

Social protection expenditures, poverty, inequality, and economic growth in Pakistan

MUHAMMAD WAQAS*, MASOOD SARWAR AWAN** E ISAAC SÁNCHEZ-JUÁREZ***

ABSTRACT

This paper analyses the relationship between social protection expenditures, poverty, income inequality and economic growth in a marginalized country like Pakistan by using annual data available from 1983 to 2015. Three econometric time series models have been developed; the first model explored the impact of social protection expenditures on poverty; the second model investigated the impact of social protection expenditures on income inequality and a third model shows the impact of poverty, income inequality and social protection expenditures on economic growth. Results from cointegration techniques suggested that social protection expenditures reduce poverty and inequality in the case of Pakistan. Furthermore, increasing expenditures on social protection programs has a positive impact on the economy and boost economic growth.

Keywords: Social programs, economic development, marginalization, public expenditures.

JEL classification: H53, O11, O47, O53.

* Assistant Professor of Economics, University of Sargodha, Pakistan. Correo-e: muhammad.waqas@uos.edu.pk. ORCID: <https://orcid.org/0000-0002-5809-0892>.

** Full Time Professor of Economics, University of Sargodha, Pakistan. Correo-e: masood.sarwar@uos.edu.pk. ORCID: <https://orcid.org/0000-0001-7866-135X>.

*** Full Time Professor of Economics, Universidad Autónoma de Ciudad Juárez, México. Correo-e: isaac.sanchez@uacj.mx. ORCID: <http://orcid.org/0000-0002-1975-5185>.

The authors appreciate the comments of two anonymous reviewers.

RESUMEN

Gasto en programas sociales, pobreza, desigualdad y crecimiento económico en Pakistán

Este artículo estudia la relación entre los gastos en programas sociales, la pobreza, la desigualdad en el ingreso y el crecimiento económico en un país marginado como Pakistán, usando los datos disponibles del periodo 1983 a 2015. Se elaboraron tres modelos econométricos de series de tiempo: el primer modelo evaluó el impacto de los gastos de protección social sobre la pobreza; el segundo modelo investigó el impacto de los gastos de protección social sobre la desigualdad del ingreso y el tercer modelo muestra el impacto de la pobreza, desigualdad y de los gastos en programas sociales sobre el crecimiento económico. Los resultados de las técnicas de cointegración aplicadas sugieren que los incrementos en los gastos en protección social reducen la pobreza y la desigualdad en el caso de Pakistán. Aun más, los incrementos de los gastos en programas sociales tienen un impacto positivo sobre la economía y alientan el crecimiento económico.

Palabras clave: Programas sociales, desarrollo económico, marginación, gastos públicos.

Clasificación JEL: H53, O11, O47, O53.

INTRODUCTION

Social protection policies, which include social insurance, safety nets, and social security, can reduce the risk of vulnerability as well as increase long-term investment in human capital of the economy (ADB, 2001). Along with reducing the risk of poverty and vulnerability, policies related to social protection programs contribute to growth of several sectors of the economy, meaning they have multifaceted impacts on macroeconomic variables. Firstly, social protection programs give support to sick, disable, and vulnerable people. It helps them to maintain the basic life standards and diminish the role of external shocks. Secondly, it generates employment opportunities because maintains the demand for necessities and services. Therefore, it enhances the economic growth along with the reduction in poverty and inequality (Bari *et al.*, 2005; ADB, 2008; Barrientos & Hulme, 2008; Barrientos, 2009).

Social protection programs play a dual role, are both a cost and an investment. Cost because that non-deprived segment of the population must pay for the support of deprived segment. Investment because it reduces the poverty and contributes to the growth of an economy. There are three major effects of social protection policies on the economy: pro-growth-enhancing effect, poverty-reducing effect, and equity-promoting effect (Waqas & Sarwar, 2017).

The pro-growth-enhancing effect states that social protection programs reduce the risk by using the tool of informal and formal insurance which has an investment demand effect on the economy, which will have ultimately enhanced growth and minimize poverty. Social protection programs (i.e., school meals, public works programs, etc.) have multiplier effects on macroeconomic indicators of economy like income, employment, etcetera, that leads to economic growth, ultimately. Under poverty-reducing effect, it plays a significant role to raise the consumption and income level of the deprived segment of the population. Indirectly it contributes to livelihood stability of poor and hence contributes to the growth of an economy. It has also an equity-promoting effect because it reduces the inequality among two segments of the population, giving a support to the deprived one. Indirectly it enhances the economic growth, for example the minimum wage law not only increases the livelihood standards of poor but also increase the productivity. Similarly, the redistribution of land can increase the output and give a support to the poor.

In the case of Pakistan, poverty, inequality, and low growth have been constant historically, only until recently, in 2006, the government implemented a plan where 17 pro-poor sectors were prioritized through a Medium-Term Expenditure Framework (MTEF). Thanks to this strategy, during 2008-09, the expenditures on pro-poor sectors were 7.4 percent of GDP which were increased to 8.3 percent of GDP in 2010-11. During 2011-12, these expenditures stood at 9.9 percent to GDP. In 2012-13 this share was 12 percent to GDP (Ministry of Finance, 2013). In 2015 the government spending in social programs was 8.3 percent to GDP.

Should government spending on social programs continue to increase? Will it lead to higher growth, poverty reduction and inequality in Pakistan? The present study aims to answer these questions evaluating econometrically the impact of government spending on social programs

on poverty, inequality, and economic growth in Pakistan, using the official information available during the period 1983-2015. Considering the above, section two presents a brief literature review. Section three presents the data and methodology while section four shows the results. The final section shows the conclusions of the study.

1. LITERATURE REVIEW

The literature of social protection and economic growth is vast and reports mixed results, some studies show a positive relation while some reveals a negative relation. In the case of a negative relation, we found the study by Hansson & Henrekson (1994) with data of 14 OECD countries, in the same direction are the works of Afonso & Alegre (2008) in the EU, Sakellariadis (2009) in Greece; Izák (2011) in new post-socialist EU countries; Hong (2012) for a panel data of all OECD nations and Owino (2017) who demonstrated in the case of Kenya that health and social security expenditure dampen economic growth.

The studies that found a positive relation among social protection expenditures and economic growth are Hassan (2010) in Sudan; Ezcurra & Rodríguez-Pose (2011) in case of 20 OECD countries, Pradhan *et al.* (2013) in case of Bangladesh; Ozlem & Demiral (2016) in 18 OECD countries and Kiendrebeogo *et al.* (2017). In the case of Pakistan, Asghar *et al.* (2011) for the period 1974-2008 found the existence of positive relationship between government expenditure on human capital and economic and community services and economic growth. More recently Anser *et al.* (2020) using a panel of 16 diversified countries, over a period of 1990-2014 found a U-shaped relationship between poverty headcount and per capita income and inverted U-shaped relationship between income inequality and economic growth. Also, that per capita income is influenced by high poverty incidence, whereas health expenditures amplify per capita income across countries.

On the other hand, Caminada & Goudswaard (2005) found that net public social expenditures have a negative impact on income inequality in case of OECD countries. The results of OLS depict that net private social expenditure increases income inequality. Furthermore, net total social expenditures have negative impact on income inequality. On aggregate level, the study found a complementarity among public and private social expenditures. Arjona *et al.* (2002) found that different

types of social protection expenditure have different impacts on growth of 21 OECD countries. By utilizing the annual data from 1970-1998, the results of GMM depict that social protection have a moderate impact on GDP in long-run. Moreover, inequality is associated with higher growth. Also, a positive relation is found among GDP and investment. Arjona *et al.* (2001) found that rapid and sustain economic growth is necessary to promote participation of labor in market through social expenditures. The study utilized the data of 28 European and OECD countries, from the period of 1970-97. The results of OLS, GMM, and Pooled Mean Group (PMG) techniques infer that active social spending positively affect GDP. Population growth and investment on human capital increases the GDP. Non-active spending has negative impact on GDP. Persson & Tabellini (1994) explored the negative relationship among social expenditure and GDP growth in case of 13 OECD countries. By utilizing the data from 1960-85, the results infer that higher inequality implies less growth. Moreover, inequality is harmful for growth because it leads to the policies that do not protect property rights. Kenworth (1999) explored that social welfare programs reduce poverty in fifteen industrialized countries. The study used data from 1960-91 of US, Australia, Denmark, UK, Belgium, Switzerland, Canada, Germany, Finland, Sweden, France, Norway, Ireland, Netherlands, and Italy. By using three alternative measures of social welfare, results of OLS found negative relationship among all social welfare proxies and poverty. Levy (2018) in the case of Mexico in Latin America considers that the policies and institutions deployed to improve social inclusion tax the high-productivity sector of the economy and subsidize the low-productivity sector, stifling productivity and slowing growth. Sánchez-Juárez (2018) found that in the Mexican case, increases in public social spending reduce the social competitiveness of the states of that country.

Few studies discussed the four components jointly, the social protection expenditures, poverty, income inequality, and economic growth in case of time series data. Those studies include the study by Pradhan *et al.* (2013), who found that spending on social safety nets reduces poverty in case of Bangladesh. The study used annual data from 1996-2010 on poverty and expenditure on social safety nets as percentage to total budget. The results of Engel-Granger cointegration approach infer no long run relationship among social safety nets and poverty. However, the results of OLS indicated that spending on social safety nets reduces

poverty. The study concluded that assistance to protect poor and vulnerable can help reduce poverty. Kiendrebeogo *et al.* (2017) found that during financial crises social protection program help to reduce poverty. The study utilized the data of 40 developing countries from the period of 1984-2010. Results of GMM and fixed effect model infer an increasing trend in poverty during financial crises. Expenditure on health and education mitigate the impact of financial crises. Comparatively, expenditure on education has more impact on poverty reduction as compared to health spending. Moreover, GDP growth play central role to control poverty. Dafermos & Papatheodorou (2010) found a positive relationship among social protection and economic growth in case of 14 European countries, by utilizing the panel data from 1994-2007. The results of fixed effect model depict that economic growth reduces the poverty and inequality. Social transfers negatively affect poverty and inequality. Moreover, social cash transfers have a significant role for poverty and inequality reduction than economic growth. Study concluded that social protection is more important than economic growth for the alleviation of poverty and inequality.

According to the literature review carried out few studies have been observed regarding the relationship between poverty, inequality, economic growth, and social protection expenditures using time series data in poor countries. Therefore, the current study is original due to three reasons: 1) utilized a large span of time series data for a poor country, 2) employed the cointegration approach and 3) with reference to Pakistan this might be the first study which utilize the time series-based analysis for the period.

2. DATA AND METHODOLOGY

2.1. Data

The study utilized annual data from the period 1983 to 2015. The variables which are used for analysis are GDP growth rate, income inequality (Gini coefficient), poverty (poverty headcount ratio at national poverty lines as percentage to population), and social protection expenditures as percentage to GDP. The data has been taken from Pakistan Economic

Survey and International Financial Statistics. The study developed three models; first model has been formed to depict the impact of social protection expenditures (SP) on poverty (Pov). Second model investigated the impact of SP on income inequality (Ineq). Third model is formed to explore the impact of SP, Ineq, and Pov on economic growth (EG).

$$Pov = \gamma_0 + \theta_1 SP + \mu \quad (a)$$

$$Ineq = \delta_0 + \rho_1 SP + \mu \quad (b)$$

$$EG = \alpha_0 + \beta_1 Pov + \beta_2 Ineq + \beta_3 SP + \mu \quad (c)$$

Table 1
DESCRIPTIVE STATISTICS OF THE SERIES

| | EG | PS | Pov | Ineq |
|--------------|----------|----------|----------|-----------|
| Mean | 4.490164 | 4.511515 | 25.85970 | 0.346617 |
| Median | 4.832817 | 3.890000 | 23.87000 | 0.372028 |
| Maximum | 7.705898 | 8.300000 | 39.10000 | 0.394193 |
| Minimum | 1.014396 | 2.120000 | 20.00000 | 0.241335 |
| Std. Dev. | 1.993779 | 1.723333 | 5.604704 | 0.049407 |
| Skewness | 0.084811 | 0.754736 | 1.055357 | -0.777648 |
| Kurtosis | 1.954162 | 2.540575 | 2.832634 | 2.163976 |
| Jarque-Bera | 1.543505 | 3.423169 | 6.164294 | 4.287090 |
| Probability | 0.462202 | 0.180579 | 0.045861 | 0.117238 |
| Observations | 33 | 33 | 33 | 33 |

Source: authors' estimation.

2.2. Methodology

Since we worked with time series, it was necessary to review the stationarity and order of integration of the series as a first step. It was checked that they did not have a unit root problem, for which were used Augmented Dickey Fuller (ADF) unit root test and Kwiatkowski, Phillips, Schmidt & Shin test (KPSS).² Also, the study utilized Engle and Granger cointegration approach for equation (a) and (b) because there is one independent variable in both equations while utilized Johansen and Juselius cointegration approach for equation (c) (see Engle & Granger, 1987; Johansen, 1988; Johansen & Juselius, 1990; Johansen, 1995).

Time series and economic data is time trended, so it is necessary to check the data stationarity before the estimation of an econometric model. Econometric literature, regarding cointegration techniques, has been categorized into two dimensions, univariate, and multivariate techniques. Checking the order of integration is necessary before applying cointegration techniques.

Characteristics of stationary time series data

As discussed, previous, time series data is time trended and hence have a problem of unit root. Stationary series of any data follows three conditions:

- i. $E(Y_t) = \text{constant}$ for all t .
- ii. $\text{Var}(Y_t) = \text{constant}$ for all t .
- iii. $\text{Cov}(Y_t, Y_{t+k}) = \text{constant}$ for all t and all $k \neq 0$.

Unit roots

For better understanding of unit root problem, consider AR (1) model, $Y_t = \gamma Y_{t-1} + u_t \dots (1)$ where u_t is the white noise process and $|\gamma| < 1$ is stationarity condition. Normally, time series have three possible conditions:

- i. The series is stationary series in case $|\gamma| < 1$
- ii. The series is explosive in case $|\gamma| > 1$
- iii. The series is non-stationary in case $|\gamma| = 1$

² According to the reviewers' recommendation, the application of unit root tests with structural breakage was evaluated. The results are presented in the appendix 1, in general it was found that the series in levels had unit roots while in first differences they were stationary. For each series the structural breaking point was different (read Gregory and Hansen (1996) for more information about the estimations in this case).

Subtracting Y_{t-1} from both sides of equation (1), we get

$$Y_t - Y_{t-1} = \chi Y_{t-1} - Y_{t-1} + u_t \dots (2)$$

or $\Delta Y_t = u_t$

ΔY_t is now a stationary series which is obtained through differencing Y_t . Mostly, there are two possibilities regarding the order of integration, I(0) and I(1). The series is I(1) when it became stationary after taking first difference. The series is I(0) when it is already stationary. The study utilized two-unit root tests, discussed below.

2.2.1. Testing the data for unit root

Augmented Dickey Fuller (ADF)

This test used lagged dependent variable as an independent variable in the model. Most of the cases time series and economic data have a trend and intercept. Time series is of three following forms (Dickey & Fuller, 1979, 1981).

$$\Delta Y_t = \phi Y_{t-1} + \sum \gamma_i \Delta Y_{t-1} + e_t \dots (3)$$

$$\Delta Y_t = \alpha_0 + \phi Y_{t-1} + \sum \gamma_i \Delta Y_{t-1} + e_t \dots (4)$$

$$\Delta Y_t = \alpha_0 + \phi Y_{t-1} + a_2 t + \sum \gamma_i \Delta Y_{t-1} + e_t \dots (5)$$

The equation (3), (4), and (5) with no trend and intercept, with intercept, and both trend and intercept, respectively. To check the acceptance or rejection of null hypothesis we compared the ADF-calculated with the tabulated values of MacKinnon (2010) table.

The Kwiatkowski, Phillips, Schmidt, and Shin Test (KPSS)

The KPSS is the second test we have utilized to check the unit root problem. This test is based on OLS, and residuals are used to test unit root problem. Consider Y_t as an endogenous variable and X_t as exogenous variable.

$$Y_t = X_t \delta + e_t \dots (6)$$

The LM statistic is:

$$LM = \sum_{\tau} R(\tau)^2 / T^2 f_0 \dots (7)$$

Where at zero frequency f_0 is an estimator of the residual spectrum and $R(t)$ is the cumulative residual function:

$R(t) = \sum_{r=1}^t \hat{e}_t$, which is based on the residuals $\hat{e}_t = Y_t - \hat{X}_t \delta(0)$ (Kwiatkowski et al., 1992).

2.2.2. Cointegration

Engle and Granger

The study utilized Engle and Granger Cointegration for equation (a) and (b) because there is one independent variable in both equations. To check long run and short run relationship among variables consider two series (Pov_t, SP_t) of order to integration m and n , can be written as:

$$Pov_t, SP_t = CI(m, n) \dots (8)$$

Where $m \geq n \geq 0$. Consider two things for cointegrating vector among (Pov_t, SP_t) the order of integration among variables is b and linear combination among both variables ($\beta_1 Pov_t, \beta_2 SP_t$) is of order $a-b$. For the existence of long run relation, the linear combination is essential among variables, say Pov_t and SP_t . Consider following function:

$$Pov_t = \beta_1 + \beta_2 SP_t + e_t \dots (9)$$

By taking the residuals,

$$\hat{e}_t = Pov_t - \beta_1 - \beta_2 SP_t \dots (10)$$

For cointegration condition among Pov_t and SP_t , $\hat{e}_t = I(0)$. Alternatively, suppose two variables Pov_t and SP_t are order to integration 1 with vector $[\gamma_1, \gamma_2]$ We can write this as:

$$\gamma_1 Pov_t + \gamma_2 SP_t = e_t \dots (11)$$

Where $\hat{e}_t = I(0)$. The set of variables $[Pov_t, SP_t]$ called cointegration and $[\gamma_1, \gamma_2]$ are cointegrating vector. For long run relationship for Pov_t is:

$$Pov_t - Pov_t^* = e_t \text{ or } Pov_t = Pov_t^* + e_t$$

To find the value of Pov_t , we must normalize (11):

$$Pov_t = -\frac{\gamma_1}{\gamma_2} SP_t + e_t \dots (12)$$

Whereas $Pov_t^* = -(\gamma_1/\gamma_2) SP_t + e_t$ represent long run equilibrium value (Engle and Granger, 1987). This procedure has also been repeated for equation (b) in which we have two variables $Ineq_t$ and SP_t .

Johansen cointegration approach

In case of more than one independent variables with different order of integration, Johansen (1988) introduced an approach to check the short run and long run relationship among variables. In the context of vector error correction mechanism (VECM) it can be written as:

$$EG_t = [Pov_t, Ineq_t, SP_t] \dots (13)$$

$$EG_t = \beta_1 EG_{t-1} + \beta_2 EG_{t-2} + \dots + \beta_k EG_{t-k} + \mu_t \dots (14)$$

removes all drawbacks of Engle-Granger approach. In equation (c) we have three variables, Pov, Ineq and SP. In matrix form this can be written as:

$$\Delta EG_t = \Gamma_1 \Delta EG_{t-1} + \Gamma_2 \Delta EG_{t-2} + \dots + \Gamma_{k-1} \Delta EG_{t-k-1} + \Pi EG_{t-1} + \mu_t \dots (15)$$

Whereas:

$$\Gamma_i = (1 - \beta_1 - \beta_2 - \dots - \beta_k) \quad (i = 1, 2, \dots, k-1) \dots (16)$$

$$\text{and } \Pi = -(1 - \beta_1 - \beta_2 - \dots - \beta_k) \dots (17)$$

Π explains the 3x3 matrix, which shows the long run relationship between $EG_t = [Pov_t, Ineq_t, SP_t]$. The $\Pi = \psi \Phi'$ The speed of adjustment is shown by ψ while Φ' is long run coefficient matrix. $\Phi' GDP_{t-1}$ is the error correction term in case of single equation. Assume $k=2$ for multi-variate case. This model is:

$$\begin{bmatrix} \Delta Pov_t \\ \Delta Ineq_t \\ \Delta SP_t \end{bmatrix} = \Gamma_1 \begin{bmatrix} \Delta Pov_{t-1} \\ \Delta Ineq_{t-1} \\ \Delta SP_{t-1} \end{bmatrix} + \Pi \begin{bmatrix} \Delta Pov_{t-1} \\ \Delta Ineq_{t-1} \\ \Delta SP_{t-1} \end{bmatrix} + e_t \dots (18)$$

or we can say that:

$$\begin{bmatrix} \Delta Pov_t \\ \Delta Ineq_t \\ \Delta SP_t \end{bmatrix} = \Gamma_1 \begin{bmatrix} \Delta Pov_{t-1} \\ \Delta Ineq_{t-1} \\ \Delta SP_{t-1} \end{bmatrix} + \begin{bmatrix} \psi_{11} & \psi_{12} \\ \psi_{21} & \psi_{22} \\ \psi_{31} & \psi_{32} \end{bmatrix} \begin{bmatrix} \Phi_{11} & \Phi_{21} & \Phi_{31} \\ \Phi_{12} & \Phi_{22} & \Phi_{32} \end{bmatrix} \begin{bmatrix} Pov_{t-1} \\ Ineq_{t-1} \\ SP_{t-1} \end{bmatrix} + e_t \quad (19)$$

For simplicity just analyze the first equation's error correction part. The first row Π of matrix is:

$$\Pi_1 EG_{t-1} = ([\psi_{11} \Phi_{11} + \psi_{12} \Phi_{12}] [\psi_{11} \Phi_{21} + \psi_{12} \Phi_{22}] [\psi_{11} \Phi_{31} + \psi_{12} \Phi_{32}]) \begin{bmatrix} Pov_{t-1} \\ Ineq_{t-1} \\ SP_{t-1} \end{bmatrix} + e_t \dots (20)$$

This can also be written as:

$$\Pi_1 EG_{t-1} = \Phi_{11} (\psi_{11} Pov_{t-1} + \psi_{21} Ineq_{t-1} + \psi_{31} SP_{t-1}) + \Phi_{12} (\psi_{12} Pov_{t-1} + \psi_{22} Ineq_{t-1} + \psi_{32} SP_{t-1}) \dots (21)$$

Equation (21) shows the cointegrating vectors and their speed of adjustment (Johansen & Juselius, 1990).

3. RESULTS

3.1. Results of unit root tests

Results of both tests are represented with trend and without trend. The emphasis has been given to the model that has trend because time series data is time trended (Asteriou & Hall, 2011). The results of ADF shows all the variables are stationarity at first difference. Similarly, the results of KPSS also depict that all the variables are stationary at first differences. Hence, all the variables are stationary at first differences.

Table 2
RESULTS OF UNIT ROOT TESTS

| Variables | ADF | | KPSS | |
|-----------|------------|----------------|--------|----------------|
| | Level | 1st Difference | Level | 1st Difference |
| SP | 0.2760 | 5.9048*** | 0.6910 | 0.2473*** |
| Pov | 1.9544 | 2.8939** | 0.4477 | 0.0763*** |
| Ineq | 1.666 | 2.6188** | 0.7838 | 0.3750*** |
| EG | 3.5327 | 7.3304*** | 1.1323 | 0.0850*** |
| | With trend | | | |
| SP | 2.0837 | 6.1993*** | 0.1622 | 0.2864*** |
| Pov | 2.4534 | 3.9678*** | 0.0063 | 0.0772*** |
| Ineq | 2.3086 | 3.3676** | 0.2121 | 0.1291* |
| EG | 1.3304 | 7.2058*** | 0.8868 | 0.0678*** |

*** 1% significance level, ** 5% significance level, * 10% significance level

Source: authors' estimation.

3.2. Engel-Granger cointegration

3.2.1. Poverty and social protection expenditures

The results of ADF confirm the existence of long run relation among poverty and social protection expenditures. The calculated value of ADF (-4.5714) is greater than the critical values at 1%, 5%, and 10% level of significance.

Table 3
ENGLE-GRANGER COINTEGRATION RESULTS

| | | | |
|--------------------|----------------|--------------------|---------------|
| ADF Test statistic | -4.5714 [0.00] | 1% Critical Value* | -4.3239 |
| | | 5% Critical Value | -3.5806 |
| | | 10% Critical Value | -3.2253 |
| R-squared | 0.51 | F-statistic | 3.7830 [0.00] |
| Adjusted R-squared | 0.3820 | Durbin-Watson stat | 1.80 |
| S.E. of regression | 3.5798 | | |

*MacKinnon critical values for rejection of hypothesis of a unit root

Null hypothesis: RES has a unit root

Source: authors' estimation.

The second step of Engle and Granger cointegration approach is to find out the short run dynamics among poverty and social protection expenditures. The Error Correction Mechanism (ECM) term confirms non-existence of short run relationship among poverty and social protection expenditures because it does not fulfill assumption of negative sign.

Table 4
ECM REGRESSION RESULTS

| Variable | Coefficient | S.E. | t-statistic | Prob. |
|--------------------|-------------|----------------------|-------------|--------|
| C | 18.32 | 2.09 | 8.751 | 0.00 |
| SP | -1.61 | 0.48 | 3.71 | 0.00 |
| ECM | 0.59 | 2.09 | 8.75 | 0.00 |
| R-squared | 0.55 | S.E. of regression | | 3.94 |
| Adjusted R-squared | 0.51 | Sum squared Residual | | 451.49 |
| F-statistic | 17.77 | Durbin-Watson stat | | 1.64 |
| Prob(F-statistic) | 0.00 | | | |

* Pov is dependent variable.

Source: authors' estimation.

3.2.2. Income inequality and social protection expenditures

Like equation (a), Engle and Granger cointegration has been estimated for equation (b). The ADF test confirms a long run relationship among inequality and social protection expenditures. The calculated value of ADF (-3.45) is greater than the critical values at 10% level of significance.

Table 5
ENGLE-GRANGER COINTEGRATION RESULTS

| | | | |
|--------------------|---------------|--------------------|-------------|
| ADF Test statistic | -3.45 [0.062] | 1% Critical Value* | -4.28 |
| | | 5% Critical Value | -3.56 |
| | | 10% Critical Value | -3.21 |
| R-squared | 0.23 | F-statistic | 6.70 [0.00] |
| Adjusted R-squared | 0.27 | Durbin-Watson stat | 1.90 |
| S.E. of regression | 0.01 | | |

*MacKinnon critical values for rejection of hypothesis of a unit root

Null hypothesis: RES has a unit root

Source: authors' estimation.

The Table 6 shows that the social protection expenditures reduce income inequality in case of Pakistan. However, the ECM terms turn out to be positive which shows no convergence between social protection expenditures and income inequality in Pakistan during study period.

Table 6
ECM REGRESSION RESULTS

| Variable | Coefficient | S.E. | t-statistic | Prob. |
|--------------------|-------------|----------------------|-------------|-------|
| C | 0.42 | 0.01 | 8.751 | 0.00 |
| SP | -0.02 | 0.00 | 3.71 | 0.00 |
| ECM(-1) | 1.07 | 0.11 | 8.75 | 0.00 |
| R-squared | 0.90 | S.E. of regression | | 0.01 |
| Adjusted R-squared | 0.89 | Sum squared Residual | | 0.00 |
| F-statistic | 135.22 | Durbin-Watson stat | | 1.36 |
| Prob(F-statistic) | 0.00 | | | |

* Ineq is dependent variable.

Source: authors' estimation.

3.3. Johansen and Juselius cointegration approach

Johansen and Juselius cointegration approach have been utilized for equation (c) because of two reasons, it includes more than one independent variable, and all the variables are of same order of integration. The first step is the selection of lag length selection. Based on the values of Akaike Information Criterion (AIC) and Schwarz Bayesian Criterion (SBC), two lag lengths have been decided for the estimation.

Table 7
LAG LENGTH SELECTION CRITERION

| Order | LL | AIC | SBC | LR test | Adjusted LR |
|-------|---------|---------|---------|--------------|--------------|
| 0 | -118.63 | -122.63 | -125.30 | 231.70[0.00] | 157.22[0.00] |
| 1 | -35.39 | -55.39 | -68.72 | 65.22[0.00] | 44.26[0.00] |
| 2 | -2.78 | -38.78 | -62.76 | ----- | ----- |

Source: author's estimation.

Both trace test and max-eigen statistic explore that there exist three cointegrating vectors among variables, meaning there is a long run relation among social protection expenditures, poverty, income inequality, and economic growth in case of Pakistan. The values of trace statistics and max-eigen are greater than the 5% significance critical values.

Table 8
JOHANSEN MAXIMUM LIKELIHOOD TEST FOR COINTEGRATION

| Hypotheses | Trace test | 5% critical values | Hypotheses | Max- Eigen statistic | 5% critical value |
|------------|------------|--------------------|------------|----------------------|-------------------|
| $R = 0$ | 70.68 | 47.85 | -125.30 | $R = 0$ | 27.58 |
| $R \leq 1$ | 41.31 | 29.79 | -68.72 | $R = 1$ | 21.13 |
| $R \leq 2$ | 17.66 | 15.49 | -62.76 | $R = 2$ | 14.26 |

Source: author's estimation.

The results of ECM regression depict that poverty is negatively related with economic growth, meaning existence of poverty in Pakistan decreases the economic growth of the country. The results are in line with Chani et al. (2011) for the case of Pakistan and Sinnathurai (2013) for a group of developing economies. Income inequality is positively insignificantly related with the economic growth of Pakistan. Social protection expenditures have positive impact on economic growth of Pakistan, meaning increase in the share of social protection expenditure in the budget will boost economic growth in the country. The ECM term confirmed the convergence of all the variables towards equilibrium in case of any shock to economy. The ECM term is negative, but the value is greater than 1, which violates one of the assumptions of short run relationship among the variables.

Table 9
ECM REGRESSION RESULTSS

| Variables | Coefficients | S.E. | Prob-value |
|------------------|--------------|--------------------|------------|
| Constant | 10.57 | 6.34 | 0.10 |
| Δ Pov | -0.02 | 0.01 | 0.10 |
| Δ Ineq | 83.23 | 0.79 | 0.20 |
| Δ SP | 1.57 | 0.77 | 0.00 |
| Δ ECM(-1) | -1.06 | 0.65 | 0.10 |
| R-squared | 0.39 | Adjusted R-squared | 0.11 |
| F-stat | 5.80 [0.00] | DW-statistic | 2.04 |

* EG is dependent variable.
Source: authors' estimation.

CONCLUSIONS

According to the results of this research, in the case of Pakistan, during the period 1983–2015, government spending on social protection programs as percentage of GDP was negatively correlated with inequality and poverty, while in relation to economic growth the correlation was positive. Based on the findings, we recommend that the government of Pakistan should increase the social protection expenditures as percentage to GDP; because it has multidimensional effects, reduce income inequality and poverty, and can enhances economic growth in the country. In addition to the increase in government spending on social programs, it is required that public resources be used properly with transparency and efficiency. Along with a long-term social policy, a productive development policy is required to contribute to an authentic economic development.

According to World Bank (2013), Pakistan's welfare policy is subject to multiple challenges, including the following: 1) Safety net programs are fragmented and often duplicative; 2) programs have limited coverage, covering approximately 2-3 percent of the total population as compared to a poverty rate of about 25 percent; 3) programs are poorly targeted; 4) implementation capacity is very low; 5) there are inadequate institutional arrangements for multi-sectoral orientation of social protection agenda and 6) existing capacity for the provision for rapid assistance to those affected by natural disasters is insufficient.

Therefore, based on what has been investigated and presented in this paper, it is necessary to increase public spending on social

programs while attending to the correct operation of the various existing programs and establishing bases for a productive development that can sustain long-term improvements in the level of well-being of Pakistanis. Furthermore, according with part of the literature review, abandoning or neglecting social programs can result in increases in poverty and inequality that will lead to lower growth and deepen the underdevelopment trap in Pakistan.

REFERENCES

- Asian Development Bank (ADB) (2001). *The social protection strategy*. Manila: ADB.
- ADB (2008). *Strategy 2020: Working for an Asia and Pacific free of poverty*. Manila: ADB.
- Afonso, A. y J. Alegre (2008). *Economic growth and budgetary components: A panel assessment for the EU.*, Working Paper 848, European Central Bank.
- Anser, M., Z. Yousof, A. Nassani, S. Alotaibi, A. Kabbani y K. Zaman (2020). “Dynamic linkages between poverty, inequality, crime, and social expenditures in a panel of 16 countries: two-step GMM estimates”, *Journal of Economic Structures*, 9(43).
- Arjona, R., M. Ladaique y M. Pearson (2001). Social protection and growth, *OECD Economic Studies* No. 35, 2002/2.
- Arjona, R., M. Ladaique y M. Pearson (2002), Growth, inequality and social protection, Labor Market and Social Policy Occasional. Paper No. 51.
- Asgar, N., P. Azim y H. Rehman (2011). “Impact of government spending in social sectors on economic growth: A case study of Pakistan”, *Journal of Business & Economics*, 3(2), pp. 214-234.
- Asteriou, D. y S. Hall (2011). *Applied econometrics*, Palgrave Macmillan, London.
- Bari, F., E. Hooper, S. Kardar, S. Khan, I. Mohammed y A. Sayeed (2005), “Conceptualizing a social protection framework for Pakistan”, Pakistan Poverty Assessment Update, Background Paper Series 4.
- Barrientos, A. y D. Hulme (2008). *Social protection for the poor and the poorest: Concepts, policies and politics*, Palgrave Macmillan, New York.
- Barrientos, Armando (2009). “Introducing basic social protection in low-income-countries: Lessons from existing programs”, en Patrick Lloyd-Sherlock (ed). *Building decent societies. Rethinking the role of social security in development townsend*. Palgrave, London, pp. 253-273.
- Caminada, K. y K. Goudswaard (2005). “Are public and private social expenditures complementary?”, *International Advances in Economic Research*, 11(2), pp. 175-189.

- Chani, M., Z. Pervaiz, S. Ahmad, A. Ali y A. Chaudhary (2011). "Poverty, inflation and economic growth: Empirical evidence from Pakistan", *World Applied Sciences Journal*, 14, pp. 1058-1063.
- Dafermos, Y. y C. Papatheodorou (2010). "The impact of economic growth and social protection on inequality and poverty: Empirical evidence from EU countries", 1st International Conference in Political Economy. Rethymno, Crete.
- Dickey, D. y W. Fuller (1979). "Distribution of estimators for autoregressive time series with a unit root", *Journal of the American Statistical Association*, 74(366), pp. 427-431.
- Dickey, D. y W. Fuller (1981). "Likelihood ratio statistics for autoregressive time series with a unit root", *Econometrica*, 49(4), pp. 1057-1072.
- Engle, R. y C. Granger (1987). "Co-integration and error-correction: Representation, estimation, and testing", *Econometrica*, 55(2), pp. 251-276.
- Ezcurra, R. y A. Rodríguez-Pose (2011). "Decentralization of social protection expenditure and economic growth in the OECD", *Publius: The Journal of Federalism*, 41(1), pp. 146-157.
- Gregory, A. y B. Hansen (1996). "Tests for cointegration in models with regime and trend shifts", *Oxford Bulletin of Economics and Statistics*, 58(3), pp. 555-560.
- Hansson, P. y M. Henrekson (1994). "A new framework for testing the effect of government spending on growth and productivity", *Public Choice*, 81, pp. 381-401.
- Hassan, H. (2010). *Social protection and economic growth in the Sudan: Trends and perspectives*, MPRA Paper 31442.
- Hong, D. (2012). "Economic growth and welfare state: a debate of econometrics", MPRA Paper 39685.
- Izák, V. (2011). "The welfare state and economic growth", *Prague Economic Papers*, 20(4), pp. 291-308.
- Johansen, S. (1988), j. "Statistical analysis of cointegration vectors", *Journal of Economic Dynamics and Control*, 12(2-3), pp. 231-254.
- Johansen, S. y K. Juselius (1990). "Maximum likelihood estimation and inference on cointegration - with application to the demand for money", *Oxford Bulletin of Economics and Statistics*, 52(2), pp. 169-210.
- Johansen, S. (1995). *Likelihood-based inference in cointegrated vector autoregressive models*, Oxford University Press, Oxford.
- Kenworth, L. (1999). "Do social welfare policies reduce poverty? A cross-national assessment", *Social Forces*, 77(3), pp. 1119-1139.
- Kiendrebeogo, Y., K. Assimaidou y A. Tall (2017). "Social protection for poverty reduction in times of crisis", *Journal of Policy Modeling*, 39(6), pp. 1163-1183.
- Kwiatkowski, D., P. Phillips, P. Schmidt y Y. Shin (1992). "Testing the null hypothesis of stationarity against the alternative of a unit root", *Journal of*

- Econometrics*, 54 (1-3), pp. 159-78.
- Levy, S. (2018). *Esfuerzos mal recompensados. La elusiva búsqueda de la prosperidad en México*. Washington D.C.: IADB.
- Mackinnon, J. (2010). Critical values for cointegration tests, Queen's Economics Department Working Paper, No. 1227.
- Ministry of Finance (2013). "Pakistan economic survey 2012-13", Ministry of Finance. <https://www.finance.gov.pk/survey_1213.html>.
- Owino, B. (2017). "Public expenditure in the social sector and economic growth in Kenya", *Journal of Economics and Sustainable Development*, 8(14), pp. 266-276.
- Ozlem, A. y M. Demiral (2016). "Public social expenditures and economic growth: Evidence from selected OECD countries", *Research in World Economy*, 7(2), pp. 44-51.
- Persson, T. y G. Tabellini (1994). "Is inequality harmful for growth?", *American Economic Review*, 84(3), pp. 600-621.
- Pradhan, B., M. Saluja y A. Sharma (2013). A social accounting matrix for India 2007-08, IEG Working Paper No. 326, Institute of Economic Growth.
- Sakellaridis, G. (2009). "An empirical investigation of social protection expenditures on expenditures on economic growth in Greece", 4th Hellenic Observatory PhD Symposium on Contemporary Greece.
- Sánchez-Juárez, I. (2018). "Gasto público, índice de competitividad y política social en México", *Problemas del Desarrollo*, 49(192), pp. 109-138.
- Sinnathurai, V. (2013). "An empirical study on the nexus of poverty, GDP growth, dependency ratio and employment in developing countries", *Journal of Competitiveness*, 5(2), pp. 67-82.
- Waqas, M. y M. Sarwar (2017). "Social protection, gender, and poverty: Application of social protection index", *Journal of Policy Practice*, 16(4), pp. 369-380.
- World Bank (2013). "Social protection in Pakistan". <<https://www.worldbank.org/en/country/pakistan/brief/social-protection-in-pakistan>>.

APPENDIX 1

Table A1
UNIT ROOT TESTS WITH A BREAKPOINT

| Variables | Break Selection: Minimize Dickey-Fuller t-statistic | | | |
|-------------------------------------|-----------------------------------------------------|------------|----------------|------------|
| | Trend Specification: Intercept only | | | |
| Break Specification: Intercept only | | | | |
| Break Type: Innovational outlier | | | | |
| | Level | Break date | 1st Difference | Break date |
| SP | -2.3082 | 2007 | -6.8365*** | 2010 |
| Pov | -5.1273*** | 2000 | -6.2206*** | 2014 |
| Ineq | -4.2171 | 2008 | -114.72*** | 2010 |
| EG | -4.3969 | 1992 | -7.6489*** | 2013 |

*** 1% significance level.

Source: authors' estimation.