



## Discovering the Socio-Economic and Environmental Factors of Health Expenditure: Case Study of Regions

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### ABSTRACT

The aim of the current study is to reduce the burden of the government's spending on health expenditure and also determine the factors which contribute to health spending. For the present examination, the data was collected from World Bank, covering the time span from 2000 to 2016 for regions i.e., East Asia & Pacific (EA&PR), Europe & Central Asia (E&CAR), Middle East & North Africa (ME&NAR), South Asia (SAR), and Sub-Saharan Africa (SSAR). The key goal of this work is to examine the important macroeconomics determinants of health expenditure (MDHE). The outcome of the study is concluded that all the determinants have significantly influenced the health expenditures across the regions. Moreover, the CO2 emission, personal remittances, urbanization, unemployment, and crude birth rate have a twin impact on well-being spending. Whereas trade openness and gross domestic product have an important and adverse impact on health expenditure, literacy, life expectancy at birth, and population age 65 and above have a significant positive impact on health expenditure.

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## 1. Introduction

Great wellbeing is the key right of everybody, and it's assumed an essential part of financial development. Due to good health, people are more competent, creative, and survive lengthier but on the other hand, wellbeing financing and wellbeing care are one of the evolving issues throughout the world. Financial resources are one of the key inputs to the wellbeing framework yet restricted financial assets are the requirement looked at all wellbeing frameworks all through overall (Apergis, Gupta, Lau, & Mukherjee, 2018). As per World Health Organization (WHO), the prosperity monetary framework raises much speedier than the overall economy and burned through 7.3 trillion in the year 2015 which is close to 10% of world income. Furthermore, from the time 2000 – 2015, the yearly development rate of health outflow was 4% while the monetary progress rate was 2.8% (WHO, 2018).

Well-being financing encompasses a huge part of the administration budget, but they endlessly try to decrease their spending to reduce the budget. As per Samadi and Rad (2013) it's difficult for individuals to shrivel their expenses explicitly in the medical services area. Medical care use and its determinants are the principal stresses in many nations. According to Rezaei et al. (2016) in developed and developing nations the main worry of the policymakers is to recognize the core influences or the determinants which are influencing the cost of health expenditure.

The United National General assembly (UNGA) for the first time decided to encounter the health problem in 2000 to achieve the Millennium Development Goals (MDGs) from 2000-2015, 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, they approved a new agenda in the year 2015 for sustainable development. This new agenda covers all three aspects i.e. financial, public, and atmosphere. The new programs of Sustainable Development Goals (SDGs) have 17 goals as well as 169 targets. Among the 17 goals, Health is one of the most significant goals with 13 targets. In the Sustainable Development Goals (SDGs) agenda (2030), wellbeing is placed at a focal situation to affirm wellbeing lives and allow well-being for all at all ages, and open connections to large numbers of different objectives (WHO, 2016).

In the past few eras, diverse works have been completed to explore the influences of health expenditure (H.E) for diverse areas i.e., Pakistan, Korea, Saudi Arabia, Swiss Cantons, in the United States and Canada, OECD (Organization for Economic Cooperation and Development), developed countries, ECO (Economic cooperation organization), and for African nations. Furthermore, in the recent different work, they distinctly investigate the consequences of external speculation, personal remittances, carbon dioxide, and trade openness on H.E respectively.

So, due to the best of my information, none of the works integrate all these factors in one place to explore the macroeconomic determinants of H.E (MDHE). The present study united all these variables to determine the determinants of health expenditure (DHE) for all regions. For exploring the MDHE, the paper is characterized into different sections. After section 1 of the introduction then we'll discuss the comprehensive literature of H.E of diverse studies in section 2. In section 3 we have the theoretical framework, information and factors, system, and finally econometric determination. The last two areas join the conversation of the outcome and conclusion.

## **2. Literature Review**

The assessment of the wellbeing factors has become the fundamental worry for the well-being of legislators and developers. A few studies have been coordinated worldwide to investigate the influences of wellbeing spending in a country. This section of the paper audits a part of the writing in such a manner. To begin with the overall perspectives, the exploration analyzed different causes of medical care. To the best of my information (Newhouse, 1977) is the pioneer for the examined the elements of hospital treatment and concluded that ninety percent of the disparity in healthiness spending is primarily due to GDP in line with capita, and also determined that the care of well-being is a luxury. While some other studies concluded that well-being maintenance is a necessity and observed a sturdy connection between GDP and H.E (Abbas & Hiemenz, 2011; Baltagi & Moscone, 2010; Freeman, 2003; Gbesemete & Gerdtham, 1992; Murthy & Okunade, 2016). Likewise, GDP is broadly observed to be a variable that is generally liable for the progressions in the degree of wellbeing use (Akca, Sonmez, & Yilmaz, 2017; Hitiris & Posnett, 1992; Rezaei et al., 2016; Toor & Butt, 2005).

In the same way, foreign direct investment (FDI) has a dual impact on H.E. The FDI positively affects individuals' prosperity predominantly by increasing the attention for such items and administrations which are identified with wellbeing, and by enlightening the stock of such goods and facilities. According to Nagel, Herzer, and Nunnenkamp (2015) the influence of FDI on health expenditure is positive in the case of low-income countries while in contrast to the positive effect, there is also a contrary effect of FDI on populace comfort in host economies due to inequality. In addition, Herzer and Nunnenkamp (2012) found a damaging result of FDI on wellbeing spending in developed economies.

Also, remittances perform the main part in reducing poverty in the recipient countries (Acosta, Fajnzylber, & Lopez, 2007; Ahmad, Shafiq, & Gillani, 2019). Some other studies also suggest that the migrant's income has a crucial impact on health expenditure (Amuedo-Dorantes & Pozo, 2011; Shafiq & Gillani, 2018; Valdero-Gil, 2009). Moreover, the income of

migrants also has a positive impact on well-being information, literacy, and disbursements (Acosta et al., 2007; Awais, Khan, & Ahmad, 2021; Ponce, Olivié, & Onofa, 2011). Likewise, trade frankness has a significant connection with life expectancy (L.E), well-being financing, the adverse and key association among trade openness (TO), and infant mortality rate (Novignon, Atakorah, & Djossou, 2018). The impact of TO is greater on health expenditure where the peoples pay high taxes and the nations which are less developed (Gillani, Shafiq, & Ahmad, 2019; Herzer & Nunnenkamp, 2012). Moreover, in developing nations TO is associated with low child death rates and average L.E (Owen & Wu, 2007).

In the previous era number of studies worked on exploring the consequence of CO<sub>2</sub> on H.E. The work of Apergis et al. (2018) concluded in their study that the relationship amid CO<sub>2</sub> and H.E is positive and meanwhile this positive relationship is positive in those places which spend a better quantity on H.E. Likewise, Khoshnevis Yazdi and Khanalizadeh (2017) inspecting the constructive influence of CO<sub>2</sub> discharge on H.E. However, Lu et al. (2017) recorded the adverse connection between CO<sub>2</sub> production and well-being expenditure but on another side, the emission of CO<sub>2</sub> has an important contribution or support toward growth and health promotion. Furthermore, Boachie et al. (2014) perceive a negative connection happens among CO<sub>2</sub> discharge and H.E. Additionally, the people who lived in urban areas have more access to healthiness services and health connected goods. According to Samadi and Rad (2013) they noticed in their study the connection between urbanization and health expenditure. Moreover, they also concluded that the relationship is positive. Also, (Rezaei et al., 2016) mentioned in their study that URB is the main influential force overdue the nonstop rise in H.E. Whereas, in some other works they testified the negative relationship among urbanization and H.E (Abbas & Hiemenz, 2011; Cumper, 1984; Siddiqui, Afridi, Haq, & Tirmazi, 1995; Toor & Butt, 2005).

Demographic factors have a significant influence on H.E (Gillani, Ahmad, Wang, & Shafiq, 2021). According to Akca et al. (2017) concluded in their study that L.E is one of the main factors to recognize health expenditure and by increasing life expectancy by one year bring foreign inflow investment by 9% (Alsan, Bloom, & Canning, 2006). In the same context, Population age assumes a significant part in expanding wellbeing use like the proportion of the populace over 65 years' age applies a positive effect on health costs (Gillani, Shafiq, Ahmad, & Zaheer, 2021; Murthy & Okunade, 2016; Samadi & Rad, 2013). Education plays a significant role in increasing H.E and is one of the driving forces behind the repeated progress (Rezaei et al., 2016). Moreover, Toor and Butt (2005) stated that literacy is an important factor and has a significant association with H.E. Probable, some other investigation discovered that unemployment (UNE) harms wellbeing spending (Abbas & Hiemenz, 2011) In accordance with this review Braendle and Colombier (2016) examines that the joblessness rate is profoundly sure identified with public prosperity spend. While similarly Crude rate of birth (CBR) additionally expands the costs of wellbeing use by raising the expense of upkeep (Leu, 1986; Toor & Butt, 2005).

### **3. Theoretical Framework**

Dual distinctive approaches have been utilized to examine the relationship in the midst of H.E and Health results, mutually the procedure was established in crafted by Grossman on human resources hypothesis (Grossman, 1972).

In the first place, the idea sees wellbeing together as a utilization and venture product. The place of the persons while devouring wellbeing is to amplify utility situation to its spending limitation, alongside characteristics that influence individual wellbeing. Moreover, inside this model revenue and literateness level expect recognizable parts as revealing variables. Moreover, further model separates well-being maintenance and wellbeing, the closing being one of the various contributions to the creation of wellbeing products. The model of speculation demand worries with a noticed inspection just as with theoretical inspection of interest for the wellbeing ware. The model respects health as a wealth product that is usual and reduces over time. As per o the theory, investment in healthiness is a procedure in which wellbeing care is composed with related influences to crop new well-being, which to some degree adjusts the cooperation of devaluation of the health stock.

The ensuing procedure reflects wellbeing inside a system of creative work. The basic theory of this procedure is that prosperity is a product of a prosperity care framework, which is

affected by the commitments to the system. This technique for assessment is valuable to investigate the relationship mid the sources of info (H.E), and yields (prosperity results) of the framework. Our observed examination stresses the subsequent methodology, which is useful for full-scale level information investigation. The vast scope examination is more fitting thinking about that, fundamentally and tentatively, miniature level results for prosperity strategy leader at the large-scale level can be questionable (Nixon & Ulmann, 2006).

#### 4. Data and Methodology

##### 4.1 Data Variable

The data for the present work was taken from the W.B in the year 2019, covering the period from 200-2016 for regions i.e., EA&PR, E&CAR, ME&NAR, SAR, and SSAR. In the present study, health expenditure is considered as a dependent variable after the evaluation of detailed literature, and furthermore, independent variables are GDP, FDI, PR, TO, CO2E, URB, LIT, UNE, CBR, LE, and POP65. The table 1 shows the list of exogenous variables:

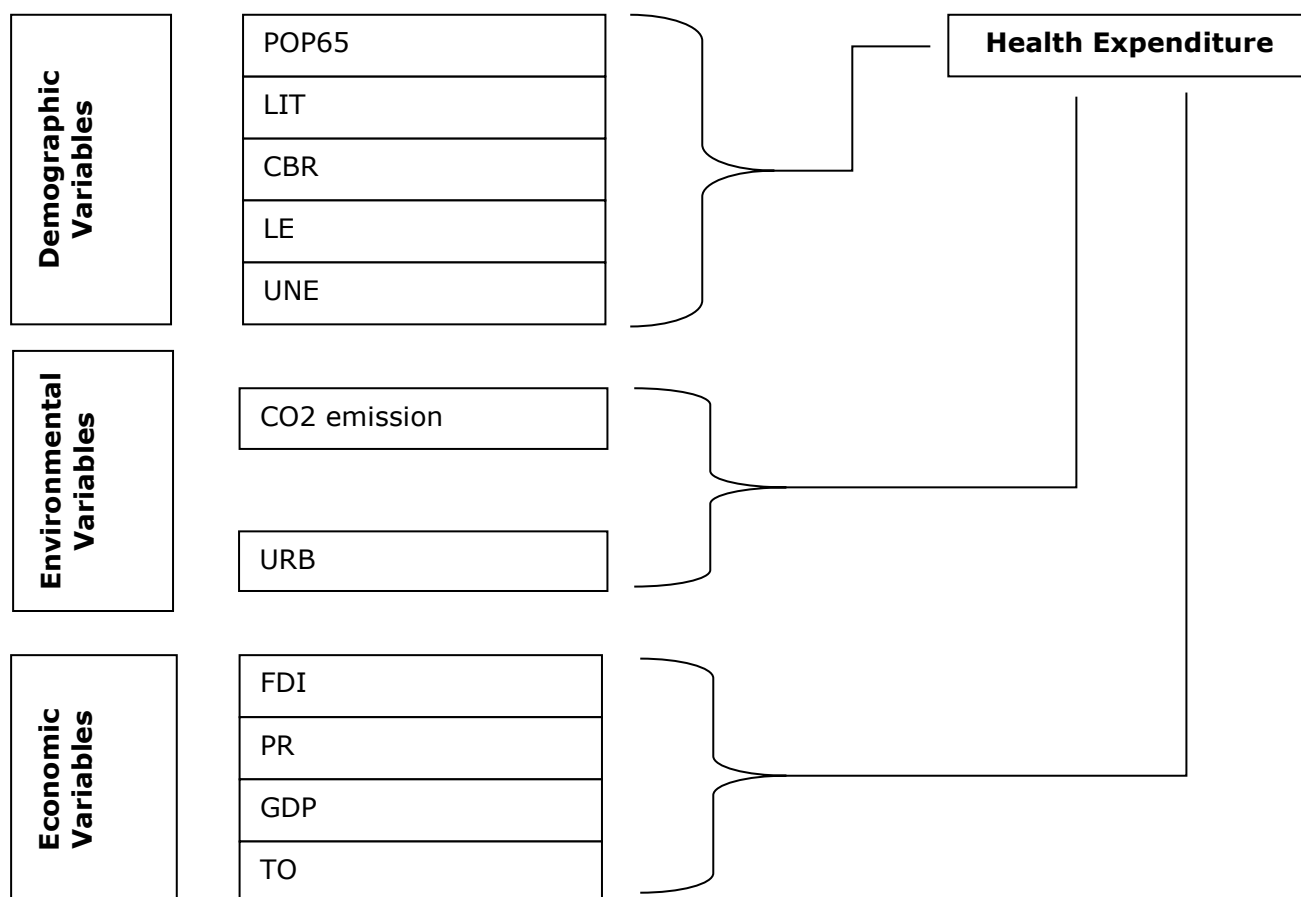
**Table 1 List of determinants of health expenditure**

Demographic Variables	Economic Variables	Environmental Variables
Population age 65 and above	Foreign direct investment	CO <sub>2</sub> emission
Literacy	Gross Domestic Product	Urbanization
Life expectancy at birth	Personal remittances	
Crude birth rate	Trade openness	
Unemployment		

##### 4.2 Methods

For examination of different factors influences on H.E expenditure, we used different models i.e., FEM (fixed-effect model), REM (random effect model), and POLS (pooled OLS). Among POLS and REM, we select one on the basis of LM (Lagrange Multipliers), and on the basis of the Hausman test we choose either FEM or REM.

**Figure 1: Determinants of Health Expenditure**



### 4.3 Econometric Specification

The following model is trying to look at the vital socio-economic, demographic determinants of health expenditure, and to test the link between H.E and its factors crosswise the different regions. So, for empirical examination the aim of the present work is to apply econometric techniques to exploration the impression of socio-economic, demographic DHE.

$$h_{it} = \alpha_0 + \alpha_1 FDI_{it} + \alpha_2 PR_{it} + \alpha_3 TO_{it} + \alpha_4 CO2_{it} + \alpha_5 \ln GDP_{it} + \alpha_6 \ln LIT_{it} + \alpha_7 \ln LEB_{it} + \alpha_8 \ln UNE_{it} + \alpha_9 URB_{it} + \alpha_{10} POP65_{it} + \alpha_{11} \ln CBR_{it} + u_{it} \quad (1)$$

Table 2 presents the descriptions of the variables used in the model and a subscript *i* and *t* is used for the cross-sectional unit, and for the time-period.

**Table 2: Description of the Variables**

Abbreviation	Description of the data series Used in Model	Source
<b>H</b>	Health expenditure percentage of GDP (% GDP)	World Bank (W.B)
<b>FDI</b>	Foreign direct investment net inflow % GDP	W.B
<b>PR</b>	Personal remittances % GDP	W.B
<b>TO</b>	Trade openness	W.B
<b>LnGDP</b>	logarithm of GDP per capita at purchasing power parity	W.B
<b>CO2</b>	Carbon dioxide emission in metric tons per capita	W.B
<b>URB</b>	Urbanization refers to people living in urban areas	W.B
<b>LnLIT</b>	Primary school enrollment utilized as proxy for literacy in logarithm form	W.B
<b>LnLEB</b>	Life expectancy at birth	W.B
<b>LnCBR</b>	Crude birth rate per 1,000 people	W.B
<b>UNE</b>	Unemployment	W.B
<b>POP65</b>	Population age 65 and above (share of the entire populace)	W.B

### 5. Result and Discussion

The empirical result of the model for the examination of the region, EA&PR, E&CAR, ME&NAR, SAR, and SSAR is offered in Table 3, 4, 5, 6 and 7 respectively. While the descriptive statistics of the research variable comprises maximum and minimum values, range, mean, and standard deviation are present in Appendix. Appendix A, B, C, D, and E show the descriptive statistics of all regions (EA&PR, E&CAR, ME&NAR, SAR, and SSAR).

In table 3, we can clearly see that the influence of URB is significant, but the sign is contrary, which contradicts the hypothesis of (Toor & Butt, 2005), implying that urbanization has a negative impact on health spending (Cumper, 1984; Siddiqui et al., 1995). So according to Toor and Butt (2005), congestion, industrial development, and the formation of overcrowded shantytowns with insufficient sanitary conditions all contribute to air pollution. As a result, we predicted URB to have a beneficial impact on health spending.

In the table 3, we can clearly notice that the impact of POP age 65 and above have a highly significant and positive impact on H.E and this result is according to the hypothesis of (Han, Cho, & Chun, 2013; Murthy & Okunade, 2016). Furthermore, they concluded that the ratio of the population is raised in total population lead to an increase in H.E.

Table 4 shows the outcome of Europe and Central Asia region and in this region personal remittance (PR) is highly significant and has a positive impact on health expenditure. According to Thoumi (2016), the income of migrants is widely used for a variety of determinations, including instant consumption or long-term consumption of human development. Moreover, inflows of migrant’s income enhance consumer expenditures, which leads to a rise in healthcare spending and, as a result, an increase in demand for healthcare services. It is the obligation of governments to meet this demand. As a result, PR has a favorable impact on health. This current outcome is accompanied by (Amuedo-Dorantes & Pozo, 2011; Ponce et al., 2011; Valdero-Gil, 2009) the increase in emission of CO2 bestows to improved economic growth, which in turn enhances the H.E (Beatty & Shimshack, 2014; Chaabouni, Zghidi, & Mbarek, 2016; Cumper, 1984; Khoshnevis Yazdi & Khanalizadeh, 2017; Nawaz, Hussain, & Hussain, 2021; Wang, Asghar, Zaidi, & Wang, 2019). But in the case of the

Europe and Central Asia region, the impact of CO2 emission highly significant but the sign is contradictor the hypothesis. But still, this result is supported by (Boachie et al., 2014; Lu et al., 2017).

**Table 3: Result of Macroeconomic DHE in East Asia & Pacific Region**

Variables	Pooled OLS		FEM		REM	
	Coefficient	t-values	Coefficient	t-values	Coefficient	t-values
FDI	0.00850	(0.40)	0.0103	(0.81)	0.00821	(0.64)
PR	-0.0592***	(-3.89)	0.0362	(1.63)	0.0193	(0.90)
TO	0.00439	(1.55)	-0.00683*	(-2.32)	-0.00495	(-1.71)
LnGDP	-0.147*	(-2.51)	0.943*	(2.27)	-0.147	(-0.88)
CO2	0.0398	(0.84)	0.0486	(0.77)	0.0780	(1.31)
URB	-0.0112	(-1.22)	-0.114***	(-4.51)	-0.0601**	(-3.08)
LnLIT	0.0194	(1.43)	-0.000805	(-0.08)	-0.00431	(-0.43)
LnLEB	8.462***	(3.42)	-9.333*	(-2.16)	-1.107	(-0.38)
LnCBR	3.146***	(4.78)	-1.148	(-1.40)	-1.234	(-1.56)
UNE	-0.0901	(-1.69)	-0.0956	(-1.72)	-0.0519	(-0.97)
POP65	0.587***	(6.79)	0.631***	(6.86)	0.567***	(6.32)
Constant	-42.21***	(-3.98)	26.18*	(1.97)	16.71	(1.36)
T		17		17		17
N		17		17		17
N		255		255		255
F-stat [Wald $\chi^2$ ]		28.23		8.32		82.11
P-value		0.0000		0.0000		0.0000
<b>Diagnostic Tests (D.T)</b>						
	<b>Breusch and Pagan LM test (B&amp;P LM test)</b>			<b>Hausman test (H.T)</b>		
Prob. > chibar2	0.0000			0.1085		

Source: Authors own calculations t-values are in parenthesis, whereas \*\*\*, \*\*, \* specifies at 1%, 5% & 10% level of significance, correspondingly

**Table 4: Result of Macroeconomic DHE in Europe & Central Asia Region**

Variables	Pooled OLS		REM		FEM	
	Coefficient	t-values	Coefficient	t-values	Coefficient	t-values
FDI	0.00164	(0.38)	0.00241	(0.93)	0.00232	(0.90)
PR	0.0827***	(8.78)	0.0387***	(4.47)	0.0415***	(4.52)
TO	0.00278	(1.89)	-0.00143	(-0.76)	-0.00271	(-1.26)
LnGDP	0.143**	(3.10)	-0.0229	(-0.19)	-0.227	(-0.78)
CO2	-0.118***	(-6.09)	-0.139***	(-4.52)	-0.183***	(-4.79)
URB	0.00340	(0.61)	0.0185	(1.30)	0.0155	(0.59)
LnLIT	-0.00325	(-0.30)	0.0108	(1.33)	0.00924	(1.13)
LnLEB	19.09***	(17.07)	11.35***	(5.16)	9.706**	(3.10)
LnCBR	-0.242	(-0.69)	1.126**	(2.67)	1.871***	(3.72)
UNE	-0.0171	(-1.72)	0.0353**	(3.13)	0.0411***	(3.32)
POP65	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 $\chi^2$ ]		77.89		296.46		23.25
P-value		0.0000		0.0000		0.0000
<b>D.T</b>						
	<b>B&amp;P LM test</b>			<b>H.T</b>		
Prob. > chibar2	0.0000			0.0004		

Source: Authors own calculations t-values are in parenthesis, whereas \*\*\*, \*\*, \* specifies at 1%, 5% & 10% level of significance, correspondingly

As we can clearly observe that the life expectancy is highly significant and the sign of the result of L.E is according to the theory that LE increases the section of elderly persons in the populace and has a positive relationship with H.E. The following research back up this positive relationship (Akca et al., 2017). In the same way, the impact of crude birth rate is highly significant and the association among CBR and H.E is positive. And this strong association shows the rising cost of issuing crude birth rates this strong interaction is strengthened by (Akca et al., 2017; Leu, 1986; Toor & Butt, 2005).

According to Forbes and McGregor (1984) UNE is positively related to H.E because due to UNE there is lower level of income and as a result, it increases the risk of illness due to deficiency of basic consumption. In Europe and Central Asia region, the effect of UNE on H.E is highly significant, and the relationship is positive (Braendle & Colombier, 2016). Furthermore, populace above the age of 65 has a beneficial impact on health spending. The impact of POP65 is highly significant, and the sign is consistent with the notion that people over 65 consume more health care than most others (Murthy & Okunade, 2016; Toor & Butt, 2005) strengthened this conclusion.

In the Middle East and North Africa region (table 5) the income of migrants is extremely momentous and has a positive impact on well-being spending. This current outcome is substantiated by (Amuedo-Dorantes & Pozo, 2011; Ponce et al., 2011; Valdero-Gil, 2009). Whereas trade openness (TO) has a profound influence on health expenditure with adverse association with H.E. This relationship is contradictory to the theory of Herzer (2017) he mentioned that TO leads to increase income and that income increase the spending on goods that improve health. The current study's conclusion is accompanied by (Wang et al., 2019).

Similarly, the impact of CO2 emission on health expenditure is highly significant with an adverse sign. This impact is consistent with (Awais et al., 2021; Boachie et al., 2014; Lu et al., 2017) but contradictory to the hypothesis which concluded that increased CO2 emissions contribute to enhanced economic growth, which in turn will enhance health spending (Beatty & Shimshack, 2014; Chaabouni & Saidi, 2017; Chaabouni et al., 2016; Khoshnevis Yazdi & Khanalizadeh, 2017; Wang et al., 2019). On the other side, URB is highly significant and positively associated with health expenditure. According to Toor and Butt (2005) URB is linked with overcrowded areas with inadequate sanitary conditions, as well as overcrowding and industrialized air pollution. Moreover, this study is also supported by [41] retaining the positive connection.

**Table 5: Result of Macroeconomic DHE in the Middle East & North Africa Region**

Variables	REM		Pooled OLS	
	Coefficient	t-values	Coefficient	t-values
FDI	0.00216	(1.53)	0.00216	(1.53)
PR	0.0991***	(6.66)	0.0991***	(6.66)
TO	-0.0154***	(-5.25)	-0.0154***	(-5.25)
LnGDP	-0.0181	(-0.18)	-0.0181	(-0.18)
CO2	-0.0328***	(-3.45)	-0.0328***	(-3.45)
URB	0.0292***	(3.64)	0.0292***	(3.64)
LnLIT	0.0611***	(5.54)	0.0611***	(5.54)
LnLEB	-5.893	(-1.88)	-5.893	(-1.88)
LnCBR	-0.871*	(-2.01)	-0.871*	(-2.01)
UNE	-0.0661**	(-3.13)	-0.0661**	(-3.13)
POP65	0.531***	(11.97)	0.531***	(11.97)
Constant	23.97	(1.80)	23.97	(1.80)
T	17		17	
N	11		11	
N	165		165	
F-stat [Wald $\chi^2$ ]	87.14		958.57	
P-value	0.0000		0.0000	
<b>D.T</b>				
<b>B&amp;P LM test</b>				
<b>Prob. &gt; chibar2</b>	1.0000			

Source: Authors own calculations t-values are in parenthesis, whereas \*\*\*, \*\*, \* specifies at 1%, 5% & 10% level of significance, correspondingly

Furthermore, literacy has a beneficial effect on H.E since a greater literacy rate in society leads to increased awareness of well-being and increased usage of wellbeing treatment services. On the basis of the empirical result, we concluded that literacy has a highly significant and positive impact on health expenditure, which is confirmed by (Toor & Butt, 2005). Similarly, the connection between the crude birth rate and health spending is negative, which contradicts the hypothesis. According to Toor and Butt (2005), expanding the crude birth rate enhances the maintenance cost, which is why it is linked to H.E.

**Table 6: Result of Macroeconomic DHE in South Asia Region**

Variables	REM		Pooled OLS	
	Coefficient	t-values	Coefficient	t-values
FDI	0.0439	(0.76)	0.0439	(0.76)
PR	0.0581*	(2.35)	0.0581*	(2.35)
TO	-0.00152	(-1.10)	-0.00152	(-1.10)
LnGDP	-0.378***	(-5.59)	-0.378***	(-5.59)
CO2	2.994***	(7.22)	2.994***	(7.22)
URB	-0.113***	(-5.34)	-0.113***	(-5.34)
LnLIT	0.0173	(1.51)	0.0173	(1.51)
LnLEB	-3.671	(-0.74)	-3.671	(-0.74)
LnCBR	2.179	(1.46)	2.179	(1.46)
UNE	0.150	(1.53)	0.150	(1.53)
POP65	-0.0404	(-0.13)	-0.0404	(-0.13)
Constant	20.50	(1.11)	20.50	(1.11)
T		17		17
N		6		6
N		90		90
F-stat [Wald $\chi^2$ ]		60.16		661.79
P-value		0.0000		0.0000
<b>D.T</b>				
<b>B&amp;P LM test</b>				
<b>Prob. &gt; chibar2</b>	1.0000			

Source: Authors own calculations t-values are in parenthesis, whereas \*\*\*, \*\*, \* specifies at 1%, 5% & 10% level of significance, correspondingly

However, unemployment is a statistically significant impact on health expenditure while the sign is contradictory to the hypothesis of (Forbes & McGregor, 1984). They mentioned that UNE creates a shortage of goods and services consumption, which boosts the risk of illness. Additionally, the populace age 65 or above has a highly significant and positive impact on health expenditure (Murthy & Okunade, 2016).

**Table 7: Result of Macroeconomic DHE in Sub-Saharan Africa Region**

Variables	Pooled OLS		REM		FEM	
	Coefficient	t-values	Coefficient	t-values	Coefficient	t-values
FDI	0.0429*	(2.31)	-0.0104	(-0.66)	-0.0256	(-1.58)
PR	-0.0375**	(-2.72)	-0.0853***	(-4.16)	-0.0852***	(-3.74)
TO	-0.0135**	(-3.09)	-0.0113*	(-2.37)	-0.00946	(-1.82)
LnGDP	-0.386***	(-5.87)	-0.0978	(-0.52)	1.157	(1.74)
CO2	0.358***	(4.67)	0.0738	(0.40)	-0.309	(-0.85)
URB	-0.0651***	(-9.98)	-0.0647***	(-3.61)	-0.102**	(-2.81)
LnLIT	0.0263***	(6.71)	0.0234***	(4.73)	0.020***	(3.91)
LnLEB	3.340**	(3.18)	4.041**	(2.97)	2.112	(1.20)
LnCBR	0.142	(0.14)	-1.963	(-1.53)	-2.142	(-1.24)
UNE	0.120***	(7.11)	0.0785**	(2.68)	0.0378	(0.94)
POP65	-0.466**	(-2.61)	-0.211	(-0.92)	0.0112	(0.04)
Constant	1.633	(0.20)	-0.204	(-0.02)	-20.19	(-1.15)
T		17		17		17
N		29		29		29
N		435		435		435
F-stat [Wald $\chi^2$ ]		28.38		86.88		8.07
P-value		0.0000		0.0000		0.0000
<b>D.T</b>						
<b>B&amp;P LM test</b>						
<b>Prob. &gt; chibar2</b>	0.0000					
<b>H.T</b>						
<b>Prob. &gt; chibar2</b>	0.0067					

Source: Authors own calculations t-values are in parenthesis, whereas \*\*\*, \*\*, \* specifies at 1%, 5% & 10% level of significance, correspondingly

The outcome of personal remittances in South Asia Region (table 6) is significant, and the sign assumes that remittances are used for either direct consumption or future investing in human development (Amuedo-Dorantes & Pozo, 2011; Mishra & Newhouse, 2009; Ponce et al., 2011; Thoumi, 2016; Valdero-Gil, 2009). While the GDP effect is highly significant, the sign is adverse, which contradicts the hypothesis. According to (Samadi & Rad, 2013)



economies with a greater monetary framework have more knowledge about health and as a result, consume more health-related goods. This negative outcome is supported by (Wang et al., 2019).

According to Atuahene, Yusheng, and Bentum-Micah (2020) CO<sub>2</sub> emissions have a positive and significantly great influence on well-being consumption. So, in South Asia Region the impact of CO<sub>2</sub> emission is a highly significant impact on H.E and this result is supported by (Beatty & Shimshack, 2014; Chaabouni & Saidi, 2017; Chaabouni et al., 2016; Khoshnevis Yazdi & Khanalizadeh, 2017; Wang et al., 2019) whereas the influence of URB is adverse on health expenditure. And this result is verified by (Cumper, 1984; Siddiqui et al., 1995).

The impact of remittance on health expenditure in the Sub-Saharan Africa Region (Table 7) is highly significant, but the sign is contradictory to the theory of (Thoumi, 2016). And our conclusion is corroborated by (Hubert Ebeke, 2012). In the same context, the result of urbanization has also opposed the theory of (Toor & Butt, 2005). Moreover, the present result is supported by Cumper (1984), and Siddiqui et al. (1995). Furthermore, literacy is a highly significant impact on health expenditure. A high level of educational attainment in society will help the populace to improve their health and education also improve the awareness among the populace and raise health care adoption (Toor & Butt, 2005).

## **6. Conclusion and Suggestion**

The main objective of the present work is to investigate the fundamental factors of well-being for all regions i.e., EA&PR, E&CAR, ME&NAR, SAR, and SSAR. Due to the data availability, we constructed the data for the above-mentioned region. Furthermore, for analysis, we retrieved data from World Development Indicator (2019) from 2000-2016. As we know, health is one of the highlighted issues throughout the world. So, such kind of work has great importance, because the well-being spending in all parts of the nations is one of an emerging matter. According to Yetim, İlgün, Çilhoroz, Demirci, and Konca (2021) spending on well-being increases dramatically everywhere in the world, so all countries on a priorities basis emphasize the issues of well-being expenditure.

The present study gives us detailed information about the different factors which affect health expenditure in the different regions. And by knowing these relationships the governments can minimize the contribution towards the health sector from GDP. In the current situation all through the world, the COVID pandemic (COVID-19) struck nations all throughout the world, giving gigantic difficulties to wellbeing frameworks, and empowering broad closures, school and business terminations, and employment misfortunes. Virtually all nations are confronting a remarkable monetary slump (WB, 2020).

Thus, in the present study, the income of migrants has a twin effect on H.E. The positive impact on Europe & Central Asia, Middle East & North Africa, and South Asian region while the negative impact on sub-Saharan African regions. Additionally, trade openness has an adverse effect on health expenditure in the Middle East & North Africa regions. GDP is one of the main factors that affect H.E. But in the present study, GDP is negatively associated with health expenditure in South Asia Region. The emission of CO<sub>2</sub> is one of the evolving matters in the present world regardless of nations and regions. The emission of CO<sub>2</sub> has a significant positive impact on South Asia while a negative impact on the spending of Europe & Central Asia, Middle East & North Africa regions. Moreover, urbanization has a dual impact on health expenditure among the different regions. The positive and noteworthy impact on H.E in the Middle East & North African region whereas negative impact on East Asia & Pacific, South Asia, Sub-Saharan African regions.

The literacy rate in society strength helps people to improve their well-being spending. So, the found result shows that literacy rate has a noteworthy and positive affiliation with H.E in the Middle East & North Africa, and Sub-Saharan African countries. And also, life expectancy is directly related to health expenditure in Europe & Central Asia region. The maintenance of good health required expenditure. So, the crude birth rate has a positive significant relationship with health expenditure in Europe and Central Asia while their effect is negative in the ME&NAR. Moreover, in East Asia & Pacific region, Europe & Central Asia region, and the Middle East & North Africa region, the relationship between POP65 and H.E is positive. Besides,

unemployment has a positive impact on the health expenditure of the Europe and Central Asia region. While a negative impact on spending of the Middle East & North African region.

In the current scenario of the Covid-19 pandemic, the present study is very important for a policymaker to understand the various factors and their connection with spending of well-being. And on the basis of these connections' policymakers will make some long-term conclusions. Furthermore, on behalf of results we recommend some of the policies that fight against the problem of health expenditure. International institutes like the WHO, the World Trade Organization, and the United Nations Environmental Programs are essential to familiarize a sustainable manufacturing procedure to lessen the effect of CO2 emission. Moreover, the governments should introduce such kinds of policies to support migrants' income. The states should place into an activity such sort of strategy to simplify for migrants to send payments back to their home. The effect of transients pay on wellbeing is reliable and supported. The beneficial outcome shows that the state-run administrations should open such kinds of networks over which repayments stream accompaniments and this stream assembles the additional money of the family level, which may be placed assets into further developing housing circumstances or augmentation the availability of food. The state-run administrations must take on such sort of strategy which advances the conventional channel of inflow of settlements instead of casual. Also, offer a guarantee to the transients' family that they can get settlements whenever without any boundaries.

However, the requirement for additional empirical examination and exploring applicable factors and ideally worked on further. It tends to be reached out by changing the size of the information, construction of the information, making a file of the factors, and furthermore applying various methods for assessment.

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**Appendix A: Descriptive statistics EA&PR**

Variable	Obs	Mean	Std.Dev.	Min	Max
H.E	289	4.812	2.039	1.649	10.142
FDI	289	3.753	5.273	-37.155	43.912
PR	289	4.632	7.348	.03	36.157
TO	289	87.708	42.163	.167	220.407
LnGDP	289	25.07	3.034	19.925	30.627
CO2	255	3.792	4.645	.153	18.2
URB	289	44.706	23.484	15.813	86.4
LnLIT	289	106.91	8.036	86.276	131.968
LnLEB	289	4.263	.08	4.068	4.412
LnCBR	289	2.994	.378	2.067	3.571
UNE	289	3.558	2.078	.489	8.796
POP65	289	6.257	3.226	2.856	15.141

**Appendix B: E&CAR**

Variable	Obs	Mean	Std.Dev.	Min	Max
H.E	765	7.479	1.967	2.692	13.677
FDI	765	6.608	12.509	-58.323	198.074
PR	765	3.844	7.19	-9.27	49.29
TO	765	99.922	48.622	24.17	416.389
LnGDP	765	25.831	1.591	22.725	28.939
CO2	675	6.818	3.911	.293	24.825
URB	765	66.587	14.762	26.501	97.919
LnLIT	765	101.054	5.089	87.135	124.893
LnLEB	765	4.325	.063	4.127	4.426
LnCBR	765	2.472	.285	2.041	3.473
UNE	765	9.591	5.649	1.805	37.25
POP65	765	14.091	4.31	2.945	22.235

**Appendix C: ME&NAR**

Variable	Obs	Mean	Std.Dev.	Min	Max
H.E	187	5.323	2.125	1.6	10.69
FDI	187	12.198	51.716	-10.614	451.716
PR	187	3.384	5.489	-7.378	26.443
TO	187	93.834	59.89	30.247	325.779
LnGDP	187	25.874	1.22	22.985	28.036
CO2	165	11.767	15.001	1.178	67.311
URB	187	76.973	17.813	42.732	100
LnLIT	187	104.326	6.637	89.088	130.986
LnLEB	187	4.324	.046	4.228	4.412
LnCBR	187	2.913	.28	2.23	3.351
UNE	187	8.385	5.164	.14	29.77
POP65	187	5.985	3.903	.715	19.379

**Appendix D: SAR**

Variable	Obs	Mean	Std.Dev.	Min	Max
H.E	102	4.601	2.002	2.344	11.471
FDI	102	2.092	2.698	-.098	15.266
PR	102	5.956	7.425	.087	31.432
TO	102	56.361	65.764	-294.175	184.093
LnGDP	102	25.163	2.614	21.416	29.723
CO2	90	.996	.705	.098	3.068
URB	102	27.828	8.082	13.397	39.428
LnLIT	102	105.268	15.758	73.829	145.128
LnLEB	102	4.23	.068	4.109	4.357
LnCBR	102	3.1	.208	2.75	3.547
UNE	102	3.01	1.879	.398	8.76
POP65	102	5.079	1.281	3.764	9.768

**Appendix E: SSAR**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std.Dev.</b>	<b>Min</b>	<b>Max</b>
<b>H.E</b>	493	5.751	1.89	2.143	12.403
<b>FDI</b>	493	3.682	4.433	-2.739	41.81
<b>PR</b>	493	3.951	6.683	-.003	53.826
<b>TO</b>	493	68.552	30.431	19.101	170.407
<b>LnGDP</b>	493	23.837	1.402	21.254	27.631
<b>CO2</b>	435	.799	1.689	.021	9.979
<b>URB</b>	493	35.067	14.193	8.246	67.933
<b>LnLIT</b>	493	100.949	22.008	32.322	149.307
<b>LnLEB</b>	493	4.033	.118	3.75	4.309
<b>LnCBR</b>	493	3.573	.271	2.313	3.98
<b>UNE</b>	493	8.868	8.158	.299	36.147
<b>POP65</b>	493	3.199	1.149	1.871	10.443