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Monetary Policy Shock and Inflation Persistence: The Case Study of Pakistan

ABSTRACT

Inflation persistence has been a major stress for economies during the past few decades. Inflation is a monetary phenomenon and the persistence of inflation has broadly attracted the attention of economists all over the world. Inflation persistence shows the degree to which future values of inflation are associated with bygone shocks or, in other words, the speed of adjustment toward its long-run value. Indeed, inflation dynamics and the degree of inflation persistence have been recognized as the most essential parameters for affecting monetary policy's performance. This study estimates the degree of inflation persistence and other macro-economic variables (under a multivariate Approach). Secondly, this study allows the long memory property of inflation persistence to examine the effect of monetary policy shocks on Pakistan's economy. Knowing the degree of inflation, offers vital information, to the central bank, about how to manage the interest rate to attain the targeted rate of inflation. The study employed Structural Fractional Integrated Vector Auto-regressive Model for the monthly data of 2004:07-2019:12. The parametric method is used for the estimation of fractional integration parameters. The result of the study suggests that there is a high but mean-reverting behavior of inflation persistence in Pakistan. Its means that monetary policy shock will affect inflation for a longer period and dissipate slower than it is under the assumption of stationarity. The results show the positive and significant impact of monetary policy shocks on inflation persistence.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

Monetary policy's central mandate is to manage the macro-economic condition with achieving the goal of stable inflation in the economy. One way to determine monetary policy's efficiency is, by determining its role in the management of stable inflation rates by measuring the change in inflation persistence. Inflation persistence indicates the degree to which future values of inflation are associated with bygone shocks or, in other words, the speed of adjustment toward its long-run value (Balcilar, 2004). Indeed, inflation dynamics and the degree of inflation persistence have been recognized as the most essential parameters for affecting monetary policy's performance.

Rudebusch (2002) states that: "...the nature of the inflation process and the degree of structural inertia has been identified as one of the most crucial parameters affecting the performance of monetary policy". So, it is essential to measure the inflation persistence degree for the central bank, to know that if any monetary policy decision will affect the inflation and then how long it will persist. Therefore, the measurement of inflation persistence is a concern among policymakers and economists (Gerlach & Tillman, 2012).

Several countries have experienced very long periods of inflation. The discussion about the degree of inflation persistence has not been limited to developed countries only like US inflation. Rather, it includes different measures of inflation for different countries. For instance, at a theoretical level, the concept of inflation persistence has been linked to the design of robust monetary policy (Benati, 2008).

Pakistan is one of the very typical among these countries, with a very long period of high inflation experience since the late 1970s. In Pakistan's history, fluctuations in inflation have always been a matter of concern. A high and sustained economic growth in combining with low inflation is the significant objective of macroeconomics policy. Low and stable inflation is the indicator of a stable macroeconomic environment (Agha et al., 2005).

In the case of Pakistan, a finite number of studies have focused on the analysis of inflation persistence. Notable studies in this context include: Hanif et al. (2016) did considerable work in this regard, which estimates the intrinsic inflation persistence for Pakistan under a univariate approach. But did not consider establishing a link between monetary policy actions and inflation persistence. The degree of inflation persistence can have significant importance for the economy because of its effects on economic efficiency. Knowing the degree of inflation, offers vital information, to the central bank, about how to manage the interest rate to attain the targeted rate of inflation (Sripinit, 2012).

The uniqueness of this study to the previously mentioned studies includes: Firstly, this study estimates the degree of inflation persistence and other macro-economic variables (under a multivariate Approach). Secondly, this study allowed the long memory property of inflation persistence to examine the effect of monetary policy shocks on Pakistan's economy. Thirdly, this study uses the structural fractional integrated VAR model that did not apply in earlier studies in the context of Pakistan. This provides us margin to fill up this gap in the case of Pakistan. However, such work is quite pronounced in studies at the international level (Lovcha & Laborda, 2018).

This study, mainly concerned about that how much inflation is persistent in Pakistan? How does monetary policy shock affect inflation in presence of long memory? So, the main objectives of the study are to measure inflation persistence by allowing both long and short memory and also examined monetary policy shocks' impact on a high degree of inflation persistence in the economy. The result of this study shows that Pakistan is the country where inflation persistence is so high. Its means that any shock will affect the inflation for a longer period and dissipate slower than it is under the assumption of stationarity. The results show the positive and significant impact of monetary policy shocks on inflation persistence. We estimated

the impulse response function for monetary policy shocks. The results of long memory are also confirmed by IRF results which show high persistence in inflation having a long memory.

The remaining paper is organized as follows. Section 2 is about the literature review; Section 3 discusses the methodology and data. Section 4 and 5 describe the empirical results and conclusion respectively.

2. LITERATURE REVIEW

The effects of monetary policy actions transmit to the economy through different channels called the "Transmission mechanism of monetary policy". Ireland (2005) Monetary policy transmission mechanism is the method with which policy changes in interest rates or the money supply are transmitted into changes in inflation and other variables including output. Monetary policy controls inflation through different channels included the interest rate channel, balance sheet channel, exchange rate channel, and expectation channel. There is evidence in Agha et al. (2005) that the interest rate channel works in the monetary policy transmission mechanism in Pakistan.

According to the interest rate channel decrease in interest rate by adopting contractionary monetary policy through increasing the bank reserve, works in the conventional framework of the macroeconomic model. By changing the interest rate, monetary policy decrease in the interest rate will decrease the savings of consumers. So this will lead to an increase in the proportion of consumption of consumers, as the consumption will increase in the economy so that AD will also increase and according to the demand law increase the demand will lead to an increase in prices or higher inflation. (Romer et al., 1990; Taylor, 1995) believe in the importance of interest rate channel on the investment behavior of consumers and businesses.

Recent literature related to inflation persistence shadows 2 major paths. 1st path deals with the macroeconomic approaches, that attempt to capture inflation persistence in the real world. The 2nd path, which is also the motivation for the present study, seeks out to measures inflation persistence empirically. A common approach is to implement a univariate time series approach, in which inflation persistence is signified by the sum of autoregressive coefficients of the AR model for inflation i.e. Pivetta and Reis (2007).

Fuhrer (2011) comprehensively analyzes the inflation persistence concept in the theory of macroeconomics and suggests that the main source of inflation is an intrinsic factor. A large number of studies indicate high persistence in developed countries, due to changes in the inflation target, structural change, change in the exchange rate, or monetary policy shocks (Levin & Piger, 2004). Mishkin (2007) states that inflation persistence cause to increase in monetary policy cost to stabilize inflation in form of high unemployment.

Benati (2006) analyzed the evolution of inflation persistence in different countries for the different monetary regimes, and measure the degree of inflation persistence. Levin and Piger (2004) demonstrate that the existence of a high degree of inflation persistence might be connected to changes in normal inflation. They proved that inflation persistence, not completely characteristic of only economically developed countries. Franta et al., (2010) analyze the degree of inflation persistence for new members of the EU for 1993-2008. They conclude that intrinsic inflation persistence is higher in some countries i.e Poland and Hungary.

Pincheira (2009) estimated inflation persistence for Chile and concludes that it shows a decreasing trend from the past few years. However, this is a simpler procedure of analyzing variables, which does not consider full dynamics of inflation, since, it only captures intrinsic persistence derived from price and wage inflation. To understand the impacts of monetary policy on prices and output, monetary authorities need to accomplish the key goals of their major policies particularly stabilization of prices which is the chief aim of monetary policy in addition to growth. Central bank adopts different policy tools or disciplines to have

its control over to manipulate money creation in the economy and the reserves of commercial banks. The nature of monetary regimes depends on the behavior of the central bank (Hetzel, 2017).

Bratsiotis et al. (2002) state that the degree of inflation persistence highly depends on monetary policy objective, if monetary policy only goal is to get stabilize inflation we will get a lower degree of inflation persistence after the study on Canada, Australia, Finland, Spain, Sweden and New Zealand for 1980- 1990. Davig and Doh (2014) claim that inflation persistence can be curb by monetary policy by adjusting the interest rate in response to change in inflation. Batini (2006), study the monetary policy impact on inflation for UK and USA and conclude that monetary policy's maximum effect on inflation in reduced form after a year of implementation Oliveria and Petrasi (2010) analyze inflation persistence in 23 industrial and 17 emerging economies. They conclude that the degree of inflation persistence is low in industrial economies than in emerging economies.

Gerlach and Tillmann (2012) examined the relationship between inflation targeting and the persistence of inflation in Asia. They used the autoregressive method for monthly data for 1985:1-2010:1. They found a decrease in inflation persistence after the adoption of inflation targeting. Meller and Nautz (2012) analyzed inflation persistence before and after EMU. They used fractional integration approach for pre (1966 to 1998) and post EMU (1999-2007) the result shows in the euro area inflation persistently decreases after EMU.

Milani and Treadwell (2012) used a small-scale DSGE model to disentangle unanticipated and anticipated monetary policy shocks and study their effects. The estimation used likelihood-based Bayesian methods on US data from 1960:q1 to 2009:q1 on the output gap, inflation, and the federal funds rate as observable variables. They showed that the unanticipated monetary shocks have a smaller and more short-lived impact on output and a large, delayed, and persistent effect due to anticipated policy shocks. The overall fraction of economic fluctuations that could be attributed to monetary policy remained limited.

Pradana and Rathnayaka (2013) established a link between economic growth and inflation, to examine the short-run and long-run correlation between them. The study focused on 3 Asian countries for 1980-2010 using Johansen's cointegration approach, Granger causality, and vector error correction model (VECM). They conclude the negative and long-run significant relationship between inflation and economic growth in Sri Lanka. While for China, they found significant and negative short-run relationships.

Mbutor (2014) evaluates the money supply on inflation in Nigeria. The impulse response function showed a persistent positive relationship between inflation and money supply. However, the variance decomposition of inflation showed that GDP was the strongest contributor to inflationary developments in Nigeria, and that money supply accounts for <50% of aggregate price changes. Umaru and Zubairu (2012) Contend that inflation exerts a positive influence on economic growth by encouraging productivity, output level and promoting total factor productivity.

Bratsiotis et al., (2015) examine that after the adoption of inflation targeting, inflation persistence reduces significantly. They used quarterly data for this purpose (1962:Q2-2001:Q2) and used an autoregressive approach and the result shows that inflation persistence decrease after the adoption of inflation targeting. Canarella and Miller (2016) also examined the effect of inflation targeting on inflation persistence using the Fractional integration approach. The result shows the decrease in inflation persistence after inflation targeting. Lovcha and Laborda (2018) examine the persistence of inflation and other variables for the US. The data used for their analysis include 1979:Q3-2007:Q4 by using VAR and FIVAR. They found inflation persistence remain stable across different sample periods.

Gil-Alana et al. (2019) investigate persistence in inequality persistence in inequality of income for 26 OECD countries for the period 1963-2008 by using fractional integration and found high persistence in income inequality. Zhang (2011) examines the relation between Inflation persistence, inflation expectations, and monetary policy in China by using monthly data for the period of 1979 to 2009 and applied the autoregressive method as a measure of inflation persistence. The study discovers that, structural changes in

Hussain (2009) used the methodology of VAR to analyze the effect of output and inflation in Pakistan. He concludes that from his finding the exchange rate channel is the most significant way for controlling inflation and output as compared to another channel. Khan and Din (2011) studied the Pakistan economy in the context of the dynamics of the Macroeconomics Model. The period was from 1972 to 2009 the main outcome of the analysis is that the important impact on the manufacturing sector in the long run by raw material and industrial machinery.

Hanif et al. (2016) work for the intrinsic nature of inflation persistence for Pakistan's economy using monthly data to capture Inflation persistence through an AR process at the overall and commodity level. Overall inflation exhibit low and insignificant persistence. At group levels, food inflation does not show significant inflation persistence. At the micro-level, they found that the estimated degree of inflation persistence in various categories is found to be relatively higher. Qayyum & Anwar (2019) did noticeable work in this aspect which explores intrinsic inflation persistence for overall inflation on a quarterly and yearly basis and found a high level of intrinsic inflation persistence in Pakistan by using a univariate approach.
Tule et al. (2020) tested for inflation persistence in Nigeria by using the FCVAR methodology. The result of this study shows the high persistence behavior of headline, core, and foo inflation. Balici and Cekin (2020) work to measure inflation persistence for the time 1990-2018, using a time-varying approach. The results of the study show that there is an increasing trend in inflation persistence.

3. DATA AND METHODOLOGY

The study employed a Structural fractional integrated Vector-Auto Regressive model (Structural FIVAR model). A large set of empirical works uses the structure Vector Auto Regressive model in examining the effects of monetary policy shocks. As the Vector Auto Regressive model imposes stationarity assumption, indicates a rapid exponential decrease of the responses of the variables to the monetary policy shock (Taylor, 1995). Because of a high degree of inflation persistence and many different variables were included in these models. High inflation persistence is a widely discussed topic (Pivetta & Reis, 2007). To join the conflicting evidence evolving from testing of unit root, Ball (1993) and Walsh (2003) proposed a fractionally integrated (FI), process.

3.1. Structural FIVAR Estimation Steps:

We followed a two-step estimation method:

- In the first step we estimate the fractional order of integration for all the variables, and make the difference to make them stationary.
- In the second step, we applied the SVAR model to estimate the effect of monetary policy shocks.

3.2. Stationarity Tests:

As, we are dealing with the monthly data so there is a possibility of seasonality; unit root in the data. To check the properties of time series data following tests are used. First, we check variables stationarity through the Augmented Dickey-Fuller (ADF) test.

$$\triangle Y_t = a_1 + a_{2t} + \beta Y_{t-1} + \sum_{i=1}^{n} \gamma_i \triangle Y_{t-1} + \varepsilon_t \quad (1)$$

This ADF test equation applies to test the unit root. Whereas β show the trend term in the model. The above equation shows both trends and intercept. The t-statistics value is used to check the significance of coefficient (β), for this purpose make a null and alternative hypothesis (Gujarati, 2012).

$$H_o: \beta = 0 \; means \; series \; is \; I(1)$$
$$H_1: \beta \neq 0 \; means \; series \; is \; not \; I(1)$$

The Augmented Dickey-Fuller (ADF) test is the power of the test. It is very low if the process is nearly non-stationary which means the process is stationary but with a root close to the non-stationary boundary (Balcilar, 2004).

3.3. Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test:

To avoid the constraint that the ADF test always has low power, Kwiatkowski et al, (1992) suggested an alternative test.

$$Y_t = \beta + \gamma_t + \mu_t \tag{2}$$

$$H_o: \gamma = 0 \; means \; series \; is \; I(0)$$
$$H_1: \gamma \neq 0 \; means \; series \; is \; not \; I(0)$$

If the contradictive results are reached based on both ADF and KPSS tests, often regarded as a symptom of long memory in the data. However, none of the above-mentioned tests have command against FI.

3.3.1. Estimation method of Fractional Integration parameter:

The long memory/short memory property of a series shows that the values of series observed in lags are co-related among themselves or the effect of any event (i.e. shocks) can be determined.

Above mentioned unit root tests (ADF and KPSS), do not have power against the measurement of memory of any shock. In this study, we use the parametric method to estimate the parameter of long memory parameter. The advantage of this approach is that it provides the opportunity to acquire an estimator that has good properties of robustness (Ando & Modigliani, 1963).

This method is based on the statistic,

$$X_{(n)} = \frac{R_{(n)}}{S_{(n)}} = \frac{\max\limits_{1 \leq x \leq n} \sum_{i=1}^{x} (Y_i - \bar{Y}_i) - \min\limits_{1 \leq x \leq n} \sum_{i=0}^{x} (Y_i - \bar{Y}_i)}{n^{-1} \sum_{i=1}^{x} (Y_i - \bar{Y}_i)^2} \tag{3}$$

Where,

$$\bar{Y}_i = n^{-1} \sum_{i=1}^{n} Y_i \tag{4}$$

and n represents the sample size this method allows us to estimate d (fractional integration).

3.3.2. Transformation of series:

So, after estimating the value of d (fractional difference), we make the series stationary to apply SVAR.

$$(1-L)^d x_t = \mu_t$$
$$(1-L)^d = \sum_{k=0}^{\infty} (-1)^k \binom{d}{k} L^k = 1 - dL + \frac{d(d-1)}{2} L^2 - \frac{d(d-1)(d-2)}{6} L^3 + \ldots \tag{5}$$

In equation 5, L shows the lag operator μ_t shows the stationarity term after taking lag of a variable series (x_t). "d" can be any real value.

3.4. Structural Vector-Autoregressive method (SVAR):

For the estimation, we used Structure Vector Auto Regression (SVAR) model. The SVAR model was widely used in empirical works in the past (Bernanke, 1996; Watson & Blanchard, 1994; Sims, 1981; 1986). The SVAR was the response to criticism on the basic VAR.

3.4.1. General equation:

$$AZ_t = B_0 + B_i Z_{t-i} + \varepsilon_t \quad (6)$$

A represents the square matrix (To capture the effect of contemporaneous relation between variables), Z_t represents the vector of endogenous variables (k), and i = 1,…,N; ε_t represents the structural shocks. ε_t should satisfy conditions.

(1): $E(\varepsilon_t)$=0; (2): $E(\varepsilon_t \varepsilon'_t) = \Sigma_t$ *and* (3): $E(\varepsilon_t \varepsilon'_t) = 0$

To get reduce form equation of VAR, pre-multiply A^{-1} with equation (7)

$$Z_t = A^{-1} B_0 + A^{-1} B_i Z_{t-i} + A^{-1} \varepsilon_t \quad (7)$$

$e_t = A^{-1} \varepsilon_t$ = reduce for residual of VAR; satisfies following conditions (1): $E(e_t)$=0, (2): $E(e_t e'_t) = 0$ *and* (3): $E(\varepsilon_t \varepsilon'_{t-k}) = 0$. Structural shocks matrix of variance-covariance:

$$\Sigma_t = E(\varepsilon_i \varepsilon_t) = E(A e_t e'_t A') = AE(e_t e'_t)A' = A\Sigma_e A'$$

To make the system identified, $n^2(n^2-1)/2$ restriction must be imposed for the recovery of all structural shocks of the reduced form VAR (e_t) residuals. The variance-covariance matrix shows the estimated residual.

3.4.2. Structural Model:

Following the formula $n^2(n^2-1)/2$, "3" restriction imposed on A matrix to make the system identified. Contemporaneous effect of variables on each other shows by the "A" matrix. The diagonal of the matrix shows the coefficients that are normalized to "unity". All the "zeros" in matrix A shows the restrictions.

$$AZ_t = \begin{bmatrix} 1 & \delta_{12} & 0 \\ 0 & 1 & \delta_{23} \\ 0 & \delta_{32} & 1 \end{bmatrix} \begin{bmatrix} IPI_t \\ INF_t \\ INT_t \end{bmatrix} \quad (8)$$

The first 2 restrictions ("0") show that inflation and interest rate do not have a contemporaneous relationship with economic growth. 3rd Restriction shows that no relationship exists between interest rate and economic growth.

3.4.3. Reduced- form VAR:

Reduced form equation (8) can be written in matrix form as:

$$\begin{bmatrix} IPI_t \\ INF_t \\ INT_t \end{bmatrix} = \begin{bmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \end{bmatrix} \begin{bmatrix} 1 & \delta_{12} & 0 \\ 0 & 1 & \delta_{23} \\ 0 & \delta_{32} & 1 \end{bmatrix} \begin{bmatrix} IPI_{t-1} \\ INF_{t-1} \\ INT_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \end{bmatrix} \quad (9)$$

3.5. Empirical Evidence of the relationship between monetary policy and inflation persistence.

In this study, we used the Structural FIVAR model to investigate the relationship between monetary policy shocks and inflation persistence. The structural FIVAR model merges the estimation of Fractional integration and the structural VAR model to examine the link. All variables in the VAR model are treated as endogenous. The current values of variables depend upon the lag values of their own and the lag values of other variables including error terms.

Reduced form VAR can be expressed in equation form as follows.

$$INF_t = \alpha_{31+} \sum_{i=1}^{p} a_{3i} INF_{t-i} + \sum_{i=1}^{p} \beta_{3i} INT_{t-i} + \sum_{i=1}^{p} \gamma_{3i} IPI_{t-i} + \varepsilon_{INFt} \quad (10)$$

In equation (10), INF_t shows the inflation depends on its lag and lag of other variables including the interest rate (INT_{t-i}) and economic growth (IPI_{t-i}).

The interest rate is treated as the proxy of monetary policy shocks. A large number of studies used interest rate as a monetary policy tool i.e. Agha et al. (2005). Any monetary policy shock is expected to have an inverse relation with inflation persistence. A decrease in the interest rate will decrease the savings of consumers. So this will lead to an increase in the proportion of consumption of consumers, as the consumption will increase in the economy so that AD will also increase and according to the demand law increase the demand will lead to an increase in prices or higher inflation (Romer et al., 1990).

Economic growth has a positive association with the level of inflation persistence in the economy. Economic growth is peroxide by industrial production. Most of the studies used industrial production as economic growth i.e. Lo and Piger (2005). Higher economic growth leads to an increase in inflation. If the economy's aggregate demand exceeds supply, it results in high inflation that persists in the economy depends upon the degree of its persistence (Sripinit, 2012).

$$IPI_t = \alpha_{11+} \sum_{i=1}^{p} a_{1i} IPI_{t-i} + \sum_{i=1}^{p} \beta_{1i} INF_{t-i} + \sum_{i=1}^{p} \gamma_{1i} INT_{t-i} + \varepsilon_{IPIt} \quad (11)$$

The above equation (11) shows that the economic growth (EG_t) depends on its lag and lag of other variables including the interest rate (INT_{t-i}) and inflation (INF_{t-i}). Inflation persistence and economic growth have a negative relation. High inflation persistence affects economic growth adversely (Benati, 2008).

Interest rate INT_t and economic growth IPI_{t-1} also exhibit negative relations. Increase in interest rate increase borrowing cost that leads to decrease in investment decrease consumer spending and lead to slow economic growth (Munir, 2018).

$$INT_t = \alpha_{21+} \sum_{i=1}^{p} a_{2i} INT_{t-i} + \sum_{i=1}^{p} \beta_{2i} IPI_{t-i} + \sum_{i=1}^{p} \gamma_{2i} INF_{t-i} + \varepsilon_{INTt} \quad (12)$$

Above equation (12) shows that the interest rate depends on its lag and lags of other variables including economic growth and inflation. According to the theory, Economic growth and interest rate are positively related to each other. Increase in interest rate. On the other hand, inflation and interest rate also have a negative relationship. An increase in inflation persistence cause to decrease in the interest rate and vice versa. Higher inflation means a high level of money supply in the economy so monetary policy increase interest rate. With the increase in interest rate, people start to increase savings which leads to a decrease in aggregate demand. As demand decreases prices also decrease and help to reduce inflation (Mishkin, 2007).

In this study, Akaike information criteria (AIC) and Final prediction error (FPE) criterion is used to choose lags. The lowest values of the above-mentioned criteria are used to select a lag length The Impulse response functions (IRF) are used to identify the reaction of present and future values of each dependent variable, by one unit increase or we can say one-time shock, in the present value of the error term in the VAR system (Gujarati, 2012). It also pre-assuming that, this error turns back to "0" in the later periods, whereas remaining all error terms are zero. The IRF is generally proposed for the VARs model. It creates shocks in error terms. This technique is useful to observe time-series data. However, the effects of structural shocks on the whole period of endogenous structures are produced via the coefficient of the impulse response. Variance decomposition in the frequency domain is used to measure the shock share in each variable. This gives us the percentage contribution of a shock to measure the fluctuations in each variable.

3.6. Data and Variables

For analyzing the effect of monetary policy shocks and inflation persistence on the economy following variables are used: (1). Consumer Price Index *(INF)* as a measure of inflation (2). Discount rate *(DR)* as a proxy for interest rate (3). The industrial production index (*IPI*)s a proxy for economic activity. The data used is time-series monthly data from 2005:09-2019:12 for the Pakistan economy. The data sources include the State Bank of Pakistan (SBP) and International Financial Statistics (IFS).

4. RESULTS AND DISCUSSION

Before application of any test, series graphs plotted, to examine the visual pattern of variables (i.e. Inflation, interest rate, and Industrial Production). It is usually the first step of the analysis of data. The behavior of different variable series is depicted in Figures 1 to 3. Graphs of all variables plotted against the selected sample size.

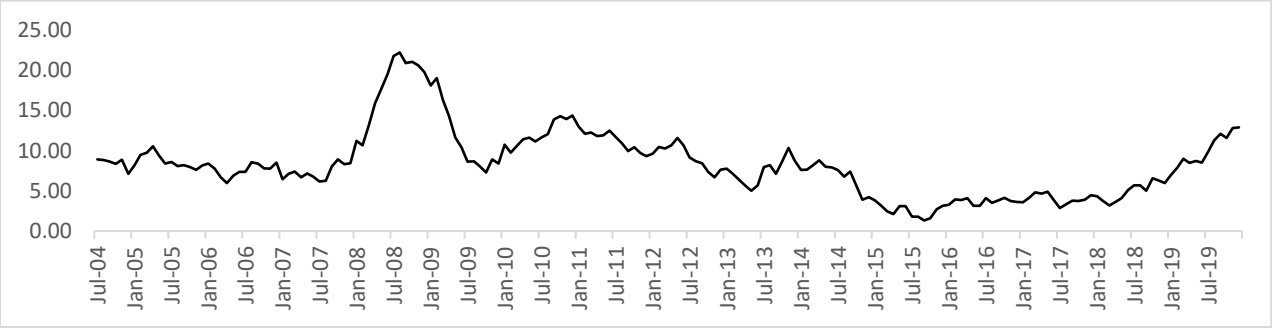

Figure 1: *Trend of Inflation in Pakistan*

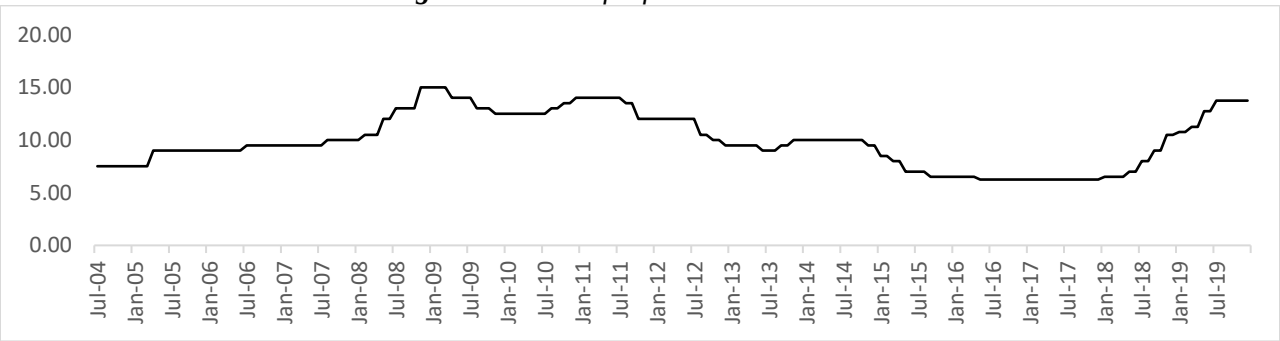

Figure 2: Trend of Discount Rate in Pakistan

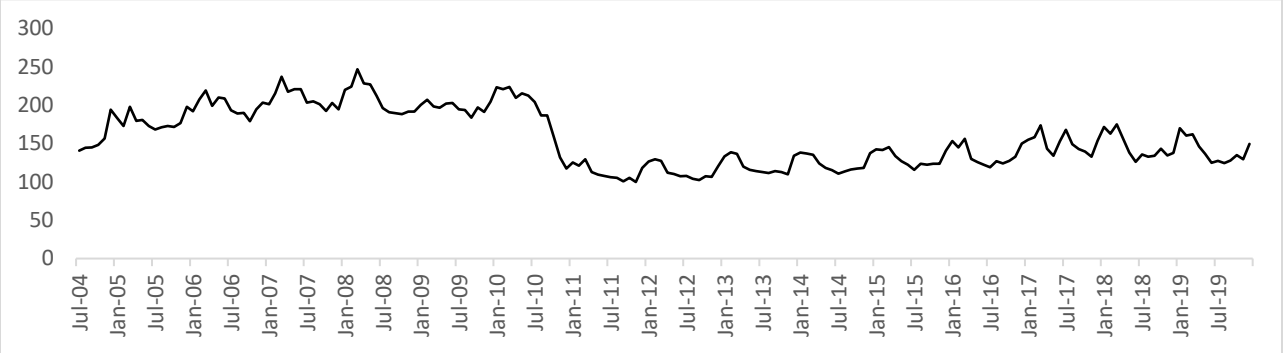

Figure 3: Trend of Industrial Production in Pakistan

The graph of different series showed in Figures 1-3. All the series plots show a persistent behavior, which could be confirmed after applying the statistical test i.e., unit root testing.

4.1. Unit Root Tests:

The different tests can be used to check the stationarity of the data, DF, ADF, KPSS, and PP, etc. But we choose the Augmented Dickey-Fuller test (1979) and Kwiatkowski, Phillips, Schmidt, and Shin (KPSS) test (1992) to test the stationarity. The results of these two tests are presented in Table 1.

The table shows the unit root results of different variables (i.e.; discount rate, industrial production, and inflation). Both the ADF and KPSS tests were applied with drift and with drift +trend. The underlined figures of the table show the t-statistics values while other figures in brackets show the critical values at a 5% significance level. All the above-mentioned figures in bold show the rejection of the Null hypothesis at 5% significance. The null hypothesis of ADF and KPSS is, series is integrated of order one, i.e. I(1), and series is stationary I(0), respectively.

Table 1: Results of the Unit Root Tests

Null Hypothesis	**Ho: series is I(1)**		**Ho: series is I(0)**	
Variables	**ADF(1)** **With drift**	**ADF(2)** **With drift and trend**	**KPSS(1)** **With drift**	**KPSS (2)** **With drift and trend**
Interest rate	**-1.92**	**-1.96**	**0.37**	0.23
	(-2.88)	(-3.43)	(0.46)	(0.14)
Economic Growth	**-1.86**	**-2.27**	0.91	0.20
	(-2.87)	(-3.43)	(0.46)	(0.14)
Inflation	**-1.22**	**-1.28**	0.59	0.16
	(-2.88)	(-3.44)	(0.46)	(0.14)

4.2. Estimation of Fractional Integration Parameter:

The limitation of both the test (ADF and KPSS) is that they don't have the power to test the degree of the Fractional Integration parameter. Results from unit root tests didn't tell much. Therefore, for appropriate assessment of memory behavior of any variable, we moved further than the traditional approach of the unit root by employing the technique of fractional integration.

The parameter "d" directs the long-run dynamics of a variable. Time-series data, with different values of fractional integration, provide different interpretations. Gadea et al. (2006) discussed several features of the "d" measurement of persistence.

i) The I(d) method permits the comparison of extremely persistent series.

ii) The parameter of "d" doesn't affect the short-run dynamics of data. An autoregressive approach for the measurement of long-run dynamics closely relates to the first-order autocorrelation of data, that responds to both short-run & long-run dynamics. Unlike the local unity parameter, in the unit-root model, estimation of "d" consistently. Christiano (1992) describes characteristics of the I(d) process. The different test used to estimate the FI parameters "d", that plays an important role in the evaluation of persistence in inflation as it estimates dependence level of series (Gil-Alana, 2008). The higher the value of d, the higher will be the level of association and degree of persistence. Possible cases of d are presented in Table 2.

Table 2: Values of Fractional Integrated Parameter and its implications

D	***Duration of shock***	***Stationarity***
d=0	Short memory	Stationarity
-0.5 < d < 0	short-memory with fast mean-reversion	Stationarity
0 < d < 0.5	Long-memory with slow mean-reversion	Non-stationarity
d =1	Long memory	Non- stationarity
d > 1	Long memory with non-mean reversion	Non- stationarity

We applied the parametric method to estimate the Fractional integration parameter (d). The following table shows that estimated values of the order of integration are estimated with the method of Exact Maximum Likelihood, which is the most common method used in the literature (Das et al., 2014).

Table 3 shows the estimated values for the order of fractional integration for the selected sample. All the above-mentioned variables (economic growth, inflation, and interest rate) show the Long-memory property but mean reversion with estimated values for the order of integration (FI) of 0.38, 0.21, and 0.31, respectively. This is the indication of high persistence, which means that the shock effect will persist for a longer time in the case of Pakistan. The result is consistent with the study of Hanif et al. (2016) and Agha et al. (2005) Tule et al. (2020).

Table 3: Estimation of Fractional Integration Parameter

Variables	**Fractional integration parameter (d)**	**Range of "d"**	**Duration of Shock**	**Stationarity**
Economic Growth	0.38	0 < d > 0.5	Long memory with mean reversion	Non-Stationarity
Inflation	0.21	0 < d > 0.5	Long memory with mean reversion	Non-Stationarity
Interest Rate	0.31	0 < d > 0.5	Long memory with mean reversion	Non-Stationarity

Long memory specifies that the series exhibits strong dependence between observations. Unit root in interest rate cannot be rejected partly because of the reason that interest rates are being used in developing countries as a stabilizing policy, with the shocks being long-term instead of transitory (Gil-Alana, 2008). While the presence of long memory in inflation and economic growth (peroxide by industrial production) is due to the reason that quite a big number of firms set their prices based on past information (Gali & Gertler, 1999). In Pakistan, 71% of manufacturers use past information, while price setting. This gives an increase to inflation persistence because when a big number of firms use past information when setting a price, inflation cannot easily transmit to a (new) lower steady-state as an outcome of any monetary policy shock. This causes a high level of inflation persistence in the economy (Hanif et al., 2016).

4.3. Transformation of series:

After estimating the fractional Integration for different series. We transform all the series by taking the difference of each variable series with the estimated fractional integrated parameter value.

4.4. Estimation of Structural VAR:

After taking the difference, we applied VAR on the transformed series. As to investigate the effect of monetary policy action on the economy under inflation persistence Structural Vector Auto-regressive model is employed. But it is not possible to directly estimate the structural VAR. so we followed the standard method, Firstly, we estimate the VAR model and then imposed restrictions to get the innovation through structural VAR.

Therefore, we estimate a reduced form VAR, and for the estimation of reduced-form VAR, the first step is the estimation of optimal lag length. After that, we applied the Granger Causality test, impulse response function (IRF), and variance error decomposition.

4.4.1. Determination of Lags:

Before estimation of VAR, the first step is to estimate the optimal lag length of all variables. A general mechanism for the selection of optimal lag length used AIC and SIC etc. the results from the lag selection criteria are shown in Table 4.

Table 4: Lag Selection Criteria for VAR

Lag	*LogL*	*LR*	*FPE*	*AIC*	*SC*	*HQ*
0	-3875.540	NA	1.69e+15	43.5791	43.6327	43.6008
1	-3148.204	1421.981	5.29e+11	35.5079	**35.7224***	35.5949
2	-3125.572	43.4838	4.54e+11	35.3547	35.7301	**35.5069***
3	-3112.977	23.7751	4.36e+11	35.3143	35.8506	35.5318
4	-3098.830	26.2276	4.12e+11	35.2565	35.9536	35.5392
5	-3082.601	29.5411	**3.80e+11***	**35.1752***	36.0333	35.5232
6	-3074.814	13.9111	3.85e+11	35.1889	36.2078	35.6021
7	-3068.872	10.4145	3.99e+11	35.2232	36.4030	35.7017
8	-3057.468	**19.6062***	3.90e+11	35.1962	36.5369	35.7399

Above table 4 shows the determination of Lag that is based on the minimum values of Final prediction error (FPE) and Akaike information criterion (AIC). Based on FPE and AIC we select 5 lags for this study.

4.4.2. Vector Auto-regression:

Regression results for reduced form VAR show in table 5. As, before the estimation of structural VAR, estimation of reduced form VAR is required and lag length choose through lag selection criteria i.e. 5 lag. The results show that interest rate and inflation show an inverse relationship at a 5% level of significance with lags, consistent with the theory. As the interest rate is used as the proxy of monetary policy so any change in monetary policy affects the inflation rate prevailing in the market. In the case of expansionary monetary policy (interest rate decreases), people save less and consume more, which leads to an increase in the demand for goods. An increase in demand will cause to increase the prices (law of demand) and hence the inflation will increase (Mishkin, 2007).

Table 5: FI Vector Autoregression Estimates

	EG	INF	INT
EGI(-1)	0.9200*****	9.95E-05	-0.0001
	(0.0773)	(0.0003)	(0.0001)
EG(-2)	0.1079	0.0005	0.0002
	(0.1033)	(0.0004)	(0.0002)
EG(-3)	0.0577	0.0002	-0.0003
	(0.1041)	(0.0005)	(0.0002)
EG(-4)	-0.2808**	-0.0002	0.0005**
	(0.1043)	(0.0005)	(0.0002)
EG(-5)	0.1583**	-0.0002	-0.0002
	(0.0800)	(0.0003)	(0.0001)
INF(-1)	-19.0130	1.0889*	0.1103*
	(15.9256)	(0.0757)	(0.0317)
INF(-2)	24.8261	-0.0605	-0.1514*
	(23.6088)	(0.1122)	(0.0470)
INF(-3)	-22.9766	0.1004	0.0615
	(24.6064)	(0.1170)	(0.0490)
INF(-4)	30.6651	-0.0482	0.0726
	(24.7234)	(0.1175)	(0.0492)
INF(-5)	-12.0813	-0.2120**	-0.0786**
	(16.8020)	(0.0799)	(0.0334)
INT(-1)	-35.3893	0.2263	0.9081**
	(37.9729)	(0.1806)	(0.0756)
INT(-2)	24.5741	-0.0102	0.2547**
	(50.0090)	(0.2378)	(0.0996)
INT(-3)	19.0528	0.0562	-0.2287**
	(49.8372)	(0.2370)	(0.0993)
INT(-4)	-33.3644	-0.5567**	0.1871**
	(48.1939)	(0.2292)	(0.0960)
INT(-5)	18.0211	-0.4073**	-0.1568**
	(35.5159)	(0.1689)	(0.0707)
C	1602.419	-9.9434	1.1878
	(961.435)	(4.5729)	(1.9159)
R-squared	0.9115	0.9626	0.9797
Adj. R-squared	0.9034	0.9592	0.9778
F-statistic	113.3030	283.7167	531.4588

*Standard errors in ( ) & *, **, *** shows the level of significance at 1, 5 and 10%.*

Inflation shows a positive relationship with an interest rate with a 5% level of significance at first lag. Higher inflation in the economy leads to an increased interest rate (contractionary monetary policy), to reduce the inflation prevailing in the economy. As monetary policy work with lag so situation of price puzzle will prevail in the economy (Khan, 2008).

Inflation shows a negative and significant impact on monetary policy decisions with lags at 5%. With time, people realize that a higher interest rate means a high cost of borrowing. This leads to a decrease in borrowing, make lesser availability of money supply in the economy so that people will have less money to spend, the demand for goods and services will decrease. As demand decreases prices decrease so this will cause a decrease in inflation. These results are consistent with the study of Hussain (2009).

4.5. Granger Causality:

The results of Granger causality are presented in Table 6. In this study, to examine the causality Granger causality / Block Exogeneity Wald test was applied. The outcomes show that industrial production (IPI) is a Granger caused by discount rate and inflation at 5% level of significance, its means both the Interest rate and inflation help us to forecast the economic growth. Inflation does not granger caused by IPI (proxy of economic growth) but significant causality present between interest rate and inflation means an increase in inflation will affect the interest rate. Similarly, there is no granger causal effect of IPI on the interest rate (monetary policy decisions) but monetary policy decision is Granger caused by inflation.

Table 6: VAR Granger Causality / Block Exogeneity Wald Tests

Excluded	Chi-sq	df	Prob.
Dependent variable: EG			
INF	3.7652	5	0.5837
INT	1.5122	5	0.9117
All	5.9306	10	0.8211
Dependent variable: INF			
EG	13.0483	5	0.0229
INT	16.7144	5	0.0051
All	28.2203	10	0.0017
Dependent variable: INT			
EG	9.4831	5	0.0913
INF	27.4744	5	0.0000
All	42.8542	10	0.0000

4.6. Impulse Response Function:

Diebold and Inoue (2001) explained that IRFs "tends to trace out the response of current and future values of each of the variables to one–unit increase in current values of one of the VAR residual, assuming that the error returns to zero in subsequent periods and all other errors are equal to zero. The implied thought experiment, of changing one error while holding the others constant, makes the most sense when the errors are uncorrelated across equations". IRF presents behaviors of variables due to any shock in other variables. To find more accurate results, structural restrictions are applied.

Figure (4, a) shows the response of inflation in the economy because of monetary policy shock i.e. interest rate. Monetary policy shock looks like to die off for inflation in a longer period, suggesting its high degree of inflation persistence is consistent with the study of Qayyum and Anwar (2018). FIVAR response shows a positive sign of inflation and is statistically significant. Consistent with estimated orders Fractional Integration, convergence to zero is very slow, which remains significant for a longer period. Provide evidence of a high degree in inflation persistence.

Due to monetary policy shock, inflation diverges from its steady-state level saving increase consumption decrease so the prices decrease and level of inflation decrease in the economy. This result is in line with the interest rate-setting mechanism in Pakistan where monetary authorities set interest rates and then the money supply is adjusted and not otherwise.

Figure (4, b) shows the FIVAR response of IPI to monetary policy shock (shock in interest rate). IRF shows that positive shock in interest rate leads to deviation in IPI in the initial period as an increase in interest rate decrease the IPI. This shows the long high degree of persistence property in IPI with a high degree memory of shock effect on the output level i.e. IPI in the economy. These finding findings are consistent with the Fractional degree estimates of IPI consistent with the study of Hussain (2019).

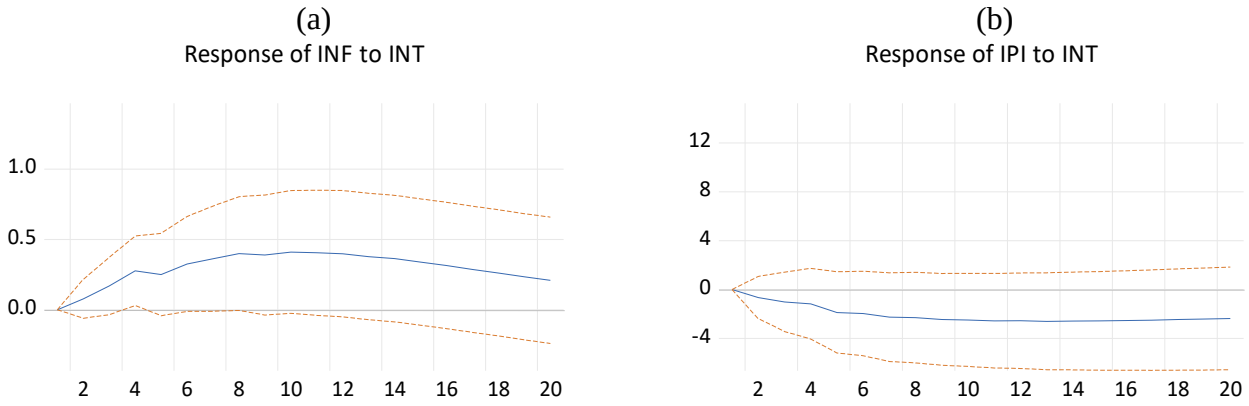

Figure 4: Impulse Response of Industrial production, Inflation to Interest rate

4.7. Variance Error Decomposition:

IRF shows the reaction of the variables in response to monetary policy shock but is not an appropriate method to analyze the contribution of each shock. VED allows measuring the share of shock. Table contributes to the monetary policy shock

Table 7 explains the variance decomposition of IPI, it shows that the maximum proportion of error variance forecast of IPI is explained by IPI itself 77% in month 6. Only 1% attributed to DR. (monetary policy shocks, and 8 % attributed to inflation greater than monetary policy shock. The contribution of discount rate and prices in explaining the variances of IPI increases after 4 months and that of IPI itself decreases to a certain degree. This suggests that due to tight monetary policy has the potential to reduce IPI if tight monetary policy is persistent. This also provides support for our a priori decision to exclude asset prices from the money supply rule in the macroeconomic model.

Table 7: Variance Decomposition of IPI

Period	S.E.	IPI	INF	DR
1	2795.168	99.5109	9.6110	0.4890
2	3649.131	98.5020	1.1972	0.3006
3	4356.420	93.7826	5.6760	0.5413
4	4951.408	90.2814	8.5332	1.1853
5	5563.609	82.0433	16.8277	1.1288
6	5881.786	77.8929	21.0732	1.0337
7	6182.879	75.9579	22.4525	1.5895
8	6356.704	75.7633	22.2986	1.9380
9	6450.901	75.8588	21.8133	2.3278
10	6528.236	76.0807	21.5677	2.3514

The result in table 8 shows that monetary policy shocks have a high effect on inflation. These outcomes interestingly suggest that, even in the 6th month, a major portion of error forecasting in inflation can be recognized due to monetary policy shock consistent with findings of (Chuku, 2009).

Table 8: Variance Decomposition of Inflation

Period	S.E.	IPI	INF	DR
1	16.24202	0.000000	1.97E-07	100.0000
2	26.47921	0.344072	1.170421	98.48551
3	34.87414	0.436344	1.665065	97.89859
4	43.90203	0.781291	2.328260	96.89045
5	52.44520	1.054836	1.920802	97.02436
6	58.38997	1.502170	1.605013	96.89282
7	63.23050	2.235655	1.401978	96.36237
8	67.19946	2.789836	1.275300	95.93486
9	70.06003	3.072377	1.183808	95.74382
10	72.45145	3.673339	1.412089	94.91457

Table 9 shows the results of Variances decomposition for interest rates is presented. These results are of high interest as it's directly associated to one of the main objectives of the study. It can be seen that high variance in DR is because of inflation and then dissipate slowly with time, and increase slowly with an interest rate as an increase in time horizon but not as IPI and INF. These results are consistent with the studies of Khan et al. (2011) and Balici and Cekin (2020).

Table 9: Variance Decomposition of Interest Rate

Period	S.E.	IPI	INF	INT
1	7.5427	0.0000	98.3718	1.6281
2	10.7575	0.0485	93.4500	6.5014
3	13.8347	0.1747	93.2117	6.6134
4	16.1785	0.1343	92.6975	7.1681
5	18.7898	0.4720	88.3326	11.1952
6	21.0053	0.3908	84.2514	15.3577
7	23.3510	0.6552	81.6431	17.7016
8	25.7695	0.5551	78.3108	21.1339
9	28.2560	0.6675	75.4496	23.8827
10	30.4959	0.7856	74.0565	25.1577

5. CONCLUSION AND POLICY RECOMMENDATIONS

Understanding the monetary policy shocks' effects on the economy is the most crucial element to achieve the objective of stable inflation and higher economic growth. To achieve these objectives, policymakers are required to have a better understanding of the dynamic properties of inflation persistence. As high persistence in inflation can increase the monetary policy cost to keep it low. To the best of my knowledge, this is the first study that estimates the monetary policy shocks' effect on the economy in presence of inflation persistence by using the structural FIVAR model.

The result of this study shows that Pakistan is the country where inflation persistence is so high. Its means that any shock will affect the inflation for a longer period and dissipate slower than it is under the assumption of stationarity. The results show the positive and significant impact of monetary policy shocks on inflation persistence. We estimated the impulse response function for monetary policy shocks. The results of long memory are also confirmed by IRF results which show high persistence in inflation having a long memory.

The degree of inflation persistence can have significant importance for the economy, because of its impact on the distribution of wealth and efficiency of the economy. The vital properties of inflation have influential

implications for the behavior of private agents. It is essentials to be highlighted that monetary policy decisions must be controlled if it causes to long-lasting rise in the rate of inflation in the economy is to be avoided. Forecast's accuracy depends greatly on the forecaster's capability to effectively forecast the pattern of shock absorption. Major policy implications which are drawn from the study are:

- In policy terms, the central banks that pursue inflation-targeted monetary policy should also bring under consideration the possible impacts of monetary policy shocks and in addition to that implement interest rate smoothing policy to prevent large fluctuations in macroeconomic variables.
- In upcoming researches, it will be helpful to provide a clear consideration to the obligations and different incentives of the central bank and to examine different ways to enhance the reliability of the monetary policy regime and make it more transparent.
- A deflationary policy is reliable if it is put into immediate action to lower inflation and vice versa. The degree of inflation persistence shows the velocity of inflation in response to a change in monetary policy. Nevertheless, those measures of reliability that do not take into account the persistence might not be sufficient. As a sound variable, the persistence of inflation discloses the reliability of the central bank. The credibility allows the central bank to regulate the inflation regarding expectations of the public and to achieve its disinflation target more quickly. As a result, a decline in inflation persistence indicates that the credibility of the central bank has been achieved.

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Regional Earning Differentials in Pakistan: Does Age Makes a Difference?

ABSTRACT

To investigate regional earning differentials in Pakistan, Data has been taken from Pakistan Social and Living Standard Measurement. Analysis has been carried out for all, young and old earners. Earning differences are decomposed by using the Oaxaca decomposition technique. Results indicate that old earners face less discrimination as compared to young earners in rural areas. Income differences of 31.6% for all earners, 34.6% for young earners, and 21.5% for old earners are due to regional (urban and rural) factors, which indicates discrimination towards rural workers. Overall, urban workers earn 27% more than rural workers. The impact of education on earnings is higher for urban workers than for rural workers in the case of all earners. The impact of the relatively lower level of education on wages is more in rural areas than in urban areas for young earners. As young earners receive higher education i.e. above graduation, the impact of education is more on earnings if worker resides in an urban area. Furthermore, the impact of the lowest level of education on the earning of workers is more in rural areas than in urban areas for old earners, but as education increases impact is stronger for old earners in urban areas. Based on the results, few policy implications have been discussed.

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1. INTRODUCTION

Urban and rural wage patterns in developing countries have dichotomous characteristics. Various studies have highlighted urban-rural wage differentials across the world which demonstrates that people living in rural areas earn less than those who reside in urban areas even after having the same endowments of the characteristics (Gollin et al., 2014; Young, 2013).

Like other developing countries, Pakistan has experienced the same patterns of income inequality among regions. Along with Pakistan's urban areas, the countryside has also contributed to the growth of the country in past decades, but differences in the development of urban and rural areas in general, and gaps in education and income among regions in particular, have contributed to unequal regional prosperity and poor rural development in the country. As per the World Bank (2019), 63.1% of the population in Pakistan lives in rural areas, whereas 36.9% lives in urban areas. These statistics indicate that majority of the population lives in rural areas. Inequalities in income deprive the majority population of the country residing in rural areas of equal opportunity of participation in economic activities. Such disparities in income also lead to migration to urban areas, besides inefficient allocation of resources, and increasing poverty in rural regions.

Regional earning differentials disincentives people to work in rural areas, which leads to the migration of educated and skilled individuals to urban areas or where there are better working opportunities. Table 1 presents the percentage of people living in Urban and Rural areas of Pakistan in 1960 and 2019. These statistics indicate that people have migrated to urban areas of the country in the last few decades, which indicates that a major portion of the population has migrated to urban areas of the country.

Table 1: Urban and Rural Population Proportion in Pakistan

Region	**1960**	**2019**
Rural	77.9%	63.9%
Urban	22.14%	36.9%

Source: Author's Self Calculation Compiled from World Development Indicator

Migration of skilled labor force from rural to urban areas increase the disparity in urban-rural areas, which is described in the report published by International Fund for Agricultural Development (Imai & Malaeb, 2018):

> *"… As a country experiences urbanization, rural-urban disparity tends to increase. If, for example, labor productivity in rural areas rises at a slower rate than in urban areas, the disparity between rural and urban areas will widen even if the proportions of the population in rural and urban areas remain constant. If this comes with an increase in the proportion of the population or labor force in urban areas, overall inequality tends to increase much faster. Different countries have undergone different processes of rural transformation with different speeds of change in labor, productivity and population in rural and urban areas, resulting in different patterns of change in inequality at national and subnational levels."*

Traditional urban-rural migration model such as, Harris & Todaro (1970) suggests that people who migrate to urban areas from rural areas and do not find employment move back to rural areas, increasing unemployment. Furthermore, earning differential also lead to inefficient allocation of labor which is discussed by Artz et al. (2016):

> *"… Large real wage gaps between equally skilled urban and rural workers are a sign that an inefficient allocation of labor exists by region within a country. The larger the wage advantage earned by urban workers over equally skilled rural workers, the greater the inefficiency…"*

Moreover, earning gaps among urban and rural earnings lead to increased poverty in rural areas. The report published by the Department of Economic and Social affairs of The United Nations states that:

> *"....In most developing countries, rural-urban income disparities contribute significantly to overall income distribution. Typically, the rural population is crowded at the bottom end of the income distribution. The difference between the average per capita or household income of rural and urban populations can be extremely large, reaching staggering proportions in some cases. ...The size of the rural-urban income gap in many developing countries reflects the higher incidence of poverty in rural areas. In all countries except Tunisia, Egypt, Indonesia and the United Republic of Tanzania, the incidence of poverty was higher in rural than in urban areas. It has been estimated that of the 1.2 billion people in the world who live in extreme poverty, 75 percent work and live in rural areas..."*

Our study aimed to investigate income gaps between urban and rural areas of Pakistan and how such income differences vary across different age groups. First, we analyzed earning differentials among urban-rural regions in Pakistan by taking all earners in the sample. Further, we examine the regional wage gap by dividing our data into two groups i.e. young earners (age is less than 40 years) and old earners (age 40 or above). Wage gaps among workers in urban and rural areas are estimated after decomposing the results into 'difference due to endowments' and 'differences due to discrimination.

The paper is organized as follows. Review the previous literature is presented first. In the next section, we discuss data and its descriptive statistics. Furthermore, in the next section, we discuss the methodology and framework used in the paper. We, then, present and interpret the econometric results. The final section of the paper highlights the conclusion and implications.

2. LITERATURE REVIEW

Studies have highlighted various reasons for the gap between urban and rural areas across the globe and in Pakistan. In a recent paper, Gollin et al. (2021) document that higher income in urban areas is offset by urban dis-amenities which include public goods provision, crime, and air pollution. Private consumption and amenities measures improve with an increase in population. But few people prefer rural areas because of more connectedness and easier mobility. Lagakos et al. (2016) have identified that the urban-rural wage gap reflects sorting and spatial misallocation of resources. They have analyzed two interpretations of these gaps: one is that labor is misallocated due to migration risk and incomplete markets and the other is that workers are diverse in characteristics and they sort efficiently considering the migration cost. Moreover, Artz et al. (2016) have attributed urban-rural earning differences to labor market distortions that arise due to a less democratic system, high level of education in urban areas, higher taxes, and lower government share in GDP. Eliminating the urban-rural gap increases per capita GDP by 13.9%.

Moreover, country-wise empirical evidence has also been estimated in different studies. Zhang et al. (2016) concluded that 49% of the urban earner's wages and 17% of the urban-rural wage gap in China cannot be explained by observable factors. Education, experience, variation across the industry, occupation account for most of the explained earning differential. Zhu et al. (2016) also investigated determinants of the regional income gap in China. The adjustment reduces the urban-rural earning gap and inequality. After controlling characteristics, residence location is the most important factor in the difference in earning as studied by Sicular et al. (2006). Pereira and Galego (2011) have investigated regional wage differentials for Portugal for time series data for 1995 and 2002. They found that wage differences due to unobservable factors have declined over time. Girsberger et al. (2020), Tremblay (1986), Margo (1999), Rhoades and Renkow (1998), Kim et al. (2015), Lim et al. (2009), Enflo et al.

(2014), Chiquiar (2008), and Nahar et al. (2015) have studied cross country wage differentials across the globe.

In Pakistan, there is hardly any study that analyzed regional earning differentials. One of the rare studies is by Shahbaz et al. (2007). They have analyzed the relationship between financial deepening, trade openness, and urban-rural income inequality in Pakistan and concluded that stability in macroeconomic policies, sustained economic growth, investment in social sectors i.e. education, health, and population welfare results in decreasing rural-urban wage gap. Khan and Idress (2014) studied determinants of earning across the district of Pakistan. Personal and household characteristics have a significant impact on earnings. Socio-development factors have a positive impact on earnings and terrorism has a negative impact on earning across different districts of Pakistan.

Furthermore, no such study can be found which analyzes the urban-rural wage gaps among different age groups in Pakistan. This study is an effort to fill the gap in the literature in this regard. Moreover, the study will help devise a policy to reduce wage inequality in the country.

3. DATA

To study regional earning differentials in Pakistan, Data comes from Pakistan Social and Living Standard Measurement (PSLM) for the year 2014-15, which is published by the Pakistan Bureau of Statistics. From PSLM microdata, 122,663 individuals with any kind of earning were selected for the study. Out of these selected individuals, 22,761 individuals reside in urban areas (18.6% of the selected individuals) whereas, 99902 individuals live in rural areas (81.4% of the selected individuals). Moreover, 102,504 individuals in the selected data set were male which is 83.6% of the total earner and 20,159 were female, which is 16.4% of the selected data set. In Marital Status Variable, 99,449 selected earners are married, and the rest 23,214 are unmarried.

Out of selected individuals, 56,263 earners were paid employees which is 45.9% of the selected earners. Whereas, 66,400 individuals were in other categories of employment, which is 54.1% of the total earners. Individuals with less than primary education are 30,677 in number which is captured by edu.1 dummy variable. 30,677 individuals have less than matric education, which is captured by edu.2 dummy variable. Earners who have education less than intermediate and more than matric are 14761 in number and are captured by edu3. Moreover, individuals who have education less than graduation are 6284 in number. Whereas, individuals with education more than graduation are 7521 in number.

Moreover, summary statistics of Variables are presented in Table 2. The maximum standard deviation is showed by the variable "Age", whereas the least standard deviation is shown by Edu4. Further, Mean, Kurtosis, and Skewness are also presented in the Table.

Table 2: Descriptive Statistics

Statistic	Mean	Standard Deviation	Kurtosis	Skewness
Age	38.02	14.492	-0.253	0.505
Marital status	0.81	0.392	0.518	-0.1587
Employment status	0.46	0.498	-1.973	0.166
Gender	0.84	0.371	1.282	-1.811
Edu1	0.25	0.433	-0.668	1.154
Edu2	0.25	0.433	-0.668	1.154
Edu3	0.12	0.325	3.447	2.334
Edu4	0.05	0.220	14.575	4.071
Edu5	0.0613	0.23991	11.375	3.657

(Source: Author's calculation)

4. METHODOLOGY AND ANALYTICAL FRAMEWORK

To investigate regional earning differentials in the country, the Oaxaca decomposition technique has been used. This technique was primarily introduced by Oaxaca (1973) and Blinder (1973). An econometric model for regional earning differential estimates earning differentials across regions i.e. urban and rural. Equation (1) presents the econometric model estimated, which takes the log of wages as the dependent variable and age, age squared, marital status, employment status, gender, and education as explanatory variables. Log has been taken to estimate Mincer (1974)[1] earning function.

$$W_i = \alpha_0 + \alpha_1(Age_i) + \alpha_2(\text{Sq. Age}_i) + \alpha_3(\text{MS}_i) + \alpha_4(\text{ES}_i) + \alpha_5(\text{Gender}_i) + \alpha_6(\text{Edu. 2}_i) + \alpha_7(\text{Edu. 3}_i) + \alpha_8(\text{Edu. 4}_i) + \alpha_9(\text{Edu. 5}_i) + \varepsilon_i \quad (1)$$

In Equation (1) Log of wages (W_i) has been taken as the dependent variable to study regional wage differentials. Age has been used as the best available proxy for experience. Since no variable existed in the survey to capture the effect of experience or duration individual had worked. Few researchers have used (Age- years of Education-4) as a proxy for experience. Sq. Age_i (Square of Age) is used to take into consideration the effect of concavity of age-earning profile. Marital Status is another important determinant of earnings. Two characteristics of marital status i.e. currently married and unmarried have been included. Unmarried is taken as the missing base category. Employment status is also an important determinant of earning differential. Two categories were identified for the study i.e. Paid employees and others who are not paid, employees. Two categories are formed because paid employees usually face wage discrimination than other categories of employment. Individuals other than paid employees are taken as the base category variable. Gender has two categories i.e. male and female. Female has been taken as the base category variable. Five different levels of Education were identified for the study. They were below primary (those with less than five years of schooling) which is taken as base category variable, below matric (those with less than ten years of schooling), below intermediate (those with less than twelve years of schooling), below graduation (those with less than fourteen years of schooling) and above graduation (those with more than fourteen years of education).

Our variable of interest wages are explained by a vector of determinants, as shown in Equation (2) and (3) for rural and urban workers respectively:

$$W_r = \alpha_r + \beta_r x_r + \varepsilon_r \quad (2)$$

$$W_u = \alpha_u + \beta_u x_u + \varepsilon_u \quad (3)$$

Where, W_u is a log of wages of urban workers in Equation 3 and W_u is a log of wages of rural workers in Equation 2. x_r and x_u in Equation 2 and 3 are vector mean values of independent variables of rural and urban earners respectively. α_r and α_u are the coefficient of the variable for rural and urban earners respectively.

We construct a counterfactual equation in which we replace the coefficient of rural with that of urban to determine wage gaps between urban and rural.

$$W_r^* = \alpha_u + \beta_u x_r + \varepsilon_r$$

[1] Mincer earning function is standard single equation model used to estimate earning differentials. It takes natural logarithm of earnings which is linear function of years of education attained and quadratic function of years of experience. It has been estimated by various researchers for almost all countries.

Now, Subtracting log of wages of rural workers from a log of wages from urban workers to get Equation (4):

$$W_u - W_r = (W_u - W_r^*) + (W_{fr}^* - W_{fr}) \quad (4)$$
$$W_u - W_r^* = \beta_u(x_u - x_r)$$
$$W_r^* - W_r = (\alpha_u - \alpha_r) + (\beta_u - \beta_r)x_r$$

Substituting values in (4) to get (5):

$$W_u - W_r = \beta_u(x_u - x_r) + (\alpha_u - \alpha_r) + (\beta_u - \beta_r)x_r \quad (5)$$

Equation (5) can be decomposed into two segments. First segment "$\beta_u(x_u - x_r)$" is explained term. These differences are due to differences in education, skills, and other such factors. The second term "$(\beta_u - \beta_r)x_r$" is unexplained and can be because of discrimination.

In this study, three categories have been developed for analysis which is: full sample which includes all earning population, young earners which includes earner whose age is less than 40, and old earners whose age is 40 or above. The reason for a separate analysis of young and old earners is that we intend to analyze the dynamics of earning across age groups. Young earners usually have unstable jobs and may switch between jobs. Whereas, as age increases, income becomes more stable.

5. RESULTS

Earning differentials were estimated using the Oaxaca blinder decomposition technique among urban and rural areas of Pakistan. This method decomposes estimates into two parts i.e. explained and unexplained. "Unexplained term" usually refers to discrimination or unobservable factors. Analysis was carried out by initially considering a full sample or all earners from the dataset, young earners and old earners. Coefficient estimates for the urban region are presented in Table 3, whereas estimates for rural regions are presented in Table 4.

Table 3: Comparison of Coefficients of All, Young and Old Earners in Urban Regions

Variables	***Urban Region***					
	All age groups		***Young Earners***		***Old Earners***	
	coefficient	***t.value***	***coefficient***	***tvalue***	***coefficient***	***tvalue***
Constant	8.9846	204.52	8.2917	78.11	9.5675	37.58
Age	0.0767***	32.79	0.1351***	16.82	0.0472***	5.51
Age Sqd	-0.0007 ***	-29.66	-0.0017***	-12.38	-0.0005***	-6.49
Gender	0.8712***	54.44	0.9516***	5.40	0.7216***	3.58
Marital status	0.1529***	8.21	0.0973***	50.19	0.3575***	26.28
Employment status	-0.1540***	-13.11	-0.2101***	-14.90	-0.0821***	-4.16
Edu2	0.2554***	17.62	0.1614***	9.36	0.3455***	13.85
Edu3	0.5406***	32.35	0.3862***	19.01	0.7100***	25.33
Edu4	0.7065***	33.37	0.5364***	21.60	0.9057***	24.24
Edu5	1.1626***	65.68	0.9660***	43.37	1.3672***	47.31
R^2	0.3507		0.3756		0.2800	
Adj R^2	0.3504		0.3752		0.2793	

Source: Author's calculation. ***, **, * *indicates level of significance at 1%, 5%, & 10%. respectively*

In the case of all earners, explanatory variables (Age, Square of Age, Marital status, Employment Status, Gender, and Education) are statistically significant for both urban and rural regions as shown in Tables 3 and 4. Age, marital status and education (edu.2, edu.3, edu.4, and edu.5) have a positive impact on the earnings of individuals. Age squared and employment status have a negative impact on earnings. The negative sign of age squared indicates nonlinearity of age, which shows earnings increase with age but a decreasing rate. The nonlinearity of age holds for both urban and rural regions. Negative relation of employment status with earning indicates that paid employees earn less than other categories of earners. This negative relation holds for earners of both urban and rural regions of Pakistan. A similar procedure was carried out for young earners (who have age less than 40) and old earners (who have age more than 40). The results discussed above hold for young and old earners as well.

Moreover, in all earners' analyses, the impact of age, marital status, and education are higher for urban areas as compared to rural areas. Results of education are in alignment with previous studies (Rhoades & Renkow, 1998). Whereas, the impact of gender is higher for rural areas. Moreover, male workers earn more than female earners in urban as well as rural areas. In young earners' analysis, age and marital status have a higher impact in urban areas than rural areas. Whereas, results differ in the case of education.

Table 4: Comparison of Coefficients of All, Young and Old Earners in Rural Regions

Variables	*Rural region*					
	All age groups		***Young earners***		***Old earners***	
	coefficient	***tvalue***	***coefficient***	***tvalue***	***coefficient***	***tvalue***
Constant	8.8385	426.25	8.0889	150.89	9.3931	71.35
Age	0.0718***	62.40	0.1286***	30.79	0.0420***	9.90
Sq.Age	-0.0007***	-55.68	-0.0017***	-22.17	-0.0004***	-11.54
Gender	1.0979***	142.68	1.1482***	6.11	1.0094***	6.68
Marital status	0.1354***	13.35	0.0627***	126.13	0.4184***	75.59
Employment status	-0.1692***	-28.27	-0.1447***	-20.41	-0.2236***	-21.59
Edu.2	0.2729***	39.42	0.2013***	24.51	0.3479***	28.91
Edu.3	0.5078***	54.32	0.3884***	35.24	0.6520***	39.59
Edu.4	0.6751***	48.08	0.5387***	34.05	0.8713***	32.60
Edu.5	1.0659***	74.81	0.8944***	52.88	1.2783***	51.48
R^2	0.3270		0.3762		0.2293	
Adjusted R^2	0.3269		0.3761		0.2291	

Source: Author's calculation. ***, **, * *indicates level of significance at 1%, 5%, & 10%, respectively*

Education dummies (Edu.2, Edu.3, and Edu.4) which represent a relatively lower level of education than Edu.5 have a higher impact in rural areas than urban areas. However, Edu5 has more impact in urban areas than rural areas, which indicates a higher level of education has more influence on earning in urban regions. Results of gender are aligned with previous analysis and suggest that male workers earn more than female workers in both rural and urban regions.

Furthermore, analysis was carried out for old earners. Results of variables i.e. age, gender, marital status, and employment status are similar to all earner and young earner analyses. But, Education dummies show a slightly different pattern in the case of old earners. The lowest level of education which is represented by Edu.2 has a higher effect on earnings in rural region earner than urban region earner. An increase in education to Edu.3, Edu.4, and Edu.5 changes the pattern. Impact of Edu.3, Edu.4, and Edu.5 is more for urban areas than rural areas.

Decomposition output is shown in Table 5. Decomposed results divide wage gaps into three parts i.e. endowments, coefficient, and interaction. The first part "Endowment" indicates explained differences or

mean an increase in wages in rural areas if they had the same characteristics as urban areas. Differentials due to endowments are a result of the difference in education, experience, or any other such factor. Estimates in Table 5 suggest that for full sample analysis differences in income due to the endowment is 71.2%. Whereas for young and old earners, the difference in earnings due to endowment is 60.9% and 90.1% respectively. Furthermore, the coefficient quantifies changes in the earning of rural earners when applying the urban coefficient to the rural characteristics.

Table 5: Oaxaca Blinder Decomposition of Regional - Earning Differentials across All, Young and Old Earners

	All age groups	**Young Earner**	**Old earner**
Overall difference	-0.2649	-0.2548	-0.2921
Endowment	-0.1887 (71.2%)	-0.1552 (60.9%)	-0.2631 (90.1%)
Coefficient	-0.0839 (31.6%)	-0.0869 (34.1%)	-0.0630 (21.5%)
Interaction	0.0077 (-2.91%)	-0.0127 (4.9%)	0.0340 (-11.6%)

Source: Author's calculation

Coefficient estimates suggest that 31.6% of the differences in case of all earners, 34.1% of the differences in earnings of young earners, and 21.5% of the differences in earnings of old earners in rural and urban areas can be due to unexplained reasons which can be regarded as discrimination against rural labor market of Pakistan.

The overall difference suggests that the average income of earners in urban areas is 27% more than those in rural areas. Whereas if an earner is young, difference squeezes to 26%, but unexplained or discriminatory factor increases. Moreover, if an earner is old (age more than 40), the difference in income of urban and rural workers increases to 29%, but the discriminatory factor is less for the old earner. The overall difference in income is higher for old earners but, the unexplained factor is more in the case of young earners than old earners, as suggested by empirical results. In general, our empirical findings suggest that earners in rural regions face more discrimination, whereas, in particular, young earners experience more discrimination as compared to old earners.

6. CONCLUSION

We examined regional earning differential among urban and rural areas in Pakistan. Urban-rural areas of the country have dichotomous characteristics. People earn more in urban areas as compared to rural areas with the same level of endowment. This study aimed to analyze regional earning differential across different age groups i.e. young and old earners. Analysis has been carried out for all earners in the sample as well. Data has been taken from Pakistan Social and Living Standard Measurement (PSLM).

By using the Oaxaca-Blinder Decomposition method, it can be concluded that 31.6% of differences in earnings of all earners are due to unobservable factors. Furthermore, 34.1% of the income gaps among young earners in urban and rural areas are due to unexplained factors. 21.5% of the differences in earnings in old earners of urban and rural regions are due to factors other than education, experience, and other explained characteristics. The difference in earnings of individuals in urban and rural areas of Pakistan is generally attributed to the endowment. But results suggest that there are some factors other than endowment which are responsible for earning differentials. This difference can be a result of discrimination in the labor market.

Education has a significant impact on earnings. It was analyzed in the study that the pattern of impact of education differs for young and old earners. A relatively lower level of education has more impact on the earnings of young earners in rural areas. As individuals receive higher education impact of education is

more on urban workers. Further, the lowest level of education has more effect on the earnings of rural workers, but as old earner receives more education than the primary level impact of earning is stronger for old earners in urban areas.

Moreover, young people face more discrimination in the labor market than old workers. Even though Pakistan's majority population (63.1%) lives in rural areas, earners face discrimination by employers. The majority of the population is facing discrimination because they reside in rural areas. To achieve inclusive growth in the country, it is essential to provide equal opportunities to all individuals (whether living in urban or rural areas) of the country. (Imai & Malaeb, 2018) write in the report published by International Fund for Agricultural Development:

> *"… Higher non-agricultural growth tends to widen the rural-urban income gap, the acceleration of the agricultural growth rate (towards the non-agricultural growth rate) would reduce the income gap. Policies to promote education in rural areas are deemed important to narrow the rural-urban human resources gap. Policies that would stabilize macroeconomic conditions and reduce fragility are likely to narrow the rural-urban income gap…"*

Policymakers should focus on improving the socio-economic status of the deprived regions. Most of the gap in the urban and rural areas is due to the disparity in the educational, infrastructural, and technological structure of both areas. The human capital formulation in rural areas needs to be focused on improving the quality of education, skill development, and spread of knowledge. Technological advancement and infrastructural facilities in rural areas should be upgraded. Economic policies should target improving macroeconomic conditions in rural areas. Differences in the income of people residing in urban and rural areas of Pakistan is also a major concern for rural development specialist. Development programs will not be effective without the active participation of people. Such active participation will not be voluntary but reciprocal as identified by Gill et al. (1999). Government and Private sector need to work jointly on policies and programs to reduce the regional earning differential in the country. Such initiatives will help in providing equal opportunities to everyone in the country. Moreover, effective implementation of the initiatives already taken is also required to make rural areas more inclusive. Further, there are avenues generally in the regional earning gap and particularly in the case of Pakistan that merit further research, which includes research at provincial and district levels.

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Household Catastrophic Health Expenditures and its Determinants in Pakistan

ABSTRACT

Pakistan being a lower-middle-income country, is always being able to allocate less than or around 2% of GDP to health due to which Out-of-Pocket payments have a very large share in Pakistan's total health financing. Hence, when this OOP health expenditure exceeds a defined threshold of the Household's Non-food consumption expenditure then the Household faces financial catastrophe. This research sheds light on the features that can make households in Pakistan more vulnerable to catastrophic health expenses and fills the gap by analyzing the determinants of Catastrophic health expenditures of Pakistan and discusses the incidence and intensity of these Catastrophic health expenditures. We have used survey data of Household Integrated Economic Survey (HIES) of Pakistan for the year 2015-2016 for 24238 households. It contains household information including education, income, consumption expenditure, and health expenditures. As anticipated, some determining factors significantly increase the risk of facing catastrophic health expenditures.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

Investment in the health sector can lead to a long-run beneficial outcome. It is useful in promoting health outcomes, decreasing poverty, and help stimulate economic growth. Despite the fact, the public health expenditure stayed squat in emerging nations and the overall public has no option but to bear health care expenditures from their pockets, which has been persisted as the main source of health financing. Globally, 32% of health expenditure was out of pocket expenditure in 2015. Out of these, World Health Organization evaluates that out-of-pocket expenditure on health care facilities impels 4100 million individuals into poverty each year. However, nearly 150 million people bear monetary calamities due to out-of-pocket health expenditures (WHO, 2015). Catastrophic Health Expenditure is health care cost or out-of-pocket outlay that surpasses a well-defined threshold level of a household's aggregate consumption or non-food consumption expenses per year. Based on a 2010 WHO report, a nation's public health expenditure of around 6% of GDP will moderate Out of pocket expenditures and make the occurrence of calamitous health expenses negligible. On the contrary, the average value of aggregate health spending as a ratio of GDP for Pakistan during the period 2000- 2016 remained 2.78% with the least 2.36% in 2011 and with the highest of 3.34% in 2007. In 2016, Pakistan being a lower-middle-income country has health expenditure per capita of US-Dollar 40 with an out-of-pocket expenditure of 65.2 % of current health expenditures and 2.8% of total health expenditures (% of GDP)[1].

The health Indicators of Pakistan as compared to the region, indicate poor health outcomes such as high infant mortality, high population growth rate, and lowest life expectancy among other regional countries. One possible reason is that the health expenditure of Pakistan is far lower than other regional countries. As also stated above that Pakistan has been allocating less than or around 2% of GDP to health on average. For instance, It has been projected from the comparatively low levels of public expenses, out-of-pocket expenditures played a great role in Pakistan at 65%[2] (% of current health expenditures), which is extremely high in a global context (where the average is 18.5% in 2015-2016).

Berki (1986) is the first to explore catastrophic health expenditures and defined them as the expenditures which covered a huge share of the household budget and interrupts the family's consumption. Also, according to Russell (1996), this method is linked to the opportunity cost of health expenditures. Contemporary studies have used this approach by using different measures, for example, Wagstaff and Doorslaer (2003) used the out-of-pocket health spending portion in the overall domestic budget to examine the occurrence, intensity, and factors of CHE. Plus, different thresholds were used to measure the sensitivity of incidence of CHE faced by households. Moreover, Wagstaff and Doorslaer (2003) assessed the prevalence of CHE by using health expenditure as a fraction of family income minus the food expenses. Although Xu et al. (2003) recommended an alternative method (ability-to-pay), in which he used the income left providing for food spending by an average household in the public. Some other studies like Flores et al. (2008) and Pal (2012) have proposed reviewed measures of calamitous OOP health expenditures.

Considering a large share of Pakistan's population is poor, we need to understand the determinants of the CHE for designing better policies. The present study uses Pakistan health and non-food expenditures from HIES 2015-2016 dataset, Wagstaff and Doorslaer (2003) methodology are employed to estimate the incidence, intensity, and determining factors of Catastrophic Health Expenditures of Pakistan.

In Pakistan, limited research exists on healthcare Expenditures, and among those, the emphasis is kept on the government's health expenditures (Siddiqui et al., 1995; Akram & Khan, 2007).

[1] World Health Organization Global Health Expenditure database (apps.who.int/nha/database)

One research (Malik and Syed, 2012) is found on OOP health spending of Pakistan. Besides, we haven't found any research that has examined the catastrophic health expenses of Pakistan. This study explores the factors that can make households in Pakistan more vulnerable to catastrophic health expenses and discusses the incidence and Intensity of these catastrophic health expenditures.

The paper is structured as follows: Section 1 is the introduction of the paper. Section 2 provides a discussion on the health profile and health expenditures of Pakistan. Section 3 is an overview of the literature. The methodology is presented in Section 4. Section 5 introduces the variables and data along with descriptive statistics and discusses the occurrence of Incidence and Intensity of Catastrophic Health Expenses. Estimation outcomes are introduced in Section 6. Section 7 concludes the study and suggests some policy implications along with limitations of the study.

2. DISCUSSION ON HEALTH PROFILE AND HEALTH EXPENDITURES IN PAKISTAN

2.1. Health Status

Along with numerous political, financial, social, and cross-boundary challenges, Pakistan must deal with some serious health issues. For example, the life expectancy of Pakistan is 66[2] which is the lowest among the regional countries and lower than other developing countries. Likewise, the infant mortality rate is 63 per 1000[3] births which are the highest in the region. Also, in youngsters, diarrhea and breathing problems are still major killers[4]. Maternal demises because of avoidable causes like sepsis, hemorrhage, hypertensive crises, and sepsis, are common. Pakistan is one of the three leftover nations where Polio is still widespread[5]. Furthermore, Pakistan has an endemicity of hepatitis B and C in the overall inhabitants with 7.6% affected individuals[6]; stands 5th highest for tuberculosis burden in the world[7], has a focal geographical area of malaria endemicity[8], and an established HIV concentration among high-risk groups[9]. Pakistan is ranked 7th highest in the world for diabetes prevalence[10]. One in four adults over 18 years of age is hypertensive, and smoking levels are high. Pakistan has one of the notable incidences of under-weight children in South Asia. Gender discrimination, Poverty, low literacy, joblessness, and enormous treatment gap have directed to an indistinguishable burden of psychological health complications.

The Health system faces challenges of vertical service delivery structures and low-performance accountability within the institutions, creating efficiency and quality issues. Largely unregulated for quality care and pricing, there is also duplication of services by the private sector[11]. Despite having the potential, the private segment pays the least. The public sector is inadequately staffed, job satisfaction and work environment need improvement[12]. The overall health sector also faces an imbalance in the skill mix and deployment of the health workforce, and inadequate resource allocation across different levels of health care i.e. primary, secondary, and tertiary.

[2] World development indicators (WDI), World Bank
[3] World development indicators (WDI), World Bank
[4] UNICEF. Child Survival: Under-Five Mortality. 2016. http://data.unicef.org/child-mortality/under-five.html
[5] Polio Global Eradication Initiative. http://www.polioeradication.org/Keycountries.aspx
[6] See Qureshi et al. (2010)
[7] World Health Organization. Global TB Report. Geneva: 2014.
[8] Global Fund. Pakistan 2014 Malaria Grant Concept Note. Islamabad: 2014.
[9] UNAIDS. Global AIDS Response Progress Report. Geneva: 2014
[10] World Health Organization. Global report on diabetes. Geneva: 2016
[11] World Health Organization. Analysis of the private health sector in countries of the Eastern Mediterranean: exploring unfamiliar territory. Regional Office for the Eastern Mediterranean, Cairo: 2014.
[12] See Hafeez et al. (2010)

A range of actions is needed, acting upon the social factors within the health and social sectors, if a wider impact is to be achieved[13]. But this strategy needs a careful understanding of underlying parameters at household levels which makes households face CHE.

2.2. Health Spending of Pakistan vs Other Regional Countries

According to UNDP, Pakistan is confronting huge socio-economic challenges including illiteracy, poverty, poor health facilities, and a continuously rising population. Pakistan is the 6th most populous country with a growth rate of 2.05% per annum and a total population of 200.2 million[14], is a major intersection in terms of the relation between health and development. Despite having a per capita income of current US$1472[15] (India: $2015, Bangladesh: $1698) in 2018, Pakistan has weak health outcomes across the region. In Human Development Index (HDI) Pakistan is positioned at 150[16] (India:130, Bangladesh:136) out of 189 countries. The health Indicators of Pakistan show a high population growth rate, high infant mortality, and lowest life expectancy among other regional countries. One reason could be that Pakistan's health spending is far less than other regional countries. Pakistan allocated less than or around 2% of GDP to health historically, which is very low. This also does not have the required prepaid component of the health financing system and also is not a match with other lower-middle-income countries as well as very far away from a global average of 5.3%. The comparative position of Pakistan in health expenditure and health outcomes among other regional countries is given in Table 1.

Table 1: Comparison of health expenditures and health outcomes in Pakistan with different countries in the region in 2016

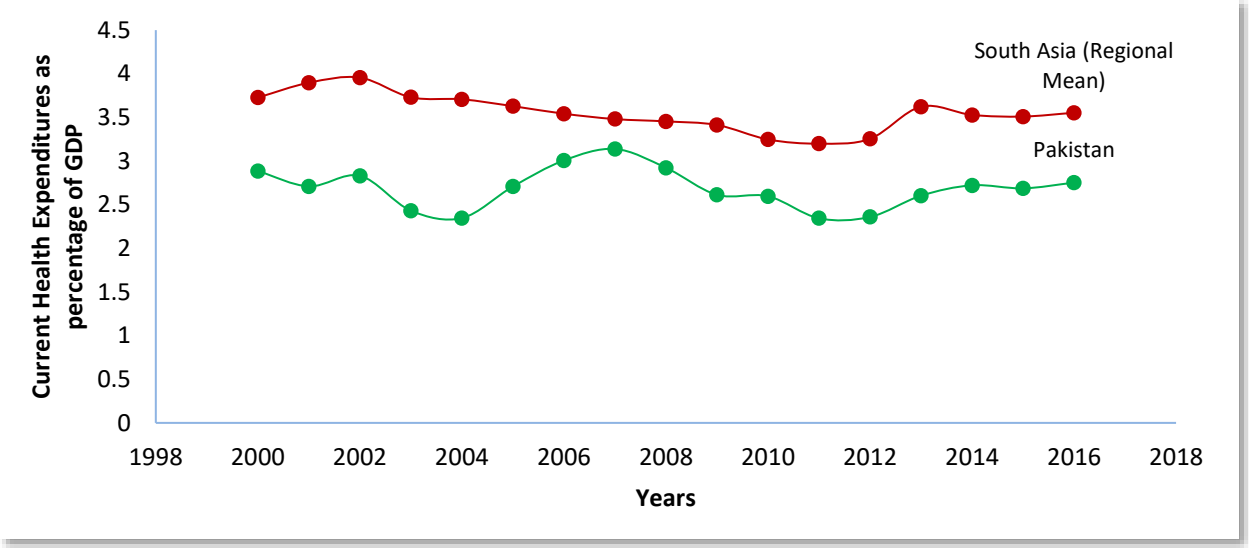
country	Current health expenditure (% of GDP)	Out-of-pocket expenditure (% of current health expenditure)	Life expectancy at birth, total (years)	Mortality rate, infant (per 1,000 live births)	Population growth (annual %)
Pakistan	2.7528	65.2279	66	62.9	2.0843
Bangladesh	2.3650	71.8888	72	28.3	1.0913
Bhutan	3.4541	20.1297	70	26.5	1.2062
India	3.6583	64.5778	69	33.6	1.0898
Maldives	10.6108	19.1006	77	7.1	4.4283
Nepal	6.2944	55.4400	70	28.8	0.9068
Sri Lanka	3.8932	50.1216	75	7.8	1.1049

Source: World development indicators, World Bank

The same picture emerges if we compare the average of South Asian countries with Pakistan. Historically it has been less and more volatile. Figure 1 presents the comparative picture. The share of OOP health expenditure out of the total expenditure is an important indicator in health financing research (Lavado et al., 2013; Xu et al., 2009). In many countries, this figure is used to derive the national level estimates of health accounts (Lavado et al., 2013)[17]. Within low-income countries, the average variation in this share is from 20% to 80%, and this share drops sharply for high-income countries. Below in figure 2, we have produced some comparative positions in the region for Pakistan. Although the average OOP of South Asian countries seems to be close to that of Pakistan but again given the base of total health expenditures,

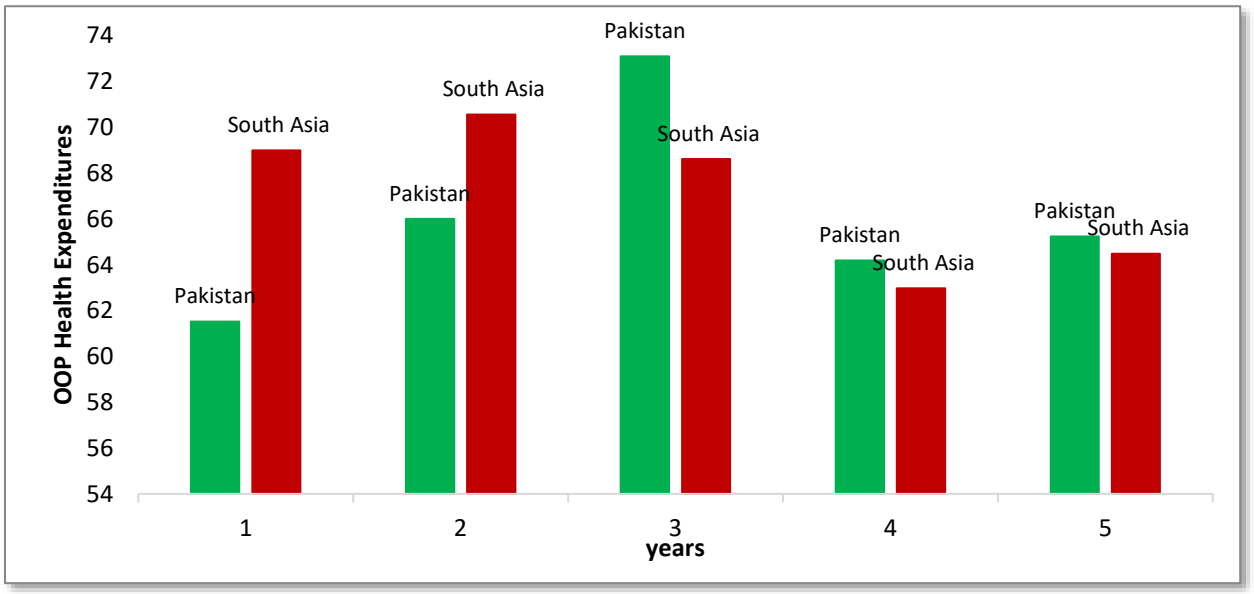
[13] See Bhutta and Hafeez (2015)
[14] Pakistan population statistics from World development Indicators (WDI)
[15] World Development Indicators (WDI)
[16] Human Development Indices and Indicators:2018 statistical update
[17] General statistical procedures used to construct WHO health expenditure database," World Health Organization, Geneva, 2012 and Guide to producing national health accounts with special application to low income and middle-income Countries," World Health Organization, Geneva, 2003

where the other countries have done more allocation, the Non-OOP would still be quite big in absolute value. Further in Pakistan. Thus, expenditure efficiency is also questionable see Rizvi (2019), for more discussion on institutional quality for health expenditures. Which reflected more on why the health outcomes such as the life expectancy (presented in Figure 3) is much low as compared to the region.



Data Source: World Development Indicators, World Bank

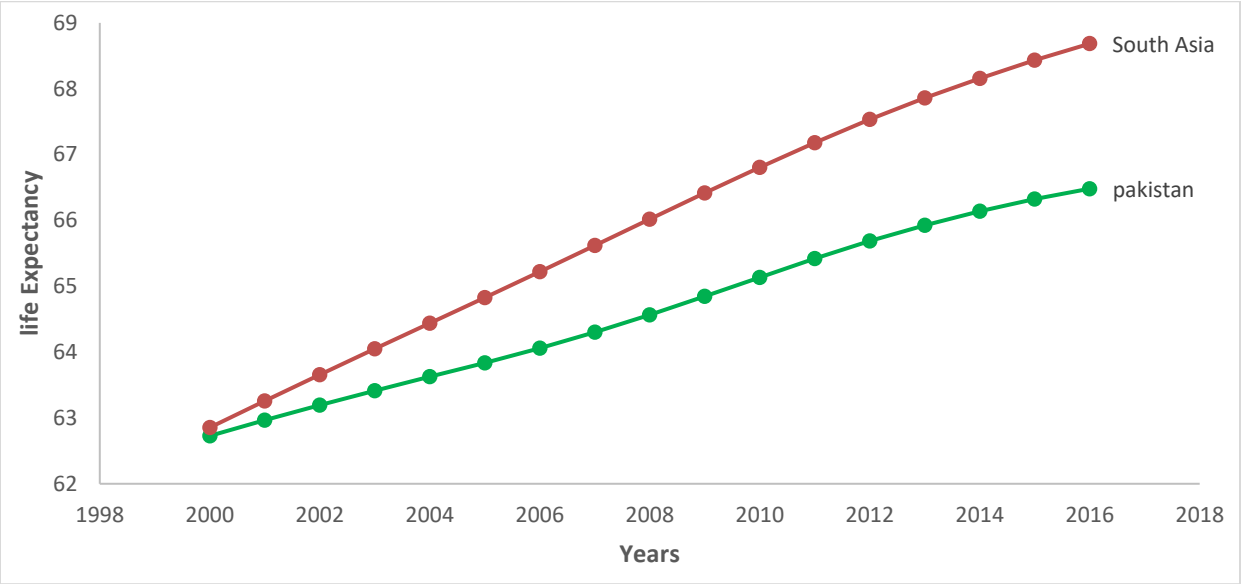
Figure 1: Current health expenditure (percentage of GDP) of Pakistan and mean of south Asian countries.



Data Source: World development indicators, World Bank

Figure 2: Out-of-pocket expenditure (percentage of current health expenditure) of Pakistan and mean of south Asian countries.

In figure 3 if we look at Pakistan vs. South Asian average, then it's evident that both the level of health expenditures being low and the efficiency of spending being questionable the health outcomes are poorer in Pakistan.

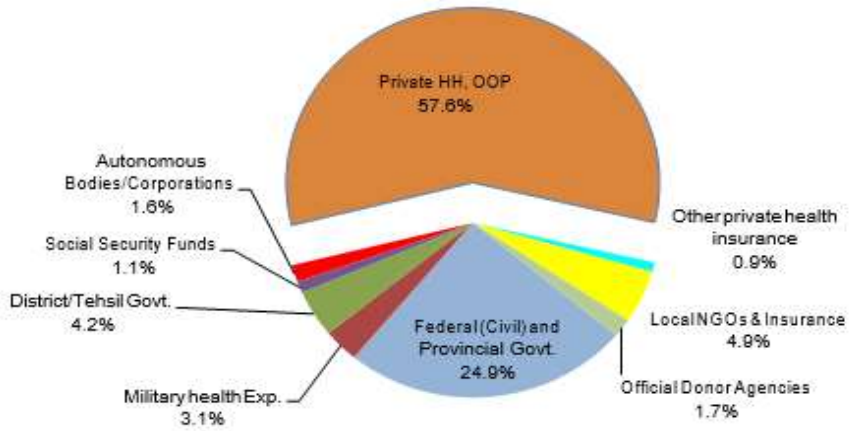


Data Source: World development indicators, World Bank

Figure 3: Life expectancy at birth, total (years) of Pakistan, and mean of south Asian countries.

2.3. Health Financing Sources in Pakistan

According to Pakistan National Health Accounts, Pakistan's total health expenditure in 2015-16 was Rs.908 billion (3.1% of GDP). As Figure 4 shows that out of total health expenditures in Pakistan, 35% are made by the government. Private expenditures constitute 63.4% of total health expenditures in Pakistan, out of which 91% are household's out-of-pocket (OOP) health expenditures. Development partner/ donor organizations have a 1.7% share in total health expenditures.



Source: National Health Accounts Pakistan 2015-2016.

Figure 4: Share of financing agents in total health expenditures of Pakistan for 2015-16

As mentioned in table 2 Funding sources have three main types, that is government financing, private financing, and the rest of the world financing. Out of the entire health spending in Pakistan, 34% of entire health expenditure is financed by the government sector. While 64.4% of the health expenses were financed through the private sector, out of this 64.4%, almost 89% are OOP health expenditures by households. As would have been projected from the comparatively low levels of public spending, out-of-pocket payments played a great role in Pakistan at 65% (% of current health expenditures) of the total financing in 2015-2016, which is tremendously high in worldwide comparative terms (where the average is 18.5). it is also greater than the 20% limit proposed by the 2010 World health report to ensure that financial catastrophe and impoverishment because of accessing health care become insignificant (World Health Organization, 2010). This warrants further study as to why these OOP expenditures are very high, given the health outcomes are not very promising. It leads to a hypothesis such as are these OOP mainly the catastrophic ones hence people end up in short financing and often end up in not the best health outcomes. We will explore these further in the sections below.

Table 2: Health Expenditure Financing Sources

Source	Total (Million Rs.)	Percentage
Federal Government	67,062	7.4
Provincial Government	187,096	20.6
District Government	39,405	4.3
Autonomous Bodies / Corporations	14,287	1.6
Employer Funds	15,369	1.7
OOP Health Expenditures	524,804	57.8
Local/National NGO's	44,271	4.9
Official Donor Agencies	15,210	1.7
Total	907,504	100.0

Data Source: National Health Account, 2015-16

3. REVIEW OF LITERATURE

There are many studies available globally on the determinants of CHE and OOP. Here we present some of them to understand the theoretical and empirical background. Xu et al. (2007) considered whether out-of-pocket expenses on health care can lead to financial hardship. For this reason, survey data of 116 countries have been used which covered 89 countries by analyzing the Gini coefficient, population characteristics under age five years and above 60 years, prepayment in form of tax and health insurance in high, low, and middle-income group countries. Results of this study indicate that all countries suffered from financial catastrophe. Nevertheless, high-income countries, are less affected than middle-income countries, and problems get adverse in low-income countries. The ratio of population below the age of five years remained insignificant to cause financial catastrophe in all income groups which may result in the provision of free-of-cost immunization to the children. On the other side, in middle-income countries ratio of the population above age sixty years enhances the occurrence of financial catastrophe but not in low- and high-income countries. Prepayment mechanism either by health insurance in a high-income group or tax-based system in the low and middle-income group kept protected individuals from financial catastrophe. On the other side out of pocket expenses have a positive correlation with financial catastrophe in all income groups.

Some studies have used different thresholds for analyzing catastrophic health expenditures and their determinants for different countries, for example, Cleopatra and Eunice (2018) studied the incidence, intensity, and determinants of CHE among Nigerian households. The study showed the existence of high intensity and occurrence of catastrophic health expenses in Nigeria which although varied under thresholds used. Also, the determinants like socio-economic status, age, dwelling, employment,

and health status of family members were allied with the catastrophic health expenses in Nigeria. Likewise, Buigut et al. (2015) examined the same for Kenya slum communities and results indicated that a considerable percentage of households in Kenya face catastrophic health expenditures. Moreover, a core set of variables were found to be the determinants of catastrophic health expenditures. In addition, the study suggested that small-scale health insurance programs are needed to protect households from catastrophic health expenditures. Similarly, Aregbeshola and Khan (2018) assessed the determinants of catastrophic health expenditures for households in Nigeria. They found that regardless of the thresholds, factors like age, education, health insurance status, geo-political zone, type of health facility, and type of illness suffered can raise the risk of facing catastrophic health expenditures among households. Su et al. (2006) has also used different thresholds to analyze the percentage of households suffering from catastrophic health expenditures in Burkina Faso and suggested that "different thresholds levels should be used for comparison".

Abul-Naga and Lamiraud (2008) narrated that in the UK some people from the high-income group, for the diversification of the risk against health catastrophe expenditures buy health insurance schemes and some people do not purchase health insurance they make out of the pocket spending. On the other side, individuals with low income do not purchase health insurance. Therefore, the overall effect of coverage of health insurance and the incidence of monetary catastrophe is unclear. The finding of this study is contradictory with Wagstaff & Lindelow (2008) who determined the same in China and found that health insurance has increased the extent of catastrophic health financing because when individuals get sick, they consume health insurance as well as extra resources on health.

Moreover, Yazdi-Feyzabadi et al. (2018) analyzed that urban families were less at risk to CHE than rural inhabitants and their ability to pay was high. Although, the occurrence of CHE is more in rural areas, individuals having inpatient and outpatient services, and families who have old age members in Iran. This research suggested that policies should be revised to enhance the health services coverage to target the underprivileged population.

Azzani et al. (2019), conducted systematic research to find out the determinants of CHE in low to high-income countries. The study showed households' Financial condition, the prevalence of hospitalization, the family with old age individuals, chorionic ill person, and disabled individuals were the mutual factors linked with Household CHE. However, socioeconomic disparity imparts a vital role in the occurrence of CHE all over the globe, where low-income individuals are at higher risk of financial suffering from health care payment. This study proposes that to decrease socioeconomic inequality and healthcare financing policies should be revised to support the people who must need more health care.

Pal (2012) used a new measure of catastrophic health expenses to inspect the occurrence and factors of catastrophic out-of-pocket in India. According to this new measure, "OOP health expenditure is considered as catastrophic if it reduces the non-health expenditure to a level where the household is unable to maintain consumption of necessities". The study suggested that the results are sensitive to the technique used and hence selecting the suitable measure of catastrophic OOP health spending is very important.

Some studies did the multi-country analysis, like Xu et al. (2003) did cross-country inquiry for 59 states and defined expenditure to be catastrophic if health spending exceeds 40% of income. Catastrophic health expenditure levels varied widely among countries, but households can be protected from catastrophic health expenditures by improving financial risk protection. Also, Mohanty et al. (2017) used a 40% threshold for the study of three countries and found that poor regions in those countries are at more risk to face health expenditure shock but an increase in public health spending and introducing health insurances can reduce the catastrophic health spending. While Wagstaff et al. (2018) have used a 10%

threshold for 133 counties and O'Donnell et al. (2005) used the same 10% threshold for Asian countries and found the same results.

Some recent studies like Shikuro et al. (2020) explored the catastrophic out-of-pocket health expenditure in Western Ethiopia and noticed a high ratio of people facing CHE. Further, the study also found that having members with chronic illnesses, the sex of household head, and employment are significant determinants among households. Similarly, Attia-Konan et al. (2020) worked on the Household Living standard survey of Côte d'Ivoire to investigate the factors associated with catastrophic Health Expenditures. Most households facing CHE were the ones with chronic disease and people over 65 years. Whilst households without health insurance were least affected. Likewise, Ahmed et al. (2021) studied the determining factors of Catastrophic Health Expenditures for Bangladesh and the findings were almost the same. Older people, chronic illness, and geographical location were found to be significant.

Liu et al. (2021) studied the determinants along with the incidence and intensity of Catastrophic health Expenditures among elderly Chinese individuals. He used 40% of non-food expenditures as the threshold for CHE. He found out the increase in both incidence and intensity of CHE. Whilst individuals with a spouse in the household, disabled, lived in middle and western zones lived in urban areas and fall in the lowest quantile were more prone to face CHE. Mulaga et al. (2021) also analyzed the incidence and determinants of CHE in Malawi. He also used 40% of non-food expenditure and 10% of total expenditure as thresholds for incidence of CHE. He found that 1.37% of households have faced CHE. In addition, some factors like hospitalizations, large household size, higher economic status, visiting health facilities, individuals who lived in rural and central regions had more chance to face CHE.

All the studies mentioned above, along with Saksena et al. (2010) and Lara and Gómez (2011) discovered a set of possible determinants that can raise the risk of experiencing catastrophic health expenses between families. Among them are characteristics and economic condition of household head, socio-demographic conditions, health insurance, a household with more elderly people, type of health care facility, in-patient events, etc. Similarly, Li et al. (2012) inquired about the features impacting catastrophic health expenditures in China. The significant factors include rural/poorer regions, households having hospitalized, chronically ill, and elderly members. Likewise, Mondal et al. (2010) studied the influential features of calamitous health expenditure in West Bengal, India. They defined the expenditures to be catastrophic if they were more than 40% of non-food spending. The analysis showed that many illness spells, hospitalizations, household members with chronic illness, and type of medical care were important factors that are responsible for catastrophic health expenditures.

Several studies including those mentioned above in both developed and developing countries have investigated the determinants of catastrophic health expenditures and listed many variables such as; type of employment of household's head, socio-demographic conditions, health insurance purchase, elderly dependence, health care facility availability, rural/urban, number of illness spells, hospitalizations, a household member with chronic illness, etc. However, there is no such research on the incidence, intensity, and determinants of catastrophic health expenditures among households in Pakistan. Our study will be unique to assess the incidence, intensity, and determinants of CHE in Pakistan by using Probit and Quantile regression. Plus, three different thresholds are used to get insights into the sensitivity of results to the threshold levels. The study provides evidence and contributes to the literature on factors associated with catastrophic health expenditures in Pakistan.

4. METHODOLOGY

Following the methodology proposed in the above-mentioned studies for example Wagstaff and Doorslaer (2003), Aregbeshola and Khan (2018), Cleopatra and Eunice (2018), Attia-Konan et al. (2020),

and others, the present study estimates determinants of the Out-of-Pocket approach by using Probit and Quantile Regressions. According to this OOP approach, Catastrophic health expenditure is the medical expenditure or out-of-pocket spending for health that surpasses a defined threshold of a family's overall consumption or non-food consumption spending yearly. Since there are no universally agreed thresholds defined in the literature, this study used thresholds of 10%, 25%, and 40% to capture the best possible sensitivity. Income is often misreported especially in developing countries' household surveys; therefore, in this study Total non-food expenditure is taken as a proxy of the household's relative income. Which is a better measure of a household's health care affordability (WHO World Health Report, 2000).

In the present study, the total health expenditures (out-of-pocket Expenses) as a ratio of non-food expenses are to be seen on different thresholds (10%, 25%, 40%). If health expenditure is more than the threshold value, then it means Household (HH) has faced catastrophic health expenditures.

CHE = (Health expenditures / Non-Food expenditures) * 100 if > 10% / 25% / 40%

Once the household is identified to incur CHE based on threshold analysis then Probit Model was used to analyze the relationship between the CHE and independent (determinants) variables to identify significant attributes of these households which push individuals towards financial poverty due to CHE. The standard Probit Model is defined as:

$$ln\left(\frac{P}{1-p}\right) = \beta_{\circ} + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_n X_n + \epsilon \qquad (1)$$

In the above equation (1), P is the dependent variable i.e. occurrence of CHE defined as 1 when HH has catastrophic health spending and 0 otherwise. X_1, X_2, X_3, X_n are explanatory (determinants) variables, $\beta_1, \beta_2, \beta_3, \beta_n$ are coefficients of independent variables and ϵ is the error term. The independent variables used in this Probit regression equation are age, province, region, Household Head (HHH) gender, HHH marital status, HHH employment, and HHH education.

Most of the regression models are concerned with examining the conditional mean of a dependent variable. However, there is a growing interest in different modeling methods of conditional distribution an increasingly common approach, quantile regression is modeling the quantiles of the dependent variable given a set of conditioning variables. Koenker and Bassett (1978) was the first one to recommend quantile regression. It is responsible for assessments of the linear relationship between regressors X to a given quantile of dependent variable Y. A quantile regression models the relationship between X and the conditional quantiles of Y rather than just the conditional mean of Y. Therefore, Quantile regression permits for a further inclusive explanation of the conditional distribution than conditional mean analysis alone, allowing us, for instance, to elucidate how regressors influence the median, or even the 10th or 95th percentile of the response variable. The quantile model for τ^{th} quantile is expressed by the following equation.

$$Q_\tau(y_i) = \beta_0(\tau) + \beta_1(\tau)x_{i1} + \cdots + \beta_p(\tau)x_{ip} \qquad i = 1, \ldots, n \qquad (2)$$

In this equation (2), the dependent variable is the log of health expenditures, while the same independent variables were used. Here y_i is the health expenditures of households who based on health expenditures being higher than 10% of non-food expenditures are identified as CHE-prone households. While, the beta coefficients, instead of being constants are now functioning with a dependency on the quantile. This study used 25th, 50th, and 75th quantile to capture the effect of the independent variables on the dependent variable in these specific quantiles.

5. DATA AND VARIABLES

Individuals' access to health care facilities from OOP expenditures is dependent on several socio-economic characteristics of households. The role of environmental, socio-economic, and demographic factors is well documented in health financing and health-care literature. (Malik & Syed, 2012; Marmot et al., 2008). Also, Michael Grossman has some significant work on health care demand and production (Grossman, 1972).

Hence, to see HH level catastrophic health expenditure for Pakistan, we have used survey data of Household Integrated Economic Survey (HIES) for the year 2015-2016[18] for 24,238 households. It contains household information including education, income, consumption expenditure, and health expenditures.

- Main Variables: Health Expenditures, non-food expenditure
- Determinant Variables: Province, region, Household Head gender, HHH age, HHH marital status, HHH employment status, HHH education
- Dependent Variable: Dummy for Catastrophic health Expenditures in Probit Regression and log of Health Expenditures in Quantile Regression

5.1. Descriptive statistics

Table 3 shows the population statistics of households surveyed in the research. According to the age classification of households, the sample population of age 11–33 years is 17.73%, between 34–65 (74.80%), and older than 66 (7.47%). According to the provincial population sample, 43.35% of people are from Punjab, 21.49% from the Khyber-Pakhtunkhwa (KP), 25.48 % from Sindh, and 9.67 % from Baluchistan. Many individuals 66.65% reside in the urban region whereas 33.35% of individuals reside in rural areas. 90.56% heads of household are male on the other hand 9.44% female are the heads of household. The marital status of 90.14% Heads of households is married, 2.56% are unmarried, 6.97% are widows and 0.33% are divorced. Around 83.25% of household heads are employed on the other side 16.75% are unemployed. The employment status of 62.18% heads of household is paid employee, 1.77% are employer, employing less than 10 persons, 1.03% are employer, employing 10 or more persons, 21.23% are Self-employed non-agriculture, 0.24% are contributing family member, 7.66% are own cultivator, 3.20% are sharecropper, 1.23% are contract cultivator and 1.47% have livestock. Around 67.33% of heads of households are educated and 32.67% are not.

The Descriptive statistics show that on average yearly health expenditures are 12225.07 (Pak-Rs), with a minimum of 20 Rs and a maximum of 1160875 Rs. The non-food expenditures are on average 145458.1 Rs with minimum zero Rs and a maximum of 5582876 Rs. On average non-food expenditures are higher than health expenditures. The measure of dispersion such as standard deviation represents variation in health expenditures is 26306.21 Rs and the dispersion in non-food expenditures is 170544.7 Rs. The volatility of non-food expenditure is more than health expenditures.

[18] Latest consumption data available for Pakistan.

Table 3: Population statistics / Descriptive statistics

Variables	Population percentage
Age	
Between 11 and 33	17.73
Between 34 and 65	74.80
Greater than 66	7.47
Province	
Punjab	43.35
Khyber-Pakhtunkhwa	21.49
Sindh	25.48
Baluchistan	9.67
Region	
Urban	66.65
Rural	33.35
HHH Gender	
Male	90.56
Female	9.44
HHH Marital Status	
Married	90.14
Unmarried	2.56
Widow/Widower	6.97
Divorced	0.33
HHH Employed	
Yes	83.25
No	16.75
HHH Employment status	
Paid employee	62.18
Employer, employing less than 10 persons	1.77
Employer, employing 10 or more persons	1.03
Self-employed non-agriculture	21.23
Contributing family members	0.24
Own cultivator	7.66
Sharecropper	3.20
Contract cultivator	1.23
Livestock	1.47
HHH Educated	
Yes	67.33
No	32.67

Variable	Obs.	Mean	StdDev	Min	Max
Health expenditures	24168	12225.07	26306.21	20	1160875
Non-food expenditures	24237	145458.1	170544.7	0	5582876

5.2. Incidence and Intensity of Catastrophic Health Expenditures

Table 4 shows an analysis of the incidence and intensity of CHE. As mentioned, before we have used a ratio of health expenditure to non-food expenditures to estimate the occurrence of catastrophic health expenditures at 10%, 25%, and 40% thresholds. The results indicate that 21.21%, 22.14%, and 17.48% people belong to age group 11-33 years which incurred CHE at 10%, 25%, and 40% threshold levels correspondingly, whereas 69.06%, 65.23%, and 68.53% of the households between 34-65 years suffered CHE at these altered thresholds. 9.73%, 12.63%, and 13.99% individuals older than 66 years suffered from CHE at 10%, 25%, and 40% threshold correspondingly. This shows that the incidence of CHE is highest for the middle age group i.e. from 34-65 years. As at this age most are married and looking after the whole family hence their CHE can be detrimental. Whereas those who have made it up to 66 years of age being the household head would be fair in terms of responding to such challenge. However, still, a

significant portion of that population has suffered it and warrants policy action as elderly people are most vulnerable to such calamities.

Table 4: Incidence and Intensity of Catastrophic Health Expenditures

Variable Description		10%	25%	40%
Age				
	11-33	21.21	22.14	17.48
	34-65	69.06	65.23	68.53
	>66	9.73	12.63	13.99
Province				
	Punjab	30.17	8.44	2.51
	Khyber-Pakhtunkhwa	41.23	9.42	4.11
	Sindh	38.47	6.57	1.92
	Baluchistan	29.38	4.73	1.40
Region				
	Urban	53.46	54.19	57.76
	Rural	46.54	45.81	42.24
HHH Gender				
	Male	90.51	88.55	85.73
	Female	9.49	11.45	14.27
HHH Marital Status				
	Married	89.0	85.35	85.71
	Unmarried	2.71	3.13	2.94
	Widow/Widower	7.80	10.79	13.17
	Divorced	0.49	0.72	1.12
HHH Employed				
	Yes	81.78	77.27	74.27
	No	18.22	22.73	25.73
HHH Employment status				
	Paid employee	1.05	0.92	1.03
	Employer, employing less than 10 persons	0.49	0.35	0.00
	Employer, employing 10 or more persons	18.42	20.78	21.03
	Self-employed non-agriculture	61.56	59.08	60.82
	Contributing family member	0.39	0.50	0.41
	Own cultivator	9.92	9.86	8.45
	Sharecropper	4.53	3.40	1.65
	Contract cultivator	1.67	2.06	2.47
	Livestock	1.97	3.05	4.12
HHH educated				
	Yes	58.18	58.76	58.24
	No	41.82	41.24	41.76
Total		34.59	8.03	2.95

Percentage of Households with catastrophic health spending to household characteristics

According to the region-wise analysis; the incidence of CHE in Punjab, Sindh, KP, and Baluchistan decreases as the threshold rises from 10% to 25% and then from 25% to 40%. However, the incidence of CHE is highest in KP and lowest in Baluchistan irrespective of these three thresholds. This means KPK on average has a higher probability of households moving into a poverty status whereas in the case of Baluchistan it simply reflects the non-affordability of even such expenditures. Whereas Sindh and Punjab are relatively well off. At threshold levels of 10%, 25%, and 40% of non-food spending, the incidence of CHE is higher in urban areas as compared to rural areas.

Urban poverty is disguised and most of the households are subsistence living households. Assets and affordability for such risks are much lower as compared to Rural. Although options to avail risk financing

through loans and insurance are there but tend to opt for those is low both from the demand and supply side. The incidence of CHE in male-headed households is high as compared to the female-headed household at these thresholds. This points out that females enter the labor force and become major earners of the households only when better jobs and earnings are available. The incidence of CHE is highest for married household' heads and lowest in divorced-headed households at these three thresholds.

Employed-headed households have a high percentage of CHE than the unemployed-headed household at these three thresholds. The incidence and intensity of CHE in self-employed HHH are greater as 61.56%, 59.08%, and 60.82% at the threshold level 10%, 25%, and 40%. On the other side intensity of CHE is least in the Employer, employing less than 10 persons is 0.49%, 0.35%, and 0.00% at the threshold level 10%, 25%, and 40% respectively. This shows that the lower business-based entrepreneurs are less at risk for such catastrophic expenditures, which is convincing. Lastly, being educated increases the incidence of incurring CHE at the same intensity and all threshold levels.

6. RESULTS

6.1. Results of Probit Regression

Table 5 reports the determinants that can cause CHE in households. Regardless, of the threshold used, all the factors except HHH gender and HHH employed were found to be significant. The association between CHE and age is found to be significant and positive at both 10% and 25%. Considering the age group, people belonging to age group 11 to 33 years are 10% more likely to have CHE as compared to people having age 34-65 years at 10% threshold level. As explained above in descriptive analysis that the middle group of 34-65 is more vulnerable as they have to manage a bigger family and are more prone to have higher CHE. Whereas people above 66 years are 11% more likely to have CHE as compared to people having age 34-65 years at a 10% threshold level. The same reasons hold for those who have made it up to 66. People who belong to the age group 11 to 33 years are 3% more likely to have CHE as compared to people having age 34-65 years at a 25% threshold level. Whereas people above 66 years are 4% more likely to have CHE as compared to people having age 34-65 years at a 25% threshold level. People belong to the age group 11 to 33 years are not likely to have CHE as compared to people having age 34-65 years at a 40% threshold level. Whereas people above 66 years are 1% more likely to have CHE as compared to people having age 34-65 years at a 40% threshold level. As explained above in descriptive analysis that the middle group of 34-65 is more vulnerable as they must manage a bigger family and are more prone to have higher CHE. The same reasons hold for those who have made it up to 66.

Provinces have a significant and positive association with CHE at 10%, while Significant but negative at 25% and 40%. According to the region-wise analysis, KP is 10% more likely to have CHE as compared to Punjab at a 10% threshold level. Sindh is 7% more likely to have CHE as compared to Punjab at the 10% threshold level. On the other hand, Baluchistan is not likely to incur CHE as compared to Punjab at the 10% threshold level. At the 25% threshold level, KP is not likely to CHE as compared to Punjab. Sindh is 2%, and Baluchistan is 3% less likely to have CHE as compared to Punjab at the 25% threshold level. KP is 1%, Sindh is 1% and Baluchistan is 2% less likely to have CHE as compared to Punjab at a 40% threshold level. Again, Punjab and Sindh provinces are relatively more stable, whereas KP presents the most vulnerable province. The government in KPK has identified universal Health coverage and hopefully, this will be managed to an extent. Whereas for Baluchistan it appears to be an affordability issue.

Compared to people living in urban areas, people living in rural areas have significant chances to face CHE. People living in rural areas are 18%, 3%, and 0% more likely to have CHE as compared to the urban area at threshold levels 10%, 25%, and 40% respectively. Divorced individuals are 22% more likely

to have to CHE as compared to married individuals at the threshold level of 10%, which is obvious because of lack of resources and assets.

Table 5: Determinants of Catastrophic health expenditure using Probit Regression

Dep. Var: Dummy			
Variables	**10%**	**25%**	**40%**
Age			
11-33	0.101***(0.008)	0.038***(0.005)	0.003(0.003)
34-65			
>66	0.112***(0.200)	0.043***(0.012)	0.014*(0.007)
Province			
Punjab			
Khyber-Pakhtunkhwa	0.110*** (0.009)	-0.002 (0.005)	-0.010***(0.003)
Sindh	0.074***(0.008)	-0.023***(0.004)	-0.016***(0.002)
Baluchistan	-0.002(0.011)	-0.039***(0.005)	-0.020***(0.003)
Region			
Urban			
Rural	0.180***(0.008)	0.036***(0.004)	0.007**(0.002)
HHH Gender			
Male			
Female	0.000(0.022)	-0.007(0.011)	-0.005(0.006)
HHH Marital Status			
Married			
Unmarried	0.007(0.021)	0.005(0.011)	0.005(0.008)
Widow/Widower	0.030(0.020)	0.015(0.012)	0.004(0.007)
Divorced	0.226***(0.066)	0.051(0.043)	0.022(0.027)
HHH Employed			
Yes			
No	0.139(0.125)	0.080(0.085)	0.162(0.100)
HHH Employment status			
Paid employee			
Employer, employing less than 10 persons	-0.073***(0.024)	-0.019(0.013)	-0.007(0.007)
Employer, employing 10 or more persons	-0.122***(0.030)	-0.038***(0.013)	
Self employed non agriculture	-0.008 (0.008)	0.001(0.004)	-0.002(0.002)
Contributing family member	0.123* (0.072)	0.043(0.044)	0.006(0.024)
Own cultivator	-0.009(0.013)	-0.004 (0.006)	-0.006(0.003)
Sharecropper	-0.033*(0.018)	-0.011 (0.009)	-0.013***(0.004)
Contract cultivator	0.027 (0.029)	0.013 (0.016)	0.007 (0.010)
Livestock	0.010 (0.027)	0.042**(0.017)	0.025** (0.012)
HHH Educated			
Yes			
No	0.092***(0.007)	0.017***(0.004)	0.007***(0.002)
No. of Observations	19526	19526	19325
Prob > Chi^2	0.0000	0.0000	0.0000
Pseudo R^2	0.059	0.028	0.024

delta method standard error in parentheses and Coefficients are Marginal effect dy/dx, ***p<0.01, **p<0.05, *p<0.1

The relationship found between household head Employment category and CHE is found significant but negative in most of the cases except contributing family members at 10% and people work for livestock at 25% and 40%. Employing less than 10 persons, are 7% less likely to have CHE as compared to a paid employee at a 10% threshold level. In contrast, Household head employers, employing less than 10 persons are not likely to have CHE as compared to paid employees at 25% and 40% threshold levels. Employers, employing 10 or more persons are 12% and 3% less likely to have CHE as compared to paid employees at 10% and 25% threshold levels. Self-employed non-agriculture employees are no likely to

have CHE as compared to paid employees at 10%, 25%, and 40% threshold levels. Contributing family members are 12% more likely to have CHE as compared to paid employees at a 10% threshold level. On the other hand, contributing family members are no likely to have CHE as compared to paid employees at 25% and 40% threshold levels. Own cultivators are no likely to have CHE as compared to paid employees at these three threshold levels. Sharecroppers are 3% and 1% less likely to have CHE as compared to paid employees at 10% and 40% threshold levels. On the other hand, sharecropper is not likely to have CHE as compared to paid employees at a 25% threshold level. Contract cultivators are not likely to have CHE as compared to paid employees at these three threshold levels. Individuals having livestock are not likely to have CHE as compared to paid employees at a 10% threshold level. On the other hand, individuals having livestock are 4% and 2% are more likely to have CHE as compared to paid employees at 25% and 40% threshold levels respectively.

Education has a significant and positive relationship with the CHE at all threshold levels. Uneducated-headed households are 9%, 1% and 0% are more likely to have CHE as compared to an educated-headed household at these three threshold levels. Finally, being uneducated has a positive and significant relationship with CHE because of lack of knowledge and awareness. Another reason could be that uneducated people won't be financially stable to bear high medical expenses.

Overall, the Chi-square with a probability of 0.00 shows that this model fits the data well and is significant at 10%, 25%, and 40% threshold levels. Pseudo R-square with values 0.05, 0.02, 0.02 indicates that this model is statistically significant, coefficients are significant and better than the model with no predictor at these three threshold levels.

6.2. Results of Quantile Regression

Table 6 reports the result of quantile regression We have used the 25^{th}, $50^{th,}$ and 75^{th} quantiles. This illustrates that for all the quantiles of the sample identified as committing CHE under the assumption of Health Expenditures being more than 10% of non-food expenditures.

Age has a significant but negative relationship with Health Expenditures. The person's age lies between 11-33 years as compared to 34-65 years the log of health expenditure decreases by the magnitude (for 25^{th} quantile it decreases by 0.304, for 50^{th} 0.272 and 75^{th} 0.244). When individuals' age increases to more than 66 years as compared to 34-65 years the log of health expenditure does not change significantly for all the percentiles. This means the CHE does not significantly reduce after the mid-thirties. Under the quintile regression dispersion regarding belonging to different groups has been controlled. So, it's the age group which is indicating that for relatively younger people the risks are less as compare to older both groups.

The log of health expenditure decreases if a person belongs to KP as compared to Punjab with a magnitude of coefficient 0.014, 0.102, and 0.161 for 25th, 50th, and 75th quantile respectively. This means people with high health expenditure will be more affected by living in KP. Whereas the log of health expenditure decreases if a person belongs to Sindh as compared to Punjab with a magnitude of coefficient 0.302, 0.472, and 0.681 respectively for 25th, 50th, and 75th quantile. The log of health expenditure decreases as a person belongs to Baluchistan as compared to Punjab with a magnitude of coefficient 0.024, 0.036, and 0.171 respectively for 25th, 50th, and 75th quantile. The log of health expenditure decreases in case a person lives in a rural area as compared to an urban area with a magnitude of around 0.3 for all quantiles. This means people living in a rural area and spending moderately will be more affected.

However, in the case of Household head marital status, unmarried household head-based families have lesser expenditure as compared to married household head households by 0.206 for the 25^{th} quintile and

0.098 for the 50th. Whereas in the case of the 75th quintile the household head household being unmarried have an insignificant difference with those households whose household heads are married. In the case of Household head marital status being widow/widower household, head-based families have lesser expenditure as compared to married household head households by 0.257 for 25th quintile and 0.172 for 50th. Whereas in the case of the 75th quintile the widow/widower household head the household have insignificant difference with those households whose household heads are married. In the case of the household head being divorced difference is insignificant for all quantiles. The log of health expenditure does not show any significant difference with the household head being unemployed as compared to employed HHH for all quantiles. The results are in line with the Probit estimations.

Table 6: Determinants of households facing catastrophic expenditures at 10% threshold using Quantile Regression

Dep. Var: Lnhexp			
Variables	**25%**	**50%**	**75%**
Age			
11-33	-0.304***(0.032)	-0.272***(0.029)	-0.244***(0.033)
34-65			
>66	-0.032 (0.065)	0.117***(0.059)	0.045 (0.068)
Province			
Punjab			
Khyber-Pakhtunkhwa	-0.014 (0.035)	-0.102***(0.031)	-0.161***(0.036)
Sindh	-0.302***(0.034)	-0.472***(0.031)	-0.681***(0.035)
Baluchistan	0.024(0.050)	-0.036 (0.045)	-0.171***(0.052)
Region			
Urban			
Rural	-0.298***(0.029)	-0.318***(0.027)	-0.269***(0.030)
HHH Gender			
Male			
Female	0.015(0.090)	0.018(0.082)	0.108(0.094)
HHH Marital Status			
Married			
Unmarried	-0.206**(0.081)	-0.098**(0.074)	0.003 (0.085)
Widow/Widower	-0.257***(0.078)	-0.172**(0.071)	-0.094 (0.081)
Divorced	-1.075***(0.199)	-0.621***(0.182)	-0.834***(0.208)
HHH Employed			
Yes			
No	0.510(0.352)	0.365 (0.321)	0.051(0.368)
HHH Employment status			
Paid employee			
Employer, employing less than 10 persons	0.907***(0.128)	0.852***(0.117)	0.634***(0.134)
Employer, employing 10 or more persons	0.940***(0.187)	0.914***(0.170)	0.658***(0.195)
Self employed non agriculture	0.238***(0.035)	0.231***(0.032)	0.305***(0.037)
Contributing family member	0.363*(0.213)	0.501***(0.194)	0.233 (0.222)
Own cultivator	0.363***(0.048)	0.365***(0.043)	0.343***(0.050)
Sharecropper	0.327***(0.065)	0.316***(0.060)	0.415***(0.068)
Contract cultivator	0.471***(0.103)	0.385***(0.094)	0.337***(0.108)
Livestock	-0.240**(0.095)	0.258***(0.086)	0.311***(0.099)
HHH Educated			
Yes			
No	-0.282***(0.027)	-0.348***(0.025)	-0.345***(0.028)
Constant	9.271***(0.030)	9.873*** (0.027)	10.451***(0.031)
No. of observations	6514	6514	6514
Pseudo R^2	0.103	0.124	0.132

*** p<0.01, ** p<0.05, * p<0.1, standard error in parentheses

In the case of Household head employment status. At all quantiles results and significant and positively related to health expenditures. Which means irrespective of occupation, if people have some income then they will use it for medical purpose at all quantiles. being Employer, employing less than 10 persons, Employer, employing 10 or more persons, sharecropper, livestock and Contributing family member, the log of health expenditure does not show any significant difference as compared to paid employees for all quantiles. Whereas in the case of Self-employed non-agriculture, Own cultivator, and Sharecropper the log of health expenditure increases as compared to paid employees' case for all quantiles.

Lastly in the case of a household head being uneducated vs educated household head the log of health expenditure decreases by 0.282, 0.348, and 0.345 for the 25th, 50th, and 75th quintile respectively. This means uneducated people spend less on health as compared to educated people. Of course, Because if they wouldn't have much knowledge about the severity of the disease then they won't spend more or might go for short financing. It is totally in line with the Probit regression result.

To conclude, the results of the current analysis indicate that social and economic determinants are somehow responsible for the incidence of catastrophic health expenditures in Pakistan. Table 7 presents the comparison of these results with findings of the previous studies. The studies mentioned below have some similarities with the findings of the present study. For example, in the study of Aregbeshola and Khan (2018), common significant factors are age, education, geographical location, and socioeconomic status. Then again age and employment status in Cleopatra and Eunice (2018) are significant like the present analysis. Similar to this study, In Mulaga et al. (2021) economic status and area of residence are found significant too. Lastly, In Pal (2012) presence of children and elderly members, education, and rural area residents are similar significant factors.

Table 7: Comparison of empirical results

Author	Data	Significant Factors	Findings' Similarity
Aregbeshola and Khan (2018)	Harmonized Nigeria Living Standard Survey of 2009-2010	age, education, health insurance status, geo-political zone, type of health facility, and type of illness	Similar
Cleopatra and Eunice (2018)	Nigeria General Household survey 2015-2016	socio-economic status, age, dwelling, employment, and health status of family members	similar
Mulaga et al. (2021)	Integrated Household Survey of Malawi 2016-2017	hospitalizations, large household size, higher economic status, visiting health facilities, individuals lived in the rural and central region	Partially similar
Pal (2012)	Consumer Expenditure Survey 2004-2005	Family size, Presence of children and elderly members, education, people living in the rural area	Partially similar

7. CONCLUSION AND POLICY RECOMMENDATIONS

7.1. Conclusion

Catastrophic health expenditure is an escalating issue in Pakistan where many people cannot afford health care services when these expenditures increase up to a certain level. It should be the government's foremost objective to reduce the prevalence of CHE and to achieve this objective it is therefore important to analyze the determining factors of CHE in Pakistan. To find the determinants of CHE, we have used

the Probit and quantile models using different threshold levels and quintiles. We have also explored the incidence and intensity of CHE in Pakistan. The result of our research shows that individuals between age 34 to 65, KP province, people living in an urban area, Male HHH, Married HHH, Employed HHH, and individuals working as self-employed in the non-agricultural sector have high incidence and intensity to have CHE. On the other hand, people above age 60 years, individuals residing in Baluchistan, people living in a rural area, Female HHH, Unemployed HHH, Employer employing more than 10 persons have the least incidence and intensity to face CHE.

Specifically, the result of the Probit model shows that people between age 11 to 34, individuals above 65 years, individuals residing in rural areas, Educated HHH, people having livestock are significant and have more chances to suffer from CHE at these different thresholds. However, Divorced HHH and people living in KP have significant and more chances to get suffered at only a 10% threshold level. On the other hand, for people living in Baluchistan, Employer employing more than 10 persons and sharecroppers are significantly fewer chances to have CHE at these threshold levels. However, Employer employing less than 10 persons have significantly less chance to have CHE at only a 10% threshold level. Furthermore, KP is more likely to have CHE at a 10% threshold and less likely to have CHE at a 40% threshold. On the other side, Sindh significantly has more chance at the 10% threshold level and fewer chances to have CHE at the 25% and 40% threshold level.

The result of the quantile model shows the difference between households who have close to threshold health expenditures and those who are above in quantile references. The results show that in the case of the younger age group of 11-33 the household health expenditures reduce whereas for the higher age group it does not change significantly. This means the CHE does not significantly reduce after the mid-thirties.

Health expenditures decrease if for households belonging to KP, Baluchistan, and Sindh as compared to Punjab, but the difference is highest for Sindh. Rural areas present a case with lesser household health expenditures as compared to urban. There was no difference in health expenditures based on household head gender. However, in the case of Household head marital status, there are differences. Unmarried and widow/widower household head-based families have lesser expenditure as compared to married household head households. While in the case of the household head being divorced difference is insignificant for all quintiles.

Similarly, there is no significant difference with the household head being unemployed as compared to employed HHH for all quintiles. Almost similar results prevailed for Household head employment status in categories. Lastly in the case of a household head being uneducated vs. an educated household head the log of health expenditure decreases which may be a result of unattended medical conditions being lesser educated and lesser motivation to respond to a health issue.

7.2. Policy Implications and Recommendations

- Given that, the government's current spending on health is not sufficient. A sharp and immediate increase in health expenditures is recommended to achieve cost-effectiveness, efficiency, and equity in the health care system.
- Government should protect the poor from the health expenditure catastrophe but simultaneously it is also essential to protect non-poor or middle-income people from health expenditure shock. In this regard, some major reforms on health care financing and health policies are required to improve the efficiency and equity in the health care system of Pakistan.
- CHE is an emerging debate in Pakistan and the fact is that it can be overcome by providing health care protection. Catastrophic health expenditures call for an affordable health insurance mechanism or some small-scale health insurance programs to protect people against health

expenditure catastrophe. So apart from health care financing policies, there should be legislation for health insurance in Pakistan. It will also pave the way to universal health coverage.

- The poor and even middle-income groups lack access to satisfactory health care services. It is, therefore, necessary to monitor the performance of public as well as private health care services.
- policymakers and public researchers should upgrade household survey instruments to better capture the household health spending e.g. some health insurance-related variables etc.

7.3. Limitation of the study

There are few limitations of the study. First, the HIES data set used in this study only reports the direct health care cost of the households. It doesn't capture the payments paid by a third party. Secondly, some variables like Health insurance coverage, presence of a disabled person, HH member with chronic illness, etc. which were found significant in most previous studies were not available in the HIES dataset. Thirdly, some studies used the household capacity to pay method for the identification of CHE but a majority of the studies have used the same methodology (Out of pocket health expenditure method) to measure the presence of CHE in the households. Moreover, the current study used only the non-food expenditure approach. Because the incidence of households with CHE was higher in the non-food expenditure approach than the total expenditure approach.

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An Analysis of Women Employment Status in Household Decision Making: Empirical Evidence from Pakistan

ABSTRACT

The study aims at empirically examining the role of women's employment status towards their capability in household decision-making. Generally, it is believed that employment status creates a sense of empowerment and allows women to be more proactive and influential in their household affairs. The study objectively explores this aspect through a survey of employed and unemployed women from Punjab province (Pakistan). A multidimensional index has been constructed to evaluate women's involvement in household decision-making. Utilizing a "Generalized Ordinal Logit Model", the study finds that employed women hold a dominant position in their household decision making as compared to their unemployed counterparts. The proportional odd of higher participation in household decisions is found significantly higher in employed women as compared to unemployed women. Additionally, the study proclaims the income level of employed women, their marital status, their education, and the educational level of their fathers as significant in the deterministic framework of women's household participation.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

Generally received literature on women empowerment[1] appears to hold consensus that education and employment are the key factors for improving women's capability in shaping decisions (Stromquist, 2002; Dacosta, 2008; Roy, 2008; Murphy-Graham, 2008, 2010; Sadania, 2016; Bulte et al., 2016). These studies suggest women's education and employment as complementary factors towards their empowerment; whereby empowerment is judged by women's participation in household decisions. Education leads to build potential human capital needed by women to enhance their job getting capacity, which in turn allows them to take active decisions in their professional and private life. The education of women is argued as an important factor that makes women capable of taking a job and enhances their decision-making power in the entire sphere of their life (Sultana, 2011; Sundaram, 2014; Barman, 2018). Manifold studies focusing on women's empowerment rationalize the women's decision capability in terms of financial empowerment and autonomy (Soetan & Obeyan, 2019; Hung et al. 2012; Sultana et al., 2013; Sadania, 2016). Most of these studies come with an optimistic view and propagate that employed women enjoy autonomy in making financial, social, and political decisions in both their personal and collective capacity.

For example, in country-specific studies, Pitt et al. (2006) utilizing survey data examines the impact of participation in group-based microcredit programs on various decision-making of women. They come with the findings that women's autonomy in different decisions surges with their increase in participation in credit programs. More specifically, women participating actively in the labor market have higher women's empowerment in terms of household decision making, greater bargaining power, greater freedom of mobility, etc. Sultana (2011) investigate the relationship between women's financial autonomy and their decision-making power within their households. According to her findings, women with relatively higher education levels and financial autonomy are more likely to be involved in decision-making at the household level. Similarly, Sultana et al. (2013) measure and analyze empowerment between working and non-working women in terms of decision-making power within a household in the case of Malaysia. According to their findings, working women enjoyed greater power and freedom compared to non-working counterparts.

Besides the direct effect of employment status in household decision-making, empirics allows us to quote many indirect channels that can affect their decision-making power. For example, some studies channelize the effect of women's employment status on the decisions made by them through children's health and education (Phipps & Burton, 1998; Glick, 2002; Seebens, 2010). These studies argue that women's labor market participation exhibits positive effects on children's health and education that in turn places women in a better position within a household and therefore enhances their decision making-capacity.

Some received studies on the subject also probe employment status in terms of the nature of the job. For example, Sadania (2016) explores aspects of women's economic participation in household decision-making using the 2006 and 2012 rounds of the Egyptian Labor Market Panel Survey. The author finds that women working outside the home enjoy more autonomy and empowerment in taking personal decisions, whereas home-based work encourages women for joint decision-making.

Some others examined the role of location in women's employment status and empowerment relationship. For instance, Mahmood (2002) using survey data reports employed women in urban areas at par with their husbands in household decision making as compared to their rural counterparts. The study also reveals autonomy on the part of these urban employed women in terms of going outside alone in this relative

[1] Empowerment relate to measures model to rise in degree of autonomy and self-determination in people and communities in order to empower them to show their interests in a responsible and self-determined way, acting on their own guts (Kieffer, 1984).

framework. Similar results are reported in a study by Bradshaw (2013) in the case of Nicaragua. The study finds that urban employed women contribute more in income and ideology as compared to their rural counterparts, hence are placed at a stronger position in the household's decision making.

The brief appraisal of the studies on the subject in the opening part indicates that researchers have taken a keen interest to analyze the impact of women's employment on their involvement in household decisions regarding their occupational, geographical, and demographic credentials. Most of the studies come with an optimistic view and argue that employed women enjoy greater access to economic resources that enhance their involvement in household decisions. However, these studies mostly evaluate women's participation in household decisions in a unidimensional manner that cannot cover the subject with its full length. The current study takes the opportunity to contribute to the literature by capturing women's household participation in a multi-dimensional way. Our study tries to fill up the literature gap in two folds: Firstly, instead of taking the household decisions in common, we categorize the household decisions in four different dimensions. Secondly, by combining these dimensions into a composite index representing women's involvement in the household decision, we present an empirical model by offering a deterministic framework of attributes of this decision making.

The rest of the study is structured as follows. Section 2 presents the theoretical methodology. Section 3 illustrates a methodology that covers data collection, empirical model, and description of variables. Section 4 discusses estimated results and their interpretations. Finally, section 5 offers some concluding comments.

2. THEORETICAL AND CONCEPTUAL FRAMEWORK

Household decision-making is a very important theme to be addressed in corridors of research. The theme becomes more viable when it is evaluated for the role that women can play in such decisions. With the emerging role of women in various economic and social activities, researchers are keen to analyze women's involvement in household decisions regarding their occupational, geographical, and demographic credentials. The current study takes the opportunity to present some dimensions in which we can categorize household decisions. Additionally, it explores the role of women's employment status on their involvement in household decision-making.

2.1. Evaluating Women Involvement in Household Decisions

Household decisions can be analyzed in various dimensions (Kritz & Makinwa, 1999; Yusof, 2014; Kaur et al., 2018; Akram, 2018). Household decisions involve taking decisions regarding education, health, major purchases, consumption/saving plans, and marriage plans, etc. (Cornish et al., 2021). Some of these decisions are tied to the social norms while others rely heavily on financial or monetary indicators (Schubert et al., 1999; Pitt et al., 2006; Sultana et al., 2013; Majlesi, 2016; Sharma & Kota, 2019). Women's role and their involvement in household decisions can be judged based on the responsibilities (reliance) accorded to them in these decisions. It depends on whether their consultation is taken in making social or community decisions.[2] It also depends upon the financial autonomy they enjoy in making a certain type of family and personal expenditures. Based on the idea extracted from the discussion we can specify the following dimensions and indicators representing the degree of women's involvement and role in household decision making. These dimensions can further be aggregated into a composite index representing women's role in household decision-making. Table 1 summarizes these dimensions as followed:

[2] For example, if father is considered as a head of household and marriage decision of an elder or younger brother of a women must be taken. Women's role in this context is judged by the weightage given to her opinion or suggestion. Even his involvement is also judged by the decision of her own marriage, whether she has been given the option to accept or reject a proposal. Within a family or social setup this involvement can be extended to the decisions about whom to relate or unrelate, which family functions to attend or not, which social circle to retain or detain etc.

Table 1: Women's Involvement in Household Decisions (Dimensions)

Involvement in Family Level Major Decisions	
Indicators	• Family Marriage Decisions • Decisions regarding Family Expenditures • Exercising control on Family Resources
The margin of taking Independent Decision	
Indicators	• Purchasing Decisions • Traveling Decisions • Decisions regarding medical treatments
The margin of Managing Financial Resources	
Indicators	• Financial Independence • Authority to utilize and spend Family resources (For example: renting a family-owned house, selling a family-owned plot, etc.) • Authority to make marriage expenditures
Capacity to Define Social Circle	
Indicators	• Decisions regarding the expanse of social circle. • Decisions regarding visiting relatives and fellow friends.

2.2. Determinants of Women Involvement in Household Decision Making

2.2.1. Women Employment Status

Women's involvement in household decision-making and their autonomy relies on manifold factors. Objectively the employment status of women plays a pivotal role in this regard (Murphy-Graham, 2008, 2010; Sadania, 2016; Bulte et al., 2016). Employed women as compared to unemployed women can be more involved in household decision making based on two accounts: Firstly, their professional experience and external exposure generate a framing effect; as women are supposed to take many independent decisions at their workplaces, they potentially apply the same at their household level (Dacosta, 2008; Murphy-Graham, 2010). Secondly, their employment status allows them to have a reasonable stake in financial matters of their family, therefore their families provide them some margin to be involved in household decisions (Hung et al., 2012; Sultana et al., 2013; Sadania, 2016). One can hypothesize that women who are employed rather than unemployed are likely to be more involved in household decisions.

2.2.2. Age of Women

Age factor plays a key role in many theoretical models of economics. As a general principle, as humans grow in age, their responsibilities induce them to be more involved in decision-making regarding different affairs of their life. The case is not different for women, as women get mature with their age, they naturally are inclined to take more interest in household-level decisions. Hypothetically, women's involvement in household decisions should increase with their age (Thapa & Gurung, 2010; Brajesh & Shekhar, 2015).

2.2.3. Marital Status

Marriage itself implies a sense of responsibility and authority. Marital status can be thought of as a major determinant of women's involvement in household decisions (Amin & Pebley, 1994; Pitt et al., 2006; Fatima, 2013; Bertocchi et al., 2014).

Even if we compare the involvement of employed and unemployed women in household decisions, marital status can create a significant differential in this content analysis. This variable renders us a strong reason to place it among the potential determinants in our theoretical framework.

2.2.4. Education of Women

The education of women is nevertheless an important variable among the chain of determinants. Education broadens up our minds and always allows us to be more practical and substantive in our lives. This physical

feature of education cannot be ignored when it comes to analyzing women's participation in decision-making. Theoretically, higher education provides a solid reason to hypothesize a higher household participation (Sultana, 2011; Sundaram, 2014; Barman, 2018).

2.2.5. Household Size

Our family domain offers a potential reason for our participation and interest in practical matters of our life. A household accords a special role to each of its comprising units and this role can vary with the size of the household. We can physically become more influential and participative within a bigger household size because much more decisions are supposed to be taken in a bigger family domain as compared to a smaller family. Within the context of our discussion which primarily focuses on women's participation, we can hypothesize that women's participation/involvement in the household decision should increase with the increase in household size. Likelihood always exists for a hypothesis to be formulated oppositely, sometimes it happens that a bigger household size relieves us from being actively involved in decision making. Decisions are often taken by some prominent members or heads of the household which decreases our margin to be involved in decision making.

2.2.6. Education of Father

Sometimes our community norms serve as the biggest impediment in our way to practically apply ourselves. In custom-based societies like we have in many places in Pakistan, women's role in household decisions is subject to family norms and traditions. The so-called male domination at times supersedes every technical aspect which allows women a margin to take independent decisions. The education of the father plays a vital role in defining these customary traditions. It is believed that fathers who are more educated are potentially more capable of resisting these customary traditions are more likely to be supportive to women in making healthy decisions.

2.2.7. Income of Women

Income offers us an opportunity to take effective and independent decisions in our lives. Even within an agglomeration or a joint family set up income is impulsive in increasing our participation in decision making. As a general observation we have seen that when we contribute within a household, we are naturally inclined to be more interested in its decisions. Hypothetically, income provides a natural impetus for someone to be involved in household decision-making; the case must be considered as same for the income of women within a household (Hung et al., 2012; Sultana et al., 2013; Sadania, 2016).

3. OPERATIONAL METHODOLOGY AND EMPIRICAL MODEL

3.1. Data Collection

A survey method is employed to collect the data for the current study. Overall a sample of 300 women is selected for interview from district Jhelum in Punjab province (Pakistan).[3] The interviews are conducted based on a structured questionnaire which is designed under the guideline of some former studies (Mahmood, 2002; Pitt et al., 2006); Sultana et al., 2013; Akram, 2018) conducted in this context. The practical feasibility of our survey was constrained by the manifold factors: As our sampling unit was employed and unemployed females within a household, it was important to find respondents who were willing to participate in the survey. Within a customary and traditional environment that most females were subject to, the randomized framework was difficult to be employed. Therefore, we preferably utilize the snowball sampling technique to materialize our survey. Although the use of non-probability sampling is often discouraged but can be followed in cases where the expectations are that the sampling distribution from a non-probability sampling would not differ significantly from the sample drawn randomly (Richard

[3] The survey was conducted in initial half of year 2018. Although a sample size of 300 appears to be limited but is often justified in research which is part of M. Phil dissertation of students. Resource constraint on the part of students offers a big challenge in these types of works. Thus, small sample size can be considered as a limitation of this study.

and Verstraete, 2016). Besides this, the underlying objectives and nature of the study at times can be used as a justification of the sampling technique. If generalization of results is a complimentary requirement of the analysis, the use of non-probability sampling is limited and restrictive, but if the basic aim of the research is to propagate an explorative idea or framework upon which further research is provoked, generalization becomes secondary. As our research is aimed at construction and deterministic analysis of the multidimensional index of women's participation, the basic aim is to provoke further research in this dimension within the given context rather than generalizations of results. We can take a safe end by quoting a "Constraint on Generality COG" statement as proposed by Simons et al. (2017) which states that our results are representative of our targeted population rather than the universe of population.

3.2. Empirical Model and Variable Description

We have specified a few dimensions through which we can capture the women's involvement in household decision-making. The scores captured through various indicators within each dimension would help us to account for the level of their involvement as per the mentioned scheme. This approach is meaningful because it allows assessment within each dimension and can also be utilized as a variable in an aggregated manner.[4] The aggregated composite index is supposed to serve as a dependent variable in our empirical model. Based on the discussion we have made in our theoretical framework we would econometrically specify our empirical model in the following manner:

$$WIHD_i = \alpha_0 + \alpha_1 WES_i + \alpha_2 AGE_i + \alpha_3 MS_i + \alpha_4 IL_i + \alpha_5 HHS_i + \alpha_6 EW_i + \alpha_7 EF_i + \varepsilon_i$$

Where $WIHD_i$ represents the women involvement in household decision making, WES_i represents the representative respondent's employment status, AGE_i is indicative of the age of respective respondent in our sample, MS_i marks the respondent's marital status, IL_i is used for defining the income level of our representative respondent, HHS_i is abbreviated for household size to which our respondent belongs, EW_i specifically captures years of education, while EF_i represents the education level of the father of our representative respondent.

The nature and abbreviations of the involved variables are explained in following Table 2.

4. RESULTS AND DISCUSSION

4.1. Dimensions of Women Participation in Household Decisions

It is customary to focus on the results of the key variable first. As identifying female participation in household decision-making is the main objective of our study, we would attribute the first part of our result section to the discussion of our respondent's performance within each dimension specified for capturing this participation. Figures 1 to 4 graphically evaluates the performance of women in household decision-making within each dimension we have specified for evaluation.

[4] We have employed factor analysis to aggregate the individual scores of each dimension.

Table 2: Structure of Variables

Variable Name	Label	Scale (Level)	Criterion for Construction	Code/label
Women Involvement in Household Decision	WIHD	Ordinal (1-3)	If factor score > 66th Percentile	3 (High)
			> 33rd but < = 66th Percentile	2 (Moderate)
			If factor score < = 33rd percentile	1 (Low)
Income Level	IL	Continuous	Variable is constructed based on intervals; for example, anyone lying below 15000 monthly income is assigned a code of one, those who lie between 15000 to 30000 are assigned a code of 2 and successively higher codes for the higher fixed intervals	
Age	AGE	Continuous	With a minimum of 20 and a maximum of 56	
Years of Education of Women	EW	Continuous	With a minimum of zero and a maximum of 18.	
Marital Status	MS	Dichotomous	Married	1
			Unmarried	0
Women Employment Status	WES	Dichotomous	Employed	1
			Unemployed	0
Years of Education own by Father	EF	Continuous	With a minimum of zero and a maximum of 18	
Household Size	HHS	Continuous	Specified based on members in a household	

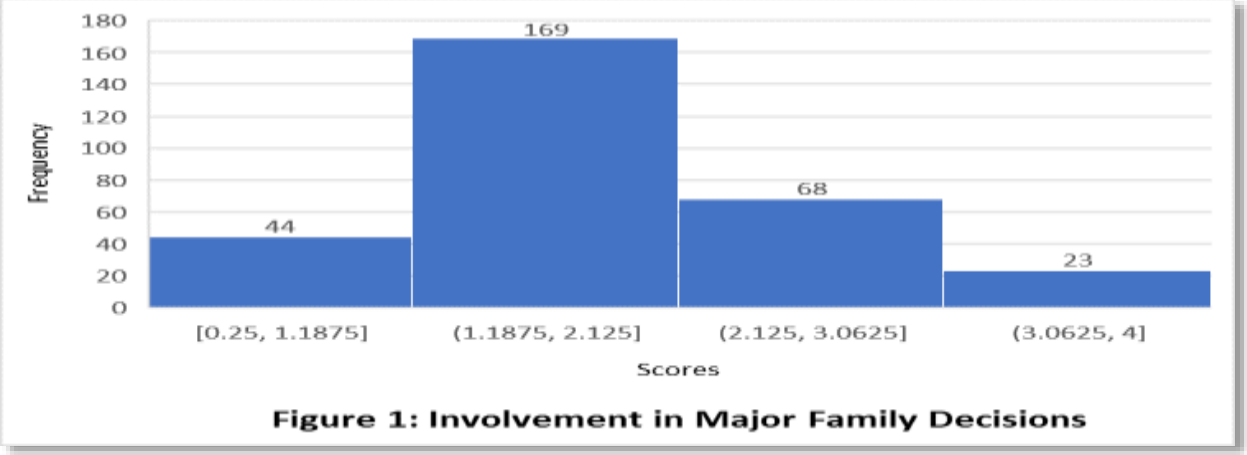

Figure 1: Involvement in Major Family Decisions

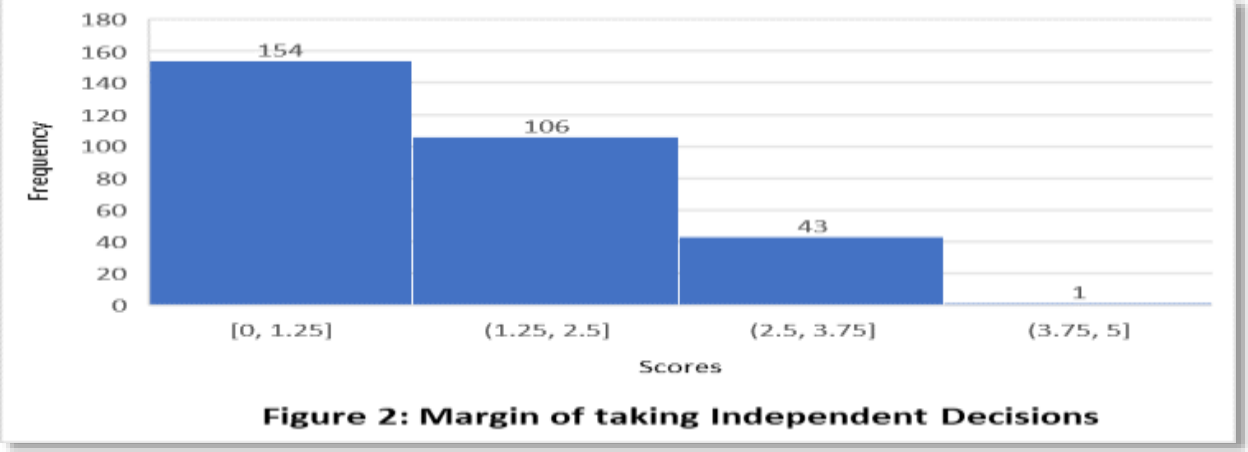

Figure 2: Margin of taking Independent Decisions

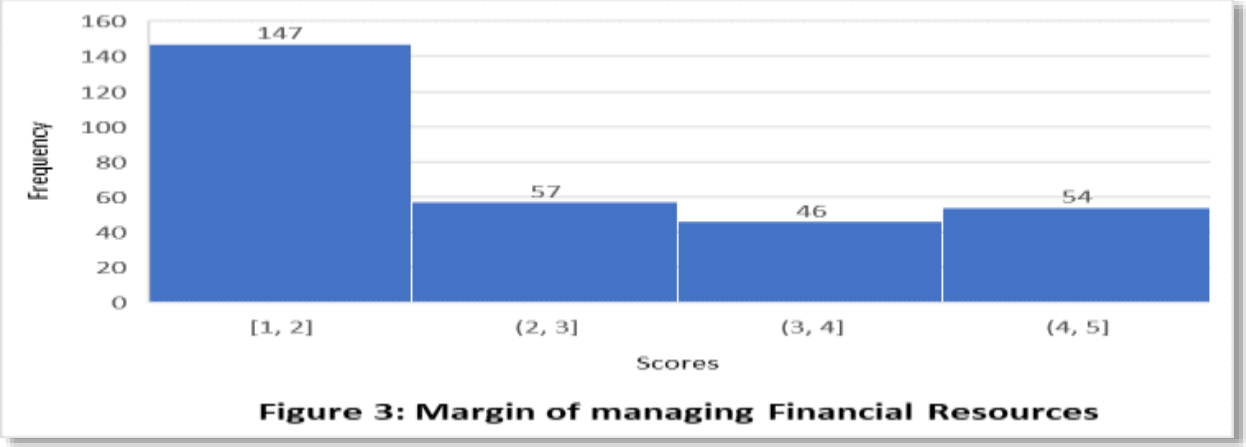

Figure 3: Margin of managing Financial Resources

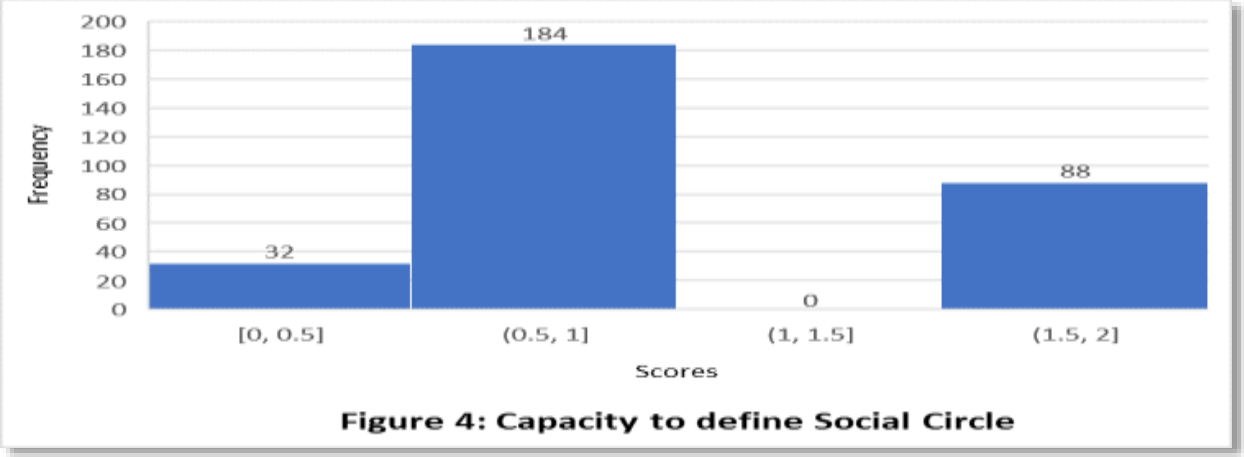

Figure 4: Capacity to define Social Circle

The visual inspection of acquired scores in each dimension reveals a relatively skewed distribution of scores towards the lower side. Almost all dimensions reflect that a higher number of respondents are concentrated more on the left side of the graphs which indicates relatively weaker participation of women in household decision making. If we compare the lower two spikes in all figures, we can see that almost 70% of respondents lie in this range for the first dimension, 85% lie in this region for the second dimension, and correspondingly 67% and 71% of respondents belong to this area for the third and fourth dimension. However, the weakest performance is observed in the second dimension which captures the margin of taking independent decisions. This result offers no surprise within a male-dominated society as we have in Pakistan. Best performance is observed in the third dimension which reflects women's authority or margin of managing financial resources. This result is also in line with the general patterns observed in our family structures; men within the household often put the responsibility of making and managing monthly budgets to their counterparts, especially matters pertinent to managing day-to-day expenditures.

4.2. Composite Index of Women Participation in Household Decisions

We have applied factor analysis on the aggregated scores of each dimension specified for capturing women's involvement in household decision-making. Factor analysis allows us to calculate the weights of each specified dimension in our theoretical framework and helps us to ascertain, how strongly each dimension represents the underlying construct of participation in household decision making. The preliminary requirements of factor analysis including sample adequacy test, interitem correlations,

explained percentage variation, and commonalities are reported in Appendix A. The factor loadings of each specified dimension are presented in the following table 3:

Table 3: Factor Analysis

Dimensions	Factor Loadings
Involvement in Major Family Decisions	0.854
The margin of Taking Independent Decisions	0.659
The margin of Managing Financial Resources	0.791
Capacity to Define Social Circle	0.716

For constructing a composite index from variable dimensions, it is important to identify that each dimension should represent the proposed construct. Factor loadings are used for the identification of this representation. Based on high values of factor loadings (above-recommended level of 0.5), we can regard our specified dimensions as truly representing a common construct. These factor loadings statistically depict the strength of intercorrelation between the specified dimensions. We have used these factor loadings to extract the factor scores which are further categorized on a percentile basis to construct an ordinal measure of our dependent variable. The said scheme has already been sketched in the first panel of Table 2.

4.3. Results of Empirical Model

Our finally composed dependent variable is ordinal with three categories representing a high, moderate, and low level of female participation in household decisions. This specification of dependent variable demands employing ordinal logit model for estimation of our empirical model. However, a preliminary requirement for employing the ordinal logit model is that the coefficients of independent variables should remain constant across ordinal categories or levels of dependent variables, this is often called parallel line assumption or proportional odd assumption (Brant, 1990; Bender & Grouven, 1998). We have tested this assumption for our model but have failed to reject the null hypothesis in our case, therefore we have employed an alternative technique proposed in the literature (McCullagh & Nelder, 1989; Peterson & Harrell, 1990; Fu, 1998; Williams, 2006) known as "Generalized Ordinal Logistic Regression". An advantage of this approach is that it enables us to calculate the separate coefficients of independent variables corresponding to variable categories of dependent variables, thus removes the possibility of any potential bias that could be created by enforcing parallel line assumption.

Table 4 comprises two panels; Panel 1 compares the lowest level of women's involvement with the higher two categories representing moderate and high levels of women participation. While Panel 2 compares the lowest two ordinal ranks (low and moderate) with the highest rank of our specified ordinal dependent variable. If we compare these two panels; the differential of coefficients and odds ratios is observed only for those variables which violate the proportional odds assumption, the coefficient of variables that meets this assumption remains the same across the two panels. If we take a formal inspection of table 4, most of the independent variables are found significant in terms of their likely impact on the dependent variable of our empirical model. The following part of the discussion focuses on interpreting each variable in terms of its sign and magnitude represented by the odds ratio.

Women employment status (WES_i) is the first significant regressor among the potential candidates specified in our model. Both panels suggest that females who are employed rather than unemployed are more likely to lie in higher ranks of participation in household decisions. The proportional odd of higher participation is 7.39 times higher for employed women as compared to unemployed women as per results of panel 1, while it is 2.75 times higher as per reported results of panel 2. The result is in line with the theoretical intuition we portrayed in our theoretical framework (Schubert et al. 1999; Pitt et al. 2006; Sultana et al. 2013; Majlesi 2016; Kaur et al., 2018). Employment status accords a potential margin and competitive advantage to the working females to have more stakes in their families, therefore are more likely to participate in household decisions. Hung et al. 2012; Sultana et al., 2013; Sadania, 2016 came with the same

findings. The second regressor titled 'Age' is found to be insignificant in terms of its likely impact when we compare the combined effect of the higher two ranks of female participation with the least rank (see panel 1). However, the likely impact is observed as significant when we compare the highest level of women's involvement with the combined effect of ordinally lower levels (see panel 2). The proportional odds of getting more involved in household decisions is 1.10 times higher for females belonging to higher age groups. Evidence is found on a positive relationship between the age of women and their level of involvement in household decisions. This result is also in line with our hypothesized proposition.

Table 4: Estimated Results of Generalized Ordinal Logistic Regression

Dependent: Women Involvement/Participation in Household Decisions	**Estimate** $(\hat{\beta})$	**Z- Statistics**	**Odds Ratios** $\exp(\hat{\beta})$
Panel 1: Low Vs Moderate and High level			
Women Employment Status (Base: Unemployed)	2.0009	5.01***	7.3957
AGE	0.0275	1.24	1.0279
Marital Status (Base Unmarried)	1.3293	4.13***	3.7786
Education	0.1908	2.58**	1.2102
Household Size	-0.4668	-2.3**	0.6269
Income Level	0.2819	3.3***	1.3257
Father's Education	0.1697	2.84***	1.1849
Panel 2: Low and Moderate Vs High level			
Women Employment Status (Base: Unemployed)	1.0115	2.52***	2.7499
AGE	0.1009	4.65***	1.1062
Marital Status (Base: Unmarried)	1.3293	4.13***	3.7786
Education	0.1908	2.58**	1.2102
Household Size	-0.4668	-2.3**	0.6269
Income Level	0.2819	3.3***	1.3257
Father's Education	-0.0113	-0.19	0.98876

Source: Author's own calculation. ***, **, * represents the significance at 1%, 5% and 10% respectively.

Marital status is nonetheless an important determinant of female household participation in our empirical model. Both panels suggest that married women are more likely to be involved in household decision-making as compared to unmarried women. The likelihood probability of falling in the highest ranks of participation is 3.78 times higher for married women as compared to unmarried women. The result offers no surprise especially when we compare the responsibilities accorded to the married life as compared to the unmarried life and are in line with earlier studies on the subject (Pitt et al. 2006; Fatima, 2013; Bertocchi et al. 2014).

Education is yet another significant determinant of women's household participation in our model as shown by results in table 4. More educated women are having a higher likelihood to belong to the pool having higher participation. Education provides a sense of maturity and confidence to assess manifold aspects of our lives. It makes us courageous and decisive and helps us take many decisions which we could not take in the absence of rationality offered by educational levels. As per reported results of both panels, the proportional odd of higher participation is 1.21 times higher for women having higher education as compared to lower levels. The results are in line with the findings of Mahmood (2002), and Pitt et al. (2006) that women having higher education are more capable to participate actively in household decision-making.

We have hypothesized household size as a factor that can affect women's participation either positively or negatively within a family context. Our results reveal that a bigger household size serves as a negative

determinant of female participation in household decisions. The negative coefficient of these variables suggests that women are less likely to be highly participative in household decisions within a bigger household size as compared to smaller household sizes. The proportional odd of higher participation is (1-0.63 = 0.37) times lower within a bigger household as compared to the smaller household. The result can be rationalized based on the conventional family structures we have in our country. Our family structures are often criticized for less decision-making margins offered to the females. When household size increases, it negatively affects the already existent scant probability for women to have their due share in decision-making.

The income level of a female is also hypothesized as a potential indicator that can affect their participation in household decisions. Our results verify that income level is a positive and significant determinant of female participation in household decisions. Women who earn relatively high-income level as compared to low or no income are 1.32 times more likely to highly participate in household decisions as compared to less participation. These results are reported in both panels of table 4. Monetary aspects prove to be consequential in almost every affair of our lives and income marks the defining margins of our stakes in these affairs. The more contribution one can make in a family setup via income, the more stakes he or she can possess within that setup. This allow margin not only to be involved in the major family decision but also allows the person a margin to take independent decisions as per his/her stakes. Our result regarding the income level of females is indicative of this factual and practical aspect of our life.

Father's education is proposed as another key determinant of women's participation in household decisions. The direction of the relationship shown by the sign of coefficient in table 4 is in line with the proposed scheme in our theoretical framework. However, the results are found significant when we compare the combined effect of higher two ranks of participation with the least rank while insignificance is observed when we compare the highest category of participation with the combined effect of preceding lower categories. Overall, from the significant results found in panel 1 of Table 4, we get an impression that high levels of father's education impart a subtle positive impact on women's participation in household decisions. Women whose fathers are highly educated hold a higher odd of falling in high ranks of participation rather than low ranks. The odd ratio is found 1.185 times higher for women having a highly qualified father as compared to those whose fathers are less qualified. Community setups and cultural barriers often serve as a big impediment to the empowerment of women. Education is the only means which can penetrate through these barriers and provides you the courage to resist the traditional setups. Within this context, our result provides us evidence that educated fathers hold more potential to breach the customary norms.

5. CONCLUSION

As discussed in the opening part that the study aims to examine the role of women's employment status on their involvement in household decision-making. Keeping in view the subject matter of study, we have developed a multidimensional composite index that can represent women's involvement in household decision-making. Based on the index, it is observed that women are heterogeneous in terms of their performance on variable dimensions. We have summarized the values of the composite index by ordinally categorizing it into three categories namely, high, moderate, and low levels of female participation in household decisions. The empirical estimation has been carried out with generalized ordinal logistic regression. A sample of 300 women has been drawn from rural and urban areas of district Jhelum in Punjab province (Pakistan). The findings of the study reveal that employed women hold a dominant position in their household decision-making as compared to their unemployed counterparts. This indication is derived from the fact that the results of both panels of our estimated Generalized ordered logit model suggest that females who are employed rather than unemployed are more likely to be in higher ranks of participation in household decisions. Touching the results thoroughly, the proportional odd of higher participation is 7.39 times higher for employed women as compared to unemployed women if we compare the lowest level of

women's involvement with a moderate and higher level of women's participation. Whereas, it is 2.75 times higher if we compare the lower and moderate levels of women's involvement with the highest rank of our specified ordinal dependent variable. Apart from employment status, other characteristics of women like income and education also affect women's involvement in household decision-making. Women holding higher levels of income and education are more likely to be involved in household decision-making as compared to women holding a relatively lower level of income and education. Additionally, we find that married women are more likely to be involved in household decision-making as compared to unmarried women.

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Appendix A

Table A.1: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.302	57.548	57.548	2.302	57.548	57.548
2	0.707	17.671	75.219			
3	0.631	15.784	91.004			
4	0.360	8.996	100.000			

Extraction Method: Principal Component Analysis

Table A.2: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		**0.730**
Bartlett's Test of Sphericity	Approx. Chi-Square	299.360
	Degree of Freedom	6
	Sig.	0.000

Table A.3: Communalities

	Initial	Extraction
Dimension 1	1.000	0.729
Dimension 2	1.000	0.434
Dimension 3	1.000	0.625
Dimension 4	1.000	0.513

Table A.4: Anti-image Matrices

		Dimension 1	Dimension 2	Dimension 3	Dimension 4
Anti-image Correlation	Dimension 1	**0.672[a]**	-0.242	-0.505	-0.270
	Dimension 2	-0.242	**0.822[a]**	-0.070	-0.150
	Dimension 3	-0.505	-0.070	**0.702[a]**	-0.129
	Dimension 4	-0.270	-0.150	-0.129	**0.813[a]**

a. Measures of Sampling Adequacy (MSA)

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Effect of Foreign Assistance on the Economic Growth of Recipient Countries of Asia

ABSTRACT

This study examines how foreign aid affects the economic growth of developing countries in Asia. The data is collected from 1984 to 2013 from nine developing Asian countries. It is experienced that foreign aid and its influence on economic growth demonstrate significant ambiguity about the sign and magnitude. This study accentuated the policy role and the role of political stability for foreign assistance on countries' economic growth. This work establishes foreign aid contributes to growth through good governance, employing fixed effect in a static-panel context. It also supports the evidence of a negative relationship between foreign aid and economic growth. The finding suggest noticeably that foreign aid is growth-enhancing if there is a better policy situation along with political stability.

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Author's contribution in the article: 1- Conceived and designed the analysis, 2- Reviewed and compiled the literature, 3- Collected the data, 4- Contributed data or analysis tools, 5- Performed the analysis, 6- Wrote the paper, 7- Financial support for the conduct of the study, 8-Other

1. INTRODUCTION

Foreign aid performs a noteworthy role in the development of developing nations. In a true sense developing nations are capital famished and dependent on foreign assistance for supporting their socio-economic development schemes. It may include sectors like education, internal and external security, area of production, to reduce poverty, and construction projects. The main objective of foreign aid is economic growth and the betterment of the people, however political concerns cannot be ignored either.

The basis behind foreign support programs is, to support the less developed countries because it helps them for economic growth and welfare. Neoclassical theory of growth, mentions "Countries that start with low endowments grow faster than resource-rich countries''. So, foreign assistance may enhance the country's growth but if foreign assistance is used accurately. Empirical work about foreign aid and economic growth has unalike results, few researchers indicated that foreign aid is growth-promoting but other marked negative foreign aid relationships with economic growth (Griffin, 1970). The followers of aid, support in this way that it is very helpful for low-income countries to attain their advanced levels of economic growth because through aid these countries can utilize domestic resources in the best way (Dowling & Hiemenz, 1983). Moreover, foreign currency reserves are less in quantity, so foreign assistance helps to reduce the saving gap (Papanek, 1973). Although conferring the "gap theory" by (Chenery & Strout, 1966), foreign assistance can boost economic growth as it frequently surges foreign exchange (Islam, 2005; Easterly, 2003). On the other hand, (Radelet et al., 2005) found that countries that receive aid use it for consumption. So, these countries are aid-dependent. According to (Gomanee et al., 2005), aid receiver nations do not use this foreign assistance constructively and do not invests it because of the fungibility of aid. Therefore, we find enormous work about the aid-growth relationship but still, there is a gap for new work especially for underdeveloped South Asian countries.

This work examines the importance of aid for economic growth. It also determines the role of political stability and economic policies. Shreds of evidence demonstrated that a large amount of aid had been delivered to developing Asian economies but economic expansion is inactive. Because this foreign assistance has not been used appropriately. Weak economic policies and corrupt government are its major causes. (Burnside & Dollar, 2000) have conferred the effectiveness for the recipient countries. It is clarified that aid is more effective concerning policy variables when it is associated with good policies or governance. So, both economic policies and political stability are considered significant indicators for foreign assistance. This study identified that aid will be growth-enhancing if a country holds with political stability and sound economic policies.

This paper determines, "foreign aid encourages economic growth. It also analyzes the role of political stability and policy for aid to encourage growth". This study comprises developing Asian economies including the Philippines, Pakistan, China, Thailand, India, Bangladesh, Malaysia, Indonesia, Sri Lanka. The analysis is constructed on a static and dynamic panel framework. We evaluate the role of policy and political stability of the recipient country for aid on economic growth through panel data analysis. Moreover, simultaneous equation system-based analysis has been involved for policy, political stability, aid, and growth. However, these variables are often determined together. Further endogeneity in the growth equation is checked by instrumental endogenous variables by lag explanatory variables.

The significance of this work is to find the relation between foreign aid and growth imparting the role of economic policy and political stability conditions of the selected Asian countries. The reason for selecting these countries is that these countries intensely depend on foreign assistance, with instability in government and inappropriate economic policy systems. It is suggested that with the help of stable government and efficient policy measures, it can help to attain the desired outcome through foreign aid. It also analyzes, foreign assistance is growth-promoting when there is sound economic policy and recipient countries hold

political stability. Our results also reveal that when we introduce the variable of policy and political stability in the growth equation, we find a positive relationship between aid and growth. It suggests policymakers put keen attention towards political stability and create a better policy environment if they want to utilize external assistance for development purposes.

This study is ordered as follows: section 1 comprises an introduction, section 2 reviews existing literature, section 3 on data and methodology. Further section 4 contains empirical results and section 5 conclusion.

2. LITERATURE REVIEW

The role of Foreign aid for economic growth is a controversial area in the literature. Prior studies hold different views and empirical results on this topic. Work for aid started by (Chenery & Strout, 1966) with the "Two Gap Model" presented, the economic rationale behind foreign assistance, contended that due to lower financing strength developing nations could not achieve desired economic goals. This is because of an adequate level of saving to fill this gap, the developing nations have to accept foreign assistance.

For Bangladesh, Islam (1992) found a weak positive relationship between aid and economic growth. Asteriou (2009) has used both panels Mean Group (MG) and Pooled Mean Group (PMG) methods for five South Asian countries and conclude a positive aid-growth relationship.

Hansen & Tarp (2000) has observed aid enhances economic growth and these outcomes are not restricted to good policy. Although (Hansen & Tarp, 2000) study "three generations" cross country regression who demonstrate the finding as for first-generation, how aid affects domestic savings if it has a positive effect then its growth-promoting. Further second-generation assesses the association of aid and growth with the investment. The third one with the only relationship between aid and growth accomplishes a positive effect. Moreover, Gomanee et al. (2005) showed by their empirical work, aid contributes indirectly to the promotion of economic growth, it works through investment. Aid supports economic growth empirically explored by (Islam, 2005). Many analysts (Dowling, 1998) (Tendulkar, 1971) depict, foreign aid sometimes has no or maybe very debauched outcome concerning the recipient countries.

Moreover, the role of fiscal strategy for aid is observed by (Collier & Dollar, 2001; Burnside & Dollar, 1997, 2000, 2004). They have determined that the positive influence of assistance is conditional on the fiscal tactic of recipient countries. Although the importance of good governance and political stability for aid to improve growth is also remains a matter of concern. (Knack, 2001) depicts that assistance that is given for training and technical purpose leads to improve institutional proficiencies, which in turn increase the efficacy of governance and growth. (Bauer, 1976) has exposed that inflows of aid can protract corrupt behavior, make moral hazard along with a destabilization of their institutions, further burdened foreign debt. Work by (Islam, 2007) maintains that aid helps to promote growth for which stability of government (better political environment) is a necessary condition. (Dollar & Levin, 2006) introduced that donor countries provide financial assistance to those nations which have suitable economic environments.

Prior literature elucidates mixed results about both aid and growth relationship. This inconsistency may be due to different reasons: it may be by time, region, and methodology-specific differences. The researcher applied different economic techniques to figure out how does aid works to develop the economy. (Feeny et al., 2014) used the Nonlinear three-stage least square method on fragile economies and finding enclosed as aid is not used constructively by Papua New Guinea Government. (Basnet, 2013) has used a simultaneous equation system for five south Asian countries, by using variables including foreign aid, domestic savings, and economic growth. Although there exists an interest for new work in the literature thus through this paper tries to add new research work on the role of economic policy and political stability for aid focusing, developing Asian countries, because these countries heavily depend on foreign assistance. (Yakubu et al.

2020) studied determinants of economic growth in Kenya which explores capital openness and financial development hinders economic growth. While political stability positively influences economic growth. It has been determined; foreign aid is a debatable issue because foreign aid has not provided desirable results (Jia & Williamson, 2019).

A call for a rise in development assistance to developing economies expressed that aid is fundamental to equitable progress suggested by The United Nations Sustainable Development Goal (2016). External financing provokes economic growth (Bird & Choi, 2020) so it is important to consider external sources of finance to enhance economic growth. But this study fails to provide desirable results on the impact of foreign aid on the economic growth of developing economies. (Azam, 2021) explores that foreign aid tends to boost economic growth without discrimination of income groups. It is also suggested that for low-income countries exports tend to increase economic growth and in low-middle-income countries, economic growth is increased through foreign aid and foreign direct investment. For upper-middle-income countries, foreign direct investment upsurges economic growth while foreign direct investment does not contribute to raising economic growth.

Conferring to the neoclassical growth theory, nations that work with low endowments nurture faster than developed countries. In production functions where labor and capital are input, introduce foreign aid as input. The Production function is written as follows:

$$Y = f(L, K, A) \tag{1}$$

Here Y is the gross domestic product in real terms, L is labor input, K is used for domestic capital stock, and A is used as an abbreviation of stock of foreign aid. If foreign stock is used effectively, it leads to economic growth. The country will grow faster and move towards economic and social development. As the foreign stock is used for investment purposes. It increases the domestic capital which is the primary source of economic development. The empirical study of (Gomanee et al., 2005) showed that aid contributes indirectly to the promotion of growth, it works through investment. it also helps to reduce the saving gap of a country. In developing nations individuals have less capability to save, that's why the investment process in these countries is slow down. Worked by (Papanek, 1973) depict that foreign currency reserves are less in quantity in these nations so foreign assistance is the source to reduce the foreign exchange as well as the saving gap.

Moreover, if this assistance is given to educate people and make them technically advance which will be helpful for a country to make their labor skilled. Skilled labor is a growth-promoting agent. Along this good policy and strong governance are needed to use the foreign assistance effectively otherwise in most countries, foreign aid just increases consumption. (Radelet et al., 2005) provides evidence, countries use aid for consumption purposes. Thus, the analysis of good policy and better governance for aid provide strong evidence about the importance of both. There is the significance of stable government and suitable economic policy, aid to promote growth. For such a purpose, steady government stability is an obligatory condition, donor countries provide financial assistance to only those countries having a stable economic environment proposed by (Islam, 2007), (Dollar & Levin, 2006). We find the answer about the significance of governance and economic policy, how both are necessary for the effective use of foreign assistance.

3. DATA

Within the framework mention in the previous section the relationship between growth and aid should have the following structure:

$$Y_{it} = \alpha_i + \sum_{i=1}^{t} \beta_i X_{it} + \mu_t + \varepsilon_{it} \tag{2}$$

Where Y_{it} is the per capita GDP of a country i and period t, α_i, and μ_t is the country-specific effect and period-specific effect, ε_{it} is an error term. In the vector, X_{it} contains growth determinist, includes physical capital, budget deficit, labor-force participant, human capital, inflation, and endogenous variables include aid, policy, and political stability. In the aid model, equation 3, includes the following variables:

$$Aid_{it} = \delta_0 + \delta_1 GGDP_{it-1} + \delta_2 \log(POP)_{it} + \delta_3 HK_{it} + \delta_4 POL_{it-1} + \delta_5 A_{it-1} + \varepsilon_{it} \quad (3)$$

The dependent variable is Aid/GDP ratio and on the left side, there is a lag of growth GDP per capita and log of policy index, a log of population, human capital, and the lagged aid variable. In literature, considerable limits of aid are described, where most important are strategic interests of donors and aid is given to low-income countries with small populations. (Schneider & Frey, 1985) have established the obligation of the World Bank and assistance is related to better policies. The policy equation 4 is written as:

$$POL_{it} = \alpha_0 + \alpha_1 TO_{it-1} + \alpha_2 BD_{it} + \alpha_3 INF_{it} + \alpha_4 GGDP_{it-1} + \alpha_5 A_{it-1} + \varepsilon_{it} \quad (4)$$

The policy equation 4 contains TO as Trade openness (import + export/GDP), BD as the budget deficit and INF is inflation. To cope with endogeneity, this equation 4 is instrumented by, lagged value of GGDP and lagged Aid. We are expecting a positive coefficient for trade openness and growth of GDP whereas a negative coefficient for the budget deficit and inflation.

$$PS_{it} = \beta_0 + \beta_1 ED_{it} + \beta_2 DEM_{it} + \beta_3 GGDP_{it} + \varepsilon_{it} \quad (5)$$

In this equation 5, we took proxies as ED for education, it is considered as an opinion. In the countries where people have aptitude and trends toward education, it leads to good governance (see, Mina & Ndikumana, 2008). DEM stands for democracy dummy and GGDP as the growth of GDP. Political stability for low developing countries is an obligatory condition for aid to indorse economic growth.

This study has empirically estimated the aid-growth relationship of growth recipient countries from 1983 to 2013. The developing countries in this study include Malaysia, Pakistan, the Philippines, Thailand, Bangladesh, China, India, Indonesia. Foreign aid is given to Asian countries to boost economic growth and the nation's development. World Development Indicators is the data source of desire variables like GDP per capita, growth of GDP, aid (Official development assistance) population growth, labor force participation, human capital. To solve the economic size problem, we took the ratio of the variables like foreign aid to GDP ratio. The human capital variable is taken as the Average year of schooling (25+) and further political stability from ICRG. We have employed the GMM method to handle endogeneity among variables. According to Boone (1994), Hansen and Tarp (2001), Rajan and Subramanian (2005), economic growth and foreign aid have an endogenous relationship which implies that aid itself depends on the income level of the recipient economy and its economic policies. Considering that economic growth also depends on aid inflows can increase the reverse causality problem in the aid-growth relationship. As suggested by many studies, instruments variables can be used to minimize endogeneity problems in panel data. While analysis, we can overcome the endogeneity issue by taking lags of variables.

We have followed Burnside and Dollar (2000) to assess the effect of foreign assistance on the economic growth of recipient countries of Asia. We have used Principal Component Analysis (PCA) for index construction. Following the literature, we have added inflation, budget surplus, and trade openness as policy variables to construct a policy index for recipient countries. The following equation represents the construction of index whereas α_1, α_2, α_3, show the weights of the first components of PCA:

Policy Index = α_0 + α_1 (TO) - α_2 (BD) - α_3 (INF)

The signs of each variable represent the economic association of that variable with economic growth.

By applying the panel data estimation technique. First, calculate the values of each equation 3, 4, and 5 separately (political stability, aid, and policy), and then minimize the endogeneity bias, the predicted values of these endogenous variables (aid, policy, and political stability) are used in the growth equation. By using panel data estimation (GMM), need to clarify that the individual effect is taken as common or fixed, or random. We compared the common effect model and fixed effect, the Redundant fixed model, by the Hausman test. Fixed effects model and random-effects model as this method tackles the issue of endogeneity if any exist. We applied the Redundant Fixed Effects tests to check whether intercepts are common or not across the cross-sectional entities.

Further, we introduce the aid-policy interaction term and the aid-political stability interaction term in the growth equation and estimated separately both interaction terms in the growth equation by fixed effect. The next step to finding the relation of aid and growth excluded the political stability and policy variable. Further endogenous variables aid, political stability, and policy are incorporated in the aid equation and estimated with lag economic growth per capita in the dynamic panel data model.

4. RESULTS

Table 1 represents the results of Equations 3, 4, and 5. Apply the fixed-effect method using the Panel data estimation technique. Column 2 (AID-EQ, Model-1) shows the results of the aid equation, GGDP, Aid is given to low-income countries. Aid is associated negatively with the population. The negative coefficient of the population shows that if the population increases, per capita aid decreases. The coefficient of variable human capital is negative which indicates that as the human capital of the country increases aid tends to decrease. Countries with technical advance human capital are fewer aid recipients. Further to explore whether aid is allocated in favor of good policy we have introduced a policy index as mentioned above. Following (Burnside & Dollar, 2000) aid policy interactive terms imply the effectiveness of aid in the existing macroeconomic policy environment.

Column 2 (PS-EQ, Model-2) reports the result of equation 4. There is a positive association between education and political stability, these results are not similar (Barro, 1996). A democratic form of government is supposed to be more appropriate for political stability rather than another form of government and better economic conditions are anticipated to be positively correlated with stable politics. Education and growth have a positive relationship at a one percent significance level. The effect of educational quality on economic growth is significantly higher in countries that have been fully open to international trade as compared to countries that have been fully closed. Moreover, the quality of the institutional environment and quality of education is important for economic growth. It has been observed, knowledge capital on growth is largely in the countries where the institutional framework is organized hence education quality and institution can reinforce each other. The macroeconomic impact of education depends on complementary growth-enhancing policies and institutions (Hanushek, 2020).

Table 1: Results of Aid, Policy and Political Stability Equation

	AID-EQ (Model-1)	**PS-EQ (Model-2)**	**POL-EQ (Model-3)**
Constant	0.0111*	2.5411***	1.2821***
	(0.097)	(0.0071)	(0.0092)
lGDP	-0.0130		-1.51E-12
	(0.0090)		(0.0001)
HK	-0.0090		
	(0.0071)		
LPOP	-0.0020*		
	(0.068)		
EDU		0.0139***	
		(0.0080)	
GGDP		0.0798***	
		(0.0093)	
DEM		0.1480	
		(0.1430)	
TO			0.0201**
			(0.040)
BD			-0.0202***
			(0.0020)
INF			-0.1801***
			(0.0080)
lPOL	-0.3420e-3		
	(0.5110)		
lAID	0.9030***		-5.02E-12*
	(0.0012)		(0.0901)

Note: Significance level 1%, 5%, 10% are represented by ***, **, * respectively. Values in parentheses are P-values.

Results of Equation 5 (POL-EQ, Model-3) are presented in column 4. In policy index independent are regressed on GDP per capita growth, followed by (Islam, 2005) and (Burnside & Dollar, 2000). Policy index implies the effectiveness of aid in the policy environment.

The Policy index = 1.2821 + 0.0201*TO - 0.0202*BD - 0.1801*INF

Budget deficit and inflation have a significantly negative effect on economic growth. High inflation and budget deficit decrease productivity growth and the upsurge inflation leads to a reduction in capital investment. Trade openness with a positive effect explains, increase in trade openness upsurges economic growth, the findings are not similar (Redmond & Nasir 2020). In Table 2 we will discuss the results with interaction terms.

In column 2 (AID-EQ, Model-1) interaction term aid with political stability: aid has a positive impact on economic growth. It makes clear aid is growth encouraging when countries hold with a stable government. The results represent, political stability is a necessary condition to enhance growth consistent with the findings of (Islam, 2005) and (Ramadhan, 2016). According to the results growth per capita increases 0.1070 percent due to a one percent increase in aid. Moreover (United Nations, 2016) suggested that aid is the key element to the economic progress of developing countries.

Other variables like trade openness are significant with the positive sign which directed us to more open countries to develop, these outcomes do not match with the findings of (Yakubu et al. 2020) who only studied one country Kenya. (Harrison, 1996) proposed democratic nations develop more rather than another system of government (Barro, 1996). The human capital variable in all three models is insignificant. This relationship specifies that in Asian countries economic growth may not depend on a higher level of education, because the economies of these states heavily depend on the agrarian sector. Other variables budget deficit and inflation are negative and significant. Stable macroeconomic policies for example low inflation and less budget deficit are assurance to enhance growth. Moreover, the stock of physical capital is essential for economic growth. These countries heavily depend on physical labor because the physical capital is significant and positive towards growth. Political institutions are grave to the growth of an economy in a financial reform policy which ultimately leads to a conducive environment for financial development and economic growth. Asian countries with a better democracy have vast market based financial systems. The established democratic environment reduces political risk, eventually leads to economic growth through financial development.

Table 2: Results of Growth, Policy and Political Stability model

	PS	**POL**	**AID-GROWTH**
Dependent variable	**GGDPc (Model-1)**	**GGDPc (Model-2)**	**GGDPc (Model-3)**
Constant	-53.3901***	-56.4001***	-66.4010***
	(0.0010)	(0.0081)	(0.0024)
Aid	0.1070*	-20.9410***	-0.3711***
	(0.0790)	(0.0061)	(0.0054)
TO	0.0130**	0.0160	0.0322
	(0.030)	(0.670)	(0.240)
BD	-0.2111***	-0.2411***	-0.2661
	(0.0023)	(0.0024)	(-45.56)
INF	-0.1880***	-0.1730***	-0.0010***
	(0.0010)	(0.0097)	(0.0067)
HK	-1.2110	-1.2980	-1.1622
	(-0.8722)	(0.8171)	(0.65)01
PK	6.6201***	7.0301***	7.6661***
	(0.0011)	(0.0073)	(0.0011)
DEM	1.0401*	0.0511	0.7890
	(0.0601)	(41.721)	(11.540)
Aid * PS	5.3490*		
	(0.041)		
Aid * POL		2.6920	
		(72.87)	
R^2	0.555	0.494	0.460
Adjusted R^2	0.524	0.46	0.420
T-Test	17.8	15.3	13.1
P value	0.001	0.001	0.001

Note: Significance level 1%, 5%, 10% are represented by ***, **, * respectively. Values in parentheses are P-values.

The aid-policy interaction term which is incorporated in column 3 (GGDPc Model-2) shows a negative relationship. It indicates that better economic policy holding countries have an extensive volume of aid. Our results are consistent with (Islam, 2007) and (Armah & Nelson, 2008), that foreign assistance is growth encouraging when countries are politically stable in government. (Azam, 2021) also confirmed that foreign

aid helps to enhance economic growth without any discrimination of income groups, not consistent with our findings.

In model 3 (AID-GROWTH, GGDPc) column 4 the two variables policy and political stability drop from the model and run the regression with simply aid and growth. We find aid has a negative relationship, elaborates that if nations want to utilize their external resources there must be government stability and a better economic policy environment. Our findings support the evidence of a negative relationship between aid and growth (Bird & Choi, 2020). Table 3 incorporate the fixed effect static and dynamic growth model results.

Table 3: Results of Static and Dynamic Growth Model

	Static Growth Model (Model-1)	**Dynamic Growth Model (Model-2)**
Dependent variable	**GGDPc**	**GGDPc**
Constant	-59.4401***	-20.6010***
	(0.0011)	(0.0012)
lGDP		-0.479***
		(0.0023)
Aid	0.9261*	0.1532*
	(0.060)	(0.0703)
Pol	0.3360*	0.3601*
	(0.073)	(0.0303)
PS	0.9801*	10.3811***
	(0.3720)	(1.5702)
HK	-1.800***	-0.0530
	(0.0071)	(0.871s)
PK	6.4601***	0.7621
	(0.0021)	(0.7601)
DDEM		12.8110***
		(0.0014)
Lab	0.0520	
	(0.661)	
R^2	0.40	0.250
Hausman (P-Value)	0.13	
Sargan J test (P-value)		0.001

Note: Significance level 1%, 5%, 10% is represented by ***, **, * respectively. Values in parentheses are P-values.

Column 2 in table 3 (Static Growth Model, Model-1), presents results of the Fixed Effect model-static panel estimate. It includes the estimated value of three variables (political stability, aid, and policy) further include growth's traditional variables as physical capita, labor force participation, and human capital. The result shows that aid, policy, and political stability are significant with a positive effect on growth, findings are in line with (Yakubu et al. 2020). Good policy is a necessary condition for growth but itself (policy) does not give satisfactory outcomes for aid to enhance growth but coupled with political stability it works meaningful. The coefficient of human capital is negative and significant, specify human capital declines growth. In column 3 (Dynamic Growth Model, Model-2) we extended it by taking lag on the right-hand side to handle endogeneity and used the generalized method of the moment. The lag explanatory variables are used as instruments and the Sargan J test confirms the validity of the instruments. Aid has a positive coefficient and further policy and political stability are positive and significant. It has been inferred that foreign aid provokes economic growth while (Bird & Choi, 2020) found undesirable results on the impact

of foreign aid on the economic growth of developing economies. However, our findings of foreign aid and economic growth are in line with (Azam, 2021) without any discrimination of income groups.

5. CONCLUSION

This study aimed to find the effect of foreign assistance on the economic growth of recipient countries of Asia using data set of 1984 to 2013. From empirical findings it is clear, with fixed-effect aid is growth-promoting in Asian countries. Growth is conditional on good policy and a stable political environment. Indeed, the findings are consistent with (Islam, 2007) that political stability is necessary for aid to encourage growth. By introducing aid political stability interaction term, we found the aid is significant and positive to growth. This indicates that if a country wants to get the desired outcome from external resources it holds with good political conditions. In our results for the static Fixed Effect model, we found growth has a positive and significant association among aid, policy, and political stability. These results indicate that for better use of external resources a country must hold better economic policies and good political conditions. Moreover, as we skip the two variables (policy and political stability) from the growth equation the aid coefficient becomes significantly negative. That makes sure these two variables are important for aid to promote growth. Aid with a negative and significant sign points out if countries want to best utilize their external resources there must be political stability and a better economic policy environment. Our finding supports the evidence of a negative aid growth relationship in line with (Bird & Choi, 2020). We conclude the whole study as the effect of aid can be positive or negative, but few factors may play a significant role to enhance growth, for the countries utilize external resources for development purposes.

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