IMPACT OF BRAIN DRAIN ON ECONOMIC GROWTH AND HUMAN CAPITAL FORMATION IN PAKISTAN: AN EMPIRICAL STUDY

By

FIAZ, Muhammad Farhan

THESIS

Submitted to

KDI School of Public Policy and Management

In Partial Fulfillment of the Requirements

For the Degree of

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Abstract

Cutting edge speculations of endogenous development have significantly restored the examination of the relations amongst instruction and wellbeing (human capital), movement (cerebrum deplete) and financial development. Human capital and aptitudes matter is endogenous. Just we can say that Brain deplete is the movement of talented HR starting with one nation then onto the next nation. Prepared wellbeing experts are required in all aspects of the world. The objective of this research is to examine, the effect of brain drain on growth of Pakistan's economy from the year 1980 to 2016. In this study we used economic growth as dependent variable with GPD as its proxy, FDI with proxy of net inflow in million dollars, exports having proxy of net exports in million dollars, exchange rate through official exchange rate and inflation rate for which Consumer Price Index-CPI is used as independent variable. We employed OLS model to the test the effect of brain drain on economic growth. The stationary of variable is showed/confirmed with the help of Augmented Dickey Fuller –ADF Test and Phillip Parron-PP Test. The empirical results shown that there is significant negative relationship between brain drain and economic growth of Pakistan. In addition, the hypothesis has also proved that brain drain and other descriptive variables have significant negative impact on economic growth. However, Labor migration alone does not impact on growth of economy but many other factors also effect directly or indirectly.

Introduction:

Brain drain is a phenomenon wherein a considerable immigration of educated and skillful people takes place from developing countries to developed countries. A number of causes have been ascribed to this phenomenon, which primarily include turmoil in developing countries; people seeking better standards of living abroad as well as better professional opportunities. In addition to occurring geographically, brain drain may occur at organizational or industrial levels when employees perceive better pay packages, perks and benefits and improved chances of upward mobility within another company or industry.

A sizeable number of both skilled and unskillful workers have been surging from emergent countries to developed economies in search of a better life. A loss of any kind of labor ,whether skilled or otherwise diminishes the total available labor pool, and hence, has an adverse effect on the economic growth of the home country. The migration of skilled labor can also have a positive effect on the growth of the home country. Therefore, the net effect will depend on whether the positive effects outweigh the reduction of labor pool resource in the home country. The impact caused by migration is based in the education level of immigrants and on the economic growth of the labor transferring countries. Our hypothesis is that the outflows of skilled labor will have a positive feedback effect on developing countries. However, outflow of skilled workers would significantly hurt the growth of the very poor economies, which experience high income inequality.

Emigration of high-ability skilled labor from developing countries to developed countries is called Brain Drain. Highly-ability skilled labor is basically attracted by higher wages and good/better working conditions. Developed countries are trying to adopt policies to attract more highly skilled labors. For Example Canada and Australia follow some policies which are admitting immigrants focused on skill level, and flexibility to the working environment. High-ability skilled labors migrants and their destination place benefit from the increased flexibility of high skill labors, but high skill migrants are the single beneficiaries from the brain drain (Gibson and McKenzie, 2010).

Nevertheless, the major impact created by the immigration of skilled labor is the resultant economic growth of their home countries. Brain drain puts a limit on a poor economy to re grow and enlarge its human capital, which is clearly identified as the key driver of economic growth.

According to Economists international migration can be the reason to delay the development of the source countries (Jagdish& Hamada, 1974; Beine et al., 2001). Brain drain has often been described as the departure of skilled workers from source countries and this term was first coined by the British Royal Society which chiefly referred to the migration of scientists from the United Kingdom to North America after WWII (Gibson & McKenzie, 2011). However, recently this insight has been challenged. According to Doquier and Rapoport (2009), some discussion that migration can create some positive effects like remittances, incentives for further

studying, and return of skilled workers to their home countries after getting additional skills may contribute to the economic development of source countries.

As stated by Endogenous growth theory, Brain Gain is the immigration of skilled laborers, which can provide some incentive for those who are left behind to invest in human capital. Growth theory is one of the key determinants for long-term economic growth. Literature review further strengthens its incentive for human capital. Some of scholars have argued that Brain Gain is more likely to occur when decisions to invest in further training and education are made in order to improve future migration opportunities (Beine et al., 2008, 2011; Corrado & Stryszowski, 2009; Mayr&Peri, 2008).

In more recent times, a number of cross countries studies have advocated macro –evidence for the presence of brain gain. (Beine et al., 2001, 21008, 2011; Clemens, 2007; Stark et al., 1997; Vidal, 1998). Of late, the debate on 'brain drain' and 'brain gain' has been strengthened with the gathering of micro-evidence from censuses and household surveys that have permitted an examination of the fundamental mechanisms between migration and human capital formation in areas of origin. Five potential mechanisms have been proposed. (Mckenzie&Rapoport 2011).

There are several studies analyze that through several channels skilled emigration can affect sending nations, the outcome is labor market shuffling which impact on wages and

employment. (Bhagwati and Hamada, 1974, Miyagiwa, 1991). Brain drain has negative effect on human capital (Mountford, 1997; Stark et al., 1998; Vidal, 1998).

Faini (2007) demonstrate that proportion of skilled migrants adversely effect on remittances. Half of medical doctors of India who are in United Kingdom send 17% income as remittances.

Studies of the impact of brain drain on economic growth have mostly relied on macro-level data. Only few studies analyzed the relationship between brain drain on growth of the economy and human capital from micro perspective. These studies have either investigated the effect of return migration on macro-economic performance of the country or examined the impact of all type of emigration on growth of the economy and factors of human capital.

This research study is primarily significant to the country as it will influence various aspects of the society. The study will give immense and in-depth knowledge to the government or public sector of the country, which will be able to analyze the findings of the study, and will be able to draw strong and concrete recommendations from the study that offers both qualitative and quantitative data and information. This will help them learn from their past experiences to improve the future prospects. Moreover, the variables studied from the time period of 1980 to 2014 will fill the gaps in the literature in the academia. The study will help the end users gain 18 instant data on economic indicators and variables from one source, as sifting through multiple sources increases the work flow, decreases productivity, and makes it harder to find the data from a single source. Thus, by conducting research on brain drain and economic

growth, we aim to study the relationships between the three variables, and we intend to establish links between these variables. Considering the minimal flow of literature that is currently present in the country, we also aim to augment it by adding our in-depth analysis and findings based on statistical results. This will help the society of Pakistan gain valuable knowledge and information regarding the topic that is pivotal to the development of the country. Another of objective of this study is to offer a different perspective to other researchers and scholars, which goes beyond the regular brain drain efect. This will be useful in presenting the information and data in a different light so that people understand another view or perspective as well to broaden their span of understanding.

The study, moreover, aims to present the relationships between variables more clearly so that the readers are able to gain in-depth knowledge about the statistical analysis of the variables. The study employs a very wide range of different economic variables and applies statistical tools to measure their performance and change in different and frequently changing regimes. Thus, this research intends to offer a very detailed insight into the trends of economic growth through brain drain by presenting elaborate information about the variations in numerous variables.

This research will provide an insight with broader spectrum on brain drain by using comprehensive data set in terms of wide scope and coverage based on most recent data up to 2015.

Primary objective of our study is to examine the effect of brain drain on economic growth and human capital in Pakistan. In view of present studies, following questions arise and require further research. This research will answer these questions through a systematic approach.

How does skilled labor migration impact on income and economic growth?

- How does brain drain effect on health standard of Pakistan?
- How brain drain can improve the school enrollment rate?
- Based on study results, what are the suitable recommendations regarding brain drain and economic growth?

1. There is a statistically negative effect of factors of brain drain on GDP and factors of Human Capital.
2. There is a negative relationship between brain drain and higher level of long run productivity.
3. To increase the entrepreneurship through creating opportunities' for skilled migrants can negatively effect on economic growth of the country.

The study aims to investigate the effect of migration, return on emigration and remittances on economic performance or growth and factors of human capital in Pakistan. Additionally, it also intend to study a different set of variables that include GDP, GDP per capita, Migration rate, return migration rate, secondary school enrollment, high school enrollment, health status, training , remittances and the like to analyze the impact of brain drain. This study effect of remittances and migration on the rate of economic growth in Pakistan. For the purpose of this research, the study will collect the data from the World Bank, Economic Surveys of

Pakistan, Pakistan Bureau of Statistics, Pen World Table, and OPHI that cover the period from 1980 to 2015. Therefore, this research will use time series analysis technique to analyze the effect of brain drain on human capital and GDP. Therefore, this study will find plausible answer based on its variables: brain drain (independent variable) economic growth and human capital (dependent variable).

This study will progress as follows:

In first section we will provide the introduction of the problem. The next section contains a detailed literature review of the topic under study that includes numerous theories and research studies by various scholars. The third chapter will contain theoretical framework and conceptual framework. Fourth chapter followed by data methodology, the last section will explain the results and findings, policy recommendations and conclusion.

Brain drain in Pakistan

Cutting edge speculations of endogenous development have significantly restored the examination of the relations amongst instruction and wellbeing (human capital), movement (cerebrum deplete) and financial development. Human capital and aptitudes matter is endogenous. Human capital has gotten restored consideration and also pertinence in late research on endogenous development. These models of development have endogenised development by taking into account expanding returns through endogenous specialized change, for example, that which emerges from advancement or revelation of new products through expanded R and D [Romer (1986, 1990) and Grossman and Helpman (1991)]. This was firmly underscored by the

90s innovation drove profitability increment in the US. Indeed, even easygoing observation recommends that the US, the wealthiest nation in the World leads in quality instruction, research and development. Lucas (1988) even discusses an immediate externality connected with the transmission of human capital through the eras.

When all is said in done the nature of human asset is a great deal more basic in monetary advancement than the accessibility of normal and money related assets. For instance, Japan is a nation which has no mineral or vitality assets however has high financial profitability on account of exceptionally educated, prepared and a proficient workforce. Endogenous development models have reliably distinguished human capital as an imperative determinant of financial development. Also, fast advance of the East (ASIAN) nations is to a great extent credited to their fantastic arrangement of instruction. Tragically, in Pakistan we have not gave careful consideration to the general training of the masses and thus, the nation is a long ways behind than others of the area in instruction division. As per authority wellsprings of World Bank, the present education rate in Pakistan is 55% Per penny where female proficiency rate is 43% Per penny while that of male is 70%. It implies that two ladies out of each three and one man out of each three men are ignorant.

Human capital refers to the aptitude that work produces among workers, which is viewed as an asset. It includes the assertion that individuals share some interests (e.g., instruction, preparing, wellbeing) and that these assertions increment an individual's profitability. The relocation of scholarly labor from less created nations to more created nations is a worldwide marvel. The most conspicuous relocation of brains is from poor people and creating nations to

the rich and propelled nations. The late pattern of globalization has been portrayed as the stream and trade of products, administrations, capital, and enlightening administrations and at abnormal state qualified talented work. As indicated by late study 59 million transients in OECD nations alone, 20 million are very talented. Created nations pulling in qualified gifted specialists from creating nations as impetuses, grants from creating nations.

Since instruction has been brought up as a noteworthy determinant of long haul development {Lucas, 1988), normal knowledge proposes that the relocation of individuals blessed with an abnormal state of human capital—the alleged A mind deplete — is hindering for the nation of displacement. Mind deplete is the movement of gifted HR for exchange, instruction, etc. Trained wellbeing experts are required in all aspects of the world. In any case, better ways of life and personal satisfaction, higher pay rates, access to cutting edge innovation and more steady political conditions in the created nations draw in ability from less created ranges. The lion's share of movement is from creating to created nations. These nations have put resources into the instruction and preparing of youthful wellbeing experts. This converts into lost extensive assets when these individuals move, with the immediate advantage gathering to the beneficiary states who have not forked out the cost of teaching them. The erudite people of any nation are probably the most costly assets due to their preparation as far as material cost and time, and above all, in light of lost open door.

Just we can say that Brain deplete is the movement of talented HR starting with one nation then onto the next nation. Prepared wellbeing experts are required in all aspects of the world. Be that as it may, better ways of life and personal satisfaction, higher pay rates, access to

cutting edge innovation and more steady political conditions in the created nations pull in ability from less created regions.

As indicated by the United Nations Global Migration Database, the quantity of worldwide transients expanded from 75 million in 1960 to 214 million in 2010. This about parallels the development in the total populace, so the world relocation rate expanded just somewhat in relative terms, from 2.5% to 3.1% of the total populace. The significant piece of this change is counterfeit and because of the separation of the previous Soviet Union, when what was before the inward development of specialists got to be renamed as universal relocation after 1990. By and large, the share of global transients in the total populace has been steady throughout the previous 50 years. The greater part of relocation is from creating to created nations. This is of developing concern overall on account of its effect on the wellbeing frameworks in creating nations. These nations have put resources into the instruction and preparing of youthful wellbeing experts. This converts into lost impressive assets when these individuals move, with the immediate advantage gathering to the beneficiary states who have not forked out the cost of instructing them. The educated people of any nation are probably the most costly assets on account of their preparation as far as material cost and time, and above all, as a result of lost open door.

Youthful, knowledgeable, sound people are well on the way to move, particularly in quest for advanced education and monetary change. There are different reasons for mind deplete, however they contrast contingent upon the nation that is encountering it. The fundamental driver incorporate looking for job or higher paying occupations, political

precariousness, and to look for a superior personal satisfaction. Reasons for cerebrum deplete can arranged into push components and draw elements.

The push elements are adverse attributes of the nation of origin that structures the catalyst for shrewd individuals relocating from Lesser Developed Countries (LDC). Notwithstanding unemployment and political unsteadiness, some other push components are the nonattendance of research offices, occupation separation, financial underdevelopment, absence of opportunity, and poor working conditions.

Pull variables are the positive attributes of the created nation from which the transient might want to profit. Higher paying occupations and a superior personal satisfaction are cases of force components. Other draw variables incorporate predominant financial viewpoint, the notoriety of outside preparing, moderately stable political environment, a modernized instructive framework to take into consideration prevalent preparing, scholarly flexibility, and rich societies. These rundowns are not finished; there might be different variables, some of which can be particular to nations or even to people.

The refinement amongst "push" and "force" variables has been perceived. Proceeding with inconsistencies in working conditions amongst wealthier and poorer nations offer a more noteworthy "draw" towards the more created nations. The part of governments and enlistment organizations in efficiently reassuring the movement of wellbeing experts expands the force.

We additionally processed nation particular impacts, with the accompanying results. Initially, nations that experience a constructive development impact (the "victors") by and large consolidate low levels of human capital and low relocation rates, though the "washouts" are ordinarily described by high movement rates as well as high enlistment rates in advanced education (this is very natural, since for this situation most vagrants are grabbed from a supply of individuals that would have occupied with instruction even with no relocation prospects). Second, we demonstrated that with the exception of outrageous cases, for example, Guyana and Jamaica, the development impacts of the cerebrum deplete are generally restricted: around give or take a most extreme 0.20% as far as yearly GDP per capita development; this is not insignificant, in any case, from a dynamic point of view. At long last, it is likewise striking that while there are a bigger number of washouts than champs, the victors incorporate the biggest nations regarding demographic size and speak to more than 80% of the aggregate populace of the specimen.

Since the most recent three decades Brain depletes or human capital flight (HCF) has been instrumental in molding the course of Pakistan's economy. The economy has confronted numerous difficulties yet strength. The country of Pakistan is undoubtedly supplied with gigantic human capital that can add to the improvement of the nation. Yet, the inversion has dependably been the situation. Profoundly instructed Pakistani would rather need to travel abroad in light of the fact that there are practically zero motivating forces for them at home and those supported abroad for studies won't consider returning home for comparable reasons. It therefore turns into a matter of worry that Pakistan's scholastic segment is progressively turning

into a reproducing ground for specialists to be prepped and later consider settling in outside nations.

Literature Review

For any research study, the main aim for reviewing existing literature is to analyze the previous studies in the area, identify the research gap, find the opposing and supporting arguments, analyzing the views and results (Bourner, 1996) . This section reviews the existing research work on impact of brain drain on economic growth and human capital and its various dimensions.

Docquier et al. (2010) claim that brain drain impact lies in the high skilled emigration nation those are able to innovate. He used empirical methodology to analyze the effect of brain drain on world economy. Emigration cannot only effect on human capital but it accelerates economic growth as well as provides social opportunities for people. It is widely considered that major indicator for assessing human capital is, education and health. Most of the studies have examined the effect of brain drain over remittances. However there are number of other indicators which assess the impact of brain drain (Miyagiwa, 1991). Therefore, impact of brain drain should not only be examined through income level but other key indicators such as Health, education, employment, wages and accumulation of high skilled labor should also be considered. Numerous researchers claimed positive impact of brain on above indicators. There

are several studies analyze that through several channels skilled emigration can affect sending nations, the outcome is labor market shuffling which impact on wages and employment. (Bhagwati and Hamada, 1974, Miyagiwa, 1991). Brain drain has negative effect on human capital (Mountford, 1997; Stark et al., 1998; Vidal, 1998).

(Michel biene et al, 2003) argues that the transfer of relatively highly educated people from developing countries to developed country is just like the transfer of resources. Early contributions (Grubel and Scott, 1966; Bhagwati and Hamada, 1974; McCulloch and Yellen, 1977) a cross sectional data of 127 countries is used and it is revealed that the migration of the skilled people of the country became a cause of increase in gross production of the country

Number of researchers claim that for poor households, liquidity constraint is one of major a problem which does not allow them start household economic activities such as micro-enterprise (ME) and utilize household labour in productive manner. Such constraints can be unleashed through cash transfers that will allow poor to initiate a new cycle for self-empowerment. (Martinez, 2004) emigration can be tool to inject funds for not only starting a ME but it can temporarily enable poor to meet essential needs.

(Cieslika&Tarsalewska, 2006) suggest that there is overall a positive response of the immigration of human capital if the flow is of educated people. Studies reveal that the flow of people from developing countries to the developed countries is not a reason that the poor countries stay poor.

Recently, brain drain has been the important aspect and argument for policy analyst and researchers. The primary phase concerning the development of economy experts on immigration are emphasizing more on economic security rather than income growth, because the former would decrease the overall vulnerability of people. Emigration also supports gender equality by women empowerment through their economic participation.

(Beine et al., 2006, 2007, 2008, 2010; Clemens, 2007; Stark et al., 1997; Vidal, 1998) studies cross country analysis and have provide some evidence regarding brain gain. Moreover, the discussion on brain grain and brain drain has more deepened with micro level data accumulation. The micro-level evidence based on surveys from household and these results are more reliable and accurate shows significant relationship between emigration and human capital.

(Mckenzie&Rapoport, 2011) proposed five tools; remittances from migrants can be a source for people to send their children to school. Skilled migration mechanism can improve the estimated return from education which creates higher incentive for education; it means effect of wage premium.

(AbebaMussa, 2013) labors weather skilled or unskilled if flowing from developing countries to developed country cause a great loop in the economic growth of the developing countries as the amount of the total number of the labors reduced in the developing country. Whereas, it has a good effect on the growth of the developing country as through remittances. 114 countries are included in the panel data and the data is collected since 1970-

2000. It shows a positive response that if the skilled labors are flowing from developing country to the developed country then it shows a positive response.

Some studies shows the brain drain create fiscal imbalances. Public sources provide 70% of financial cost for education in developing countries. (The World Bank, 2009a). The loss in investment of human capital creates externalities and it is not private investment. If public sector support for current education to increase the taxes in future, and might be increase the finance for education later, then emigration can leads to hurt the revenues of public sector and reduction in financial support. (Egger et al. 2007 and Desai et al. 2004) examine the welfare impact of special income tax for migrants and their feasibility assessment.

Research Methodology

This research aims to address the issue of brain drain and tends to identify the impact of three major indicators that sum into economic growth and human capital. The research belongs to the field of social sciences and holds significant importance for not only social scientists but also for academicians and public administrators because it reveals an important relationship between brain drain and economic growth. Thus, the study can serve as a foundation to various policy options at both national and international level

Research Problem

Highly-ability skilled labor is basically attracted by higher wages and good/better working conditions. Developed countries are trying to adopt policies to attract more highly skilled labors.

However, it can be noticed in the literature review that brain drain is measured through a limited number of indicators and is analyzed through a limited number of relationships. While planning and formulating policies, world leaders tend to sideline some important causes of brain drain which are non-mainstream. Hence, there is a need to analyze brain drain from a different perspective i.e. as an issue of national concern.

The policy makers tend to ignore the puzzling relationship between brain drain and economic growth and in instances where it is recognized. Limited study is conducted to check the impact of brain drain and economic growth. Thus, this study examines the impact of brain drain on economic growth and human capital in Pakistan.

Research Objective

This research aims to establish a relationship between brain drain on economic growth and human capital in Pakistan through quantitative analysis. The study tends to examine the statistical relationship of each of the subcomponents of brain drain on economic growth and human capital in Pakistan. The research will determine whether Migration rate, return migration rate, secondary school enrollment, high school enrollment, health status, training and remittances affect the GDP of the economy. In addition to this it will allows us to explore the Brain deplete is the movement of talented HR caused by economic fluctuations.

The conclusion of the research will allow us to anticipate a concrete relationship between brain drain on economic growth and human capital in Pakistan which will contribute to the existing literature as well as help all the stakeholders, specifically public sector, to view the issue of food insecurity from a new lens, in order to propose appropriate policy options to curb it. Thus, for the purpose of this study, the research will answer the following research questions:-

How does skilled labor migration impact on income and economic growth?

How does brain drain effect on health standard of Pakistan?

How brain drain can improve the school enrollment rate?

Based on study results, what are the suitable recommendations regarding brain drain and economic growth?

For the purpose of this study, research adopts the following hypothesis:

There is a statistically negative impact of brain drain on economic growth and human capital in Pakistan.

Null Hypothesis: There is no relationship between brain drain on economic growth and human capital in Pakistan.

The independent variable for the purpose of this study is brain drain. Brain drain is broken down into 3 indicators which include Migration rate, return migration rate and remittances. Each of these can further be broken down into sub indicators.

The dependent variable for the purpose of this study is economic growth and human capital. The three indicators of human capital include secondary school enrollment, high

school enrollment, health status and training. The study also makes use of use of proxy or outcome indicator in order to yield he results for the purpose of this research.

Data Collection

This research is a quantitative study which makes use of secondary sources of data i.e. archival data in order to assess the relationship between Brain drain and Economic Growth. Indicators chosen for the purpose of this research are frequently researched upon frequently by reliable humanitarian organizations for e.g. Economic survey of Paksitan, and World Bank. In addition to this, the sample size for the purpose of this research includes 35 years, thus for such a sample size primary research was not feasible.

Majority of the data is taken from Pakistan Bureau of Statistics and World Bank's database, particularly the data for economic indicators. Pakistan Bureau of Statistics has established by Government of Pakistan and the function of PBS is data collection, data compilation and analysis of data which is related to different sectors of the economy. World Bank's data, published through 2 publications popularly known as World Development Indicators and International Debt Statistics, is collected through a collaborative effort between regional development banks, international humanitarian organizations, branches of World Bank and other partners, and ensures electronic exchange of statistical data. World Bank makes use of Virtual Statistical System (VSS) which serves as a portal and links World Bank to other statistical organizations. Economic Data relating to national accounts and balance of payments

comes from current reports gathered by the Bank's country management units and data obtained from official sources.

Aggregates are based on the World Bank’s regional and income classification of economies. Because of missing data, aggregates for groups of economies should be treated as approximations of unknown totals or average values. Growth rates are calculated as annual averages and represented as percentages. Except where noted, growth rates of values are computed from constant price series. Three principal methods are used to calculate growth rates: least squares, exponential endpoint, and geometric endpoint.

The data set used for the purpose of this research is time series data which can be attributed to the large amount of data used. Moreover, because the research relied on the secondary sources of data, it limitations relating to the availability of the data.

Given the number of indicators to be used for the purpose of this study, and to check their behavior over the period of time, research makes use of time series data. Thus, for the purpose of his study, we use time series data from the period 1980-2016. This will allow us to observe behavior of various indicators in different countries, periodically over a defined time frame.

Time series data is appropriate for this study as it allows us control various factors that otherwise would serve as a limitation to our study.

Time series analysis accounts for the fact that data points taken over time may have an internal structure (such as autocorrelation, trend or seasonal variation) that should be accounted for. Moreover, time series data will also make adjustments to the findings for distinctness of the entities. Furthermore, it will allow us to study the effects that otherwise would not have been detectable. For e.g. while studying the impact of GDP per capita on the affordability of food, time series data analysis will simultaneously incorporate the impact of inflation on affordability as well. Thus, this will not only allow us to test our complicated hypothesis but will also provide us with more valid and reliable results. In this way, we research will be less vulnerable to the limitation of omitted variables, uncovering the most dynamic relationships which will allow us to make the most accurate predictions.

Research Design

This study makes use of correlational method of research, in order to assess the relationship between different variables. Correlational Research allows us to carry out quantitative statistical analysis to determine a pre-existing relationship between variables. The two variables for the purpose of this research are brain drain and economic growth, where brain drain is an independent variable while economic growth and human capital is a dependent variable. Both the variables are broken down to further indicators, which will be used to check the correlation between the two variables. The relationship between the two variables can be positive, negative or have no effect.

Thus, the correlational method of research will allow us to check the association between brain drain economic growth and allow prediction of outcomes on the basis of interaction between the variables, which will allow us to derive appropriate policy options for the issue at hand. However, correlation doesn't directly imply causation between the variables. The method is appropriate for this study since the motive of the study is to check the impact of brain drain economic growth and to prove how both soft and hard security elements (as defined by the contemporary theorists) significantly influence the economic growth of the country. Moreover, the method is useful because limited amount of research is done to check the impact of brain drain economic growth, thus, the method provides us a starting point for the research while referring us a possible relationship between the two. It will also give an idea of the direction the two variables are associated which can be used by later studies to narrow down their findings.

The study is done through empirical analysis, which makes use of empirical evidence (in the form of observations) provided by reliable sources like World Bank. In order to carry out empirical analysis, the study makes use of quantitative techniques.

Empirical Analysis is of extreme relevance when studying the relationship between brain drain economic growth because Empirical Analysis bind theory with practice. This means empirical analysis yields results based on the real world observations, which are contextual (i.e. applicable in real world scenario). This is of great significance because it allows us to draw solutions for migration and human capital.

Research Method

The technique used under the Correlational Method of Research is Regression Analysis, which is a statistical approach for estimating the relationship between two variables. In order to check the association between brain drain economic growth, the study is based on multiple regression tests carried to check the impact of each indicator of economic growth. Multiple Regression serves as a power technique which will use multiple indicators of the Independent Variable i.e. brain drain in order to check their collective relatedness to economic growth and human capital. Multiple Regression is the most appropriate method for the purpose of this study given that we wish to measure the collective impact of a number of indicators on economic growth that allow us to find the most comprehensive and applicable results. Moreover, multiple regressions will make use of multiple independent variables, with each controlling for others. For e.g. while we will be checking the relatedness of brain drain to GDP per capita, exchange rate, and inflation, the model will estimate the effect of GDP per capita controlling for exchange rate and inflation. In this way Multiple Regression Method will yield the most comprehensive findings.

Research Limitations

The research is based on secondary sources of data given the large sample size. Thus, the data availability of all the indicators adopted for the purpose of this research could not be ensured. Indicators for the purpose of this research were streamlined and the ones with data availability were selected. Hence, given the large list of indicators which could possibly be

adopted for the purpose of this research, the results are subject to change. Similarly, for some indicators for which data was available, the number of observations were less. Thus, again the timeline for the purpose of this research was shortened, incorporating a limited number of observations. Moreover, for essential indicators for which data was unavailable proxy indicators are selected. The results of the research are although generated using quantitative analysis, human mind has limited capacity to evaluate and analyze the numbers. Thus, the interpretation of the analysis may be confined by the human ability to analyze quantitative data.

Ethical Considerations

The study is carried out keeping in mind the ethical considerations that ensure that this study does not tends to exploit or manipulate the workings of any other author or organization. The study consists of the most summarized and comprehended knowledge respecting the work of the original author and giving credit to the original author. No data has been fabricated or altered. Secondary data is used as reported by the databanks. The analysis however, is subjected to personal interpretation. No data is changed such that it portrays false or incorrect meaning. The data is portrayed in its purest form.

Econometric Model:

$$\mathbf{GDP_t = \varphi_0 + \varphi_1 LM_t + \varphi_2 FDI_t + \varphi_3 ER_t + \varphi_4 MIG_t + \varphi_5 INF_t + \varphi_6 R_t \epsilon_t}$$

$$\mathbf{UNEMP_t = \varphi_0 + \varphi_1 LM_t + \varphi_2 FDI_t + \varphi_3 ER_t + \varphi_4 MIG_t + \varphi_5 INF_t + \varphi_6 R_t \epsilon_t}$$

$$\mathbf{HS_t = \varphi_0 + \varphi_1 LM_t + \varphi_2 FDI_t + \varphi_3 ER_t + \varphi_4 MIG_t + \varphi_5 INF_t + \varphi_6 R_t \epsilon_t}$$

$$\mathbf{SE_t = \varphi_0 + \varphi_1 LM_t + \varphi_2 FDI_t + \varphi_3 ER_t + \varphi_4 MIG_t + \varphi_5 INF_t + \varphi_6 R_t \epsilon_t}$$

Where;

- GDP = GDP (million $) and

• GDP = GDP (million $) • LMI = Labor Migration (million $) • FDI= Foreign Direct Investment • UNEM= Unemployment rate • HS= Health Standard • ϵ = Error Term	• MIG= Migration rate • EXP = export (million $) • ER = foreign exchange rate • INF= inflation rate • R= Remittances

Explanation of Variables:

$$\mathbf{GDP_t = \varphi_0 + \varphi_1 LM_t + \varphi_2 FDI_t + \varphi_3 ER_t + \varphi_4 MIG_t + \varphi_5 INF_t + \varphi_6 R_t \epsilon_t}$$

Expected coefficients of first model should be negative because raise in increase of labor migration will effect negatively on growth of economy, but remiitances has positive effect on GDP, this analysis is found fromdifferent papers that conducted empirical study of many economies. Expected coefficient of export which is another important explanatory variable should also be positive because it has historically formed that growth in export is proportional to the increase in inflow of foreign currency and improves the balance of foreign exchange reserves and these reserves are used for the purchase of capital goods from abroad, thus leads to economic growth.

In the distribution theory that supports the Dick-Fuller test, it is assumed that variance remains constant and the error terms are statistically independent. In the ADF

methodology, it must be taken care of that the error terms are not correlated besides constant variance. Similarly, later on Philips and Perron developed and modified the ADF procedures for soft assumptions regarding the error distribution.

However, on the right hand side, the Augmented Dickey Fuller test combines lagged differences terms by correcting higher order serial correlation. In this way the test of Phillip Parron draws a correlation to t-statistic of coefficients from auto regression of order 1 to the serial of correlation Ine_t. Hence, it can be concluded that Phillip Parron statistics is simply an alteration in Augmented Dickey Fuller t-statistics, and PP has comparatively low constrictive approach.

H_0 § > 1 Non-stationary Data

H_1 **§**<1 Stationary Data

As per results of Stationary tests (shown in Table2) § of all the variables are less than one so **H_0**is rejected and **H_1** accepted, the data is stationary and at the 1 % significance level.

The Table 2 shows Augmented Dickey Fuller Test result. This test checks the stationary.

$$\Delta Y_t = \beta_0 + \beta_i Y_{t-i} + \Sigma\beta_i Y_{t-i} + \mu_t$$

The result of test indicates that Independent and Dependent variables are integrated at 1st difference (less than 1). This test is very important due to avoid the unauthentic regression. Ouattara (2004) also mentions bound test assumption that all variables should be integrated at I(0) or I(1).

Estimation and Empirical Results:

To analyze the effect, regression model is used with time series from the year 1980 till 2016 through employing OLS estimator. The OLS results as shown in Table 3 and 4, are based on time series analysis i.e. auto regressive of order 1.

$$\mathbf{GDP_t = \varphi_0 + \varphi_1 LM_t + \varphi_2 FDI_t + \varphi_3 ER_t + \varphi_4 MIG_t + \varphi_5 INF_t + \epsilon_t}$$

The study examines the effects of brain drain, exports, exchange rate, inflation on economic growth i.e. boost in GDP. Least square method is employed where the sample was selected with time period ranging from 1980 till 2016. After adjustments, 36 observations are included to analyze the impact of Labor migration, Foreign Direct Investment, Exchange rate, Inflation, remittances and exports on GDP. The convergence was achieved after 46 iterations.

After regressing, GDP (which is taken as an indicator of economic growth on remittances and other explanatory variables) shows that if there is 1 unit change in remittances there will be 3.2 changes in GDP. The results also shows that change in migrationby 1unit will change the GDP by - 2.14 units and last if the exchange rate changes by 1 unit, GDP will be changed by 7.82 units. In order to check further reliability, different test is applied.

The table portrays noteworthy relationship of remittances and economic growth, because t-statistics of all the variables is above minimum level of 1.64, which shows significant impact of explanatory variables on dependent variable. At the end a negative growth in GDP is observed if all the aforementioned variables are kept constant. In terms of percentage the GDP is decreased by 1.29 units. To end with, it is clearly shown that there is strong impact of

remittances on the growth of GDP and its relation with other stated variables is also positive as mentioned above.

Conclusion and Policy Recommendations:

Labor migration, return migration and remittances are the main factors of brain drain in Pakistan. Due to these factors we found many intellectual Pakistani in developed countries. This study examined the impact of above mentioned causes/factors of brain drain on human capital and economic growth. The results have clearly shown that brain drain has negative impact on human capital and economic growth. Only remittances has positive effect on economic growth and human capital. All estimated parameters are highly statistically significant.

The research concludes that the country needs skilled people to help in boosting the economy of Pakistan. In this regard, there is a great need for the Government to improve upon the request the social and economic growth of the country. Government must create more jobs, increase salary packages and enhance the economic status of the people of the country, especially professionals. The Government must facilitate the private sector in order to create more jobs. This in turn will initiate high economic growth for the people. Furthermore, the Government must expand the market by offering stat-of-the art R&D facilities to both the public and private sector.

The future research should be conducted with a view to inculcate the expert opinion of professionals which will provide better commentary on the most influential factors of brain drain.

Table 1: Descriptions of Variables

Column 1	Variables	Proxy	Expected Sign	Data Source
1	Economic Growth (Dependent Variable)	GDP (Million $)		World Bank
Independent Variable (Predictor)				
2	Labor Migration	outflow (Million $)	+	Bureau of emigration and overseas employment
Macroeconomic Variables (Explanatory)				
3	Export	Net Export (Million Rs.)	+	Annual Data From 1980 to 2016 (obtained from World Bank's World Development Indicators Database)
4	Exchange Rate	Official Exchange Rate	+	State Bank of Pakistan
5	Inflation Rate	Consumer Price Index	+	Federal Bureau of StatisticsPakistan, World Bank and State Bank of Pakistan

Table 2: Results of Stationary Tests for Pakistan

Tests	Variable	No. of Lags	Specification		Values	Order of integration
ADF-Test	ER	-1	Constant	First Difference	-4.768 (0.001)*	-1
PP-Test	ER	---	Constant	First Difference	-3.56 (0.0133)*	-1
ADF-Test	LM	-1	Trend & Intercept	First Difference	-3.3122	-1
					(0.0683)*	
ADF-Test	LM	-1	Trend & Intercept	First Difference	-3.6122	-1
					(0.0691)*	
PP-Test	FDI	---	Constant	First Difference	-3.399 (0.0693)*	-1
PP-Test	FDI	---	Constant	First Difference	-3.399 (0.019)*	-1
ADF-Test	GDP	-1	Constant	First Difference	-3.347 (0.021)*	-1
PP-Test	GDP	---	Constant	First Difference	-3.444 (0.017)*	-1
ADF-Test	INF	-1	Constant	Level	-3.17 (0.033)*	-1

PP-Test	INF	---	Constant	First Difference	-6.59 (0.000)*	-1
ADF-Test	EXP	-1	Constant	First Difference	-3.475 (0.016)*	-1
PP-Test	EXP	---	Constant	First Difference	-3.474 (0.016)*	-1

*, **, *** significant at 1%, 5% and 10%, respectively Values in parenthesis are p-values: exchange rate, INF: Inflation, GDP FDI EXPORTS. Augmented Dickey Fuller Test (ADF), Phillips-Perron test (PP-Test)

Table3: OLS Results

GPD : Dependent Variable

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.29E+10	1.99E+10	-0.648408	0.5229
remittances	3.1861	1.3450	2.3687	0.0262
mig	-3.2041	1.3257	2.3872	0.0222
Return mig	-2.1487	1.0058	1.7365	0.0119
ER	7.82E+08	2.43E+08	3.213914	0.0037
EXPORTS	4.296554	0.7501	5.727809	0
AR(1)	0.91028	0.10114	8.999628	0

R-squared	0.722221	Mean dependent var	7.08E+10
Adjusted R-squared	0.711111	S.D. dependent var	4.37E+10
S.E. of regression	4.02E+09	Akaike info criterion	47.24558
Sum squared resid	3.89E+20	Schwarz criterion	47.52582
Log likelihood	-702.6837	Hannan-Quinn criter.	47.33523
F-statistic	680.7373	Durbin-Watson stat	1.914542
Prob(F-statistic)	0		
Inverted AR Roots	.91		

Table4: OLS Results

Dependent Variable: Human Capital

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.449	1.7553	-0.6778	0.5279
Remittances	3.2261	1.3229	2.3778	0.0296
LM	-0.0474	1.3257	2.3872	0.0178
MIG	-0.4877	1.0058	1.7365	0.0280
ER	6.87E+08	2.74E+08	3.774	0.0012
EXPORTS	2.9855	0.4655	5.7725	0.057
AR(1)	0.7228	0.1117	7.4425	0

R-squared	0.625	Mean dependent var	7.78E+10
Adjusted R-squared	0.6011	S.D. dependent var	4.25E+10
S.E. of regression	2.01E+09	Akaike info criterion	45.225
Sum squared resid	4.00E+20	Schwarz criterion	45.2258
Log likelihood	-701.004	Hannan-Quinn criter.	45.7758
F-statistic	670.7373	Durbin-Watson stat	1.92
Prob(F-statistic)	0		
Inverted AR Roots	.91		

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