
Fiscal Decentralization and Its Role in Poverty Reduction: Insights from the ARDL Model

Sadia Hussain¹, Sumera Iqbal², Muhammad Farhan Fiaz³

¹ Ph.D scholar Comsats University Islamabad Vehari Campus Pakistan,
Email: sadia.hussain.jutt@gmail.com

² Bahria Business School, Bahria University, Islamabad Campus, Pakistan,
Email: sumera.buic@bahria.edu.pk

³ Teaching Visiting Faculty, National University of Science and Technology, 44000
Islamabad, Pakistan, Email: farhankdi9@gmail.com

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Abstract

This paper aims at analyzing the impact of Fiscal Decentralization and Its Role in Poverty Reduction: Insights into ARDL Model. The estimation range is 1975 to 2023 to use the ADF (Augmented Dickey Fuller 1979) at the level and 1st difference to confirm the stratification of the variables. This study has applied, the ARDL approach is applied to model on the mix result (I(0), I(1)) of ADF estimation bases. The outcome discloses that there is a direct and indirect influence of the poverty eradication by fiscal decentralization. When the living standard of the people in Pakistan is given the autonomy by the central government, the living standard of the people in Pakistan can be raised by enhancing the agricultural output, industrial production, education and health facilities as well as country defense. The analysis recommends that the government ought to mount the direct tax on the wealthy individual more and receive the income and use it on the poor particularly backwards times and offer alternative amenities such as no cost education, health facilities and clean water.

Key words: - Fiscal Decentralization, Poverty, ARDL.

Introduction

Fiscal decentralization is a necessary policy adjustment; approximately 95 of the developing nations globally have embraced this policy in order to stabilize their economy in many sectors. Fiscal decentralization is broadly understood as devolution of power and responsibility of the federal government to the sub national governments and it enables the people to manage their day to day economic, social and political lives facilitated by their local governments. The fiscal decentralization of various countries has various objectives, such as enhancement in the delivery of key state services such as the delivery of the basic education, necessary health care and financial empowerment of the local people by the local government and distribution of the resources throughout the sub-national space. The fiscal decentralization adopted in developing countries to alleviate the poverty and enhancement of the provision of the public services to the local regions of that country. This is because Rondinelli (1981) said that decentralization is a path towards transferring the assets, and the roles of central governments to the local governments. Therefore, the key motive behind transferring the fiscal authority is to enable the sub-nation with improved government services. Neyapti Bilin (2005) says that the fiscal decentralization has been a policy of considerable significance in terms of resource allocation and it has transferred the national government responsibility upon the local government. Poverty has become a gait problem of the world. The problem is afflicting almost all the

countries. Poverty in the various countries has various causes. That is why the fiscal decentralization is the most appropriate country has experienced in order to alleviate the poverty in both the national and local level. The local government fiscal planning can potentially be a critical role in eliminating the poverty in the country. Mehmood and sadique (2010) expound further that fiscal decentralization are crucial to enhance the level of education and health facilities and it is very beneficial to eliminate poverty in any nation be it an advanced country or a developing country. Pakistan is developing country. Since the day of independence (14 August 1947), it has been experiencing numerous problems. Pakistan faces numerous economic, political and social challenges to development of its economy. But poverty is colossal economic challenge to the economy of Pakistan. This is fact that it is inherited in the sub-continent. The fiscal decentralization is regarded as a major factor in eliminating the poverty of the Pakistan. This research would pave the path to clarify that how the poverty could be relieved with the fiscal decentralization by the Pakistan. Central government cannot go to corner to corner and does not know the problem of the local area because only wearer knows where shoe pinch is. There for, the central government adopts the fiscal decentralization policy. This study will explain the new dimension of fiscal decentralization in Pakistan according to the economic situation of this country and this current study will explain the education, health, provisional revenue ratio, unemployment and agricultural productivity as variables which have never been used at same time. This study will also identify the trends of fiscal decentralization in Pakistan in different decades and will try to find the theoretical foundation of the fiscal decentralization and poverty link.

The Pakistan is developing country and the poverty is black spot on the progress of this country. So, the fiscal decentralization is exact way to eradicate the poverty. This study is very significant to elaborate that how can a country root out the poverty problem through the fiscal decentralization. It is said a physician cannot cure his patient without identify the diseases. Just like that, any country cannot get progress without identify the actual problem of the state. We know that poverty is greatest issue in Pakistan now a day and the fiscal decentralization has direct and indirect effect on the poverty. This study will explain that why only the distribution of the fiscal power to local government is best way to eradicate the local and national problems such as poverty, unemployment, health, education and living standard of people etc. The objective of the study is to analyze the impact of fiscal decentralization on poverty in Pakistan the specific objectives of the study are

- To inspect the impact of fiscal decentralization on poverty.
- To analyze the trends of fiscal decentralization in Pakistan in different decades.
- To find out the theoretical foundation of the fiscal decentralization and poverty link.
- To enlist policy implications and recommendations.

Fiscal decentralization is generally defined as the transfer of power and responsibility from federal government t to sub national governments and it empowers the people to run their daily economic, social and political affairs with the help of their local governments.

Literature review

In this research, following literature reviews are based on the authentic studies of the scholars, which provide the foundation to the current study on fiscal decentralization and the poverty. (Hussain et al., 2021) In this research the World Bank predicted higher rate of poverty in the situation of COVID-19 pandemic. According to the research the rate of poverty could be increased from 0.3 to 0.7 round about 9% in 2020. The aim of the research is to give insights into poverty rate in Pakistan. This research examined the effect of fiscal decentralization on poverty alleviation. This research applied unit root test to station the data from the year of 1975-2010. This research found that fiscal decentralization has direct and indirect impact in eradicating poverty. This research concluded that central government cannot tackle with the local issues so the government should adopt fiscal decentralization policy to understand the

local problems. Government should also use advanced taxation policy to minimize the poverty rate and maximize revenues. (Tunio et al., 2024) In this study fiscal decentralization is a way to increase economic development in Pakistan. This study also shows that fiscal decentralization increases environmental issues. The objective of the study is to investigate a link between fiscal decentralization, economic development and environmental quality. This study applied SVAR and AMAR models to analyze the results and used data from the year of 1979-2019. The outcome discloses that there is a positive link between environmental efficiency, revenue collection, tax autonomy and transfer payments, while government spending has negative impact on economic development. This study concluded that policymakers should adjust fiscal strategy and enhance management among government level to obtain sustainable growth because there is complex relationship between fiscal decentralization and environmental quality. (Shahid et al., 2022) In this study fiscal decentralization is considered as an important element for improving condition of society and eradication of poverty. This study examined the impact of various dimensions of decentralization on urban and rural areas and poverty level in Pakistan. This study applied ARDL bounds testing co-integration method for error correction for short run analysis and long run estimation. This study found that fiscal decentralization minimizes poverty rate in urban and rural areas and political decentralization maximizes poverty rate in Pakistan. This study concluded that administration should decrease political decentralization and should promote GDP per capita development for poverty eradication. (Shahzad & Yasmin, 2016) In this research the impact of fiscal decentralization on welfare problems of poverty and income examined from the year of 1972-2013 in Pakistan. The aim of the research is to investigate the impact of revenue decentralization, composite decentralization, expenditure decentralization and institutional quality in welfare issues. This research used GMM to method to find the impact. The finding of the research shows that fiscal decentralization increases inequality in income distribution and poverty but when complimented through enhanced institutional quality used to eradicate negative impacts. This research concluded that when the educational quality is high then welfare management in the long run is possible. This also moderates the balance of fiscal decentralization. (Ghafoor, 2024) This study explored the impact of fiscal decentralization on education sector in Pakistan. The aim of the study is to find the link between the higher autonomy of district administrative and the progress of education. This study used panel data from the year 2003-2015 and applied Generalized Method of Moments (GMM). The findings of the study show that fiscal decentralization improves education in term of primary school registration in Pakistan. This study concluded that education sectors should be decentralized to all provinces in order to obtain fiscal decentralization to be boosted. (Anggraeni et al., 2023) This study examined the poverty reduction in Indonesia by implementing fiscal decentralization by regional government. The aim of the study is to investigate the impact of regional expenditures, profits and foreign transfer on poverty alleviation. This study applied Regression model for results and used panel data of 33 provinces from year 2010-2016. This study found that regional administration profits and administrative transfers decrease poverty level but regional administrative expenditures have no impact. The study concluded that maximizing profits and minimizing expenditures can reduce poverty level. (Song et al., 2022) This research examined the effect of fiscal decentralization and economic development on poverty reduction. This research aimed to analyze the impact of fiscal decentralization and economic growth on poverty reduction. This research used panel data of 24 outlying areas from year 2010-2018 and applied static panel model also used Moran index to analyze spatial agglomeration of poverty. This research found that fiscal revenue decentralization and increased economic development can reduce poverty level while fiscal expenditures promote it. This research concluded that policy makers should focus on minimizing fiscal expenditures, equality in efficiency and fostering agriculture production process. (Sarwar et al., 2022) This study examined the effect of fiscal decentralization on the proficiency of public service delivery (PSD) in the education sector of Pakistan. This study

collected data from the year 1982-2017. This study used Stochastic Frontier Analysis technique for the estimation of coefficients for secondary school enrollment. This study also used ARDL method for the analysis of the impact of fiscal decentralization on public service delivery. This study found that revenue decentralization has positive impact of the PSD efficiency in education sector but fiscal expenditures has negative impact on the efficiency of education sector.

Theoretical Basis of Fiscal decentralization:

Horizontal imbalance theory

The horizontal fiscal imbalance occurs when the local governments of any country has different abilities to provide services and to lift up fund from taxes. In the Horizontal decentralization the central government uses to shift the power of decision-making to the local government that is related with the human development, including education and health of the people of that area. The central government also let the local government to handle the national public goods, regional projects and economy of scale. Through the horizontal decentralization the burden of the central government use to decrease and it is very helpful to collect and reallocate the funds in the local area where the central government cannot get access. So, this is helpful to create the net fiscal benefit. This horizontal fiscal decentralization leads to the intergovernmental competition that is very helpful in provision of public services to the all people

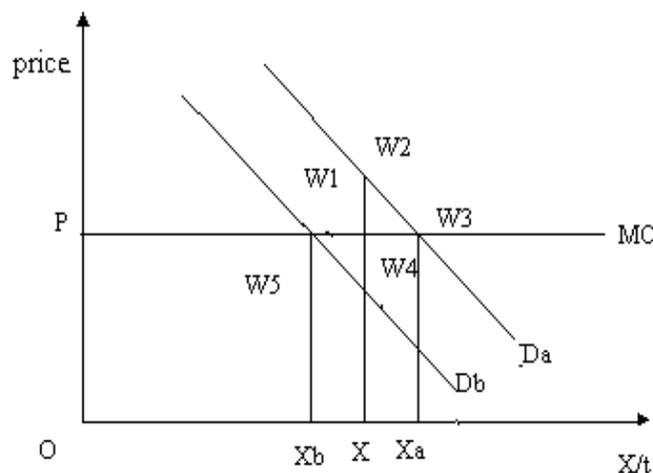
Fiscal decentralization theorem

The theorem of Oates' (1972) identify that fiscal decentralization is best to get the welfare in the society and to eliminate the deadweight losses caused by the centralization.

Assumption

- In this theorem he spilt the population of any state or nation into two localities.
- Each nation is provided by the same social goods. There are no inter-jurisdictional spillovers. The both nations are equally sharing the cost of that public service.

Figure 1



The demand curve of sub national government is DA. The marginal cost is constant and horizontal. Every individual paying price P that is equal to MC. DB curve highlight the B's demand for social goods. If central government provide X social goods to the sub- nations than the quantity of X would be different for both nations. There will be welfare loss for each nation or individual. Triangle W1, W2, W3 indicate the welfare loss for sub-nation A. and W1, W4, W5 triangle shows the B's welfare loss. So, fiscal Decentralization is best way to eliminate the risk of deadweight loss. Oates (1999) further elaborated that strength of this theorem and stated

that the allocation of the resources can be distribute in best way if the government is closer to the people. Sometime political pressure decreases the power of the central government to facilitate the people with the public service and goods.

Data and methodology

This chapter explains the data analysis and the result of predictable variables. It is developed on econometric techniques to get the result from study "Fiscal decentralization and poverty alleviation: an empirical analysis for Pakistan". The data of the variables is collected from different web sites like handbook of statistics, WDI, Pakistan 50 years' statistic. The range of data use for estimation is from 1975 to 2014. The ADF (Augmented Dickey Fuller 1979) apply at the level plus at the 1st difference to verify the stationary values of the variables. There are three models of this study the ARDL approach is applied on the model 1 and model 2 on the bases of mix result (I(0), I(1)) of ADF estimation. These results are based on E- Views estimations. In the end, the chapter explains the conclusion of these estimations.

Model

$$\text{Poverty} = \beta_0 + \beta_1 \text{INF} + \beta_2 \text{AGRI} + \beta_3 \text{RPE} + \beta_4 \text{RPR} + \beta_5 \text{IND} + \beta_6 \text{EDU} + \beta_7 \text{HE} + \beta_8 \text{HCR} + \varepsilon_t \quad (2)$$

Following is the description of the variables used in the model.

Where

- ✓ Pr = poverty
- ✓ HCR = Head count ratio
- ✓ Edu = Education Expenditure
- ✓ He = Health Expenditure
- ✓ RPR = Ratio of Provincial Revenue
- ✓ RPE = Ratio of Provincial Expenditure
- ✓ Agri = Agricultural production
- ✓ Ind = Industrial production
- ✓ Def = defense expenditures
- ✓ Inf = Inflation

5.2 Graphic expression of the model

The direct and indirect impact of fiscal decartelization on the poverty is depicted in the following diagram. The fiscal decentralization is gauged as the RPR and RPE. The direct effect directs the meaning that the Government directly finance the poor through various income schemes and employment opportunities to given people. The indirect effect implies that the government does have the work on the some essential institution and departments such as health, education, productive sectors, it make the developmental expenditure on the provinces and supply jobs. Not only do these elements enhance the living standard of the people but also create the stability to the economic activity in the country. These indirect and direct impacts serve to assist the government in ridding itself of poverty.

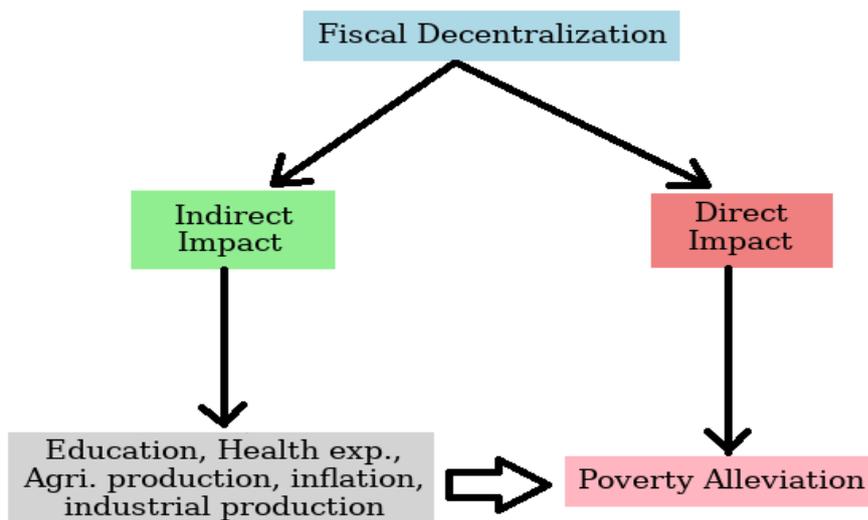


Figure 2: Conceptual framework

This diagram elaborates the whole study and indicates the method to eradication of the poverty.

Data analysis and estimation

This paper aims at analyzing the impact of Fiscal Decentralization and Its Role in Poverty Reduction: Insights into ARDL Model. The estimation range is 1975 to 2024 to use the ADF (Augmented Dickey Fuller 1979) at the level and 1st difference to confirm the stratification of the variables. This study has applied, the ARDL approach is applied to model on the mix result (1(0),I(1)) of ADF estimation bases. The outcome discloses that there is a direct and indirect influence of the poverty eradication by fiscal decentralization.

Model

$$\text{Poverty} = \beta_0 + \beta_1 \text{INF} + \beta_2 \text{AGRI} + \beta_3 \text{RPE} + \beta_4 \text{RPR} + \beta_5 \text{IND} + \beta_6 \text{EDU} + \beta_7 \text{HE} + \beta_8 \text{HCR} + \varepsilon_t$$

Unit Root Test for model

The unit root test is frequently used to stationer the data. The Dickey and Fuller proposed the unit root test in 1981. The ADF (Augmented Dickey Fuller 1979) test is applied to the stationer the data. The poverty is dependent variable while the fiscal decentralization, education level, health facilities, agricultural productivity in the Pakistan, revenue ratio central government to provincial government, expenditure ratio central government to provincial government expenditure, industrial production, defense expenditure, deficit financing are independent variables. The result of variables is based on the E- Views estimation.

Table: of ADF for model

Variables	Augmented Dickey-Fuller test							Result
	Values	Level			1st Difference			
		Trend	Without trend	None	Trend	Without trend	None	
Poverty (GINI)	ADF value	5.38	5.49	0.42	5.65	5.67	5.76	I(0)
	Cr.value	2.72	3.57	1.99	2.97	3.59	1.93	
HCR	---	2.49	2.45	0.65	9.65	9.58	9.75	I(1)
	---	2.92	3.59	1.99	2.97	3.55	1.97	
Agriculture production	---	1.63	1.69	1.25	5.96	6.12	5.72	I(1)
	---	2.74	3.43	1.98	2.98	3.54	1.95	
Health	---	1.48	2.97	0.65	6.15	5.90	6.23	I(1)
	---	2.74	3.60	1.90	2.96	3.51	1.96	
Education	---	0.42	1.64	1.54	6.04	6.13	5.69	I(1)
	---	2.59	3.72	1.97	2.95	3.55	1.89	
RPR	---	2.85	3.60	0.02	6.86	6.78	6.70	I(1)
	---	2.82	3.90	1.98	2.99	3.59	1.95	
RPE	---	0.19	1.50	1.19	6.86	7.12	6.61	I(1)
	---	2.93	3.59	1.95	2.95	3.55	1.93	
Industrial production	---	2.74	3.02	0.52	6.98	6.96	6.94	I(1)
	---	2.34	3.57	1.98	2.95	3.57	1.97	
Inflation	---	2.72	3.09	0.96	7.63	7.54	7.79	I(1)
	---	2.89	3.56	1.95	2.97	3.58	1.96	

- Note*at 5% level of significant based on **Mackinnon (1996) and ***E
- Null hypothesis all above unit root test is that series has a unit root.
- SBC and AIC criteria are used for optimal lag selection.

In this study ADF (Dickey and Fuller, 1979) is applied to find out the orders of integration. The information show that all the variables i.e. (poverty, fiscal decentralization, education level, health facilities, agricultural productivity, inflation, industrial production, revenue ratio central government to provincial government, expenditure ratio central government to provincial government expenditure, HCR) are at 1%, 5% and 10% level of significance I(0) in their level and I(1) in the first difference. The result is showed that some variables are at I (1) first difference and some on the level.

ARDL Approach for Model

This method is developed by Pesaran et al. (2001). The ARDL estimation is used for the model because there are mix stationery results for the variables. This approach is used to analysis the short run and long run result of the variables.

Bound test for MODEL

- Null Hypothesis: No long-run relationships exist

Trace- statistics	Value	K
F-statistics	3.582730	8

Critical value bonds

Significance	I0 bound	I1 bound
10%	1.95	3.06
5%	2.22	3.39
2.5%	2.48	3.7
1%	2.79	4.1

The lower and upper bound values (2.22 and 3.39 at 5 percent) for F-statistic is taken from Bound test table unrestricted intercept and no trend given in Pesaran et al. (2001).

Table: Short ECM Model Dependent Variable Δ (pov)

Variables	Coefficients	Stander error	t-ratio	Prob.value
INF	0.77	0.31	2.51	0.02
RPE	0.49	0.20	2.41	0.02
RPR	-0.65	0.16	-3.90	0.01
IND	-2.86	0.79	-3.59	0.00
AGRI	2.07	1.02	2.02	0.05
EDU	0.05	0.02	2.16	0.04
HE	15.98	5.71	2.79	0.01
POV	-0.63	0.12	-4.92	0.00
ECM(-1)	-1.71	0.24	-6.94	0.00

The ECM result of short run ARDL model indicates that the Coefficients of variables with Δ sign explain the short-run elasticity. The inflation has positive effect with the poverty its means, 1% increase in inflation the poverty increase 0.77%. The 0.77 value of coefficient (POV) expose that 1% increases in POV it brings about 0.63% decrease in poverty. 1% increases in RPE the poverty increase 0.49%. 1% increases in the RPR the poverty decrease 0.65%. 1% increase in IND, AGRI, EDU, HE the poverty decrease 0.86, 2.07, 0.05 and 15.98% respectively.

Table: Long run results of Model

Variables	coefficients	Stander error	t-ratio	Prob.value
AGRI	1.719	0.309	5.547	0.00
EDU	0.034	0.015	2.254	0.037
HE	-16.285	4.112	-3.959	0.001
IND	-2.668	0.845	-3.156	0.005
INF	0.668	0.226	2.947	0.009
POV	-0.901	0.147	-6.109	0.000
RPE	0.290	0.126	2.306	0.033
RPR	-0.379	0.105	-3.614	0.002
C	98.339	29.421	3.342	0.003
R-squared		0.76		
Adj. R-squared		0.37		
F-statistic		2.18		
Akaike AIC		6.41		
Schwarz SC		7.25		
Durbin-Watson stat		2.47		

Poverty

$$\text{Poverty} = \beta_0 + \beta_1 \text{INF} + \beta_2 \text{AGRI} + \beta_3 \text{RPE} + \beta_4 \text{RPR} + \beta_5 \text{IND} + \beta_6 \text{EDU} + \beta_7 \text{HE} + \beta_8 \text{HCR} + \varepsilon_t$$

$$\text{Poverty} = 98.33 + 0.66\text{INF} - 1.71\text{AGRI} + 0.29\text{RPE} - 0.37\text{RPR} - 2.66\text{IND} + 0.03\text{EDU} - 16.28\text{HE} - 0.90\text{HCR} + \varepsilon_t$$

Interpretation of model

The coefficient of AGRI indicates that 1 % increase in AGRI the poverty will increase 1.71%. Its mean, that the agricultural production has positive and significant effect on the income inequality but it reduce the poverty. This is very controversial question that how the agricultural production increase the incomes inequalities? the answer is that there is Gagidar system in Pakistan the many people get their earning from the land that they get at rent. The tenants of that land have to bear more expenditure to grow the crop than benefits. A. R. Kemal (2006) argues "the subsidies have been falling up to 2001-02 and since then have increased to meet the losses of some public enterprises. The development subsidies and consumption subsidies have been withdrawn and resultantly there have been the price of fertilizer, tube wells, pesticides etc. increased with adverse implications for income distribution". The mediocre take the crops at low price to the formers and sell it high prices. In the case of sudden calamities all the expensive have to bear to the tenants. No doubt, the poor person getting their employment but there is differences between their income. The coefficient of RPE indicates that 1 % increase in RPE the poverty will increase 0.92%. Its mean, that the RPE has negative and significant effect on the poverty. The RPE has negative long ran affect on the poverty. If the local government increases their expenditure to develop the local community like, facilitate local unemployed with jobs, technical education, better health facilities etc the poverty will decrease and income inequality as well. When the central government let the provinces government to provide the grants and public facilities to their people without any restriction the poverty and income inequality among the provinces as well as people can be decreased. O. Odior E.S (2014) argues in the study that the government spending reduces the poverty and increase the education in the country. Mehmood and Sadiq (2010) the government spending and poverty has long run relationship. The poverty decreases if the government increases its spending. The coefficient of RPR indicates that 1 % increase in inflation the poverty will decrease 0.36%. Its mean, that the RPR has positive and significant effect on the poverty. When government increases indirect tax and direct tax and the revenue do no use for the developmental purpose the poverty use to increase. The poor person has to bear a great burden of tax and due to low income or unemployment the people stander of the people decrease. Zaidi (2005) the poverty use to increases when the budget of the government goes deficit so, it has to increase the revenue and government impose the high rate tax and this tax rate increase the poverty. The coefficient of EDU indicates that 1 % increase in EDU the poverty will increase 0.03%. Its mean, that the technical education has positive and significant effect on the poverty. The education is key to get success and to get jobs opportunities and it reduces the poverty. Boex et al. (2006) "Education not only helps to improve the income earning potential but it also has the ability to empower individuals; education enables someone to participate in local and national government, it provides skills and knowledge to improve quality of life, and to become more productive" but the results shows that the technical education increase the income inequality, the reason is that the poverty trap. A report by Thomas (2007) explains that "children from lower income households score significantly lower on measures of vocabulary and communication skills, knowledge of numbers, copying and symbol use, ability to concentrate and cooperative play with other children than children from higher income households". Janus et al (2007) argue that "schools with the largest proportion of children with low school readiness were from neighborhoods of high social risk, including poverty". The coefficient of IND indicates that 1 % increase in IND the poverty will decrease 2.66%. Its mean, that the industrial production has negative and significant effect on the poverty. Its mean,

that the industrial production has negative and significant effect on the poverty. The industrial sector is very powerful sector in country that provide the bread and butter to all kind of the people. The great numbers of the people are related to this sector for the employment. The people of that country can easily get industrial goods at reasonable price due to high production in industrial sector. Chen and Ravallion (2004) stated that the industrial growth decreases the poverty in developing countries. The coefficient of INF indicates that 1 % increase in inflation the poverty will decrease 0.90%. Its mean, that the inflation has negative and significant effect on the poverty. the increase in inflation the purchasing power of the people decrease the poor become more poor because of high price. the income inequality is also increase due to this high inflationary situation in any country. Faridi et al. (2012) inflation harshly reduces employment through increasing the cost of production. the high cost of production decreases the purchasing power of people and some people cannot survive maintain their daily routine this situation lead to poverty and income inequality among the people. The coefficient of HE indicates that 1 % increase in HE the poverty will decrease 16.28%. Its mean, that the GOVT. health expenditure has negative and significant effect on the poverty. The better health is related to the more capacity to do work more work means more income opportunities to the people. when people get their treatment at free it will lead the people to prosperous life and the poverty will decrease. it is possible when government increase its expenditure on the health. Boex et al. (2006) argue that in developing countries with greater emphasis on universal access to health services in their organization of the health sector, public health services are likely to have a progressive incidence of benefits. The coefficient of HCR indicates that 1 % increase in HCR the poverty will decrease 0.90%. Its mean, that the HCR has negative and significant effect on the income inequalities. If the HCR of any country increase the government use to facilitate the people with different program of poverty reduction the government decrease the tax burden on the people. In the situation of the HCR, the governments increase the direct tax on the rich person and gets the revenue and spend on the poor by providing different facilities like free education, health, employment. Boex et al (2007) "education provides skills and knowledge to improve quality of life, and to become more productive" this process make two benefits, first the poverty use to reduce and second the income inequalities gap will shrink

Conclusion

This research paper has a goal of exploring the impact of fiscal decentralization to the poverty alleviation. This paper identified the theoretical basis of the fiscal decentralization in the Pakistan. The variables data is gathered through various web sites such as handbook of statistics, WDI. The data has a range of 40 uses to be estimated between 1975 and 2023. The general variables of the study are; Poverty, RPR, RPE, education, health expenditure, agricultural productivity, industrial production, defense expenditure, deficit financing, investment, employment, political instabilities and inflation. In the study, results are determined by using three models. The ARDL model is estimated in model 1 and 2 where the poverty is determined by GINI coefficient. The income inequality is measured in terms of the GINI coefficient. In third model VAR estimation is carried out on the foundation of ADF result and poverty in this model is identified as Head count ratio. The proxy to fiscal decentralization is RPR and RPE. The study result suggests that the policy of fiscal decentralization is highly significant as a way to eliminate the poverty. The paper finds that poverty could be tamed in case the national government reinstated the provincial government with independence in fiscal operations. The exploration about the study about spending power devolved by central government to provincial government reveals that the industrial production diminishes the poverty and income disparity, this finding substantiate the neo-classical theory of fiscal decentralization that increment of fiscal spending, increment of production, reduction of income disparity and poverty also augment the livelihood level of the population. Where agricultural output is concerned, the outcome that explains that the poverty will fall but the income inequality will fall, justifies to the model of fiscal decentralization that Lindahl

described, that, all the individuals will be better off, when the marginal cost of the goods in question is equal to the marginal benefits. In case the small farmers receive the employment in field, but do not receive sufficient income as the landlords of the owner of land. Education outcomes also show that the technical and the vocational education decreases the poverty but rises the income inequality. Conversely, there is a decrease in the income inequality and poverty with the governmental expenditure on health. The employment and poverty relation has the historical underpinning whereby the employment level is the highest factor that minimizes the poverty as Faridi (2012) "Expenditure decentralization increases economic efficiency which increases employment opportunity due to economies of scale".. Concluding it is concluded that the fiscal decentralization has direct and indirect impacts on the way it reduces poverty and this study has theoretical basis in the Pakistan.

Policy recommendations

On the base of conclusion of the study suggest following policy recommendations. These policies are necessary and need of time.

It is a big struggle to overcome the vicious circle of poverty as developmental investment must be upsurge such as formation of additional dams and completion of some mega projects which are in process. ii. The resources should be distributed equally among the provinces by central government. The Inequality and disparities must be narrowed by providing the populace of all the provinces with technical education and the population with basic education with same syllabus and not simple education. iii. The provinces should be allowed fiscal autonomy. iv. The policies should be strategized by Central Bank and Federal Government to reduce the Cost Push Inflation. v. The government ought to raise the direct tax on the affluent individual and collect the revenue and invest on the backward ones, particularly on the backward times and offer the various amenities such as free education, health and clean water.

Appendices

Table:1	Indicators of the poverty due to income
➤	<p>Headcount ratio (poverty incidence) $H=q/n$, where q is number of poor and n is total population Population is n, q is the people having earnings less than poverty threshold and P_0 is headcount ratio.</p>
➤	<p>SPG (Square poverty gap) (severity of poverty) $SPG = 1/n \sum_{i=1}^q [z-y_i/z]^2$ Y is income of ith poor individuals. (q) Represents the number of poor, n is total population. $\alpha=2$ indicates the poverty aversion.</p>
➤	<p>Poverty gap (for depth of poverty) $PG = 1/n \sum_{i=1}^q [z-\mu_i/z]$ μ_i represent income of ith poor people. Z is poverty line. $I[z-\mu_i/z]$ is income gap among poor person</p>
➤	<p>(FGT) Foster Greer Thorbecke (poverty index) $P_\alpha = 1/n \sum_{i=1}^q [z-y_i/z]^\alpha$ The poverty aversion is α so,</p> <ul style="list-style-type: none"> • If $\alpha=0$ then $P_\alpha=H$ (headcount ratio) • If $\alpha=1$ then $P_\alpha=PG$ (poverty gap) • If $\alpha=2$ then $P_\alpha=SPG$ (square poverty gap)
➤	<p>Sen.'s formula poverty index $P = H[I + (1-I)G^*]$ H is headcount ratio, I is poverty gap between persons, G^* indicates Gini- coefficient</p>
➤	<p>Watt's formula for poverty Index This formulae is presented by Watts (1968) It includes both concepts of non- income and income attributes of wellbeing in it. $W = 1/N \sum_i \log [z/y_i]$ Where y indicates the wealth by dent of human and non human and z is referring to poverty line.</p>

Table:2	non-income indicators of the poverty
➤	<p>HDI (The Human Development Index) HDI is developed by the UNDP. It measures average achievements for the three fundamental measurement of the human development in a country.</p> <ul style="list-style-type: none"> • Healthy and long life (it measures as life expectancy from the time of birth) • Knowledge (one third weight of enrollment ratio for primary, tertiary and secondary) • Living standard measured by GDP <p>So, $HDI = 1/3$ (life expectancy index) + $1/3$ (education index) + $1/3$ (GDP)</p>
➤	<p>HPI (The Human Poverty Index) First time Anand and sen (1996) proposed human poverty index. Later on it was used in Human development report by UNDP in 1997. $HPI = [1/3 (P_1^\alpha + P_2^\alpha + P_3^\alpha)]^{1/\alpha}$ P_1 indicate the early age death, P_2 represent exclusion of education, P_3 lack of pure water, health facilities etc.</p>
➤	<p>GDI (gender-related development index) GDI like HDI measures the average of following components;- $HDI = 1/3$ (life expectancy index) + $1/3$ (education index) + $1/3$ (GDP)</p>
➤	<p>GEM (Gender Empowerment measure) It concerned with gender inequality and women's opportunities in three ways:</p>

First is participation in political decision-making, second is participation in economic activity and third is control over the economic resources.

$$GEM = EDEP_1 + EDEP_2 + EDEP_3/3$$

Where $EDEP = [(male\ index)^{1-\alpha} + (female\ index)^{1-\alpha}]^{1/1-\alpha}$

➤ **The Gini Coefficient**

This is developed by Corrado Gini an Italian statistician. It widely use as the measure of income inequality and unequal distribution of wealth. The Gini coefficient largely derives from the Lorenz curve.

Brief Description of Variables and Data Sources

Variable	Symbols	Description/Unit	Data/Source
Fiscal decentralization	FD	Fd is a route to shift the assets as well as responsibilities of central governments to local governments .It is measured as RPR and RPE.	Handbook of Statistics
Provincial Revenue	RPR	The ratio of sub national Govt. revenue to Govt. revenue. (Ratio)	Handbook of Statistics
Provincial Expenditure	RPE	The ratio of sub national Govt. Expenditure to Govt. Expenditure. (Ratio)	Handbook of Statistics
Poverty	Pr	It is defined, The inability to purchase necessities required by nature or custom. $P_o=q/n$ where Population is n, q is the people having earnings less than poverty threshold and P_o is headcount ratio. (HCR)	WDI
Industrial production	IND	It is defined as the Industrial output. Percentage to GDP	Economy watch
Education	Edu	Education means to get knowledge. It is measured as technical and vocational educated person.	Handbook of Statistics
Health	He	Expenditure on health. Health expenditure is measured as total expenditure percentage to GDP. (% to GDP)	Economy watch
Agricultural production	Agri	It is defined as the agricultural output. Percentage to GDP.	Economy watch
Inflation	Inf	The inflation it a situation in which the too much money too small goods. It is measured as CPI	WDI

Reference

Ahmed. (2013). Fiscal decentralization and political economy of poverty reduction: theory and evidence from Pakistan Doctoral thesis, Durham University.

Na hou and bo chen (2013) military expenditure and economic growth in developing countries: evidence from system GMM estimates: *defense and peace economic Volume 24, 2013 – Issue 3*

Faridi et al. (2012) the Impact of Fiscal Decentralization, Inequality and Poverty on Employment: Evidence from Pakistan: *Pakistan Journal of Social Sciences (PJSS) Vol. 32, No. 2 (2012), pp. 357-369*

- Delafrooz, N., & Paim, L. H. (2011). Determinants Of Financial Wellness Among Malaysia Workers. *African Journal Of Business Management* , 5(24), 10092-10100.
- Khattak, N., Ahmad, I. and Khan, J. (2010). Fiscal Decentralization in Pakistan: *The Pakistan Development Review 49:4 Part II (Winter 2010) pp. 419–436*
- Sepulveda, C. and Martinez-Vazquez, J. (2010). The Consequences of Fiscal Decentralization on Poverty and Income Inequality. *International Center for Public Policy Working Paper Series. Paper 102.*
- Ali, M. & Nishat, M. (2010). Do foreign inflows benefit Pakistani poor? *Paper presented at 25th annual general meeting and conference of Pakistan society of development economists, Marriot, Islamabad, Pakistan, 16th to 18th March 2010.*
- Wei-qing L., and shi C., (2010): Fiscal Decentralization and Public Education Provision in China; *Canadian social science. Vol. 6, No. 4, 2010, pp. 28-41*
- Mehmood, R. and Sadiq, S. (2010) Impact of Fiscal Decentralization on Human development: A Case Study of Pakistan; *26th Annual General Meeting and Conference*
- Afzal, M., Farooq, M. S., Ahmad, H. K., Begum, I & Quddus, M. A. (2010). Relationship between school education and economic growth in Pakistan: ARDL bounds testing approach to cointegration. *Pakistan Economic and Social Review, 1(48) 39-60*
- Chaudhry, I. S., Malik, S., Hassan, A. & Faridi, M. Z. (2010). Does education alleviate poverty? Empirical evidence from Pakistan. *International Research Journal of Finance and Economic, 52, 134-141*
- Sepulveda, Cristian F. & Vazquez, M. (2010). the Consequences of Fiscal Decentralization on Poverty and Income Inequality. *International Center for Public Policy Working Paper Series. Paper 102.*
- Khattak N., Ahmad, I. and Khan. J. (2010) Fiscal Decentralization in Pakistan *The Pakistan Development Review 49:4 Part II (Winter 2010) pp. 419–436*
- Imran Sharif Chaudhry (2009) Poverty Alleviation in Southern Punjab (Pakistan): An Empirical Evidence from the Project Area of Asian Development Bank. *International Research Journal of Finance and Economics-Issue 23*
- Vazquez, M. & Yao. (2009). Fiscal Decentralization and Public Sector Employment: A Cross-country Analysis. *Public Finance Review, 37, 539-571. Development Cooperation (NORAD) Report 22b Discussion.*
- Chaudhary, A. R., Asim, I. & Gillani, S. Y. M. (2009). The nexus between higher education and economic growth: An empirical investigation for Pakistan. *Pakistan Journal of Commerce and Social Sciences, 3.*
- Awan, M. and Waqas, M. (2008). Impact of education on poverty reduction. *EABR & TLC Conferences Proceedings Rothenburg, Germany.*
- Braathen. (2008). Decentralization and Poverty Reduction: A review of the linkages in Tanzania and the international literature. *Norwegian Agency for Development Cooperation (NORAD) Report 22b Discussion.*
- Asfaw, A., Frohberg, K., James, K. and Jutting, J. (2007). Fiscal decentralization and infant mortality: Empirical evidence from rural India, *Journal of Developing Areas, fall 2007.*
- Yao. (2007). Fiscal Decentralization and Poverty Reduction Outcomes: Theory and Evidence. *Dissertation, Georgia State University*
- Skira. (2006). Fiscal decentralization and Poverty, Department of Economics, *Andrew Young School of Policy Studies, summer 2006internship Program.*
- Boex, J., Heredia-Ortiz, E., Martinez-Vazquez, J., Timofeev, A and Yao, G. (2006) Fighting Poverty Through Fiscal Decentralization;
- Afzal, M., Malik M.E., begum I., sarwer K., and Fatima H. (2006) Relationship among Education, Poverty and Economic Growth in Pakistan: An Econometric Analysis: *Journal of Elementary Education Vol.22, No. 1 pp.23-45*

- Kiran. (2005). Decentralization and State-level Gains: empirical evidence in India, Department of applied economic and management, *Prepared for the NEUDC Conference, September 23-25.*
- Fritz Breuss, Markus Eller (2004) Fiscal decentralization and economic growth: Is there really a link? *Journal for Institutional Comparisons, Volume 2, No. 1, pp. 3-9*
- Shah anwar (2004). Fiscal decentralization in developing and transition economies: Progress, Problems and Promise. *World Bank Policy Research Paper 3282, April 2004.*
- Habib, N., Haung, C., Miranda, D. Murillo, V., Raines, G., Sarker M. and Stewart M. (2003). Decentralization and Human Development in Argentina, *Journal of Human Development, Vol 4, No.1, 2003.*
- Khaleghian, Peyvand (2003). "Decentralization and Public Services: The Case of Immunization," *Policy Research Working Paper Series_2989, The World Bank. Vol 59, Pages 163–183*
- Habib, N., Haung, C., Miranda, D. Murillo, V., Raines, G., Sarker M. and Stewart M. (2003). Decentralization and Human Development in Argentina, *Journal of Human Development, Vol 4, No.1, 2003.*
- Bird, R. and E. R. Rodriguez (1999) _Decentralization and Poverty Alleviation: International Experience and the Case of the Philippines_ *Public Administration and Development* 19(2): 299-319.
- Tao Zhanga, b, Heng-fu Zou (1998) Fiscal decentralization, public spending, and economic growth in China ; *Journal of Public Economics* 67 (1998) 221–240
- M. Rao, Bird Richard, M. Govinda, and Jennie. I. Litvack (1998) Fiscal decentralisation and poverty Alleviation in a Transitional Economy: The Case of Vietnam. *Asian Economic Journal, 12 (4): 353-378*
- Woller, Gary M. and Kerk Phillips (1998) Fiscal Decentralisation and LDC Economic Growth: An Empirical Investigation, *Journal of Development Studies, 34, 4, 139-48.*
- Rao M., Bird, M. and Litvack, J. (1998) Fiscal decentralization and poverty Alleviation in a Transitional Economy: The Case of Vietnam. *Asian Economic Journal, 12 (4): 353-378*
- Scott, C. D. and Litchfield, J. A. (1994). Inequality, Mobility and the Determinants of Income among the Rural Poor in Chile, 1968 to 1986, *London School of Economics, the Development Economics Research Programme, No. 53 London.*

Books

- Benoit (1978) Growth and defense in LDCs. *Economic Development and Cultural Change*, 26: 271–280
- A. Hamid Shahid (audition 2011-12) Major Issues in Pakistan Economy.