Effect of Health Expenditure on GDP, a Panel Study Based on Pakistan, China, India and Bangladesh

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Abstract: Health expenditures are the primary concern for any government. The objective of this study is to investigate the relationship between health expenditures and economic development. The study is done by taking a sample size of 20 years from 1995 – 2014. This study is based on four countries Pakistan, China, India and Bangladesh. STATA 11 is used for panel regression run. The Husman test confirms that random effects model is appropriate which shows insignificant results in this part of world. This article focuses the importance of health expenditure because it is main indicator of an economy growth and development.

Keywords: Health Expenditures, Economic Development, Stata 11, Hausman Test, Random Effects Model
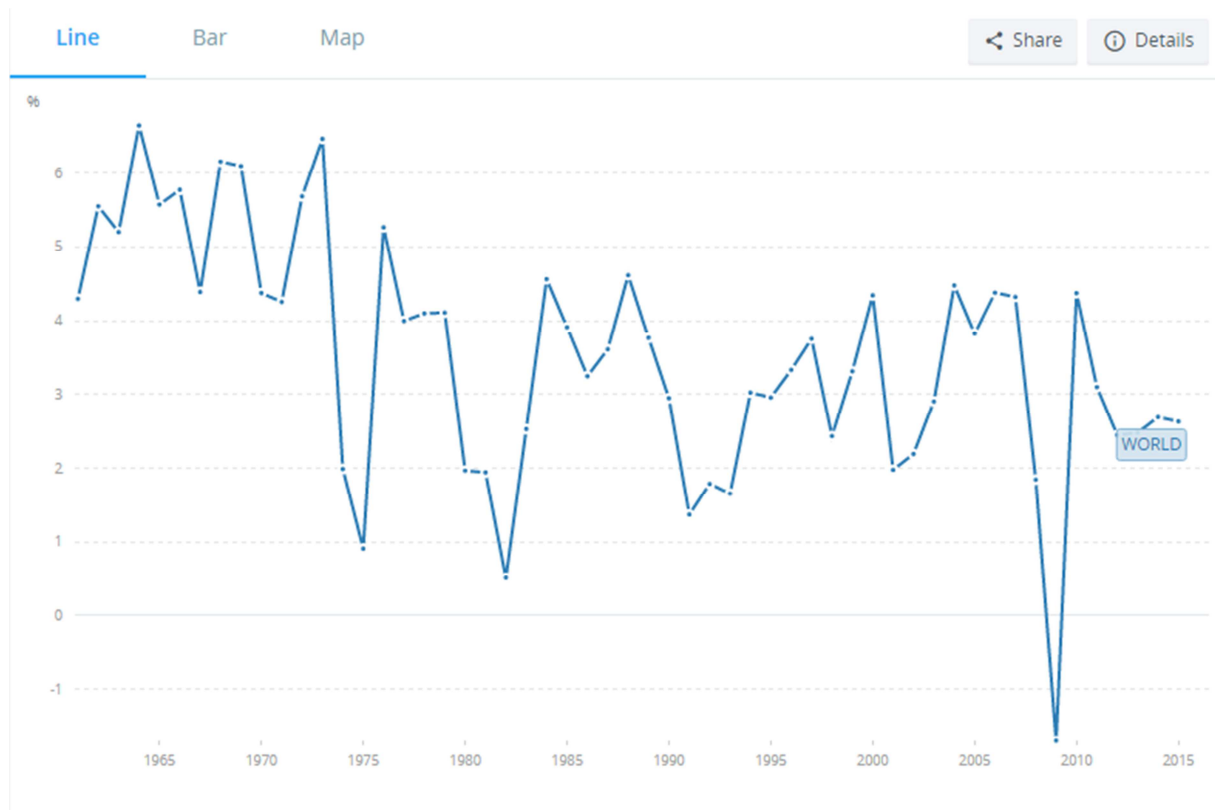
1. Introduction

Government is basicaly a father of a nation. He (government) is responsible for the education, health and social development of the people. Those countries who are taking care of their nations are successful and enjoying considerable gdp growth. Every country which is sincere to growth, works on social development and health care for the people of the country. The research gap is very considerable. This study observes a very noticable relationship between gdp and expenditures on health care (% to gdp).

Since 1965 the annual growth in the statistics of gdp in all over the world has been dancing trend but in 2008-2010 the graph has observed a huge financial crisis that has opened a new world of research for the researchers. The over all gdp of the world has an increasing trend but now one can observe that in 2015 it is also facing decline which is a sign of red signals for the researchers. In figure 1 & 2 we can have a deep look into the statistics [11].

On the other hand the world has paid a keen focus on health expenditures in the period where the world was facing crisis. In figure 3 one can can observe a huge jump in the statistics of health expendiutures incurred in all over the
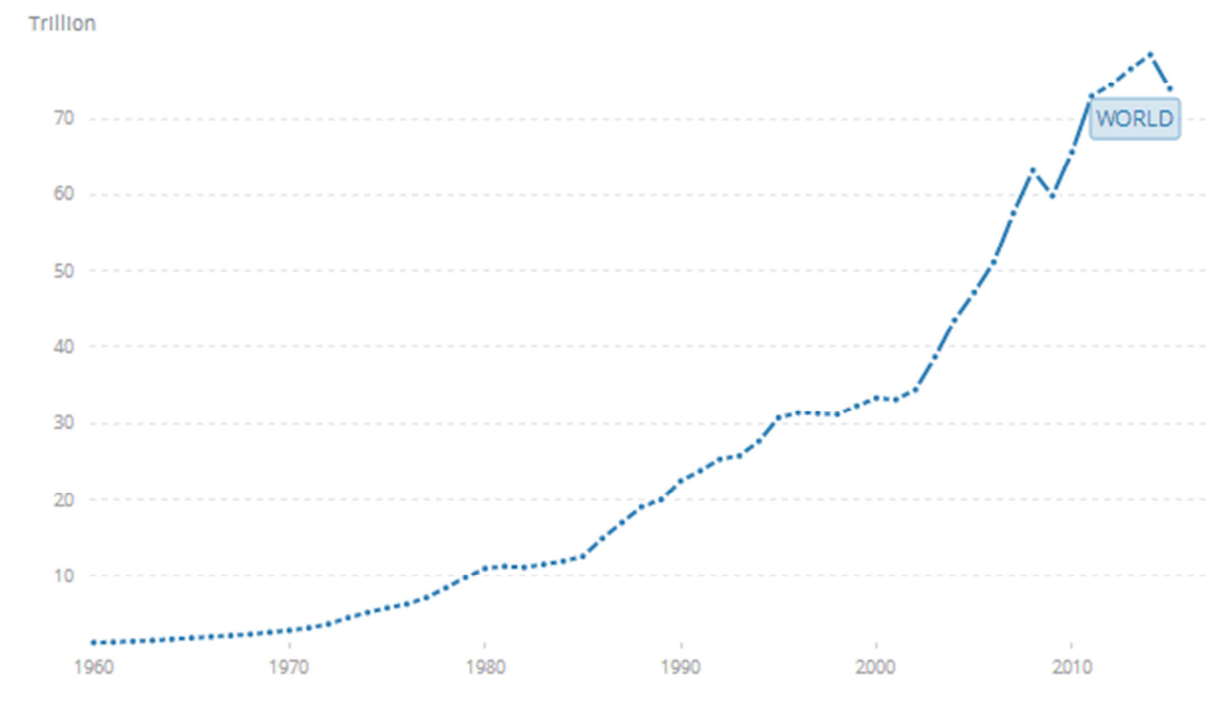
world [11]. The world is not allocating health expenditures proportionately to the gdp.

A large body of literature studies on the relationship between health care expenditure (HCE) and GDP have been analyzed using data intensively from developed countries, but little is known for other regions [7]. We analyze four countries Pakistan, India, China and Bangladesh. These are the developing countries and cover the area of south east asia which is one of the most influential contnent in all over the world. Pakistan, India, China and Bangladesh are struggling in maintainnig the quality of health and continuously doing effort in acheiveing excellence in health development. Figure 4 shows the gdp comparison of this region [5] which shows China at top among these countries since 1980, only in 1988-1990 China faced worst in the region. Currently the gdp of Pakistan, India and Bangladesh is increasring but China is facing a decreasing tend. 2009 was the worst year for Pakistan Whereas 2005 had been a better over the time line shown in the Figure 4 [5].
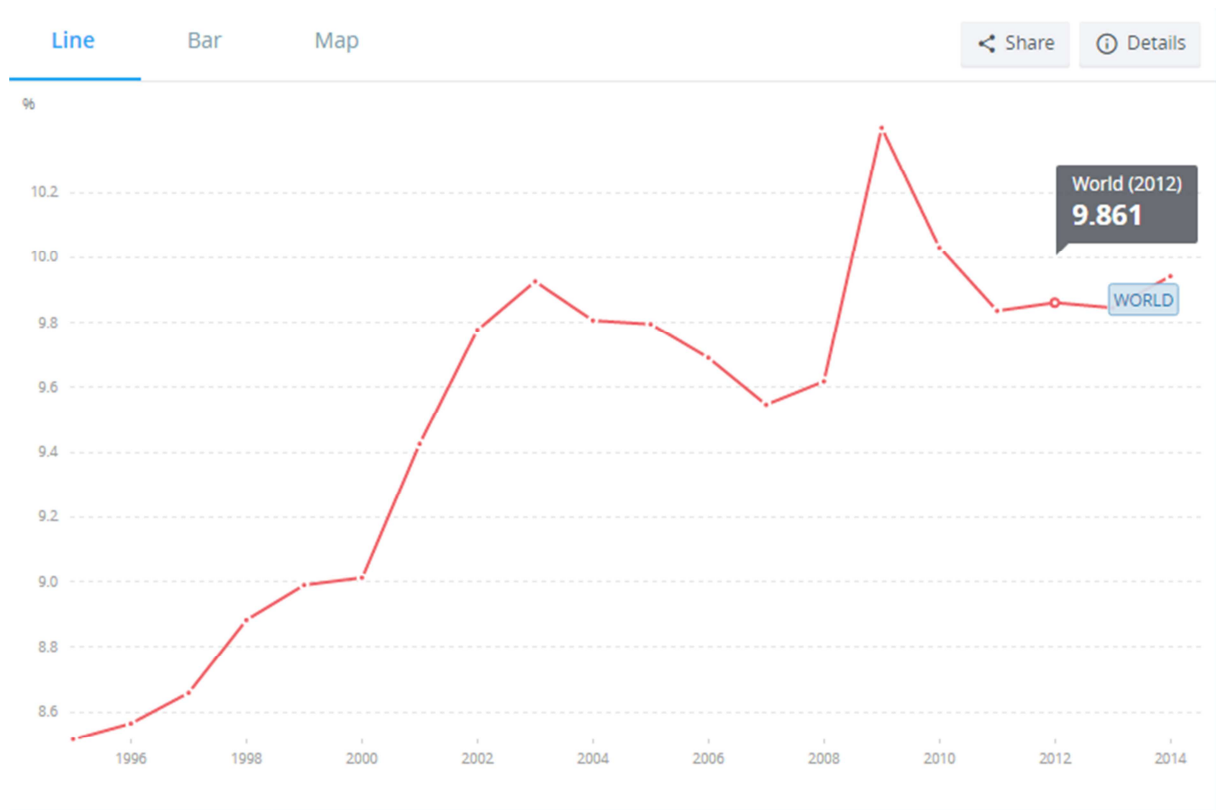
Source: World Bank Data Bank

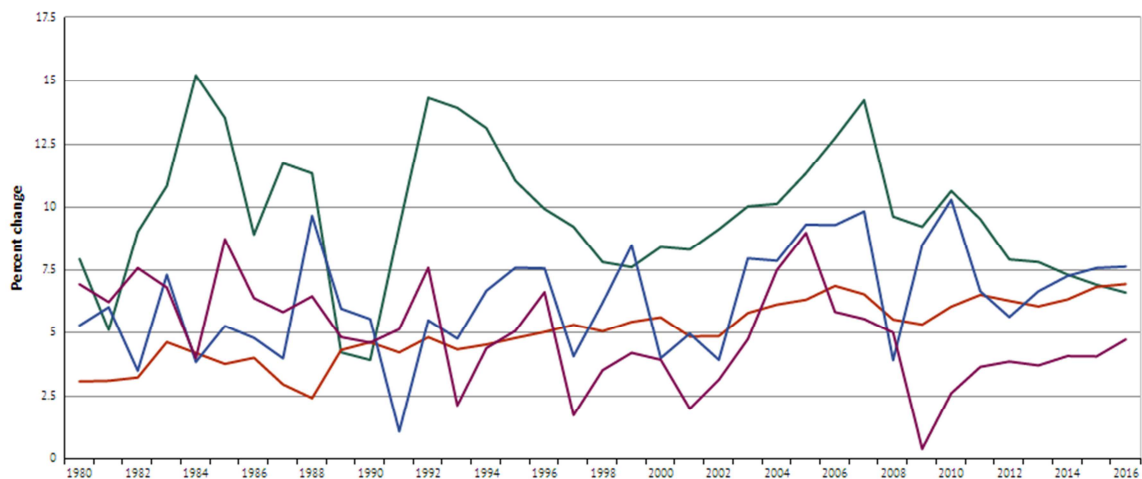***Figure 1.*** *GDP growth(annual %) of the world from 1980-2015.*

Source: World Bank Data Bank

Figure 2. *GDP in trillion US$ of the world from 1980-2015.*

Source: World Bank Data Bank

Figure 3. Health expendiutures incurred in all over the world.

Source: Knoema

Figure 4. Comparative gdp of China, Pakistan, India and Bangladesh.

Health Expenditures are extremely important in this region Figure 5 shows a comparative analysis of these four countries. Since 1995 the China is comparatively more concerned towards health in the country, Similarly India is also having increasing trend but lower than China. On the other hand Pakistan and Bangladesh have to pay lot of attention towards this expenditures, now Pakistan and Bangladesh are facing big challenge in the development of their health sector [5].

Source: Knoema

Figure 5. Comparative health expenditure (% of gdp) of China, Pakistan, India and Bangladesh.

2. Objective of Study

The huge research gap has apealed us to study the following research problem:

To study the impact of health expenditure total (% gdp) on gdp growth (annual %)

3. Literature Review

Lot of researchers have been taking care of this gap therefore Hitiris, (1992) re-examine the results of previous work using a sample of 560 pooled time-series and cross-section observations. He confirms the importance of GDP as a determinant of health spending.

On the other hand McCoskey, (1998) opens a new space for researchers by saying that no single test is likely to be definitive in this rapidly-evolving area of econometric research; however, his results help to mitigate concern that panel data analyses of national health care expenditures are misspecified.

Similarly Gerdtham, (2000) demands more efforts on theory of the macroeconomic analysis of health expenditure, which is underdeveloped at least relative to the macro econometrics of health expenditure. He also demands more replications based on updated data and methods that seeks to unify the many differing results of previous studies.

Gerdtham U. G., (2000) studies stationarity and cointegration of health expenditure and GDP, for a sample of 21 OECD countries using data for the period 1960–1997, He argues that both health expenditure and GDP are non-stationary. The no-cointegration and cointegration results indicate that health expenditure and GDP are cointegrated.

Gerdtham U. G., (2002) again tested for existence of cointegration between health expenditure and GDP using data from 25 OECD countries. Univariate country-by-country and panel unit root tests generally fail to reject the null of a unit root in the health expenditure and GDP variables. Country-by-country results based on the Johansen multivariate likelihood-based inference indicate somewhat mixed results on country-specific cointegration with a rank of one found for 12 countries and a rank of zero for the remaining 13 countries. Application of a new panel test for cointegration rank with higher power than the individual tests indicates that health expenditure and GDP are cointegrated around linear trends.

Lago-Peñas, (2013) adds a value in the existing literature by writing a very informative paper in which he analyzes the relationship between income and health expenditure in 31 Organization for Economic Cooperation and Development (OECD) countries. His Econometric results show that the long-run income elasticity is close to unity, that health expenditure is more sensitive to per capita income cyclical movements than to trend movements, and that the adjustment to income changes in those countries with a higher share of private health expenditure over total expenditure is faster.

Sisko, (2014) conclude a significant findings by saying that "since the end of the Great Recession in 2009, economic growth in the United States, as measured by GDP, has remained slow: just 3.9 percent per year, on average, which is well below the average rate experienced in the four years following the three previous recessions." Lv, (2014) considers a semi-parametric panel data analysis for the study of the relationship between per capita HCE and per capita GDP for 42 African countries over the period 1995–2009.

4. Theoretical Framework and Research Methodology

There has been a strong historical relationship between spending on health care and economic growth (CMS, 2016),

On the basis of previous researches studied by Gerdtham U. G., (2000), Gerdtham U. G., (2000), Hitiris, (1992), Lago-Peñas, (2013) and McCoskey, (1998) we can surely develop a framework shown in figure 6.

Figure 6. *Theoretical framework of our study.*

We can develop equation

$$gdp_{it} = \beta he_{it} + \alpha + \varepsilon_{it}$$

Where;

gdp_{it} Is the gross domestic product growth (annual %), the data has been taken from world bank data bank

he_{it} Is the health expenditure (% of gdp), the data has been taken from world bank data bank

$_i$ Stands for countries and $_t$ stands for time period

α Is constant

β Is parameter

ε Is error term

We have taken over sample size from 1995 – 2014, and we believe that this sample size is enough to study the population. This period also include the phase of financial crisis. We used STATA 11 for statistical analysis and applied panel regression based on fixed effect model and random effect model. After that we applied Hausman test to identify which model is appropriate for our study.

5. Results and Findings

Table 1. *Stata 11 is the source self-generated by authors.*

DESCRIPTIVES OF OBSERVATIONS						
Variables		observations	Mean	Std. Dev.	Min	Max
gross domestic product	gdp	80	6.494651	2.667841	1.014396	14.23139
health expenditure	he	80	3.622648	0.922521	2.250286	5.548228

Table 2. *Stata 11 is the source self-generated by authors.*

HAUSMAN F.				
	(b)	(B)	Difference	S. E
	fixed model	random model	(b-B)	Sqrt (diag (v_b_v_B))
he	-0.7778695	0.2777381	-1.055608	0.3059414
health expenditure				

b= consistent under H_0 and H_a; Obtained from xtreg

B= inconsistent under H_a, efficient under H_0; Obtained from xtreg

Test: H_0: difference in coefficients not systematic

Chi2 (1) = (b-B)'[v_b_v_B^(-1)(b-B)

Chi2 (1) = 11.90

Prob>chi2 = 0.0006

Table 3. *Stata 11 is the source self-generated by authors.*

Xtreg gdp he, re						
RANDOM-EFFECTS GLS REGRESSION				Number of obs = 80		
Group variable: c				Number of groups = 4		
R-sq:	Within = 0.0241			obs per group: min = 20		
	Between = 0.8014			average = 20.0		
	Overall = 0.3884			max = 20		
Random effects u_f = Gaussian				wald chi2 (1) = 0.33		
corr(u_i, x) = 0 (assumed)				prob > chi2 = 0.5651		
gdp	coef.	st. Err.	z	p>|z|	[95% conf. interval]	
he	0.277738	0.482753	0.58	0.565	-0.66844	1.223916
_cons	5.488503	1.880743	2.92	0.004	1.802314	9.174692
sigma_u	1.259362					
sigma_e	1.671626					
rho	0.362072	(fraction of variance due to u_i)				

Table 1 shows the descriptive of the data and Table 2 shows the findings of Hausman test which states that random effect model is appropriate for our study. Hausman Test compares fixed effect with random effect in STATA.

Running a Hausman specification test at five (5) percent level enables the researcher to choose between fixed and random models (AFRIYIE, 2013). The Hausman Test evaluates the Null hypothesis that the coefficient estimated by the random effect estimator is the same as the ones estimated by the constant fixed effect estimator. If the Hausman test is insignificant (Prob > Chi2 greater than.05), then the fixed effects model will be used (Torres-Reyna, 2007). The random effect model is showing insignificant results for our study.

6. Conclusion

So we conclude that in this part of world the effect of health expenditure on gdp is insignificant. We recommend the policy makers on this part of world that to derive some policies related to health expenditures because it will contribute to the development of the country. Table 3, shows the results of random effects model.

7. Limitation

A huge work is required in this part of world, we have only used gdp as dependent variable, new researchers are advised that the dependent variable can be replaced with human development index and the study can be explored more by introducing moderating and mediating variables in the study.

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