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# EXAMINING THE IMPACTS OF HUMAN CAPITAL FLIGHT ON ECONOMIC GROWTH: A CASE STUDY OF PAKISTAN

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## ABSTRACT

Human capital is one of the key drivers of economic development and sustainable competitive advantage in the global market. Human capital flight or Brain drain can lead to a permanent impact on the growth process of the country of emigration. Like numerous other developing countries, Pakistan has also been experiencing both the negative and positive consequences of human capital flight. To examine these impacts of international movements on Pakistan economy we retrieved data from different sources. The fundamental objective is to examine the consequences of international migration and its associations with poverty, economic growth, and human development. To keep this in mind, we employed the ARDL approach on three different models for the period of 1975 to 2017. District wise analysis of all provinces states that the international migration is playing a key role in the reduction of poverty level except in KPK. In addition, empirical evidence describes that international migration is positively associated with economic growth and human development while negatively associated with poverty level. The study is concluding that there are enormous potential benefits exists in international migration process because it boosts the economic growth of Pakistan via personal remittances inflow. Likewise, it smoothes out the consumption pattern of ordinary households due to the direct transfer of remittances to them. This monograph is also suggesting some useful policy recommendations for instance, if we export our manpower to highly developed countries then reverse brain drain will encourage the innovation practices along with improvement in economic growth.

**Contribution/Originality:** The fundamental objective is to examine the consequences of international migration and its associations with poverty, economic growth, and human development. The study is concluding that there are enormous potential benefits exists in international migration process because it boosts the economic growth of Pakistan via personal remittances inflow.

## 1. INTRODUCTION

International migration of people is a global phenomenon which is rapidly mounting in terms of influences, scope, and complexity. People often migrate to boost their living standards because the global labor market provides them with better job opportunities. International migrations can be provisional or permanent, depends on the circumstances, but the ultimate goal of the migrants is to uplift their livelihood. These overseas workers are recognized as key players of the economic development for their origin countries because they transfer their income in terms of foreign exchange which is also known as remittances. The inflow of remittances has a positive

correlation with the economic growth of the country via dampening balance of payment deficit and international borrowing dependency.

A closer look to the literature on international migration associated with economic development, however, reveals a number of gaps and shortcomings which are addressed in this paper. Historically, there has been a great deal of confusion in the writings concerning the effectiveness of international migration. That is why we examine all major linkages of emigration with the economy of Pakistan to scrutinize these misunderstandings. In simple words, we linked international migration with poverty level, economic growth, and human development of Pakistan to assess the real consequences of human capital flights.

### 1.1. Background of the Study

History has proven that the economic development and higher living standard of a nation depend, to a large extent, on the influx of foreign exchange in terms of overseas direct investments and remittances [1-3]. Remittances inflow is an intrinsic phenomenon necessary for Pakistan economy to survive and grow. According to the State Bank of Pakistan report, Pakistan received 19.62 billion dollars in terms of remittances with a 1.4 percent growth rate during the fiscal year 2018. This is the second largest source of financing for the country after foreign direct investment. Impact of remittances on the economic development of a country has been a widely discussed topic during the last couple of decades. Many researchers and economists wrote papers to examine the effectiveness of international migration and remittances for different countries around the world. The study in hand will also explore these linkages with the perspective of Pakistan economy.

Nowadays, there is a special type of international migration taking place from developing countries like Pakistan to developed countries which are known as human capital flight or brain drain. As per United Nation website, brain drain means the flight of talented youngsters to other countries that are required for the development of their motherlands. Pakistan is facing these types of international movements since the 1970s, which is why we are far behind from the rest of the world in terms of inventions and innovations. It is very hapless that every year plenty of doctors, engineers, accountants, and scientist are leaving Pakistan due to lack of employment opportunities.

There is a plethora of studies are available that dealing with the international migration and remittances association with the economic growth of a country. But as per our exploration, there is no serious attempt has yet been made, with the perspective of Pakistan, which comprehensively examine the international migration impacts on human development, poverty and economic growth of Pakistan. Furthermore, this study is exclusively providing a deep parameter analysis of district wise migration impacts on district wise poverty level of Pakistan. In nutshell, we systematically inspect emigration data of highly skilled or unskilled workers and then pursue the consequences of these movements on Pakistan economy.

The prime focus of this research is to evaluate the pros and cons of international emigration and how these movements are influencing the Pakistan economy in terms of poverty reduction, human development, and economic growth. In simple words, this paper is divided into two different methodologies; 1) Graphical Analysis, and 2) Econometrical analysis. In the graphical analysis, we keenly observe the emigration of Pakistani workers on the basis of data retrieved from the Bureau of Emigration and Overseas Employment of Pakistan. We performed deep parameter analysis in this approach, for example, province wise emigration, category wise emigration, occupation-wise emigrations, protectorate wise emigration, district wise emigration, and country wise emigration. In other words, we provide the deep parameter analysis via examining the district wise migration of skilled and unskilled workers with the help of empirical data. Our aim is to find the answers of some key research questions for instance, is the international migration playing any role in reducing poverty level of Pakistan, what are the associations of human development and remittances, and is there any association exists between the economic development of Pakistan and human capital flight.

This study is based on the quantitative data on the human capital flight, poverty and economic development of Pakistan economy. Different types of statistical and econometrical techniques are employed on this data to obtain suitable policy recommendations. We expanded the province wise analysis via selecting top districts from each province in terms of emigration and linked it with their poverty level. In simple words, we examined that whether international migration is reducing the poverty level in respective districts are not. Our results postulated that there is strong positive correlation exists between the international migration and poverty level of the districts because migrants sent personal remittances to their respective districts which smooth out the consumption patterns of people and ultimately lower down the poverty level. The positive correlation is valid for the districts of Punjab, Balochistan, and Sindh but there is no clear pattern is being observed in KPK province. This is pointing out the fact that there must be many factors other than remittances which are playing a key role in determining KPK poverty level, for example, employable tourism industry discourages them from moving abroad etc.

In the econometrical analysis, we selected three key areas, including poverty, human development, and economic growth, and empirically examined the influences of international migration on them with the help of an econometric technique called Autoregressive Distributed Lags (ARDL) model. The first model is describing that international migration is positively linked with the reduction of the poverty level in Pakistan which invigorating our findings based on the graphical analysis. While the second model concluding that international migration is favorable for the human development of Pakistan because personal remittances directly reached to the households which remove consumption constraints on them that ultimately improve the living standards and human development. Some main findings of the third model stating that there is a strong and positive relationship between international migration and economic growth of Pakistan i.e. if remittances inflow increases then economic development of the country increases.

The ultimate goal of any research project is to apply a suitable research methodology on the given data and obtain some empirical results that can be used for the improvement of the policymaking process. The study in hand is also following the same conventional approach with the aim of providing some useful recommendations to improve the policymaking process of Pakistan. It is contributing to the existing body of literature on international migration influences the domestic economy and provides a roadmap for the convergence towards sustainable growth and welfare improvement via remittances inflow. This study is based on the following research questions:

- How the economic development of Pakistan affected by international migration of skilled and unskilled workers?
- Does brain drain or international migration hamper the economic growth of Pakistan?
- What are the impacts of international migration on economic growth, poverty level and human development of Pakistan?
- Does international migration contribute to the reduction of the poverty level in Pakistan?
- What is the relationship between remittances inflow and economic growth of Pakistan?
- Is there any correlation exist between the district wise reduction in poverty and remittances inflow?
- Are the government stability and socio-economic conditions of Pakistan playing any rule in human development?

The remaining paper is organized as follow; the Second chapter provides a detailed review of the past literature. Chapter 3 deals with the research methodology, data sources, and formation of the research model of the study. Chapter 4 provides the results which further divided into two sections consists of graphical analysis and econometrical analysis. The last chapter describes the conclusion, policy recommendation, and dimensions of future research.

## 2. LITERATURE REVIEW

"Study the past if you would define the future" (Confucius)

Owing to its significance for the policymaking process, economists and researchers worked extensively to investigate the consequences of international migration of human capital in a range of perspectives. Several research methods and stylized facts are reported in the literature to address the influences of international migration on economic development and growth process of a country [4-6]. This section begins with a short review of the literature regarding international migration linkages with poverty level, human development and economic growth of a country. Then we provide a comprehensive review of previous studies associated with human capital flight and their impacts on different sectors of the economy. Some prominent studies related to international migration and the human capital flight is chronologically compiled in the following Table 1.

**Table-1.** Other prominent studies related to human capital flight linkages with economy.

| Authors | Area/Focus | Objectives | Key Findings |
|---|---|---|---|
| Beine, et al. [7] | Panel Data analysis of 50 developing countries | Brain drain and growth linkages in developing countries | There are more losers than winners in international migration due to negative impacts on understudy economies. |
| Faini [8] | Skilled migration on sending countries | Explore the links between skilled migration, education, and remittances | Skilled labor mobility intensifies the effects of brain drain which further reduces the growth in sending countries. |
| Commander, et al. [9] | Theoretical Sides | Analyzes a survey of the literature and examine whether brain drain a curse or boon | Postulates that high skilled migration lessens the welfare of people left behind in origin country by lowering their wages and ex-ante employment level |
| Rapoport [10] | Use a cross-country comparison of 37 developing countries | Investigates the growth effects of human capital flight | The analysis shows a positive effect of high skilled migration on growth through remittances, return migration, trade and knowledge transfer. |
| Saravia and Miranda [11] | Developing countries analysis | The plumbing of brain drain to knowledge-based global economies for better career and educational opportunities | To plumb this asymmetric flow of talented individuals, developing countries should provide world-class educational opportunities, a feasible research environment and investing in development industries. |
| Schaeffer [12] | Western European nations | Studies the human capital, migration strategy and brain drain of industrialized western European nations to the United States | The results show that migration encourages more people to invest in pre-migration human capital stock. |
| Rosenzweig, et al. [13] | Developing countries analysis | Investigates the consequences of migration for developing countries | Increased human capital flight from developing countries due to differences in wages and skill prices across countries. |
| Groizard and Llull [14] | 94 countries from 1995-2004 | Analyses the impact of skilled migration on sending economies by testing brain drain and brain gain theories | Show the negative impact of skilled migration on human capital and positive on Trade and FDI. The influence on the economic growth of sending countries is still ambiguous. |
| Docquier, et al. [15] | OECD countries from 1990-2000 | Examines the magnitude of brain drain determinants with the perspective of | Describes that if the skilled migration rate lies between 5 to 10 percent, then it has a significant positive effect on living standards of respective countries. |

| | | developing countries | |
|---|---|---|---|
| Le and Bodman [16] | 50 developing countries from 1980-2000 | Examine remittances and technological diffusion importance for the developing countries | Shows high skilled workers of developing countries working in industrialized economies can diffuse technological knowledge back to their origin country, which will have a significant positive influence on economic growth |
| Niimi and Ozden [17] | Data from 82 countries for the year 2000 | Review the main determinants of remittance flow like migration rate, education level of migrants and financial sector development | The analysis shows a positive correlation between the level of migration and remittance flow, for instance, more the migration level more they will remit. In addition, per capita income increases with migration level and financial sector development. |
| Docquier and Croix [18] | Small island developing states | Do Brain Drain and Poverty Result from Coordination Failures? | When skilled people find their home country with low productivity and poor governance they move to better places. Moreover, high productivity and good governance forced them to stay at home and this is usually happening in small states |
| Marchiori, et al. [19] | The perspective of sending countries overtime period of 1950-2011 | Evaluates the brain drain on globalization from the sending countries' perspective. | Direct and short-run impact of brain drain is harmful for domestic production of the home county. While a positive influence of brain drain is inspiring more human capital formation, remittances and through diaspora effect. |
| Mitra, et al. [20] | Panel data of 67 OECD countries | Explore associations among financial liberalization, institutional character, and skilled migration. | The results show a strong financial sector of source country increases the length of brain drain with a negative effect on high skilled migration |
| Foo [21] | Malaysian Brain Drain | Quantifies the Malaysian Brain Drain and investigates the key determinants of high skilled migration | The study shows a significant association between the high skilled migration rate and better living standards. The key determinants of Malaysian high skilled migration are distance, religious diversity, livability, change in income and English language. |
| Alonso [22] | UN report on international migration in light of the crisis | highlights the international migration and development mostly in crisis | In globalization migratory flows are difficult to manage, the only way for a fair process to be managed is with the cooperation of the host country, sending county and through transits. |
| Lowell, et al. [23] | Use comparative data of BD for 1990 | Studies some development effects of the international high skilled migration | Brain drain negatively affects economic growth by lowering the wages of unskilled people and increasing the wages of skilled people left behind. |
| Gibson, et al. [24] | Five small countries covering the period of 1976-2004 | Analyses the economic consequences of 'Brain Drain' of the academic high achievers | The result shows positive impacts for such academic high achiever migrants not for themselves but in form of high Income for the people left behind. |
| Kohli [25] | Data is taken from 64th RNSS conducted by the Indian government | The impact of migrant remittances on fertility and education in case of India | The results depict migrants remittances lower the fertility in the remittance receiving household, increases the education outlays and education investment on each child of remittance receiving household |

| | | | |
|---|---|---|---|
| Docquier, et al. [26] | Developing countries during the period of 1960-2010 | The cross-country determinants of potential and actual migration. | The study shows modern nations need high skilled migration because it's a sign that a nation is uccessfully integrating into the global world. |
| Croix, et al. [27] | Panel data estimation on SIDS from the time period 1975-2000 | Analyzes brain drain and economic performance in small island developing states and studies their bi-directional links | The study shows high skill brain drain has harmful effects on the economy and it induces other waves of high skill migration. Coordination failure is the reason for this high brain drain and low development. Subsidizing the temporary return of migrants is an improvement in these countries. |
| Afridi and Baloch [28] | Empirical Analysis of Public Sector Universities of KPK province | Present strategies for turning the brain drain of Pakistan to brain circulation. | The study shows the negative impact of skilled migration on homelands economy in terms of leaving expenses and unskilled labor force left behind. The government should provide a more pleasing environment so that natives add to their national economy. |
| Najimdeen, et al. [29] | Pakistan over the time period of 1980-2011 | Analyzes human capital flight and its impact and challenges on GDP growth | Foreign remittances obtained from abroad shows a positive impact on GDP and per capita income. |
| Ahmed and Martinez-Zarzoso [30] | Gravity model with remittance data for 23 major source countries from 2001-2011 | Studies the drivers of bilateral remittances to Pakistan | The analysis depicts better economic conditions, financial development and the politically stable environment in the home country have a positive effect on remittance flow. While transaction cost of remittance is found to be negative on remittance flow. |
| Mirza, et al. [31] | Household Integrated Economic Survey of Pakistan (HIES) for 2007-08 | Investigate the impact of foreign remittances on household incomes and poverty in Pakistan. | The result of the study depicts remittances increase the per capita income of remittance receiving household by 45 percent than those households who do not receive remittances. This increase in per capita income will reduce the poverty of those households by 30 percent. The government should encourage easy remittance flow policies for achieving economic stability and reduction in poverty level. |
| Papakonstantinou and Inklaar [32] | 104 countries and 28 manufacturing industries from the time period 1980-2000 | Analyze the impact of highly skilled and medium-skilled migration on human capital | The results show countries with highly skilled or medium skilled migration have faster growth in knowledge-intensive manufacturing industries which leads to an increase in human capital. |
| Aqeel [33] | Panel data analysis of emigration over 1980-2000 | Highlights determinants of migration | Higher income and friends and family networks have a positive impact on the current emigration rates. Traditional gravity variables show mixed effects on migration rate |
| Kouni [34] | Panel data analysis of middle-income countries | Investigates theoretically and empirically high skilled migration and human capital | Shows by adopting a selective policy of emigration we can achieve quantitative and qualitative brain gain which has significant effects on human capital investment |

| Javed, et al. [35] | Pakistan, India, and Nepal for the period 2000-2014 | Inspects the relationship between remittances, economic growth, and technology | The result shows remittances, technology and brain drain have a positive influence on economic growth in case of Pakistan, India, and Nepal. |
|---|---|---|---|
| Matuzeviciute and Butkus [36] | Cross-country data of 116 developed and developing countries covering 1990-2014 | Investigate the relationship between remittances and long-run economic growth and their interaction with the development level in the recipient country. | Remittances promote economic growth relatively more in developed countries than undeveloped ones. The analysis also shows the impact of remittances is diminishing on LR economic growth of those countries whose remittances to GDP ratio reaches 10.4-11.9 percent because remittances discourage labor supply in remittance abundant countries. |
| Mujeeb [37] | A Case study on Afghanistan | An empirical study of the effects of brain drain on developing countries | The study finds people of Afghanistan suffered from security threats which lead to migration of youngsters mainly. Empirical analysis also demonstrates through that the students who go abroad for higher education do not return back to origin country which creating a vacuum of skilled people. |

After a keen review of the plethora of international migration studies, we are concluding this chapter with some key propositions.; 1) Literature suggesting that there is a strong association exists between international migration and alleviation of poverty level in an economy, 2) Personal remittances are playing a key role in improving the living standards of both emigration and immigration countries, 3) economic growth process of developing countries is highly depended on the remittances because it provides foreign exchange for financing the international transactions of government, 4) human development of developing countries can be improved via promoting emigration for the surplus labor, and 5) personal remittance is an imperative part of the Gross Domestic Product of a country, so any government should pay proper attention to this channel of foreign exchange inflow.

## 3. DATA SOURCES AND RESEARCH METHODOLOGY

### 3.1. Data Sources

Regardless of the area or field of study, the most significant and dynamic aspect of research is data sources. The integrity of research and appropriate policy recommendations depends on the authenticity of data sources. To examine the impacts of international migration on the Pakistan economy, we retrieve data of the understudy variables from different reliable sources.

**Table-2.** Variables data sources.

| Variable Name | Data Source |
|---|---|
| International Migration | Bureau of Emigration and Overseas Employment |
| Personal Remittances | World Development Indicators, 2018 |
| Real GDP | World Development Indicators, 2018 |
| Poverty Level | Social Policy and Development Centre of Pakistan |
| Multidimensional Poverty Index | United Nations Development Programme |
| Gini Index | WDI and Economic Surveys of Pakistan |
| Human Development Index | United Nations Development Programme |
| Government Stability | International Country Risk Guide, 2018 |
| Socioeconomic Conditions | International Country Risk Guide, 2018 |
| Corruption Level | International Country Risk Guide, 2018 |
| Internal Conflicts | International Country Risk Guide, 2018 |

As mentioned in the introduction section, this study consists of eleven variables including International Migration, Personal Remittances, Real GDP, Poverty Level, Multidimensional Poverty Index, Gini Index, Human Development Index, Government Stability, Socioeconomic Conditions, Corruption Level, and Internal Conflicts. The sources of these variables include Bureau of Emigration and Overseas Employment, United Nations Development Programme, World Development Indicators, Social Policy, and Development Centre of Pakistan, International Country Risk Guide and Economic Surveys of Pakistan. The following Table 2 is providing a concise summary of variables and their data sources in an explicit way.

### 3.2. Methodology of the Study

As far as the research methodology of the study is concerned, we divided our analysis into two main types; 1) Graphical Analysis, and 2) Econometrical Analysis. In the first approach, we performed visual analysis on the given data from different perspectives, for example, province wise emigration, category wise emigration, occupation-wise emigrations, protectorate wise emigration, district wise emigration, and country wise emigration. In the second approach, we performed an econometric technique on three different models which is known as Autoregressive Distributed Lags (ARDL) Bounds approach. On the basis of the reviewed literature, we extend our study into three different models. The reason of choosing three different models is to acutely perceive the all possible connections of international migration with Pakistan economy.

### 3.2.1. International Migration Linkages with Poverty Level

The main emphasis of the first model is to assess that whether international migration is playing any role to alleviate the poverty from Pakistan economy. As per the theoretical model, overseas Pakistani sent remittances directly to their families which remove the imposed budget constraints and smooth out households consumption pattern. This increase in consumption positively affects the Gross Domestic Product of the country because of 60 to 70 percent share consumption. In addition, workers' remittances influence economy from another channel which is known as a domestic investment as shown in the following Figure 1.
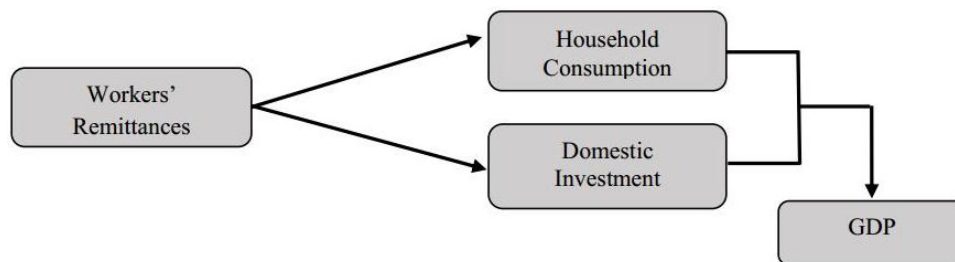


**Figure-1.** Remittances impacts on economy.

In addition, these direct transfers have significant importance to moderate the poverty level of the beneficiary households. On the basis of literature review, we developed an econometrical model to examine all these theoretical justifications. There are four variables used in the first model which includes poverty level, real Gross Domestic Product, personal remittances and Gini index. The first econometric model can be presented in the following Equation 1 form;

$$lnpov_t = \alpha + \beta lnrem_t + \gamma lnGini_t + \delta lnRGDP_t + \varepsilon_t \qquad (1)$$

Where lnpov is the log of the poverty level, lrem is a log of personal remittances, lnGini is a log of Gini coefficient, and lnRGDP is a log of real Gross Domestic Product of Pakistan. The reason for taking logs is to normalize all the variables of study because it smoothes out the dispersions and make results easy to interpret.

### 3.2.2. International Migration Linkages with Human Development

There is a bulk of literature is available that postulating the strong association between human development of the country and international migration. The second model of our study is based on this theoretical formation. The main objective here is to empirically examine and test these theoretical associations with the help of latest data on Pakistan economy. There are four variables used in the first model which includes the human development index, personal remittances, government stability, and socioeconomic conditions. The second econometric model can be presented in the following Equation 2 form;

$$HDI_t = \alpha + \beta lnrem_t + \gamma SC_t + \delta GS_t + \varepsilon_t \qquad (2)$$

Where HDI is representing the human development of Pakistan, lnrem is a log of personal remittances, SC is socioeconomic conditions of Pakistan and GS is government stability of Pakistan. An important thing to mention here is that we take log only of the personal remittances to normalize it. The reason for not taking the log of other variables is that they already in reasonable figures. Also, we do not run the regression number 2 at once but two stages. First, we use only two independent variables including personal remittances and government stability. In the second stage, we just check the robustness of results via introducing new variable called socioeconomic conditions.

### 3.2.3. International Migration Linkages with Economic Growth

In the third model, we exclusively examine the linkages between international migration and economic growth of the country. According to the latest report of State Bank of Pakistan, Pakistan received 19.62 billion dollars in terms of remittances with a 1.4 percent growth rate during the fiscal year 2018. This is the second largest source of financing for the country after foreign direct investment. The third model of our study can be presented in the econometrical form as following Equation 3;

$$lnRGDP_t = \alpha + \beta lnrem_t + \varepsilon_t \qquad (3)$$

Where lnRGDP is showing the log of real Gross Domestic Product of Pakistan while lnrem is representing the log of personal remittances. The Autoregressive Distributed Lag (ARDL) approach, developed by Pesaran and Shin [38] used to examine the long run and short-run relationships among variables in the above mentioned econometrical models. The benefits of this econometrical approach are that it can be used if variables of the model have different orders of integration, for example, some variables are stationary of level I(0) while others are stationary at first difference I(1). In addition, it is also useful if the researcher has a small sample size. ARDL formulation of the study can be shown with the help of the following Equation 4:

$$\Delta Y = \alpha + \beta Y_{t-1} + \gamma Z_{t-1} + \sum_{i=1}^{k} \delta \, \Delta Y_{t-1} + \sum_{i=1}^{k} \theta \, \Delta Z_{t-1} + \varepsilon \qquad (4)$$

Where Y is representing the dependent variables of the models, Z is representing the explanatory variable vector i.e. the vector of all variables used on the right hand side of right-hand, 2, and 3. The Autoregressive Distributed Lag (ARDL) approach is based on Bounds test which consists of F-statistics test of Cointegration. The null hypothesis of this test assuming that all coefficients of the equation are jointly equal to zero which means no long-run association between the variables under study. The following Figure 2 is summarizing the whole research methodology which we used in this research paper.

## 4. FINDINGS AND DISCUSSION

Migration decision is highly associated with the household welfare, community welfare and, to a large extent, whole economy welfare in different ways. Like numerous other developing countries, Pakistan has also been experiencing both the negative and positive consequences of human capital flight or migration. To examine these

impacts of international movements on Pakistan economy we retrieved data from different sources. This section presents empirical results of the study which acquired on the basis of pre-determined econometric and statistical techniques. The results are divided into two main sections; 1) Graphical Analysis, and 2) Econometrical Analysis.

### 4.1. Graphical Analysis

Before moving towards empirical investigation, it may be worthwhile to evaluate the understudy variables via graphical analysis which is a very powerful tool to examine the behavior of the system. The graphical analysis is a visual display of data which helps to present the information in quickly understandable manners. The first graph Figure 3 is exhibiting the number of Pakistan emigrants during the time period from 1970 to 2018. It is a time series plot which evaluates the emigrant's movement behavior over the given time interval via connecting the data points to highlight the trends.
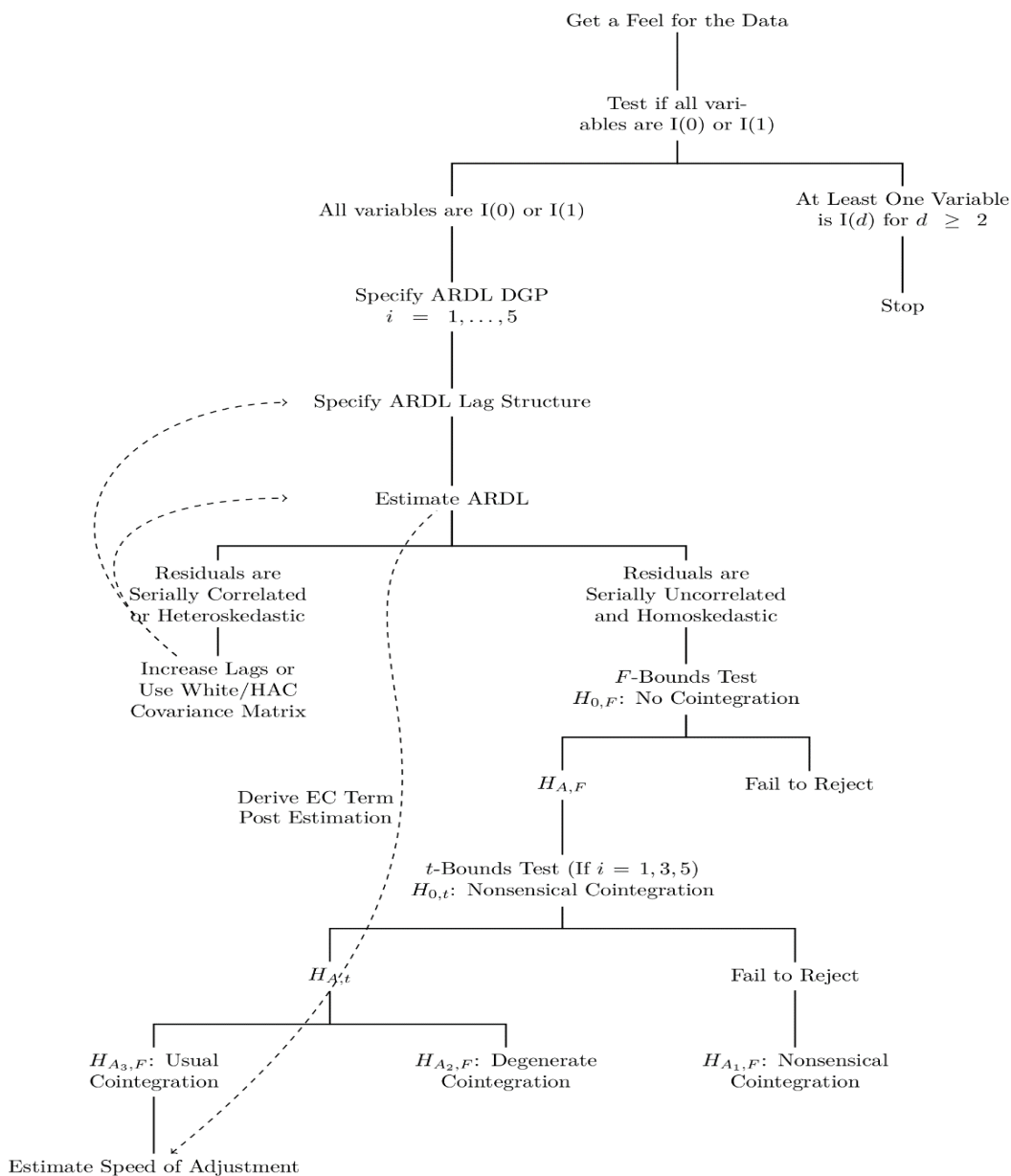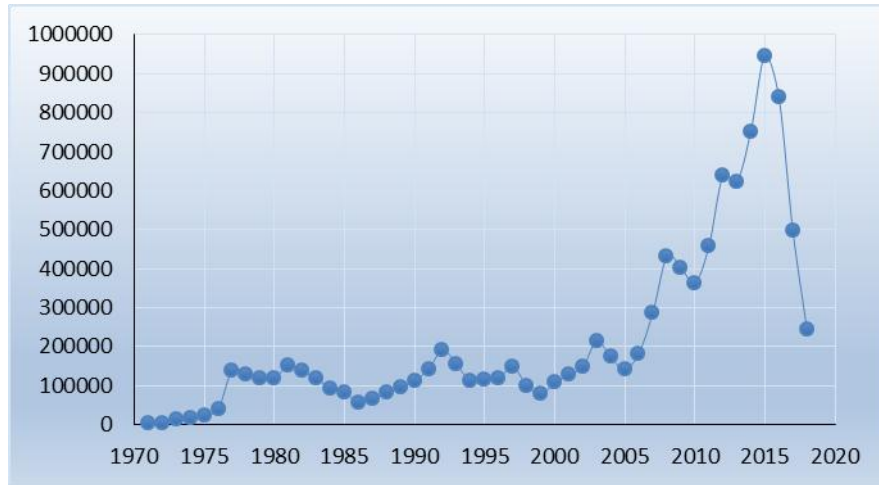


**Figure-2.** ARDL flowchart.

**Figure-3.** Number of emigrants during 1970 to 2018.

According to the Bureau of Emigration and Overseas Employment (BEOE), 10.3 million people moved from Pakistan to other countries during 1970 to date. If we keenly perceive the above time series chart, a positive trend is obvious from 1970 to 2015 but after that, there is a sharp decline. A possible explanation of this decay is the Gulfisation Policy adopted by the Gulf region countries to transform their economies from oil-based to service sector oriented. In addition, Saudi Arabia has sliced its infrastructure budget due to the economic crisis which severely affected the low skilled emigrants around the world. The imposition of Value Added Tax (VAT) and reduction of work visa validity to one year for expats are also invigorating the declining trends of Pakistani emigrants (see Figure 4).
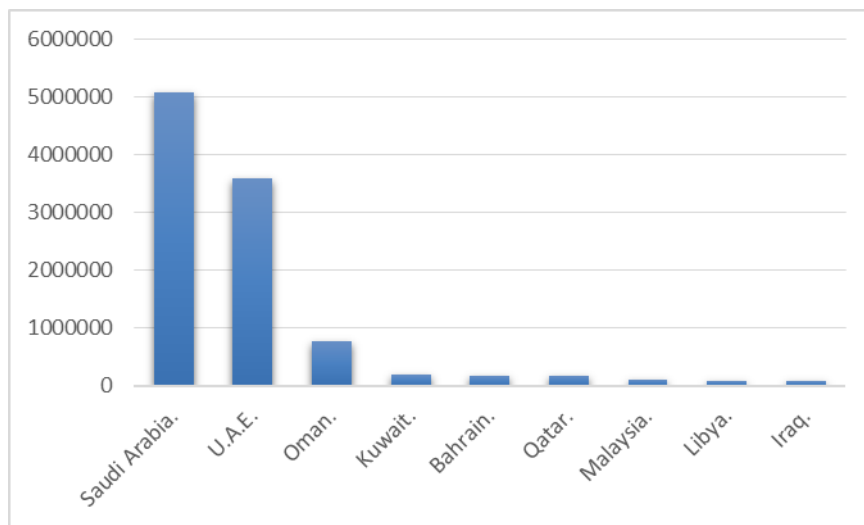


**Figure-4.** Top ten countries for Pakistani emigrants.

Emigration destination of the majority of Pakistani people in the Gulf region or Middle East Countries. As presented in the above Figure 4, 3.5 million people have migrated to the United Arab Emirates (UAE) and 5.01 million migrated to Saudi Arabia. So UAE and Saudi Arabia remained the top place for Pakistani emigrants which revitalizing our above-mentioned explanations of emigrants declining tendencies. In simple words, the main reasons for decreasing emigrants trends after 2015 includes the Gulfisation Policy, VAT implementation, reduction in work permit duration and changes in infrastructure budgets by top two emigrants destinations for Pakistani.
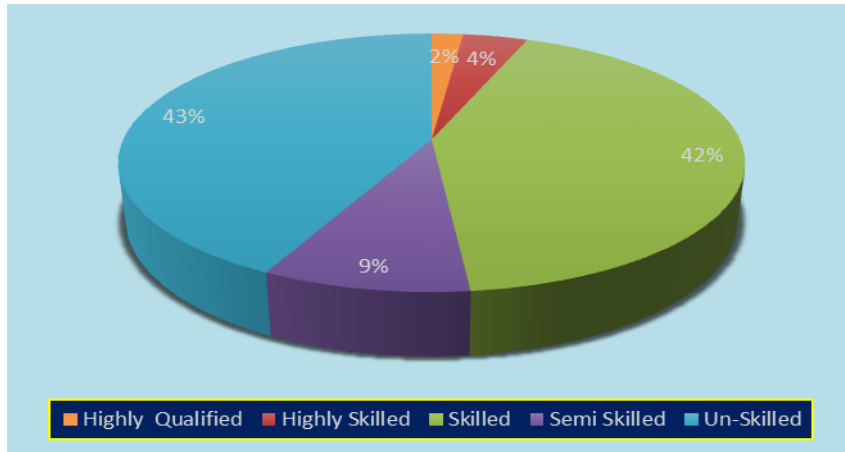
**Figure-5.** Skill Composition of emigrants during 1970-2018.

For the purpose of examining the brain drain magnitudes, we obtained data on skill composition of emigrants from Bureau of Emigration and Overseas Employment. The above pie chart Figure 5 is visually presenting the proportion of each category relative to the whole data set which also known as the slices of the pie chart. 42 percent out of total migrants belongs to skilled workers, 9 percent semi-skilled, 4 percent highly skilled, 2 percent highly qualified and remaining 43 percent belongs to unskilled workers category. Some possible explanations of the highly qualified or other workers emigration includes attractive global job market, weak economic conditions of Pakistan, the decline in living standards, substantial scarcity of resources, high unemployment, and to offer more opportunities to their children.
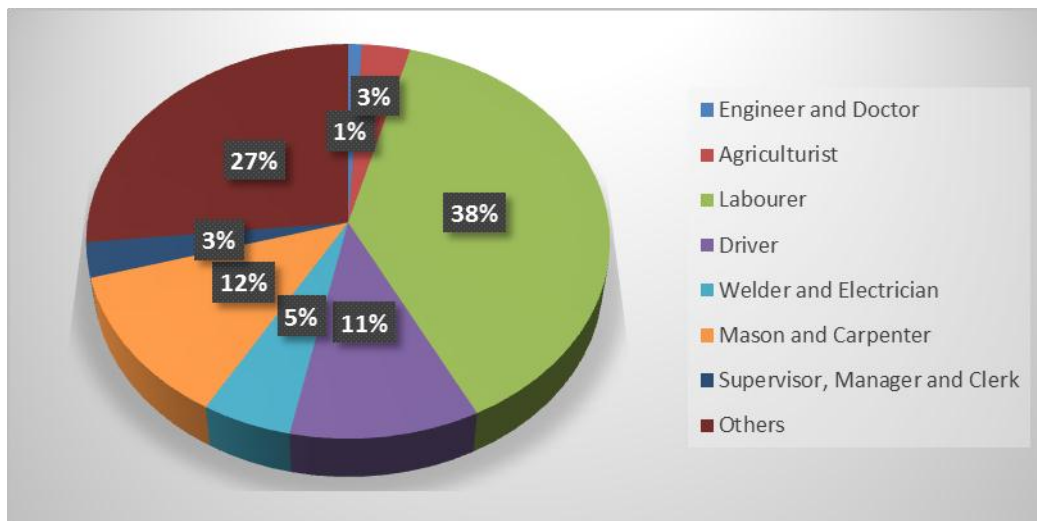


**Figure-6.** Catagory wise overseas employment during 1970-2018.

Skill composition of the emigrants is further investigated via exploring the category wise overseas employment. Above pie chart Figure 6 is showing the proportion of different employment categories of employees around the world where laborer are leading with 38 percent of total emigrants during the understudy period of 1970 to 2018. In addition, 11 percent are associated with driving, 12 percent with carpenter and Mason, 5 percent with welder and electrician, 3 percent with supervisory jobs, 1 percent with medical and engineering, 3 percent agriculturist and 27 percent of the total are associated with other occupations.
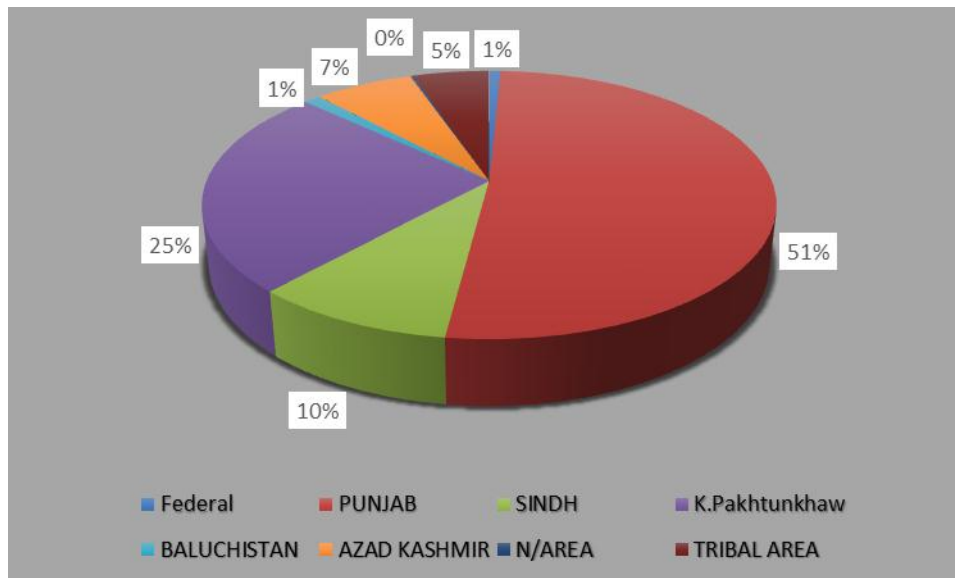
**Figure-7.** Province wise migration during 1970-2018.

We extended our analysis to geographical distribution and scrutinize province wise migration from 1970 to 2018. The biggest slice of the above pie chart Figure 7 is representing the migrants belongs to the province of Punjab which means the majority of the overseas Pakistani workers are Punjabi standing at 51 percent of the total. While KPK is following Punjab with 25 percent of the total, 10 percent from Sindh, 7 percent from Azad Kashmir, 5 percent from tribal areas, 1 percent from federal and only 1 percent from Balochistan. One possible explanation of lower migration from other than Punjab provinces may be the availability of the better business environment or job opportunities which embolden them to stay in the native country.

*4.1.1. Human Capital Flight and Poverty*

As stated in the introduction section, there is a strong association between the human capital flight/emigration and poverty level of the country. To keep our discussion concise, emigrants send remittances to the home country which is either consume or save. In both cases, the Gross Domestic Product (GDP) of the country increases which ultimately enable the policymakers to re-allocate their resource for poverty reduction. In Economics language there is a strong Keynesian multiplier effect of the remittances on home country, depends on marginal propensity to consume.

In this paper, we linked human capital flight with a poverty level of Pakistan to investigate their interactions. Next four bar chart figures are providing a visual display of district wise data on percent of migrants and last year poverty level. Graphical analysis of Punjab, Sindh, and Balochistan are postulating that there is a lower poverty level in those districts which have a higher percentage of migrants. However, this statement is not valid for the districts of KPK province which are providing the mixture of positive and negative connection between poverty and percentage of migrants. One possible explanation of KPK unorthodoxy from other graphs is that there must be some additional determinants which play a key role in KPK poverty level (see Figure 8, Figure 9, Figure 10, and Figure 11).

## PUNJAB DISTRICT WISE ANALYSIS

Percent Migrant ■ MPI
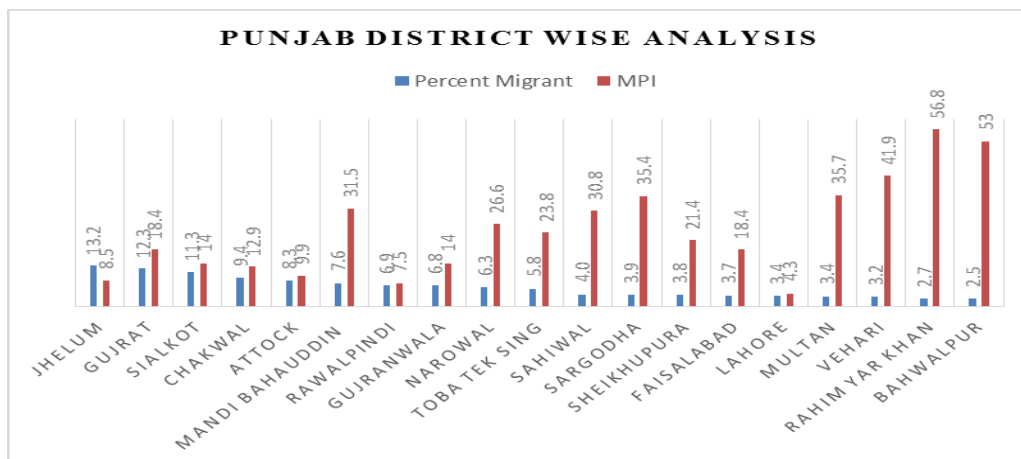
**Figure-8.** Overseas migration and poverty Punjab.

## SINDH DISTRICT WISE ANALYSIS

Percent Migrant ■ MPI
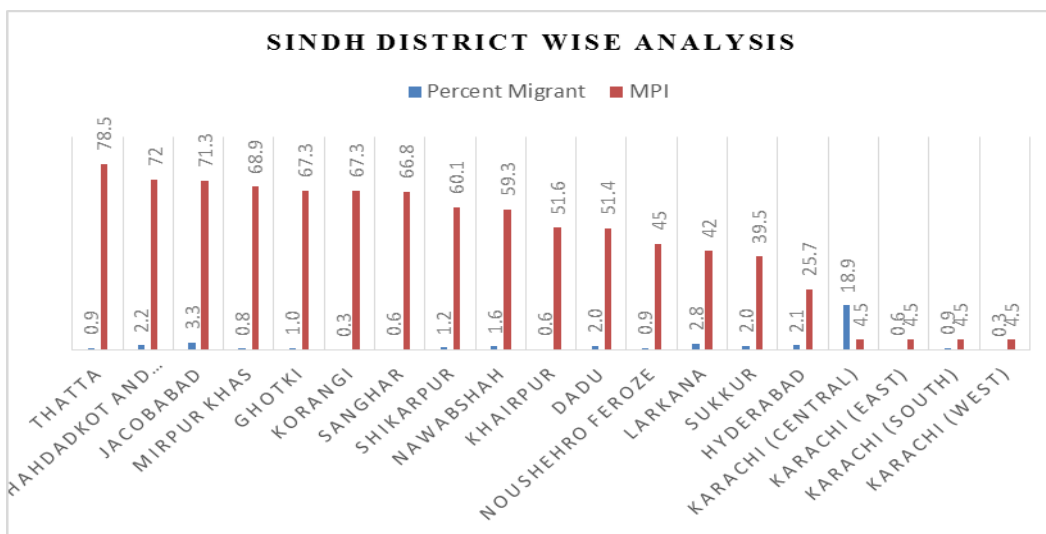
**Figure-9.** Overseas migration and poverty Sindh.

## BALOCHISTAN DISTRICT WISE ANALYSIS
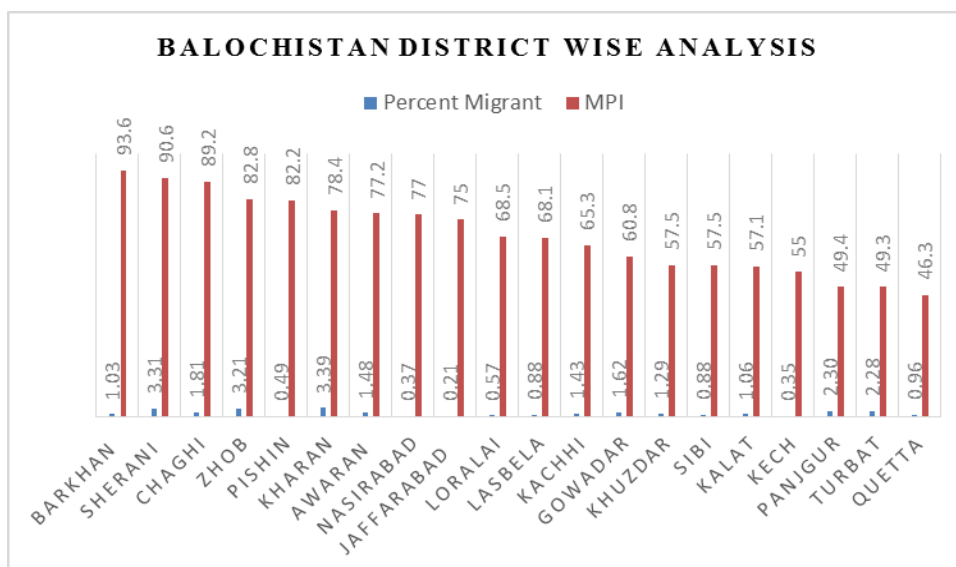
Percent Migrant ■ MPI

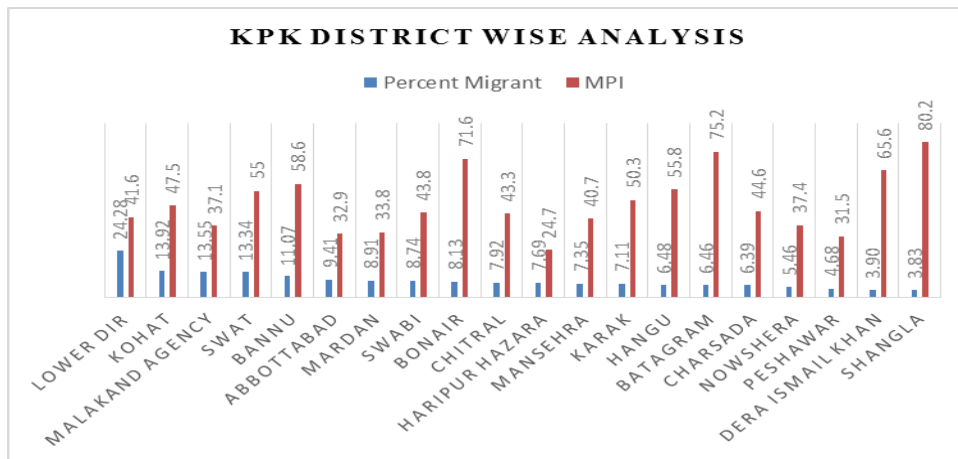**Figure-10.** Overseas migration and poverty Balochistan.

**Figure-11.** Overseas migration and poverty KPK.

There are two color bars used in the previous four figure where blue is representing the percentage of migrants in any specific district while orange is showing the Multi-Dimensional Poverty Index of that specific district. If we keenly compare these graphs, Punjab has higher blue bars and lower orange bars while Balochistan has higher orange bars and lower blue bars. It means that Punjab districts have lower poverty level and a higher percentage of migrants as compare to Balochistan which has a higher poverty level and a lower percentage of emigrants. On the basis of these graphs, we can conclude that the lower level of poverty in Punjab and a higher level of poverty in Balochistan is associated with the percent of migrants. In simple words, Punjab province have lower poverty because the majority of the people are working abroad and Balochistan province have a higher level of poverty which is due to the lower level of their migration.

If we examine the bar graph of Sindh districts, there is a lower percent of migrants except for central Karachi district. The higher percent of the migrant is the reason for lower poverty level in central Karachi. In all other districts, orange bars are higher and blue bars are tiny which strengthing our claim of an inverse relationship between emigration and poverty level. As far as KPK district-wise analysis is concerned, there is no deduction can be made because no clear pattern exists between blue and orange bars. As mentioned earlier, there might be some factors other than emigration which is contributing to the KPK poverty level.



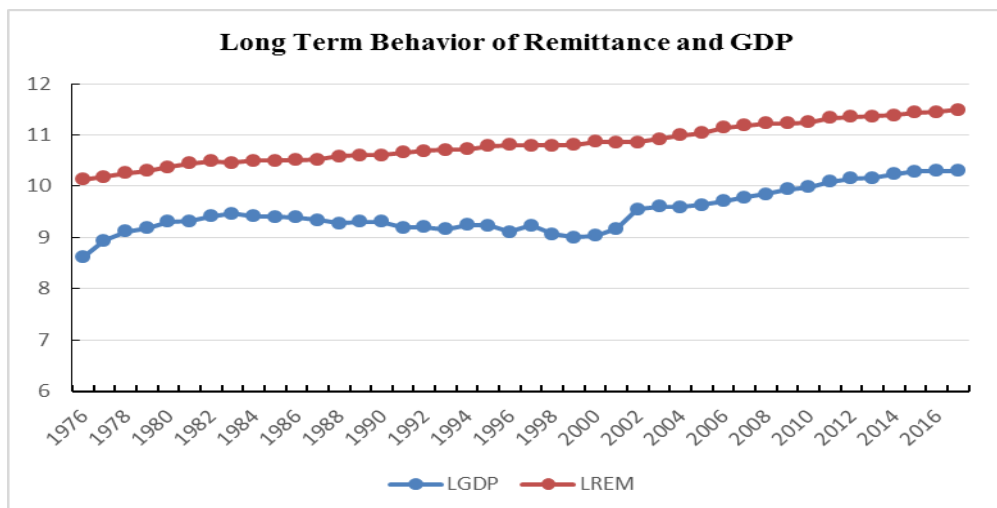**Figure-12.** Trends analysis of remittance and GDP 1976 to 2017.

The last time series plot Figure 12 is demonstrating the long run behavior of Remittances and GDP by connecting data points over the time period of 1976 to 2017. The graph is showing an explicit positive relation between Gross Domestic Product of Pakistan and remittances sent by overseas migrants. It is confirming our claim

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of a positive association between both variables, as mentioned in the introduction and literature review sections. In sum up, we acutely examine the overseas migration data in this section and explore some useful linkages for instance, positive association between remittances and Gross Domestic Products of Pakistan, negative linkages between poverty and overseas migration, reasons of declining trends in overseas migration since 2015 etc. There is a major shortcoming graphical analysis is that graphical presentation does not always indicate correctly the true value, however, it reflects some patterns or trends in the understudy data set. In order to get empirical and quantitative analysis, we need to apply some econometrical technique on the given data which we will discuss in the upcoming segment.

### 4.2. Econometrical Analysis

Econometric Analysis is a convenient approach to extract useful quantitative information from the given data which can be used to verify an economic theory, testing hypothesis, improve policy-making process and forecasting. In this section, we will apply different econometric approaches i.e. statistical and mathematical methods of data to assess the consequences of migration on Pakistan economy.

### 4.2.1. Descriptive Statistics Analysis

Before moving towards econometric inquiry, a comprehensive statistical analysis is carried out. The following table is dealing with the statistical description of all the variables used in this paper. There are seven variables used in this study including poverty level, Gross Domestic Product, personal remittances, international migration, Gini index, government stability and human development index covering the time period of 1970 to 2017. To keep our discussion concise, mean tells us about the average of given variable during given time interval, median defines the middle value of the given time series, standard deviation representing the possible deviation from average, Kurtosis explains the degree of flatness or peakedness while the skewness describes the deviation of given distribution from normal distribution.

The Jarque-Bera is a statistical test for checking the normality of the data series. The probability provided at the end of the table can be used for this purpose, for instance, to test the null hypothesis "Residuals of the time series data is normally distributed". All probabilities are greater than 5 percent level of significance which means these data series are normally distributed except remittances and migration. An important thing to mention here is that the normality assumption can be disregarded if the sole purpose is regression estimations because the normality assumption is important only for inference of the model. Table 3 provides descriptive statistics of variables.

**Table-3.** Descriptive statistics of variables.

|  | Poverty | Gdp | Remittances | Migration | Govt. St | Gini | Hdi |
|---|---|---|---|---|---|---|---|
| Mean | 52.94118 | 113000000000 | 5900000000 | 267307.8 | 6.980392 | 33.21324 | 0.47197 |
| Median | 59.9 | 72300000000 | 2560000000 | 148225.5 | 6.75 | 33.4 | 0.4535 |
| Maximum | 69.3 | 305000000000 | 19800000000 | 946571 | 10.83333 | 36 | 0.562 |
| Minimum | 24.1 | 31100000000 | 996000000 | 58002 | 2.166667 | 28.7 | 0.409 |
| Std. Dev. | 14.0649 | 84000000000 | 6100000000 | 242542 | 2.168517 | 2.19294 | 0.05155 |
| Skewness | -0.827052 | 0.902140 | 1.263218 | 1.41027 | -0.095836 | -0.536382 | 0.3807 |
| Kurtosis | 2.301545 | 2.438712 | 3.155997 | 3.87616 | 2.209241 | 1.959473 | 1.62 |
| Jarque-Bera | 4.567194 | 5.058165 | 9.076889 | 12.35773 | 0.937886 | 3.164151 | 3.51921 |
| Probability | 0.101917 | 0.079732 | 0.01069 | 0.002073 | 0.625663 | 0.205548 | 0.17211 |

### 4.2.2. Augmented Dickey-Fuller Test of Stationarity

The building block of time series econometric analysis is that the data must be stationary. Stationarity of time series means that the mean, variance, and covariance of the given time series is constant no matter which point of time we are examining them. According to the basic time series, if we apply Ordinary Least Square (OLS) method

on the non-stationary variables then our results will be spurious or meaningless. In this segment, we examined the stationarity of the variables used in our models via applying Augmented Dickey-Fuller (ADF) unit root test. The summary of the ADF test result is presented in the following table at the level and at first difference (see Table 4).

<div align="center">

**Table-4.** Augmented dickey-fuller test results.

| At Level | P-Value | At First Difference | P-Value | Decision |
|----------|---------|---------------------|---------|----------|
| Human Development Index | 0.9704 | Human Development Index | 0.0060 | I(1) |
| Remittances | 0.9617 | Remittances | 0.0013 | I(1) |
| Poverty | 1.0000 | Poverty | 0.0285 | I(1) |
| Real GDP | 0.9715 | Real GDP | 0.0022 | I(1) |
| Gini Coefficient | 0.032 | Gini Coefficient | 0.0000 | I(0) |
| Govt. Stability | 0.4314 | Govt. Stability | 0.0002 | I(1) |
| Socio Eco Conditions | 0.0795 | Socio Eco Conditions | 0.0005 | I(1) |

</div>

The null hypothesis of the ADF test states that the under consideration time series contains a unit root. In simple words, the time series that contains unit root is non-stationary series. We applied the ADF test on all variables and note the probability value to compare it with the level of significance. The rule of testing hypothesis used in above table is; reject the ADF null hypothesis if P-value is less than 5 percent level of significance meaning that the series is stationary. The results are stating that Human development index, personal remittances, poverty, real Gross Domestic Product, government stability and socio-economic conditions are non-stationary at their original level. However, the first difference of log transformations of these variables became stationary which is indicated with I(1). Gini Coefficient is the only variable which is stationary at the level, that is why we write it I(0). In a nutshell, all variables have different orders of integration which indicating that we should apply the ARDL approach to examine the long run and short-run relationships among variables.

As point out in the methodology section, this monograph consists of three different models to assess the significance of international migration. The first model deals with the impact of international migration on poverty, the second model describes the association of international migration with human development of Pakistan, while the last model presents the relationship between economic growth and international migration. Due to the mixed order of integration, we applied Autoregressive Distributed Lag (ARDL) approach on all three understudy models.

### *4.2.3. Model 1: Impact of International Migration on Poverty*

The relationship between international migration and poverty has been a widely discussed topic during the last couple of decades. As we explored in the literature review section that many researchers and economists wrote papers on the linkages of migration with poverty reduction. In the first model, we will empirically check the impact of international migration on poverty with the perspective of Pakistan. As mentioned earlier, ARDL approach will be used on a given model to find the long term and short-term relationships. An important thing to mention here is that we used personal remittances as a proxy [39] for international migration.

### *4.2.3.1. Optimal Lag Length Selection*

Before moving towards the estimation of an economic model with ARDL approach, we need to find out the optimal lag length on the basis of different criterion which we have comprehensively discussed in the methodology section, for example, Akaike and Schwarz criterion. There is a bulk of studies are available which proposing that Akaike Information Criterion (AIC) should be preferred over all to select an optimal lag length. Following table is presenting a concise summary of different lag length criterion where AIC indicates 4 lags are optimal for estimation of the equation (see Table 5).

**Table-5.** Optimal lag length selection criterion.

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 115.8113 | NA | 1.06e-09 | -9.317611 | -9.121269 | -9.265521 |
| 1 | 216.6764 | 159.7030 | 9.18e-13 | -16.38970 | -15.40799* | -16.12925 |
| 2 | 239.7225 | 28.80765* | 5.81e-13* | -16.97688 | -15.20980 | -16.50807 |
| 3 | 248.5263 | 8.070169 | 1.52e-12 | -16.37719 | -13.82474 | -15.70003 |
| 4 | 285.2711 | 21.43446 | 6.55e-13 | -18.10593* | -14.76811 | -17.22040* |

* indicates lag order selected by the criterion.

### 4.2.3.2. Bounds Test

Pesaran, et al. [40] presented a cointegration approach to finding the long-term relationship between variables, known as ARDL bounds testing. The null hypothesis of the bound test states that there is no long-run relationship exists among understudy variables. Following table is showing the results of Bounds test where F-Statistics is greater than the upper and lower Bound critical values which means reject the null hypothesis. In other words, the long run relationship exists among variables (see Table 6).

**Table-6.** ARDL bounds test results.

| Null Hypothesis: No Long Run Relationships Exist | | | | |
|---|---|---|---|---|
| Test Statistic | Value | k | | |
| **F-statistic** | 7.008818 | 3 | | |
| Critical Value Bounds | | | | |
| **Significance** | **I0 Bound** | **I1 Bound** | | |
| 10% | 2.72 | 3.77 | | |
| 5% | 3.23 | 4.35 | | |
| 2.5% | 3.69 | 4.89 | | |
| 1% | 4.29 | 5.61 | | |

### 4.2.3.3. Long Run Relationship

The Bounds test rejected the null hypothesis which means that there is long-term relationship exists among poverty, remittances, gross domestic product, and Gini index. Following table is presenting the long run coefficients of the Autoregressive Distributed Lag (ARDL) model where poverty is dependent variable while personal remittances, Gini index, and Gross Domestic Product are independent variables. All variables shown in the table are in natural log form. The reason for taking variables log is to smooth out the data series and to make the results easily interpretable. In addition, the poverty, remittances and real GDP are used in first difference form while Gini index is used in the level form (see Table 7).

**Table-7.** Coefficients of estimated ARDL model.

Long-Run Coefficients of ARDL (3,4,3,4) Model
Dependent Variable ln (Poverty)

| Variable | Coefficient | Standard Error | T-Statistic | P-Value |
|---|---|---|---|---|
| Ln (Remittance) | -50.67944 | 5.7726 | -8.7792 | 0.0003 |
| Ln (Gini Index) | 0.575120 | 0.212436 | -2.707262 | 0.0424 |
| Ln (RGDP) | -10.005075 | 2.79113 | -3.584593 | 0.0158 |
| Constant | 0.286792 | 0.137258 | 2.089433 | 0.0910 |

The long-run results are stating that there is a negative and significant relationship between personal remittances and poverty of Pakistan. In simple words, if remittances inflow increases then the poverty level of Pakistan will decrease. The justification of this negative relation is that the remittances directly reached to the Pakistani households which smooth out their consumption pattern that ultimately leads to a reduction of poverty. Similarly, the ARDL results further stating that there is positive and significant relationship between remittances and real Gross Domestic Product which is confirming our claims of introduction section. Lastly, there positive and significant relationship between poverty and Gini Index appears in our analysis which means that greater income

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inequality leads to higher poverty level in Pakistan. Some prominent studies like Dutt and Tsetlin [41] are stating that what really matters is poverty, not income inequality, so we can disregard this association between poverty and the Gini Index. Our prime focus was on checking the negative association between remittances and poverty which founded significant.

### 4.2.3.4. Short Run Relationship

The following table is presenting the short-run relationship between dependent variable and independent variables. An important thing to note in the following table is the last term which is known as error correction term. It tells us about the speed of adjustment of the model. In simple words, it defines how much time system will take to converge towards its equilibrium. Our estimated coefficient indicates that about 37 percent of the disequilibrium is corrected within one year. Some researchers [42] are stating that this value should be between 0 to -1 while other [43] asserting that it could be close to -2. So there are no consensus on the range of error correction term but it must be negative and significant for converging towards its long-run equilibrium. Moreover, the majority of the short-term relationships are significant at 5 percent and 10 percent level of significance while some are insignificant. If we keenly observe the table, the majority of the insignificant relationships are those who do not make economic sense, for example, negative relationship between poverty and inequality, and positive relation between remittance and poverty etc. (see Table 8).

**Table-8.** Error correction representation of the ARDL model.

Error Correction Representation of the Selected ARDL Model
Dependent Variable ln (Poverty)

| Variable | Coefficient | Standard Error | T-Statistic | P-Value |
|---|---|---|---|---|
| $\Delta Poverty_{t-1}$ | 0.250537 | 0.282052 | 0.888264 | 0.4151 |
| $\Delta Poverty_{t-2}$ | -0.546559 | 0.218381 | -2.502784 | 0.0543 |
| $\Delta LGDP_t$ | 18.402052 | 6.936296 | 2.653009 | 0.0453 |
| $\Delta LGDP_{t-1}$ | -17.283310 | 9.799664 | -1.763664 | 0.1381 |
| $\Delta LGDP_{t-2}$ | 27.821207 | 7.575457 | 3.672545 | 0.0144 |
| $\Delta LGDP_{t-3}$ | 14.115607 | 4.827974 | 2.923712 | 0.0329 |
| $\Delta GINI_t$ | -0.434971 | 0.191512 | -2.271249 | 0.0723 |
| $\Delta GINI_{t-1}$ | 1.156540 | 0.345139 | 3.350938 | 0.0203 |
| $\Delta GINI_{t-2}$ | -0.280271 | 0.365181 | -0.767487 | 0.4775 |
| $\Delta LREM_t$ | -13.928060 | 8.836992 | -1.576109 | 0.1758 |
| $\Delta LREM_{t-1}$ | 29.579953 | 10.524055 | 2.810699 | 0.0375 |
| $\Delta LREM_{t-2}$ | 25.827459 | 8.862600 | 2.914208 | 0.0332 |
| $\Delta LREM_{t-3}$ | 32.710384 | 18.027380 | 1.814484 | 0.1293 |
| $ECM_t(-1)$ | -0.374100 | 0.384989 | -6.166667 | 0.0016 |

### 4.2.3.5. Stability Test of Model

The CUSUM test is often used by the researchers to examine the stability and structural breaks of the estimated Autoregressive Distributed Lag (ARDL) model. CUSUM and CUSUM squares charts of our estimated model are presented below. This test is based on a simple rule of thumb which postulating that the blue line should be within the limits of red dotted lines where dotted lines are displaying the upper and lower bounds critical value

of the estimated model. Because our estimated model is meeting the stability criteria of the CUSUM test so we can conclude that our estimated ARDL model is stable (see Figure 13 and 14).
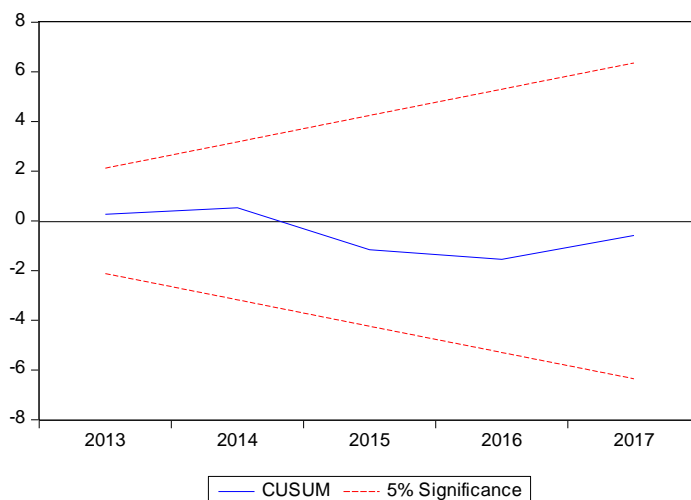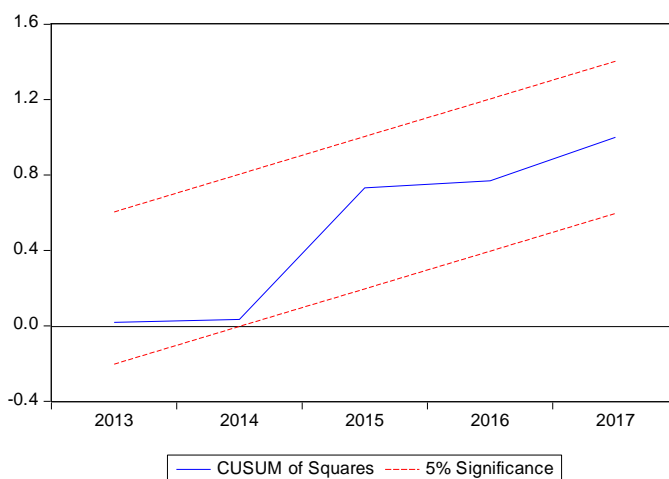


**Figure-13.** Plot of ARDL CUSUM test.



**Figure-14.** Plot of ARDL CUSUM of squares test.

### 4.2.3.6. Diagnostic Tests

The following table is presenting results of different diagnostic tests which we applied on our estimated Autoregressive Distributed Lag (ARDL) model. Normality test, Hetro test, and Ramsey RESET tests are most commonly used by the researchers for diagnostic analysis of the model. In all tests, a probability value is greater than 5 percent level of significance which means that we do not reject the null hypothesis, so there is no problem of Normality assumption, heteroskedasticity and functional form of the estimated Autoregressive Distributed Lag (ARDL) model (see Table 9).

**Table-9.** Diagonistic test.

| Normality Test* | Jarque-Bera Test | P-Value= 0.80 | Null hypothesis accepted means normally distributed |
|---|---|---|---|
| Heteroskedasticity Test* | Breusch Pagan Test | P-Value= 0.62 | Null hypothesis accepted means homo |
| Ramsey RESET Test | Functional Form Test | P-Value= 0.99 | Null hypothesis accepted means functional form is suitable |

### 4.2.4. Model 2: Impact of International Migration on Human Development

The relationship between human development and international migration has been discussed by a great number of authors in the literature. As per our exploration, there is no serious attempt has yet been made with the perspective of Pakistan economy on latest data sets. In this second model, we scrutinized the empirical influences of international migration on human development of Pakistan where international migration is proxified by personal remittances variable. In addition, human development index is used as proxy for the human development. Because the variables used in this model also have a mixed order of integration so we applied Autoregressive Distributed Lag (ARDL) model to assess the cointegrating relationships.

### 4.2.4.1. Optimal Lag Length Selection

As mentioned in the previous model, before moving towards the estimation of an economic model with ARDL approach, we need to find out the optimal lag length on the basis of different criterion which we have comprehensively discussed in the methodology section, for example, Akaike and Schwarz criterion. There is a bulk of studies are available which proposing that Akaike Information Criterion (AIC) should be preferred over all to select an optimal lag length. Following table is presenting a concise summary of different lag length criterion where AIC indicates 4 lags are optimal for estimation of the equation. So we will use 4 lags onward during the ARDL estimation process (see Table 10).

**Table-10.** Optimal lag length selection of the model 2.

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|-----|------|-----|-----|-----|-----|-----|
| 0 | –3.954556 | NA | 1.25e-06 | 0.596970 | 0.830503 | 0.671680 |
| 1 | 132.6536 | 218.5731 | 7.54e-10 | –6.843575 | **–5.442378*** | –6.395320 |
| 2 | 159.1539 | 33.56697 | 7.94e-10 | –6.943591 | –4.374729 | –6.121790 |
| 3 | 201.9783 | 39.96947* | 3.74e-10* | –8.131886 | –4.395360 | –6.936540* |
| 4 | 227.2001 | 15.13311 | 1.06e-09 | **–8.146676*** | –3.242485 | –6.577783 |

\* indicates lag order selected by the criterion.

### 4.2.4.2. Bounds Test

We followed the footprints of model 1 estimation process and applied Bounds test to examine that whether there are long-term relationship exists between the understudy variables or not. The null hypothesis of the bound test states that there is no long-run relationship exists among understudy variables. Following table is showing the results of Bounds test where F-Statistics is greater than the upper and lower Bound critical values which means reject the null hypothesis. In other words, the long run relationship exists among variables (see Table 11).

**Table-11.** ARDL bounds test results for model 2.

| Null Hypothesis: No Long Run Relationships Exist | | | | |
|---|---|---|---|---|
| Test Statistic | Value | k | | |
| **F-statistic** | 11.60221 | 2 | | |
| Critical Value Bounds | | | | |
| **Significance** | **I0 Bound** | **I1 Bound** | | |
| 10% | 3.17 | 4.14 | | |
| **5%** | **3.79** | **4.85** | | |
| 2.5% | 4.41 | 5.52 | | |
| 1% | 5.15 | 6.36 | | |

### 4.2.4.3. Long Run Relationship

Our Bounds test results have confirmed that there is long-term relationship exists among the Human Development index, personal remittances, and government stability. The following table is showing the long run coefficients of the selected ARDL (1,1,2) model where the human development index is the dependent variable. An important thing to mention here is that during ARDL estimation on E-views we put lags on the basis of optimal lag

length criteria which was four lags. But the selected ARDL model have (1,1,2) lags here which is automatically chosen by the software from optimal criterion. The table is stating that there is positive and significant relationship exists between the human development index and personal remittances. The probability value of the coefficient is less than 5 percent level of significance which means that this association is significant (see Table 12).

**Table-12.** Long run coefficients of the ARDL model 2.

Long-Run Coefficients of ARDL (1,1,2) Model
Dependent Variable HDI

| Variable | Coefficient | Standard Error | T-Statistic | P-Value |
|---|---|---|---|---|
| Ln (Remittance) | 0.233365 | 0.106231 | 2.196762 | 0.0379 |
| GS | 0.007447 | 0.003122 | 2.385251 | 0.0253 |
| Constant | -0.003376 | 0.003835 | -0.880460 | 0.3873 |

Similarly, the table is also testifying that there is positive and significant relationship exists between human development index and government stability of Pakistan. As mentioned in the methodology section, the data on government stability is retrieved from International Country Risk Guide 2018.

The probability value of this coefficient is also less than 5 percent level of significance which means that this relationship is significant. In simple words, an increase in remittances inflow leads to higher human development in the long run and an increase in government stability is also contributing in the human development of Pakistan in long run.

### 4.2.4.4. Robustness Checking

In the second model, we extend our analysis via introducing some new independent variables to check the robustness of the estimated model. These variables includes socio-economic conditions of Pakistan, internal conflicts, and corruption level.

The data on these variables for Pakistan economy is also obtained from the International Country Risk Guide 2018. To make our discussion explicit and concise, we presented only one model results of the robustness for the variable socioeconomic conditions of Pakistan. The following Table 13 is presenting the long run coefficients of estimated ARDL model for robustness checking.

**Table-13.** Long run coefficients of the robustness checking ARDL model 2.

Long-Run Coefficients of ARDL (1,1,1) Model
Dependent Variable HDI

| Variable | Coefficient | Standard Error | T-Statistic | P-Value |
|---|---|---|---|---|
| Ln (Remittance) | 0.164985 | 0.070196 | 2.350360 | 0.0266 |
| Socioeco Cond | 0.016875 | 0.004122 | 4.093629 | 0.0004 |
| Constant | -0.000924 | 0.002563 | -0.360373 | 0.7215 |

Above table is affirming that there is positive and significant relationship exists between human development index and personal remittances. The probability value of the coefficient is less than 5 percent level of significance which means that this association is significant. Moreover, it is also stating that there is positive and significant relationship exists between the human development index and socioeconomic conditions of Pakistan.

### 4.2.4.5. Short Run Relationship

The following table is describing the short run association between a dependent variable and independent variables. As mentioned in the previous model, an important thing to note in the table is the last term which is known as error correction term.

It tells us about the speed of adjustment of the model. In simple words, it defines how much time system will take to converge towards its equilibrium. Our estimated coefficient indicates that about 130 percent of the

disequilibrium is corrected within one year. Some researchers [42] are avowing that this value should be between 0 to -1 while other [43] emphasizing that it could be close to -2. So there are no consensus on the range of error correction term but it must be negative and significant for converging towards its long-run equilibrium and existence of relationships. The short-run results presented in the following Table 14 are corresponding with the long run results which mean a positive association between dependent and independent variables.

**Table-14.** Error correction representation of model 2.

Error Correction Representation of the Selected ARDL (1,1,1) Model

Dependent Variable HDI

| Variable | Coefficient | Standard Error | T-Statistic | P-Value |
|---|---|---|---|---|
| $\Delta LREM_t$ | 0.125542 | 0.061508 | 2.041051 | 0.0515 |
| $\Delta SC_t$ | 0.015083 | 0.003788 | 3.981935 | 0.0005 |
| $ECM_t(-1)$ | –1.196690 | 0.184375 | –6.490528 | 0.0000 |

### 4.2.4.6. Stability Test of Model

The CUSUM test is used again to examine the stability and structural breaks of the estimated Autoregressive Distributed Lag (ARDL) model.

Following the chart is showing the CUSUM test results at 5 percent significance. This test is based on a simple rule of thumb which postulating that the blue line should be within the limits of red dotted lines where dotted lines are displaying the upper and lower bounds critical value of the estimated model. Because our estimated model is meeting the stability criteria of the CUSUM test so we can conclude that our estimated ARDL model is stable (see Figure 15).
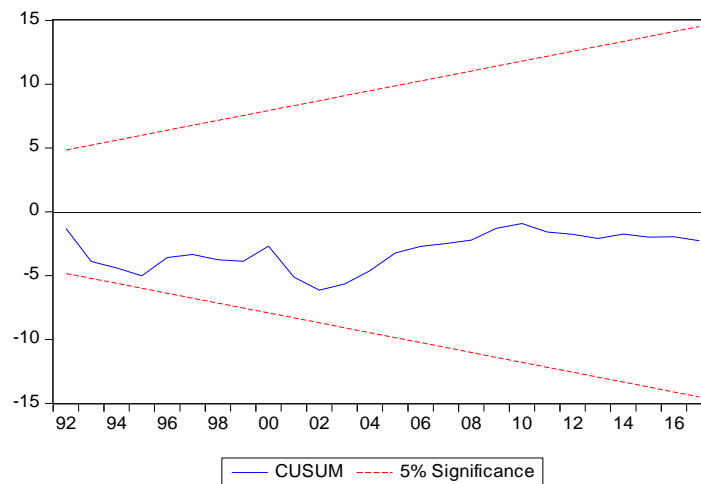


**Figure-15.** Plot of ARDL CUSUM test for model 2.

### 4.2.4.7. Diagnostic Tests

The following table is presenting results of different diagnostic tests which we applied on our second estimated Autoregressive Distributed Lag (ARDL) model. When we applied Ramsey RESET test, the results postulated that the probability value is less 5 percent level of significance which means we rejected the null hypothesis. So the functional form of the estimated Autoregressive Distributed Lag (ARDL) model is not fully suitable. A possible explanation of this deficiency is that there are plenty of other variables which play a key role in determining the human development index of Pakistan but we dropped them for simplicity or non-availability of data. While in hetro and autocorrelation tests, the probability value is greater than 5 percent level of significance which means

that we do not reject the null hypothesis, so there is no problem of autocorrelation and Heteroskedasticity in the estimated model (see Table 15).

Table-15. Diagnostic testing.

| | | | |
|---|---|---|---|
| Autocorrelation Test* | Breusch Godfrey Test | P-Value= 0.93 | Null hypothesis accepted means no autocorrelation |
| Heteroskedasticity Test* | Breusch Pagan Test | P-Value= 0.11 | Null hypothesis accepted means homo |
| Ramsey RESET Test | Functional Form Test | P-Value= 0.00 | Null hypothesis rejected means functional form is not fully suitable |

### 4.2.5. Model 3: Impact of International Migration on Economic Growth of Pakistan

In the third model, we exclusively examined the relationship between international migration and economic growth of the Pakistan where international migration, again, is proxified by personal remittances.

There exists a considerable body of literature on the association between both variables but this monograph will emphasis only on the Pakistan economy. Yet again, we will apply the Autoregressive Distributed Lag (ARDL) model to assess the cointegrating relationships between understudy variables.

### 4.2.5.1. Optimal Lag Length Selection

Before moving towards the estimation of an economic model with ARDL approach, we need to find out the optimal lag length on the basis Akaike and Schwarz criterion. Following table is presenting a concise summary of different lag length criterion where AIC indicates one lag is optimal for estimation of the equation. So we will use only one lag onward during the ARDL estimation process (see Table 16).

Table-16. Optimal lag length selection of model 3.

| Lag | LogL | LR | FPE | AIC | SC | HQ |
|---|---|---|---|---|---|---|
| 0 | 27.19098 | NA | 0.000639 | -1.679399 | -1.585985 | -1.649515 |
| 1 | 144.9010 | 211.8781* | 3.27e-07* | -9.260068* | -8.979829* | -9.170417* |
| 2 | 146.2635 | 2.270842 | 3.91e-07 | -9.084235 | -8.617170 | -8.934817 |
| 3 | 146.8431 | 0.888627 | 4.97e-07 | -8.856205 | -8.202313 | -8.647019 |
| 4 | 149.1395 | 3.215043 | 5.68e-07 | -8.742635 | -7.901917 | -8.473682 |

\* indicates lag order selected by the criterion.

### 4.2.5.2. Bounds Test

We applied Bounds test again to examine that whether there are long-term relationship exists between the understudy variables or not. The null hypothesis of the bound test states that there is no long-run relationship exists among understudy variables. Following table is showing the results of Bounds test where F-Statistics is greater than the upper and lower Bound critical values which means reject the null hypothesis. In other words, the long run relationship exists among variables (see Table 17).

Table-17. Bounds test results for model 3.

| Null Hypothesis: No Long Run Relationships Exist | | | | |
|---|---|---|---|---|
| Test Statistic | Value | k | | |
| F-statistic | 14.41726 | 1 | | |
| Critical Value Bounds | | | | |
| **Significance** | **I0 Bound** | **I1 Bound** | | |
| 10% | 4.04 | 4.78 | | |
| **5%** | **4.94** | **5.73** | | |
| 2.5% | 5.77 | 6.68 | | |
| 1% | 6.84 | 7.84 | | |

### 4.2.5.3. Long Run Relationship

The following Table 18 is showing the long run coefficients of the selected ARDL (1,0) model where the log of real Gross Domestic Product (GDP) is dependent variable while the log of personal remittances is the independent variable.

The results are stating that there is positive and significant relationship exists between human development index and personal remittances because the probability value is less than five percent level of significance. In simple words, if remittances inflow increases by one unit then our Gross Domestic Product will increase by 0.49 units.

**Table-18.** Long run coefficients of the ARDL model 3.

Long-Run Coefficients of ARDL (1,0) Model

Dependent Variable Log of Real GDP

| Variable | Coefficient | Standard Error | T-Statistic | P-Value |
|---|---|---|---|---|
| Ln (Remittance) | 0.490653 | 0.169502 | 2.894679 | 0.0071 |
| Constant | 0.041973 | 0.006409 | 6.549049 | 0.0000 |

### 4.2.5.4. Short Run Relationship

The following table is unfolding the short run association between a dependent variable and independent variables. As stated in the preceding models, an important thing to note in the table is the last term which is known as error correction term. Our estimated coefficient indicates that about 88 percent of the disequilibrium is corrected within one year.

Some researchers [42] are avowing that this value should be between 0 to -1 while other [43] emphasizing that it could be close to -2. So there are no consensus on the range of error correction term but it must be negative and significant for converging towards its long-run equilibrium and existence of relationships. The short-run results presented in the following Table 19 are consistent with the long run results which mean a positive association between dependent and independent variables.

**Table-19.** Error correction representation of model 3.

Error Correction Representation of the Selected ARDL (1,0) Model

Dependent Variable Log of Real GDP

| Variable | Coefficient | Standard Error | T-Statistic | P-Value |
|---|---|---|---|---|
| $\Delta LREM_t$ | 0.434985 | 0.115734 | 3.758504 | 0.0008 |
| $ECM_t(-1)$ | -0.886544 | 0.156233 | -5.674514 | 0.0000 |

### 4.2.5.5. Stability Test of Model

All over again, the CUSUM test is often used by the researchers to examine the stability and structural breaks of the estimated Autoregressive Distributed Lag (ARDL) model. CUSUM and CUSUM squares charts of our estimated model are presented below in Figure 16 and Figure 17. This test is based on a simple rule of thumb which postulating that the blue line should be within the limits of red dotted lines where dotted lines are displaying the upper and lower bounds critical value of the estimated model. Because our estimated model is meeting the stability criteria of the CUSUM test so we can conclude that our estimated ARDL model is stable.
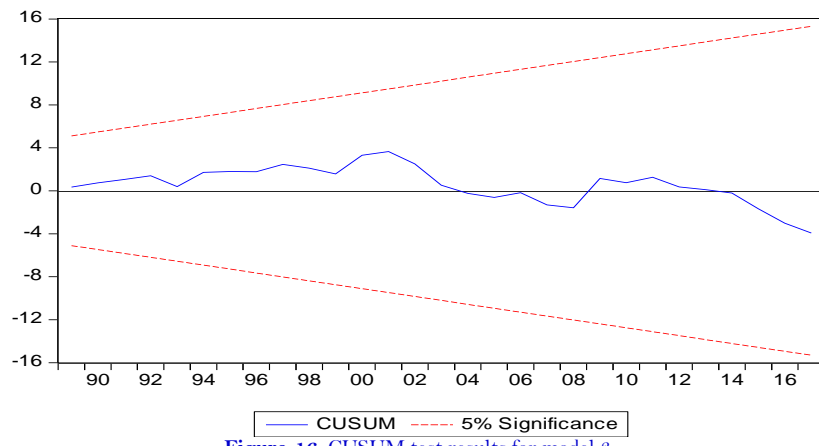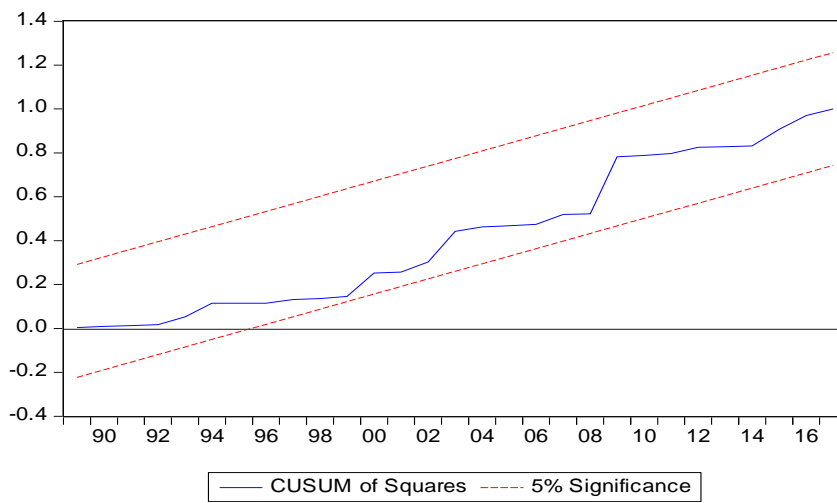
**Figure-16.** CUSUM test results for model 3.



**Figure-17.** CUSUM of squares test results for model 3.

*4.2.5.6. Diagnostic Tests*

**Table-20.** Diagnostic testing.

| Autocorrelation Test* | Breusch Godfrey Test | P-Value= 0.99 | Null hypothesis accepted means no autocorrelation |
|---|---|---|---|
| Heteroskedasticity Test* | Breusch Pagan Test | P-Value= 0.75 | Null hypothesis accepted means homo |
| Ramsey RESET Test | Functional Form Test | P-Value= 0.93 | Null hypothesis accepted means functional form is suitable |

The above Table 20 is showing the results of different diagnostic tests which we applied on our third estimated Autoregressive Distributed Lag (ARDL) model. When we applied Ramsey RESET test, the results postulated that the probability value is greater than 5 percent level of significance which means we do not reject the null hypothesis of suitable functional form. So the functional form of the estimated Autoregressive Distributed Lag (ARDL) model is fully suitable. While in hetro and autocorrelation tests, the probability value is greater than 5 percent level of significance which means that we do not reject the null hypothesis, so there is no problem of autocorrelation and Heteroskedasticity in the estimated model.

## 5. LIMITATION AND FUTURE RESEARCH DIRECTIONS

In this research essay, we comprehensively explore the linkages of international migration with the economic development of Pakistan. There are some key questions and notions that are still not discussed due to a couple of reasons, for example, unavailability of data or lack of scientific literature. It should be acknowledged that the

impacts of international migration on the economy are not a one-way linear path. In simple words, we have examined only the positive sides of international migration for example, how international migration is improving the living standards of Pakistani people.

From another perspective, international migration is harshly disturbing the innovation culture of Pakistan because the majority of educated people fly out of the country due to the attractive employment opportunities in the global market. These limitations are providing an opportunity for future researchers and scholars to extend and improve the international migration analysis via incorporating innovation damages. Furthermore, the analysis provided in this paper can be extended to panel data analysis via incorporating south Asian countries along with Pakistan to capture a regional picture of migration consequences.

## 6. CONCLUSIONS AND POLICY RECOMMENDATIONS

In this research paper, we comprehensively examine the consequences of international migration on the Pakistan economy. To empirically explore the connections of these international movements, we retrieved data from different sources including Bureau of Emigration and Overseas Employment, United Nations Development Programme, World Development Indicators, Social Policy, and Development Centre of Pakistan, International Country Risk Guide and Economic Surveys of Pakistan. Our results are divided into two different methodologies; 1) Graphical Analysis, and 2) Econometrical analysis.

In the graphical analysis, we keenly observe the emigration of Pakistani workers on the basis of data retrieved from the Bureau of Emigration and Overseas Employment of Pakistan. We performed deep parameter analysis in this approach, for example, province wise emigration, category wise emigration, occupation-wise emigrations, protectorate wise emigration, district wise emigration, and country wise emigration. District wise analysis of all provinces states that the international migration is playing a key role in the reduction of poverty level except in KPK. This is pointing out the fact that there must be many factors other than remittances which are playing a key role in determining KPK poverty level, for example, employable tourism industry discourages them from moving abroad etc.

On the other hand, econometrical analysis consists of three different models in which we scrutinize the emigration process from three different perspectives; 1) Impact of international migration on economic growth of Pakistan, 2) Impact of international migration on human development of Pakistan, and 3) Impact of international migration on the alleviation of poverty in Pakistan.

ARDL approach describes that international migration is positively associated with economic growth and human development while negatively associated with poverty level. The study is concluding that there are enormous potential benefits exists in international migration process because it boosts the economic growth of Pakistan via personal remittances inflow. Additionally,  the direct transfer of remittances smooth out the consumption pattern of households.

The significant results are suggesting some useful policy recommendations to improve the social welfare and living standards of emigration country. Empirical evidence revealed a strong positive association between remittances and economic development of Pakistan. These associations can be strengthened if the foreign exchange obtained from remittances convert into direct investments which are only possible when the government put special attention on providing a sound atmosphere to the overseas employees so that they may transfer their remittances through proper channels. Also, almost 70 percent emigration is taking place in the United Arab Emirates and Saudi Arabia, so the government should provide some platforms their i.e. assistance offices to sort out the problems related to foreign exchange transfers. Additionally, the majority of human capital is flying towards Gulf regions which is not beneficial in terms of promoting innovative practices in Pakistan. If we export our manpower to highly developed countries then reverse brain drain will improve the economic growth and encourage innovation practices.

In sum up, strong economic governance system is required to boost human capital development via inflow of personal remittances.

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