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Price Levels and Poverty Nexus: A Case Study of Pakistan

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ABSTRACT

The study has examined the relationship between price levels and poverty over the period of 1982-2015 in Pakistan by employing Auto Regressive Distributed Lag Model (ARDL). It is the pioneer empirical study on the topic in Pakistan. The study has revealed mixed findings between the price levels and poverty both at aggregated and disaggregated levels. The study has also suggested policies to reduce poverty according to the various price levels investigated in the assorted models.

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1. Introduction

Poverty is a state where an individual survives below the poverty line[1]. The individual hardly satisfy or cannot get daily needs such as shelter, food, education, and health care. Economically, the poor are trapped in the vicious circle of poverty he does not has enough money to fulfill his essential wants. The vicious circle of poverty can be explained by the quotes 'a person is poor because he is poor' which implies that the poor do not even have enough money to fulfill their basic needs, so, they are unable to avail opportunities such as education and business to break poverty trap. If poor country is hit by inflation, the poor are losers rather the rich ones. In reality, the case becomes worse when we talk about the food inflation. The theory of development economics highlighted the distributional effects of increasing price level in the economy and its potentially disturbing results for the poor. Unanticipated price rise has been worse than expected which erodes the real incomes of the poor making them to avail the fewer goods and services than before. The unanticipated increase in price level in the economy also affects various social security benefits such as time lags in adjustment of unemployment benefits, old-age benefits and pensions. Third world countries present picture in this regard World Bank (2004) stated that 1.2 Billion (20%) of world population is consuming 1% of total world production.

Poverty is crucial issue worldwide but stands as a rural phenomenon in developing countries like Pakistan. Pakistan like other developing countries, is striving with high poverty rate and inflation has increased it further in Pakistan

[1]US $ 1.90 income per day is poverty line defined by World Bank.

(Chani et al., 2011). The Government of Pakistan has not been successful in addressing the issue of poverty while the growth-oriented policies have inspired the economists of Pakistan without distribution intent.

The present research is an attempt to explore the relationship between price level changes and poverty in Pakistan. The study not only measures the impact of changes in aggregate price level but also disaggregates the Consumer Price Index (CPI) and Wholesale Price Index (WPI) to observe their influence on Pakistan's poverty. This decomposition of the price levels is expected to provide us an additional insight about the components of price levels along with their influence on Pakistan's poverty.

The study is novel on two grounds. Firstly, to the best of authors 'knowledge, the disaggregation of both CPI and WPI in terms of their components is used for the first time in Pakistan. Secondly, different base years have been converted into a common base year using the splicing[2] method. Rest of the discussion is structured as under Section 2 presents the review of assorted literature while section 3 is devoted to methodology and model specification employed in this study. Section 4 elaborates models used in the analysis along with description of variables. Section 5 presents results of unit root test, Bounds test, while section 6 consists of the long run analysis with error correction analysis. The final part concludes with policy implications and an agenda for future research.

2. Review of Assorted Literature

Inflation has been the cruelest tax of all time, people have been influenced by it more than anything else because for the poor finance is the life blood. The burden of high prices, especially of basic food items, has become intolerable for poor households while poverty is consequently on the rise again. Whatever decline was achieved in poverty, appears to have been wiped out. Prices have risen sharply around the world in the past few decades, with data suggesting acceleration in the trend over the recent past. A bird's eye view of previous works unveiled that there exist positive and negative relationships among inflation, poverty around the world. Positive correlation implies that with an increase in price level, there is decrease purchasing power of the people, Skyrocketing prices hurt poor the most by reducing their real income that caused more poverty among them. The careful examination of the literature revealed the positive linkage between inflation and poverty which implies increasing level of income increase the rift between the poor and the rich. The rich has more facilities as it was availed by their forefathers and the poor has more deprivations as compared to their forefathers. The literature also revealed negative correlation between inflation and poverty which implies an increase in price level decreased the poverty. The paradox of results is based on distribution structure of the economy. The negative relations hip between inflation and the poverty was seen because of the strong government protection against inflation in form of subsidies, strong workers union, pre-trade cycle era and politically bulged fiscal policy.

The impact of the poverty has always been more adverse in case of galloping inflation. The rise in the price levels at one side reduces the real wages of the poor while on the other hand, it makes the basket of goods inapproachable for the poor. Resultantly, the deprivations of the poor have intensified further. A snapshot of some of the studies in context of the issue is presented in Table 1 below.

Table 1: Review of Selected Studies on Price Levels and Poverty

Reference(s)	Time period	Country	Model Specification	Methodology	Main Results
Belongia (1985)	1954-85	U.S.A	FPr=*f*(M1-UM1) NFPr=f(M1-UM1)	OLS	The findings pointed out accepted the hypothesis inflation was positively correlated with M1 growth.
Cardoso (1992)	1974-1984	Cross country	Pov=*f*(Inf)	OLS	The relationship between inflation and poverty proved significant.
Amble and Stewart (1994)	1987-1993	United States	Pov = *f* (Inf)	CPI-Urban CPI-Elderly and CPI-Wage Earners	The study identified that the inflation affected households with respect to their consumption pattern.

[2]The conversion of two different base years into one base year is called data splicing. (Asteriou and Hall, 2007).

Chaudhary and Ahmed (1996)	1972-1992	Pakistan	Pov=*f*(MS, expected, Inf(e),DS	2SLS	The study basically supported the hypothesis that inflation increases the cost of living in Pakistan
Garner et al. (1996)a	1982-84, 1992-94	United	Pov=*f*(Inf)	Laspeyre's index , Paasche Index and Fisher Ideal index	The study demonstrated the result that poor subgroups faced the higher inflation and inflation cost than the overall population.
Ravellion (2000)	1958-94	India	Pov=*f*(Inf,w)	Head Count Ratio, Squared Poverty Gap	The positive relationship between poverty and inflation was significant.
Easterly and Fisher (2001)	1995	Cross country	Pov=*f*(Inf,HY, Edu, Reg Ext, Cyc Un)	Dummy variable , OLS	The result pointed out that very poor was more concern among developed countries. The very poor were 14% more concern about inflation as compared to 9% in case of developing and transitional economies
Deaton. (2003)	National Sample Survey 43th , 50th and 55th	India	Pov=*f*(Inf)	Laspeyre's index, Paasche index , Tornquist index , poverty line deflator and Head Count Ratio	The study unveiled the result that all the Indian states affected by the inflation but the states with low income group provinces such as Assam and Bihar the condition turned more worse.
Wodon et al. (2008)	2003-2007	Cross Country	Pov=*f*(food Inf)	FGT (1984)	The result of the study clarified that the galloping price increase the poverty in the 12 selected countries.
Lyssiotou (2008)	2003	Cyprus	Pov = *f* (Inf)	CPI and OECD deflator of World Bank	The report revealed that the impact of inflation diffused among poor hastily.
Henriksen and Kydland (2010)	1954 and 1994	United States	Pov=*f*(Inf, Tra Tec,seignorage, SOBS.	OLS	The study revealed that inflation affected the poor class of consumers because they had modicum access to transaction technologies.
Coleman (2012)	2006-2012	Ghana	Pov = *f* (Inf)	The Modified Log Periodogram Regression	The study identified the fact that nine out of regions of Ghana poverty was aggravating due to inflation.
Wood et al. (2012)	2006-2009	Mexico	Pov=*f*(food Inf)	cross price elasticities	The study manifested that a 24%-25% price spike leads to the 45%-65% income loss among poor Mexicans.
Estrades and Terra (2012)	2006-08	Uruguay	Pov=*f*(food Inf, fuel Inf)	Computable General Equilibrium Model, Micromutation Approach	The inference showed positive impact of inflation on poverty with "DUTCH DISEASE" that the output increased in export sector only while in other sectors of economy inflation dragged the poor into poverty.

Fujii (2013)	2006-08	Philippines	Pov = *f*(Inf)	Non-parametric regression	The study strongly supported the hypothesis that the inflation was correlated with poverty.
Arndt et al. (2015)	2007-2009	Mozambique	Pov= *f*(Fop, Fup)	CPI Inflation GDP Deflator Inflation	The skyrocketing prices forced the poor to consume less food and fuel that increased the level of poverty in Mozambique.
Wood et al. (2016)	2008-2010	Mexico	Pon=*f*(Fop, Pedu, Pot, Pohl, Poh)	OLS	The study concluded that with the increased in the prices of food, housing, health, transportation and housing the poverty increased in Mexico.
Loayza and Rigolini (2016)	1990-2012	Peru	Pov= *f*(Inf) Ineq= *f*(Inf)	OLS	The study explored that in non-producing districts the impact of inflation was positive on poverty and inequality and the vice versa in case of producing districts due to better system of distribution.
Moncarz et al. (2016)	2003-2010	Argentina	Pov= *f*(Inf)	Prices elasticities	The results manifested that rising prices reduced the real wages in Argentina that enhance the poverty in the region. The results were reversed in case of subsidies.
Moser and Schnetzer (2017)	1985-2015	Austria	Pov= *f*(Inf)	Spatial Regression Analysis	The inferences showed that increase in inflation increased poverty.

Source: Authors' calculations

3. Methodology

To analyze the long-run and short-run correlation of variables the study has applied an auto regressive distributed lag model (ARDL). The reason to apply of the ARDL approach is due to mixed results of stationarity and non stationarity of variables.

3.1 Data Handling and Sources

The disaggregated data of consumer price index and wholesale price index employed in this study are collected from Pakistan Economic survey from 1982-2015. The comprising variables of consumer price index was subject to change over time that's why the study set 1982-1999 components of CPI and WPI and added the relevant variables of further periods such as from 1992-2007 data of education are added in recreation entertainment and education, data of health is added is added cleaning laundry and personal appearance. Data of fuel and lightning are added in energy. Data of 2008-2015 were also arranged, transportation and communication both are averaged to make one slot as per standard. Data of fuel and lightning are added in energy. Similarly, for the WPI six components variables were added relevant variables such as from 2008-2015 agricultural forestry and fishery products are added in raw material, ores and minerals, electricity and gas is added in the fuel lightning and lubricants and metal products, machinery and equipment added in the manufacturing. The data of price levels were not at same base, so, data splicing method was utilized to create same base series of data. The base year is 2001. Head Count Ratio (hcr) and Poverty Gap (pg) used as proxies of poverty as independent variable. The data of hcr are availed from World Development Indicators (WDI). The data of hcr for Pakistan is available on web source of trading economics[3] and quandle[4]. The data of poverty gap are gathered from WDI, however, the data were missing and completed by using linear interpolation and extrapolation techniques. The data of price levels were also gathered from Pakistan Economic Survey. This study applied linear extrapolation for year 1982-86 and 2015-15, while data completed by

[3] http://www.tradingeconomics.com/pakistan/hcr-index-wb-data.html
[4] https://www.quandl.com/collections/demography/hcr-index-by-country

interpolation are of years 1988-89, 1991-95, 1997, 1999-2000, 2002-03, 2008-09 and 2012. The data of all variables are standardized as well.

The study is based the estimating the impact of price level on poverty in Pakistan. In the study, the dependent variable is poverty. For poverty measurement the head count ratio and poverty gap are employed. The study included the disaggregate price levels, consumer price index (CPI) and wholesale price index (WPI) to analysis their impact on poverty in Pakistan. The consumer price index is decomposed in ten components and wholesale price index is decomposed in six components as per composition of Pakistan standard set by ministry of finance and state bank of Pakistan. Poverty scenario also analyzed by aggregate model of consumer price index, wholesale price index, GDP deflator and sensitive price index (SPI). The study has developed six models 1 and 2 consist of CPI components. The models 3 and 4 are comprised on WPI components and model 5 and 6 consists on aggregate price levels. The functional form, econometric models with expected signs of variables are as discussed below.

3.2 Model Specification and Description of Variables

Following models are used to explore the nexus between price levels and poverty. We have specified two types of models to estimate the nexus between price levels and poverty. The reason behind disaggregation of price levels is that it provides additional insight of impact on poverty of components of price levels. The variables used in the study are taken from the extant literature with the explanation in table 2 below.

Table 2: Description of Variables

Name of Variable	Description	Name of Variable	Description
Hcr	Head count ratio ($1.90 per day (2011 PPP))	gdpdi	Gross domestic product deflator inflation
Pg	Poverty gap ($1.90 a day (2011 PPP)	fbti	Inflation on food, beverages and tobacco products
Atfi	Apparel textiles and foot ware inflation	hfei	House furniture and equipment inflation
Hri	House rent inflation	tci	Transportation and communication inflation
Ei	Energy inflation	fi	Food inflation
Reei	Recreation entertainment and education inflation	rmi	Raw material inflation
Clpai	Cleaning laundry and personal appearance inflation	flli	Fuel lightning and lubricants inflation
Mi	Miscellaneous inflation	bmi	Building material inflation
Gi	General inflation	cpii	Consumer price index inflation
Wpii	Wholesale price index inflation	spii	Sensitive price index inflation

Note: all the variables are in annual percentage form.

3.3 Disaggregated Models

The disaggregate models are based on disaggregation of CPI and WPI components to explore their relationship with poverty.

Model 1: Head Count Ratio (hcr) with disaggregated CPI

The model explains the relationship between the poverty and disaggregated CPI. For poverty measurement the model used the headcount ratio. The functional form is as under:

$$hcr = f(\text{atfi, hri, ei, reei, clpai, mi, gi, fbti, hfei, tci}) \quad (1)$$

The econometric form is as under:

$$hcr = \beta_1 + \beta_2 atfi + \beta_3 hri + \beta_4 ei + \beta_5 reei + \beta_6 clpai + \beta_7 mi + \beta_8 gi + \beta_9 fbti + \beta_{10} hfei + \beta_{11} tci + \varepsilon_t \quad (2)$$

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11} > 0$$

Model 2: Poverty Gap (pg) with disaggregated CPI

The model explores the correlation between poverty and disaggregated CPI. For poverty measurement, the model used the poverty gap index. The functional form of the model is given:

$$pg = f(atfi, hri, ei, reei, clapi, mi, gi, fbti, hfei, tci) \quad (3)$$

The econometric equation of the model is as under:

$$pg = \beta_1 + \beta_2 atfi + \beta_3 hri + \beta_4 ei + \beta_5 reei + \beta_6 clpai + \beta_7 mi + \beta_8 gi + \beta_9 fbti + \beta_{10} hfei + \beta_{11} tci + \varepsilon \quad (4)$$

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7, \beta_8, \beta_9, \beta_{10}, \beta_{11} > 0$$

Model 3: Head Count Ratio (hcr) with disaggregated WPI

The model explicates the correlation between the poverty and disaggregated WPI. For poverty measurement, the model uses the headcount ratio. The functional form of the model is given:

$$hcr = f(\text{gi, fi, rmi, flli, mi, bmi}) \quad (5)$$

The econometric model is given below:

$$hcr = \beta_o + \beta_1 gi + \beta_2 fi + \beta_3 rmi + \beta_4 flli + \beta_5 mi + \beta_6 bmi + \varepsilon_t \quad (6)$$

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 > 0$$

Model 4: Poverty Gap (pg) with disaggregated WPI

The model estimates the relationship between the poverty and disaggregated WPI. For poverty measurement the model used the poverty gap index. The functional form of the model is given:

$$pg = f(\text{gi, fi, rmi, flli, mi, bmi}) \quad (7)$$

The econometric model takes the following form:

$$pg = \beta_o + \beta_1 gi + \beta_2 fi + \beta_3 rmi + \beta_4 flli + \beta_5 mi + \beta_6 bmi + \varepsilon_t \quad (8)$$

$$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6 > 0$$

3.4 Aggregate Models

The aggregate models make use of the aggregate price levels to compute the inflation rates such as CPII WPII SPII and GDPDI.

Model 5: Head Count Ratio (hcr) with Aggregate Price Levels

The model illustrates the relationship between poverty and disaggregated WPI. For poverty measurement, the model has used the hcr index. The functional form is as under:

$$hcr = f(\text{cpii, wpii, spii, gdpdi}) \quad (9)$$

The econometric form is as follows:

$$hcr = \beta_o + \beta_1 cpii + \beta_2 wpii + \beta_3 spii + \beta_4 gdpdi + \varepsilon_t \quad (10)$$

$$\beta_1, \beta_2, \beta_3, \beta_4 > 0$$

Model 6: Poverty Gap (pg) with Aggregate Price Levels

The model explicates the linkage between poverty and aggregate price levels. For poverty measurement, the model has used the poverty gap index. The functional form of the model is given as under:

$$pg = f(\text{cpii, wpii, spii, gdpdi}) \quad (11)$$

The econometric form of the model is presented below:

$$pg = \beta_o + \beta_1 cpii + \beta_2 wpii + \beta_3 spii + \beta_4 gdpdi + \varepsilon_t \quad (12)$$

$$\beta_1, \beta_2, \beta_3, \beta_4 > 0$$

4. Results and Discussions

The results of disaggregated and aggregated models are in following.

4.1 Unit Root Analysis

Stationarity and non stationarity of variables in the model is checked by the unit root test. Stationarity condition revealed constant mean and variance of the variable and vice versa for non stationarity. The test that is involved to check the stationarity and non stationarity of variables is called Augmented Dicky Fuller (ADF) test. I(0) and I(1) showed that variable is stationarity and stationarity at first difference, respectively.

Table 3: Results of Unit Root Test of CPI Disaggregated Model (1982-2015)

Variables	Intercept	Lags	Trend and Intercept	Lags	None	Lags	Conclusion
hcr	-1.1426 (0.6864)	0	-1.3020 (0.8693)	0	-1.0678 (0.2521)	0	I(1)
pg	-1.9098 (0.556)	0	-1.5813 (0.499)	1	-0.9541 (0.2963)	0	I(1)
gi	-6.0184 (0.000)	0	-6.9961 (0.001)	0	-6.3719 (0.000)	0	I(0)
fbti	-6.0433 (0.000)	0	-6.06981 (0.000)	0	-6.2864 (0.000)	0	I(0)
atfi	-6.4383 (0.002)	0	-6.6198 (0.000)	0	-6.6380 (0.000)	0	I(0)
hri	-6.8482 (0.000)	0	-6.8363 (0.003)	0	-6.3430 (0.001)	0	I(0)
ei	-6.6328 (0.000)	0	-6.6786 (0.000)	0	-6.1096 (0.000)	0	I(0)
hfei	-6.2068 (0.000)	0	-6.2672 (0.007)	0	-6.6067 (0.000)	0	I(0)
tci	-6.2679 (0.000)	0	-6.1836 (0.000)	0	-6.6438 (0.000)	0	I(0)
reei	6.8166 (0.000)	0	-6.7611 (0.005)	0	-6.6331 (0.000)	0	I(0)
clpai	-6.1268 (0.000)	0	-6.077 (0.000)	0	-6.0063 (0.000)	0	I(0)
mi	-6.8719 (0.000)	0	-6.9064 (0.000)	0	-6.4030 (0.000)	0	I(0)

Source: Authors' calculations

Note: MacKinnon p-values at 5% Level are -2.967110, -3.66776 and -1.961687 for Intercept, Trend and Intercept and None respectively.

Table 3 shows the ADF unit root test for the CPI components for Pakistan. The hcr and pg are stationary at first difference I(1) and remaining variables are stationary at I(0).

Table 4: Results of Unit Root Test of WPI Disaggregated Model (1982-2015)

Variables	Intercept	Lags	Trend and Intercept	Lags	None	Lags	Conclusion
hcr	-1.1426 (0.6864)	0	-1.3020 (0.8693)	0	-1.0678 (0.2521)	0	I(1)
pg	-1.9098 (0.556)	0	-1.5813 (0.499)	1	-0.9541 (0.2963)	0	I(1)
gi	-6.0968 (0.000)	0	-6.0740 (0.000)	0	-6.3166 (0.000)	0	I(0)
fi	-6.0962 (0.000)	0	-6.0770 (0.000)	0	-6.3498 (0.004)	0	I(0)
rmi	-6.3407 (0.000)	0	-6.3316 (0.000)	0	-6.6367 (0.000)	0	I(0)

Flli	-6.6243 (0.000)	0	-6.6464 (0.000)	1	-6.0838 (0.000)	0	I(0)
Mi	-6.6349 (0.000)	0	-6.1948 (0.002)	1	-6.1468 (0.000)	0	I(0)
Bmi	-6.3409 (0.000)	0	-6.3310 (0.000)	0	-6.6364 (0.000)	0	I(0)

Source: Authors' calculations

The above table reveals that hcr and pg are stationary at I(1) while all other variables are stationary at I(0).

Table 5: Results of Unit Root Test of Aggregate Price Levels Model (1982-2015)

Variables	Intercept	Lags	Trend and Intercept	Lags	None	Lags	Conclusion
Hcr	-1.1426 (0.6864)	0	-1.3020 (0.8693)	0	-1.0678 (0.2521)	0	I(1)
Pg	-1.9098 (0.556)	0	-1.5813 (0.499)	1	-0.9541 (0.2963)	0	I(1)
Gdpdi	-6.1439 (0.000)	0	-6.0736 (0.000)	0	-4.6702 (0.000)	0	I(0)
Wpii	-6.4637 (0.000)	0	-6.8981 (0.006)	8	-4.8346 (0.000)	0	I(0)
Cpii	-3.0296 (0.424)	1	-3.0704 (0.569)	0	-1.2417 (0.009)	1	I(1)
Spii	-6.8061 (0.000)	0	-7.2183 (0.000)	1	-6.1139 (0.000)	0	I(0)

Source: Authors' calculations

Note: MacKinnon p-values at 5% Level are -2.967110, -3.66776 and -1.961687 for Intercept, Trend and Intercept and None, respectively.

Table 5 shows the ADF unit root test for the aggregate price levels for Pakistan. The Table 5 reveals that hcr and pg are stationary at I (1) while all other variables are stationary at I (0).

4.2 Bounds Test Analysis

In this section, Table 6 shows the bounds test of CPI, WPI components and aggregate price level with the poverty models which are model one to six. The bounds test is applied to check whether ARDL is applicable or not. To apply the ARDL F-statistics of the model must be between upper and lower bounds value.

Table 6 illustrates the bound values of CPI, WPI disaggregate and aggregate models with hcr and pg. The results represent that all the values of F-statistics are between the bounds extreme values that means the long run correlation exist.

Table 6: Bounds Test Results of Model 1 2 3 4 5 and 6

Models	F-statistic	At 5 % level of Significance		At 10 % level of Significance	
		Io Bound	I1 Bound	Io Bound	I1 Bound
Model 1	6.97	2.33	3.46	2.07	3.16
Model 2	37.0	2.33	3.46	2.07	3.16
Model 3	26	2.86	4.01	2.46	3.62
Model 4	4.83	2.86	4.01	2.46	3.62
Model 5	26.4	2.86	4.01	2.46	3.62
Model 6	4.38	2.86	4.01	2.46	3.62

Source: Authors' Calculation

4.3 Results of the Models: Long run Analysis

This section illustrates the long run results of the model one and two.. The models in Table 5 use the headcount ratio and the poverty gap index to estimate the incidence of the poverty and depth of the poverty due to the change in the prices of the CPI components. Table 6 reveals the long run results of the model three and four. The model

three and four in Table 6 estimate the incidence of the poverty and depth of the poverty due to the change in the prices of the WPI components. Table 7 explicate the long run results of the model five and six, the models estimate the incidence of the poverty and depth of the poverty due to the change in aggregate price levels.

4.3.1 Long Run Results of Poverty Models (CPI Disaggregated Analysis)

The long run results of the CPI components with poverty are shown in the Table 7. Table 7 manifests the impact of price levels on hcr and pg in Pakistan. The significant positive impact of price levels on hcr and pg in Pakistan is revealed. The positive relationship is justified by following the reasons.

Firstly, when price level increases the real income of the poor decreases which causes the reduced number of goods and services available for consumption of the poor that ultimately increases the poverty in Pakistan. Ravellion (2000) also explained that an increase in the prices was associated with the decrease in the real wages which dwindle the amount of goods purchased by the poor and increases the incidence and depth of poverty. Son and Kakwani (2006) explored that the poverty increased due increase in price level and decrease in real wages. So, through the increase in price levels the poverty increases in Pakistan. Our results are supported by the Son and Kakwani (2006) and Coleman (2012).

Table 7: Long run Results of Poverty Models (Disaggregated Analysis, 1982-2015)

Variable	Poverty Models (Disaggregated)	
	Model 1	**Model 2**
	DV: (hcr)	**DV:(pg)**
Atfi	1.172776 (0.4442)	2.971306 (0.1248)
Hri	-6.661729 (0.0341)	-3.664677 (0.0806)
Ei	2.214144 (0.0646)	3.129616 (0.0842)
Reei	-4.841262 (0.0182)	4.478097 (0.0763)
Clpai	-2.076163 (0.0096)	0.668390 (0.1462)
Mi	4.613011 (0.0381)	0.808379 (0.3114)
Gi	8.226677 (0.0486)	-8.344036 (0.0663)
Fbti	1.798669 (0.0767)	2.218618 (0.1641)
Hfei	-0.976716 (0.6443)	-7.446642 (0.0769)
Tci	-0.224122 (0.8087)	0.143048 (0.8683)
C	0.846381 (0.0123)	-0.062170 (0.6216)

Source: Authors' calculations
Note: The parenthesis values are probability values

Secondly, in the political economy of Pakistan the political competition among the political parties to win the voters and the for the justification of the dictatorship the public expenditures increased, in absence of strong tax base the tax rate increased to meet escalated public expenditures. The amplifying tax burden only increases the price levels and increases the poverty as well. Sachs (1989) highlights that weak political structure, instability and pressure groups laid burden on the inflationary financing of government that leads to the hyperinflation, increase in

poverty. Our results are supported by Edwards (1994), Desai et al. (2003), Al-Marhubi (2000) and Desai et al. (2006).

Thirdly, the weak bargaining power of the workers union also increases poverty, as the price level increases in the economy the weak bargaining power of workers union is unable to negotiate the wages, so, at same monetary wages the increased price level reduces real wages which make the workers to cut consumption of goods and services that increases the poverty. Albanesi (2006) reveals that the price shocks reduces the real wages of the workers with weak bargaining power and enhances the level of poverty. The author further highlighted that the monetary and fiscal policies, income tax and wage rate determination are the bargaining game between governments and the pressure groups. Our results are also advocated by (Jacoby, 2016).

Fourthly, the poor system of indexation contributes to the amplifying the hcr and pg in our results. When the price level increases in the economy the poor system of indexation cannot compensate the people influenced severely because the indexation has not properly established or managed, so, it contributes to the increase in hcr and pg. Boskin et al. (1998) elucidates that reduction in the poverty and income in equality based on the proper information of the poor and to establish efficient system of indexation to compensate the poor in cases of price spike. The results our study are backed by Amble and Stewart (1994) and Easterly and Fisher (2001).

Fifthly, shopping time approach explains the positive impact of price level on hcr and pg. The unavailability or poor access to the delayed transaction instruments for spending money increases poverty. The households with fewer access to delayed transaction methods inflamed more by the price level spike. Cysne et al. (2006) explains that inadequate access to the modern delayed transaction technologies cause households 'welfare loss. The results are consistent with the Henriksen and Kydland (2010).

Table 5 also reveals the negative association among price levels, hcr and pg. The paradox results explain that with increase in price level the hcr and pg reduce. The reasons for the paradox association are as under,

Firstly, in the presence of subsidies and social security benefits reduces the hcr and pg despite price spike. When price level increases in the economy the subsidies and social security benefits provided by the government increases the monetary income of the people and the people become more immune to the price hike. Achdut and Bigman (1991) elaborates the phenomenon that despite skyrocketing prices the provision of subsidies and social security benefits abolish the inflationary influence on poverty.

Secondly, the lucrative opportunity cost of holding liquid assets by people reduces the hcr and pg. The more the opportunity cost of holding liquid assets the fewer the poverty will be. The people utilized the delayed payment instrument to purchase goods and services and put liquid assets for productive use. Freeman and Huffman (1991) illustrates that people face with transaction cost of money while make purchase of goods and services, so. If interest rate is high and transaction cost is low than the people turn liquid assets to the interest bearing bonds and securities and avail delayed transaction tools for purchase of goods and services, this increases monetary income and reduces poverty. Our results are supported by the Freeman and Kydland (2000) and Simonsen and Cysne (2001).

Thirdly, the Dutch disease is a situation where a specific sector of economy grows more than the others, in this case the wages in that particular sector also increase that reduces the poverty in that particular sector along with inflation. Estrades and Terre (2012) reports that due to the Dutch disease the wages shoots and the incidence and depth of poverty level dwindles. Our results are according to the Valensisi (2008).

Fourthly, the Philips curve clarifies the negative correlation with price levels and hcr, and pg. An increase in the price levels reduces the unemployment rate which implies that the income of households increases and the poverty decrease. Mocan (1995) explains that price hike in the economy reduces the structural unemployment amplifying the household income. Out results are in line with the Cutler and Katz (1991).

Fifthly, trickledown effect demonstrates the positive relationship among hcr and pg. It implies that the consistent growth of a country trickles the benefits of growth to the poor and the incomes of the poor starts increasing that reduces poverty. The phenomenon was also illustrated by Kuznet in his inverted U-hypothesis. Khattak (2014) clarifies that the high rate of GDP growth reduces poverty in Pakistan. Our results are supported by Lahiri (2010) and Namini (2016).

Sixthly, the strong bargaining power or workers union reveals the positive association among hcr and pg. An increase in the price level in the economy with strong bargaining power of workers union negotiate for high wages and reverse the impact on price level on poverty. Albanesi (2006) elucidates that strong bargaining power of the worker set higher monetary wages and reduces poverty.

4.3.2 Long Run Results of Poverty Models (WPI Disaggregated)

The long run results of the WPI components with poverty and income inequality are shown in the Table 8. This table explains reveals hcr is positively associated with the gi and bmi while negatively associated with the fi, rmi, flli and mi. The pg is positively associated with the fi, rmi and mi while negatively associated with the gi, flli and mi. The justifications of both the positive and negative signs of variables are already discussed in the illustration of Table 7.

Table 8: Long run Results of Poverty Models (WPI Disaggregated Analysis, 1982-2015)

Variable	Poverty Models Disaggregated	
	Model 3	Model 4
	DV: (hcr)	**DV:(pg)**
Gi	-23.016336 (0.0866)	-17.66923 (0.1033)
Fi	12.622346 (0.1767)	7.697302 (0.1066)
Rmi	-6.308424 (0.0381)	9.160873 (0.0786)
Flli	-6.914371 (0.0368)	-7.713327 (0.0622)
Mi	-7.404816 (0.0926)	4.014363 (0.0608)
Bmi	1.446906 (0.3679)	2.044836 (0.0670)
C	0.968617 (0.1611)	4.388961 (0.0624)
T	0.017168 (0.1046)	----

Source: Authors' calculations

4.3.3 Long Run Results of Poverty Models (Aggregate Price Levels)

The long run results of model 5 and 6, the aggregate price levels with poverty are shown in the Table 9.

Table 9: Long run Results of Poverty Models (Aggregate Analysis, 1982-2015)

Variable	Poverty Models Aggregated	
	Model 5	**Model 6**
	DV: (hcr)	**DV:(pg)**
cpii	23.097769 (0.4347)	4.433348 (0.6164)
wpii	-10.176636 (0.0937)	3.207001 (0.0913)
spii	8.773611 (0.0488)	8.470184 (0.0626)
gdpdi	-1.430872 (0.0087)	2.763136 (0.1161)
C	0.642490 (0.2729)	0.301712 (0.8912)

The Table 9 manifests the positive correlation of hcr with the cpii and spii while negative correlation wpii and gdpdi. The pg is positively correlated with the cpii, wpii, spii and gdpdi. The reasons of both positive and negative signs of variables has discussed in the illustration of Table 7.

4.4 Results of the Error Correction models

Having examined the long run relationship among the variables employed in the model, error correction model (ECM) is used to investigate these short run variations. Table 10 shows the short run error correction results of the poverty models 1 and 2 with the CPI components. Table 10 reveals the short run error correction results of the model three and four. Table 11 shows the short run error correction results of the models five and six.

4.4.1 Error Correction Results of Poverty Models (CPI Disaggregate Analysis)

The error correction results of the CPI components with poverty are shown in the Table 10.

Table 10: Error Correction Results of Poverty Models (CPI Disaggregate Analysis)

Variable	Poverty Models (Disaggregate)	
	Model 1	Model 2
	DV: (hcr)	DV: pg
D(hcr(-1))	-0.612946 (0.3616)	----
D(hcr(-2))	-0.600676 (0.3762)	----
D(hcr (-3))	0.413734 (0.4466)	----
D(pg(-1))	----	-0.30076 (0.2088)
D(pg(-2))	----	0.261118 (0.2470)
D(pg(-3))	----	1.037396 (0.0686)
D(atfi)	-1.018921 (0.0831)	-1.369063 (0.0766)
D(hri)	2.766124 (0.0128)	-1.682270 (0.1097)
D(ei)	0.277932 (0.4630)	1.682270 (0.1194)
D(reei)	0.716231 (0.3712)	0.806067 (0.1621)
D(clpai)	0.667200 (0.0066)	1.486874 (0.4306)
D(mi)	-1.779367 (0.0067)	-0.026271 (0.6704)
D(gi)	-2.019884 (0.1928)	-1.962839 (0.1062)
D(fbti)	-1.164678 (0.0361)	-0.067166 (0.7611)
D(hfei)	2.822662 (0.1821)	-0.472810 (0.6442)
D(tci)	-0.146124 (0.8121)	0.636476 (0.1847)
T	0.003326 (0.1664)	-0.009297 (0.0687)
CointEq(-1)	-0.6476 (0.0284)	-0.4979 (0.0612)

Source: Authors' calculations

The dependent variables in model 1 and 2 are the poverty head count ratio and poverty gap respectively. In Table 10 values of Error Correction Coefficients of model 1 and model 2 are -0.6476 and -0.4979 respectively. Negative signs show the short run convergence to the equilibrium. Model 1 shows the long run dispersion from equilibrium due to short run jolt will be corrected in six months while in model 2 the convergence will occur in approximately five months.

4.4.2 Error Correction Results of Poverty Models (WPI Disaggregate Analysis)

The error correction results of the WPI components with poverty are shown in the Table 11.

Table 11: Error Correction Results of Poverty Models (WPI Disaggregate Analysis, 1982-2015)

Variable	Poverty Models Disaggregated	
	Model 3	Model 4
	DV: (hcr)	DV:(pg)
D(hri(-1))	0.437467 (0.0024)	----
D(pg(-1))	0.797636 (0.2986)	1.772381 (0.0009)
D(gi)	0.3671 (0.0340)	1.637494 (0.0146)
D(gi(-1)	----	2.094177 (0.0684)
D(gi(-2)	-------	3.649062 (0.0141)
D(fi)	-0.179814 (0.7768)	0.084184 (0.0907)
D(fi(-1))	1.678969 (0.0109)	-0.976332 (0.1690)
D(fi(-2))	----	-2.704626 (0.0124)
D(rmi)	-0.610436 (0.0076)	-0.604808 (0.0141)
D(rmi(-1))	----	-1.487823 (0.0010)
D(rmi(-2))	----	-1.049883 (0.0010)
D(flli)	-0.923688 (0.0146)	-2.036222 (0.0018)
D(flli(-1))	----	0.702686 (0.0233)
D(flli(-2))	----	-0.290660 (0.1162)
D(mi)	0.188670 (0.4812)	1.861331 (0.0039)
D(mi(-1)	1.212361 (0.000)	----
D(bmi)	0.226793 (0.0374)	-0.868691 (0.0360)
D(T)	0.002679 (0.439)	----
cointEq(-1)	-0.1661 (0.0183)	-0.0670 (0.0638)

Source: Authors' calculations

The dependent variable in model 3 is poverty head count ratio, in model 4 the dependent variable is poverty gap. In Table 11 values of Error Correction Coefficients of model 3 and model 4 are -0.1661 and -0.0670 respectively.

Negative sign shows the short run convergence to the equilibrium. Model 3 shows long run dispersion from equilibrium due to short run jolt will be corrected in more than one month. In model 4 the convergence will occur in approximately one month.

4.4.3 Error Correction Results of Poverty Models (Aggregate Analysis)

The error correction results of model 5 and 6 are shown below in the Table 12.

Table 12: Error Correction Results of Poverty Models (Aggregated Analysis, 1982-2015)

Variable	Poverty Models Aggregated	
	Model 5	**Model 6**
	DV: (hcr)	**DV:(pg)**
D(hcr (-1))	1.00626 (0.0360)	----
D(hcr (-2))	-0.442087 (0.2499)	----
D(hcr (-3))	1.633760 (0.0229)	----
D(pg(-1))	----	0.844199 (0.0466)
D(pg(-2))	----	0.706177 (0.1882)
D(pg(-3))	----	-0.687127 (0.1717)
D(cpii)	27.046161 (0.4976)	6.699817 (0.6720)
D(cpii(-1))	-0.164337 (0.1829)	-0.067706 (0.3027)
D(cpii(-2))	0.122214 (0.3396)	-0.169082 (0.0770)
D(cpii(-3))	0.216074 (0.1661)	----
D(wpii)	-3.860342 (0.2466)	0.692922 (0.3616)
D(wpii(-1))	-0.783861 (0.6012)	-0.093798 (0.8184)
D(wpii(-2))	2.876729 (0.2196)	-1.681468 (0.1708)
D(wpii(-3))	1.39489 (0.3423)	-2.291066 (0.0616)
D(spii)	1.696764 (0.1970)	-1.16890 (0.1021)
D(spii(-1))	0.666070 (0.6696)	0.184967 (0.6868)
D(spii(-2))	-2.701223 (0.2269)	1.766746 (0.1730)
D(spii(-3))	-1.666949 (0.1970)	2.368992 (0.0694)
D(gdpdi)	-0.043842 (0.6879)	0.224396 (0.1364)
D(gdpdi (-1))	0.236607 (0.0693)	0.06360 (0.4107)
D(gdpdi (-2))	0.346118 (0.0766)	-0.116216 (0.1710)
D(gdpdi (-3))	0.802096 (0.1037)	0.077161 (0.3639)
CointEq(-1)	-1.1820 (0.0360)	-0.1426 (0.1460)

Source: Authors' calculations

The dependent variable in model 5 is poverty head count ratio while in model 6, the dependent variable is poverty gap. In Table 12 values of Error Correction Coefficients of model 5 and model 6 are -1.1820 and -0.1426 respectively. Negative sign shows the short run convergence to the equilibrium. In model 5 the convergence to longrun equilibrium will occur two months approximately. In model 6 the convergence will occur in more than one month. It is also observed that in all ECM models the speed of adjustment is different. It might be due to the different dependent variables in different models.

5. Conclusions, Policy Implications and Future Research Agenda

Price level is a crucial factor in our routine lives while the individuals are diverse in terms of their wants, pattern of income and consumption. Hence, the impact of price levels on the individuals is different. The study examined the impact of change in prices of components of the price levels and the change in the aggregate price levels on the poverty in Pakistan. The study collected data of aggregate and disaggregate price levels, and poverty in Pakistan from World Development Indicators (WDI) and the Handbook of Statistics of the State Bank of Pakistan (SBP) for the years 1982-2015. Heterogeneity of the base of data of the price levels and their components was removed by using linear data splicing method and all the data converted to same base. The ARDL method is used to access the correlation among variables.

The results of the study are diverse in some cases, while are according to the theory in other cases, leading to a paradoxical situation. The results reveal that poverty has positive relationship with price level components and the aggregate price levels which increase the incidence and depth of the poverty in Pakistan. The increase in poverty is not merely associated with the deprivation of food only but is also linked to essentials of life such as food, clothing, education, health, freedom of speech, richer cultural life, justice, self-esteem etc. The development economists of our time reveal that the poor are more insecure and defenceless and victim of crimes as compared to the rich while the phenomenon becomes worse for the poorest sections of the society. The reason for positive association is the reduced real income of individuals, weak bargain power and poor system of indexation. The paradoxical results explain a positive association between components of the price levels, aggregate price levels, poverty manifested that increase in the prices of the components of the price levels, and aggregate price level reduced the poverty in Pakistan. These results are due to the negative relationship between inflation and unemployment, trickle down and strong workers bargaining power. However, due to large number of population, living in the rural areas where average income of household is very low, the inflation hurts them adversely.

The Government of Pakistan needs to consider policies for retail and wholesale prices as well. The following are some of the policy recommendations:

- The Government of Pakistan may focus on components of the CPI that are causing poverty such as atfi, ei, fbti etc. The inflation rates may be checked properly and their effect may be compensated by proper policies to reduce the poverty.
- The economic managers of Pakistan may consider components of the CPI that are reducing poverty such as hri and hefi etc. These components may be properly regulated.
- The Government of Pakistan may consider the components of WPI that are increasing the poverty such as. fi, bmi etc. hence, inflation rates may be controlled.
- The policy makers may properly check the components of WPI that are decreasing the poverty such as. gi, rmi etc. These inflation rates must be properly managed for better gains in the economy.

The present study explores the association of aggregate and disaggregated price levels and poverty in Pakistan. However, there is a need for future research to explore the relationship between consumption poverty and price levels.

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