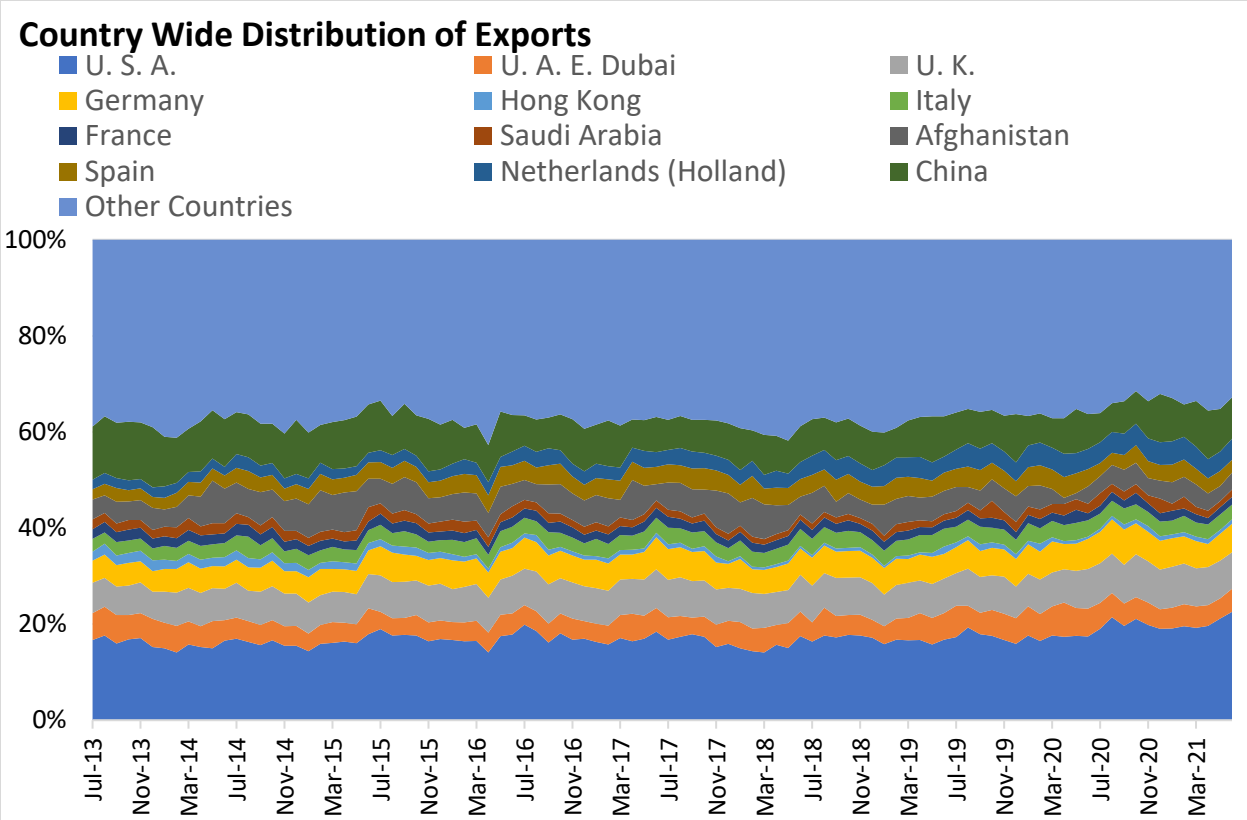

Figure 1.2: Country-Wise Distribution of Exports

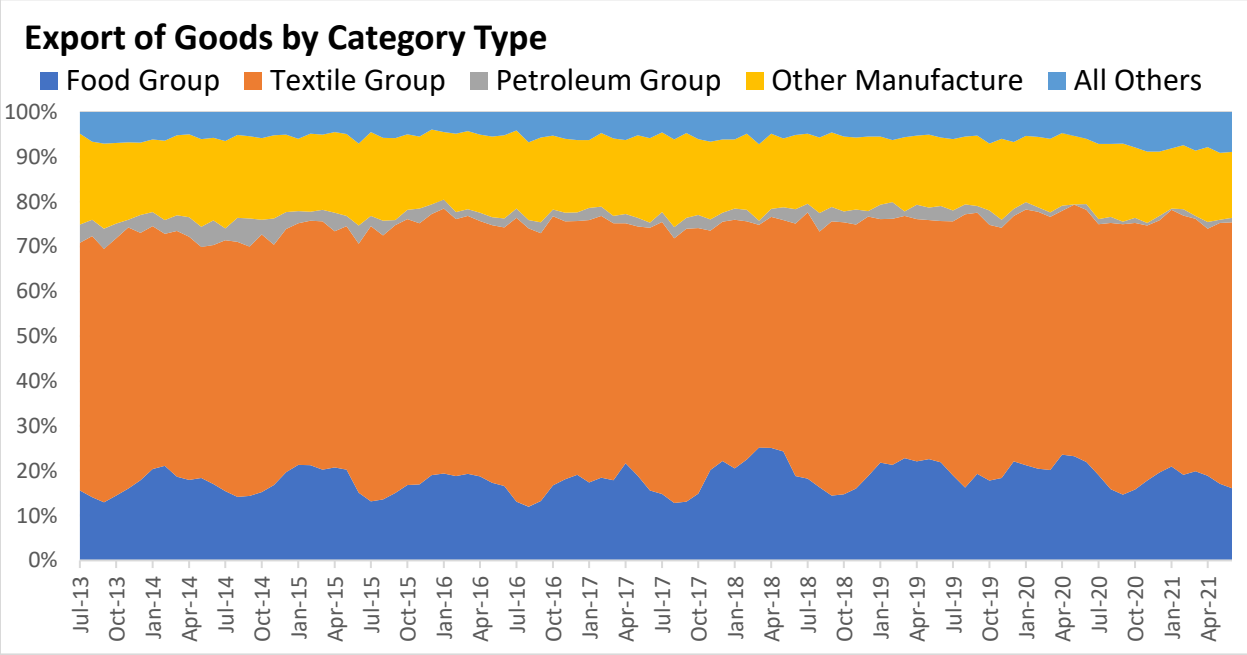

Figure 1.3: Exports of goods by Category type

As the world has become a global village, countries have to implement policies under the supervision of the IMF, World Bank, and other international organizations. With the increasing era of trade liberation, developing countries have to face issues in managing fiscal revenue when they are imposed to decrease the tariff rate and other taxes. Pakistan has over the 3 decades decreased the tariff rate from 17% to 4%. Although different policies were implanted to decrease the tariff on the import of machinery and other things as most exports are dependent on the imports which can increase the efficiency and competitiveness of the producer to increase exports. But decreasing tariff rates have increased the problem of managing fiscal revenue as well as increasing the bill of imports, although it has still more tariffs comparatively to boast the domestic product consumption (Ali & Naeem, 2017).

With increasing Trade liberalization, trade agreements have become an important way to increase trade such as FTAs and PTAs. Pakistan has free trade agreements with Sri Lanka, Malaysia, and China. It is involved in bilateral trade treaties with the USA since 1959 and is also a member of SAARC. Although FTAs are necessary for increasing exports, they can negatively affect the overall export performance due to a decrease in export to non-member countries of FTAs. Pakistan needs to be actively involved in more trade agreements to create more opportunities for exporters in foreign markets (Qureshi & Shah, 2020).

In the case of Pakistan, both policies have been implemented i.e., in the 1950s the IS policy was implemented which was converted into an Export-led Growth strategy in 1989 that aimed at increasing trade Openness. In the case of IS policy, the studies of Soligo and Stern, (1965) showed that it contributed to the growth of Pakistan by increasing production in both consumer and manufacturing industries. While the study Radhu, (1964) conflicts with it by saying that it will lead to a distorted growth pattern and Asif et al., (2021) added by concluding that Pakistan needs to reconsider its policies of prote9ctionism. On the other hand, in the case of Export-led strategy, the study of Hye and Siddiqui, (2011); Bashir et al., (2015) presented evidence in favor of the ELG strategy while at the same time Afzal and Hussain, (2010) contradict this strategy and found no relationship in between exports and growth.

Pakistan results in both cases are not robust and a single conclusion cannot be made from the literature. However, Pakistan hasn't shown efficient growth in both phases facing problems in both scenarios. At present the both approaches are considered and implemented but there is no

significant effect on the growth of Pakistan. So, the review of policy mix should be done so that the problems in the case of Pakistan for both polices can be identified and solved.

Section 2 of the study provides a review of the literature on the economic as well as econometric perspectives of the study. Section 3 enlists the methodology in which techniques and research design have been discussed. In Section 4, results are enlisted and discussed. Section 5 concludes the main points of the study. In section 6, references are listed.

1.1. Explanation of Key Terms

- **Policy Mix:** Combination of measures taken by two or more policies to see the combined effect of both.
- **Import Substitution:** It is a method of restricting the imports of goods to produce these goods domestically and strengthening the domestic market.
- **Export-led Growth:** It postulates that exports are a main determinant that affects the growth of the economy.
- **Tariff Rate:** It is the rate of tax that is levied on the imported goods by the government of the importing country.

1.2. Problem Statement

In the past, Pakistan has adopted the policy of import substitution to strengthen its domestic industries by restricting imports by imposing high custom duties, applying high tariff rates, and decreasing its trade deficit but has not become able to achieve either of the objectives. According to ministry of Commerce strategic policy framework (STPF) 2020-25, the shift has been taken from import substitution to an export-led growth strategy for the coming years. Through the export-led growth strategy, Pakistan aims to increase its exports so that productivity can increase, and industries can work on the competitiveness of the products in international markets. However, the literature has shown that the export-led growth strategy has not worked for the majority of developing countries even for Pakistan. Although in most countries IS policy is used to generate revenue collection to meet the budget deficit, but if for instance Import substitution is chosen as a mean to protect domestic markets, there is not enough investment or availability of resources to meet the needs of domestic demand. On the other hand, if an export-led growth strategy is adopted then whether there is enough production for export and whether there is a world demand for the

products of Pakistan, which lacks innovation. Therefore, the problem arises of choosing which policy through which the development of Pakistan can occur while decreasing the trade deficit. If each of both has failed to achieve the objective, then what can be the possible solution

1.3. Research Questions

1. Which policy should be focused more to achieve maximum growth in Pakistan.
2. How to predict the GDP of Pakistan after having IIS in univariate variable predictions.

1.4. Research Objectives

1. To review policy mix solution of Import substitution policy and export-led growth strategy in Pakistan
2. To predict the GDP of Pakistan after having IIS in univariate variable predictions.

1.5. Significance of the Study

This study will help the economy of Pakistan to decrease its trade deficit account, which nowadays needs prime attention. It will provide a review of the policy mix, which will help the government to tackle this problem with the provided resources of the economy. As it will identify the sectors, in which there is a potential for growth and more export. Similarly, it will identify the sectors that need to be protected through an import substitution policy. As applying only Import substitution will block the raw materials needed by the firms that have the potential of production or exports, similarly, at present time Pakistan does not have enough innovation to compete with the goods of the international market in case of implementation of an export-led growth strategy. Moreover, it will identify the policy among IS and ELG, which can bring comparatively larger effect on the growth of Pakistan and is suitable for the Pakistan economy. This will provide a solution keeping in view the problems of Pakistan's economy or developing phases so that the solution is not difficult to implement, and Pakistan can achieve sustainable growth in the long term.

1.6. Research Gap

Literature shows that Pakistan considering other countries in start either has wholly implemented the ELG strategy or IS policy and now more a type of mix of both policies. This study will add to the literature by giving a review of policy mix of both approaches in which Pakistan can work on increasing its exports of goods in which there is already growth potential. At the same time adopt

the policy of import substitution on the specific goods which can increase industrial growth with minimum protection through subsidies. This study add to literature using ARMA with IIS. Including breaks in the ARMA model and projecting the future values can produce results that are more precise.

CHAPTER

2. LITERATURE REVIEW

2.1. Export-Led Growth

2.1.1. Evidence from Developed Countries

Although the relationship between export and productivity is ambiguous for industrialized or developed economies, the outward expansion of products significantly affects the economy's growth (Marin, 1992). This positive relationship is because of the higher exchange rate, which increases the number of foreign low-cost producers, and decreases domestic high-cost producers causing overall productivity to be raised but the export elasticities should be low enough to prevent the overall decline of output. So, the exchange rate plays role in productivity either through depreciation or revaluation, increasing exports in the former case and evaluating competitive import sector production in the latter case.

Similarly, Federici and Marconi, (2002) clear support for the export-led growth hypothesis was shown empirically through the VAR model in Italy, a developed country. The Kaldorian approach used provided a useful understanding of the short-run and long-run growth relationships and fluctuations in an open economy like Italy. Exports will contribute more to the growth of the economy if there is more world demand for the domestic products of the economy. Similarly, in European countries, an export-led growth strategy has also proven very beneficial for the stagnant domestic markets (Santos, Ribeiro, & Carvalho, 2013). However, the specification in exports which impacted the growth to a larger extent was the export of high value-added products and exports to the country which were more developed and near to the county in distance. The European countries should export high technology export and should convert trade to a partnership that is less representative but has high growth like China.

2.1.2. Evidence from Developing Countries

Dreger and Herzer, (2013) found a positive relationship in developing countries but the positive effect of export growth on non-export GDP was only in the short run and this effect became negative in the long run-on average i.e., for 90 percent of the countries was negative. However, the country-specific characteristics were associated with this negative relationship and the study suggested that by curtailing the monitoring burden on business, increasing labor market flexibility,

and removing primary export dependency on the economy cannot only decrease the negative effect of export growth but can increase long-run export-led growth of the country.

Along with the literature emphasis on export-led growth, the problem of causality between growth and exports has also gained major focus in the literature of developing countries. A causality test by using the panel co-integration test for developing countries showed that co-integration exists when export is the dependent variable but disappears as output becomes the dependent variable (Bahmani-Oskooee, Economidou, & Goswami, 2005). This shows that growth policies should be adopted to increase export growth in the long-run. The export-led growth strategy also worked for the South Asian countries except for Sri Lanka. That is why these countries should work on their export sectors by importing only raw materials that can be needed for value addition and by improving technology to increase the capacity and production of the industries (Shirazi & Manap, 2005).

According to the literature presented on the export-led growth strategy, results in developing countries are not robust. Although a positive relation is shown through empirical literature, the impact was very small quantitively and the strategy cannot be considered an engine of growth (Medina-Smith, 2001). Likewise, the study found this strategy valid in Costa Rica's case but development was found to be more due to physical investment and population drive.

2.1.3. Evidence from Neighboring Countries

India in the last decade has shown huge progress. The export-led growth hypothesis when examined, it shows a bidirectional causality between exports and growth, which is the weaker form of relation. In the past, most studies showed no relationship between both, but Agrawal, (2015) pointed to the problem of not separating the phases of import substitution and export-led growth in estimation, missing some valuable variables, which have a significant role like REER and use of GDP instead of non-export GDP.

India has a long phase of different policies, so the effect of export on GDP in the import substitution phase could not be significant owing to high tariff rates and overvalued exchange rates. That is why exports explained 5.5% of output while output explained 64% of GDP in the pre-trade liberalization period. On the other hand, in the post-trade liberalization period exports explained 65% of GDP while GDP explained 35% of exports. In 1980 Turkey adopted an export-led industrialization growth strategy with no historical reason for adaptation. However, it's still a

mystery whether this 40-year export-increasing strategy has some useful results. The empirical study of Bozatli, Bal, and Albayrak, (2022) added to the literature the results of both the time domain and frequency domain and concluded that there is no significant role for export-led growth strategy in Turkey. The results suggested that alone exchange rate alone is not enough to meet the need and policy regarding high technology products, productivity, and economic stability should be focused on to increase competitiveness.

Bangladesh in the 1980s adopted policies to boost exports in the country by developing exporting zones and faster development of export-based industries (Mamun & Nath, 2005). By adopting such policies, it was not only able to increase export growth but was able to convert exports to more technologically advanced products. This was shown by the long-run unidirectional relationship between exports and industrial growth and then overall growth.

2.1.4. Evidence from Pakistan

After getting independence from colonial powers, Pakistan had few industries which were also not in proper shape. So, it had to focus on its industries looking at the Western countries and their fast-growing industrial development. That's why it implemented import substitution policies in the start but converted to Export promoting policies in the early 1990s. Afzal and Hussain, (2010) investigated the export-led growth hypothesis for the post-liberalization period and didn't find any significant relation to the support of the hypothesis. Granger causality was also absent. So modern scientific methods in agriculture were suggested to take advantage of the sector which has a comparative advantage.

According to the study of Shahbaz, Azim, and Ahmad, (2011) more than 60% of exports depend on the textile sector which further depends on the agricultural system of the country, harmony should be created between the two sectors, and the government should work on the policies like credit on low cost to boost the agricultural system. Likewise, the government should focus on value-added goods exports through the implementation of proper policies. On the other hand, Hye and Siddiqui, (2011) through their work concluded that there occurs a long-run relationship between exports and the growth of Pakistan. Exports are important for the economy as they increase foreign exchange decreasing pressure on the balance of payment and providing employment to domestic labors.

Similarly, a positive long-run and short-run relationship between export and growth were found by Bashir, Iqbal, and Nasim, (2015). They recommended that government should create an export processing zone so that Pakistan can gain the attention of foreign investors and a proper channel could be provided to domestic industries for exportation. Along with it, different packages for exports in the form of bonuses, credit, or export financing by the government can help boost the export sector of the country.

2.2. Import Substitution

It is a development strategy, accelerating the investment through profit-risk tradeoffs in the home market by substantial reliance on the government manipulation of market prices and other factors (Felix, 1989).

2.2.1. Evidence from Developed Countries

The United States and western Europe adopted IS policy at the initial stage of their industrial development in the early 90s with the help of the government in protecting and developing small industries it was done, although it didn't entirely stop using the protectionism policy but it didn't remain the principal method (Baer, 1972). However, later the advanced countries like Canada and the United States, being countries with high growth rates and high tariffs, didn't show any relationship between the two. The high growth was caused by the exports of staple food and the inward-oriented development policies (Irwin, 2002). When considered on a regional level, the IS Policy has proven very effective as it circulates the domestic currency in the region and helps both consumers and producers in the market. Kwon, (2009) concluded that a sustainable future will be introduced by such a policy and benefits will increase with financial, political, and administrative help from the government.

In Mexico, the same results were found by Aspra, (1977) as in the United nation at the national level but the reason behind the failure of the Import substitution policy was due to the geographical concentration of its industries and the capital-intensive nature of these industries. As the result different low-production industries were built that needed future protection by the government and these measures didn't prove useful in addressing the chronic unemployment problem of Mexico. Russia on the other hand followed the policy of import substitution industrialization after facing a slow industrialization phase due to the policy of serfdom. After the IS policy, Russia faced rapid

growth because they were able to gain benefits both economically and militarily from this policy (Adewale, 2017)

2.2.2. Evidence from Developing Countries

After the adaptation of IS policy by the US and Western Europe Latin America was among the countries that adopted the policy of Import substitution fifties and sixties as their principal method of gaining development and as successful. However, in the 70s the results of IS were doubted. Unemployment increased, industrial growth slowed down, and income distribution remained the same or decreased in many countries leaving no further chance of implementing IS policy (Baer, 1972).

The sub-African couldn't implement the IS policy due to the colonial regime which was interested in European imports but as soon as they got independence, they implemented the Is policy in the follow-up of Latin America in the 50s. However, due to constraints of Domestic structure and external forces, it showed a negative impact that too in large magnitude (Mendes, Bertella, & Teixeira, 2014). The comparison between the results of IS policy implementation in Asia and Latin America by Felix, (1989) and Asia had greater success as compared to Latin America. The reason behind the success gap was identified as the bearing of culture and antiquity on consumer preferences and further on the craft industry.

Developing countries use protection for domestic industry development, according to Gafar, (1979) these policies do not reduce the rate of unemployment or dependence on foreign products but lead to an inappropriate structure of industrial development. The protection given to the infant industry is difficult to remove later causing efficiency problems.

2.2.3. Evidence from Neighboring Countries

The import substitution policy was adopted by India to protect their small industries from large-scale industries and international competitiveness, especially the textile industry but it creates many other problems in the economy (Mazumdar, 1991). Although the large industries were restricted to expand their domestic market so that small industries could expand and income could increase there was no imperative effect on the growth of smallindustries and technological progress was also impeded due to the policy of protectionism.

Similarly, in the 1980s, Turkey decided to adopt import substations on arms production so that national security could be enhanced and industries could grow to provide employment opportunities (Ayers, 1983). However, the manufacturing base is too small and it could create problems by increasing prices and inefficiency due to high protection. The arms production industry will be defeated and an excessive burden will be placed on foreign exchange due to the import of technology and components of arms. China on the other hand has benefitted from the import substitution policy. Although it converted to a trade liberation policy from an import substitution policy, its aim remained the same to increase domestic value-added product exports by replacing the import of raw materials with domestic production (Shafaeddin, Mehdi, & Pizarro, 2007). China showed rapid growth in exports of advanced technology products during the trade liberation period but these industries were established in the import substitution era.

2.2.4. Evidence from Pakistan

In the 1950s, Pakistan adopted the policy of IS for the growth of industrialization and saw rapid growth in the manufacturing sector and it was believed that Pakistan will become self-sustainable growth (Ahmed, 1980). Later studies by Radhu, (1964) on indirect taxes concluded that the system of indirect taxes was making an incentive for the protection of the consumer goods industry while it was hostile toward intermediate goods industries and investment. This led to a distorted pattern of Pakistan's growth. Late on. The review of Radu (1964) was criticized by the Soligo & Stern, (1965) pointing out that in the first phase of 1959/1960 both the sectors of consumer goods and intermediate goods were showing an increase in growth with a 50% increase in growth due to these sectors. After that, it was domestic demand increased excessively, and import substitution was eased to meet the domestic demand. However, nothing can be said about the role of efficiency or comparative advantage in growth. However, the study of Asif et al., (2021) concludes that the tariff rate has both positive and negative effects on the short-run and long-run growth of Pakistan. It should reinvestigate the effect of import substitution in each of the industries as a tariff on manufactured goods has a positive effect on growth while a tariff on all goods has a negative impact on growth.

2.3. Literature on some studies using the ARDL approach

Haq and Larsson, (2016) in their article has used the ARDL approach to find the relation between stock market return and macroeconomic indicators. They have used this technique as it allows

finding both long-run and short-run relations between the variables without making changes to the data as in Var. ARDL approach also allows you to integrate the short-run impact of variables with long-run equilibrium. In the VAR model if the series is not stationary and integrated at first difference then it causes the long-run relationship between the variables to disappear (Brooks, 2019). ARDL allows determining different lags of the variables in the model

In this article, Oluwafemi and Laseinde, (2019) the ARDL model in Nigeria have examined the effect of different macroeconomic variables on growth. For the long-run relationship, the ARDL bound test was used and it rejected the null hypothesis showing co-integration in the long-run. in long trade openness and FDI were the two most important variables that are important for the long-term growth of the Nigerian economy. In the short run, they used dynamic modeling to depict the speed of convergence to equilibrium after the shock. Lag of variables introduced in the form of independent and dependent were used and introduced in ARDL through ECM (-1) known error correction term. So, for the short-term error correction model ARDL is used. The value ECM(-1) was -0.182 which meant that 18.2% of short-term variations in macroeconomic variables are converted into long-term effects on the growth of Nigeria.

In the article of (Sunde, Tafirenyika, & Adeyanju, 2023), the same ARDL approach has been used which consist of a WALD test, short-run causality test, error correction and short-run relationship estimation, and long-run OLS estimation technique. The method provides the ability to identify co-integrating vectors among the presence of many different integrating vectors. Once the co-integration trough the bound test was identified then Error correction mechanism was used. In this article, the effects of export, import, and trade openness have been determined in Namibia through the above procedure from 1990 to 2020. Two ARDL growth model was made, one including trade openness and the other including exports and imports. The results showed that imports in long run significantly affect growth of the Namibia country. While Export and trade openness had a positive impact on the growth of the country.

In the case of Turkey, dash used the ARDL bound test for estimation purposes, and analysis was done both using classical and Bayesian approaches. This article before using the bound test, has made the stationarity checks to identify fixed series. In the case of fixed series, the model can be estimated through ARDL limit test. Specification tests were applied to make the model meaningful. These tests include Autocorrelation Test, Variance Analysis, Specification Error

Analysis, and Normality Tests. After clearing the specification test, the long-run and short-run estimations of the bound test can be interpreted. The article using the above-mentioned method, has determined the effect of export and import on the exchange rate of the country. The analysis showed that imports have a long-run negative impact on the exchange rate of a country while exports also have a long-term effect on the dependent variable but in a positive direction. The result obtained coincided with the theory but the same was not the case for literature.

Iheanacho & Eugene, (2017) In their article have seen the impact of trade liberalization on economic growth in Nigeria through ARDL approach. Trade liberalization included trade openness and financial development. The long-run effect of trade liberalization on economic growth was negative while the short-run effect was negative. By combining both effects, it was suggested that Nigeria still has to harness the benefit of international trade. ARDL method was used due to its usefulness. ARDL method provides unbiased results in the long run even if some of the regressers in the model are endogenous. It provides upper and lower critical values for different type of integrated variables. Although the bound test of the ARDL model provides critical values for all sample sizes, Narayan (2002) criticizes the upper and lower critical values present for the large sample size cannot b used for the small sample size.

ARDL with structural breaks has been used as a methodology by Alsamara et al., (2019) in their article to find the impact of energy imports, financial development, and trade openness on per capita real GDP of Turkey in the time period of 1960-2014. ARDL was criticized for not changing its co-integration relationships even for the whole period in case of a long time. Similarly, it was also mentioned that the co-integration vector could change to an unknown point in a sample of time-variant. Due to these limitations of time-invariant, structural breaks was introduced in the years 1980 and 1988. These breaks were found by the HJ method which helps in better forecast the model. These breaks were identified as political and economic events. Estimation showed better results in the case of these breaks. Trade openness and financial development both had positive impacts on growth in the long-run as well as the short run.

2.4. Literature on some studies using ARIMA Modeling

Rout et al., (2014) in their article on “Forecasting of currency exchange rates using an adaptive ARMA model with distinction evolution based training” have forecasted the exchange rate of

rupees, yen, and pounds with reverence to US dollars by using the ARMA model with differential evolution (DE) as a hybrid prediction model. They have predicted fifteen months of forecasting for three different currencies and compared with other different variations of the ARMA model such as ARMA-particle swarm optimization (PSO), ARMA-cat swarm optimization (CSO), ARMA-bacterial foraging optimization (BFO) and ARMA-forward backward least mean square (FBLMS). They used the Box–Jenkins method for forecasting and predictions and results show that their hybrid model was more predictive than other models. They suggested using hidden adaptive measures for long-term prediction. In case of sudden ups and downs in exchange rates in case of natural disasters or political turmoil, more in-depth examination is required in terms of the selection of features, models, and learning algorithms.

In Lebanon, as the energy sector is becoming more important due to the heavy reliance of people on it, Saab et al., (2001) in their article "Univariate modeling and forecasting of energy consumption: the case of electricity in Lebanon" has used three different univariate models to try one step forward of monthly forecasting of energy consumption. The three univariate models were autoregressive, autoregressive moving average, and a novel alignment merging an AR(1) with a high pass filter. Three models' performance was compared using the sum of absolute error, mean square error, and mean average error. As Lebanon energy data is a real challenge for forecasting that's the ideal model was required. Based on a performance indicator, AR(1) with a high pass filter showed the finest forecast for the unusual data of the energy sector of Lebanon.

Belmahdi et al., (2020) in their article "One month-ahead forecasting of mean daily global solar radiation by means of time series models" used ARMA and ARIMA modeling to forecast the one, two, and three months ahead for mean daily global solar radiation parameters. Based on AIC and BIC criteria, ARMA (2,1) and ARIMA (0,2,1) models were selected for forecasting. ARIMA (0,2,1) showed the largest improvement percentage and had the lowest value of MBE, MAPE, RMSE T-test, and σ, which are the errors of forecasting. The best performance of ARIMA (0,2,1) was followed by ARMA (2,1) in relations of forecasting. Persistence models showed the worst forecasting performance. In addition, the results of the three models exhibited that the error of forecasting was higher for the latter forecast as compared to the first two forecasts.

Cuaresma et al., (2004) in their Forecasting electricity spot prices using linear univariate time-series models dash has used univariate modeling for forecasting electricity spot prices. Electricity

prices sometimes are volatile having price spikes which can reduce the performance of the forecasting model. In this article, jumps in data have been included. Two types of information arrivals are used, one as normal other as abnormal, which causes the discrete price jump. Jump-diffusion models can account for conditional density functions with fat tails and non-zero skewness, whose sign hinge on the mean jump size. They have also used a structural time series model for unnoticed components that are interpretable outside the data like the interest rate. The separable crossed ARMA model with jumps and restricted coefficients grants highly significant increase in forecasting accuracy when compared to the rest of the representatives of the model classes. Given the huge number of out-of-sample observations in the forecasting exercise, the results give very robust evidence of better predictive abilities of this model in contradiction of all others.

CHAPTER

3. METHODOLOGY

In time series data if the residuals are auto correlated then coefficients are hard to interpret and the relationship between the variables is spurious which was called as “nonsense correlations” by Yule, G. U. (1926). This serious autocorrelation between the residuals also shows a miss-specification of the model.

In earlier studies, missing variables were suspected to be the major case of the spurious relation. Later, Granger and Newbold, (1974) through their studies found that non-stationary data series was the major cause of spurious relation. Even after including the missing variables the regression showed a spurious relationship. Mostly times series with the I(0) process have a major cause in building spurious regression.

However, different studies showed that even if the data is stationary, the regression can be spurious and can give incorrect regression results (Granger et al., 1998). This means that there can be more than one reason for regression to be spurious. Non-stationarity cannot be the only reason for a spurious relationship. According to the findings of Granger and Newbold, (1974), the spurious relation increases as the size of the sample in ARDL increases. In the case of ARDL (1,1) for the sample size of 50, ARDL reduces the probability of spurious relation from 66..2% to 6.2%. ARDL (2, 2) also reduces the probability by a large percentage. In case of a sample, size of 100 and 200 the probability remained the same.

3.1. Unit Root

Unit root test is used to check the stationarity of the series. The series is stationary, if they have constant mean, constant variance, and constant autocorrelation for the specified time lag. By having these three terms constant, the OLS regression is said to have BLUE (best linear unbiased estimators) coefficients.

There are different methods to check the stationarity of data. Every method has its own weaknesses and benefits and there are no limitations in the literature to use any specific method. Augmented dicky filler test and Kwiatkowski-Phillips-Schmidt-Shin (KPSS) are the two mostly used methods in the literature. In this study, we will us both the test to counter check the results.

Augmented dicky filler test has a null hypothesis of having a unit root, which means that the series is non-stationarity. Where Kwiatkowski-Phillips-Schmidt-Shin (KPSS) has a null opposite to ADF as a series in stationary having no unit root. It tests the stationarity of the series around the deterministic trend.

Both these test have the options of intercept and trend. Whether to include trend or not, can be checked by the graphical representation of the data. If the graph visually shows the trend, then the option of trend can be included.

3.2. IIS and SIS

For identification and detection of sudden changes in the output that occur for a particular value of the input also known as an impulse, the method of Impulse indicator Simulation is used which was introduced by Hendry et al, (2006). In this technique, a dummy variable is used for which the value of 1 is assigned Yit while all the other variables take the value of zero. Repeating the step repeatedly for each variable.

For identification and detection of changes that last for some time i.e., the changes in output occur for the limit of input values. The method of Step indicator Saturation is used when the magnitude or location of the change is unknown. Doornik et al., (2013), assessed this method, which was seen as an extension of the IIS method. This method also uses the dummy variable matrix in which a value of 1 is assigned to the Yit variable while for all others it is zero.

The Impulse indicator will help to identify if there are some sudden changes due to some exogenous changes or it can be named as shocks. This will decrease the chance of error in forecast and projections can be done more precisely.

The step Indicator will help to identify the upward sudden shift in the data. It will assist in recognizing if there is some technological advancement or some other invention e.tc which has increased the focused variable by a large amount.

Although both the methods of IIS and SIS seem similar, there is an important difference between the two that should be focused on and analyzed. First, the IIS indicator is mutually orthogonal but in the SIS indicator as the values of the second indicator increase, it increases the overlapping. Secondly, if the change in IIS does not end then it would require two indicators to identify it.

Lastly, detection is affected by the similarity and dissimilarity of signs and magnitude (Castle et al., 2015).

3.3. ARDL

ARDL is a simple technique for estimating short and long-run relationships. It can include in the model different variables with different orders of lags or a combination of both (Uko & Kelvin, 2016). The null hypothesis of the ARDL approach is no co-integration and is tested by F-test. When the value of statistics is above the value of critical value, we discard the null hypothesis of no co-integration. The ARDL approach avoids the large number of specifications that were required in the previous standard co-integration technique. The problems of deciding the number of dependent or independent variables, treatment of deterministic variables, and determining optimal lags are easily handled in the case of the ARDL approach (Duasa, 2007). ARDL provides a general model including all the variables also known as GUM (generalized unrestricted model) with their identified lags, which progressively reduces the number of variables afterward by imposing different kinds of linear and non-linear restrictions.

3.4. General to Specific Model Selection

The general-to-specific modeling method, also known as the "Hendry approach," was developed by David F. Hendry and Grayham E. Mizon. Hendry and Mizon are prominent econometricians known for their contributions to time-series econometrics and modeling methodology.

The general-to-specific modeling approach is characterized by starting with a broadly specified model and then systematically refining it based on empirical evidence, diagnostic tests, and economic theory. Econometric methodology of general-to-specific modeling, in which the modeler streamlines an initially general model that effectively characterizes the empirical evidence within his or her theoretical framework. Central features of this approach comprise the theory of reduction, dynamic specification, model selection procedures, model selection criteria, model comparison, encircling, computer automation, and empirical implementation (Campos et al., 2005)

Step by step procedure of general to specific modelling is given as following

- Begin with a general or inclusive model that includes a wide range of potential variables and specifications. This model is often derived from economic theory or previous research.

- Explore the data and conduct preliminary analysis to identify potential relationships and patterns. This step involves descriptive statistics, graphical analysis, and initial correlation assessments.
- Use automatic model selection techniques, such as autometrics, to systematically search through various combinations of variables and model specifications. The goal is to find the model that best fits the data according to chosen criteria (e.g., AIC or BIC).
- Perform diagnostic tests on the selected model to ensure that it meets the assumptions of the chosen econometric method. This includes tests for autocorrelation, heteroscedasticity, and other violations of model assumptions.
- Refine the model based on the results of diagnostic tests. If issues are identified, iteratively modify the model by adding or removing variables or by incorporating additional specifications.
- Consider economic theory and intuition when refining the model. Ensure that the chosen variables and relationships make economic sense and are theoretically justified.
- If applicable, conduct out-of-sample testing to assess the model's predictive performance on data not used in the model estimation.
- Perform robustness checks to assess the stability of the model across different time periods or sub-samples.
- Arrive at a final model specification that strikes a balance between goodness of fit and model simplicity. This model is expected to provide meaningful insights and reliable results.

3.5. Auto metrics

Auto metrics is a technique of econometrics, which is used for automatic model selection procedures. It is used in many econometric applications including macroeconomic analysis and forecasting and, time series analysis.

Krolzig and Hendry, (2001) anticipated an algorithm for automatic model selection, called PcGets, but, auto metrics which is a third-generation logarithm was introduced by Doornik (2009). Auto metrics is the latest method of automatic method selection added to PcGets.

The main column of this method is the concept of GETS modeling: starting from a general dynamic statistical model that arrests the main characteristics of the essential data set, standard testing

procedures are used to decrease its complication by removing statistically irrelevant variables, examination the validity of the drops at every stage to confirm the congruence1 of the certain model. The goal is to automate the search for an appropriate model specification while taking into account issues of model misspecification and overfitting (Epprechta et al., 2019)

Auto metrics automatically selects the model that minimizes the chosen information criterion, considering various combinations of variables, lags, and transformations. The procedure is iterative, systematically adding or removing variables from the model and re-evaluating the information criterion until a satisfactory model is found. The initial point for Auto metrics is the whole space of models produced by the variables in the initial model. At every node in this tree is a exclusive model, which can be estimated. Then, the sub nodes on the following level can be ordered according to increasing significance of the variables in the model (Doornik J. A., 2009).

It includes tests for endogeneity and other types of model misspecification. This is important for ensuring the reliability of the chosen model. For diagnostic tests, Autometrics practices Jarque and Bera, (1980), residual normality test, Breusch and Pagan, (1980), and Godfrey, (1978) second-order residual autocorrelation, auto correlated conditional heteroscedasticity (ARCH) to second-order (Engle, 1982), and in-sample stability (Chow, 1960).

3.6. Recursive Estimation

Recursive estimation refers to the process of continuously updating an estimate based on new data as it becomes available. This approach is particularly useful in dynamic systems or scenarios where data is acquired sequentially over time. Instead of recalculating the entire estimate each time new data is received, recursive estimation involves updating the estimate incrementally, taking into account the new information. The basic idea behind recursive estimation is to maintain a state or estimate at each time step and update it based on the incoming data. This process allows for real-time adaptation to changing conditions and provides a more efficient way of handling large datasets (Ljung & Ljung, 1985). The most commonly used method of recursive estimation recursive least square algorithm.

3.7. ARMA & ARIMA Modeling

Box and Jenkins were the first who deduced the ARIMA methodology and because of this, ARIMA models are most frequently mentioned as Box Jenkins models.

Yule, (1926), first introduced the autoregressive (AR) models. Subsequently, Slutzky, (1937) presented moving average (MA) models in 1937. The arrangement of the AR and MA models, ARMA, was first applied by Wold, (1938) who disclosed that ARMA processes can be used to model stationary time series with suitable number of p and q lags. The acceptance of ARMA modeling increased significantly with the advent of fast computers, which are proficient of performing the essential calculations for parameter estimations.

- A typical ARMA model entails three steps: identification, parameter estimation and forecasting. Box and Jenkins, (1976) provided a step-by-step process for ARMA analysis through: (1) short and seasonal differencing of the time series to attain stationarity in the mean and power transformation to attain stationarity in the variance
- Investigating the autocorrelation and partial autocorrelation coefficients to correctly decide the p and q orders as well as their P and Q seasonal order counterparts
- A means for estimating AR and MA coefficients by means of an optimization procedure (e.g,. Marquardt)
- Lastly, model validation is made through a diagnostic check to decide whether the residuals are white noise.

An order of ARIMA model is usually symbolized as ARIMA (p,d,q), where

p = Order of the autoregressive part

d = Order of differencing

q= Order of the moving average process

The ARIMA methodology investigates and estimates correspondingly spaced intervention data, univariate time series and transfer function data by utilizing the Autoregressive Moving Average (ARMA) or Autoregressive Integrated Moving Average (ARIMA) model. In a response time series, the ARIMA model as a linear arrangement of past shocks, its own former values, present values and, previous values of other time series forecasts a value. A complete set of tools are provided by the ARIMA technique for Parameter estimates, Identification, and Forecasting of univariate time series models. Furthermore, the ARIMA technique encourages interrupted time series models as well as Factored, subset, and seasonal ARIMA models and multiple regression examination with ARIMA errors.

3.8. Theoretical Framework

In this section, the theories used are linked to the arguments that have been created to support this study. As the study has used two approaches for development, two theories have been used to support each one of the approaches. One for export-led growth strategy and the other one for the import substitution approach.

3.8.1. Export Base Theory

The export base theory argues that there are two sectors in the economy. One is the export or basic sector, which produces the goods and sells it in the international market. The other one is the non-basic sector, which yields goods for local consumption and is made to support the basic sector of the economy. Although the non-basic sector is a large sector but it is dependent on the export sector its progress and development (Poinsot & Ruault, 2019) .

The Export-led growth strategy is based on the similar concept of expanding exports for the growth of the economy. The change in the export sector has a multiplier effect on the economy. For if the exports of particular goods say garments increase, it will increase the local production as well as local purchases of the economy (Williamson, 1975). Along with it, there will be more influx of dollars in the economy as the people in the international market will be buying the goods. This study has incorporated diverse variables to gather the effect of the export sector on the growth of the economy. Exports, Merchandise Exports, exchange rate, export as a capacity to import, inflation, external balance on goods and services are variables, which are supported by this theory.

$$\boldsymbol{X = f(MX, EB, ECI, Inf)} \qquad \textbf{(..1)}$$

X = Exports

MX = Merchandise Exports

EB = External Balance

ECI = Export as a Capacity to Import

INF = Inflation

This equation shows the export-led growth strategy part of the policy mix. These variables directly or indirectly through exports have a role in the development of the economy. Some may have also

have negative impact like inflation and exchange rate. When an economy is exports large quantity og goods, it means that the it is producing a large quantity of output and there is high level of employment in country to keep these factories and industries running. In return, when large number of funds enter into an economy, it stimulates consumer spending and growth.

3.8.2. Theory of Mercantilism

The theory of mercantilism is all about managing the trade surplus account. Old era mercantilists were of the opinion of increasing the influx of money and decreasing the outflow of the money. The earlier mercantilists would have proposed a solution through administrative restrictions on the export of money while the later ones would have proposed the solution through regulation of foreign trade. According to the English mercantilists Thomas Man, "The usual means of increasing our wealth and our treasures is foreign trade, in which we must always adhere to the rule of annually selling our goods to foreigners for a greater amount than we consume their goods" (Alekseevich et al., 2022).

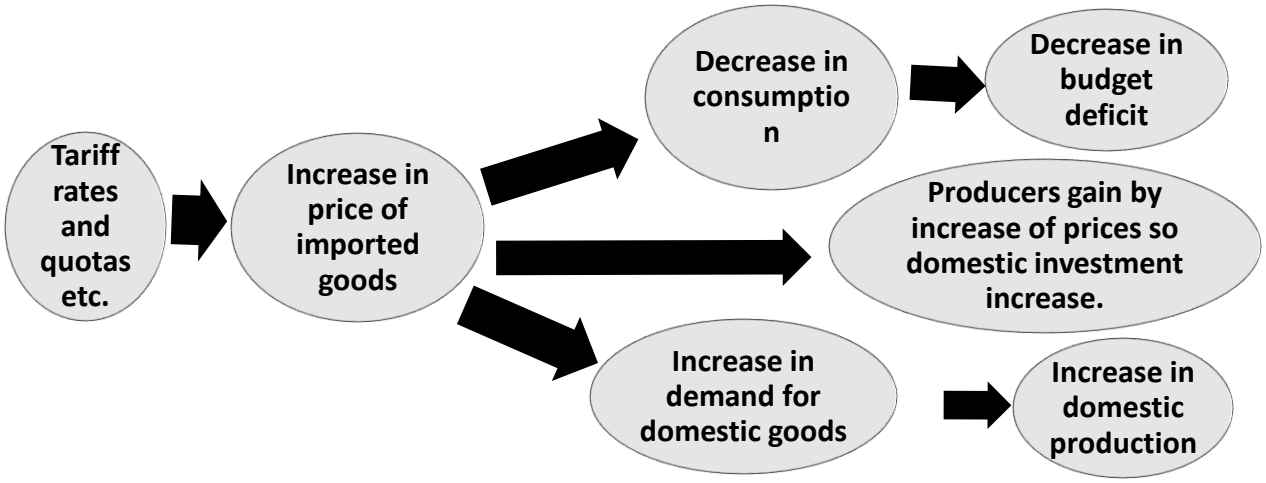

Figure 3.1: Theoretical framework for Import substitution

Import substitution policy aims at decreasing imports so that the economy can stand on its own by producing goods domestically. It increases the demand for domestic products, which will increase the output of the industries, increasing the employment level of the economy. All these steps lead to a decrease in the budget deficit, which has a major role in the growth of the economy.

$$I = f(MI, TLS, IND, ER, INF, TR, ODA) \quad \textbf{(..2)}$$

I = Imports

MI = Merchandise Imports

TLS = Taxes less Subsidies

IND = Value added, Industrialization

ER = Exchange rate

INF = Inflation rate

TR = Tariff rate

ODA = Net official development Assistance

The above equation shows the Import Substitution policy approach towards growth. Merchandise Imports, Taxes less subsidies, value-added industry production, Exchange rate, Inflation, Tariff rate, and official development assistance are variables that influence growth directly or indirectly through imports. Imports make the economy dependent on foreign goods, which are more expensive. These goods then affect the domestic industries decreasing their demand and in large increasing the budget deficit of the country. As Pakistan's currency is more devalued against foreign currency, it creates a huge burden on the economy making imports expensive.

This study mixes both approaches toward growth; it mixes all the variables from both the theories and identifies the joint effect. As Pakistan is a developing country, it doesn't the industrial base that can meet the domestic demand in case of strict import substitution policy Pakistan has employed this policy in past but got not result. Similarly, the export-led growth strategy is not enough for the economy to grow because in the present case Pakistan does not have enough exporting base to compete the foreign products. Mostly products exported are in raw form. It has limited value addition and incompetent packaging industries. Manufacturing of some products can require raw material that Pakistan is unable to produce which lead to importing these materials. We need to approach towards growth of Pakistan exclusively by considering the variables of both policies.

$$GDP = f(X, MX, ECI, EB, I, MI, ODA, IND, TLS, TR, ER, INF \quad \textbf{(..3)}$$

GDP = Gross Domestic Product

X = Exports

MX = Merchandise Exports

EB = External Balance

ECI = Export as a Capacity to Import

INF = Inflation

I = Imports

MI = Merchandise Imports

TLS = Taxes less Subsidies

IND = Value added, Industrialization

ER = Exchange rate

TR = Tariff rate

ODA = Net official development Assistance

This equation shows a policy mix solution to growth by incorporating the variables of both approaches backed up by both theories. Although the variables exchange rate and inflation effects both the exports and imports of the country so they represent both sides of the approaches.

3.9. Econometric Framework

In this section, the step-wise process of finding the relation of each variable with the growth has been explained. This study has utilized the ARDL method as its main because it provide more useful benefits as compared to other method used in the literature like the VAR model etc. to apply this method or to use this model , the following are steps to follow in order to get proper results.

The method starts with graphical representation of each variable to get informal information about the variable and to check the trend, which will help in the stationarity test.

The first step include checking the stationarity of each variable. Although the method can incorporate, variables with both integrated of order 0 and 1 but it does not include variable that is

integrated of order 2. ADF and KPSS tests are used only to check the stationarity to avoid using variables of I(2).

As our study has included structural breaks for identifying a plebe in the data in case of sudden change or any step in the data in case of any technological change or in case of policy change. Structural breaks have been identified separately for each variable through the ISS and SIS technique. These techniques were applied individually to each variable and years were identified which were common in most of the variables. Then these impulses or steps can be incorporated in the equation or the same technique can be applied collectively to the ARDL equation in the end.

For using ARDL, first, the number of lags should be identified. For this, a simple regression is run through OLS and then the residuals are saved and their ACF and PACF graphs are used to identify the number of lags to be used. After identifying the number of lags to be incorporated, the ARDL method is applied.

ARDL method uses General to specific methods. It provides a GUM that is a Generalized Unrestricted model. Which incorporates all the variables with their lags. This model is then restricted through different methods including the manual method by using different restriction tests. This study has used auto metrics, which is an automatic method of identifying the significant variables. This technique gives a restricted model based on statistical significance. However, after using this method, the variables that were left out have been added one by one, so that the variables are double-checked. This will avoid the omission of variable, which has theoretical significance but not statistical significance. Restricted model independent variables are regress on dependent variables and results are incorporated. Different recursive tests and other model specification tests are done to make the results robust.

In the next step, the long-run static equation is derived from restricted ARDL model. The variables that are significant in the long-run static equation are forecasted using the ARMA model with IIS. Maximum likelihood estimation technique is used to estimate the ARMA model with the lowest AIC information criterion. The projections of each variable for the next five years from forecasting are used to predict GDP for the next five Years. This creates a hybrid model, including projections from atheoretical univariate analysis and coefficients from the theoretical long-run static equation to solve for the value of GDP from 2023 to 2027.

3.10. Data Description

This study has employed data from different resources like the State Bank of Pakistan, WDI (World Development Indicator), World Bank, and WTO. The data cover the time span of 1981 to 2022, which makes a total 42 observations. Each variable supports either import substitution or export-led growth. In case of Import substitution, the tariff rate is the policy variable along with other theory-based variables such as industrialization, imports, taxes less subsidies. In the case of export-led growth strategy, it is not a specific policy but a strategy in practice. Different variables can be used to support it such as exchange rate, trade liberalization, export promotion program (Taxes lee subsidies), exports, external balance, and export as a capacity to import and official development assistance. The study is based on annual time series data of different variables as shown below:

Table 3.1: Description of Variables and their source

S.N	Variable (symbol)	Description	Source
1	Gross Domestic Product (GDP)	It is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not involved in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources.	WDI
2	Export of goods and services (X)	Exports of goods and services contain transactions in goods and services (sales, barter, and gifts) from residents (own country) to non-residents (foreign country).	WDI
3	Merchandise Export (MX)	Merchandise exports are goods exiting the statistical territory of a country. It include only exports of physical goods.	WDI

4	External Balance on goods and services (EB)	External balance also known as formal resource balance is equal to exports minus imports balance.	WDI
5	Export as a capacity to import (ECI)	Exports as a capacity imports means the current price value of exports of goods and services deflated by the import price index.	WDI
6	Imports of goods and services (I)	Imports of goods and services characterize the worth of all goods and other market services received from the rest of the world.	WDI
7	Merchandise Imports (I)	Merchandise imports are goods, which add to a country's stock of material resources by coming into its statistical territory. It comprise import of only physical goods.	WDI
8	Industry (including construction), value added (IND)	It is net output of an industrial sector after adding up all outputs and deducting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or exhaustion and degradation of natural resources. The International Standard Industrial Classification (ISIC) determines the origin of value added.	WDI
9	Taxes less subsidies (TLS)	Taxes less subsidies on products (net indirect taxes) are the totality of product taxes less subsidies. Product taxes are those taxes billed by producers that relate to the production, sale, buying or usage of the goods and services.	WDI
10	Inflation (INF)	Inflation is the increase in the price of goods and services over time in a general level. The consumer price index is used as a proxy for	WDI

		Inflation. The inflation rate is measured by. CPIt – CPIt-1 / CPIt * 100 Consumer price index (2010 = 100)	
11	Net official development assistance received (ODA)	ODA consists of grants and loans given by the official sector to its country with the purpose of economic development and welfare at concessional financial terms.	WDI
12	Official exchange rate (ER)	Official exchange rate states to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual mean centered on monthly averages (local currency units comparative to the U.S. dollar).	SBP
13	Tariff rate, applied, weighted mean, all products (TR)	Weighted mean applied tariff is the average of effectually applied rates weighted by the product import parts corresponding to each partner country. Data is categorized using the Harmonized System of trade by the six- or eight-digit level.	WTO

CHAPTER

4. RESUTS AND DISCUSSION

4.1. The Informal or Graphical Representation

In this section, all the variables are graphically inspected to identify the trend in the series. It will further help us in unit root tests to whether to include the intercept and trend or not. The separate line graphs for all variables are shown below:

Figure 4.1: Variation of Gross Domestic Product ($) over time

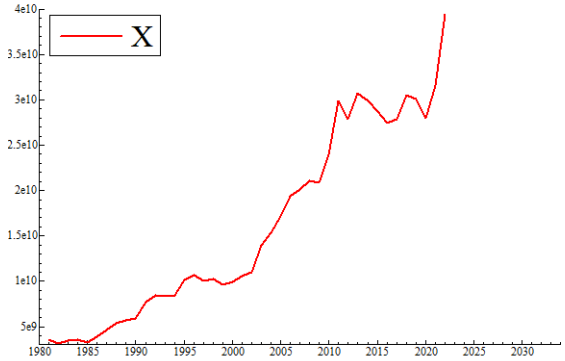

Figure 4.2:Variation of Exports ($) over time

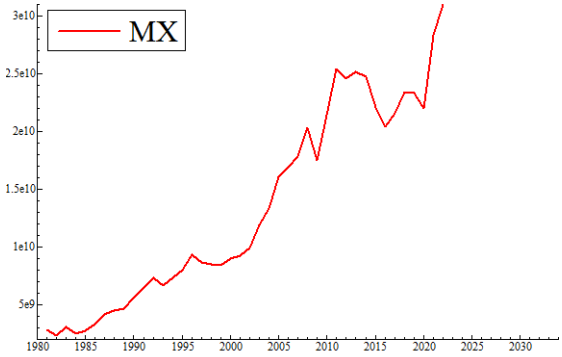

Figure 4.3: Variation of Merchandise Exports($) over time

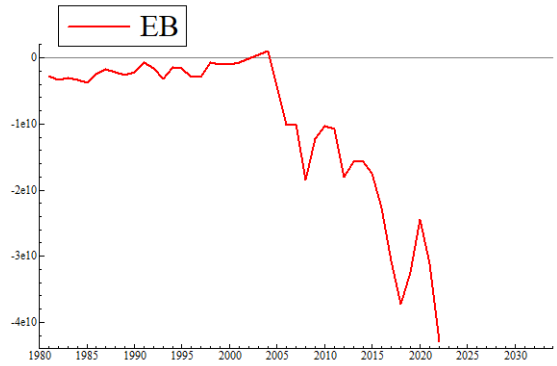

Figure 4.4:Variation of External Balance ($) over time

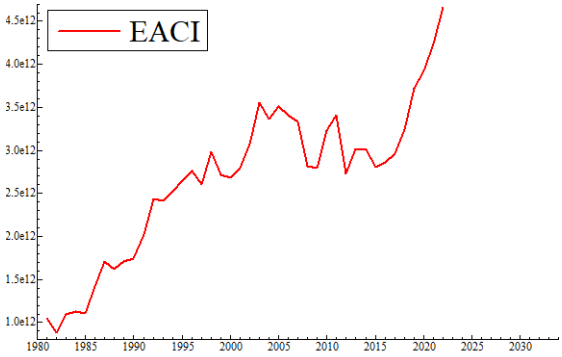

Figure 4.5: Variation of Exports as a capacity to import($) over time

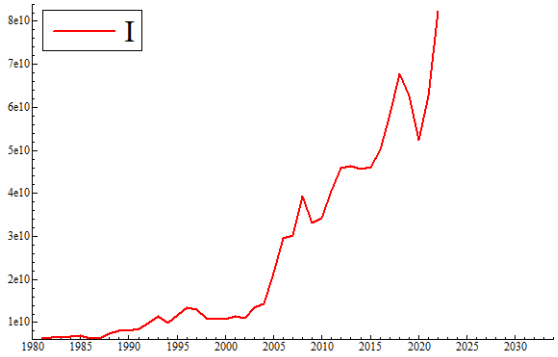

Figure 4.6: Variation of Imports ($) over time

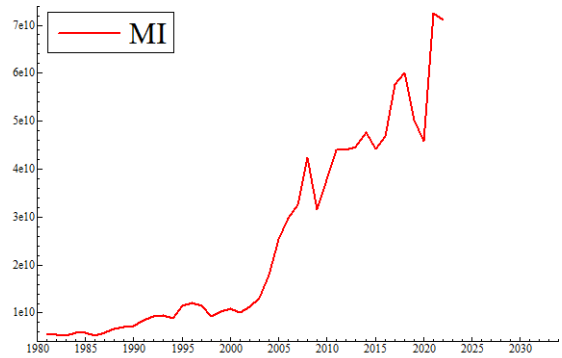

Figure 4.7: Variation of Merchandise Imports ($) over time

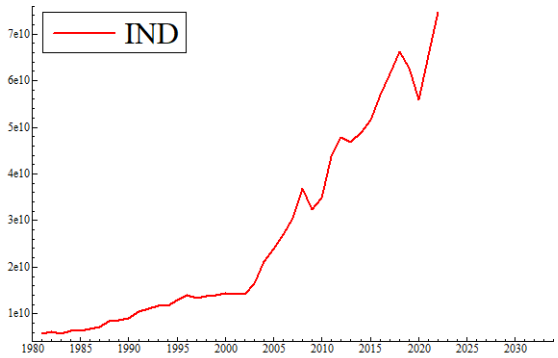

Figure 4.8*:* Variation of Industrialization ($) over time

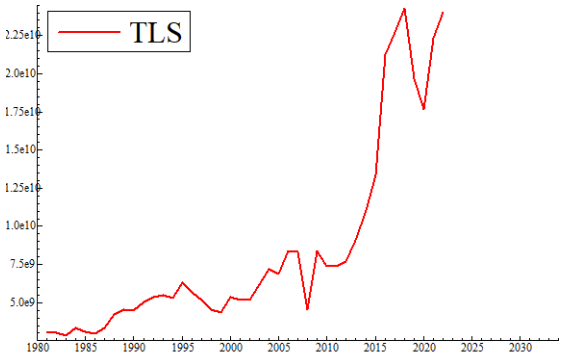

Figure 4.9: Variation of Taxes less subsidies ($) over time

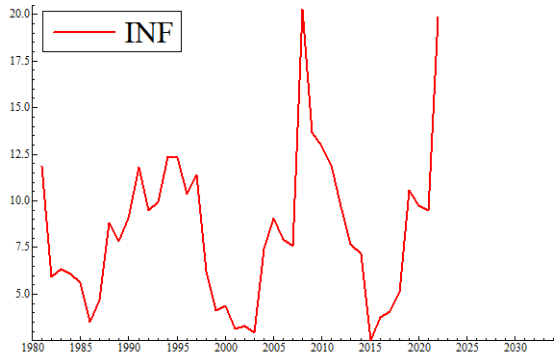

Figure 4.10: Variation of Inflation (%) over time

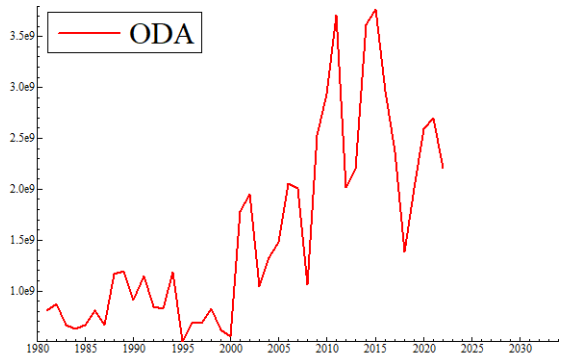

Figure 4.11: Variation of Official development index ($) over time

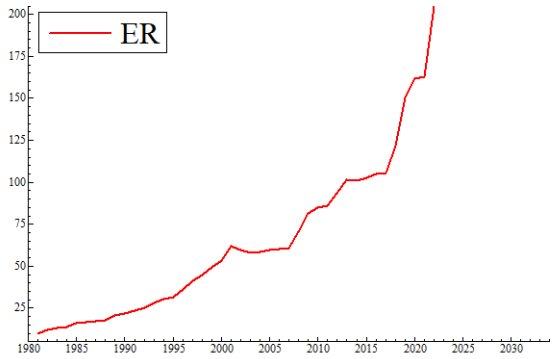

Figure 4.12: Variation of Exchange rate over time

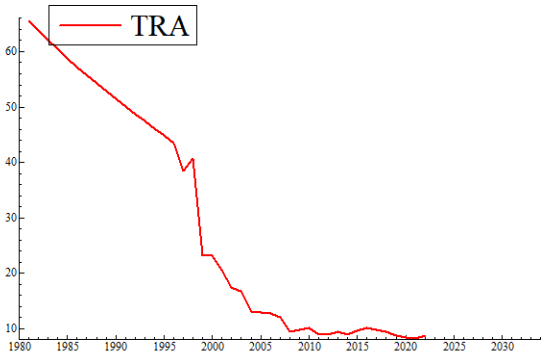

Figure 4.13: Variation of Tariff rate (%) over time

As we can see all the graphs show some kind of trend overall except INF and ODA. There are some impulses and steps in each data set which can be viewed through sudden ups and downs in the graph. Following each paragraph, explain the two graphs in the line one by one.

The first line shows graphs of GDP and exports. As we can see, both have an upward positive trend. GDP is showing a continuously upward trend but has shown a sudden downfall around the year 2020, which can be the result of COVID-19. In that phase, GDP decreased due to the lockdown of markets and industries, which in return decreased the consumption of people and production of goods. After the COVID phase, the GDP has regained its position with a sharp upward trend. Similarly, the exports have also shown an upward trend but from 2010 to 2020, Pakistan has not increased its exports significantly. In recent 2-3 years, Pakistan has increased its exports by a good amount.

In the second line, the first graph represents merchandise exports. As we can see merchandise exports and exports have somewhat the same graph, which means that they contribute to a large part of exports and most exports are in a physical form lacking the IT services. The second graph shows EACI, which is overall increasing over time but from 2000 to 2016, it has not shown any significant increase. As exports in the years were stagnant, due to which, EACI has also not shown any significant increase. After 2016, it started increasing significantly and smoothly.

The first graph in the third line shows the graph of External Balance. Through the graph, it can be viewed that the external balance of Pakistan has been negative throughout except for the years 2002 to 2005. After 2005, it started to increase negatively showing that Pakistan has been importing goods more than it exports. Pakistan has reached approximately 40 billion of negative external balance. However, in COVID-19, it decreased by 10 billion due to fewer imports in that time. The second graph in the third line shows the exchange rate of Pakistan, which shows an increase throughout the selected years without any significant ups or downs. This means that the Pakistani rupee is devaluing continuously.

The first graph in the fourth line shows imports from Pakistan. Pakistan began to import more goods after 2005. After that the amount dropped by a few in 2009 because of the financial crisis and after that in COVID when borders were closed and transportation was stopped. Otherwise, Pakistan has been importing large amounts of foreign goods. The second graph of the line shows the Inflation rate of Pakistan. The graph does not show any specific pattern. However, it can be visualized that there was hyperinflation during the financial crisis of 2008 and during recent two to three years due to the economic crisis of Pakistan. In 2015 however, the inflation rate was the lowest of all the years.

The first graph in the fifth line shows the merchandise exports of the country. The graph shows the same pattern as imports of the country. The imports decreased around the years 2008 and 2020. In 2009 due to financial crisis and in 2020 due to COVID. As both merchandise imports and overall imports are showing the same pattern it means that Pakistan is importing more physical goods than services. The second graph in the line shows value-added industrialization, which is the total output of the industrial sector after subtracting intermediate goods. It shows an upward pattern without significant disturbance except for the years 2008 and 2020 due to the reasons mentioned above. In 2008 due to an increase in oil prices, the input price increased so output decreased.

Similarly, in COVID-19 consumption decreased due to the lockdown and industries output decreased.

The first graph of the sixth line shows taxes less subsidies for Pakistan. As it shows an upward positive trend, it means that taxes have increased over time. Instead of a large amount of subsidies, the graph shows showing upward trend. It means that taxes were a lot more than subsidies. TLS has shown more sharp increase after 2012. Similarly, this variable also has shown a sudden decrease during the year 2008 and 2020 due to reasons mentioned above. The second graph shows Official Development assistance for Pakistan. This variable as viewed through graph do not show any specific pattern. It shows sharp upward trend in 2002, 2010 and 2015 while sharp downward trend in years 2008 and 2020. In recent years, it has decreased.

The last graph shows the weighted tariff rate for all the products in Pakistan. As it is visualized through the graph, the tariff rate in the 1980s was very high around 65% after which it started to decrease and sharply declined in the 1980s. It was because at that time the approach was moving toward a global economy and many developed countries started to use export-led growth strategies. The world was changing into a global village and Pakistan did not have enough industries to rely on their domestic production. After 2008, it decreased to a minimum level. Pakistan also changed its approach toward export-led growth strategy after the 1990s but the results were not fruitful.

By analyzing all the graphs, we can suggest that the years 2008 and 2020 are exceptional and in some cases 2015 too. These years affected approximately all the variables that were related to either import substitution or export-led growth strategy. By individually applying ISI and SIS to these variables, we can see which years repeatedly showed impulse or step in these all variables.

4.2. Unit Root

Table 4.1: Results of ADF unit root test

Variables	I(0)		I(1)		Order in which it is stationary
	Constant	Constant & Trend	Constant	Constant & Trend	
GDP	1.918772	-1.285126	-5.244482***	-6.271223***	I(1)
X	1.065521	-1.894515	-4.373666***	-4.561856***	I(1)
EACI	-0.418315	-1.664332	-6.208876***	-6.130080***	I(1)
MX	0.499451	-2.260200	-5.846195***	-5.916824***	I(1)
EB	2.286101	-0.138760	-5.189896***	-6.335605***	I(1)
I	2.128282	-0.803310	-5.555956***	-6.030243***	I(1)
IND	2.314227	-1.088428	-5.875901***	-7.125991***	I(1)
TLS	0.396212	-1.293218	-5.708232***	-5.908909***	I(1)
MI	1.484301	-1.430659	-7.091864***	-7.760179***	I(1)
INF	-5.104176***	-5.259399***			I(0)
ODA	-2.229512	-3.682147**	-6.705671***	-6.605019**	I(0)
ER	1.243224	2.481052**			
TRA	-1.638854	-0.619170	-7.803993***	-8.318220***	I(1)

*** is significance level at 1%, ** is significance level at 5%

Table 4.2: Results of KPSS unit root test

Variables	I(0)		I(1)		Order in which it is stationary
	Constant	Constant & Trend	Constant	Constant & Trend	
GDP	0.736485***	0.207216***			I(0)
X	0.783064	0.163358***	0.267774***	0.054972***	I(0)
EACI	0.717839***	0.136406***			I(0)
MX	0.786887	0.110328***	0.154516***	0.051526***	I(0)
EB	0.637173***	0.205335***			I(0)
I	0.735419***	0.735419***			I(0)
IND	0.743961	0.206759***	0.494814***	0.384415	I(0)
TLS	0.626577***	0.216000***			I(0)
MI	0.750835	0.195459***	0.398321***	0.500000	I(0)
INF	0.077111***	0.043633***			I(0)
ODA	0.650323***	0.120350***			I(0)
ER	0.782782	0.201724***	0.535183***	0.124467***	I(0)
TRA	0.751490	0.164074***	0.321586***		I(0)

*** is significance level at 1%, ** is significance level at 5%

The above tables show the results of the stationarity test. Two tests of stationarity are applied. One is ADF and the second one is KPSS. The null hypothesis of ADF is that the series contains a unit root i.e. it is not stationary. Except for Inflation, all the variables are stationary at first difference. The null hypothesis of the KPSS test is that the series is stationary around the deterministic trend. According to it, half of the variables are stationary at a level without a trend while all the variables are stationary at a level with a trend. Mostly these two tests are used counter counter-check the results, but both tests have different hypotheses. ADF test is concerned with whether the difference is required to achieve stationarity and KPSS is concerned with whether the series is stationary around the deterministic trend. KPSS test showed that these variables are stationary at a level due to deterministic trends.

The results of both tests confirmed that none of the variables is stationary at the second difference. ARDL incorporate variables of both I(0) and I(1) but do not incorporate variables of I(2). These tests are done to check the presence of variables with I(2).

4.3. ISS and SIS

After applying ISS and SIS to each variable, the year 2005, 2008, 2015, 2018, and 2020 is repeated for most of the variables. In these years, the graphs also showed sudden positive or negative impulses or steps. It means something unusual happened in these years that affected the imports, exports, and growth of the economy.

In 2005, which was the Musharraf era, economic figures showed a remarkable increase as compared to previous years. It showed an annual growth rate of 8.4% as compared to 6.45 in the previous year. This was mainly due to the large scale, which contributed around 15%. The agricultural sector also recovered from the drought faced by Pakistan in 2001 and 2002. The wholesale and retail trade grew by 12%. That is why we can see that the slope of all the variables in 2005 is positive and sharp comparatively.

In 2008, there was a lack of growth in Pakistan; the Annual growth rate was 5.8%, which was mostly contributed by the services sector. The agriculture and manufacturing sector did not show any growth. The political decision was delayed. The biggest upset was the financial turmoil in the developed countries, which affected the whole World. World trade was decreased by 15%. Inflation increased in Pakistan and domestic imbalances started to worsen. All these changes affected the growth of Pakistan and a sharp decline in most of the variables can be seen in the graph.

In 2015, during the Nawaz Sheriff era, again it achieved the highest growth rate after 2008-09. Inflations decreased from 8.8% to 4.5%. Oil prices decreased to the lowest in six years due to which the cost of production decreased and the trade sector was improved. A successful full implementation of china Pakistan economic corridor project had an important impact on the region. Although, still most of the growth was contributed by the service sector.

In 2020 due to COVID-19, the economy reported negative growth mainly due to less consumption, lockdown in the country, and the bane on international trade. In these years, all the economies in world were effected. People stated to consume less, transportation decreased; industries were shut

down and cross border trade was stopped due to COVID. All these factors contribute to a sudden fall in imports, exports, and growth.

4.4. ARDL

To apply the ARDL method, the following steps are taken to get the proper recipe for the model. Firstly, we applied a simple OLS method and regressed all the independent variables on GDP. After getting the results, residuals are saved and their ACF and PACF graph is drawn to do common factor analysis. The number of PACF bars outside the horizontal line marked at 0.26 will be the number of common factors between the dependent and independent variables.

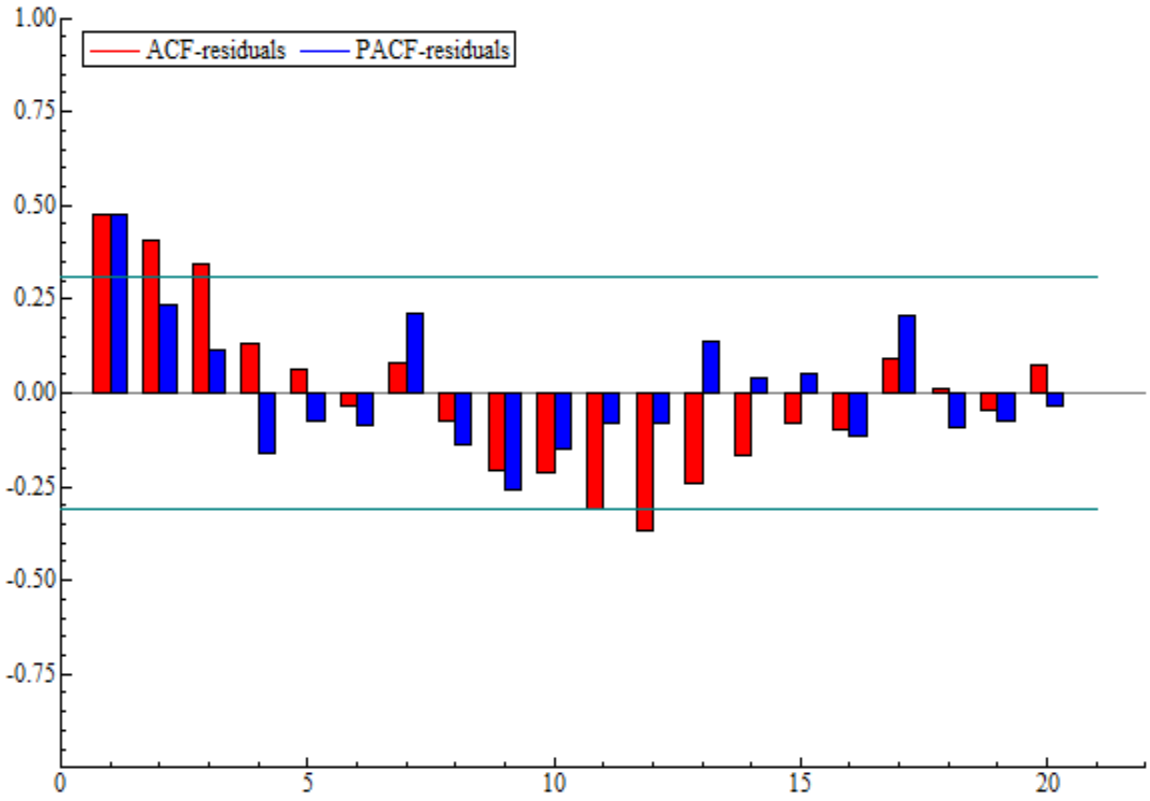

Figure 4.14: *ACF and PACF plot of residuals of model*

As we can see in the above graph, only one bar is outside the line which means there is only one common factor. It means that it is an AR (1) process and we will include one lag of all the independent variables along with the lag of the dependent variable. The GUM generated after including lags as follows:

$$GDP_t = \theta_0 + \sum_{i=0}^{p} \beta_i X_{t-i} + \sum_{i=0}^{q} \gamma_i I_{t-i} + \sum_{i=1}^{e} \lambda_i GDP_{t-i} + \eta_t \qquad (..4)$$

This equation is a generalized unrestricted model. Where X includes the variables of export-led growth strategy variables, I represents the variables of Import Substitution, and GDP is the dependent variable.

The following are the results of estimation of this GUM model:

Table 4.3: Results of generalized unrestricted ARDL model

Variables	Coefficients	Std. errors	t- value	t- prob
GDP_1	0.797893	0.1735	4.60	0.0003
Constant	0.000000	-----		
X	1.74923	2.116	0.827	0.4213
X_1	0.000000	-----		
EACI	-0.00144100	0.006966	-0.207	0.8389
EACI_1	0.00566237	0.006890	0.822	0.4240
MX	-4.19532	2.712	-1.55	0.1427
MX_1	-1.36589	3.630	-0.376	0.7120
EB	1.76695	0.9360	1.89	0.0785
EB_1	-0.563668	2.124	-0.265	0.7943
I	0.000000	-----		
I_1	-1.44558	1.924	-0.751	0.4640
IND	2.76991	1.049	2.64	0.0186
IND_1	-0.498864	1.212	-0.412	0.6864
TLS	1.44910	1.000	1.45	0.1679
TLS_1	-2.47758	1.249	-1.98	0.0659
MI	1.81297	0.7618	2.38	0.0310
MI_1	0.599780	0.8725	0.687	0.5023
INF	0.000000	-----		
Inf_1	0.000000	-----		
ODA	-0.701529	2.099	-0.334	0.7428

ODA_1	2.33148	2.068	1.13	0.2773
ER	0.000000	-----		
ER_1	0.000000	-----		
TRA	0.000000	-----		
TRA_1	0.000000	-----		

Sigma: 4.74737e+009

RSS: 3.3806215e+020

Log-likelihood: -951.078

No. of observations: 41,

No. of parameters: 26

Mean (GDP): 1.39537e+011,

Se (GDP): 1.12358e+011

AR 1-2 test: F (2, 13) = 0.47 513 [0.6322]

Normality test: Chi^2(2) = 15.772 [0.0004] **

Hetero test: not enough observations

RESET23 test: F (2, 13) = 0.60430 [0.511]

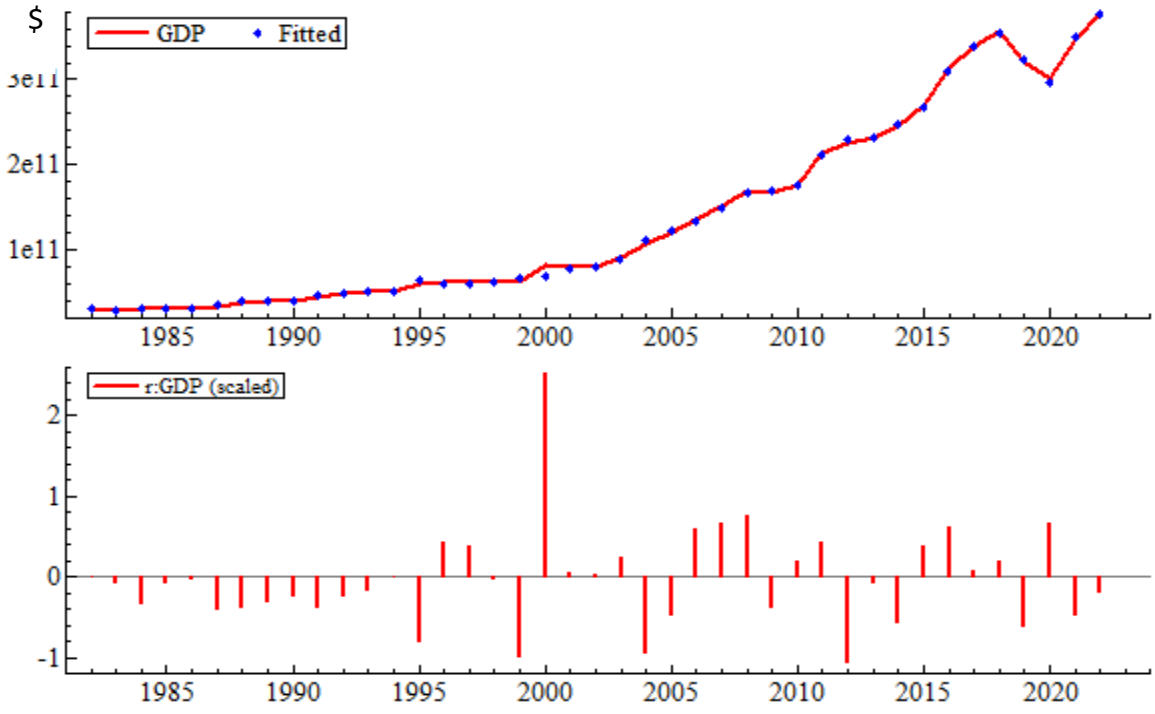

***Figure 4.15**:* Model for generalized unrestricted ARDL model

The above tables show the estimation results of regression including one lag. As we can see many variables are not significant and the number of parameters is large in number due to which degree of freedom is affected. To decide which variable is more or less important. We use the auto metrics technique. It is an automatic technique of including significant variables.

4.5. Auto Metrics

Table 4.4: Results of restricted ARDL model using auto metrics

Variables	Coefficients	Std. errors	t- value	t- prob
GDP_1	0.540188	0.1031	5.24	0.0000
IND	3.68532	0.3989	9.24	0.0000
TLS	2.14777	0.3950	5.44	0.0000
ER	-4.53284e+008	1.203e+008	-3.77	0.0007
X_1	-1.62416	0.7054	-2.30	0.0287
I_1	-0.572517	0.2985	-1.92	0.0650
TLS_1	-2.12892	0.5778	-3.68	0.0009
ER_1	4.37922e+008	1.400e+008	3.13	0.0040
ODA	2.04460	1.312	1.56	0.1301
TRA	-7.69425e+007	3.429e+007	-2.24	0.0327
EACI_1	0.00254983	0.001835	1.39	0.1752
EB	-0.0625417	0.3461	-0.181	0.8579

Sigma 3.43242e+009
RSS 3.41664157e+020
Log-likelihood -951.296
No. of observations 41
No. of parameters 12
Mean (GDP) 1.39537e+011
Se (GDP) 1.12358e+011
AR 1-2 test: F (2, 27) = 0.13384 [0.8753]
Normality test: Chi^2(2) = 9.7307 [0.0077] **
Hetero test: F (24, 16) = 1.5380 [0.1883]
RESET23 test: F (2, 27) = 2.9406 [0.0772]

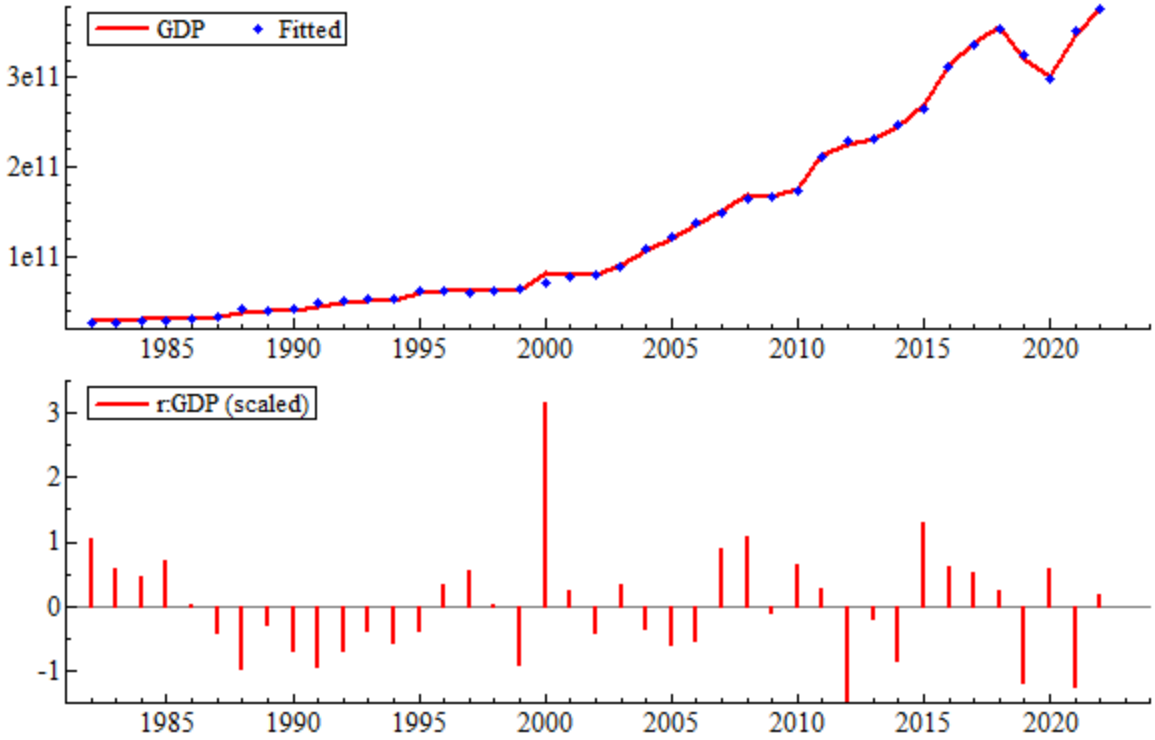

Figure 4.16: Graphical representation of restricted ARDL model

The variables in the upper table are selected based on the auto metrics technique but it is a statistical software that excludes the theoretical significance of the variable. Therefore, we have also used the manual trial & error method and different comparison methods to reach the model that has a low absolute value of adjusted R square.

The result shows that the coefficient of the lag variable of GDP is positive and significant. A coefficient of 0.54 indicates that one unit change in the GDP of one year has a half-unit impact on the GDP of the next year. It means that the growth of one year positively affects the growth of the next year. GDP is the indicator of the general health of the economy. It shows how an economy is performing. Therefore, if the economy is performing well, it creates a more productive environment for the future making people more positive about their future and economy.

The coefficient for value-added industrialization (IND) is positive and significant showing a value of 3.68. It means that one unit increase in industrialization increases the GDP of the country by more than three units. It has three times more effect on the growth. Industrialization is very

important for the growth of the country. As it increases the employment rate, production, and competitiveness of domestic products in the international market. Pakistan needs industries for its growth to meet the domestic demand of consumption, which is increasing due to population growth, and to increase its export capacity in the products having comparative advantage. It also decreases the import bill of the country due to which it also indirectly helps in the country's growth. This result is in line with the study of Ajmair, (2014) in which growth of industrial sector, large and small manufacturing sector and construction sector has positive impact on growth of GDP.

Taxes less subsidies (TLS) have a coefficient of 2.14, which is positive and significant. For the same year, it has a positive impact on the growth of the country. It generates more revenue for the government in the form of taxes. Specifically, the industries, which are running on heavy subsidies, or not paying taxes, if their taxes are increased or subsidies are reduced, both help in generating revenue for the government which can be used in other development projects that help in the growth of the country. It also increases the nominal budget of the country for the same year, which is reflected in the GDP of the same year. In Pakistan, heavy subsidies are given to different sectors, which makes them dependent and unable to grow and stand on their resources. Ilzetzki and Lagakos, (2017) in their article suggest increasing tax enforcement to involve sectors or people who are not paying taxes rather than increasing the rate which can affect the growth negatively.

The coefficient for the Exchange rate (ER) is -4.53284e+008, which is negative and significant for the same year. The large value of the coefficient is due to signify the effect of small scale as compared to other variables. The exchange rate has many linkages to other macro variables of the country and GDP itself. The effect of the exchange rate on growth is not specifically identified in general terms. In the case of Pakistan, the result shows that it has a negative impact on growth for the same year also suggested by Ahmad et al., (2013). It may be due to an increase in the import bill of the country. As Pakistan has a large number of imports including raw materials for different sectors and industries. It increases the import bill as a whole and the cost of production for the industries. It causes an external balance deficit. All these factors can be a reason to have a negative impact on the GDP.

The lag of exports (X_1) has a coefficient of -1.62416. It is significant but negative in contrast to the general positive relation between exports and GDP. This result in accordance with the paradox of plenty theory, which states that if a country abundantly relies on the exports of specific lucrative

goods which are not value-added and neglects the rest of the economy, it causes the GDP to decrease (MarisaOlson et al., 2014). It is also caused due "Dutch disease" (Auty, 2002). According to this theory, when the economy depends entirely on the exports of one sector, the exchange rate increases and negatively affects the other sectors with low exports causing GDP to decrease. In Pakistan, only a few industries are exporting without value addition of the products. Pakistan is lacking innovations in its products, exporting goods in the raw form.

Import (I_1) on the other hand has a coefficient of -0.52 at a 10% significance level. It means that a unit increase in imports decreases the GDP of the next year by 0.52 units. Pakistan over the years has adopted the import substitution policy to build demand for domestic products and increase in the domestic industries. The results also show that it has a negative impact on GDP as it decreases the external balance by increasing the import bill of the country hindering industrialization development. Similarly, depending on foreign goods does not increase the productive environment of the country. The result is in line with the study of Aslam et al., (2018) which shows negative relation of import and Economic development in short and long run. As in Pakistan, imports are very high due to which change in the exchange rate recently had a major impact on the inflation rate of Pakistan.

The lag of Taxes less subsidies (TLS_1) has a coefficient of -2.12, which is significant. Although for the same year, it has a positive impact on the GDP but this increase in taxes or decrease in subsidies effect become negative for the next year. AS it is not generating any revenue in the next particular year but is effecting the decision that the producers make. It cannot be made clear whether the increase in taxes has made is effect or decrease in subsidies but both of them increase the GDP for the same year but negatively affect it next year by approximately same amount. It means that in short run it will benefit the government but in long run it will affect the decisions in the way, which negatively influence the progress of the economy. Huge amount of taxes in Pakistan are making people reluctant to produce goods or to do productive investments.

The lag of Exchange rate (ER_1) has a coefficient value of 4.37922e+008, which is significant at 1% level. Exchange rate of Pakistan is showing positive relation to the GDP of the next year. By increasing exchange rate means that the local currency is appreciated against the foreign currency. It decreases the cost of imports making foreign goods cheaper and producers are able to earn more reserves by exporting goods. Increase in exchange rate increase the demand for the local currency

in the foreign market. It indirectly increases the foreign direct investment. In Recent years, Pakistan currency is devalued to very low level due to which all these factors mentioned above are effecting negatively the growth of Pakistan. The results also identified that exchange rate of previous year has significant effect of GDP as compared to the exchange rate of present year.

Official development assistance (ODA) has a coefficient value of 2.0 but at a significance level of 13%. Development assistance has a direct link to the growth of the economy if it is given to the productive activities of the government. Here, the targets of this development assistance are not known. Maybe the assistance is given for the development of some social activities which are hindering the productive nature of the people of Pakistan. Therefore, it has a positive impact on the progress of the country but is insignificant statistically to affect the GDP. However, a study of Perveen and Khan, (2021) shows that ODA has a positive and significant effect on the development of the Pakistan

The weighted average tariff rate for all the products has a coefficient of -7.69425e+007. It shows a negative relation to the GDP. Increasing the tariff rate can decrease the competitiveness of the economy. Imports of final goods can encourage the producers to be more efficient. It can create hindrances for industries that rely on foreign raw materials for manufactured goods. Import contributes more to GDP as compared to exports as it contain raw material, manufactured goods, and capital goods. According to Mujahid et al., (2019), border tariff rate and tariff rate on imported goods should be reduced to liberalize the economy.

Exports as a capacity to import variable has a coefficient of 0.00254983, but it is significant at 17%. According to a study by Badar, (2006), Pakistan's Export industry relies on imports. Raw materials contribute 24% and capital goods contribute 16% to the total export performance. The result is in accordance with the TRA variable. Pakistan needs to decrease the tariff rate in order to facilitate the export base industries of Pakistan.

In conclusion, the results suggest that Pakistan imports have more role in GDP then exports. Imported goods including raw materials and intermediate goods are utilized to enhance production efficiency and productivity which further increases export capacity in Pakistan. While imports of final goods increase competitiveness of the producer. Whereas, the main reason is that our exports have no role in international trade due to inelastic demand and primary goods. Our exporters are not following international standard that's why our export are continuously declining from last

few year due to foreign competition in international market with India and Bangladesh. The elasticity coefficient of capital goods reflects that by increasing, the capital imports for those exporting industries, which have a potential to export but due to capacity constraints, are unable to do so, we can increase the export level of the country.

In addition, this study also indicates that in medium to long run, it is the structure of imports, particularly capital and raw materials, which should be monitored closely. As according to the study of Zeeshan and Nasir, (2019), there many products which have strong backward- linkages and many have strong forward linkages. Pakistan needs to focus on manufacturing products which produce strong forward linkages and increase production, while products creating backward linkages should be monitor to check the role of imports.

This will help the policymakers to focus on importing more of those items, which are directly used in export production. Thereby increasing the export capacity of the country and reducing the excess pressure on trade imbalances. Therefore, any one approach cannot work in the case of Pakistan. It need to improve its quality of exports without interrupting the manufacturing process of export base industries through import restrictions, which leads to policy mix solution.

4.6. Recursive Analysis

Recursive analysis is the part of dynamic analysis, which shows the performance and stability of the model and changes over time in the variable. Recursive graphics can provide insights into how economic relationships evolve and help researchers and analysts understand the dynamic nature of economic variables.

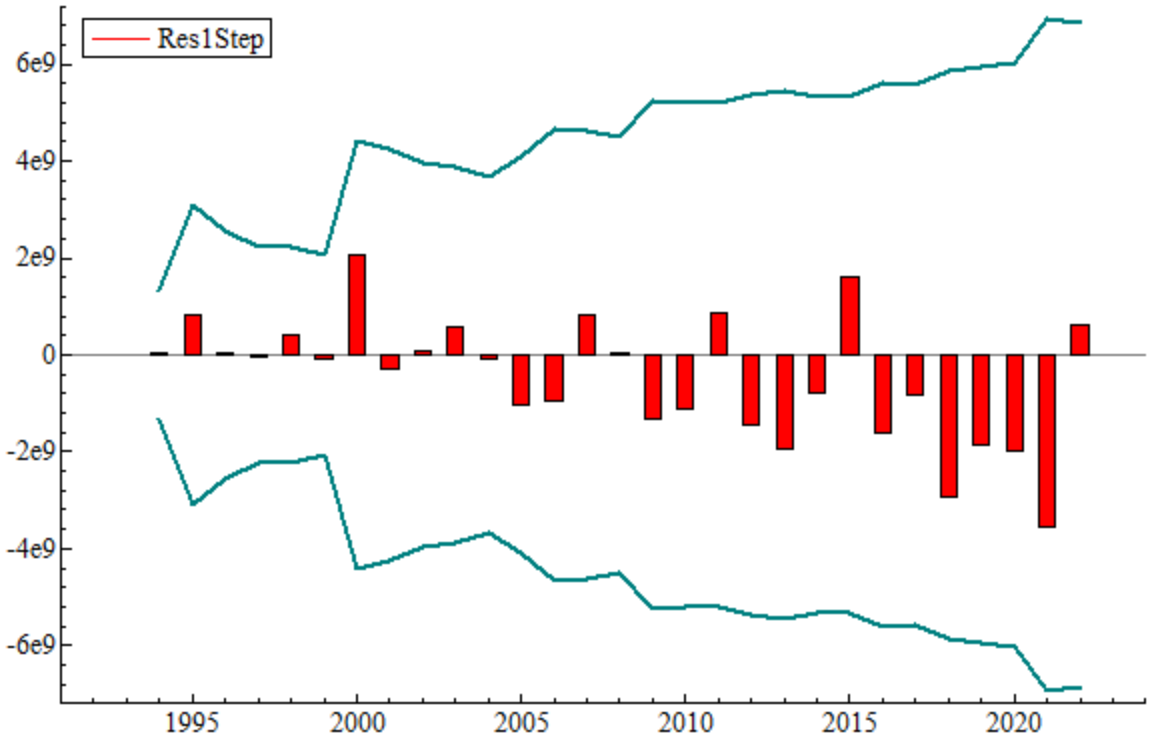

Figure 4.17: Res1Step graphical representation

This graph represent the precision of beta coefficinet over the time. It tells that based on sample data, there 99% of chance that populaton beta will fall in this interval. The confidence interval in this grpah is built with the width of approximately one standard error. As the beta coefficient line represent by red is between the interval, we can say that the beta coefficient is a good estimator of population.

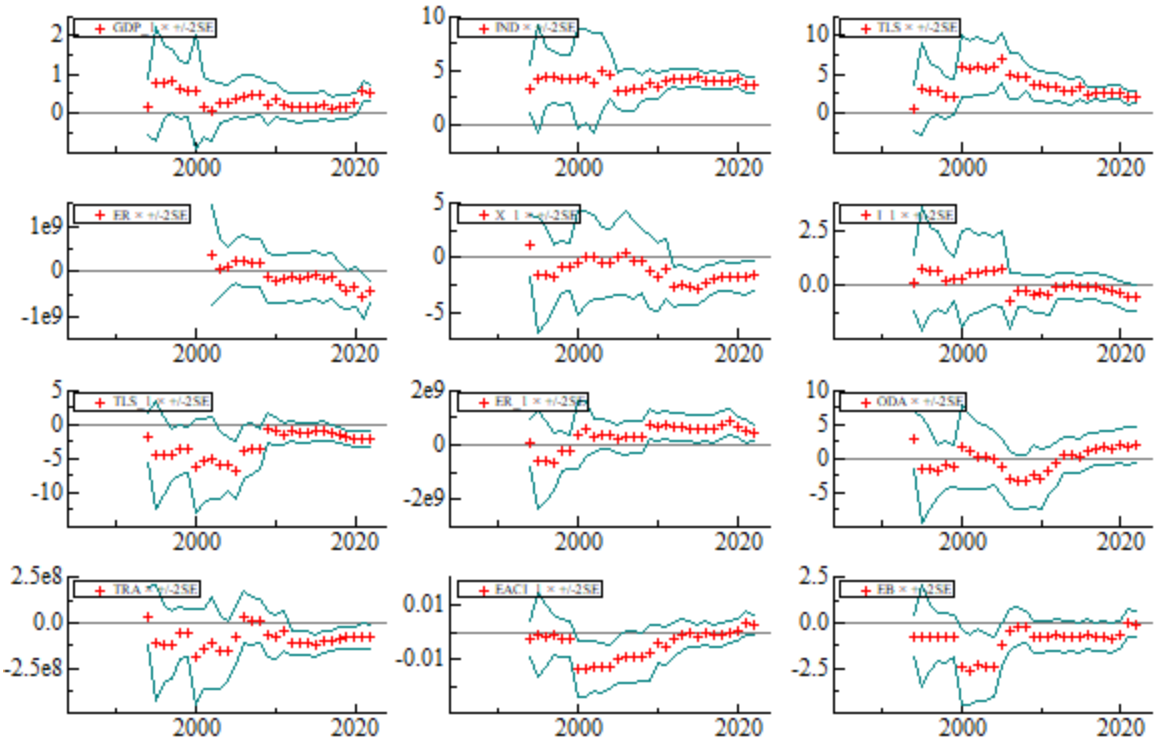

Figure 4.18: Beta Coeffecient +/-SE test results

The expression "beta coefficient +/- 2SE" implies constructing a confidence interval with a width of approximately two standard errors on either side of the estimated beta coefficient. The choice of "2" is common in statistical practice and corresponds to a 95% confidence interval. In other words, it is expected that, based on the sample data, the true population beta coefficient has a 95% chance of falling within this interval.

This interval provides a sense of the precision of the estimated beta coefficient and helps researchers assess the reliability of their findings in regression analysis. As we can see with the increase of sample size the coefficient become more precise. Beta coefficient lies between the confidence interval for all the variables included in the restricted model.

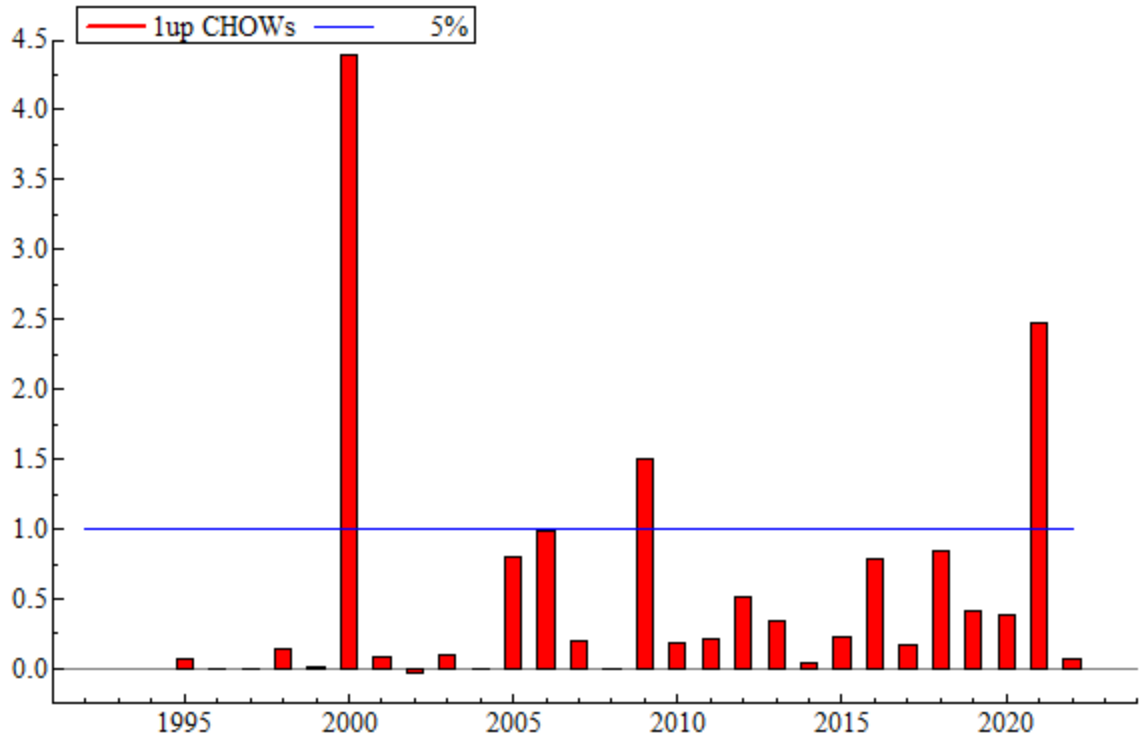

Figure 4.19: Accessing structural breaks in data through CHOWs test result at 5% significance level

The "one-step Chow test" specifically refers to a version of the Chow test where the structural break is assumed to occur at a specific point in the dataset. It helps identify points in time where there might be a significant change in the relationship between variables. As graph represents that, the data points around years 2000, 2008 and 2020 lies outside the confidence interval, suggesting that there is a significant difference in the coefficients before and after the break point.

4.7. Long Run Statistic Equation

The solved static long-run equation for GDP is given in the following tables. Among all the variables of the restricted model of GDP, five variables significantly affect the GDP in the long run. The term "static" implies that the analysis is conducted at a particular point in time, and it assumes that the relationships between variables do not change over that period.

Table 4.5: Long run static equation results

Variables	Coefficients	Std. errors	t- value	t- prob
IND	4.73031	0.2605	18.2	0.0000
TLS	2.68218	0.3801	7.06	0.0000
X	-3.14746	0.8671	-3.63	0.0057
ODA	6.26542	1.391	4.50	0.0001
TRA	-1.92844e+008	3.114e+007	-6.19	0.0000

Long-run sigma = 4.79106e+009

4.8. Projection Using ARIMA Modeling

In this section, each of the five variables of a static long-run equation is Projected using ARIMA modeling and the box Jenkins method. Univariate atheoretical project of the variable is done to get the projection of each variable for the next five variables. All the variables are first converted in to the rate by taking Dlog of the series, so the series are stationary and only ARMA models applies. Maximum likelihood estimation process is used to estimate the different ARMA models.

Structural breaks are added in the projection process of each variable. Significant breaks for each variable are identified by the IIS method and auto metrics is used to get breaks that are more significant for each variable. The IIS method is used as an impulse indicator to identify plebe or sudden breaks, and the step indicator (SIS) that identifies the change, that lasts for some time, is not used due limited number of observations.

4.8.1. Industrialization (IND)

To forecast the variable IND and get the projections of it in the next five years. The variable IND is converted in the rate of IND by taking the D-log of the variable by the formula:

$$\boldsymbol{\gamma_t = \ln \frac{IND_t}{IND_{t-1}}.}$$

Different ARMA models are estimated to get the most suitable model for the projections based on AIC information. The chosen model with the lowest AIC information ARMA (2,0,2) is estimated without an in-sample forecast with a significant break of 2020. The first lag of the AR and MA process is not fixed. The significant breaks are 2008 and 2020.

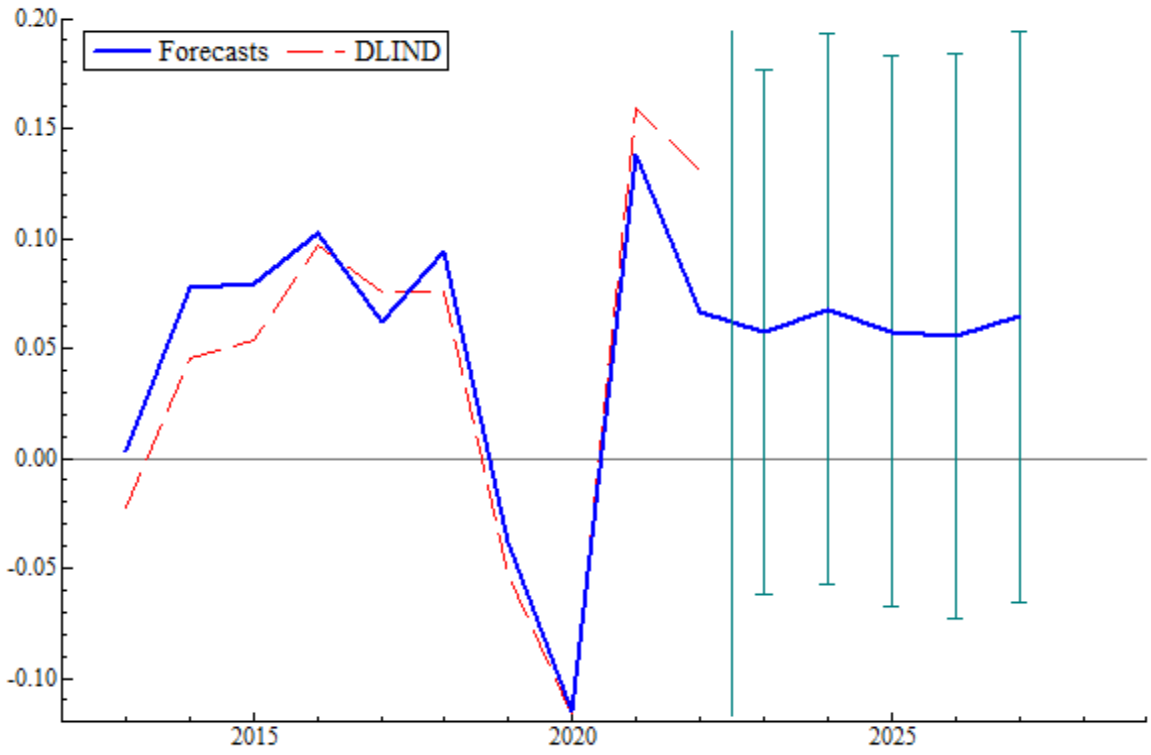

Figure 4.20: Graphical representation of forecast of rate of Industrialization

Table 4.5: Rate of Industrialization projection results

Horizon	Projections(γ_t)	(SE)
2023	0.087322	0.05969
2024	0.057554	0.05260
2025	0.047706	0.06262
2026	0.045308	0.06419
2027	0.034607	0.06491

Descriptive statistics for residuals:
Normality test: Chi^2(2) = 0.81863 [0.6641]
ARCH 1-1 test: F (1, 28) = 0.30424 [0.5856]
Portmanteau (6): Chi^2(2) = 3.8011 [0.1495]
The projected values for γ_t are then converted to original IND series by formula: $IND_t = e^{\gamma_t} * IND_{t-1}$

The projected values of the variable IND are

Table 4.6: Projection values for Industrialization ($)

Horizon	Projection
2023	81449888649
2024	86275181087
2025	90490780079
2026	94685035528
2027	98019159821

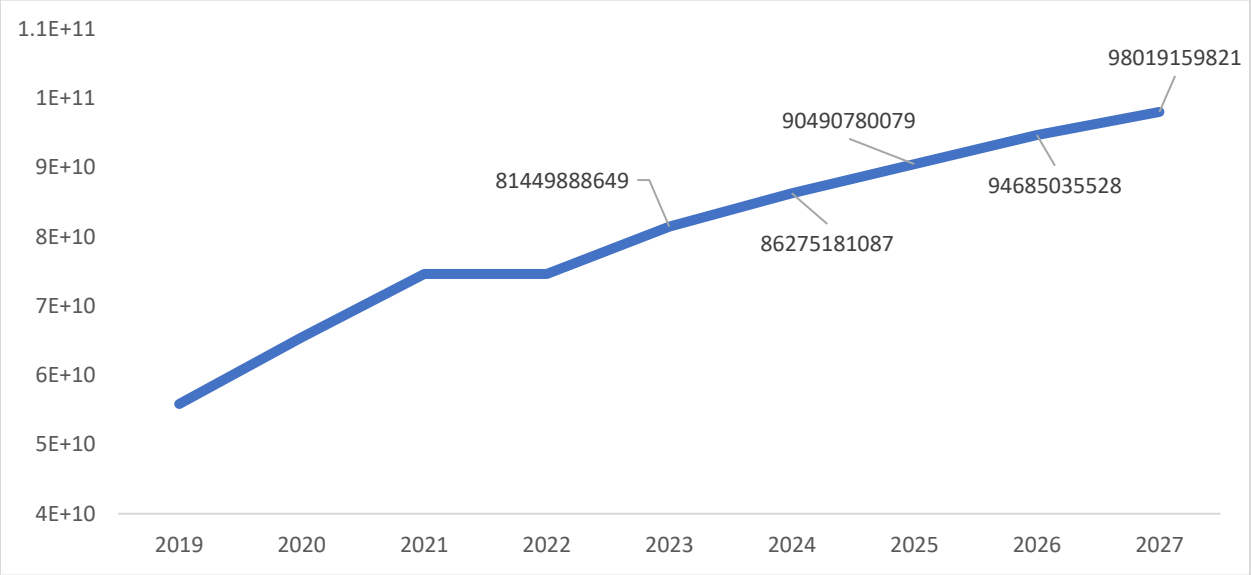

***Figure 4.21**:* Graph of projected values for Industrialization

4.8.2. Taxes less subsidies (TLS):

In the case of TLS, after changing the variable into rate of ODA, the ACF and PACF plot for the DLTLS shows first lag of both AR and MA process to be significant. So, ARMA (1,0,1) having the lowest AIC information is chosen with the addition of significant breaks. The significant breaks, in case of TLS, are 2008, 2009, 2016 and, 2019. The projectefore rates of TLS are in given in the following table:

Table 4.7: Rate of Taxes less subsidies projection results

Horizon	Projection	(SE)
2023	0.0088282	0.1017
2024	0.078801	0.1034
2025	0.023146	0.1045
2026	0.067413	0.1051
2027	0.032203	0.1056

Descriptive statistics for residuals:
Normality test: Chi^2(2) = 2.3473 [0.3092]
ARCH 1-1 test: F(1,32) = 0.037691 [0.8473]
Portmanteau(6): Chi^2(4) = 3.5962 [0.4634]

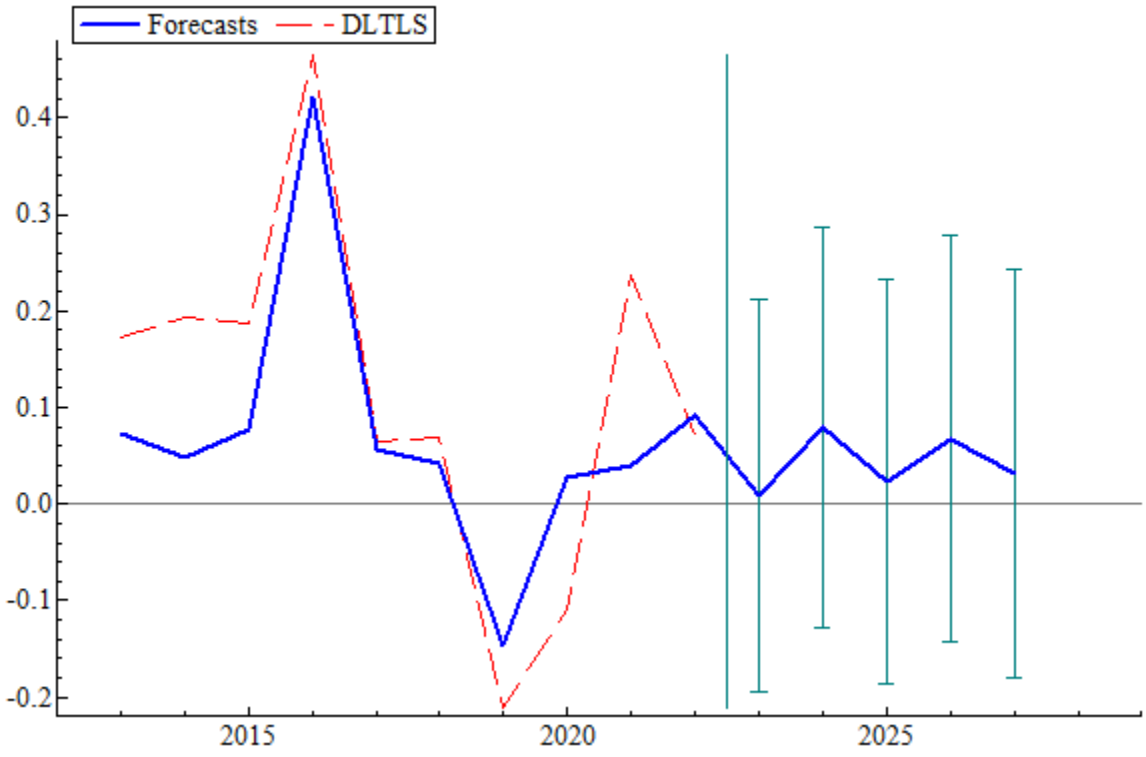

Figure 4.22: Graphical representation of forecast of rate of Taxes less subsidies

After converting the rate into original series of TLS, the projections for these five years are given as:

Table 4.8: Projection values for Taxes less subsidies ($)

Horizon	Projection
2023	24241184993
2024	26228695142
2025	26842864887
2026	28714810813
2027	29654564092

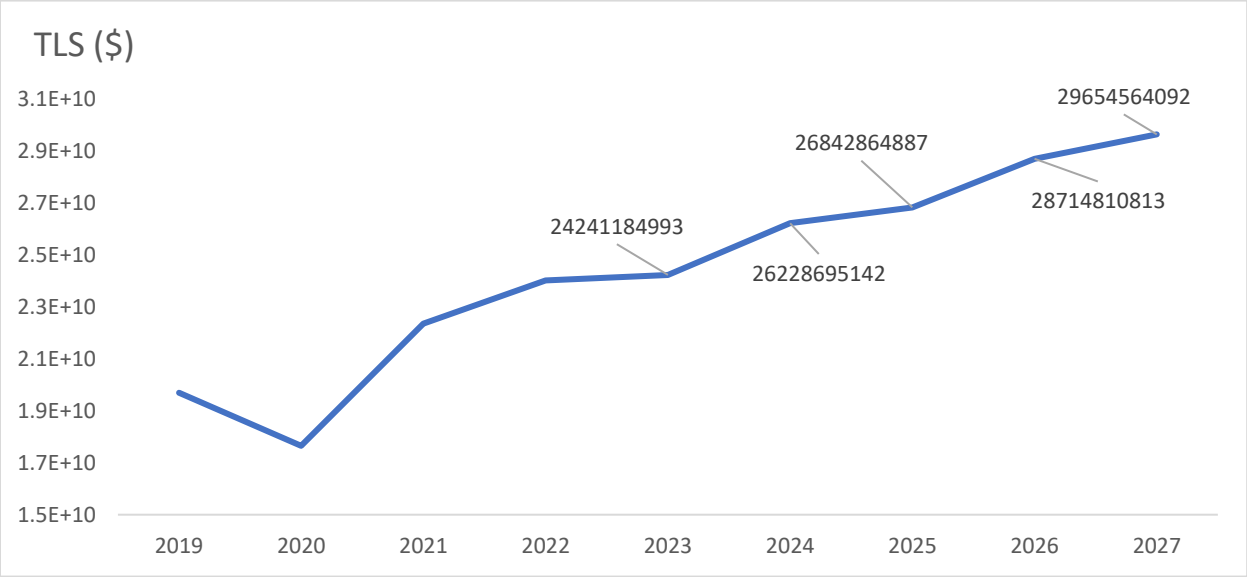

Figure 4.23: Graph of projected values for Taxes less subsidies

4.8.3. Exports (X):

For X, the same process is followed by taking the rates of X through Dlog. The model ARMA (2,0,2) with lowest AIC information is chosen without fixing the lags.There are two significant breaks in year 2016 and 2022. By introducing the breaks the projections for the rate of X variable is given as.

Table 4.9: Rate of Exports Projections results

Horizon	Projections	(SE)
2023	0.059121	0.07417
2024	0.087277	0.07574
2025	0.013608	0.07852
2026	0.10076	0.08047
2007	0.034736	0.08085

Descriptive statistics for residuals:
Normality test: Chi^2(2) = 0.98792 [0.6102]
ARCH 1-1 test: F(1,32) = 0.50749 [0.4814]
Portmanteau(6): Chi^2(2) = 4.9029 [0.0862]

After converting the rate into original series of X, the projections for these ive years are given as

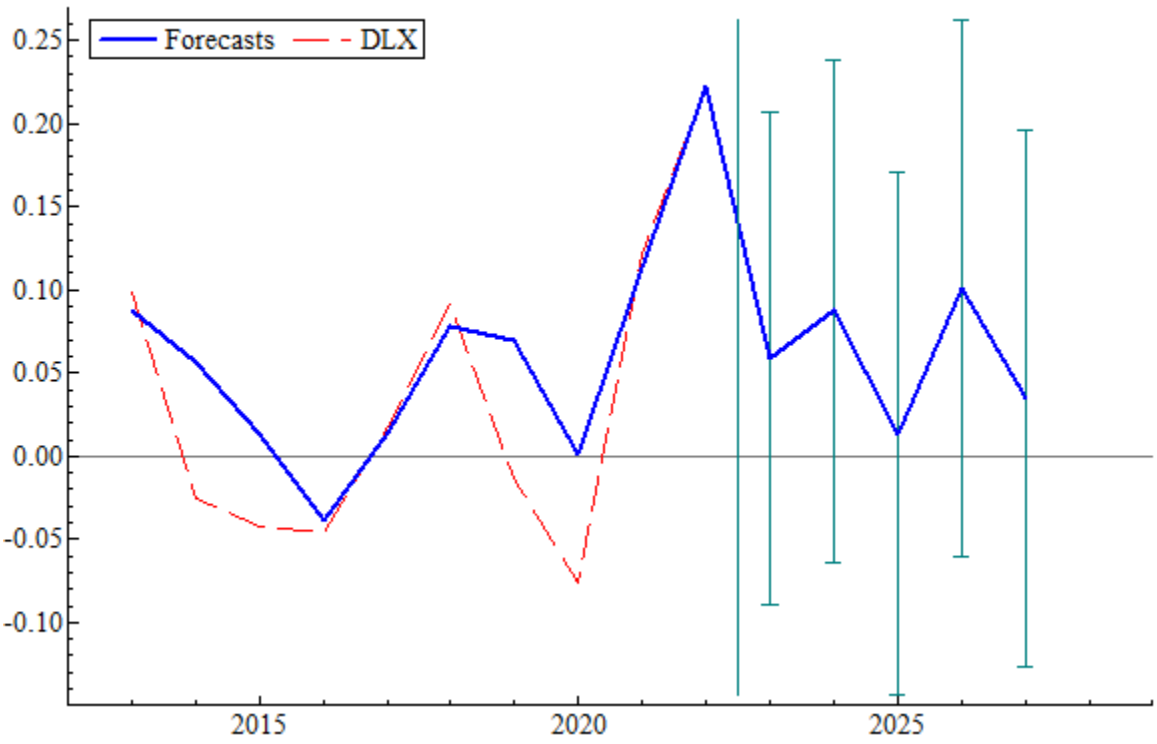

Figure 4.24: Graphical representation of forecast of rate of Exports

Table 4.10: Projection values for Exports ($)

Horizon	Projections
2023	41815989677
2024	45629561936
2025	46254733032
2026	51158251270
2007	52966508279

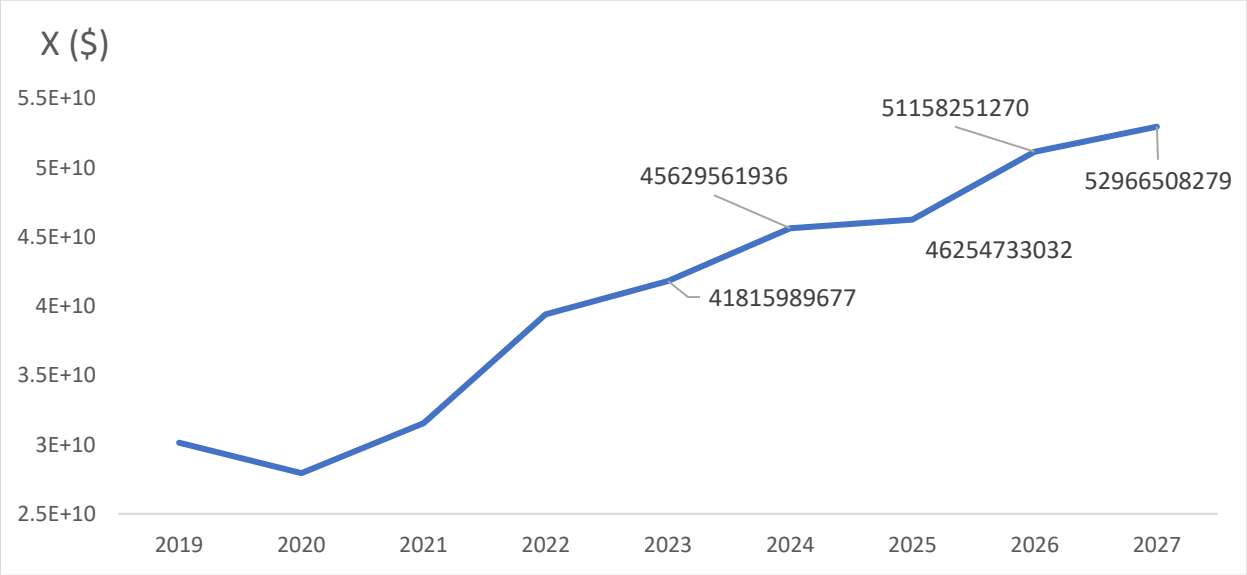

Figure 4.25: Graph of projected values for Exports

4.8.4. Official development assistance (ODA)

In the case of ODA, after changing the variable into the rate of ODA, the ACF and PACF plot shows ARMA (2,0,3) significant. So, the ARMA (2,0,3) model is more significant and suitable having the lowest AIC information criterion. Due to taking Dlog the variable becomes stationary at level. The lags are not fixed. The significant breaks for the variable DLODA are 1995, 2001, and 2009. The projections for the rate of ODA using the ARMA (2,0,3) model and significant breaks is given in table as:

Table 4.11: Rate of Official development assistance projection results

Horizon	Projections	(SE)
2023	0.13502	0.2217
2024	0.021341	0.2776
2025	0.043481	0.2816
2026	-0.0078746	0.2848
2027	-0.032811	0.2869

Descriptive statistics for residuals:
Normality test: Chi^2(2) = 3.0212 [0.2208]
ARCH 1-1 test: F(1,30) = 0.053508 [0.8186]
Portmanteau(6): Chi^2(1) = 0.91985 [0.3375]

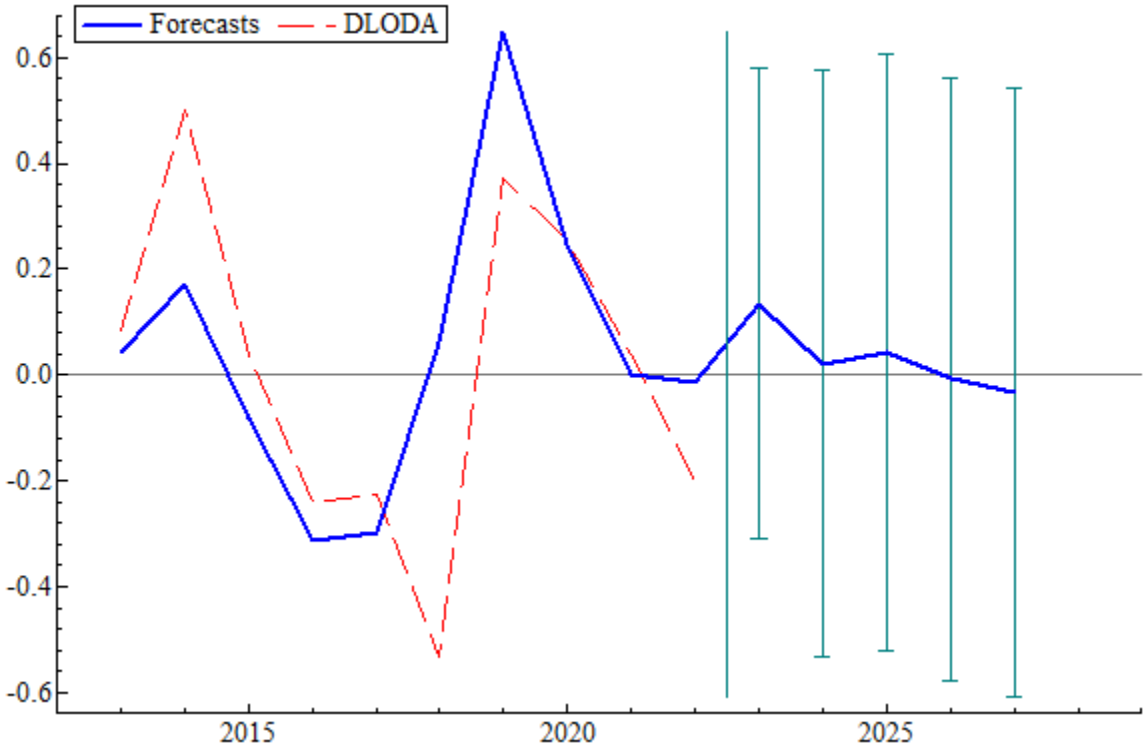

Figure 4.26: Graphical representation of forecast of rate of official development assistance

After converting the rate into original series of ODA, the projections for these five years are given as:

Table 4.12: Projection values for Official development assistance ($)

Horizon	Projections
2023	2529616543
2024	2584181251
2025	2699022653
2026	2677852392
2007	2591415178

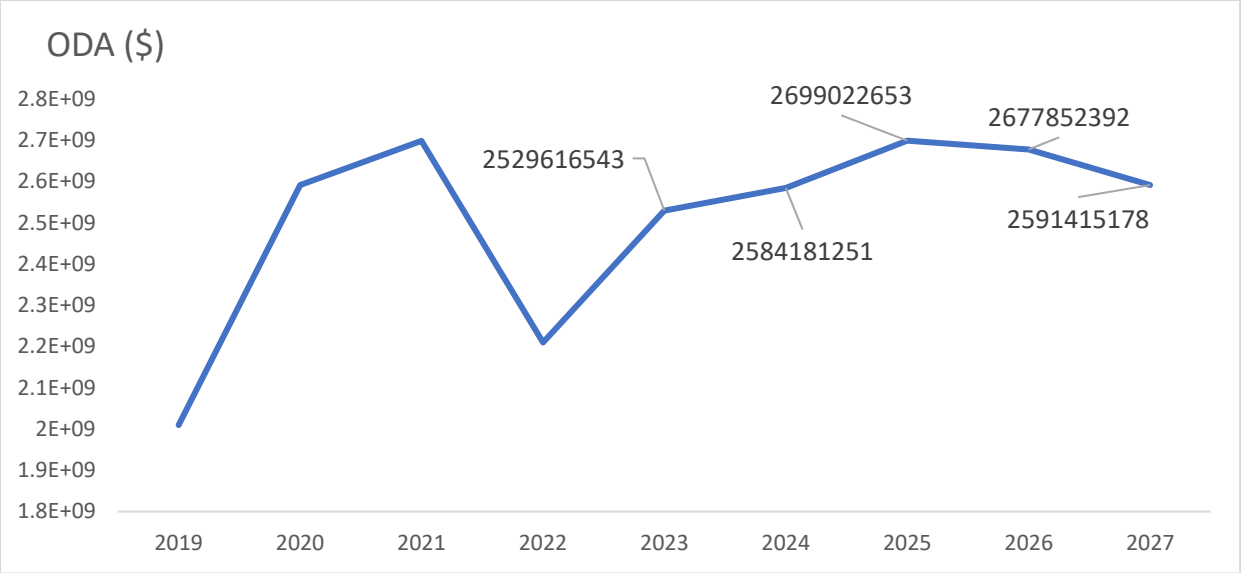

Figure 4.27: Graph of projected values for Official development assistance

4.8.5. Tariff rate average (TRA):

For TRA, the same process is followed by taking the rates of TRA through D-log. The model ARMA (2,0,2) with lowest AIC information is chosen without fixing the lags. There are two significant breaks in year 2004 and 2015, that are significant in increasing the forecasting performance of the variable. By introducing the breaks, the projections for the rate of X variable is given as:

Table 4.13: Rate of Tariff projection results

Horizon	Projection	(SE)
2023	-0.016491	0.08451
2024	0.017002	0.08594
2025	-0.018231	0.09176
2026	-0.052333	0.09485
2027	-0.052785	0.09490

Descriptive statistics for residuals:
Normality test: Chi^2(2) = 155.28 [0.0000]**
ARCH 1-1 test: F(1,32) =0.00032383 [0.9858]
Portmanteau(6): Chi^2(2) = 0.11463 [0.9443]

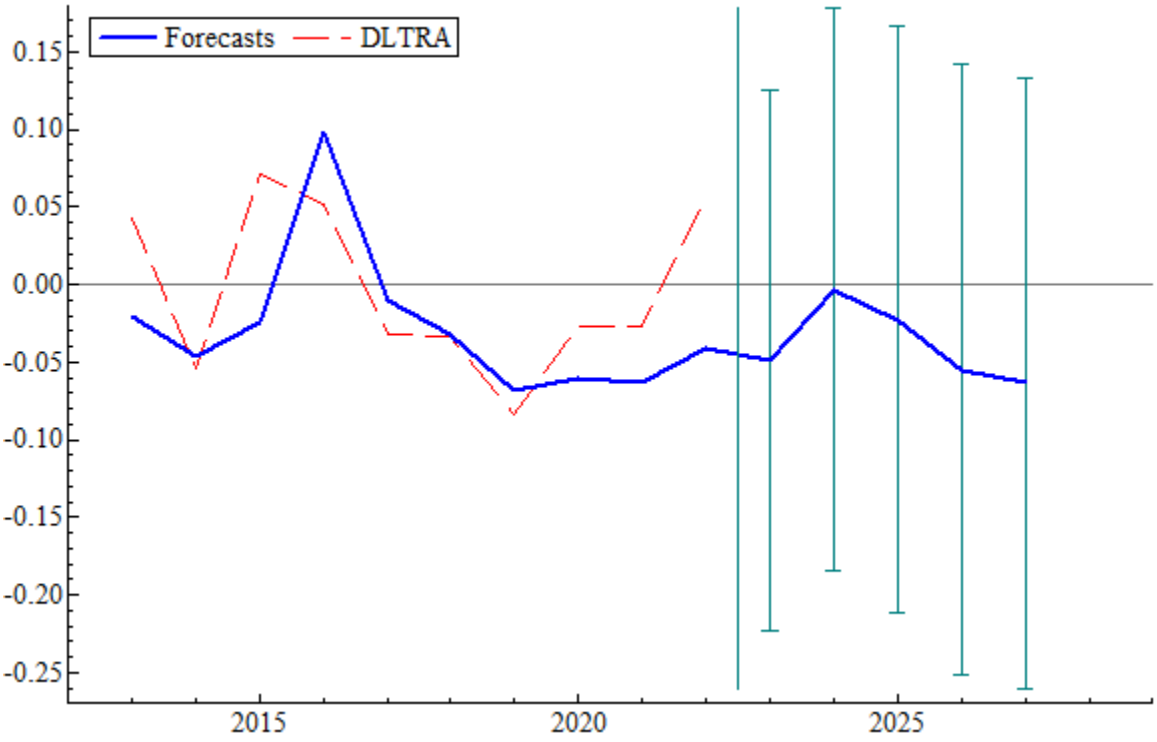

Figure 4.28: Graphical representation of forecast of rate of tariff

After converting the rate into original series of ODA, the projectionss for these five years are given as:

Table 4.14: Projection values for Tariff (%)

Horizon	projection
2023	8.55770482
2024	8.704446836
2025	8.547193861
2026	8.111396318
2007	7.694340246

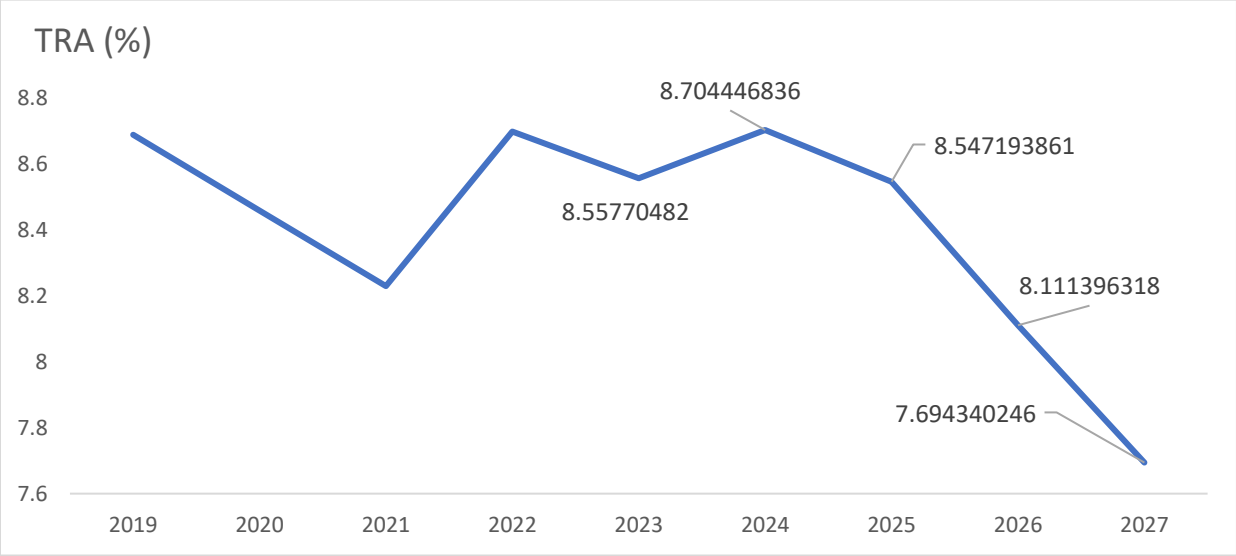

Figure 4.29: Graph of projected values for tariff

4.9. GDP Prediction

In this section, GDP s predicted by hybrid model combining Coefficients from the Static long run equation of ARDL model and Value of the variables from atheoratical univariate projections for the next five years i.e. t = 1…..5.

$$GDP_{t+i} = \beta_1 IND_{t+i} + \beta_2 TLS_{t+i} + \beta_3 X_{t+i} + \beta_4 ODA_{t+i} + \beta_5 TRA_{t+i} + \varepsilon_t \quad (..5)$$

$\beta_1 = Industry, value\ added\ long\ run\ coeffecient$

$\beta_2 = Taxes\ less\ subsidies\ long\ run\ coeffecient$

$\beta_3 = Exports\ of\ goods\ and\ Services\ long\ run\ coefecient$

$\beta_4 = Net\ official\ Development\ Assistance\ long\ run\ coeffecient$

$\beta_5 = Tariff\ rate\ (weighted)\ long\ run\ coeffecient$

These coefficients are taken from the long-run static equation derived from the theoretical ARDL model incorporating variables from both approaches i.e. import substitution and export-led growth strategy.

For t=1 (2023)

$$GDP_{t+1} = \beta_1 IND_{t+1} + \beta_2 TLS_{t+1} + \beta_3 X_{t+1} + \beta_4 ODA_{t+1} + \beta_5 TRA_{t+1} + \varepsilon_t \quad (..6)$$

GDP_{t+1} = 4.73031(81449888649) + 2.68218(24241184993) - 3.14746 (41815989677) + 6.26542(2529616543) - 192844000(8.55770482)

= 3.32887E+11$

For t=2 (2024)

$$GDP_{t+2} = \beta_1 IND_{t+2} + \beta_2 TLS_{t+2} + \beta_3 X_{t+2} + \beta_4 ODA_{t+2} + \beta_5 TRA_{t+2} + \varepsilon_t \quad (..7)$$

GDP_{t+2} = 4.73031(86275181087) + 2.68218(26228695142) - 3.14746 (45629561936) + 6.26542(2529616543) – 192844000(8.704446836)

=3.49012E+11 $

For t=3 (2025)

$$GDP_{t+3} = \beta_1 IND_{t+3} + \beta_2 TLS_{t+3} + \beta_3 X_{t+3} + \beta_4 ODA_{t+3} + \beta_5 TRA_{t+3} + \varepsilon_t \quad (..8)$$

GDP_{t+3} = 4.73031(90490780079) + 2.68218(26842864887) - 3.14746 (46254733032) + 6.26542(2584181251) -192844000(8.547193861)

= 3.69005E+11 $

For t=4 (2026)

$$GDP_{t+4} = \beta_1 IND_{t+4} + \beta_2 TLS_{t+4} + \beta_3 X_{t+4} + \beta_4 ODA_{t+4} + \beta_5 TRA_{t+4} + \varepsilon_t \quad (..9)$$

GDP_{t+4} = 4.73031(94685035528) + 2.68218(28714810813) - 3.14746 (51158251270) + 6.26542(2699022653) -192844000(8.111396318)

= 3.79236E+11 $

For t=5 (2027)

$$GDP_{t+5} = \beta_1 IND_{t+5} + \beta_2 TLS_{t+5} + \beta_3 X_{t+5} + \beta_4 ODA_{t+5} + \beta_5 TRA_{t+5} + \varepsilon_t \quad (..10)$$

GDP_{t+5} = 4.73031(98019159821) + 2.68218(29654564092) - 3.14746 (52966508279) + 6.26542(2591415178) -192844000(7.694340246)

= 3.91242E+11 $

The prediction for the next five years show that GDP tends to increase after decline in the year 2023. Two variables including exports and tariff rate show a negative long run effect on the GDP. The effect of industrialization, taxes less subsidies and net official development assistance shows a positive effect on the GDP in the long-run and outweighs the effect of two variables having a negative effect after 2023. As the graph shows the economic situation of 2023 has a large negative impact on the economy which will take Pakistan next three years to reach around its GDP of 2022.The overall impact of five variables become positive on the growth of Pakistan in the next five years as shown in the graph as following:

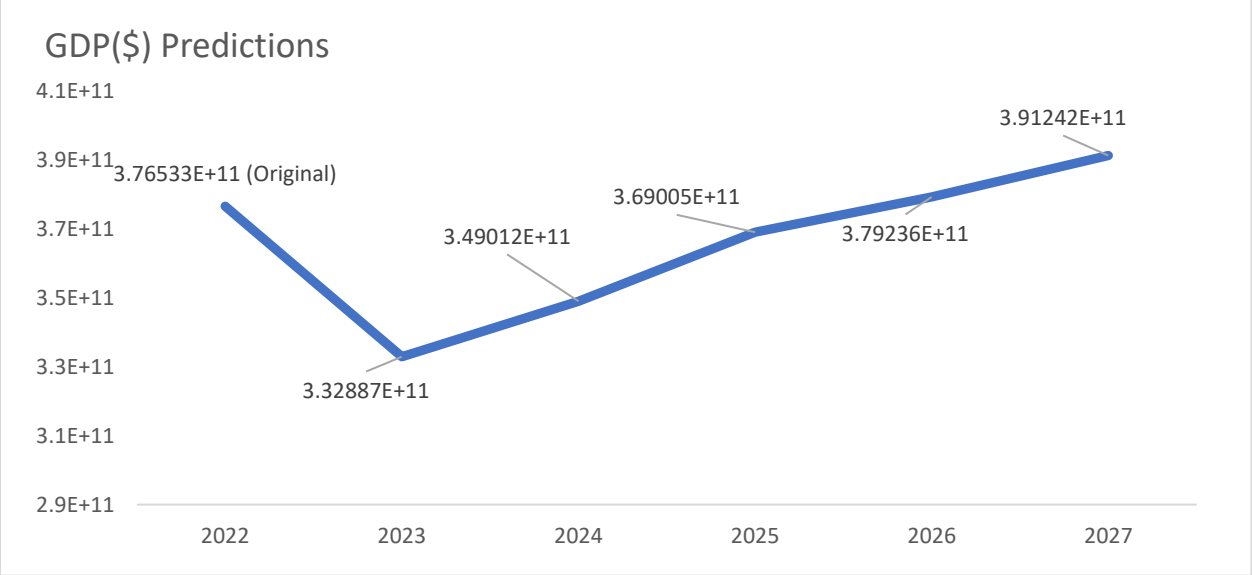

Figure 4.30: Predicted values for GDP

CHAPTER

5. CONCLUSION AND POLICY RECOMMENDATIONS

5.1. Conclusion

Imports substitution policy and export-led growth strategy are two approaches toward development. IS policy suggests the restriction on imports, while ELG strategy suggests increasing and diversifying exports. The study aims to find the most suitable approach in the case of Pakistan. Data of 12 different variables from the period 1981 to 2022 have been used, as suggested by the theory and literature that covers these two approaches.

The study employs the theoretical ARDL model and creates a Generalized Restricted model (GUM) including the first lag of both the dependent and independent variable obtained by the ACF and PACF function of the residual of the static equation. GUM is converted into the restricted model using the Auto metrics technique and manual method using different tests. The results show that the lag of GDP, Industrialization, Taxes less subsidies and, lag of exchange rate have a positive significant impact on the GDP, while exchange rate, lag of exports, lag of imports, lag of taxes less subsidies, and lag of tariff rate have significant negative impact on the GDP. Official development assistance, export as a capacity to import, and external balance have positive but insignificant impacts on the GDP of Pakistan.

Long run static equation from the restricted ARDL model contains 5 variables i.e. industrialization (IND), Taxes less subsidies (TLS), Exports (X), official development assistance (ODA), and weighted average tariff rate (TRA). Based on this long-run static equation, the study uses the maximum likelihood estimation method to estimate the ARMA model with IIS breaks for univariate atheoretical projecting of variables. The projections from atheoretical univariate projecting and coefficients from long-run static equations are used to predict GDP for the next five years.

The findings show that only one approach is not enough to tackle the situation in Pakistan. Imports contribute more to the GDP as compared to Exports. Exports are not competitive enough to meet international demand and due to reliance on non-value-added products (as per the paradox of plenty theory and Dutch disease), exports are not contributing positively to the development of Pakistan. Imports cannot be restricted due to their large share in the manufacturing process of

exported goods. The prediction of GDP for the next five years shows that it will increase but after 2023. Therefore, Pakistan needs to work on its export side making more value-added and innovative goods while not restricting the imports of raw material and intermediate goods.

5.2. Policy Recommendation

As per result, Pakistan needs to focus on both approaches because not anyone is enough to tackle the position of Pakistan. In case of import substitution, Pakistan cannot increase the tariff to restrict imports beyond limits as per the country's obligation under WTO pledges. Therefore, it has to work on the exchange rates and interest rates side to grab the problem. In the case of an export-led growth strategy, Pakistan needs a multi-faceted approach to cover various aspects of trade to make this sector work. Some of the measures that can help in achieving the target goal of the development of Pakistan through policy mix solution are as follows:

- Imports of intermediate goods and capital goods should be encouraged through less custom taxes and easy access way through border, as compared to the consumer goods.
- As the result shows that tariff rate has a negative impact on growth, border tariff should be removed for the goods that are used as an input in export base industries or for value addition purposes or in which we have comparative/ absolute advantage so that the cost can be reduced and productivity can be increased. In the case of the country, it should be prioritized to remove countries with low-cost imports.
- Pakistan's most imports are from North America and Western Europe, which increases the cost of transportation, making imports more costly. Instead, the direction should be changed to Asian countries that will help to decrease transport costs and time like Japan, Indonesia, Thailand, etc.
- Pakistan needs to work on its export diversification in the case of goods as well as the countries to which goods are being exported. It will help to reduce the effect of external shocks and bring competitiveness to the market.
- As Pakistan has a weak infrastructure and many structural problems, it should start with the IT market, help people to get skills in the IT department and teach them the ways to compete in the international IT market.
- As industrialization has large positive impact on GDP, domestic production should be encouraged by incentivizing them with loans, partnerships and basic facilities of electricity

Therefore, those imports of consumer goods can be decreased. It can be done by providing insurance for loss, export-credit guarantees, and an easy mechanism for entering the market. Small-scale businesses should be encouraged by providing low-interest financing and guidelines about the market.

- Exporting mechanisms should be made easy and less costly to encourage industries to export. In this case, the government should pursue actively maximum trade agreements including bilateral and multilateral to expand the area of exports for its exporters and to increase competitiveness. Streamline custom procedures should be adopted to reduce the time and cost of the exporters.
- Pakistan, at present times, needs the most focus on bringing innovation to its products. Pakistan exports are mostly in raw form lacking value addition. It is a big hurdle in expanding our exports in both quantity and quality. Branding its products can produce a good name for other exporters in the international market. The government should engage in educating their exporters according to the demand of people in the international market.
- Instead of providing subsidies and making industries dependent forever on these subsidies, investment should be made in R&D. It will help the industries to flourish and reduce their risk of loss.
- Lastly, the Government should keep a linkage between import and export policies, as both of them are affected by each other. Imports and exports should be monitored collectively with one another. Import restrictions should first be checked in line with exports. It will create a balance and help to figure out the problem that needs the utmost attention.

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