EXPORT, HUMAN CAPITAL AND ECONOMIC GROWTH IN PAKISTAN

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CERTIFICATE

This is to certify that this thesis entitled: **"Export, Human Capital and Economic Growth in Pakistan"** submitted by Ms. Bushra Ahmed is accepted in its present form by the Department of Economics, Pakistan Institute of Development Economics (PIDE), Islamabad as satisfying the requirements for partial fulfillment of the degree of **Master of Economics**.

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Dedicated to my parents,
whose prayers for me are what have sustained me this far

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LIST OF ABBREVIATIONS

PPP	Purchasing Power Parity
ER	Exchange Rate
ECM	Error Correction Model
PBM	Portfolio Balance Payment
CPI	Consumer Price Index
IMF	International Monetary Fund
SDR	Special Drawing Rights
BOT	Balance of Trade
ADF	Augmented Dickey-Fuller Test
GUM	General Unrestricted Model

Abstract

Exchange rate plays a vital role for maintaining internal equilibrium within country. The stable exchange rate is key for sustainable growth. This study has constructed a specific model for determination exchange rate of Pakistan with UK, USA, Japan and Euro Area by using Hendry General to Specific approach. Monthly time series data is taken for this study from 2000:1 to 2018:5 and determinants of monetary, trade and forex model includes real output differential, real money differential, real interest differential, price differential, imports, exports and foreign reserves. The existing long run relationships among variables have been observed by Johenson and Juselious (1992) cointegration technique. While the error correction model (ECM) is applied for estimating short run relationship. The results suggest that all variables has significant role in all cases except Pak-Euro. In case of Pak-Euro, real money differential, real interest differential, exports and imports are dropped from model. On the basis of results it is suggested to reduce and maintain money supply and to increase foreign reserves in order to improve the exchange rate.

CHAPTER 1

INTRODUCTION

Economic development in the economics literature is qualified as a continuous growth in GDP per capita. Such increase is an indicator of the improvement in the degree of standard of living compared in an international economic environment. There are many factors that lead to economic growth in an economy. For example, labour as a factor of production used in all sectors of an economy. Investments in labour enhance the productiveness of human capital. The know-how, capabilities, revel in, and comparable belongings of people significantly influence production elements through exertions and accelerate economic increase (Koç,2013). In this manner, every additional benefit to labour accelerates fiscal rise.

1.1 The Concept of Exports

Theoretic research on trade evolved from Mercantilist's principle of trade to a new alternate concept. The improvement of those results generated theoretical discussions concerning the style and role of change in GDP Growth. From 16^{th} to 18^{th} century, the Mercantilist study of trade was dominant. The Mercantilist doctrine believed that a country's strength and wealth was based on the amount of treasury (gold and silver) that it can accumulate from different international locations.

These theories believed that the wealth of countries or profits made via trade could be used for the establishment and reinforcement of armed rules. Nevertheless, this principle was refuted afterwards by classical economists. For example, Adam Smith contended that philosophies of mercantilism emphasize most effective at the making and they left out feastings and imports. In line with Adam Smith, the accumulation of wealth had a little element in the welfare of nations.

1.1.1 Evaluation of Export

There are two perspectives that try to evaluate the connection between economic growth and exports. For example, in the aspects of primary organization export seems as a positive contributor towards economic growth. The second perspective deals with what seems to be no linking with exports and economic development. Other than these two views, some even contend that exports contribute positively to the GDP increase. As an illustration, Berg and Schmidt (1994), Onafwara (1996), D.E.A Giles, J.A Giles and McCann (1992) suggest that

increase of export increases GDP boom. there may be a high-quality relation among the rise of export and monetary rise. The following motives are given:

1. Export rise can additionally replicate a boom inside the country's outputs demand, and this increase can be comprehended as GDP growth.
2. Ssupernumerary international exchange will be engendered through raising the level of exports, and this accelerate the buying of efficient transitional items.
3. Increase in exports can also result in extra efficiency, possibly over thrifts of measure or technical upgrades as a consequence of a pact with overseas competition and improved productivity. Efficiency boom is also implicit to be the outcome of particular products, particularly that enlarge exports.
4. There are externalities related to the export sector because export income permits an economy to apply external capital deprived of running into complications overhauling overseas debt.

Alternatively, opinions have also been thru (for instance, D.E.A Giles, J.A Giles and E. McCann (1992) in backing of a contradictory view; therefore, it was claimed that export delays the improvement of economy. The reason, few researchers to support the decrease of the export because the involvement of economic boom of the nation can significantly base on the type of good that is operated like number one supplies exporting. Furthermore, D.E.A Giles, J.A. Giles and E. McCann (1992) said that export has no influence economic growth. Their philosophy excluded the presence of impact of export on country development. As per some of them stated, that the association among actual GDP and actual exports does not happen in unindustrialized countries like Ethiopia, depending on exporting number one products. The practical proof related to the outcome of export on economic rise is mixed. Consequently, the foremost resolution of their research is to check the strength of the research study, i.e., the effects of exports on economic increase in the framework of Ethiopian economic scheme.

In growing countries like Pakistan, accelerated economic growth is crucial in preventing poverty and ensuring improvement in the standard of living. Inside globalized world, economic development is noticeably correlated, among other things, with the improvement in human capital (Khan et al., 2014). It stimulates economic growth through increasing the level of labor's productivity (Jajri, and fsmail,20l0)., Educated and healthy people are able to use the elements of production efficiently which increases their productivity (Djomo and Sikod,2012). ln the-classical growth models evolved via Harrod (1939), Domar (1946), Solow (1956) and

Swan (1956), it is argued that output of an economy grows as variables such as savings, capital, and the rate of technical progress grow However, in Harrod and Domar like models, non-financial variables like human capital has no influence on the economic boom. However, the neoclassical economists believe that HC has a significant contribution in economic increase and, as a result, they incorporate the concept of human capital in their models (Schultz, 1961; Becker, 1962; Welch, 1970).

Endogenous growth theory holds that HC is the principal apparatus of economic development and growth (Romer, l994). It argues that growth is the end result of investment in human capital, innovation and information (Jones and Schneider, 2006). High quality externalities and spillover outcomes of human capital cause economic development (Stokey, l99l; Lucas, 1993; Romer, l994). For example, subsidies on schooling and research and development (R&D) facilitate economic growth as they introduce new ideas and innovations in endogenous growth models even as rate of savings and the technical progress decide long-run economic growth in exogenous growth models (Ronrer, 1994, Funke and Strulik, 2000; czarnitzki and toivan.n, 2013).

Human capital is a record essential element for the making of exceptional items and offerings. However, the economic growth literature also shows that, along with human capital, other factors also play a major role in the economic increase of developing countries. One such factor is exports. In a country which increases her exports will increase foreign exchange reserves (Stokey, l99l). This expanded foreign exchange eases the stress on the balance of payment, facilitates imports of capital items, hastens technological progress, and enjoys economies of scale, which in result enhaces the production ability of a country in the long run ultimately (Ramos, 2001; Balaguer, and Cantavella-Jorda,200l; Ahmed and Uddin,zoov). Moreover, export of goods and services increases intra-enterprise trade and facilitates the country to integrate with other economies of the world, condense the effect of external surprises on the local economy and later enhance economic growth and development (Stait, 2005). Accordingly, the interaction between HC and exports perform a very important part in the long term (Levin and Raut, 1996).

1.2 The Concept of Human Capital

Commonly, in the economic growth literature, capital is divided into physical capital, i.e., factories, shares and so forth, and intellectual capital. The highbrow capital is described as "nonfinancial constant belongings-intangible assets", and the HC is a part of highbrow capital.

It signifies the funds made on human beings and incorporates human-associated elements comparable information, talents, entrepreneurialism, efficiency, trade excellence, EI, flexibility, worker devotion, worker delight, creativity and academics. In agencies, funding on people is the maximum difficult asset to control.

Romer (1990) regarded HC because it is a source of economic efficiency. The OECD (organisation for monetary Co-operation and development) defines the position of human capital because the contributions of know-how and and abilities to a country's financial machine and for this reason as the improvement in social and economic area through people (Eser and Gökmen, 2009). Thus HC, in short be defined as the contributions of individuals and to each type of knowledge acquired with the aid of an individual.

Since human capital is the qualifications acquired with the aid of people in specific stages of the dynamics of an economic system, those qualifications can be summarized as all sorts of knowledge which aid production (Karataş & Çankaya, 2010). However, it can be ambiguous to link the efficiency of HC alone to economic monetary growth. In fact, the quantitative aspect of labor force are important for growing nations, whilst know-how, competencies, and education-like qualitative inclinations come into prominence in advanced countries. It is vital to remember that in modern globalized world it is not the international locations with large population that can be of the maximum benefit for information in countries with informed labor force (Yumuşak, 2008).

1.3 Human Capital and Economic Growth Relation:

The outcomes of empirical studies and technological enhancements have led to directing energies to building up the inventory of human capital. In all international places with consistent economic growth, schooling has allowed international locations to triumph over the modifications in manufacturing policies and to augment human conditions (Becker, 1993). Thus, respective shape of asset made on HC also may remain as a contribution to country’s economic growth and development.

Even as explaining economic growth, neoclassical theorists treated regularly occurring generation of HC as an exogenous element (Kar and Ağır, 2006). Afterwards, neoclassical idea supported the hypothesis of "technological trends eliminated the troubles which resulted from population growth and the populace even surely affected monetary development" (Güneş, 2005). Inclusion of HC into EGMs modified after Romer (1986). Contrary to neoclassical version, Romer (1986) comprised human capital into the endogenous growth versions of

growth models and thus endogenized economic boom. Romer (1990) then endogenized HC into the version. Lucas (1988) advanced a dynamic to outline the technology variable and described this dynamic as human capital within the version. Romer (1990) seemed production as an outcome of abilities to obtain innovative merchandise with fresh thoughts after which HC was incorporated into growth models for this reason. Furthermore, Lucas (1988) added HC in the model due to the fact the qualification tiers of people (Ulucak, 2015).

Endogenous growth models as a substitute recognized the best of the population and acquire the number one factors of financial boom as both an instantaneous growth in HC or secondary HC alike R&D etc.. Economic success offers large contributions to funds, normally to HC, and will also improve performance and productivity (Tsen, 2006). Great economic development makes certain type of human capital more important. As it may be seen, even though the route of interplay among economic growth and HC differs, the attributes of human capital, in particular, the understanding and implementation of production, have an outcome on economic advancement and the feasibility of monetary systems have an effect on human capital (Genç, Değer, & Berber, 2009).

The investments made on HC are particularly massive in the phases of economic competition amongst countries. In reality, the attributes that make a few countries prominent than others embody any type of supplements to, specially , labor, which is engaged in the manufacturing factor. Countries with an authorized exertions pressure combine this pressure with advanced generation and accordingly experience the gain of constantly being one step in advance than the competition. in this manner, growing efficiencies in human capital offer massive contributions to a rustic's monetary machine (Çakmak & Gümüş, 2005).

Previous research and reviews discovered that economic growth could not be done handiest via only improving physical capital. Additionally, the expertise and capabilities received by way of using the working and producing character need to also be standard as a expedient for commercial development. Likewise, Becker, Murpy, and Tamura (1990) in a paper entitled "Human Capital, Fertility and Economic Growth", indicated better yields of HC and schooling in developed countries than in emerging countries. Based totally upon the aforementioned facts, it can be see that the increase in population on its own is not always sufficient for economic growth and the bottom line is the facts, capabilities, and experience-like attributes of the population.

1.4 Objective of the study:

The core purpose of this study is to see whether there is some casual connection between HC accumulation, exports and economic growth in Pakistan, and it is increasing over time.

1.5 Research Question:

- What is the effect of primary, semi-manufactured and manufactured export on the economic growth of Pakistan?
- What is the impact of human capital accumulation on the economic growth of Pakistan?
- Is there any interaction between human capital and the export sector in the economic growth of Pakistan?

1.6 Significance of the study

Research-study illustrates the significance of the categorical export and HC in economic

Research-study illustrates the significance of the categorical export and HC in economic growth of an economy, especially the developing countries. The study estimates the effect of HC in economic development, i.e. whether it has any significant effect on economic growth. There is a vast literature which illustrate it with many other techniques in country as well cross-country economic growth determination. OLS is the basic tool, but here the techniques which will be used for estimation is ARDL GUM model. At time the more significant technique which is used with some specific lag is good starting point to start general to specific methodology by using diagnostic tests on the residual of the model.

CHAPTER 2
REVIEW OF LITERATURE

2.1 Review of literature

Levin and Raut (1997) used panel of 30 semi industrialized countries to check for export led growth hypothesis and observed equal sensitivity to variations in model period, choice of countries and illustrative variables as observed in previous studies. One additional observation was the collaboration between exports and HC. This interaction was explained to be the reason of previously observed sensitivity. This indicates a top notch of complementary relation between trade decisions and human capital policies. They also found out that the manufactured export sector accounts for the GDP growth and all efficiencies like increasing returns to scale and technology spill overs are related to manufacturing sector.

Aditya and Roy (2011) calculated the export growth connection taking in accordance with modification and nature of export alignment. They used dynamic board estimation on data of sixty-five countries for the period 1965 to 2005. There results revealed that diversification and composition do determine the level of economic Growth when controlled for variables such as insulated Growth, infrastructure, investment, and export. Also, export concentration and income have a non-linear relationship. Up to a perilous level of export attention economic growth increases with export diversification after which increasing specialization results in higher Growth. Moreover, the connection between export concentration and income is found to be nonlinear. Robustness of these results is confirmed by using 4 sub-panels dividing the countries into sub-groups.

Zhenhui Xu 2000 analyzed the effects of primary exports on the Growth of industrial exports and gdp growt for 74 countries with data ranging from 1965 to 1992. The results recorded show positive effects in short as well as the long run for almost two third of the countries. Policy implicitations from this research emphasize that developing countries should not be biased against primary products as some of the previous studies imply. Instead, export promotion should be the prime goal.

Hesse 2008 determined the connection between export modification and income progress to be positive. Furthermore he found out that the relationship is non-linear. Implying that countries with lower per capita income growth benefit from export diversification and countries with high per capita income growth benefit from export specialization. Export promotion and trade

liberalisation policies in these poor countries therefore are least effective and a focus on export diversification might be more appropriate (Hesse, 2008)

Feder (1983) provided evidence in supporting the view that the achievement of economies which undertake export-oriented policies is due, as a minimum partly, to the truth that such policies carry the economic system in the direction of premier distribution of assets. The approximate display that, on average, there are great divergences in peripheral component yields among the export and non- export areas. Those alterations originate in element from the catastrophe of entrepreneurs to associate borderline element productions and in component because of externalities. The latter are produced since the export quarter deliberates advantageous outcomes on the productiveness within the other area, but these aren't any meditated in marketplace fees. The effects are, that social marginal productivities are better in the export-area, and economies that move funds into exports will advantage greater than inward oriented economies. The empirical findings advise that even when marketers optimize resource allocation given the charges they face, there are massive gains to be made because of the externality consequences. The analytical framework advanced on this have a look at may be applied in research the usage of more detailed data such that the quantity of productivity differential corporations of countries (with different policy orientation) may be assessed. similarly, the relation between inter-sector externalities and export composition can be clarified further the usage of the equal analytical framework.

AI Sanjuán-López and PJ Dawson (2013) quantified the contribution of exports to financial increase in developing countries. They used recently evolved panel cointegration methods which admit structural breaks to examine bivariate export-earnings relationships for a panel of forty-seven growing international locations for annual information for 1970-2004. The results show that long-run relationships exist and there is bi-directional causality among exports and earnings; structural breaks arise in maximum united states of america-specific relationships and most occur inside the 1980s following the debt disaster of 1981-82; the income-export elasticity is zero.22 whilst the export-profits elasticity is 1.13. Structural variations additionally exist in the relationships with the aid of extensive income group and the impact of exports on income will increase even as that of income on exports falls as earnings increases. Export-promoting rules are not out of place and the change liberalization rules recommended and every so often imposed via the arena financial institution which intention to stimulate monetary development appear justified but ought to by way of tailored to individual

Moon (1998) argues that the immoderate specialization of a selected product, which emanates from an outward-oriented paradigm, may additionally harm financial growth.

Steven Radelet (1999) talked about exports and said that export podiums have been an essential part of the growth plan in all of the most prosperous emerging country manufactured exporters throughout the past 30 years.

Podiums have facilitated companies overcome approximately on the basic evils that wave emerging countries that representatives like policymakers can't rapidly change. Of course, export platforms alone are no silver bullet. Moderately, they have functioned finest when they are part of a more inclusive extensive span change towards more open and better-working markets and amalgamation with the global economy. The states that have been most effective have to happen with some elementary circumstances in room, plus macroeconomic steadiness, preliminary (but incomplete) liberalization of trade and FDI (foreign direct investment), and a minimum level of operational infrastructure.

Wajahat Ali and Azrai Abdullah (2015) studied the relationship of trade and industry with the economic boom of Pakistan. The study investigates a inverse relationship in between trade liberalization and economic growth in Pakistan in duration of 1980-2010. The VECM and Johansen method was implemented to check short and long run results. The resulting outcome tells us that there is a constructive affiliation among trade and growth development production increase of the respected country as well as long run state an adverse relationship of liberalization of trade and economic rise but, it is because of a weak battle supervision institution and deficiency of quality institutions of country. The undesirable impression can be because of the substantial raw exports as a substitute of final yields.

Manuel R. Agosin and Santiago (2007) showed that the broadening of comparative advantage is gotten as the main strength of overdue economic Growth. The theory of export divergence is verified with an experiential growth model. Monitoring for additional variables that mark Growth, export divergence, unaccompanied, and cooperated with per capital trade volume growth, is initiate to be extremely significant in illumination per capita GDP growth over the 1980-2003 period.

Frankel and Romer (1999) investigate that trade and use of some instrumental variables check the effect of trade on income and outcome provides no proper indication that ordinary least-squares evaluations exaggerate the impact of trade. Additionally, they recommend that trade

has a quantitatively huge and tough, however only temperately statistically significant, positive effect on income.

Jadoon et al,. (2019) did a comparative analysis and there analysis show that developed and developing countries both enjoy the consequences of trade controlled Growth for a certain period. The influence of trade openness on human capital has been found confident for both groups but found significant only for the developed countries due to well-trained HC. The speculation in HC is the dreadful need of the time for the developing nations to enjoy more valuable properties of trade openness.

Samia Nasreen (2011) said that the experimental outcomes on mixed connection hypothesis show that the relation is created successively from economic increase to exports in Pakistan, Sri Lanka and Indonesia and from exports to economic Growth in Malaysia and Thailand. Bidirectional causality also happens in a situation of India, Sri Lanka and Indonesia, whereas unbiased hypothesis is found in Bangladesh.

Dawson and Lopez (2013) talks about 47 evolving countries for the time period of 1970-2004. They examined the bivariate in between exports and income relationship between exports and income and applied panel cointegration method. Results direct that there is a relationship of long-term, but it's a bi-directional causality in exports and income but the elasticity of income-export is 0.22 during 1980's while on the other hand export-income elasticity is 1.13. They concluded that policies related to export-promotion should not be misplaced.

Söderbom and Teal (2003) has examined the hypothesis that higher level of human capital and more openness or trade of an economy leads to higher productivity growth. To examine the research question 93 counties were taken and time interval for the estimation was from 1970-2000. Fixed effect models were used to obtain the results. The results has highlighted that technical progress will be 0.8% if openness level is doubled. The effect of human capital on the income is significant but no significant effect was observed on the productivity growth

Utkulu and Özdemir (2004) empirically examined the impact of trade openness on the economic growth and per capita income of Turkey. The data has been used of large range, i.e. from 1950 to 2000 to obtain results. The Johansen's Cointegration and Error Correction Model (ECM) were used to test the relationship between trade openness and economic growth. Physical capital and human capital (measured in secondary school enrolment rate) were taken as control variables with trade openness as main variable. The results showed significant impact of trade openness on economic growth as trade policy affected economic growth of Turkey both in short-run and in long-run. Further, all three

exogenous variables, trade openness; physical capital and human capital were causing the economic growth of Turkey for the selected period.

Hasan and Butt (2008) empirically examined the effect of trade, labour force, education and debt on the economic growth of Pakistan. The data range for the study was taken from 1975 to 2005. The Auto Regressive Distributed Lag (ARDL) approach was applied to obtain the estimates. The result revealed labour force of Pakistan and education was contributing positively towards the economic growth of Pakistan. One percent increase in the level of labour force yielded 2.85% increase in the economic growth in the long-run

Chaudhry et al. (2010) checked the relationship between human capital, trade openness and economic growth of Pakistan. The authors checked the causal relationship between the above stated three variables by using Granger Causality. The short-run and long-run relationship of three variables had been checked by applying Johansen's cointegration and Vector Error Correction Model. Time series data of range 1972 to 2007 was used to obtain the results. The results suggested a positive and significant relation between trade openness and economic growth for the selected period of study. Same relation was obtained for the human capital and economic growth. Export led growth hypothesis were also proved as trade openness and labour force were having significant effect on economic growth. A unidirectional causality was found running from trade openness to economic growth

Maksymenko and Rabbani (2011) examined the impact of human capital accumulation and economic reform (trade reforms) on the post-reform economic growth of Indian and South Korean economies. The data range for the South Korea was taken from 1966 to 1977 and for India it was from 1992 to 2003. Estimates were obtained by applying multivariate maximum likelihood co integration. The human capital positively and significantly contributed to the economic growth of both countries. The effect of reforms was significant and positive for the case of South Korea but for india it was negative and small.

Manni and Afzal (2012) empirically tested the effect of trade liberalization on the economic growth of Bangladesh economy. Simple Ordinary Least Square (OLS) was applied to check the effect of trade liberalization on the economic growth for the period 1980 to 2010. The result of the study showed that trade liberalization had positively contributed towards the economic growth of Bangladesh. The liberalization has not affected the inflation in the country but both real imports and exports had been increased in the above stated period.

CHAPTER 3

THEORETICAL FRAMEWORK

Past studies show that there exist theories that show that exports and human capital has optimistic connotation with economic growth of a country. In this section, we will discuss economic theories that show the correlation among human capital, exports, and economic growth and also discuss their expected signs with Economic Growth.

3.1 Exports and Economic Growth

It is believed by many economists that exports has an important impact on economic growth of a country. Many theories are available in the literature showing that trade significantly effect growth of any country. Initially during the sixteenth century, Mercantilist presented the concept that trade has impact on the economic growth of a country. According to Mercantilists, the wealth and power of a nation depend on the amount of gold and silver that can be collected form other nations of the world. But classical economist refused this concept. According to Adam Smith, mercantilist theory only focuses on the export side and it neglect imports and consumption side. Beside this he focuses on the theory of absolute advantage. He argued that country should export the commodity which is absolutely beneficiary for them. But according to Ricardo, it is not necessary to having absolute advantage for becoming beneficiary form international trade. According to him a country must have relatives per unit less labor cost for production. Helpman and Krugman(1991), introduced a new theory during 70s and 80s. According to this theory, constant return to scale does not holds if there exist globalization and technological improvement.

According to the Classical growth theory, there is exists positive connection between economic growth and trade openness. The rationale behind this is that as the country starts to do international trade, the technological progress starts to increase in the country and this results in the efficiently allocation of resources. Trade is now a day seems as the important 'engine' of the economic Growth because it has positive association with economic Growth.

Exports causes to rise foreign reserves of a country that further helps for importing commodities from abroad and also helps to reduce balance of payment deficit. Beside this exports also appreciate domestic currency causing to make foreign commodities more cheaper as compare to before. Higher exports as compare to imports cause a surplus balance of payment. Increase in exports means that there is an increase in output that causes to generate

employments. Michaely (1977), Balassa (1978) and Tyler (1981) found positive correlation of exports with economic Growth.

3.2 Human Capital and Economic Growth.

There is existing a huge number of studies showing that both human capital and economic Growth has positive impact and both are strongly correlated with each other. Human capital develops skills and knowledge among people that helps in the utilization of resources efficiently.

According to classical growth theory, productivity of labor is taken as exogenous variable that is depending on ratio existing between physical capital, work forces and technological progress. But this theory has some short comings. To fill these shortcomings, new theory was introduced during early 1980s that focuses on importance of innovation and education. According to neoclassical growth theory and Endogenous growth theory, human capital and economic growth has positive association. While the Solow growth model exclude human capital form its model and that is the main reason behind not capturing the growth world widely.

Studies form developing countries shows that individuals that have higher level of income will have higher income level. Basically, human capital develops capacity through both formal and informal education specially at home and at school, through technical experience, training and labor market mobility. If the labor force is educated then they think technically.

CHAPTER 4

METHODOLOGY AND DATA

In this chapter we will elaborate the methods which we have to employed to illustrate the significance of determinant which is affecting growth rate and assumption of these are in next section.

4.1 The data and Variables

The key objective of this research-study is to illustrate the short-run and long-run causal connection between human capital, primary, semi, and manufactured exports, and Growth of economy in Pakistan. The research is based on the secondary data is composed from the Sources of World Development index (WDI), and PENN World Tables.

Real GPD is the dependent variables whereas the set of variables which will be used as regressors or explanatory variables are:

PRIMX → *Primary Exports*

SEMIX → *Semi manufactured Exports*

MANUX → *Manufactured Exports*

HK → *Human Capital*

KS → *Capital Stock*

LF → *Labor force*

The estimation methodology is employed for this study are unit root ADF test, ARDL General to specific modeling and Error correction technique (ECM*).*

4.2 Unit Root Test

ADF Unit root test needs to be run according to recognize whether the numerical data series are stationary or not. Testing unit root additionally serves as the first step to test whether these variables are cointegrated or there is any causal relationship between the variables, In case of time series data, the existence of non-stationarity in causality check would possibly create the hassle of spurious regression. Therefore, it is fundamental to take a look at whether the time collection of the variables are stationary. This is finished by way of the utility of the Augmented Dickey-Fuller (1979) test.

4.3 ARDL General to Specific Model

"ARDL" stands for "Autoregressive-Distributed Lag". Regression estimation of this technique is in use for decades, nevertheless in extra current times, they have been publicised to grant an appreciated tool for trying out the occurrence of long-run associations between economic time-series.

In its elementary form, an ARDL regression model looks like this:

$$Y_t = a_0 + a_1 Y_{t-1} \dots\dots\dots\dots + a_p Y_{t-p} + \beta_1 X_{t-1} \dots\dots\dots + \beta_p X_{t-p} + \varepsilon_t \quad \textbf{EQ (1)}$$

where ε_t is an arbitrary "disturbance" term.

The model is "autoregressive", in the logic that Y_t is "explained (in part) by means of protected values of itself. It also has a "distributed lag" factor, in the form of sequential lags of the "x" explanatory variable. Occasionally, the cutting-edge price of **xt** itself is omitted from the dispensed lag section of the model's structure.

Now let us designate the model above as being one that is ARDL(p,q), for apparent reasons. Given the presence of lagged values of the established variable as regressors, OLS estimation of an ARDL model will yield biased coefficient estimates. If the disturbance term, εt, is autocorrelated, the OLS will also be an inconsistent estimator, and in this case, instrumental variables estimation used to be typically used in applications of this model.

In the 1960s and 1970s distributed lag (DL(q), or ARDL(0,q)) were used a lot. To avoid the adverse results of the multicollinearity related with such as many lags of "x" as regressors, it used to be common to limit the number of parameters through imposing restrictions on the pattern (or "distribution") of values that the α coefficients ought to take.

Now here I am going to explain the ARDL general to a specific method in context of concerned Variable and Model for growth rate.

4.4 Exports as the Engine of Growth

A massive quantity of literatures has taken into consideration several situations that may cause whole component yield to be advanced in export-orientated industries than in non-export-oriented industries: extra-capability utilization, economies of scale, extra efficient adoption of foreign generation, and greater desirable incentives for efficiency because of competitive pressures overseas.

$$RGDP = a_0 + a_1 RGDP + a_2 PRIMX + a_3 SEMIX + a_4 MANUX + a_5 MANUX + a_6 KS + a_7 \text{LF} + \varepsilon_t \quad \textbf{EQ (2)}$$

In ARDL model, number of parameters must be less then number of estimations, because this is the time series annual data from 1972 to 2017, to eradicate the issue of multicollinearity, heteroskedasticity, and auto correlation, here we used the 4 lags of all variables.

In this equation, there are Real GDP, Primary exports, Semi manufactured exports, Manufactured exports and capital stock respectively.

4.5 Human Capital as engine of Growth

Many theoretical models has dealt with HK as an important factor in figuring out the growth rate of output. Moreover, studies for numerous growing nations have determined that individuals with more education tend to have better earnings. For instance, the usage of information from seven developing international locations, G. Psacharo- poulos discovered that average income of individuals with secondary college education are 2.4 times those of individuals with primary school education. Of course, investment in education also includes sizable charges a student in phrases of systems, private, and foregone earnings; and those charges boom extraordinary at higher schooling degrees (i.e., 4.75 times higher for secondary education comparative to number one schooling based totally on UNESCO records for eight underdeveloped international locations). Based on earnings differentials and overall costs for 30 developing countries, Psacharopoulos calculated that social fees of go back to investment in education are distinctly high, averaging about 25% for primary schooling and about 15% for secondary education.

Unluckily, microeconomic validation on charges of come back to education doesn't offer a whole illustration of education's effect on economic growth. On the other hand (relatively positive side), skilled workers may offer externalities inside the company or industry that are not absolutely pondered by the prevailing wage differentials. Investment in eeducation may also contribute indirectly to GDP increase via decreasing fertility and enhancing health and existence expectancy (as cautioned by using way of numerous empirical studies in many economies). on the terrible aspect, the level of schooling can be used as a screening device in hiring decisions (e.g., as a signal of higher capability or socioeconomic ancient beyond), simply so relative earnings do now not replicate the right productiveness differential because of higher training. Unionization and different market imperfections may increase the income differential associated with schooling and thereby exaggerate its true impact on productiveness.

Aggregate production function analysis the use of macroeconomic records has supplied inconclusive proof on the importance of tutorial investment as a determinant of economic growth. using the complete Penn global Tables records set, previous research found a super relationship among school enrolment fees and commonplace GDP boom prices. but, Levine and Renelt (1992) determined that this statistical courting isn't always always strong to small

modifications within the pattern, global locations, or the time period or inclusion of extra explanatory variables.

Given the discussion, the model used in the study is as following:

$$\boldsymbol{RGDP = a_0 + a_1 RGDP + a_2 PRIMX + a_3 SEMIX + a_4 MANUX + a_5 KS + a_6 HK + \varepsilon_t} \quad \textbf{EQ (3)}$$

All the variables are the same as in the equation 1 above, expect for HK, which is human capital. Now here in this model the variable added is known as human capital, HK as basic engine of economic growth.

4.6 Interaction of HK with all Exports

Basically, the purpose behind adding interaction of human capital with exports are that as utilization of human capital is more efficient in export sector as compared to other sectors. For example, educated workers may be able to adapt more quickly to the sophisticated technology and rapid production changes required for competitiveness in world markets

$$\boldsymbol{RGDP = a_0 + a_1 RGDP + a_2 HPRIMX + a_3 HSEMIX + a_4 HMANUX + a_5 KS + a_6 LF + \varepsilon_t} \quad \textbf{EQ(4)}$$

4.7 Error Correction Mechanism (ECM)

To obtain the generalization to higher order of lags in ARDL modelling is known as ECM. The ECM illustration has the appealing structures of on behalf of an economic agent's desire in phrases of a rule-of-thumb reaction to present day adjustments, in step with established variable parameters and corrections to deviations from a favored lengthy-run equilibrium relation with explanatory variables parameters.

The ECM form turn out to be first proposed with the resource of Denis Sargan (1924-1996) for a version of wages and fees (Sargan 1964). It changed into eventually popularized through using the paintings of David Hendry and others in the context of modeling programs in macroeconomics, which consist of the intake characteristic and the decision for cash. The seminal contribution is J. E. H. Davidson, D. F. Hendry, F. Srba, and J. S. Yeo (1978), normally mentioned in the literature as DHSY.

CHAPTER 5

RESULTS AND DISCUSSION

5.1 Stationarity of Data series: Unit Root Tests

This is the econometric technique to check that whether the data series is stationary as in its original form or the series is drifted or trended at 1st difference and 2nd difference. The most common technique is Augmented Dickey Fuller Test (ADF). The results of all data series are given below.

Table 5.1: Unit Root Test

Variables	At Level	At 1st Difference	At 2nd Difference	Decision
RGDP	0.765	0.001	N.A	Stationary at 1st Diff
LF	0.9947	0.0000	N.A	Stationary at 1st Diff
KS	1.000	0.0224	N,A	Stationary at 1st Diff
HK	0.6607	0.3511	0.0000	Stationary at 2nd Diff
PrimX	1.0000	0.0020	N.A	Stationary at 1st Diff
SemiX	0.9999	0.0287	NA	Stationary at 1st Diff
ManuX	0.2651	0.0230	NA	Stationary at 1st Diff

Except of Human Capital and RGDP, all other variables are stationary at 1st difference, it means that there are some other factors except of time which are affecting HK that is why it became stationary at second difference. Here we have mix stationarity level so we can use ARDL GUM model to estimate and get our empirical results.

5.2 ARDL GUM Specific Model of RGDP

Levin and Renelt (1992) discover that increase within the industrial exports/GDP ratio has a solid impact on economic growth, while increase in share of number one product exports as a percentage of GDP has insignificant impact, demonstrating that growing returns and special competences are largely focused within the manufactured export area. The results offer in addition care for improvement guidelines that inspire lengthy-run monetary growth through concurrently encouraging funding in HC in addition to funds in the synthetic export area.

5.3 Exports as Basic Explanatory variable of Economic Growth

Initially we start with a general model in which all the determinants are adopted. After that Hendry's general-to-specific model is applied and a specific model is constructed by dropping all insignificant variables and lags.

Table 5.2: Specific Model of Exports

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
RGDP_1	0.407109	0.05548	7.34	0.0000	0.6130
RGDP_4	0.206065	0.01429	14.4	0.0000	0.8594
Constant	-149905.	5.133e+004	-2.92	0.0062	0.2006
PRIMX_3	7.33252	1.077	6.81	0.0000	0.5766
SEMIX_4	-9.36058	1.434	-6.53	0.0000	0.5563
MANUX_4	6.68348	1.017	6.57	0.0000	0.5595
KS	0.433033	0.007841	55.2	0.0000	0.9890
KS_1	-0.233403	0.02432	-9.60	0.0000	0.7303

AR 1-2 test	F(2,32)	0.33763 [0.7160]
ARCH 1-1 tesT	F(1,40)	1.6718 [0.2034]
Normality test	Chi^2(2)	1.4006 [0.4964]
RESET23 test	F(2,32)	1.2758 [0.2930]

5.3.1 Long Run Relationship

Long run relationship shows the relationship among variables. For this, long run static test is applied on the determinants of ARDL specific model. Table shows that primary and manufacturing exports has a positive association with GDP growth. If there is an increase in primary and manufacturing exports then economic growth will increase by 18.9 and 17.27 respectively. Beside this, semi manufactured exports has negative association with GDP growth as it decreases due to an increase in semi exports.

Table 5.3: Long Run Association

	Coefficient	Std.Error	t-value	t-prob
Constant	-387525.	1.373e+005	-2.82	0.0076
PRIMX	18.9556	3.681	5.15	0.0000
SEMIX	-24.1984	4.074	-5.94	0.0000
MANUX	17.2777	1.196	14.4	0.0000
KS	0.516071	0.01505	34.3	0.0000

5.3.2 Error Correction Mechanism (ECM)

Error correction method is used for estimating short run association among variables. It is clear from results that due to a previous disequilibrium in GDP, in short run GDP growth will decline. Primary Exports, semi-manufactured exports, manufactured Exports and capital stock showing mixed relationship. Some lags have negative association, and some have positive. It means that our exports and capital stocks are not performing consistently even in short run in economic growth. And the basic value of ECM shows the speed of convergence in short run.

Table 5.4: ECM of Exports

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DRGDP_1	0.315367	0.05423	5.82	0.0000	0.5750
DRGDP_2	-0.196939	0.01618	-12.2	0.0000	0.8556
DRGDP_3	-0.235979	0.06474	-3.65	0.0012	0.3471
DPRIMX_1	-14.8533	1.672	-8.88	0.0000	0.7594
DPRIMX_3	10.3774	1.379	7.52	0.0000	0.6937
DPRIMX_4	11.0255	2.710	4.07	0.0004	0.3983
DSEMIX	-10.5500	1.385	-7.62	0.0000	0.6989
DSEMIX_3	9.39797	2.304	4.08	0.0004	0.3996
DMANUX	6.33959	0.7323	8.66	0.0000	0.7498
DMANUX_3	-4.14227	1.085	-3.82	0.0008	0.3685
DMANUX_4	10.1569	1.078	9.43	0.0000	0.7804
DKS	0.421166	0.008268	50.9	0.0000	0.9905
DKS_1	-0.173886	0.02318	-7.50	0.0000	0.6923
DKS_3	0.152066	0.02756	5.52	0.0000	0.5491
DKS_4	-0.0553084	0.01417	-3.90	0.0006	0.3788

ECM_1	-0.0929371	0.02074	-4.48	0.0001	0.4453

AR 1-2 test:	F(2,26)	0.41711 [0.6633]
ARCH 1-1 test:	F(1,39)	1.5140 [0.2259]
Normality test:	Chi^2(2)	0.88898 [0.6412]
Hetero test:	F(18,23)	2.8584 [0.0218]*
RESET test:	F(2,31)	0.83949 [0.4433]

5.4 Human capital as the Main Engine of Economic Growth

The specific model is generated by including real GDP growth, primary exports, semi-manufactured exports, manufactured exports, capital stock and human capital.

Table 5.5: Specific model of Human Capital

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
RGDP_4	0.339787	0.01706	19.9	0.0000	0.9297
Constant	-6.55230e+00	9.961e+005	-6.58	0.0000	0.5906
PRIMX_4	25.4143	3.049	8.33	0.0000	0.6984
SEMIX_1	-9.65201	1.412	-6.84	0.0000	0.6090
MANUX	1.65955	0.5629	2.95	0.0061	0.2247
MANUX_2	-3.30964	0.7733	-4.28	0.0002	0.3791
MANUX_3	6.59607	0.6884	9.58	0.0000	0.7537
HK	-8.54356e+00	1.098e+006	-7.78	0.0000	0.6687
HK_4	1.37408e+007	1.375e+006	9.99	0.0000	0.7689
KS	0.363648	0.006378	57.0	0.0000	0.9909
KS_2	-0.0290557	0.007884	-3.69	0.0009	0.3117

AR 1-2 test:	F(2,28)	1.4030 [0.2626]
ARCH 1-1 test:	F(1,39)	0.011495 [0.9152]

Normality test:	Chi^2(2)	0.97450 [0.6143]
RESET test:	F(2,28)	1.2105 [0.3132]

5.4.1 Long Run Relationship

For observing long run relationship, variable of ARDL specific model is used. It shows that what will be the relationship in long run among exports, HC and economic growth. Because in short run some factors cannot change their dimensions, but in long run all variables or economic factor can change their dimensions and ability. Results shows that primary exports, manufactured exports and human capital has a positive association with GDP growth rate, while semi-manufactured exports have negative relationship. And as we indicate that human capital is the main engine of economic growth, here according to the value of coefficient, it clearly shows that human capital in long run has positive relationship more than other variables.

Table 5.6: Long Run Association

	Coefficient	Std.Error	t-value	t-prob
Constant	-9.92452e+006	1.494e+006	-6.64	0.0000
PRIMX	38.4941	4.118	9.35	0.0000
SEMIX	-14.6195	1.899	-7.70	0.0000
MANUX	7.49149	1.053	7.11	0.0000
HK	7.87213e+006	1.195e+006	6.59	0.0000
KS	0.506794	0.01498	33.8	0.0000

Long-run sigma = 222850

5.4.2 Error Correction Mechanism (ECM)

ECM is used for observing short run relations. And surprisingly the results are demonstrating that Manufactured exports has confident and vastly substantial relationship with GDP rise during short run. Theoretically Human capital is the basic factor of economic increase, but statistically in short run (In case of Pakistan, the developing country) has no association as it factor out by the ECM while capital stock has mixed results. Speed of convergence is -0.046 as shown by ECM.

Table 5.7: ECM of Human Capital

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DRGDP_2	-0.152728	0.02678	-5.70	0.0000	0.4889
DRGDP_4	0.501518	0.06297	7.96	0.0000	0.6511
DMANUX_3	3.74479	0.6734	5.56	0.0000	0.4763
DMANUX_4	7.76476	0.8323	9.33	0.0000	0.7191
DKS	0.367923	0.01036	35.5	0.0000	0.9738
DKS_4	-0.136885	0.03365	-4.07	0.0003	0.3273
ECM2_1	-0.0463163	0.01710	-2.71	0.0105	0.1776

5.5 Interaction among Exports and Human Capital

We suggest, following Levin and Raut (1996) that the export quarter can make use of HC more efficaciously than can the rest of the financial machine. Educated personnel are capable enough to adapt quickly to the sophisticated techniques, advanced machines and fast manufacturing adjustments required for competitiveness in world markets.

5.5.1 HPRIME (Interaction between HK and Prim Exports)

GUM model is applied by taking real GDP, intraction of human capital with primary export, manufactured export and capital stock.

Table 5.8: Specific Model of Interaction between HK and PRIMX

	Coefficient	**Std.Error**	**t-value**	**t-prob**	**Part.R^2**
RGDP_1	0.698920	0.03957	17.7	0.0000	0.9096
RGDP_2	-0.216430	0.03061	-7.07	0.0000	0.6173
RGDP_3	0.297653	0.02696	11.0	0.0000	0.7973
HK*PRIMX	4.39441	1.244	3.53	0.0013	0.2869
HK*PRIMX_1	-5.63908	1.307	-4.31	0.0002	0.3750
HK*PRIMX_4	10.5927	1.416	7.48	0.0000	0.6434
SEMIX_1	-7.82634	1.800	-4.35	0.0001	0.3788
MANUX_1	2.70867	0.5594	4.84	0.0000	0.4306
KS	0.414247	0.008525	48.6	0.0000	0.9870
KS_1	-0.300437	0.01709	-17.6	0.0000	0.9088

AR 1-2 test	F(2,29)	2.0178 [0.1512]
ARCH 1-1 test	F(1,39)	2.8820 [0.0975]
Normality test	Chi^2(2)	0.22752 [0.8925

5.5.1.1 Long Run Relationship

Now the in long run association of basic variable HPRIM (HK*PRIMX) is significant with all other explanatory variables. Showing that in long run the Growth of Pakistan is significantly affected by All mentioned variables, but semi export is negatively affecting the growth rate.

Table 5.9: Long Run Association

	Coefficient	**Std.Error**	**t-value**	**t-prob**
HK*PRIMX	42.5189	3.961	10.7	0.0000
SEMIX	-35.5975	5.589	-6.37	0.0000
MANUX	12.3202	2.235	5.51	0.0000
KS	0.517653	0.01825	28.4	0.0000

Long-run sigma = 775186

5.5.1.2 Error Correction Method (ECM)

Now in short run relation, lags of Real GDP, HPRIM, SemiX, ManuX, and capital stock, are significant with mix relationship, but the current term of interacted variable is negative highly significant, and other 2 lags are positively significant.

Table 5.10: ECM of Interaction between HK and PRIMX

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DRGDP_1	0.925860	0.09632	9.61	0.0000	0.8148
DRGDP_2	-0.275494	0.06925	-3.98	0.0007	0.4298
DRGDP_3	-0.509612	0.08187	-6.22	0.0000	0.6485
DRGDP_4	0.497451	0.05685	8.75	0.0000	0.7848
Constant	202865.	2.976e+004	6.82	0.0000	0.6887
DHK*PRIMX	-5.93096	1.326	-4.47	0.0002	0.4879
DHK*PRIMX_2	13.0588	1.971	6.63	0.0000	0.6764
DHK*PRIMX_3	23.0264	2.520	9.14	0.0000	0.7990

DSEMIX	-16.2903	2.306	-7.07	0.0000	0.7039
DSEMIX_2	-6.75223	2.038	-3.31	0.0033	0.3433
DSEMIX_4	-8.52855	2.259	-3.77	0.0011	0.4042
DMANUX	7.65171	1.098	6.97	0.0000	0.6980
DMANUX_2	4.08614	0.8092	5.05	0.0001	0.5484
DMANUX_4	26.1779	2.319	11.3	0.0000	0.8585
DKS	0.378212	0.008503	44.5	0.0000	0.9895
DKS_1	-0.409523	0.03826	-10.7	0.0000	0.8451
DKS_2	0.102075	0.03387	3.01	0.0066	0.3019
DKS_3	0.341545	0.03990	8.56	0.0000	0.7772
DKS_4	-0.270045	0.03305	-8.17	0.0000	0.7607
ECM_1	0.171832	0.02456	7.00	0.0000	0.6997

5.5.2 HSEMI (Interaction between HK and Semi Exports)

GUM model is applied by taking real GDP, interaction of human capital with semi manufactured export, primary export, manufactured export and capital stock.

Table 5.11: Specific Model of interaction Between HK and SEMIX

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
RGDP_1	0.436276	0.05917	7.37	0.0000	0.6153
RGDP_4	0.199494	0.01535	13.0	0.0000	0.8325
PRIMX_3	6.78478	1.153	5.88	0.0000	0.5045
HK*SEMIX_4	-6.76999	0.9485	-7.14	0.0000	0.5997
MANUX_4	7.58898	1.121	6.77	0.0000	0.5742
KS	0.427998	0.008367	51.2	0.0000	0.9872
KS_1	-0.245064	0.02595	-9.44	0.0000	0.7240

5.5.2.1 Long Run Relationship

HSEMIX is significant in long run but the it is negatively affecting the real GDP. As the exports level increase, the level of education also increases, so export sector is not more productive rest of the economy without utilizing educated worker.

Table 5.12: Long Run of interaction between HK and SEMIX

	Coefficient	Std.Error	t-value	t-prob
PRIMX	18.6278	4.187	4.45	0.0001
HK*SEMIX	-18.5872	3.127	-5.94	0.0000
MANUX	20.8357	1.325	15.7	0.0000

Long-run sigma = 510289

5.5.2.2 Error Correction Method (ECM)

To analyze the short run relationship, by ECM technique we get the results that there is mix relation among the dependent and explanatory variables, The lags of RGDP are negatively effecting the dependent variable, Primary exports, Capital stock, and Interacted term HSEMIX are showing mixed relation with different lags.

Table 5.13: **ECM of interaction between HK and SEMIX**

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DRGDP_1	0.294789	0.04858	6.07	0.0000	0.5956
DRGDP_2	-0.192789	0.01468	-13.1	0.0000	0.8734
DRGDP_3	-0.265043	0.05758	-4.60	0.0001	0.4587
DPRIMX_1	-14.9988	1.499	-10.0	0.0000	0.8002
DPRIMX_3	10.4326	1.183	8.82	0.0000	0.7569
DPRIMX_4	11.0840	2.399	4.62	0.0001	0.4606
DHK*SEMIX	-6.29847	0.7152	-8.81	0.0000	0.7562
DHK*SEMIX_3	5.72708	1.182	4.85	0.0001	0.4844
DKS	0.418814	0.007089	59.1	0.0000	0.9929
DKS_1	-0.167302	0.02044	-8.18	0.0000	0.7281
DKS_3	0.164463	0.02473	6.65	0.0000	0.6388
DKS_4	-0.0547415	0.01209	-4.53	0.0001	0.4507
DMANUX	6.49914	0.6473	10.0	0.0000	0.8013
DMANUX_3	-4.29468	0.9371	-4.58	0.0001	0.4566
DMANUX_4	10.5916	0.9439	11.2	0.0000	0.8343
ECM5_1 U	-0.0894262	0.01587	-5.63	0.0000	0.5595

5.5.3 HMANU (Interaction between HK and Manufactured Exports)

GUM model is applied by taking real GDP, interaction of human capital with manufactured export, primary export and capital stock. Result shows that primary export has positive association while semi and interaction of manufactured export has mix results. Beside this capital stock also has mix type of results.

Table 5.14: Specific Model of Interaction between HK and MANUX

	Coefficient	**Std.Error**	**t-value**	**t-prob**	**Part.R^2**
RGDP_2	0.382982	0.03786	10.1	0.0000	0.7852
RGDP_3	0.128072	0.03872	3.31	0.0026	0.2809
PRIMX	13.6562	1.997	6.84	0.0000	0.6254
PRIMX_1	-7.15405	2.535	-2.82	0.0087	0.2214
PRIMX_4	22.5047	2.247	10.0	0.0000	0.7817
SEMIX_1	-12.4065	2.153	-5.76	0.0000	0.5425
SEMIX_3	8.43212	2.740	3.08	0.0046	0.2528
HK*MANUX_1	1.49681	0.4698	3.19	0.0035	0.2661
KS	0.430713	0.009965	43.2	0.0000	0.9852
KS_1	-0.0347830	0.01844	-1.89	0.0697	0.1128
KS_2	-0.248621	0.02332	-10.7	0.0000	0.8024
KS_4	0.101836	0.01475	6.90	0.0000	0.6299
LF_2	-11064.8	2020.	-5.48	0.0000	0.5173

5.5.3.1 Long Run Relationship

Manufactured or final goods play a significant role in exports of a country. Because, the 2 type of exports or imports have more demand, the raw material and final products. As in results the long run relationship between GDP growth and the exports are significant. Also Capital stock and Labor force are significant, as mentioned above that the educated worker increase the exports of goods, that why education has also a significant effect in form of labor force.

Table 5.15: Long Run of interaction between HK and MANUX

	Coefficient	Std.Error	t-value	t-prob
PRIMX	59.3252	5.195	11.4	0.0000
SEMIX	8.12850	4.256	-1.91	0.0641
HK*MANUX	3.06130	0.8639	3.54	0.0011
KS	0.509555	0.01769	28.8	.0000
LF	-22630.0	4402.	-5.14	0.0000

Long-run sigma = 291443

5.5.3.2 Error Correction Method (ECM)

We estimate the short run relation among the variables because this short run relation leads us to construct a long run relation, or to make the effective policy in respective field, as in this perspective we have to make a policy on these short run and long run relationships which increase our exports also increase our GDP growth.

The ECM technique again shows the mis results of variables with their different lags. Which shows that how the previous time values affect the GDP growth. And the ECM term tells us the contraction speed in short run.

Table 5.16: ECM of interaction between HK and MANUX

	Coefficient	**Std.Error**	**t-value**	**t-prob**	**Part.R^2**
DRGDP_1	0.290808	0.2797	1.04	0.3229	0.0976
DRGDP_2	-0.401929	0.1343	-2.99	0.0135	0.4726
DRGDP_3	-0.257944	0.1744	-1.48	0.1700	0.1794
DRGDP_4	0.0508138	0.1718	0.296	0.7735	0.0087
Constant	58166.2	4.400e+004	1.32	0.2156	0.1488
DPRIMX	-2.49568	5.984	-0.417	0.6854	0.0171
DPRIMX_1	-23.3642	7.475	-3.13	0.0108	0.4942
DPRIMX_2	-11.0701	12.82	-0.864	0.4080	0.0694
DPRIMX_3	-0.268964	14.38	-0.0187	0.9854	0.0000
DPRIMX_4	4.43959	7.953	0.558	0.5890	0.0302
DSEMIX	-7.62055	3.444	-2.21	0.0513	0.3286
DSEMIX_1	3.27106	4.384	0.746	0.4728	0.0527

DSEMIX_2	-8.71128	4.080	-2.13	0.0585	0.3131
DSEMIX_3	5.63222	5.079	1.11	0.2934	0.1095
DSEMIX_4	-5.11796	3.671	-1.39	0.1935	0.1627
DHK*MANUX	3.59622	0.9684	3.71	0.0040	0.5797
DHK*MANUX_1	-0.194784	0.7343	-0.265	0.7962	0.0070
DHK*MANUX_2	0.960174	0.7570	1.27	0.2334	0.1386
DHK*MANUX_3	-2.93520	1.191	-2.46	0.0334	0.3779
DHK*MANUX_4	6.50377	3.013	2.16	0.0563	0.3178
DKS	0.441385	0.01975	22.3	0.0000	0.9804
DKS_1	-0.184773	0.1013	-1.82	0.0981	0.2496
DKS_2	0.0816801	0.05539	1.47	0.1711	0.1786
DKS_3	0.121050	0.1230	0.984	0.3483	0.0883
DKS_4	-0.130138	0.07479	-1.74	0.1125	0.2324
DLF	4362.64	3.224e+004	0.135	0.8951	0.0018
DLF_1	-7488.81	1.757e+004	-0.426	0.6790	0.0178
DLF_2	-5439.60	1.493e+004	-0.364	0.7233	0.0131
DLF_3	-25756.1	1.515e+004	-1.70	0.1200	0.2242
DLF_4	-75.7253	1.617e+004	-0.00468	0.9964	0.0000
ECM6_1 U	-0.249903	0.2210	-1.13	0.2846	0.1133

5.5.4 Interaction of HK with all Exports

Now we want to find the interaction of human capital. For this we multiply human capital with primary, secondary and manufactured export and estimated a GUM model. The results are provided below. Result shows that primary export has more significant role as compare to secondary and manufactured export. Now the results are showing that in all interacted term, (all exports are multiplied by HK) only manufactured exports is significant in its current value, Semi exports, and primary exports are significant but in their previous values.

Table5.17: Specific Model of Interaction between HK and TOTALX

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
RGDP_1	0.866411	0.02863	30.3	0.0000	0.9652
HK*PRIMX_3	3.58530	1.095	3.28	0.0025	0.2453
HK*SEMIX_2	1.61947	1.281	1.26	0.2150	0.0462
HK*MANUX	0.596446	0.1769	3.37	0.0019	0.2563
KS	0.419256	0.01243	33.7	0.0000	0.9718
KS_1	-0.368232	0.02515	-14.6	0.0000	0.8666
KS_2	-0.0939188	0.01960	-4.79	0.0000	0.4103
KS_3	0.113605	0.01259	9.02	0.0000	0.7116

5.5.4.1 Long Run Relationship

In this relation, all exports with capital stock are significant and affecting the GDP growth positively. This is the results or technique which can increase the country's GDP growth. As human capital interacted with in all term of exports and put their input to achieve significant output, it gives a positive respond to this technique.

Table 5.18: Long Run of interaction between HK and TOTALX

	Coefficient	Std.Error	t-value	t-prob
HK*PRIMX	26.8384	8.134	3.30	0.0021
HK*SEMIX	12.1228	9.181	1.32	0.1948
HK*MANUX	4.46479	1.412	3.16	0.0031
KS	0.529312	0.03582	14.8	0.0000

Long-run sigma = 1.80153e+006

5.5.4.2 Error Correction Method (ECM)

By ECM technique the mix results are showing the effect of short run restriction and assumptions. But at the end the result are showing that the country like Pakistan can effectively increase there GDP growth by exporting Manufactured goods with skilled human capital, because this is the highly significant term as the model is showing in our final results.

Table 5.19: ECM of interaction between HK and TOTALX

	Coefficient	Std.Error	t-value	t-prob	Part.R^2
DRGDP_1	0.525187	0.2210	2.38	0.0389	0.3609
DRGDP_2	-0.360676	0.1281	-2.81	0.0183	0.4421
DRGDP_3	-0.334290	0.1811	-1.85	0.0948	0.2540
DRGDP_4	0.0645908	0.1975	0.327	0.7504	0.0106
Constant	91994.6	5.851e+004	1.57	0.1470	0.1982
DHK*PRIMX	-4.28591	3.235	-1.32	0.2147	0.1493
DHK*PRIMX_1	-10.4900	2.207	-4.75	0.0008	0.6932
DHK*PRIMX_2	1.50486	3.840	0.392	0.7033	0.0151
DHK*PRIMX_3	8.77644	4.138	2.12	0.0599	0.3103
DHK*PRIMX_4	6.11794	5.455	1.12	0.2883	0.1117
DHK*SEMIX	-6.08302	2.182	-2.79	0.0192	0.4373
DHK*SEMIX_1	1.54125	3.114	0.495	0.6313	0.0239
DHK*SEMIX_2	-3.70230	2.410	-1.54	0.1554	0.1910
DHK*SEMIX_3	3.96888	3.433	1.16	0.2745	0.1179
DHK*SEMIX_4	-2.55205	2.711	-0.941	0.3687	0.0814
DHK*MANUX	4.74525	0.9966	4.76	0.0008	0.6939
DHK*MANUX_1	0.342753	0.7887	0.435	0.6731	0.0185
DHK*MANUX_2	0.916026	0.8476	1.08	0.3052	0.1046
DHK*MANUX_3	-2.09068	1.320	-1.58	0.1442	0.2007
DHK*MANUX_4	9.65832	2.715	3.56	0.0052	0.5585
DKS	0.419830	0.01437	29.2	0.0000	0.9884
DKS_1	-0.259737	0.08101	-3.21	0.0094	0.5069
DKS_2	0.105866	0.05732	1.85	0.0945	0.2543
DKS_3	0.225296	0.09818	2.29	0.0447	0.3449
DKS_4	-0.118867	0.08734	-1.36	0.2034	0.1563
DLF	18987.7	2.764e+004	0.687	0.5077	0.0451
DLF_1	-17149.2	1.438e+004	-1.19	0.2607	0.1244
DLF_2	-8567.01	1.438e+004	-0.596	0.5646	0.0343
DLF_3	-29214.0	1.498e+004	-1.95	0.0798	0.2755
DLF_4	688.156	1.599e+004	0.0430	0.9665	0.0002

ECM7_1	U	-0.0103993	0.08445	-0.123	0.9044	0.0015

CHAPTER 6

CONCLUSIONS

Initially, we start with a general model to construct a specific model. For this we include all the determinants of ARDL model. Long run relationship is also observed among variables. The results shows that primary exports, manufactured exports and capital stock have positive association with economic growth while semi manufactured exports has negative association with economic growth as GDP growth declines due to an increase in semi manufactured exports. During short run primary export and semi exports has negative association with GDP growth. A positive relation is observed with manufactured export during short run. Under short run capital stock has mix association.

Again, a specific model is constructed but this time we include an additional variable of human capital. During long run, primary export, manufactured export and human capital has positive association while semi exports has negative association. For the short run mixed results has been observed in case of primary and semi manufactured exports while manufactured exports has positive association. Human capital has positive impact on GDP growth during short run. Beside this capital stock also has mix association under short run.

We also observe interaction of exports with human capital. For this, firstly we do interaction with primary manufactured exports and a GUM model is constructed. Results shows that interaction with primary exports has significant and positive association. In the next step we do interaction of human capital with semi exports and generate a GUM model. Result shows what? After that we take interaction of human capital with manufactured export and GUM is constructed. Results shows what?

Finally, we find interaction of human capital with all three types of exports. Results shows that interaction of human capital with primary exports and manufactured exports is highly significant while that of semi manufactured exports is insignificant. Thus, in case of Pakistan primary exports should be focused upon in contrary to previous studies. The reason for this

deviation is that Pakistan's industry has not reached its maturity and lots of progress is still needed.

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