CAN FISCAL DECENTRALIZATION PROMOTE PUBLIC SERVICE DELIVERIES? EVIDENCE FROM PAKISTAN

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Abstract

This study is conducted to empirically analyze the impacts of fiscal decentralization on public service deliveries in case of Pakistan. The study based on annual data which range from 1972 to 2009. Autoregressive Distributive Lag model is employed to estimate the long run coefficients. The finding of the study suggest that in long run vertical balances have no impacts on health sector while the fiscal transfers significantly influences the infant mortality rate. On the other hand in short run both vertical balances and fiscal transfers have significant impacts on public service deliveries (health). Other variables also showed significant impacts on public service deliveries. Therefore it can be concludes that devolution of fiscal powers from central government to the local governments are helpful in reducing the infant mortality rate in case of Pakistan.

Key Words: Fiscal Decentralization, Public Service Deliveries, health, ARDL

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Introduction:

Fiscal decentralization is consider being the policy option which helps in enhancing economy, providing the public services and allocates the resources more efficiently. Dillinger (1994) conducts a survey of 75 countries where 84% countries devolve certain type of powers to the local tiers of governments. Because of this enthusiasm for decentralization in most of the countries around the world the causes and consequences of decentralization have caught the interest of researchers and policy makers.

Health care reformists consider the decentralization an important tool through which the public services like health services can be delivered in a better way than the central government. Devolving power to lower tiers of governments are assumed to improve the efficiency of the governments and also because these governments are closer to the inhabitants of their locality and it provide an opportunity for the masses to take part in decision making and implementation of policies therefore it is assumed that health sector can also be improved. (Mills, 1994; Arun and Ribot, 1999; Peabody et al., 1999; Robalino et al., 2001; Besley and Burgess, 2001).

Decentralization, because of its importance within the health sector, became the integral part of the agendas of both national governments and international organizations. Peabody et al., 1999 are of the view that devolution of some fiscal responsibilities is helpful in improving the technical and allocative efficiency. The idea behind this proposition is that local governments are well informed of the needs and culture of their locality. Thus they can allocate the resources to the sector which deserve it. In decentralized governments the fiscal responsibilities remain in the hands of the local manager who can improve the efficiency by using the savings for some other purposes and can also have the opportunity to reduce the cost. Local manger is in a position from where he can use the information without much delay. On the other hand if there is lack of coordination amongst the different sectors and regions, if the resource transformation does not made on a proper formula then decentralization of fiscal responsibilities may reverse the case for economy.

Literature on the impacts of fiscal decentralization showed mixed up results for transitional and developing economies e.g. Pallavi Jain Govil (2011), Hiroko Uchimura and Johannes Jütting (2007), David A. Robalino et al, Abay Asfaw et al (2004), Holland and Pimphachanh, 1995. Visschedijk et al., 1995; Bossert, 1995; Collins, 1994; Kutzin, 1994; Gilson, 1993; Bossert et al., 1991.

In this paper an attempt has been made to find the impacts of fiscal decentralization on health in case of Pakistan. We develop a simple theoretical model to show the impacts of fiscal decentralization and then estimate this model on time series data. This data includes the indicators of fiscal decentralization with the proxy for health (infant mortality rate). Other economic and social indicators are also included to capture the impacts of fiscal decentralization. Rest of the paper is organized as following; in the next section there some facts about the health sector of Pakistan, section three describe the theoretical model developed for the study, data and methodology is discussed in fourth section while results interpretation are in section 5 and the last section of the paper consist of conclusion and policy recommendation.

ii- Some facts of health sectors in Pakistan:

Both public and private sectors are engaged in providing the health facilities to the inhabitants of Pakistan. Till the 18th amendment bring to the constitution in June 2011, the public sector work under the supervision of the health Ministry. Now this is transferred to the provincial government and thus provincial government has to make their own health strategies and policies which have to be based on their local needs. Private health care system can be found all over the country both in rural and urban areas. This sector not only provides various types of doctors, pharmacist, nurses, laboratory technicians and also the traditional healer but also build the hospitals and maternity clinics. The facilities provide by the private sector can be judge by looking at the trend of the masses who prefer to be benefitted from the private sector rather than go to the public sector. These private sector hospitals have both the partnership and also run by a sole proprietor.

The population growth in Pakistan having ever increasing trend and the government after doing its best cannot provide the basic necessities of health to the masses living here. Also the poor performance of the health sector is contributed by lack of infrastructure, lack of research

facilities, corruption, and mismanagement of the fund. The transmittable diseases are still causing death in Pakistan. Today the infant mortality rate is the highest one in the region so special attention is needed to address the health problems.

The health policy targeted the following intervention to achieve the health objectives;

i. by making the accountable and responsive health system, ii- reforms in health sector is needed which address the new emerging issues of health, iii- by bringing together both private and public sector to communicate the health problems

Health Indicators:

Here below the table present the data on basic health indicators where comparison is made between pakistan and other Asian countires. Table 1

Regional Human Development Indicator

Country	Life expectancy 2011	Mortality rate under 5 per 1000 2010	Infant mortality rate per 1000 2011	Population growth rate (%) 2011
Pakistan	65.99	86.50	63.26	2.03
India	66.80	62.70	47.57	1.34
China	74.68	18.40	16.06	0.49
Indonesia	71.33	35.30	27.95	1.07
Bangladesh	69.75	47.80	50.73	1.57
Sri lanka	75.73	16.50	9.70	0.93
Malaysia	73.79	6.30	15.02	1.58
Nepal	66.16	49.50	44.54	1.60
Thailand	73.60	13.00	16.39	0.57
Philipines	71.66	29.40	19.34	1.90

Source economic survey of pakistan 2011-2012

From the above table it is clear that infant mortality rate in Pakistan is the highest in the south Asia which is 63 per 1000 live births and similarly the under 5 years mortality rate (at 86.5 per 1000 live births) is also highest in the region. All these indicators are high mainly because of; unhealthy dietary habits, malnutrition and rapid population growth. To achieve the desired health objectives considerable resources are needed.

Health Expenditure:

Following table depicts the picture of the health expenditure made by the government of Pakistan from 2000-01 to 2011-12.

Table 2: health and nutrition expenditure 2000-2001 to 2011-2012

	Public sector expenditure in Rs. Billion				
Fiscal Year	Total health Expenditure	Developmental expenditure	Current expenditure	% change	Health expenditure as a %age of GDP
2000-01	24.28	5.94	18.34	9.9	.72
2001-02	25.41	6.69	18.72	4.7	.59
2002-03	28.81	6.61	22.21	13.40	.58
2003-04	32.81	8.50	24.31	13.80	,57
2004-05	38	11	27	15.80	.57
2005-06	40	16	24	5.30	.51
2006-07	50	20	30	25.00	.57
2007-08	60	27.22	32.67	20.00	.57
2008-09	74	33	41.10	23.00	.56
2009-10	79	38	41	7.00	.54
2010-11	42	19	23	-47*	.23
2011-12	55.12	26.25	28.87	31.24	.27

*This – sign is because of rationalization on account of flood in 2010, Source: Economic Survey 2011-2012

Upto 2009 the expenditure made on health sector showed increasing trend but in 2010 the flood affect the economy of Pakistan badly and thus the expenditure on health sector reduced to 42 in 2010-2011. Then in 2011-2012 the health expenditure were increased to 55.12 million rupees and that consist of 26.25 developmental expenditure and 28.87 were the current expenditure.

Health Facilities:

Following table present the health facilities available to the population of Pakistan.

Table 3: health care facilities:

Health Manpower	**2009-2010**	**2010-2011**	**2011-2012**
Register Doctors	139,555	144901	149201
Register Dentist	9822	19508	10958
Register Nurse	69313	73244	76244
Population per doctor	1183	1222	1206
Population per dentist	16914	16854	16426

Population per bed	1592	1701	1665

Source: Economic Survey of Pakistan 2011-2012

iii. Empirical literature: fiscal decentralization impacts on health:

The impacts of fiscal decentralization on health has been investigated by number of researchers and majority of the research showed positive impacts of fiscal decentralization on health sector. Here we briefly describe few of these researcher works;

Mahal et al (2000) conducted their study for India and in their study they used the data from rural villages of India. The results of their study showed that the estimated coefficients for decentralized states have positive impacts while the election frequency variable showed insignificant impacts. Asfaw et al (2004) study the impacts f fiscal decentralization on health sector in case of India. By using the index of fiscal decentralization constructed through factor analysis they concluded that when the political decentralization increases the fiscal decentralization showed greater results. Habibi et al (2003) took the period from 1970 to 1994 for Argentina. Their results showed that locally raised revenue and the ratio of the controlled revenue helps to reduce the infant mortality rate and also they conclude that the regional inequalities were reduced by decentralization. Robalino et al (2001) showed that fiscal decentralization helps to reduce the infant mortality rate. They divide the sample countries into high and low income countries. The findings of their study suggest that in low income countries the benefits of fiscal decentralization are at a greater proportion as compared to high income countries. Yee (2001) conducted his study for China and concludes that fiscal decentralization helps to reduce the infant mortality rate. Uchimura and Jütting (2009) also found that in case of China infant mortality rate can be reduce by devolving the powers to the local governments. Jiménez-Rubio (2010) also found negative association between fiscal decentralization and infant mortality rate in Canada.

iv- Specification of the Model

To find the conceptual impacts of fiscal decentralization on health a theoretical model has to be developed which will show us the ways through which explanatory variables can affect the dependent variables (Akin et al., 2001; Robalino et al., 2001). So far to model the impacts of fiscal

decentralization, very rare attempts have been made. Here a model is developed on hypothesis that fiscal decentralization have positive impacts on health and this depends on the efficiency of lower tiers of government in providing health services.

Let's say there is a state planner whose primary function is the better delivery of the public services in say "N" number of districts. It is assumed that public service deliveries are a function of economic level and fiscal decentralization. We further assume that because the lower governments are well aware of the problems of their locality and can provide the better supervision to the projects implemented and thus there is more possibility of the efficient allocation of resources therefore the public services provision can be improve by fiscal decentralization. To a state planner economic structure of the province and budget allocation are exogenous. Now the problem he faces is to use the budget in such a way that the public service deliveries assure to be improved. Mathematically we can say that the problem a state planner face is;

$$H = Þ\ (Œ_t + ə_t) \cdots\cdots\cdots\cdots\cdots\cdots\ (1)$$

Where

- H are the health outcome in a province
- $Œ_t$ is economic indicators in province of state at time t.
- ə t is impacts of FD at time t.

Now we say that the public service deliveries depends on total amount of the budget allocated, use of this budget and on the structure of the economy. So in light of this we can write the latter part of equation (σ_t) as a function of total allocated budget and the use of the decentralized budget.

$$ə_t = f(D_t,\ W_t)] \cdots\cdots\cdots\cdots\cdots\cdots\ 2$$

Here D_t is the total allocated budget and W_t is the utilization of the the decentralization budget efficiently.

By substituting equation 2 in equation 1 we have,

$H = Þ\ (Œ_t + ə_t)$

$H = Þ_t\ [Œ_t + f(Dt,\ Wt)]$…….3

Let's assume that in equation 3 the Þ and f are continuous and twice differential function so,

$∂H/∂D = ∂Þ/∂D + ∂Þ/∂f * ∂f/∂D$…….4

In equation 4 $∂H.E/∂D$ is the fiscal decentralization overall effects on health and the sign of these variables depends on the value of two terms on right hand side of equation 4. As it is expected that fiscal decentralization will be helpful in a better allocation of the resources therefore it is said that $∂Þ/∂D$ will be positive. While $∂Þ/∂f * ∂f/∂D$ depends on the social structure, and institutional setting and capacity of province to take responsibilities.

On the basis of the above statements we postulate that impacts of fiscal decentralization are a function of decentralized budget and management of the resources. Maximization thus depends on;

$Max.D_t = Ht = Þ\ [Œ_t + f(D_t + W_t)\}]+ ſ\ [Ƒ_s - Dt]$ ……..5

Here ſ is the impacts of budget, $Ƒ_s$ decentralized budget. Now if the equation 5 is a functional form of the maximization then Dt is the total amount of decentralized budget to delivered the public services.

v- Data and Methodology:

In this study annual data is used for the period from 1972 to 2009 and the data is collected from state bank of Pakistan and economic survey of Pakistan various issues.

Methodology:

To achieve the desired objective bound test for cointegration is employed develop by Pesaran and Shin (1995,1999), pesaran et al (1996) and Pesaran(1997). Before going to the practical application of the bound testing

approach the unit root problem is checked by applying Augmented Dicky Fuller test. Although it is not the primary condition for the bound test approach but still it is not applicable in case where the variables order of integration exceeds 1. It is applicable in case where we have I(0) or I(1) order of integration of the variables.

ARDL approach is useful to get the long run and short run relationship without loss of the long run information. This approach (bound test for cointegration) has three steps; in the first step we have to select the optimum model for estimation process and for that we calculate Wald test. If the calculated F-value is greater than the upper bound of the tabulated F-value (critical value tabulated by Pesaran (1997) and Pesaran et al. (2001))that means that there exists a long run relationship amongst the variables under study. , if the test statistic falls below a lower critical value, the null hypothesis is not rejected. However, if the test statistic falls between these two bounds, the result is inconclusive.

The general form of the approach is

$\Delta Zt = \alpha 0 + \alpha 1 + \Pi Zt\text{-}1 + \Sigma \Gamma j \Delta Z_{t-1} + \varepsilon t + \ldots\ldots\ldots\ldots i$

Here Π and Γj are matrices representing the long run and short run multipliers, on the basis of this equation our estimated model are,

$$\Delta lnimrt = \alpha 0 + \sum_{i=1}^{p} \alpha 1 \Delta lnimrt - i + \sum_{i=1}^{q} \alpha 2 \Delta lnvbt - i + \sum_{i=1}^{r} \alpha 3 \Delta lnftpt - i + \sum_{i=1}^{s} \alpha 4 \Delta lnrgdpt - i + i=1t\alpha 5 \Delta lnpset-i + i=1u\alpha 6 \Delta lnhet-i + i=1v\alpha 7 \Delta lnrurt-i + i=1w\alpha 8 \Delta lnpcgdpt-i + \upsilon lnimrt-1 + lnvbt - 1 + lnftpt - 1 + lnrgdpt - 1 + lnpset - 1 + lnhet - 1 + lnrurt - 1 + \square lnpcgdpt -_1 \ldots\ldots\ldots\ldots\ldots\ldots 6$$

Here in this model α1, α2, α3, α4, α5, α6, α7, α8 represents the short run dynamics while υ, , , , , . , □ represents long run effects in the model. Further more in the above model,

imr = Infant Mortality Rate,

Vb = Vertical Balances,

ft = Fiscal Transfers,

pse= Primary School Enrollment,

he= Health Expenditure

Rur= Rural-Urban Ratio

pcgdp = Real Per Capita Gross Domestic Product

rgdp = Real Gross Domestic Product

It has to be mention that all the variables are taken in a log form.

The null hypothesis is;

H_0: υ= =, = = = = , □ = 0 (No long run relationship)

Ha: υ≠ ≠, ≠ ≠≠ ≠ , ≠ □ ≠ 0 (existence of long run relationship) ≠

In the second step, once we found that there exists a long run relationship then we estimate the following model to get the long run coefficients;

$$\text{lnimrt} = \alpha 0 + \alpha 1\text{lnvbt} - 1 + \alpha 2\text{lnftpt} - 1 + \alpha 3\text{lnrgdpt} - 1 + \alpha 4\text{lnpset} - 1 + \alpha 5\text{lnhet} - 1 + \alpha 6\text{lnrur} + \alpha 7\text{lnpcgdpt} - 1 + \varepsilon t \ldots\ldots 7$$

in a third step we estimate the underlying model for short run effects and this is the error correction model which is associated with the long run estimates;

$$\Delta\text{lnimrt} = \alpha 0 + \sum_{i=1}^{p} \alpha 1 \Delta\text{lnimrt} - i + \sum_{i=1}^{q} \alpha 2 \Delta\text{lnvbt} - i + \sum_{i=1}^{r} \alpha 3 \Delta\text{lnftpt} - i + \sum_{i=1}^{s} \alpha 4 \Delta\text{lnrgdpt} - i + \sum_{i=1}^{t} \alpha 5 \Delta\text{lnpset} - i + \sum_{i=1}^{u} \alpha 6 \Delta\text{lnhet} - i + \sum_{i=1}^{v} \alpha 7 \Delta\text{lnrurt} - i + \sum_{i=1}^{w} \alpha 8 \Delta\text{lnpcgdpt} - i \ldots\ldots\ldots\ldots\ldots\ldots 8$$

For a goodness of fit determination of our employed model we conduct the diagnostic tests (Serial correlation test, functional form of the model checking normality test and heteroscadasticity testing) and stability tests [cumulative residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ)].

vi- Results interpretation:

As stated earlier that ARDL model is applicable in case where the variables are integrated of order 1 or 0. Therefore before going to test the cointegration amongst our variables it seems necessary to check the nature of integration of our variables. In this study Augmented Dicky Fuller Test (ADF) is applied for unit root checking. Results of unit root are presented in table 4 below;

Table 4:

VARIABLE	intercept	T+I
Δlnimr	-8.2164*	-8.364*
lnvb	-6.1381*	-6.0996*
Δlnftp	-8.8566*	-8.794*
Δlnrur	-2.2821**	-2.043**
Δlnpse	-5.4015*	-5.338*
Δlnhe	-4.9519*	-5.283*
Δlnpcgdp	-9.0228*	-8.9243*
Δlnrgdp	-4.6954*	-4.667**

*1% level of significance **5 level of significance

From the above table 4 it is clear that all our variables are integrated of order 1 or 0 and therefore the case of Bound test is applicable. It can be seen that infant mortality rate, fiscal transfers, rural urban ratio, health expenditure, per capita real GDP, are stationary at first difference and the vertical balances are stationary at level.

Before presenting the formal explanation of the results, it has to be verified that whether the long run relationship exist amongst our variables or not and for that Pesaran et. Al. (2001) suggested the F-statistics. It is said that if the calculated value of the F-statistics is greater than the tabulated value then the null hypothesis of no cointegration is rejected. Here when equation 6 was estimated, we found that the value of the calculated F-statistics is 5.9602 which is a far greater than the tabulated value of the F-statistics (4.10) at 1% level of significance. This shows that in our case the long run relationship existed and the null hypothesis of no cointegration is rejected.

After investigating that we have the long run relationship amongst our variables, now the coefficients of the long run has to be estimated for equation 7 above. The results of the long run coefficients are displayed in table 2. This suggest that in the long run vertical balance have insignificant impacts on infant mortality rate and this can be justified because in a country like Pakistan fiscal decentralization is in immaturity stage and also it may have insignificant impacts on infant mortality rate because of the lack of the economies of scale which increase the coordination cost. May be because of the lack of accountability at local level which leads to increase corruption and also it may be contributed by the lack of administrative capacities at lower level of governments.

On the other hand fiscal transfers have significant impacts to decrease the infant mortality rate and this impact is -.021%. All other variables have considerable impacts to decrease infant mortality and this shows that in case of Pakistan devolution of expenditure power have significant influence to decrease the mortality rates.

Table 3 show the results computed for short run impacts of fiscal decentralization on health sector. The signs of the coefficients are not different from the long run estimates and also this time in short run vertical balances have significant impacts on infant mortality rate. The equilibrium correction coefficient (ecm) estimated -.31111 (000) is highly significant and imply a moderate speed of adjustment to equilibrium after a shock. Almost 31% of disequilibrium from the previous year shock converge back to the long run equilibrium in the current year.

ARDL regression for equation 1 fit very well at R^2 = 85% and adjusted R^2=73%. The diagnostic test for serial correlation, functional form misspecification, heteroscadasticity, and normality shows that it is a good model for estimation as none of these problems exist in the model. The cumulative sum (CUSUM) (Fig. 1) and cumulative sum of squares (CUSUMQ) (Fig. 2) from a recursive estimation of the model also indicate stability in the coefficients over the sample period.

Table 5: long run coefficients (ARDL(1,2,0,2,1,0,0,0) selected based on SIC)

Dependent variable is LNIMR

Regressor	Coefficient	St error	T ratio	prob
Lnvb	.0021	.0053	-.4076	.687
Lnpse	-.3496	0.3350	-10.4377	.0000
lnrgdp	-.6625	.1070	6.1875	0.000
Lnhe	-.1577	0.0344	-4.5738	0.000
Lnrur	2.3255	.5256	4.4237	0.000
Lnpcgdp	-.0426	.01690	-2.5250	.019
lnftp	-.0210	.0114	-1.8345	.080
A	-9.9840	2.6915	-3.7094	0.001

Table 6: Error Correction Representation (ARDL (1, 2, 0, 2, 1, 0, 0, 0) on SIC

Dependent variable is dLNIMR

Regressor	Coefficient	St error	T ratio	prob
dlnvb	-.0075805	.8716E-3	8.6975	0.000
dlnvb(-1)	-.0049716	.8177E-3	6.0800	0.000

dlnrgdp	-.20614	.029349	7.0235	0.000
dlnpse	-.041728	.012794	-3.2616	0.003
dlnpse(-1)	.056508	.013931	4.0563	0.000
dlnhe	-.030697	.0083609	-3.6715	0.001
dlnrur	.72349	.25268	2.8632	0.008
dlnpcgdp	-.013276	.0046929	-2.8290	0.009
dlnft	-.0065594	.0039511	-1.6601	0.009
dA	-3.1061	1.0922	-2.8440	0.009
ecm(-1)	-.31111	.053463	-5.8193	0.000

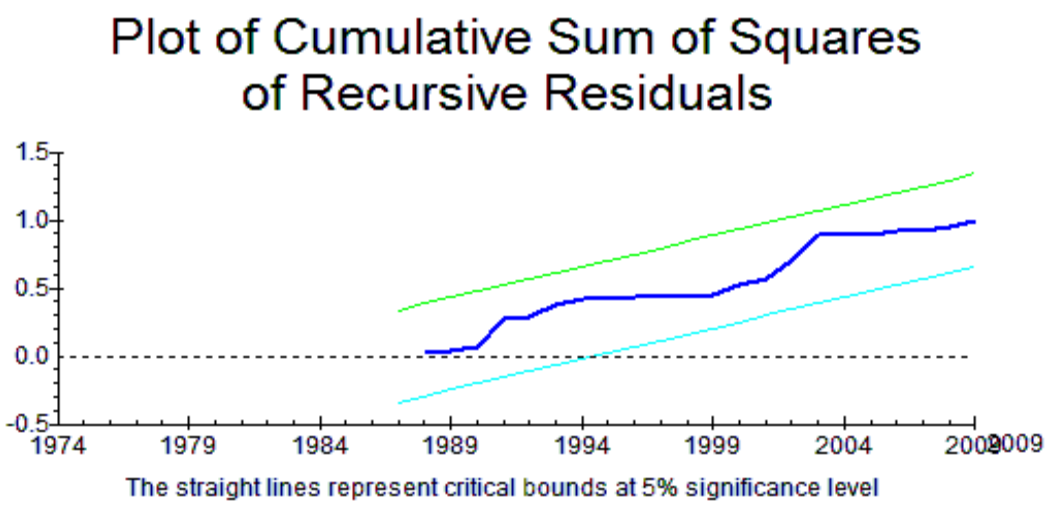
ecm = LNIMR + .0021997*LNVB -.66258*LNRGDP + .34967*LNPSE + .15776*LNHE -2.3255*LNRUR + .042674*LNPCGDP + .021084*LNFTP + 9.9840*A

R-Squared = .85048, R-Bar-Squared = .72122, DW-statistic = 2.1015 , F-stat. F(10, 25) 10.2291[.000]

Table 7: Diagnostic Tests

T -Statistic	CHSQ	LM Version		F-Version		
Serial Correlation	1	4.165	.141	1,13	1.700	.115
Functional Form	1	4.8577	.228	1, 13	2.027	.178
Normality	1	1.3855	.500	1,16	1.092	.143
Heteroscad	1	.1800	.671	1,34	1.708	.682

Fig. 1


Plot of Cumulative Sum of Squares of Recursive Residuals
1.5
1.0
0.5
0.0
-0.5
1974
1979
1984
1989
1994
1999
2004
2009
The straight lines represent critical bounds at 5% significance level

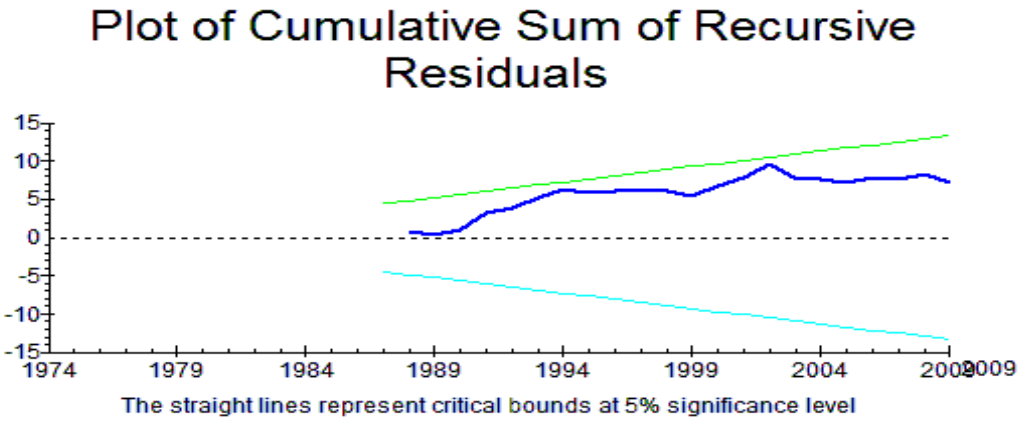

Plot of Cumulative Sum of Recursive Residuals
15
10
5
0
-5
-10
-15
1974
1979
1984
1989
1994
1999
2004
2009
The straight lines represent critical bounds at 5% significance level

Fig 2

Vii- Conclusion and policy Recommendation:

This paper was designed to empirically analyze the proposition of fiscal decentralization with respect to public service deliveries. For that purpose annual data for the period from 1972 to 2009 was used. Fiscal decentralization is measured with respect to vertical balances and fiscal transfer taking as a percentage of the total state expenditure. Health is taking as a proxy for public services and infant mortality rate is used as a proxy for provision of health services. The study employed Bound test for cointegration and it is found that in case of Pakistan fiscal decentralization is helpful as when the expenditure (fiscal transfer) decision making power is devolve it is found that it significantly decrease the infant mortality rate. Although vertical balances do not have effects on infant mortality rate in the long run but it does have influence to decrease the infant mortality rate in short run which is the indication that if the fiscal decentralization process is managed properly and the monitoring system is developed at local level then it will affect the infant mortality rate in the long run too. Other control variables of the model (real GDP, per capita GDP, Health Expenditure and Primary School Enrollment) all helps to decrease the infant mortality rate in the long run when the decision making power is given to the local authorities.

In light of this study it is suggested to the policy makers that by transferring more and more fiscal autonomy to the lower tiers of governments the health services can best be provided to the inhabitants therefore the policy makers should stress on devolution of fiscal powers to the lower governments.

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