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PUBLIC HEALTH CARE AND GOVERNMENT HEALTH EXPENDITURES IN PAKISTAN

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ABSTRACT

This study evaluates the impact of health care expenditure by the government on health sector outcomes in Pakistan by using data from the period 1982 to 2016. To examine whether the variables are stationary, the ADF test is run whereas the relationship among the variables is tested through the ARDL model technique. The empirical result from the regression equation shows that healthcare expenditure affects significantly the health sector outcome i.e., a decrease in infant deaths in the long run. Bilateral and multilateral fund assistance becomes a part of health expenditure in less progressive countries which is helpful for increasing the resource allocation in the vital segment of the economy. Hence funds allocated for health care expenditure need to be sensibly utilized because it will help in achieving a portion of the Millennium Development Goals. Improved wellbeing can be achieved as an outcome of enhanced capacities of the health sector as a result of the proper allocation of public healthcare funds.

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INTRODUCTION

When we talk about economic development, we find a strong link between economic development and health improvement because when an economy starts to grow, it results in an overall improvement in health quality and equity. The rise in equitable health facilities results in a more effective workforce in the economy. For the purpose of an effective public health care system, it is fundamental to provide care to the ailing, and promoting wellness while taking measures to combat diseases. There is always a need for the availability of funds when there arises a need for health-related campaigns and other mechanisms to improve health in a nation and control numerous widespread diseases and chronic illnesses. Effective health care programs contribute significantly to the reduction of infant mortality and reduced death rate and increased life expectancy despite poor policies and mismanagement of funds. Pakistan is among the developing countries where more and more people are unable to access quality health care opportunities whereas a major segment of the population doesn't understand the risk. In numerous lower and middle-income nations, chronic illnesses are the core interest of health sector officials and policymakers. HIV/AIDS, tuberculosis, and malaria take an immense toll, hence increasing the death toll and lessening the workforce. The more advantageous nations are the ones with a more viable workforce; the better strength of their youngsters, the less child mortality rate, and the increased life expectancy rate. Immunizations are of prior importance in less developed countries for tracking down lifelong ailments (polio vaccine) and other life-threatening diseases. "Abdul Salam Afridi" in his article "Foreign Aid to Pakistan" stated that Pakistan only spends one rupee out of hundred rupees in Gross Domestic Product for healthcare which has resulted in poor health. Many infants and mothers die during childbirth because the major segment doesn't have access to healthcare facilities. Increasing life expectancy and decreasing child mortality in developing countries is related to increased health care expenditure. There is a downward trend in infant mortality & under 5 years of children mortality for countries allocating funds wisely.

In Pakistan, USAID is converged to save the lives of women and children, fortifying families and communities, and helping develop a healthy workforce. Hence the focus includes improving the quality of health services, expanding

the area under its umbrella, and raising awareness to save the lives of mothers and children resultantly a downward trend in child and maternal deaths. The amount and distribution of the funds allocated specifically for the health sector differ from country to country but the point is how much of these expenditures are productive and effective? Government expenditure policies are implemented to increase overall efficiency in the allocation of the resources by extending its availability which the private market fails to provide optimally. The government wants to enhance equity and improve the distribution of resources. Hence the distribution of funds is very important.

Berger and Messer (2002) estimated the health production model using 1960–1992 data across 20 OECD countries and the effect of health expenditure is evaluated on health outcomes. Tobacco alcohol and fat consumption together with female labor force participation and literacy rates are also found associated with overall mortality rates. The result that high government expenditure increase mortality rates distributed and allocated less productively were significant in samples. Nixon and Ulmann (2006) estimated an association between health expenditure and health outcomes. Fixed effects models are conducted as an econometric analysis tool using panel data during the period 1980–1995. It is to be noted that health care expenditure contributes to health outcomes but the measurement of its effectiveness in health status is not a perfect process. The key findings are in line with previous studies and various policy improvements are suggested for future purposes. By using panel data, Bokhari et al. (2007) econometrically evaluated that economic growth was undoubtedly an important factor to affect health outcomes and government spending on health was a significant factor in developing countries. Akinkugbe and Mohanoe (2009) find that health expenditures, the provision of doctors, female literacy, and child immunization also contribute to health status improvement. The policy suggestions for the government of Lesotho are recruiting more physicians, and increasing the number of children immunized per year, hence an increase in public spending on health.

Yaqub et al. (2012) revealed that public health spending has a significant impact on health outcomes. Hu and Mendoza (2013) empirically evaluated the factors affecting child health in less developed countries and how public health policy may respond to these factors. The Health database of 136 countries is taken from 1960–2005. The results highlighted that public spending on healthcare and the quality of governance lead to low child mortality rates. Based on data from 17 OECD countries for the time between 1973 and 2000, Kim and Lane (2013) find that government health expenditure decreases infant mortality rate and has a positive impact on life expectancy at birth. The policy suggestions are to provide better overall health results for individuals, Government should prefer more medical spending. Ssozi and Amlani (2015) evaluated the effectiveness of health expenditures in African countries by using the General Method of Moments technique. Health expenditure is tracked down into the government and non-government entities, and it is found that while there exists a higher effect on targeted immunization, malaria, HIV/AIDS, and nutrition, there is found a low effect on the final goals such as life expectancy, infant mortality and child mortality.

Ahmad and Hasan (2016) conducted a study on general spending & governance on public health care in Malaysia based on data from 1984 to 2009. The data technique used is the Autoregressive Distributed Lag model. The co-integration result showed a link between public health expenditures and infant mortality rate. Filmer and Pritchett (1999) investigated the effect of public health care expenditure on infant mortality rate and child mortality rate. The ordinary least square and two-stage least square technique were applied in this research to estimate the parameters. The result showed that 95% of changes in health outcomes were explained by income distribution and cultural factors on infant mortality rate. The per capita income caused a strong significant impact on health outcomes rather than other factors.

METHODOLOGY

The data was taken from WDI & Pakistan Economic Surveys for the period of 1982-2016. ARDL technique was used to estimate this model because the mix order of integration among explanatory variables was found after the ADF test.

$$IMR = \beta 0 + \beta 1\ HEX + \beta 2\ NOD + \beta 3\ NOH + \beta 4\ IMS + \mu$$

IMR = Infant mortality rate (dependent variable)
HEX = Health expendture as % of GDP
IMS = Immunization measles 12-23 months children
NOH = Number of total hospitals
NOD = Total number of registered doctors

RESULTS AND DISCUSSION

The number of observations under analysis is 34, where (immunization measles, number of hospitals) are negatively skewed and the rest of the variables are positively skewed. J-B probability suggests that (skewness and kurtosis) match normal distribution, as the null hypothesis holds in our model as shown in Table 1. There exists no multicollinearity problem and the presence of a negative correlation between

IMR & HEX is observed as shown in Table 2. The results of Table 3 suggested to select the 3 lags of dependent and independent variables in the model. The results of ADF test is shown in Table 4. Table 5 shows that the calculated value 8.31 is greater than upper bound. So, Null hypothesis is rejected and there is co-integration.

Table 1. Descriptive statistics of the variables used in the study.

Statistics	IMR	HEX	IMS	NOH	NOD
Mean	94.90882	0.726853	49.79412	826.7941	81612.94
Median	94.25000	0.744938	52.50000	861.5000	77356.50
Maximum	122.1000	1.253917	73.00000	1113.000	167759.0
Minimum	69.10000	0.230286	1.000000	600.0000	11860.00
Std. Dev.	16.60477	0.217040	18.85958	139.0009	45397.00
Skewness	0.087667	0.073369	-1.409551	-0.051607	0.213421
Kurtosis	1.698232	3.405433	4.375373	2.215230	1.953310
Jarque-Bera	2.444234	0.263370	13.93857	0.887565	1.810153
Probability	0.294606	0.876617	0.110940	0.641605	0.404511
Sum	3226.900	24.71300	1693.000	28111.00	2774840.
Sum Sq. Dev.	9098.707	1.554509	11737.56	637601.6	6.80E+10
Observations	34	34	34	34	34

Table 2. Pairwise correlation.

IMR	1.000000				
	0.730612	1.000000			
	6.053031	-----			
HEX	0.0000	-----			
	-0.853370	-0.443849	1.000000		
	-9.260205	-2.801905	-----		
IMS	0.0000	0.0086	-----		
	-0.981373	-0.654894	0.836632	1.000000	
	-28.89711	-4.902133	8.640015	-----	
NOH	0.0000	0.0000	0.0000	-----	
	-0.991444	-0.727464	0.818579	0.978062	1.000000
	-42.96468	-5.997490	8.061692	26.55993	-----
NOD	0.0000	0.0000	0.0000	0.0000	0.0000
	IMR	HEX	IMS	NOH	NOD

Table 3. Lag-length criteria.

Lag	LogL	LR	FPE	AIC	SC	HQ	Lag
0	-654.7836	NA	2.11e+12	42.56668	42.79797	42.64208	0
1	-378.1363	446.2053	192281.5	26.33137	27.71910	26.78374	1
2	-322.9614	71.19344*	31461.50*	24.38461	26.92878*	25.21394*	2
3	-292.1995	29.76959	31974.09	24.01287*	27.71348	25.21918	3

**3 lags of dependent & independent variable are used as suggested by SC in my model.*

Table 4. Unit Root Test.

Variables	Level		First difference	
	T statistics	P value	T statistics	P value
IMR	-2.0316	0.2725	2.7228	0.0234
HEX	-2.00769	0.2822	-4.6766	0.0007
IMM MEA	-3.779	0.0073	-3.158	0.0325
NOH	0.4719	0.9830	-2.724	0.0814
NOD	2.4914	0.0046	-3.685	0.0026

Level Stationary = Immunization Measles, Reg Doctors.
1st Diff. Stationary = M.R Infant, H. Exp as % of GDP, No. Of Hospitals.

Table 5. Bound test results.

Test Statistic	Value	K
F-statistic	8.319902	4
Critical Value Bounds		
Significance	Lower Bound	Upper Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

** The calculated value 8.31 is greater than upper bound. So, Null hypothesis is rejected and there is co-integration.*

Table 6. Long run results.

Variable	Coefficient	t-statistic
HEX	-6.025059 ***	-3.368149
IMS	-0.011825	0.405145
NOH	-0.091395 ***	-6.797010
NOD	-0.000102 **	-2.322200
C	169.375774	27.113635

Table 7. Short-run results.

Variable	Coefficient	t-Statistic
D(IMR(-1))	0.3414*	1.8201
D(HEX)	-0.2240 **	-1.9915
D(HEX(-1))	0.2614 **	2.2011
D(IMS)	0.0010	0.4313
D(NOH)	-0.0003	-0.3836
D(NOH(-1))	0.0025**	1.9547
D(NOH (-2))	0.0050***	3.6060
D(NOD)	-0.0000	-1.6654
CointEq(-1)	-0.0837	-4.084691
R-squared	0.9999	
Adjusted R-square	0.9999	
Log likelihood	61.70815	
Durbin-Watson stat	2.2655	
F-Statistic	305560.6	
Prob(F-Statistic)	0.00000	

Table 6 shows long run results. Health expenditure affects negatively the infant mortality rate. The coefficient of the number of hospitals is negatively associated with infant mortality rate and statistically significant. The registered

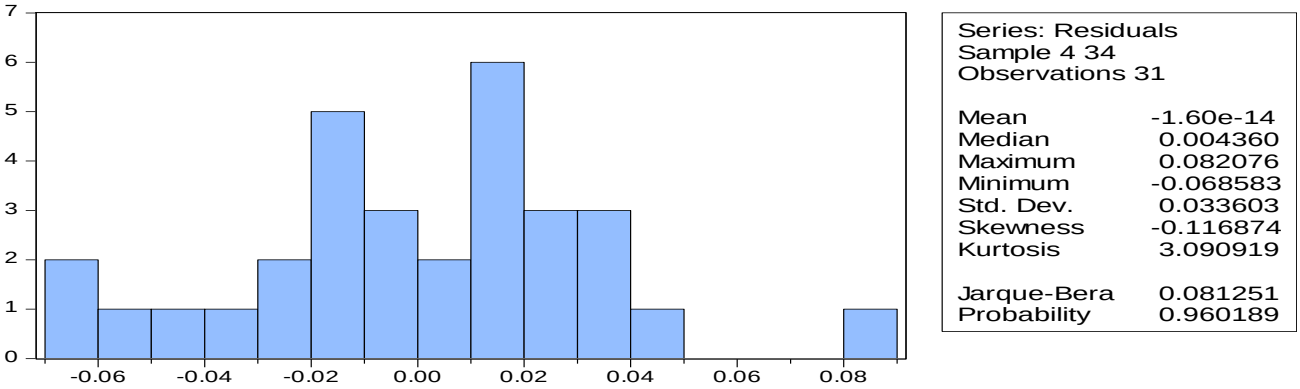
number of doctors negatively affects the infant mortality rate. Table 7 shows the short-run results. Health expenditure decreases the infant mortality rate. However, the number of doctors and hospitals leads to decrease in the infant mortality rate. ECM value of -0.0837 shows the correctness of the model along with a P value of 0.0007.

Table 8. Diagnostics tests.

White Heteroskedasticity Test			
F-statistic	0.618228	Prob. F(12,18)	0.8006
Obs*R-squared	9.047691	Prob. Chi-Square(12)	0.6989
Scaled explained SS	3.189088	Prob. Chi-Square(12)	0.9941
Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.183166	Prob. F(3,15)	0.3494
Obs*R-squared	5.931935	Prob. Chi-Square(3)	0.1150
Omitted Variables: Squares of fitted values			
	Value	Df	Probability
t-statistic	0.609987	17	0.5499
F-statistic	0.372084	(1, 17)	0.5499

As shown in Table 8 the results of the White Heteroskedasticity Test shows the calculated value of F-probability is greater than critical value 0.05 we accept the null hypothesis that no presence of "heteroscedasticity". Breusch-Godfrey Serial Correlation LM Test shows that The calculated value of F- probability is greater than critical value 0.05 hence we accept the null hypothesis that no presence of "autocorrelation". The p-value in test Omitted Variables presents that the functional form of this model is corrected.

Table 9. Normality tests.



The Normality test as shown in Table 9 suggests the stability of the economic model looking at the P values and we accept our null hypothesis of zero mean and constant variance of residuals.

CUSUM & CUSUM square test (Figure 1) presents the stability of the model as the blue line resides within the red line (5% significance level) hence constancy of coefficients prevail resultantly helpful for forecasting.

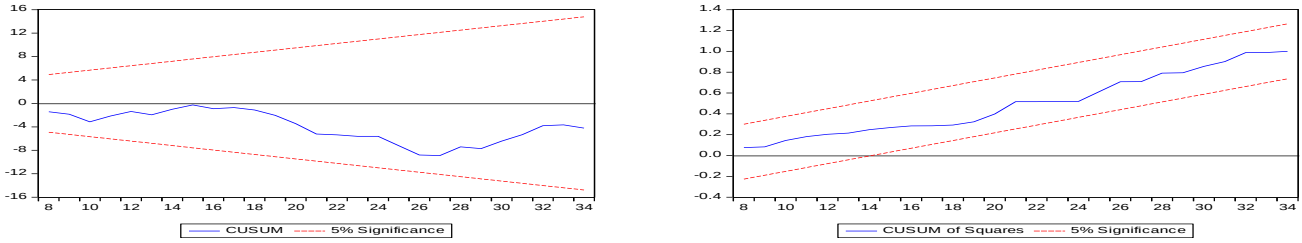


Figure 1. Plot of CUSUM & CUSUM

CONCLUSIONS

The empirical result from the regression equation shows that healthcare expenditure affects significantly the health sector outcome i.e., a decrease in infant deaths in the long run. Health expenditure is very vital in reducing newborn death toll with the increased number of doctors

and hospitals provided with enough facilities required for covering far-flung outreach and improved vaccination facilities that are not significantly impacting new-born death in a less developed country but has a negative relationship if increased in reducing the infant death toll. It is very important to demonstrate a properly regulated mechanism framework in diminishing crude deaths and improved life expectancy together with reduced infant deaths as a policy grip. Improved pure drinking water reach and sanitary facilities in all areas across the country require budgetary share. Increasing the number of trained doctors and well-equipped hospitals are beneficial to improve a broad spectrum of the health sector in our country. Vaccination programs are required to be made effective as our youth suffers from polio, hepatitis, and other life taking diseases. The fundamental inferences will help the policymakers to bring down the infant mortality rate of our country. We have to target the three main pillars of management i.e. Man, Money & Material. It is imperative to note that logically addressing the issues of these 3 M's will improve the situation. The foremost factor in this regard is to enhance our health budget.

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