WORLDWIDE AND REGIONAL COMPARISON OF MACROECONOMIC DETERMINANTS OF HEALTH EXPENDITURES

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Dedication

This thesis is dedicated to my beloved parents,
elder brothers and sister who raised me up to
more than I can be

Certificate

This is to certify that the thesis titled "**Worldwide and Regional Comparison of Macroeconomic Determinants of Health Expenditures**" submitted by Muhammad Awais, Registration number 02091811003 is accepted in its present form by School of Economics, Quaid-i-Azam University, Islamabad, as satisfying all the necessary requirements for the partial fulfillment of the degree of Master of Philosophy in Economics.

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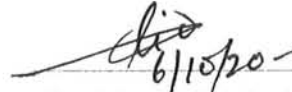University of Azad Jammu &
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Declaration Form

I **Muhammad Awais**, son of **Zahid Yunus**, Registration no: **02091811003**, Candidate of MPhil School of Economics, at Quaid-i-Azam University Islamabad, do hereby declare that the thesis **"Worldwide and Regional Comparison of Macroeconomic Determinants of Health Expenditures"** submitted for the partial fulfillment of Master of Philosophy (MPhil) degree in School of Economics, is my own work. All the error and omission are purely on my part and I also somberly pronounce that it will not be submitted for attaining any other degree in the future from any institution.

Muhammad Awais

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All the praises be to Allah Almighty for His blessings and guidance throughout my work. I wish to express my deep gratitude to Allah for giving me courage and strength to accomplish this task and bestowing me with the light of knowledge.

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List of Abbreviations

CHE	Current health expenditure
CO_2	Carbon dioxide
CO_2E	CO_2 emissions
DF	Demographic factors
DHE	Determinants of Health Expenditure
ECF	Economic factors
ECO	Economic cooperation organizations
EF	Environmental factors
ENV	Environmental variable
FDI	Foreign direct investment, net inflows
FEM	Fixed effect model
GLS	Generalized least square
HCE	Health care expenditure
HE	Health expenditure
IMR	Infant mortality rate
CBR	Crude birth rate
lGDP	GDP per capita, PPP
LIT	School enrollment, primary
LEB	Life expectancy at birth
LMICs	Low middle-income countries
MDGs	Millennium development goals
MEI	Medicare economic index
OECD	Organization for economic cooperation and development
OLS	Ordinary least square
PHCE	Public health care expenditure
POLS	Pooled OLS
POP	Population
POP65	Population ages 65 and above
PR	Personal remittances received
REM	Random effect model
RHCE	Real health care expenditure
SDGs	Sustainable development goals
TC	Transitional countries
TO	Trade openness

U.S.	United States
UNE	Unemployment, total
URB	Urban population
WB	World Bank
WDI	World development indicators
WHO	World health organization

Abstract

A notable boost in health expenditure is a serious concern for the world because of the increasing cost of health expenditure. Understanding the factors that cause growth in health expenditure is important. The fundamental target of the current analysis is to investigate the regional and global comparison of macroeconomic determinants of health expenditure. For the empirical analysis, the data was retrieved from the World Bank, covering the time span 2000-2016. The panel analysis indicates that personal remittances have a dual effect on health expenditure, positive impact on transitional economies, Europe & Central Asia, Middle East & North African and South Asia region while the negative impact on developing economies and Sub Saharan Region. In the same way, CO_2 emission has a positive impact on South Asia while negative on worldwide, developed countries, Europe, Central Asia, Middle East, North African, Latin America, the Caribbean and North America. In addition, trade openness has a negative impact on health expenditure globally including developed countries, Middle East & North African region.

Chapter 1

Introduction

1.1 Background of the Study

Good health is a fundamental worth to human pleasure and prosperity. Health performs a very crucial liability in financial growth. Consequently, healthy people live longer, more productive. In wellbeing spending, we composed all the expenditure which came from checkup, avoidance, sponsorship, treatment, society wellbeing actions, wellbeing management, and guideline and assets development with the significant goal of improving wellbeing.

The World Health Organization (WHO) characterized wellbeing that "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' and the enjoyment of the highest attainable standard of health as a fundamental human right" (WHO, 2018).

The main goal of the WHO is to accomplish the highest possible health. Since 1948, lots of things have been altered in worldwide health, the number of innovative projects and organizations are created that confront the directing and coordinating authority of WHO. The World Bank access to WHO plays a remarkable role in the 1980s in providing funds for establishing a new organization (Clift, 2013).

The United National General assembly decided to the Millennium Declaration in September 2000, by setting eight intentional growth goals to be accomplished until 2015. Among the eight three of the goals of MDGs were targeted toward health while health is an essential component than several other MDGs goals. On one side MDGs achieved a remarkable achievement but on the other side, they face several limitations like the limitation of focusing, bringing about virtualization of wellbeing and infection programs in nations (WHO, 2015).

In the presence of the dark side of MDGs, the United National General assembly adopted a new agenda in the year of 2015 for sustainable development. These new agenda cover all the three aspects of upheld development i.e. financial, public, and

are no such studies which explain the macroeconomic determinants in the broad picture-covering all the aspect of the factors which affect the health expenditure. Consequently, the present study is different in the sense that it covers all the factors i.e. the demographic, economic, and environmental factors which affect health expenditure. Further, the present study covers the macroeconomic determinants of wellbeing expenditure Worldwide, regional wise, and for developing transitional and developed countries.

1.3 Research Question

The present work is important in the sense to know the commitment of health in financial development. Health is believed to perform a significant role in refining the standard of living of the population. Therefore, this study trying to analyze the resulting research questions:

- What are the crucial or key determinants of health expenditure throughout the World, region, and transitional, developing, and developed countries?
- Are there any distinctions in the determinants of health expenditures Worldwide, regional wise, and for developing transitional and developed countries?

1.4 Objectives of the Study

Keeping in mind that wellbeing performs a fundamental role in educating the living condition of the populace. In general, the aspire of the work is to consider the link among macroeconomic variables on applying the panel data examination of income-based countries, regions wise and worldwide countries. The objective is to empirically explore the linkages between macroeconomic determinants with health expenditure. The detailed objectives of the study are:

- to explore the macroeconomic factors which affect health expenditure?
- to see if there is any difference in the list of variables which can affect health expenditures for the developing, transitional, and developed countries.
- to regional distinction in the macroeconomic determinants of the health expenditures.

determinants of health expenditure for the whole world, region, and for the developing, transitional, and developing countries.

1.7 Plan of the Study

For examination of the macroeconomic factors of health expenditure, the present study is categorized into six chapters. After the description of chapter 1, chapter 2 offers a detailed review of different studies regarding health expenditure, the impact of CO_2 emission, remittances, trade, and foreign investment. The methodology of the study is described in chapter 3 and chapter 4 explained the data sources, data description, and construction of the variables. In the last two chapters, we discussed the result, discussion, conclusion, and summary of the thesis.

consuming other family member's health. Each family member's utility increases form an increase in other family member's health (Lindgren, 2004).

Although, health is one of the influencing factors of the utility of the individual; however, it might be an especially important one. There is still an economic model that described the individual's optimal demand for health and factors that affect the individual's health-related behavior. The revolutionary work in the area of individual's demand for health was done by Grossman (1972), Grossman treated the demand for health in a dynamic setting where the individual was born with a certain level of health that depreciated over time unless the individual invested in health through various activities.

2.3 Determinants of health expenditure

For the first time, Newhouse (1977) examined the determinants of medical care in 13 developed economies. The finding of the study concluded that medical care expenditure is luxury because the elasticities of income are greater than one.

In another study, explore the income elasticity which is near to unity means wellbeing is basic rather than a luxury. The study further concluded that that 78.3% of the variation in wellbeing care spending is mainly due to GNP, birth attended by wellbeing staff, and external aid received per capita. And aid significantly related to health care expenditure (Gbesemete & Gerdtham, 1992).

In the same way, the outcomes of econometric examination of wellbeing expenditure demonstrate that the institutional aspect of the health framework. Further, GDP incorporates an important explanation of the health expenditure use variety between nations. Data was taken from 19 OECD countries in 1987 (Gerdtham *et al.*, 1992).

In the same year, Hitris and Posnett (1992) worked on the same channel to invention out the factors of wellbeing spending in 20 OECD economies from the period 1960-87. The result shows that GDP is the vital determinants of health outflow through expected income elasticity around unity. Further concluded that the effect of the non-income variable is small.

manipulated by the health of the populace in low-income nations and middle-income nations. Besides, one year of life expectancy increases the FDI by 9% managing all remaining variables. For this analysis, they used the mechanized and developing nations' data from the time 1980-2000.

In the same context, migrants' inflow of money has also a statistically important effect on wellbeing expenditure. Additionally, research also suggested that 10% of varies in remittances are committed to health spending. Data was taken from Mexico's national income expenditure survey of the household for the year 2004 (Gil, 2008).

Comparison of U.S and Canada health expenditure are useful because of their similarities and the study concluded based on data that was taken from OECD 2005a that the U.S ranked higher in health spending than Canada based on their administration cost (Spithoven, 2009).

Another study identified the link between wellbeing aid and child mortality. The study concluded that wellbeing aid is helpful and statistically important outcomes on infant death rate: doubling-up the health aid will reduce infant mortality by 2%. For this study, the data was taken from 118 countries between 1973 and 2004 (Mishra & Newhouse, 2009).

Remittances play an important role in growing health expenditure. For this breakdown Dorantes and Pozo (2009) worked on the responsibility of migrant's inflow of income on wellbeing care expenditure. This revision concluded that health expenditure raised by remittances about 6 pesos of every 100-peso increase in migrant income is used upon health. The response of remittance on health care expenditure is less in the lower-income household.

Additionally, remittances carry out a key role in the reduction of poverty in the recipient countries and remittances also have a constructive effect on literacy and health but this effect is constrained to exact groups of the population. Result based on nationally representative household surveys in Latin American economies (Acosta et al., 2007).

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Explore the effect of the external inflow of direct investment on human resources stock in the Central Asian Turkic Republic. Data was taken from 1999 to 2011 by applying panel OLS methodology. The outcome of the study concluded that FDI stock has insignificantly linked with education level which is used as a proxy for human assets investment (Yildirim & Tosuner, 2014).

In the same context investigated the effect of external direct investment on education, wellbeing, and social security. The result of the study shows that FDI inflow has a statistically momentous negative result upon literacy spending in only Asian economies, foreign direct investment inflow has a significant negative impact on health spending in Euro, OECD, and transition economies, for which the Latin country show positive and important results (Unver & Erdogan, 2015).

In addition to the panel data, they examine the impact of overseas inflow of direct investment on health. Based on their finding, they concluded that FDI and healthy relationship is nonlinear. FDI mainly depends upon the level of income: the result of FDI on wellbeing is positive in the case of low-income economies while the effect is decreasing in case of increasing income and the effect is negative in case higher level of income (Nagel *et al.*, 2015).

For the Swiss cantons, the study examined the driving force behind health care expenditure. Data was taken from 26 Swiss cantons from 1970 to 2012. The result shows that the unemployment rate, per capita income, and the contribution of foreigners were significantly connected to community wellbeing care spending (Braendle & Colombier, 2016).

In Saudi Arabia, the GDP and lagged health care spending were the two main features that affect wellbeing care spending, and due to these, 93.3% variations in the per capita wellbeing care spending. For this analysis, the study employs data from the period 1979 to 2013 (Farouk *et al.*, 2016).

The effect of remittances is not notably linked with the reduction of government health expenditure, but it is positively connected with outcomes like infant death rate and

of the study reflects that CO_2 emissions and economic development are positively associated with each other and the unidirectional association of causality from wellbeing spending to economic development (Ghorashi & Rad, 2017).

Providing an essential condition for fascinating FDI and promote health in developing economies. In the case of these economies the share of foreign inflow of investment in GDP, per capita physician, per capita income, registration in secondary courses, and population of urban improve the health indicator in the long term (Golkhandan, 2017).

Trade is a greater effect on those economies where there are less developed and high-income taxes. Furthermore, the result also explores that trade has an encouraging effect on health spending and there is long causality that exists in both directions between trade and life expectancy. For this analysis they employ panel data of 74 countries from the time spans 1960-2010 (Herzer, 2017).

The responsibility of atmosphere quality and financial expansion was explored in the aspect of factors of health spending in the Middle East and North African region. The study concluded that health spending, income, and PM10 are con-integrated. The long-run elasticity displays that there are positive statistical important effects of income, CO_2, and PM_{10} on health spending. Further, they explored that income is inelastic which shows that health spending is no more sensitive (Yazdi & Khanalizadeh, 2017).

The emission of carbon dioxide outcome on wellbeing spends. For this examination, they employ annual data of 50 U.S states taken from the period 1966 to 2009. The study concluded that the outcome of CO_2 emission on wellbeing worry was comparatively higher for the states that spent a huge amount of health expenditure (Apergis *et al.*, 2018).

Additionally, in another study, they explore the link between CO_2 emissions, health spending, and economic expansion. Yearly data from 1995 to 2017 was used. The outcomes of the study demonstrate that there is an important long-run affiliation that exists with CO_2, economic growth, and health spending. Granger causality test found that the relationship between CO_2 and health expenditure is bidirectional and further among wellbeing spending and economic growth and carbon emissions and growth.

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Urbanization is one of the driving forces behind the continual increase of health care expenditure (Toor & Butt, 2005; Rezaei *et al.*, 2016) while Abbas and Hiemenz (2011) concluded that population in urban has a negative effect on wellbeing care expenditure. In the same context average health expenditure of urban or lower than rural due to a lower likelihood of reporting illness (Rous & Hotchkiss, 2003). Moreover, education plays an important role in raising health expenditure. Literacy is an essential variable and significant relationship with healthcare expenditure (Toor & Butt, 2005). In the same manner, literacy is one of the driving services behind the continual growth in health expenditure (Rezaei *et al.*, 2016).

The health of the population strongly and positively influences the external direct investment in low and middle-income economies (Alsan *et al.*, 2006). Another study concluded that aid related to health is helpful and considerable effect on infant mortality and infant mortality decreases by 2% when health aids become double (Mishra & Newhouse, 2009). Foreign direct investment found is significant with a negative effect on health expenditure in developed countries (Herzer & Nunnenkamp, 2012). Additionally, foreign inflows of direct investment stock do not affect education level (Yildirim & Tosuner, 2014; Unver & Erdogan, 2015). Region-wise external investment has a statistically important and negative relationship with wellbeing spending in OECD, transitional countries, and in Euro while in Latin countries they show positive effect (Unver & Erdogan, 2015). Also, foreign direct investments have a significant positive impact on health spending in low-income countries (Nagel *et al.*, 2015).

Many studies show the significant positive impact of trade on life expectancy and infant mortality (Novignon & Atakorah, 2016; Herzer, 2017; Owen & Wu, 2002). Also, remittances as well have a statistically important effect on health expenses (Gil, 2008; Dorantes & Pozo, 2009). In the same context, remittances perform a crucial role in decreasing poverty in the beneficiary economies and a positive effect on literacy and wellbeing (Acosta *et al.*, 2007). Similarly, migrant's inflow of income has a momentous effect on medicine spending when illness occurs. Further, there is a positive and significant effect of remittances on health knowledge (Ponce *et al.*, 2011).

In the panel context, co-integration exists among health spending, income, and PM_{10} emission. Long run elasticity shows that there are positive statistically significant

Figure 3.1 Determinants of Health Expenditures
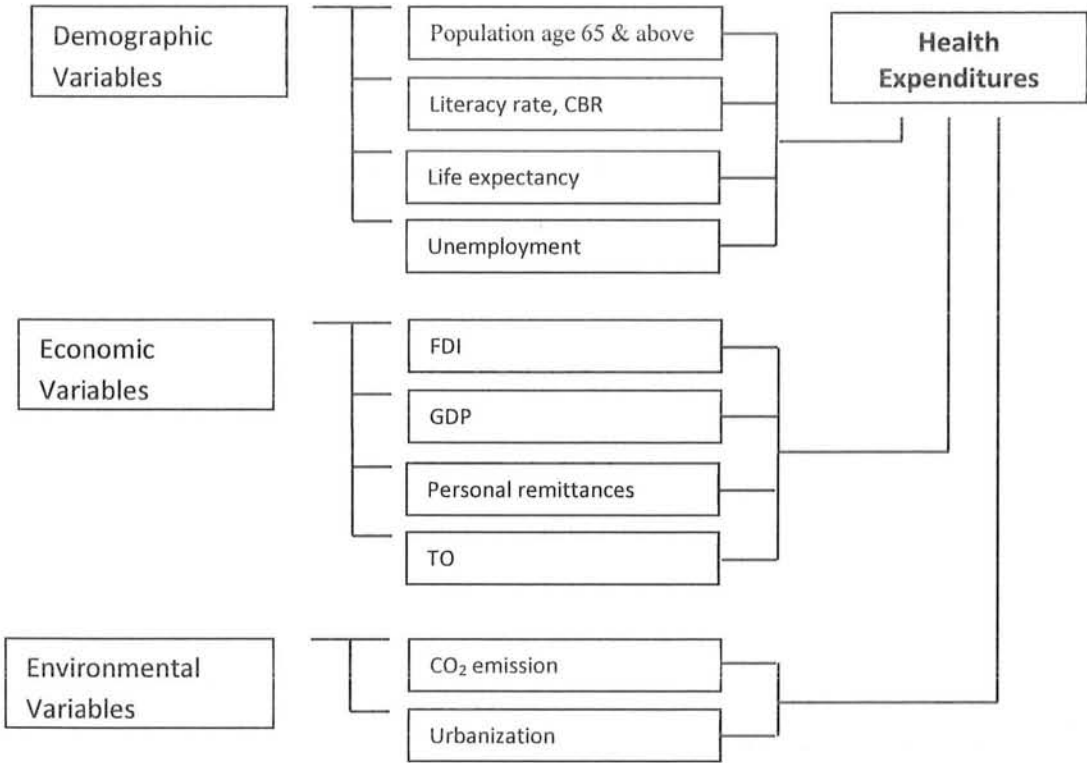
In the present study, we used the macro model and we incorporate vector X into sub-sectors vectors of demographic, economic and environmental variables.

$$h = f(Y, S, V) \tag{3.4}$$

Here, "h" is used for aggregate health expenditure, "Y" is the vector of economic factors (ECF), "S" is taken the vector of demographic factors (DF), and "V" is the vector of environmental factors (EF). By transforming the above equation to its scalar form, Equation (3) can be reworded as:

$$h = f(y_1, y_2, \ldots, y_n; \; s_1, s_2, \ldots, s_m; \; v_1, v_2, \ldots, v_j) \tag{3.5}$$

Where h is the current health expenditure, the classification of the above sub sectors vectors is shown table 3.2.

technique. Unlike cross-sectional analysis, the panel data methodology has been adopted because it has an advantage that to control for individual heterogeneity, more inconsistency, more degree of freedom and high efficiency and less co-linearity among the variables. Panel data also called cross-sectional time-series data and longitudinal panel data is a set of data of different entities in which characteristics and behavior of different groups are observed across the time.

Most of the time researchers examine panel data choose between FEM and REM. Panel data consist of unobserved heterogeneity because the mean of the dependent variables is not constant across the country and each country has its own special characteristics which may not be the same as other factors. It is allowed to control variables that are not possible to measure and or observe due to different cultural factors. For this purpose, we estimate the models with different techniques such as FEM, REM, and Pooled OLS in panel data. So, the present study estimated the panel data with well-known methods stated as Poole OLS, Fixed Effect Model and Random Effect Model.

The analysis is done for macroeconomic determinants of health expenditure and to see the impact of demographic, economic and environmental variables on health expenditure for the worldwide, for all regions and for the developing, transitional and developed countries. To check the heterogeneity in the balanced panel data we incorporate Pooled OLS, Fixed Effect Model and Random Effect Model.

3.4.1 Pooled OLS Model Approach

Pooled model regression undertakes the intercept similar for all countries and slope coefficients identical for all cross-sections. This axiom may distort the accurate image of the association between exogenous and endogenous. However, if the model is definite correctly and E.V are uncorrelated with error term then OLS can be used to estimate the model and results are consistent.

3.4.2 Fixed Effect Model

The FEM is used in analyzing the effect of variables that are not constant over time. To see the impact of the exogenous variable and endogenous variables, FE model is considered. Each group has individual characteristics that may or may not have an influence on the interpreter variables. One of the assumptions of F.E model is that the error term of the entity and the interpreter variables have not correlated each other, and

Chapter 4

Data and Variables Discussion

4.1 Introduction

Data is processed gathering and breaking down any data for any discussion and reasoning's. It is an essential step for a researcher to approve the findings. The improper and incorrect collection of data will lead to an unwanted result.

Therefore, the consistency and validity of data play a significant role in the completion of successful research. Therefore, the present chapter explains the data source for the analysis of the study. The detail explanation of data and variables are discussed in this section. The sample consists of 132 selected countries on the basis of regions, developed, developing, and transitional countries. The current health expenditure is the endogenous variable of the study and the exogenous variables are foreign direct investment, trade openness, CO_2 emission, personal remittances, urbanization, GDP per capita, crude birth rate, unemployment, population age 65 and above, life expectancy at birth, and literacy. The time is taken from 2000-2016 and yearly data is extracted from World Development Indicators (WDI). Section 4.2 gives details about the data source and 4.3 and 4.4 provide descriptions of the variables and descriptive statistics for a better understanding of the data, respectively.

4.2 Data and Data Source

For the empirical analysis panel data is formed and countries are selected on the bases of data availability. The classification of countries in Table 4.1 is according to the World Bank, shows the categorization of countries on the basis of region.

Table 4.3 Variable Description

Variables:	Code:	Description:
Current health expenditure (% of GDP)	CHE	The level of current H.E is stated as a percentage of GDP. H.E includes the consumption of wellbeing care goods and services throughout each year and does not comprise capital health expenditure.
Foreign direct investment, net inflows (% of GDP)	FDI	FDI is the net inflow of investment. Net inflow is got from the FDI is divided by GDP. FDI is the sum of equity capital, reinvestment of earnings, long term capital and short term capital, which is revealed in the balance of payment.
GDP per capita, PPP (constant 2011 international $)	lGDP	GDP per capita depends on obtaining power equality since GDP changed over into worldwide dollars using buying power equality rates. Gross domestic product is the aggregate of definite worth included by every single inhabitant maker in the economy and any item imposes, less endowments that are given to the items. It is determined without reasoning's for deterioration and debasement of normal assets. Information are consistent at 2011 worldwide dollars.
Birth rate, crude (per 1,000 people)	lCBR	CBR shows the quantity of live births occurring during the year, 1,000 populaces expected at midyear. Rough passing rate less from unrefined birth rate so it gives the common increment and its equivalent to the pace of populace changes without movement.
Life expectancy at birth, total years	lLEB	LEB shows the quantity of years an infant kid would live. Winning examples of mortality at the hour of birth were to remain the equivalent all through its lifetime period.
Personal remittances received (% of GDP)	PR	PR include personal transfers and reimbursement of employees. P.T consist of all current transfers in cash or in-kind made or received by resident households to or from nonresident households. Reimbursement of employees discusses to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not peoples and of populaces employed by nonresident entities.
Trade (% of GDP)	TO	Trade percentage of GDP is likewise called trade openness. It shows the transparency of an economy comparative with universal exchange. Exchange transparency is the entirety of imports and fares of an economy and the extent of the nation's GDP.
Population ages 65 and above (% of the total population)	POP65	The period of populace 65 or over 65 is the level of the complete populace, in view of true meaning of populace. It tallies all residuals paying little mind to legitimate status or citizenship.
Urban population (% of total population)	URB	National statistical officer defines urbanization as urban population discusses to people living in urban areas. United Nations Population Division collected the data and makes its smother.
CO_2 emissions (metric tons per capita)	CO2E	The fiery of fossil fuels and cement manufacturing result in CO_2 emission. Liquids, solids, gas fuels and flare stack used for the consumption of the manufacturing process. Its harmful gas directly affecting the health of people and is estimated by dividing per year total national CO_2 emissions by the total population.
Unemployment, total (% of the total labor force) (modeled ILO estimate)	UNE	Unemployment mentions to the part of the labor force that is deprived of work but obtainable for and looking for employment.
School enrollment, primary (% gross)	LIT	Gross enrollment ratio is the share of whole enrollment, irrespective of age, to the populace of the age group that officially links to the level of education shown.

Source: World Development Indicators (WDI

4.3 Descriptive Statistics

For the empirical study, the description of data is the precise form is essential because the descriptive coefficient gives a summary of the data set. It is representative of the sample for the given population. It allows the reader to extract the required information from the data so the accurate and appropriate information can be extracted from the sample.

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Chapter 5

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RESULTS AND DISCUSSION

5.1 Introduction

To analyze the macroeconomic determinants of health expenditure this study incorporates different econometrics tests and techniques. In the first section, the study provides the outcome of panel regression analysis for overall countries comprises POLS, FEM, and REM.

The chapter is distributed into sub sections. Section 5.2 comprises the exploratory analysis of different regions and income based categorized countries. Section 5.3 presents the outcomes of the panel regression and 5.3.1 demonstrate the macroeconomic determinants of health expenditure worldwide. Section 5.3.2, 5.3.3 and 5.3.4 shows the result of macroeconomic determinants of health expenditure of developed, transitional and developing countries respectively. Further section 5.3.5 to 5.3.10 demonstrates the macroeconomic determinants of health expenditure for all region i.e. East Asia, Pacific, Europe & Central Asia, Middle East & North Africa, South Asia, Sub-Saharan Africa, and Latin and North America and the Caribbean correspondingly. Furthermore, the section 5.4 and 5.5 explain the comparison analysis of regions and income categorized countries' and 5.6 gives a short summary of the chapter.

5.2 Exploratory Analysis

Before moving toward empirical analysis, we would like to perform exploratory analysis on our data. The Figure 5.1 gives the detail information about the different regions of their contribution toward total health expenditure. And Figure 5.2 provides the detail information of developed, developing and transitional countries contribution toward total health expenditure.

contribution toward health expenditure is greater in developed countries than transitional countries.

5.3 Results based on panel regressions

The impact of demographic, economic and environmental DHE can be inferred on the basis of a various well-known method which is "Pooled Ordinary least square (POLS), Fixed Effect Model (FEM) and Random Effect Model (REM)".

5.3.1 Result of Macroeconomic Determinants of Health Expenditure Worldwide

The empirical outcome of the models for the panel of worldwide countries is offered in Table 5.1. The model shows the linkage among endogenous variable health expenditure and with exogenous variables i.e. FDI, PR, trade openness, gross domestic product, carbon dioxide, urbanization, literacy, LEB, crude birth rate, unemployment and percentage of populace age above 65.

The F-statistics of the overall goodness of fit model shows whether the linear regression is a better fit for overall data. The null hypothesis states that the model is not a good fit conflicting to the other that the model having an independent variable is a good fit. The variable which we have included in the model is generally a good fit and improves the overall significance of the model. If the considered value is greater than the F-statistics, we reject the null hypothesis and admit the alternative. Generally, the P-value is determined by the F-statistics therefore, we have considered the F-statistics while interpreting the model.

In choosing between the Pooled OLS (POLS) model and the Random effect model (REM) the P-value is less than 0.05. So, chi-square rejects the null hypothesis i.e. POLS is preferred over fixed effect and accepts the alternative hypothesis that is the REM is preferred over the POLS model. Likewise, deciding between POLS and REM, the value of the Breusch-Pagan test indicates that the REM performs better than POLS models. The last Hausman test is employed between the FEM and the REM. The P-value of chi-square shows that the FEM is relatively better in all cases. Diagnostic tests indicated that, in all the specifications, the FEM performs better than the POLS model and REM model. In the FEM of Table 5.1, we get that there is a significant and negative

While the role of literacy in increasing HE is very significant. According to Rezaei *et al.* (2016), higher the education level in the society leads to more awareness about health which lead to a rise in the consumption of healthcare services. Our empirical result shows that 1% increase in literacy will lead to an increase the HE by 0.00745% and this result is bear by the following studies (Toor & Butt, 2005). Likewise, the effect of life expectancy at birth is highly significant at 1% level of significance. Life expectancy increases the share of the population of the elderly and positively associated with HE. The empirical analysis shows that 1% increase in life expectancy will lead to a rise in the health expenditure by 5.195%. This positive association is supported by the following studies (Akca *et al.*, 2017).

Similarly, the effect of the crude birth rate is significant at 5% level of significance. Crude birth rate increases the maintenance cost of given health. So, our result shows that 1% increase in crude birth rate, will lead to rise the health expenditure by 0.860%. This positive relationship is supported by (Leu, 1985; Toor & Butt, 2005). In the same way, the effect of unemployment is highly significant at 1% level of significance. Unemployment is positively related to HE due to the low level of income which leads to a low level of basic consumption. The empirical result shows that 1% increase in UNE will lead to an increase the HE by 0.0370% and this result is supported by (Braendle & Colombier, 2016). Further, health expenditure is positively related to the age of POP. The result of the percentage of the POP above 65 is highly significant at 1% level of significance. The result shows that 1% increase in the age of population above 65 will lead to a rise the HE by 0.382%. Our result is in accordance with (Murthy & Okunade, 2016).

5.3.2 Result of Macroeconomic Determinants of Health Expenditure in Developed Countries

The observed result of the models for the panel of developed countries is presented in Table 5.2. The model shows the link between dependent variable wellbeing expenditure and with independent variable i.e. FDI, PR, TO, GDP, carbon dioxide, urbanization, literacy, LEB, CBR, UNE, and percentage of POP age above 65.

The F-statistics demonstrates whether the linear regression is better on overall data or not. The null hypothesis states that the model is not a good fit conflicting to the

literacy, LEB, CBR, UNE and POP above 65 have a positive and significant relationship with HE.

The effect of TO is significant at 1% level of significance with the negative sign which is contradictory to the theory, according to the theory TO leads to rise HE (Herzer 2017). The empirical result shows that 1% TO will lead to a decrease in the HE by -0.0134%. And result is supported by (Wang *et al.*, 2019). Similarly, the effect of CO_2 emission is significant at 1% level of significance with negative. The empirical analysis shows that 1% increase in CO_2 emission it will lead to a decrease in -0.168% HE. The negative relationship between CO_2 emission and HE is supported by the following studies (Lu *et al.*, 2017; Boachie *et al.*, 2014).

While, the countries with good financial infrastructure have more information about the importance of health care and give the highest priority to health care more than other priorities (Samadi & Rad, 2003). The effect of GDP is significant at 1% level of significance and the sign is according to the theory. The result of the present study shows that 1% rise in GDP will lead to rising the HE by 1.708%. And our result our accordance with (Braendle & Colombier, 2016; Murthy & Okunade, 2016). The effect of GDP is significant at 1% level of significance and the sign is according to the theory. According to Toor and Butt (2005), URB followed by the appearance of overcrowding shantytowns with insufficient sanitary conditions, overcrowding and industrialization air pollution. Therefore, we expected that URB positively related to health expenditure. So, our result shows that 1% increase in URB will lead to the growth of the HE by 0.121%. The positive relationship is supported by Rezaei *et al.* (2016).

Likewise, literacy has a positive significant impact on HE because awareness of health came from education. So, the present study shows the positive link between literacy and HE by rising 1% in literacy it will lead to increase health expenditure by 0.0246%. The reason behind this positive relationship is that higher literacy in the society would increase the utilization of health care services because education promotes or improved awareness. Our result is supported by (Toor & Butt, 2005). In addition, the role of life expectancy is positive on HE because in the population the ration of the elder POP is increasing. The empirical analysis shows that 1% rise in LEB will lead to an increase

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Table 5.3 Result of Macroeconomic DHE in Transitional Countries

Variables	Pooled OLS		FEM		REM	
	Coefficient	t-values	Coefficient	t-values	Coefficient	t-values
FDIgdp	0.0108	(0.80)	0.0363*	(2.46)	0.0261	(1.89)
PRgdp	0.0488***	(4.02)	0.0349*	(2.48)	0.0457***	(3.53)
TOgdp	0.0000303	(0.01)	0.000990	(0.20)	0.00154	(0.33)
lGDPPP	-0.0281	(-0.19)	0.359	(0.67)	0.330	(1.32)
CO2Emetric~C	-0.0210	(-0.43)	-0.147	(-1.43)	-0.0945	(-1.19)
URBtotalPOP	-0.0866***	(-5.36)	-0.0796	(-1.26)	-0.0778*	(-2.15)
LIT	-0.0419*	(-2.52)	-0.0185	(-1.13)	-0.0113	(-0.73)
lLEB	5.244	(1.73)	11.27	(1.69)	9.778*	(2.27)
lCBR	-2.025***	(-3.95)	0.623	(0.56)	-0.444	(-0.53)
UNEtotalla~e	-0.00192	(-0.11)	0.0977**	(2.80)	0.0664*	(2.39)
POP65total~p	0.253***	(4.66)	0.0134	(0.08)	0.217*	(2.10)
Constant	-3.905	(-0.28)	-47.25*	(-2.22)	-40.13*	(-2.34)
t	17		17		17	
n	14		14		14	
N	210		210		210	
F-stat [Wald χ^2]	28.29		4.61		66.90	
P-value	0.0000		0.0000		0.0000	

Diagnostic Tests		
	Breusch and Pagan LM test	Hausman test
Prob. > chibar2	0.0000	0.7572

Source: Authors own calculations t-values are in parenthesis, whereas, ***, **, * indicates at 1%, 5% & 10% level of significance, respectively. Note: Breusch and Pagan LM test: Ho: pooled is better than random effect model, H1: Random effect is better than Pooled OLS. Hausman test: Ho: random is better than fixed, H1; Fixed effect is better than Random effect.

In choosing between the Pooled OLS and Random effect model is based upon the P-value. So, if P-value is less than 0.05 then chi-square rejects the null hypothesis i.e. Pooled OLS is preferred over Fixed effect model and accepts the alternative hypothesis that is the Random effect model is preferred over the Pooled OLS model. Furthermore, deciding between Pooled OLS and Random effect model, the value of the Breusch-Pagan test indicates that the Random effect model executes better than Pooled OLS models. Although, the selection between the Fixed effect model and Random effect model based on the Hausman test. The P-value of chi-square shows that the Random effect model is relatively better in all cases. Diagnostic tests indicated that, in all the specifications, the Random effect model performs better than the Pooled OLS model and Fixed effect model.

In the final model, we get a significant positive association between HE and PR, life expectancy at birth, UNE and POP age 65 and above 65 while URB has a significant negative association with HE. The effect of PR is highly significant at 1% level of significance level and the sign of remittances is according to the theory. According to Thoumi, (2016) remittances are used for a variety of reasons for instant consumption

model and third model, we incorporated the environmental i.e. CO_2 and URB and demographic variables (primary enrollment, Life expectancy at birth, crude birth rate, and unemployment and POP age above 65).

The F-statistics shows whether the linear regression is a better fit for overall data or not. The null hypothesis consists of a statement that the model is not a good fit against the AH that the model is a good fit. It shows that the variables which we have included in the model are generally a good fit and improves the overall importance of the model. We rejected the null hypothesis if the calculated value is greater than the F-statistics and accept the alternative.

The Breusch-Pagan test is used to select the model between POLS and REM. The selection of the model is based upon the P-value is less than 0.05 then chi-square reject the null hypothesis i.e. POLS is preferred over Random effect model and accept the alternative hypothesis that is the REM is preferred over the POLS model. While the selection between the Fixed effect model and the REM based on the Hausman test. The P-value of chi-square shows that the FEM is relatively better in all cases. Diagnostic tests indicated that, in all the specifications, the FEM performs better than the Pooled OLS model and FEM model. In the concluding model of Table 5.4, we obtained that FDI, PR, and URB have a negative relationship with HE while literacy, LEB at birth and POP above 65 have a positive association with HE.

The result of foreign direct investment shows that FDI is significant at 10% level of significance level and the sign is contradictory to the theory. According to Herzer and Nunnenkamp (2012) foreign direct investment has direct effect within firms, economy-wide while indirect effects on wellbeing could follow from FDI-induced growth to the extent that higher average incomes result in more demand for wellbeing services. Our result shows that 1% increase in FDI will lead to -0.0202% will lead to a reduction in HE. And our result is in accordance with (Unver & Erdogan, 2015).

The effect of remittances is significant at 10% level of significance level and the sign is contradictory to the theory, which is presented by Thoumi (2016) remittances are used for different reasons either for instant consumption or for long term consumption in human development. Our empirical result stated that 1% rise in PR will lead to a

the prime importance of increasing health expenditure. Those above 65 years of age population consume more medical services than others. The effect of the population is highly significant at 1% level of significance and sign is according to the theory that HE mainly associated with the elderly POP (Han *et al* (2013). Our empirical result shows that 1% increase in age of population above 65 leads to raising the health expenditure by 0.421%. The result is supported by (Murthy & Okunade, 2016).

5.3.5 Result of Macroeconomic Determinants of Health Expenditure in East Asia & Pacific Region

The empirical result of models for the panel of East Asia & Pacific region is presented in Table 5.5. The first model shows the association among dependent variable (HE) and independent variables i.e. FDI, PR, TO, and GDP. In the second model and third model, we incorporated the environmental i.e. carbon dioxide and urbanization and demographic variables (primary enrollment, LEB, crude birth rate, and unemployment and POP age above 65).

The null hypothesis of F-statistics states that the model is not a good fit against the AH that the model having an exogenous variable are a good fit. The F-statistics of the overall goodness of fit model shows whether the linear regression is a better fit for overall data. The variables which we have included in the model are generally a good fit and improve the overall significance of the mode. The criteria are if the a=considered value is superior to the F-statistics we reject null hypothesis and accept the alternative hypothesis.

In choosing between the POLS model and the REM the P-value is less than 0.05. So, chi-square rejects the null hypothesis i.e. POLS is preferred over REM and accepts the alternative hypothesis that is the REM is preferred over the POLS model. While deciding between POLS and REM, the value of the Breusch-Pagan test indicates that the REM performs better than POLS. The last Hausman test is hired among the FEM and the REM. The P-value of chi-square shows that the REM is relatively better in all cases. Diagnostic tests indicated that, in all the specifications, the REM performs better than the POLS and FEM. The final model of Table 5.4 shows that only URB and a POP above 65 have a relationship with HE. And we get the significant negative signs of urbanization and a significant positive sign of population above 65.

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in the final model, we incorporated the environmental variables i.e. and demographic variables (primary enrollment, LEB at birth, CBR, and unemployment and population age above 65).

Table 5.6 Result of Macroeconomic DHE in Europe & Central Asia Region

Variables	Pooled OLS		REM		FEM	
	Coefficient	t-values	Coefficient	t-values	Coefficient	t-values
FDIgdp	0.00164	(0.38)	0.00241	(0.93)	0.00232	(0.90)
PRgdp	0.0827***	(8.78)	0.0387***	(4.47)	0.0415***	(4.52)
TOgdp	0.00278	(1.89)	-0.00143	(-0.76)	-0.00271	(-1.26)
lGDPPP	0.143**	(3.10)	-0.0229	(-0.19)	-0.227	(-0.78)
CO2Emetric~C	-0.118***	(-6.09)	-0.139***	(-4.52)	-0.183***	(-4.79)
URBtotalPOP	0.00340	(0.61)	0.0185	(1.30)	0.0155	(0.59)
LIT	-0.00325	(-0.30)	0.0108	(1.33)	0.00924	(1.13)
lLEB	19.09***	(17.07)	11.35***	(5.16)	9.706**	(3.10)
lCBR	-0.242	(-0.69)	1.126**	(2.67)	1.871***	(3.72)
UNEtotalla~e	-0.0171	(-1.72)	0.0353**	(3.13)	0.0411***	(3.32)
POP65total~p	0.113***	(4.00)	0.196***	(4.66)	0.213***	(4.20)
Constant	-79.30***	(-16.72)	-48.29***	(-5.84)	-37.28***	(-3.81)
t	17		17		17	
n	45		45		45	
N	675		675		675	
F-stat [Wald χ^2]	77.89		296.46		23.25	
P-value	0.0000		0.0000		0.0000	
Diagnostic Tests						
	Breusch and Pagan LM test				Hausman test	
Prob. > chibar2	0.0000				0.0004	

Source: Authors own calculations t-values are in parenthesis, whereas, ***, **, * indicates at 1%, 5% & 10% level of significance, respectively. Note: Breusch and Pagan LM test: Ho: pooled is better than random effect model, H1: Random effect is better than Pooled OLS. Hausman test: Ho: random is better than fixed, H1; Fixed effect is better than Random effect.

The F-statistics of the overall goodness of fit model shows whether the linear regression is a better fit for overall data. The variables which we have comprised in the model are usually a good fit and improve the overall significance of the model. The null hypothesis of F-statistics states that the model is not a good fit conflicting to the AH that the model having an independent variable is a good fit. The criteria are if the considered value is greater than the F-statistics we reject the null hypothesis and accept the alternative hypothesis.

In choosing between the POLS model and the REM the P-value is less than 0.05. So, chi-square rejects the null hypothesis i.e. POLS is preferred over REM and accepts the alternative hypothesis that is the REM is preferred over the POLS model. While deciding between POLS and REM, the value of the Breusch-Pagan test indicates that the REM performs better than POLS models. The last Hausman test is employed

of illness (Forbes and Mcgregor, 1984). The result shows that 1% rise in UNE will lead to a rise in HE by 0.0411 %. Our result is supported by Braendle & Colombier, (2016). In addition, the POP age above 65 exerts a positive effect on health expenditure. The effect of population age above 65 is highly significant at 1% level of significance level and the sign is according to the theory that the population above 65 consumes more health services than others (Toor & Butt, 2005). The empirical outcome shows that 1% rise in the age of the population will lead to an increase in health expenditure by 0.213%. The result is supported by Murthy & Okunade, 2016.

5.3.7 Result of Macroeconomic Determinants of Health Expenditure in the Middle East & North Africa Region

The empirical result of the models for the panel of the Middle East & North Africa region is presented in Table 5.7. The model shows the association among endogenous variable HE and exogenous variables i.e. FDI, and PR, TO, GDP, CO_2 and urbanization, literacy, LEB, CBR, and UNE and percentage of POP age above 65.

The F-statistics shows whether the linear regression is a better fit for overall data or not. The null hypothesis and alternative hypothesis consist of a statement that the model is not a good fit against the AH that the model is a good fit. It shows that the variables we added in the model are generally a good fit and improve the overall significance of the model. We rejected the NA if the calculated value is greater than the F-statistics and accept the alternative.

In choosing between the Pooled OLS (POLS) model and the Random effect model (REM) the P-value is greater than 0.05. So, chi-square rejects the AH i.e. REM is preferred over the POLS model and accepts the null hypothesis i.e. POLS is preferred over REM. While deciding between POLS and REM, the value of the Breusch-Pagan test indicates that the POLS performs better than a REM. In the final model, Table 5.7. The final model shows that PR, URB, literacy and POP have a significant positive association with HE while trade openness, CO_2 emission, crude birth and unemployment have a significant negative association with HE.

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insufficient sanitary conditions, overcrowding and industrialization air pollution. Therefore, we expected that urbanization positively related to health expenditure (Toor & Butt, 2005). The effect of urbanization is highly significant at 1% level of significance and the sign is positive. So, our result shows that 1% rise in urbanization will lead to an increase in the HE by 0.0292%. The positive relationship is maintained by Rezaei *et al.* (2016).

In addition, literacy is a positive significant impact on HE because higher the literacy rate in society will lead to improve wellbeing awareness and raise the utilization of health care services. Our empirical result demonstrates that 1% increase in literacy will lead to increase health expenditure by 0.0611% and this result is supported by (Toor & Butt, 2005). In the same way, the relationship between crude birth rate and health expenditure is negative which is contradictory to the theory. According to Toor and Butt, (2005) by increasing the crude birth rate will increase the maintenance cost, so that's why it is positively related to HE. The empirical result shows that 1% rise in the CBR will lead to a decrease in the HE by -0.871%.

Likewise, unemployment is significant at 5% level of significance. The outcome shows that 1% rise in unemployment will lead to a reduction in the HE by -0.0661%. The result is contradictory to the theory that unemployment leads to a lack of consumption of basic goods and services which in turn increases the risk of illness (Forbes & Mcgregor, 1984). In addition, the population age above 65 exerts a positive effect on HE. The result of the POP age above 65 is highly significant at 1% level of significance. The empirical result shows that 1% rise in the age of the population will lead to an increase in health expenditure by 0.531%. The result is supported by Murthy & Okunade (2016).

5.3.8 Result of Macroeconomic Determinants of Health Expenditure in South Asia Region

The empirical result of the models for the panel of the South Asia region is presented in Table 5.8. The first model shows the affiliation between endogenous variable health expenditure and exogenous variables i.e. FDI, PR, TO, and GDP. In the second model, we incorporate carbon dioxide and urbanization (environmental variables) and in the

The result of personal remittances is significant at 10% level of significance and sign is according to the theory that remittances are utilized for instant consumption or it is used for future investment in human development. The result of remittances shows that 1% rise in remittances will lead to an increase in the HE by 0.0581%. These present results supported by (Gil, 2008; Dorantes & Pozo, 2009; Ponce *et al.*, 2011). While the effect of GDP is highly significant at 1% level of significance, but the sign is negative which is contradictory to the theory. The empirical result shows that 1% increase in GDP will lead to a decrease in the HE by -0.378%. Our result is supported by (Wang *et al.*, 2019).

Similarly, the effect of CO_2 emission is highly significant at 1% level of significance. The result shows that 1% increase in CO_2 emission will lead to raising the HE by 2.994%. Our results are in accordance with the theory that CO_2 emission leads to increase economic growth which leads to increase health expenditure and which is supported by (Yazdi & Khanalizadeh, 2017; Wang *et al.*, 2019; Ali *et al.*, 2019; Chaabouni *et al.*, 2014; Beatty & Shimshack, 2014; Narayan *et al.*, 2008). In the same way, urbanization also shows a negative association with HE. The empirical result shows that 1% rise in urbanization will lead to a decrease in the HE by -0.113%. The variable urbanization is highly significant at 1% of significance level and this outcome is supported by Cumper (1984), Siddiqui *et al.* (1995).

5.3.9 Result of Macroeconomic Determinants of Health Expenditure in Sub-Saharan Africa Region

The empirical result of the models for the panel of the Sub-Saharan Africa region is shown in Table 5.9. The first model shows the association between endogenous variable HE and exogenous variables i.e. FDI, PR, TO and GDP. In the second model, we incorporate carbon dioxide and urbanization (environmental variables) and in the final model, we incorporated the environmental variables i.e. and demographic variables (primary enrollment, LEB, CBR, and unemployment and POP age above 65).

The F-statistics of the overall goodness of fit model shows whether the linear regression is a better fit for overall data. The null hypothesis states that the model is not a good fit next to the AH that the model having an independent variable is a good fit. So, if the considered value is bigger than the F-statistics we reject the null hypothesis and accept the AH.

empirical result shows that 1% rise in URB will lead to a decrease in the HE by -0.102%. The variable urbanization is highly significant at 1% of significance level and this outcome is maintained by Cumper (1984), Siddiqui *et al*. (1995).

While the effect of literacy is highly significant at 1% of significance level with positive sign according to theory. Higher education levels in society would help people to improve their health because education promotes awareness and raise the utilization of health care. So, the present study shows the positive relationship between literacy and HE by rising 1% in literacy it will lead to increase health expenditure by 0.027% and this result is supported by (Toor & Butt, 2005).

5.3.10 Result of Macroeconomic Determinants of Health Expenditure in Latin America & Caribbean& North America Region

The empirical outcome of the models for the panel of Latin-America, Caribbean & North America region is presented in Table 5.10. The model shows the link between health expenditure as endogenous variable and exogenous variables i.e. FDI, PR, TO, GDP, CO_2 emission, URB, LIT, LEB, CBR, UNE, and POP above 65.

The null hypothesis states that the model is not a good fit against the AH that the model having an independent variable is a good fit. The variable which we have included in the model is generally a good fit and improves the overall significance of the model. If the considered value is greater than the F-statistics, we reject the null hypothesis and accept the alternative hypothesis. Generally, the P-value is determined by the F-statistics therefore, we have considered the F-statistics while interpreting the model.

In choosing between the POLS and REM is based upon the P-value. So, if P-value is less than 0.05 then chi-square rejects the null hypothesis i.e. POLS is preferred over FEM and accepts the alternative hypothesis that is the REM is preferred over the POLS model. Furthermore, deciding between POLS and REM, the value of the Breusch-Pagan test indicates that the Random effect model performs better than POLS. Although, the selection between the Fixed effect model and the REM based on the Hausman test. The P-value of chi-square shows that the FEM is relatively better in all cases. Diagnostic tests indicated that, in all the specifications, the FEM performs better than the Pooled OLS model and REM. In the final model of Table 5.10 we get that FDI,

Likewise, the effect of CO_2 emission highly significant at 1% of the significance level with the negative sign which is contradictory to the theory. The empirical result shows that 1% increase in FDI will lead to a decrease in the health expenditure by -0.274 %. Our result is supported by (Lu et al., 2017; Boachie et al., 2014). In the same way, the outcome of urbanization is also significant at 1% of the significance level. The negative sign of urbanization is inconsistent to the theory, according to the theory "urbanization followed by the emergence of overcrowding shantytowns with the insufficient sanitary condition, overcrowding, and industrialization cause air pollution, so it will be expected that urbanization positively related with health expenditure (Toor & butt, 2005). The empirical result shows that 1% increase in urbanization will lead to a decrease in the health expenditure by -0.0845%. Our result is supported by Cumper (1984), Siddiqui et al. (1995). Cumper (1984) argued that urbanization leads to larger accessibility of health services and hence may offset the demand for HCE.

Similarly, the result of the crude birth rate (CBR) is inconsistent with the theory. According to Toor and Butt (2005), the CBR raises the cost of maintaining a given health level. So there is a positive relationship between CBR and HE. Our empirical result is inconsistent with the theory which stated that 1% rise in CBR will lead to a decrease in the HE by -2.862%. While according to Samadi and Rad (2003) country with good economic infrastructure have more information about the benefits of wellbeing care and consequently use health care more than other countries. In our model, the effect of gross domestic product is highly significant at 1% of the significance level. The empirical result shows that 1% rise in GDP will lead to a rise in HE by 1.698%. Our result is supported by (Braendle & Colombier, 2016; Rezaei et al., 2016; Boachie et al., 2014).

In the same way, unemployment is highly significant at 1% level of significance and the sign is according to the theory that Unemployment leads to low income – leads to insufficient level of basic consumption of goods and services which in turn increases the risk of illness (Forbes & Mcgregor, 1984). The result shows that 1% increase in unemployment will lead to a rise in HE by 0.0961%. Our result is supported by (Braendle & Colombier, 2016).

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level leads to increase health expenditure, Forbes and Mcgregor (1984), unemployment has a positive impact on health expenditure of Europe and Central Asia, Latin America, Caribbean and North America region. While a negative impact on spending of the Middle East & North African region. Further, there is a positive and significant relationship that explored between population age above 65 and East Asia & Pacific region, Europe & Central Asia region and the Middle East & North Africa region and health expenditure.

5.5 Developed, developing and transitional countries Comparison of Macroeconomic Determinants of Health Expenditure

Spending on health varies across the world. So, there is a number of variables that affect health spending. In this present study, there is no impact of FDI on health expenditure while the remittances have a dual impact on health expenditure in transitional and developing countries. The positive impact on transitional countries while negative on developing countries. The impact of gross domestic product and trade openness is positive in developed countries while no impact on developing and transitional countries.

Similarly, environmental determinants have a twin effect on health expenditure. The emission CO_2 has a negative effect on developed countries while urbanization has a positive effect on developed countries and negative on developing countries respectively.

Likewise, the demographic variables have a positive and negative effect on health expenditure throughout income-based categorized countries. Literacy has a positive effect on developed and developing countries' health expenditures. The ratio of the population also exerts a positive effect on health expenditure of developed, developing and transition countries' health expenditures and the crude birth rate has positive on developed countries. In the same way, unemployment also exerts a positive effect on the health expenditure of developed and transition countries. Further, there is a positive and significant relationship that explored the population age above 65 and developed countries, transitional countries, developing countries.

CONCLUSION

Health expenditure has become a burning issue in the worldwide. Wellbeing care spending is a global issue and all economies were facing severe threats of rising cost or expenses of health expenditure. According to WHO (2018) report that global health expenses were 7.3 trillion in 2015 whereas it is near to 10% of the world income. From the year 2000 to 2015 the health expenditure growth rate is 4% while the financial growth rate is 2.8%.

Several empirical studies justify the relationship of macroeconomic variables with health expenditure but there are a lot of factors behind it. The present study intends to justify how these demographic variables i.e. population age 65 and above, literacy, life expectancy, crude birth rate, and unemployment, economic variables i.e. foreign direct investment, trade openness, personal remittances and GDP, and environmental variables i.e. CO_2 emission and urbanization have an impact on health expenditure. The objective of the study is to evaluate the crucial determinants of health expenditure. The annual data is taken from 2000 to 2016 for the worldwide, regions and income-based categorized countries.

In addition, there are numerous studies that explore the macroeconomic factors which affect health expenditure and also separately identify the relationship among FDI and health spending, remittances and health spending, trade openness and health spending but there are no such studies that identify the relationship among them in one platform. So, the present study jointly investigates the macroeconomic determinants of health expenditure by incorporating all these variables for the first time. In addition, as far as I could possibly know that there are no such studies that explore the macro factors for the worldwide, regions, developed, developing, and transitional countries. Further, the null hypothesis of studies that macroeconomic determinants has no impact on health expenditure conflicting to the alternative that macroeconomic determinants have an impact on health expenditure.

same context, the emission of carbon dioxide is a significantly negative relationship with health expenditure for worldwide, developed countries, Europe & Central Asia, Middle East & North Africa and Latin America & Caribbean& North America. While in the case of South Asia region its relationship with health expenditure is positive and significant.

Likewise, the result of urbanization is accordance to theory that urbanization lead to increase health expenditure in in developed countries and the Middle East, and North Africa region while also the sign of urbanization is inconsistent to the theory but significant relationships in developing countries, transitional countries, East Asia & Pacific, South Asia, Sub-Saharan Africa, Latin America, Caribbean and North America region. In the same way, literacy has a significant positive impact on health expenditure worldwide, developed countries, developing countries, Middle East, North Africa and Sub-Saharan Africa region. The result of these countries and regions is according to the theory of Rezaei et al., 2016) which shows that higher the literacy rate in society could help people to get better health awareness and raise the consumption of the healthcare service and this process increases the healthcare expenditure. Similarly, life expectancy at birth is a significantly positive relationship with health expenditure worldwide, developed countries, transitional countries, developing countries and Europe & Central Asia region.

Correspondingly, the effect of crude birth rate is positive and significant on health expenditure worldwide, developed countries, Europe and Central Asia region. While the relationship is negative on health expenditure in the case of the Middle East, North Africa, Latin America, Caribbean and North America region. In the same way, unemployment leads to increase the health expenditure and there is positive and significant relationship between unemployment and health expenditure in worldwide, developed countries, transitional countries, Europe, Central Asia, Latin America, Caribbean and North America region although there is negative and significant relationship was found in the Middle East & North Africa region. Further, there is a positive and significant relationship that explored between population age above 65 and health expenditure worldwide, developed countries, transitional countries, developing countries, East Asia, Pacific, Europe, Central Asia, Middle East and North Africa region.

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