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# **Do Remittances Impact Human Development in Developing Countries?**

## **A Panel Analysis of Selected Countries**

**Chan Bibi<sup>1</sup>, Amjad Ali<sup>2</sup>**

### **Abstract**

Remittances are the part of migrant workers and essentially cash exchanges earned abroad and sent to their families. Worker remittances are an important part of international capital flows. The volume of remittances increments in developing countries day by day and season through season. Remittances are the backbone of developing economies. We have used annual cross-section data from the period 2014 from 100 developing countries including Afghanistan, Pakistan, Turkey, Bangladesh, Iraq, and China. Results show that there is a positive and insignificant relationship between remittances and human development in each of the selected developing countries.

**Keywords:** remittances, human development, developing countries

**JEL Codes:** F24, J24

### **1. Introduction**

Remittances are the part of migrant workers and essentially cash exchanges earned abroad and sent to their families. The critical meaning of remittances is financial support for generations. Worker remittances are an important part of international capital flows. In developing countries, Remittances are the second largest external source of funding after Foreign Direct Investment (FDI) (Ebeke, 2012). The general aggregate for worldwide remittances is \$583 billion. European countries, for illustration, Spain, Italy, and Ireland were reliant on remittances amid the nineteenth and twentieth hundreds of years. The flow of remittances expanded a decade ago in the 20<sup>th</sup> century. In 1946, the remittances in Spain were 21% of all its current accounts. 150 million ex-pats sent more than the US \$300billion to their families in developing countries during 2006. Because of the striking increment in remittances in the past few years, the research interest in remittances has increased a lot. It is estimated by the World Bank that developing countries received \$167 billion in remittances in 2005 (World Bank, 2006). Registered remittances sent back to developing countries increased from \$31 billion in 1990 to \$83 billion in 2000, to no under \$338 billion in 2008. Formally, recorded remittances to developing countries were estimated to reach \$406 billion in 2012, up by 6.5% from \$381 million in 2011 (World Bank, 2012). While remittances to

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developing countries surged, official aid streams witness a declining pattern. Although this flow slightly reflects the surfacing of past informal remittances, enhanced recording of remittances, and declining devaluation of the United States (US) dollar, there is little uncertainty that at any rate, a portion of this increment has been genuine. We cannot quantify the flow of remittances because people who work abroad send their money through formal and informal methods. For the most part, remittances are sent through an informal method that is not in the knowledge of the government. There are different specific components of remittances flow by different countries and even by international organizations (e.g. IMF Balance of payments statistics and the World Bank's Global Development Finance Report). Remittances play an essential role to build the job or the national income. Remittances satisfy the requirements of sustenance and 80% of remittances are used for purchasing land, repaying the debt, consumption purposes, more expensive instruction for kids, and social capacities like marriage and other events. 20% of remittances are utilized for beneficial reasons like interest in the industry, small businesses, and farming businesses. Generally, remittances appear to create a negative impact on the economy. For example, remittances used for unproductive purposes and migrants impact currency appreciation, etc. (Pant, 2008). It is easy to understand how and why remittances affect the country's recipients in previous research. Because increasing the flow of remittances is very important, which has been targeted and widely explored in additional studies. Many studies support the view that remittances have decreased poverty and have caused a positive impact on economic growth (Chimhowu, Piesse, and Pinder, 2005) while many contrasting studies with negative effects on the countries which receive the remittances. In countries that receive remittances, the chances of corruption and corruption influencing economic growth are manifold (Berdiev, 2013). The remittances had kept greater importance in developing countries and play a very important role to grow up the economy and human development. The present study aims to check the impact of remittances on human development in developing countries. In this study, we follow the cross section for the estimation procedure, and the data selected is from developing countries. Migration is an important factor that affects currency appreciation and inflation and plays both negative and positive roles. People who move to occupation countries send cash back to their countries of origin which may aid to enhance education, sustenance, setting up new businesses and improving the way of life, and so on.

## **2. Literature Review**

Ångman and Larsson (2014) analyzed remittances and development using annual panel data of 99 developing countries. This relationship was estimated with the help of the ordinary least square (OLS), fixed effect model, and random effect model. The data consisted of the yearly panel between 2005 to 2012. Results indicate a positive

relationship between remittances and the level of human development in developing countries. Ustubici and Irdam (2012) examined the impact of remittances on human development using quantitative analysis. This relationship was estimated with the help of ordinary least squares (OLS). The data consisted of from 1990 to 2005. They said that remittances have a positive impact on changes in human development and they are more important for human development than other foreign inflows such as FDI, ODI, and exports. Alishani and Nushi (2012) analyzed the effect of remittances on the education and health of family members behind. The data consisted of yearly observations between 1989 to 1999. According to Kosovo Remittances Study by UNDP (2010), it is suggested that remittances not only affect positively the level of income but also the ability to access healthcare and education. Brown (2008) examined the remittances and development in the Pacific to check the effect on human development in Fiji and Tonga. The cross-sectional data was taken from 2006 and instrumental variable techniques were used to examine the impact of migration and remittances on human development in two countries. When remittances increase the household income, it helps to decrease the poverty level. There is a positive and significant impact of remittances on human development such as health and education but the effect on inequality is uncertain because of the possibility of rise in inequality. Another study that included penal data analysis of the growth effect of remittances was done by Rao and Hassan (2011). The data consisted of the yearly observations for 1960 to 2007. To check the direct growth effect, conventional specification and panel data estimation, modified specification, and the system GMM method were used. Results show that remittances have no effect on the direct long-run growth but they may influence short-run growth.

According to Fayissa and Nsiah (2010), remittances may spur economic growth and development. They used annual panel data from Latin American Countries (LACs). In this study, data was used from 1980 to 2005, and estimation methods based on simple fixed effects and random effects models were applied. The main purpose of this study was to check the impact of remittances relative to other external sources of capital such as FDI and foreign aid. This study tells us that remittances cause a positive impact on the economic growth and development of Latin American Countries. In another study, De Haas (2010) examined remittances, migration, and development and policies in developing countries. The purpose of the social policies is to redistribute the wealth and provide basic public facilities and access to enhance the economic policies of non-elite groups to insurance and credit markets. They concluded that there is a positive impact of remittances on social development, particularly in education, health, and infrastructure. Orrenius et al., (2010) explored whether remittances improve economic development. Data from 2003 to 2007 was used using a two-stage least square method. The study explained the impact on economic development as a measure of employment, unemployment, school enrollment,

and wages. The result indicated that remittances have a positive impact on economic development. In another study, Salas (2014) analyzed international remittances and human capital. This study was based on human capital theory and investment in education that linked to remittances and panel data used from 2007 to 2010. The result showed that families who receive the remittances mostly send their children to private schools for better education. This study determined that a positive impact and significant impact of remittances on human capital can not only provide individual benefits but also affect the growth and development of the country. Kroeger and Anderson (2014) explained about remittances and human capital of children in Kyrgyzstan during the revolution and financial crisis. The data consisted panel dataset of children from 2005 to 2009 and boys aged 14-18 who live in remittances receiving household than others. They try to check the improvement in school enrollment among young children. They worked on unbalance panel and used fixed effect estimation and fixed effects and instrumental variables estimation. The role of remittances with nutritional outcomes of younger girl if this girl is at home where any person of the family lives abroad and in absence of this situation, then parent force on remaining members of the household. Kyrgyzstan is a male dominant economy where boys are interested to leave school to start working abroad.

In the study, Ilahi and Jafarey (1999) explored guest worker migration, remittances, and the extended family in Pakistan. In this study, cross-sectional data used ILO-ARTEP in 1986. The purpose of this study was to check the effect of loans on refugees' savings and families. The results show that in Pakistan negative relationship between loan requirements and remittances to the extended family. In another study Koska, Saygin, Çağatay, and Artal-Tur (2013) analyzed international migration, remittances, and the human capital formation of Egyptian children. In this study, panel data was used between 1998 to 2006. This relationship was estimated through standard OLS techniques, OLS with regional, fixed effects and instrumental variable approach. The results showed that the remittances have positive impact on school enrollment and negative on labor force participation. Ponce et al., (2011) analyzed the role of international remittances in health outcomes in Ecuador by using an instrumental variable approach. Ecuador is a low-middle-income country. In this study cross-sectional data is used and taken from the living standard measurement survey of 2006. The results show that remittances have a positive and significant impact on health knowledge because remittances are used for emergencies and medicine expenditure when people are sick. Stojanov and Strielkowski (2013) explored the role of remittances as a more efficient tool of development aid in developing countries. The data consisted of yearly panel data between 1970 to 2009. The empirical model was based on a two-stage least squares estimation and a standard OLS estimation. The results show that remittances are more important for economic growth and development than ODA, which appeared as

the annual growth of GDP per capita in developing countries. Official development systems may play a crucial role such as the United Nations or the World Bank in distributing international aid to needy people in developing countries. Madani et al., (2013) explored the effect of remittances on the living standards of Albanians and the country's GDP. The data consisted of between 1992 to 2012. The result shows that Albanian families use their remittances on basic needs such as food and health services but when there is a reduction in remittances then the quality of life becomes worse and both situations also influence the percentage of GDP. Sawyer (2014) examined the effect of remittances on youth educational attainment, participation, and aspirations in Southern Mexico. This relationship was estimated with the help of OLS and Logistic regression analysis. The cross-sectional data between 2007 to 2008 from the Mexican Migration Field Research and Training Project (MMFRRP) was used. Remittances are not enough for education, there are so many other factors, which must be taken into consideration, to the expansion of universities, financial support and improvement in educational standards and public awareness programs must be conducted for parents and youngsters to motivate them.

In another study, Bredl (2011) analyzed migration and the effect of remittances on educational outcomes in Haiti. In this study, data consisted of three communities; 1<sup>st</sup> community consisted of the Jacmel in the country's Southwest department, the 2<sup>nd</sup> community found in Southwest Haiti, and 3<sup>rd</sup> community consisted of the Atlantic coast in the country's North-Western department. Results show that remittances play an important role for poor households and cause a positive impact on education but migration hurts household children and education. Migration increases the duties of children and the loss of parental role models which influence educational outcomes. Koc and Onan (2004) analyzed international migrants' remittances and the welfare status of left-behind families in Turkey. In this study, data was taken from the 1996 Turkish International Migration survey (TIMS-96) which consisted of between 1964 to 2000. The results show that 12% of families use migration saving for basic consumption needs and 80% of families use remittances for their standard of living. Remittances and migration have a positive impact on the income of migration families than non-remitting families. Remittances mostly use for education, health, and nutritional purposes. Afaha (2013) explored migration, remittances, and development in origin countries as evident in Nigeria. The data consisted of between 2000 and 2010. This relationship was estimated with the help of linear regression OLS test, stationary test (ADF) test, (PP) unit root test, and cointegration test. Results show that remittances are a positive and significant impact on economic growth as a GDP in origin countries. Workers' remittances send in the form of cash and goods to their origin places which use for purchasing food, healthcare, education, and business, rebuilding the house, and purchasing land. International remittances should be used for productive activities such as agriculture, livestock, fishing, and non-

agricultural economic activities such as woodwork. Barguelli, Zaiem, and Zmami (2013) analyzed remittances' effect on education and economic growth. This study was based on panel data analysis of two groups of countries between 1990 to 2006. 1<sup>st</sup> group consisted of the largest remittances recipients' in GDP percentage and 2<sup>nd</sup> group of countries consisted of large recipient amount. Results show that in 1<sup>st</sup> group of countries, remittances have direct and indirect impact on education and economic growth and positive correlation but not significant, between education and economic growth and 2<sup>nd</sup> group of countries these effects vanish. Kock and Sun (2011) analyzed about why the remittances in Pakistan surge and plunge down? This estimation was based on panel data with flows of remittances in Pakistan and data used from 1997 to 2008. This study was estimated with the help of Bayesian approach and OLS approach. Results show that remittances have a big source of inflows for Pakistan, skill labor migrant in host countries and their investment return in Pakistan, inspire the exchange rate and migrants' worker help to increase the remittances.

Ponce et al., (2008) explored the impact of remittances on human development in Ecuador. This data was taken according to INEC data in 2006 and in this study, remittance was distributed among quantile. This study was estimated with the help of OLS estimation and two stages estimation. Results show that remittances have an insignificant impact on human development outcome variables in the long term such as education and health expenditure because people who are receiving the remittances transfer their children from public to private schools. In the short term, remittances have a positive and significant impact on reducing poverty but in long term, it does not expand people's capabilities. Deb and Seck (2009) explored internal migration, selection bias, and human development evident in Indonesia and Mexico. This case was estimated with the help of the standard two-stage least square method (2SLS). The study used panel data from Indonesia (FLS) from 1994 to 2000 and Mexico (FLS) from 2003 to 2005. The results show that migration develops the socioeconomic position through an increase in consumption or income and it determines the health status of people and increases migrants' standard of living and support for their families. Gounder (2014) analyzed the impact of remittances on finance welfare development in Fiji. In this study data on household income and expenditure was used from survey 2002 to 2003 a dataset of 5,245 households. The results show that remittances are used on housing and human capital expenditures in urban Indo-Fijian households and rural Fijian households use remittances on durable and non-durable goods and human capital. The impact of remittances is significant overall and positive on the education of children. On the basis of gender support, Fijian households use remittances for the higher education of boys and girls but Indo-Fijians' remittances impact is negative for girls in rural areas. Hatemi and Shamsuddin (2016) examined the causal interaction relationship between financial development and human development in

Bangladesh. This study was estimated with the help of a bootstrap causality test and used macro-level data between 1980 to 2011. The results show that the government of Bangladesh focuses on promoting the education level among citizens and human capital can be used for increasing productivity which leads to higher economic growth and resource mobilization in the private sector which leads to financial development and economic growth. After analyzing these studies, most studies show the positive impact of remittances on human development while some studies show the negative impact of it but these studies did not explain the relationship between human development and remittances clearly. So, the main objective of this paper is to check the true role of remittances on human development index.

### 3. The Model

This part presents the model specification and variable description. A wide range of studies analyzed the role of remittances on human development. Different researchers used different methodologies to check the role of remittances on human development. The analysis is based on cross-sectional tools to examine the role of remittances on human development. For this exploration purpose, we have taken the human development index as a dependent variable and independent variables are personal remittances, gender inequality index, and trade, world governance indicators (rule of law, government effectiveness, and regulatory quality). Based on (Ali, 2015; Ali, 2018; Ali and Bibi, 2017; Ali and Ahmad, 2014; Ali and Audi, 2016; Ali and Audi, 2018; Ali and Rehman, 2015; Ali and Senturk, 2019; Ali and Zulfiqar, 2018; Ali et al., 2016; Ali et al., 2021; Ali et al., 2021; Ali et al., 2015; Arshad and Ali, 2016; Ashraf and Ali, 2018), our model can be written as:

$$HDI = F(PREMB, GIINDEX, TGDP, IUSERS, RLAW, RQUALITY, GEFFECT)$$

This equation shows the human development index is the function of remittances, gender inequality index, and trade as a percentage of GDP, internet users, rule of law, regulatory quality, and government effectiveness.

Where,

HDI = Human Development Index

PREMB = Personal Remittances current dollars (Billion)

GIINDEX = Gender Inequality Index

TGDP = Trade as a GDP percentage

IUSER = Internet Users (per 100 people)

RLAW = Rule of Law

RQUALITY = Regulatory Quality

GEFFECT= Government Effectiveness



Different sources were used to collect data for this study. The basic source for collecting data is World Development Indicators (World Bank, 2015). Data for HDI and Gender Inequality Index were collected from Human Development Reports (UNDP, 2015). Data about trade as a percentage of GDP, personal remittances, and internet users were collected from World Development Indicators, and institutional variables conducted from World Governance Indicators (World Bank, 2015). We have used annual data from the period 2014 of a cross-section of 100 developing countries. According to World Bank, a country is developing if it is low income or middle-income country where income is measured by GNI (World Bank, 2015).

#### 4. Estimation Results

This sample period used for analysis is taken from World Development Indicators (World Bank, 2014). We start our analysis by observing the descriptive statistic of each variable.

**Table 1: Descriptive Statistics**

	HDI	GIINDEX	PREMB	IUSER	RLAW	RQUALITY	GEFFECT	TGDP
Mean	0.620270	0.456256	4.707736	28.51410	-0.51620	-0.520300	-0.485700	78.92738
Median	0.666000	0.467500	1.207468	25.22000	-0.55000	-0.510000	-0.500000	73.71040
Maximum	0.898000	0.713000	70.38864	74.70000	0.980000	1.000000	1.180000	197.5766
Minimum	0.348000	0.125000	0.000837	0.000000	-1.73000	-2.200000	-2.030000	19.11879
Std. Dev.	0.133512	0.144664	10.49614	19.98651	0.553267	0.691956	0.636281	33.47194
Jarque-Bera	7.748953	2.651888	1562.212	7.136363	2.474626	0.391814	0.123896	15.78464
Probability	0.020765	0.265552	0.000000	0.028207	0.290163	0.822089	0.939932	0.000374
Observations	100	86	66	100	100	100	100	86

Level of significance ( $\alpha = 0.05$ )

In table 1, the results show that in developing countries the average human development index is 0.620270, the average trade as a percentage of GDP (per 100 people) is 78.92738, the average of internet users is 28.51410, the average of personal remittances is 4.707736 billion dollars and an average of gender inequality index is 0.456256. Similarly, in developing countries, the average government effectiveness is -0.485700 and the average rule of law is -0.516200 and the average regulatory quality is -0.520300. In developing countries, the median human development index in El-Salvador and Vietnam is 0.666000; the median gender inequality index is 0.463 in Suriname and 0.472 in Paraguay. In developing countries, the median of personal remittances is 1.2313 billion dollars in Belarus and 1.183636\$ in Bolivia and the median of internet users is 24.64 in Sudan and 25.8 in Sir-Lanka. Similarly, the median rule of law is -0.5500 in Benin, Kazakhstan, and Peru and the median of regulatory

quality is -0.5100 in Belize and Benin. The median government effectiveness is -0.5000 in Belarus, Benin, and Ecuador. The median trade as a GDP percentage is 73.71040 in Senegal. The range of human development index found between 0 to 1. In the year of 2014 in developing countries maximum human development index is 0.8980 in the Korean Republic which shows that this country gets more developed because it's close to one and the minimum human development index is 0.3480 in Niger which shows that this country gets less development in this year because it's close to 0. In developing countries, the highest gender inequality index is 0.7130 in Niger which shows that in this country there is more gender inequality and human development is less, minimum gender inequality index is 0.1250 in the Korean Republic which shows that this country found less gender inequality and more human development. In developing countries, the maximum personal remittances are 70.388 billion dollars in India and the lowest personal remittances in Mauritius which is 0.000837 billion dollars. The maximum number of internet users found in Lebanon is 74.70000, and the minimum number of internet users is found in the Korean Republic. In developing countries, (2014) maximum rule of law follows in the Korean Republic and the minimum rule of law follows in the Central African Republic. Maximum regulatory quality follows in Mauritius and minimum regulatory quality follows in the Korean Republic. Similarly, Government effectiveness follows in the Korean Republic and minimum government effectiveness follows in Haiti. Maximum trade as a GDP percentage in the Maldives, which is 197.5766, and minimum trade as a GDP percentage in Sudan, which is 19.11879. In developing countries average variations in the human development index are 0.133512, average variations in gender inequality are 0.1446, average variations in personal remittances are 10.49614 billion dollars, and average variations in internet users (per 100 people) is 19.98651. Average variations in rule of law are 0.553267, average variation in regulatory quality is 0.6919, average variations in government effectiveness is 0.636, and average variations in the trade as a GDP percentage is 33.471. Jarque-Bera test uses to check the normality in variables and the normality criteria is if the p-value is greater than  $\alpha$ , ( $\alpha = 0.05$ ) which shows that data is normally distributed. The probability of JB for the human development index (0.020765) shows that this variable is not normally distributed. The probability of gender inequality index (0.265552) shows that this variable is normally distributed because the p-value is greater than  $\alpha$ . The probability of personal remittances (0.000) and the probability of internet users (0.0282) show that this variable is not normally distributed. The probability of rule of law (0.2901), the probability of regulatory quality (0.8220), and the probability of government effectiveness (0.9399) show that these variables are normally distributed. The probability of trade as a GDP percentage (0.000374) shows that this variable is not normally distributed.

**Table 2 Covariance analysis: Ordinary**

Variables	HDI	GIINDEX	PREMB	IUSER	RLAW	RQUALITY	GEFFECT	TGDP
HDI	1.000000	-0.812883	0.027918	0.708763	0.525462	0.403275	0.691944	0.225006
	-----	-10.16074	0.203325	7.314329	4.496168	3.208343	6.977517	1.681177
	-----	0.0000	0.8397	0.0000	0.0000	0.0023	0.0000	0.0986

Level of significance ( $\alpha = 0.05$ )

In table 2, we see a correlation positive and negative between dependent and independent variables because in developing countries some variables keep a positive correlation and some negative correlation. In developing countries, the coefficient of the gender inequality index (-0.8128) shows that there is a negative correlation between the human development index and the gender inequality index, and the p-value (0.0000) shows that there is a significant impact. The coefficient of personal remittances is 0.0279 billion dollars, which shows that there is a positive correlation between personal remittances and the human development index, and the p-value (0.8397) shows that there is an insignificant impact. The coefficient of internet users (0.708763) shows that there is a positive correlation between internet users and the human development index, and the p-value (0.0000) shows that there is a significant impact. The coefficient of the rule of law (0.525462) shows that there is a positive correlation between rule of law and the human development index, and the p-value (0.0000) shows that it is significant. The coefficient of regulatory quality (0.403275) and coefficient of government effectiveness (0.691944) show that there is a positive correlation between developing countries' HDI and regulatory quality, HDI, and government effectiveness and the p-value of regulatory quality (0.0023) and the p-value of government effectiveness (0.0000) shows that there is significant impact. The coefficient of trade as a GDP percentage (0.225006) shows that there is a positive correlation between trade as a GDP percentage and HDI and the p-value (0.0986) shows that there is an insignificant impact.

Table 3 shows that in developing countries there is a positive relationship between the dependent variable human development index and independent variables (personal remittances, internet users) and a negative relationship between the dependent variable human development index and independent variables (gender inequality index, trade as a GDP percentage). The coefficient of the gender inequality index is -0.5263 shows that if the gender inequality index increase by 1 unit then the human development index decreases by 0.5263 units. The Economic theory suggests that when the literacy rate of male and the literacy rate of female become unequal then the overall literacy rate in a country become less. The ratio of uneducated people will increase on the one hand if the female literacy rate becomes low then they cannot educate the future generation and also cannot participate in economic

activity. On the other hand, if the male literacy rate become low then the skilled employed will decrease and they will not be able to use the new technology by which the production sectors cannot produce at full employment level and the wage rate will reduce, per capita income will reduce, human wellbeing will also go down. Therefore, we can conclude that gender inequality hurts human development and it is also supported by economic theory. The coefficient of personal remittances is 0.0008 billion dollars shows that if personal remittances increase by 1 billion dollars then the human development index increase by 0.0086 units. The Economic theory behind this when remittances will increase then income will increase and purchasing power also increases. On the other hand, consumption will increase and living standards will be better who grow up the human development. Ponce (2011) has also found the same conclusion that remittances have a positive impact on human development and it is also supported by economic theory and previous studies.

**Table 3: Long Run Results**

Dependent Variable: HDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GIINDEX	-0.526373	0.144255	-3.648893	0.0006
PREMB	0.000860	0.000486	1.767276	0.0833
IUSER	0.001986	0.000906	2.192694	0.0330
TGDP	-0.000138	0.000285	-0.483218	0.6311
C	0.818496	0.098839	8.281079	0.0000

Level of significance 5%

The coefficient of internet users is 0.0019 shows that if internet users (per 100 people) increase by 1 unit then human development increases by 0.0019 units. The economic theory behind this is if internet users will the more educated investor get more ideas and produce more innovative products then export will increase then revenue will be higher and human development will increase. So we can conclude that internet user has a positive impact on human development and it is also supported by economic theory. The coefficient of trade as a GDP percentage is -0.000138 shows that if trade as a GDP increases by 1% then human development decreased by 0.000138 units. The Economic theory behind this is when developing countries' imports exceed than export and the balance of payment will be in deficit. On the other hand, for the reduction of the balance of payment deficit, the government will increase the taxes on imported goods then the import will decrease and human development will increase. Fayissa (2010) has found the same conclusion that trade as a GDP hurts human development in developing

countries and it is also supported by economic theory and previous literature. T-statistic of gender inequality index (-3.6488) which is greater than 2 and sign doesn't matter shows that our model is significant and the t-statistic of personal remittances in billion dollars (1.767276) which is less than 2 shows that our model is insignificant. The t-statistic of internet users (per 100 people) (2.192694) shows that our model is significant and the t-statistic of trade as a GDP percentage (-0.4832) shows that our model is insignificant. The p-value of gender inequality is 0.0006 and the p-value of internet users is 0.0330, which is less than the 5% level of significance showing that the results are significant. The p-value of personal remittances is 0.0833 and the p-value of trade as a GDP percentage is 0.6311 which shows that result is insignificant. R-square is 0.7401 which shows that 74% variations in the human development index due to gender inequality index, personal remittances, internet users (per 100 people), and trade as a GDP percentage and remaining unexplained. The p-value of the F-statistic (0.000000) shows that our model is overall significant.

**Table 1: Plot of the histogram to check the normality**

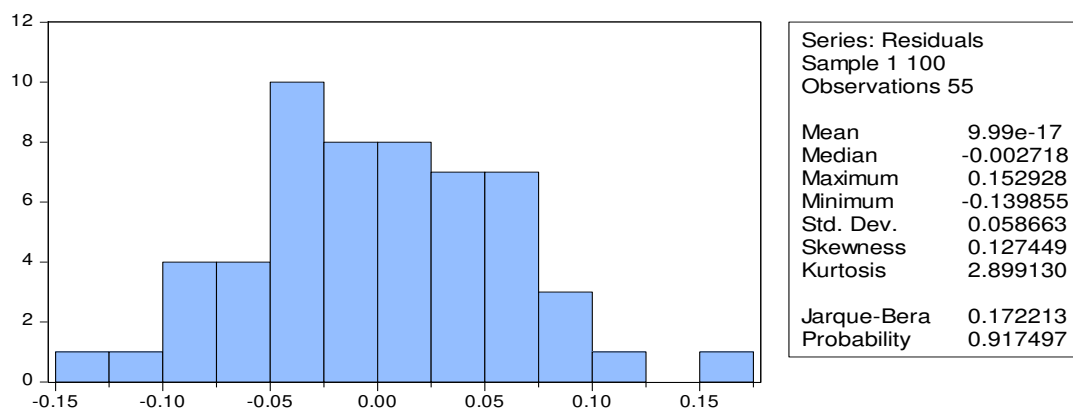


Table 1 results interpret through the plotting of the histogram. This figure shows that the average variations are 0.0586. Jarque-Bera test is used to check the normality and the probability (0.9174) is greater than the 5% level of significance which shows that our model is normally distributed.

**Table 4: Breusch-Godfrey Serial Correlation LM Test**

F-statistic	1.548178	Prob. F(2,48)	0.2231
Obs*R-squared	3.332910	Prob. Chi-Square(2)	0.1889

Level of significance 5%

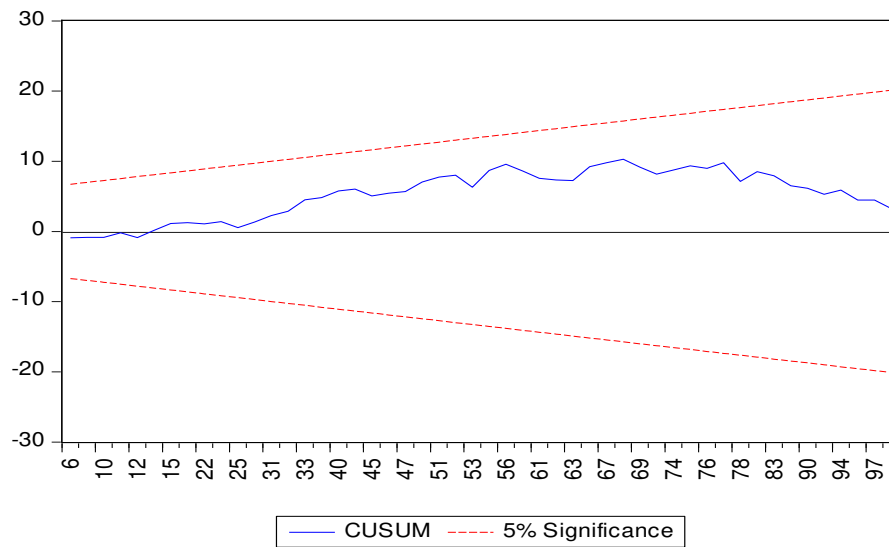
In table 4 Breusch-Godfrey Serial Correlation LM test estimate that the p-value of the F-statistic is 0.2231 which is greater than the 5% level of significance then we will accept the null hypothesis and we can say that there is no serial correlation.

**Table 5: Heteroskedasticity Test: ARCH**

F-statistic	0.069954	Prob. F(1,31)	0.7932
Obs*R-squared	0.074300	Prob. Chi-Square(1)	0.7852

Level of significance 5%

Table 5 results interpret the results of the ARCH test of Heteroskedasticity. According to this test, the p-value of the F-statistic is 0.7932, which is greater than the 5% level of significance and shows that there is no Heteroskedasticity.



**Table 1: Plot of Cumulative Sum of Recursive Residual**

Table 1 results interpret by using a stability test. A stability test uses to check the stability of the model. We use the cumulative sum of recursive residual (CUSUM) to check the stability of the model. In this figure, the straight lines represent the critical boundaries at a 5% level of significance and the horizontal lines show the observations. The zigzag line lies between critical boundaries showing that our model is stable.

Table 6 results interpret data about developing countries (2014) in which the human development index is a dependent variable and gender inequality index, personal remittances, internet users (per 100 people), trade as a GDP percentage, and rule of law used as independent variables in which some keep the positive relationship and some negative relationship. The coefficient of the gender inequality index is -0.4485 which highlight that there is a negative relationship and if 1 unit increase by the gender inequality index then the human development index decrease by 0.448551. The coefficient of trade as a GDP percentage is -0.000144 shows that there is a negative relationship between human development and trade as a GDP percentage and if trade as a GDP increases by 1% then human development decreased by 0.000144 units. Coefficients of personal remittances are 0.000705, internet users are 0.002010, and rule of law is 0.041341 which shows that there is a positive relationship between human

development index and personal remittances, human development index and internet users (per 100 people), and human development index and the rule of law.

**Table 6: Results Outcomes**

Dependent Variable: HDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GIINDEX	-0.448551	0.082590	-5.431039	0.0000
PREMB	0.000705	0.000728	0.967817	0.3379
IUSER	0.002010	0.000514	3.909343	0.0003
TGDP	-0.000144	0.000261	-0.552540	0.5831
RLAW	0.041341	0.015974	2.588041	0.0127
C	0.803501	0.055315	14.52588	0.0000
R-squared	0.771366	Mean dependent var		0.663145
Adjusted R-squared	0.748036	S.D. dependent var		0.115072
S.E. of regression	0.057762	Akaike info criterion		-2.762317
Sum squared resid	0.163484	Schwarz criterion		-2.543336
Log likelihood	81.96373	Hannan-Quinn criter.		-2.677635
F-statistic	33.06328	Durbin-Watson stat		2.341808
Prob(F-statistic)	0.000000			

Level of significance 5%

If personal remittances increase by 1 billion dollars then human development increases by 0.000705 units. If internet users (per 100 people) increase by 1 unit then human development increases by 0.002010 units. If rule of law increase by 1 unit then human development increase by 0.041341 units. The t-statistic of the gender inequality index is -5.431039 which is greater than 2 highlighting that our model is significant which is also confirmed through the p-value (0.0000) which is less than  $\alpha$ . The t-statistic of personal remittances is 0.967817, which is less than 2 confirming that our model is insignificant. T-statistic of internet users (3.909343), t-statistic of rule of law (2.588041) which is greater than 2 shows that our model is significant, and the p-value of internet users (0.0003) and the p-value of rule law (0.0127) which is less than  $\alpha$  shows that it is significant. T-statistic of trade as a GDP percentage (-0.552540) which is less than 2 shows that our model is insignificant. R-squared (0.771366) shows that 77% variations in the human development index due to gender inequality index, personal remittances,

internet users (per 100 people), trade as a GDP percentage, and rule of law and remaining unexplained. The p-value of the F-statistic (0.000000) shows that our model is overall significant.

**Table 6: plot of the histogram to check the normality**

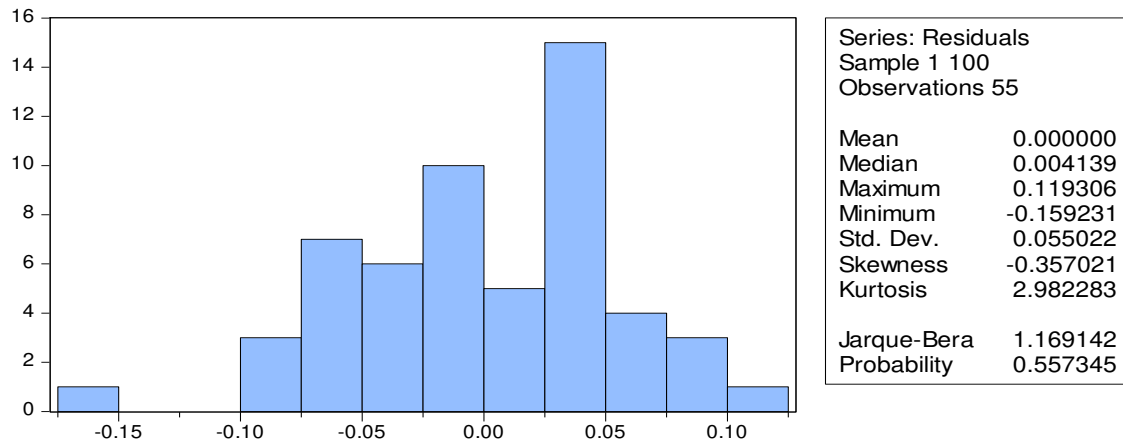


Table 3 interprets through the plotting of the histogram to check the stability. This figure shows that the mean value is 0.000000 and average variation is 0.055022 and through Jarque-Bera value (1.1691142) use to check the normality and p-value (0.557345) which is less than the 5% level of significance, which shows that, our model is not normally distributed.

**Table 7: Heteroskedasticity Test: ARCH**

F-statistic	0.364763	Prob. F(1,31)	0.5503
Obs*R-squared	0.383781	Prob. Chi-Square(1)	0.5356

5% level of significance

Table 7 interprets the results of the ARCH test of Heteroskedasticity. According to this test, the value of the F-statistic, corresponding to the p-value is 0.5503, which is greater than the 5% level of significance. Therefore, we conclude that there is no Heteroskedasticity.

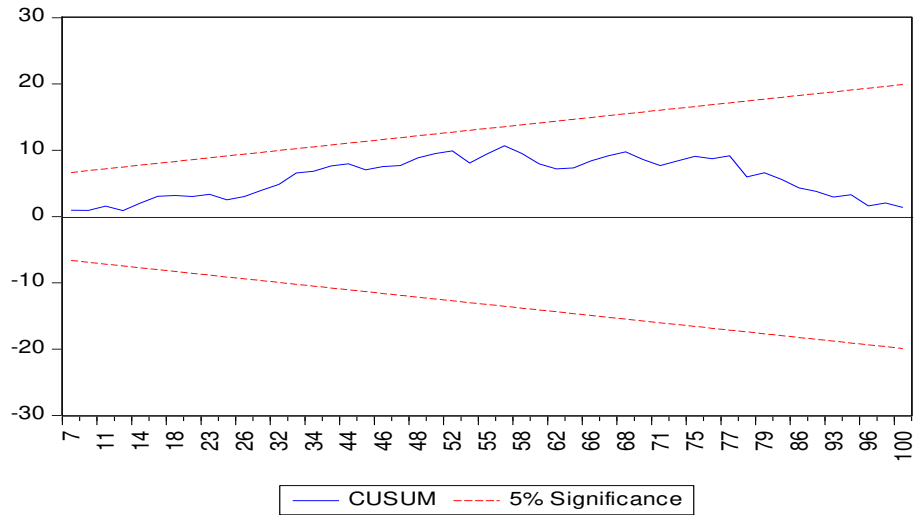
**Table 8: Breusch-Godfrey Serial Correlation LM Test**

F-statistic	1.514282	Prob. F(2,47)	0.2305
Obs*R-squared	3.329518	Prob. Chi-Square(2)	0.1892

Level of significance 5%

Table 8 interprets the results of the Breusch-Godfrey Serial Correlation LM test. According to this test, the p-value of the F-statistic is 0.2305, which shows that the p-value is greater than the 5% level of significance. This result shows that there is no correlation.





**Table 6: Plot of Cumulative Sum of Recursive of Residual**

Figure 6 plots the cumulative sum of recursive residual. Red straight lines represent the critical boundaries at a 5% level of significance and horizontal lines show the observations. In the figure zigzag line lies between critical boundaries showing that our model is stable.

**Table 9**

Dependent Variable: HDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GIINDEX	-0.400506	0.084382	-4.746326	0.0000
PREMB	0.000478	0.000714	0.668670	0.5068
IUSER	0.001810	0.000502	3.608934	0.0007
TGDP	-0.000128	0.000253	-0.505862	0.6152
GEFFECT	0.048055	0.015047	3.193602	0.0025
C	0.788139	0.054199	14.54146	0.0000
R-squared	0.784888	Mean dependent var		0.663145
Adjusted R-squared	0.762938	S.D. dependent var		0.115072
S.E. of regression	0.056027	Akaike info criterion		-2.823280
Sum squared resid	0.153815	Schwarz criterion		-2.604298
Log likelihood	83.64020	Hannan-Quinn criter.		-2.738598
F-statistic	35.75763	Durbin-Watson stat		2.440510
Prob(F-statistic)	0.000000			

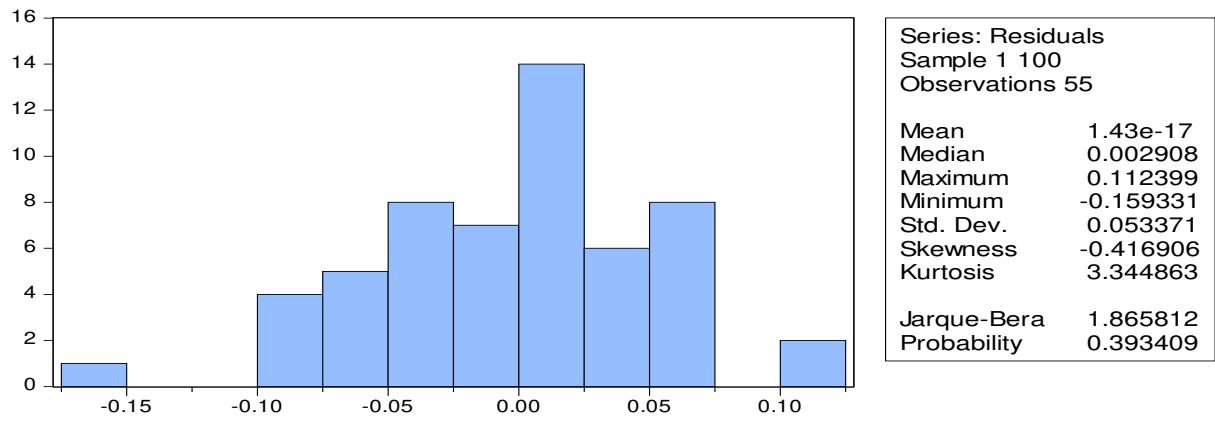
Level of significance 5%

Table 9 regression results interpret and which use human development index as a dependent variable and gender inequality index, personal remittances, internet users (per 100 people), trade as a GDP percentage, and government effectiveness. The coefficient of the gender inequality index is -0.400506 shows that there is a negative relationship between the gender inequality index and the human development index; if gender inequality increases by 1 unit human development decreases by 0.400506 units. The coefficient of trade as a GDP is -0.000128 highlighting that there is a negative relationship between trade as a GDP and the human development index and if trade increases by 1 unit then human development decreases by 0.000128 units.

The coefficient of personal remittances is 0.000478 billion dollars, the coefficient of internet users (per 100 people) is 0.001810, and the coefficient of government effectiveness (0.048055) shows that there is a positive relationship between the human development index and gender inequality index, personal remittances, internet users and government effectiveness. If personal remittances increase by 1 billion dollars then human development increases by 0.000478 units. If one internet user (per 100 people) increases, then human development increases by 0.001810 units. If government effectiveness increases by 1 unit then human development increases by 0.048055 units.

T-statistic of gender inequality index (-4.746326), t-statistic of internet users (3.608934), and T-statistic of government effectiveness (3.193602) which is greater than 2 show that our model is significant. The t-statistic of personal remittances (0.668670), and t-statistic of trade as a GDP percentage (-0.505862) which is less than 2 show that our model is insignificant.

R-squared (0.784888) shows that 78% variation in the human development index due to gender inequality index, personal remittance, internet users, trade as a GDP percentage, government effectiveness, and remains unexplained. The p-value of the F-statistic is 0.000000, which is less than  $\alpha$  shows that our model is overall significant.



**Table 9: Plot of the histogram to check the normality**

The plot of histogram through table 9 to check the normality and this figure shows that the average variation is 0.053371 and the p-value is 0.393409. Jarque-Bera test tells us the p-value is greater than  $\alpha$  which shows that our model is normally distributed.

**Table 10**

Heteroskedasticity Test: ARCH

F-statistic	0.202432	Prob. F(1,31)	0.6559
Obs*R-squared	0.214094	Prob. Chi-Square(1)	0.6436

Level of significance 5%

Table 10 interprets the results of the ARCH test of Heteroskedasticity. According to this test, the p-value of the F-statistic is 0.6559, which is greater than the 5% level of significance. The result shows that there is no Heteroskedasticity.

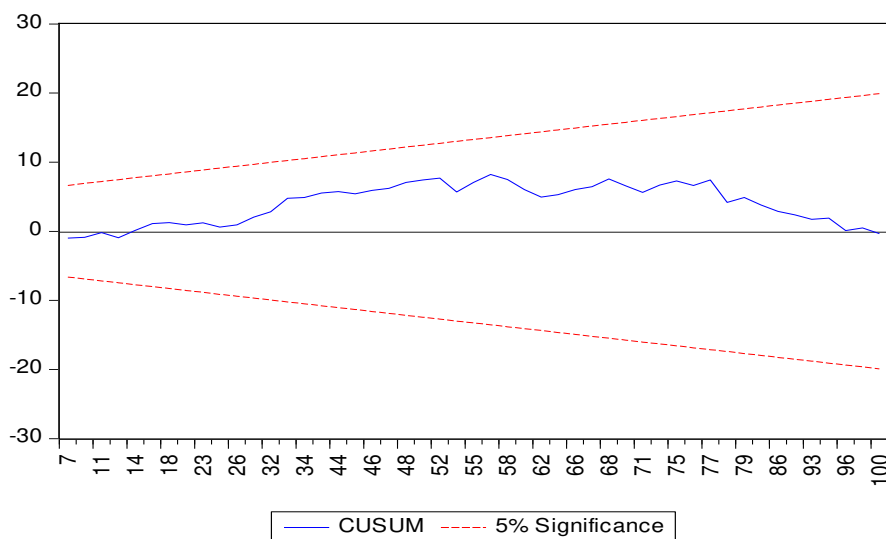
**Table 11**

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.727587	Prob. F(2,47)	0.1888
Obs*R-squared	3.766405	Prob. Chi-Square(2)	0.1521

Level of significance 5%

Table 11 interprets the results of the Breusch-Godfrey Correlation LM test. According to this test, the p-value of the f-statistic is 0.1888, which is greater than the 5% level of significance. Results show that there is no serial correlation.



**Table 9: Plot of Cumulative Sum of Recursive of Residual**

This figure draws through table 9 which shows that red straight lines represent the critical boundaries at a 5% level of significance and the horizontal lines show the observations. The zigzag line lies between critical boundaries which shows that our model is stable.

**Table 12**

Dependent Variable: HDI

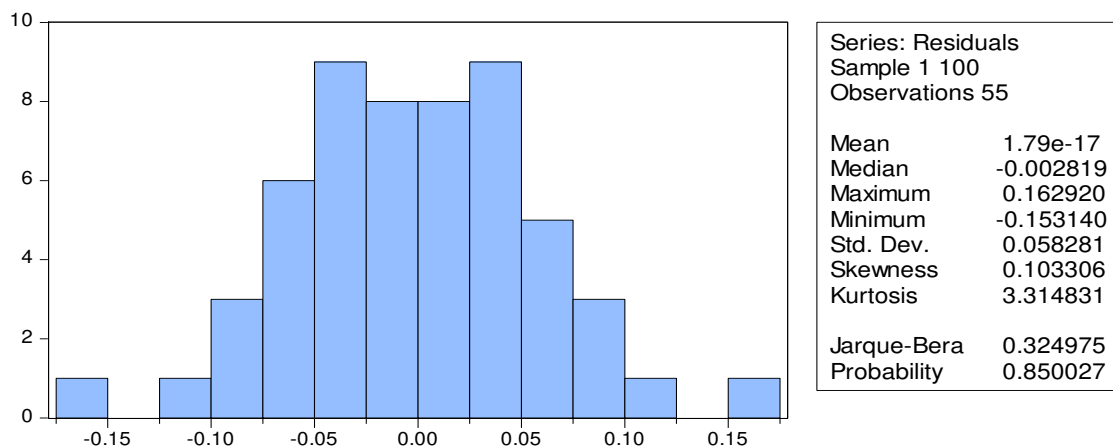
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GIINDEX	-0.535046	0.082192	-6.509725	0.0000
PREMB	0.000829	0.000770	1.076439	0.2870
IUSER	0.001705	0.000647	2.633676	0.0113
TGDP	-0.000139	0.000276	-0.502819	0.6173
RQUALITY	0.011924	0.014864	0.802194	0.4263
C	0.836145	0.062284	13.42464	0.0000
R-squared	0.743482	Mean dependent var		0.663145
Adjusted R-squared	0.717307	S.D. dependent var		0.115072
S.E. of regression	0.061183	Akaike info criterion		-2.647242
Sum squared resid	0.183422	Schwarz criterion		-2.428260
Log likelihood	78.79915	Hannan-Quinn criter.		-2.562560
F-statistic	28.40398	Durbin-Watson stat		2.307130
Prob(F-statistic)	0.000000			

Level of significance 5%

Table 12 regression results show that developing countries' human development index is used as a dependent variable and independent variables (gender inequality index, personal remittances, internet users (per 100 people), trade as a GDP percentage, and regulatory quality). The coefficient of the gender inequality index is -0.535046, which shows that there is a negative relationship between the human development index and the gender inequality index. If the gender inequality index increases by 1 unit then the human development index decreases by 0.535046 units. The coefficient of personal remittances is 0.000829 which shows that there is a positive relationship between personal remittances and the human development index, and if personal remittances increase by 1 billion dollars then the human development index increases by 0.000829 units. The coefficient of internet users is 0.001705, which shows that there is a positive relationship between internet users and the human development index, and if

internet users (per 100 people) increase by 1 unit then human development increases by 0.001705 units. The coefficient of trade as a GDP percentage is -0.000139 which shows that there is a negative relationship between the human development index and trade as a GDP percentage and if trade as a GDP increases by 1% then the human development index decreases by 0.000139. The coefficient of regulatory quality is 0.011924, which shows that there is a positive relationship between regulatory quality and human development index and if regulatory quality increases by 1 unit then the human development index increases by 0.011924.

The t-statistic of the gender inequality index is -6.509725 and the t-statistic of internet users (per 100 people) is 2.633676, which is greater than 2 and shows that our model is significant. The t-statistic of personal remittances is 1.076439, the t-statistic of trade as a GDP percentage is -0.502819, t-statistic of regulatory quality is 0.802194, which is less than 2 and shows that our model is insignificant. R-squared is 0.743482 which shows that 74% variations occur in the human development index due to gender inequality index, personal remittances, internet users, trade as a GDP percentage, and regulatory quality and remaining unexplained. The p-value of the F-statistic is 0.000000 which shows that our model is overall significant.



**Table 12: Plot of the histogram to check the normality**

The plot of the histogram through table 12 to check the normality and this figure shows that the average variation is 0.058281 and the p-value is 0.850027. Jarque-Bera test tells us the p-value is greater than  $\alpha$  which shows that our model is normally distributed.

**Table 13**

Heteroskedasticity Test: ARCH

F-statistic	0.023675	Prob. F(1,31)	0.8787
Obs*R-squared	0.025184	Prob. Chi-Square(1)	0.8739

Level of significance 5%

Table 13 interprets the result of the ARCH test of Heteroskedasticity. According to this test, the p-value of the f-statistic is 0.8787, which is greater than the 5% level of significance. The results show that there is no Heteroskedasticity.

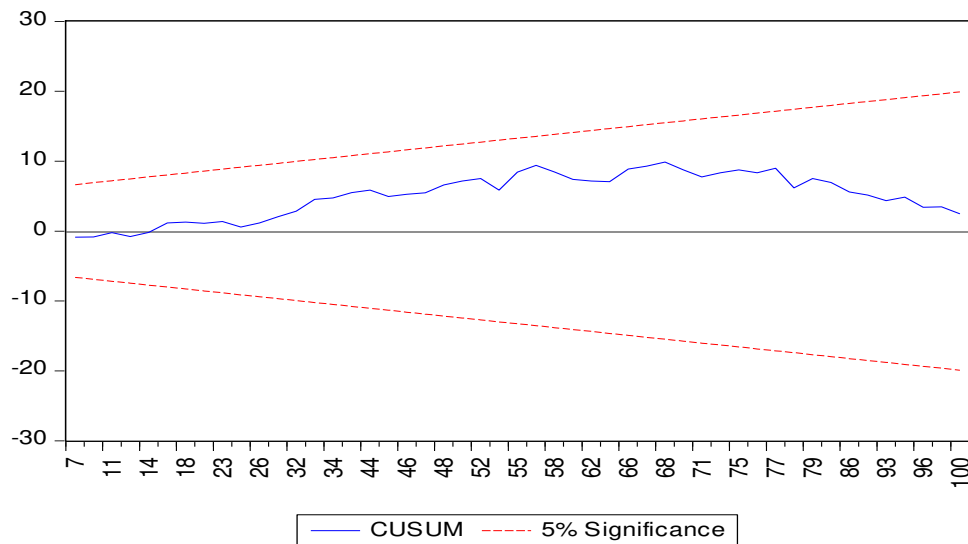
**Table 14**

Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.355208	Prob. F(2,47)	0.2678
Obs*R-squared	2.998826	Prob. Chi-Square(2)	0.2233

Level of significance 5%

Table 14 interprets the result of the Breusch-Godfrey Serial Correlation LM test. According to this test, the p-value of the f-statistic is 0.2678, which is greater than the 5% level of significance. The results show that there is no serial correlation.



In this figure, the red lines represent the critical boundaries at a 5% level of significance and the horizontal line shows the observations. The zigzag line lies between critical boundaries which shows that our model is stable.

## V. Conclusion and policy recommendations

This has been planned to investigate the role of remittances on human development in developing countries. Results show that gender inequality has a negative significant effect and trade as a GDP has a negative insignificant effect on human development. While remittances and regulatory quality have a positive insignificant effect, internet users (per 100 people), rule of law, and government effectiveness have a positive significant effect on human development. The role of remittances on human development has been the subject of broad research over the previous decade. This chapter summarizes the empirical results of the earlier chapters and provides the overall conclusions of the study. Some recommendations and policy suggestions are also presented in light of our

empirical results. The study was planned to investigate the role of remittances on human development in developing countries by using cross-sectional data. Data was taken from 100 developing countries including Afghanistan, Pakistan, Turkey, Bangladesh, Iraq, and China the annual period 2014. To find the role of remittances on human development cross-sectional regression was applied. We revised the earlier studies and investigated the role of remittances on human development and found mixed results. The different researcher has different point of view and the motive behind this research was to study remittances across human development in developing countries. Results show that gender inequality index and trade as a GDP negative impact on human development. Remittances have a positive and insignificant impact on human development while in previous studies positive and significant impact on human development (Ångman and Larsson 2014). So we justify that remittances are one factor but many factors increase human development. For example, foreign direct investment, official development assistance, Foreign aid, etc. These factors make a reason for the change in human development in developing countries and except remittances, other factors also affect human development. While internet users and institutional variables have a positive impact on human development. This paper finds gender inequality hurts human development in developing countries. Low gender inequality increases human development. Due to the lack of reliable data, the gender inequality index is available for one year and it is not possible to use it for time series analysis. Therefore, it is necessary to build a time series analysis, to provide a dynamic dimension to these results, and to take into account country-specific effects. When trade as a GDP increases then human development will decrease. Gender inequality has a negative correlation with human development. Finally results underlined that there is no serial correlation between remittances and human development and there is no Heteroskedasticity between remittances and human development.

The results of this study have extensive importance for policymakers. We can suggest to policymakers how remittances can extend human development, especially in developing countries. So for human development government need to reduce the cost of money transfer of foreigners to their home country.

- Particularly for Pakistan, we can suggest to the policymakers if government decrease the tax on money transfer then people will send their money through formal methods, and through this method, all transfer payments will be recorded.
- If the government reduces the difference between male and female literacy rate and provide equal rights then human development will increase.

- Trade as a GDP percentage hurts remittances to human development in developing countries. We can suggest to policymakers if developing countries promote exports and make the substitute for imported goods then we can increase human development.
- Institutional measurement has a positive impact on human development in developing countries. We can suggest to policy makers if in developing countries government will increase the strength of institutions then people will strictly follow the rules, investors will invest their capital and human development will increase and people send their cash through formal methods.

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