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ENERGY PRICES AND ITS IMPACT ON HOUSEHOLD CONSUMPTION IN PAKISTAN

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Abstract

The objective of this research paper is to analyze the energy prices and their impact on household consumption in Pakistan. Time series annualyy data for period of 1972-2018 was used in this study. The data was collected from World Development Indicators, Pakistan Economic Survey,2020 and Asian Development Bank. Household energy consumption was dependent variable while independent variables include energy prices, urbanization, per capita income and investment. We applied unit root test to check stationarity among variables and also used ARDL approach and Bound Test to determine long run relationship. Our results reveal that there is a negative relationship between energy prices and household energy consumption in Pakistan. We suggest that Pakistan should use renewable resources to generate electricity and to reduce its growing cost.

Keywords: Energy prices; Household Consumption; Urbanization.

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1.Introduction

In developing countries like Pakistan, energy is considered one of the most significant sectors because most of the economic activities are relied upon it. Energy development is directly related to well-being of people beside business success throughout the world. It improves the lives of people (Ramchandra and Boucar (2011). The foremost two components of the worldwide energy situation are rapid population increase and thus the rise within the living standard associated with entire societies. Per person, energy consumption is taken into consideration as the degree of per-person income also as the welfare of any nation (Rai (2004)). Energy is also a source of fuel for productive activities such as agriculture, trade, manufacturing, industry, and research. Again, low energy supply results in poverty and hunger and reduces economic growth and prosperity (Azerbaijan, etc. (2012). Oil is an important factor in maintaining economic growth and well-being in oil-importing countries like Pakistan. Energy is likely to be one of the biggest concerns of this century, especially in the age of globalization, as energy dependence is growing rapidly. The central axis of traditional growth theory is labor and capital because they are the key drivers of production, ignoring the importance of energy in the development process (Stern and Cleveland, 2004). Research also suggests that energy plays an important role in the production and consumption functions of countries in the middle stages of economic development (IEA, 2005).In the context of globalization, the increasing demand for energy and dependence on energy suggests that for every country, energy is considered the most important issue globally in the

next century. Along with the energy cycle in all these sectors, almost all economic sectors are interconnected, so almost every change in the energy price range has had a huge impact on the economy as a whole (khan. et al. (2012). This is precisely why commodity prices are considered more important than regular prices. In developing countries like Pakistan, this issue is considered as a major concern. The energy demand is expected to increase across Pakistan due to growing population industrial expansion in the future (Haider, et al. (2013)). However, fair prices are considered a necessary prerequisite for promoting energy efficiency and achieving sustainable development (Erbeckel (2008)). Energy prices reform policies face serious economic, political and social challenges and complement the country, with unintended consequences. One among the main drawbacks of uniformly applied subsidies and price reform is that households don't enjoy subsidies alike and don't answer equivalent changes in prices and income. Importers of energy prices reform consider implicit or explicitly a homogeneous and robust response to changes in domestic energy prices. Therefore, increasing energy prices eliminates effective solutions to social and economic issues produced due to lack of energy resources. However, removing domestic subsidies doesn't have a big impact on energy use and therefore the environment, especially if households with high energy consumption have less flexibility in demand for domestic energy consumption. Additionally, the subsidy policy could also be backward because the share of energy in low-income households is above that of high-income households (Zhang, 2011). Energy price reforms may include paying compensation to households to scale back the impact of

upper households and improve income distribution. However, if this pattern doesn't significantly reduce energy consumption, the country would have to face adverse economic conditions like inflation and unemployment and poverty. In order to evaluate the impact of energy price reform it's important to gauge the elasticity of energy demand insight of the relative domestic view. Pakistan's electricity demand has increased dramatically within the past five years. Quite half of the demand is from Punjab, which is the most populous province of Pakistan. In Punjab, the electricity demand often exceeds the available power supply by a couple of gigawatts, which is about 30% of the entire installed capacity. As a result, many businesses, industries, and houses have installed diesel generators, Solar Panels, Ups,etc, as backup, and the people are paying high cost of electricity consumption. Buzinska (2014) states that the inflation of energy sources like fuel, gas, and electricity harms the welfare of consumers. Therefore, cost and income are the foremost important determinants of consumer welfare, the consequences of which are never considered in Pakistan's energy consumption. Due to fluctuations in energy prices, it's difficult for oil-importing countries to manage its balance of payments. Before every major economic downturn, energy shocks increase and rising energy prices create inflation. Central Bank just increases interest rate to cool down inflation (Harris et al., 2009). Pakistan's energy needs are increasing rapidly, and within the last 15 years it has increased by 80%. Pakistan relies heavily on traditional sources of energy to meet its energy consumption needs. Conventional non-renewable energy sources meet quite 99% of the energy requirements (Sheikh, 2010). However, the government of

Pakistan aims to get 5% of total installed electricity by alternative / renewable energy by 2030 and this task is assigned to the Energy Commission (Khalil et al., 2005). Pakistan is located on the highly insulated belt which offers a comparative advantage in the developing solar energy. But it needs huge investment. This is the reason that fossil fuels are being used widely (Awan and Saeed Akhtar, 2015). The oil industry particularly refinery sector is most protected and monopoly sector which is refining petroleum products in traditional way and their cost of products is very high. This is one of the reason of high oil prices in Pakistan (Awan and Anjum,2015). The petroleum products having high sulpher particles produce environmental emission and damage vehicles. We can see the high level of emission in Pakistani urban areas. The number of vehicles have increased many fold during last one decade and low quality fuel being used in these vehicles also producing high level of pollution and spoiling clean environment (Awan, 2013).

1.1 Main research Problem

The main research problem of this study is to study energy prices and measure their impact on household consumption in Pakistan because shortage of energy is a serious problem for the country and its people. Low availability of power vis-à-vis growing demand is hampering economic growth and causing low productivity in different economic sector. So we have decided to explore the cause of this problem and suggest its possible solution.

1.2 Objective of the study

The main objective of the study are given below:-

- To estimate the impact of energy prices on household electricity

consumption in Pakistan.

- To estimate the impact of personal income on household electricity consumption in Pakistan.
- To estimate the impact of urbanization on household electricity consumption in Pakistan.

1.3 Scope of the study

This study is important for policymakers and individuals to make their decisions regarding use of energy efficiently and reduce its cost by applying alternate energy resources. It will highlight how much people of Pakistan are suffering due energy load-shedding and high cost of electricity. Though this study is specific to Pakistan but its results can be generalized to all countries facing energy shortage and spending most of its tax revenue on the import of oil.

2. Literature Review

Many previous studies explored the welfare effect of rising energy prices like, Conrad and Schroder (1991); Davoodiand Salem (200) and Beznoska (2014) argued that consumers are adversely affected by the increase in petroleum product prices. But there's no relevant study for Pakistan that calculated the welfare cost of energy consumption. We briefly reviewed some relevant studies to analyze the impact of energy prices on household consumption.Feeney (2005) conducted a study to estimate the impact of energy price and the economic process of Papua New Guinea. The study supported statistical data over the amount 1965 to 1999. The study used the GDP as a dependent while energy prices, trade, investments, and governance

as independent variables. The ARDL (Autoregressive distributed lag) model. The results indicated that energy prices have a negative relationship with the GDP growth while trade and investment have positive impact on the economic process. Moreover, the author concluded the bad governance in Papua New Guinea caused the inefficiency energy prices. Azam et al (2009) examined the impact of household consumption on the economic growth of Pakistan and India. The period of the study was from 1971 to 2005. The OLS Method was used to draw the results about market size, domestic investment, physical infrastructure, household consumption and trade openness. The study concluded that market size, trade openness and domestic investments have positive impact while household consumption has negative impact on the economic grow of both Pakistan and India.Akram (2011) studied the impact of energy prices on the economic development in Pakistan and the study used the GDP per capita to capture the economic growth. The study used the time series data from 1981 to 2009 and estimation was done by using ARDL econometric technique. The study produced many favourable results because it gave focused on short run also as end of the day period of time. The appliance ARDL technique pointed that for aid has negative impact on the GDP per capita of Pakistan for both short run and end of the day time periods. Mbah and Amassoma (2014) examined the connection between energy prices and financial development in Nigeria over the age of 1981 to 2012. For exact examination OLS and Johansen Cointegration tests connected and these strategies demonstrated that energy prices is contrarily identified with financial development (GDP) of Nigeria. There are always fiscal defects that

stale the financial development of Nigeria however this nation tremendously profit by foreign assistance that's how or another capable cover the sparing and out of doors trade hole. The author proposed use of mechanical, political and monetary changes build up the proficiency of administration and remote guide put resources into advancement plans will enhance the economic process of Nigeria.Rehman (2007) estimated the import price for Pakistan using 31 annual observations for the period 1975 to 2005. Johnson's test was performed to examine the system's common potential distribution. The author uses the equation login line to apply the equation and finds that discriminatory equations have a greater effect. The study found that long-term profitability and flexibility in trade prices were significant, but that domestic prices were not significantly linked to Pakistan's demand. In the short term, import flexibility for all three variables was not found to be significant.Yue (2010) studied the function of import price for C ڈی te d'Ivoire using thirty observations per year for the period 1970 to 2007 and using the Autoresponder Distribution Business Model approach. Make a profit. All changes can be made using the logarithmic form. The study confirms the effect of zero demand relative to demand, price, financial investment, exports and price. The results show that there is high flexibility in exports and investment and is a key factor in long-term import demand. A brief analysis shows that consumers in the quota device have a better understanding of costs than exports and capital expenditures. Evidence suggests that the country's demand for imports is negative because the relative cost capability is not important, both long and short.

3. Data and Methodology

3.1 Source of Data

The goal of this study is to find energy prices and its impact on household consumption in Pakistan. The study used time series data for the period from 1972 to 2018. The data of selected variables was obtained from World Development Indicators, Asian Development Bank, Pakistan Economic Survey and the State Bank of Pakistan.

3.2 Analytical Techniques

3.2.1 Unit Root Test

The time series data mostly follows some trend such as consistent downward or upward. There are many factors behind it such as seasonal impact, trade cycle, weather conditions or many other economic fluctuations. The accuracy of estimation of model depends on the specific characteristics of data such as mean and variance of variables are constant. There are greater chances of spurious regression if the data has upward or downward trends and non-stationary condition. Unit root tests are widely used to check the stationarity level of data such as ADF (Augmented Dickey Fuller), DF (Dickey Fuller), PP (Phillips-Perron), etc. These tests enable us to understand the level of stationarity whether it is at level, first or second difference. It helps us to choose the appropriate estimation techniques that lead to error free outcomes. ADF is widely used as unit root test and it pinpoints the existence or nonexistence of unit root in the time series data. The outcomes of the test

show wehther the data is stationary at level, first different or at second difference.

The Augmented Dickey Fuller used the t statistics and it is compared with the critical value. There is enough evidence to reject the null hypotheses if critical value is less than the calculated value that indicates the stationarity of data (Gujarati, 2003). Here are the general mathematical equations of Augmented Dickey Fuller test,

$$\Delta y_s = \varpi y_{s-1} + \sum_{s=1}^{\sigma} \alpha_i \Delta y_{s-p} + u_{ns} \quad (1)$$

$$\Delta y_t = \beta_o + \varpi y_{s-1} + \sum_{s=1}^{\sigma} \alpha_i \Delta y_{s-p} + u_{ns} \quad (2)$$

$$\Delta y_t = \beta_o + \varpi y_{s-1} + \beta t + \sum_{s=1}^{\sigma} \alpha_i \Delta y_{s-p} + u_{ns} \quad (3)$$

The levels and critical values of ADF test is shown in Table 1.

Table 1: Critical Values for Unit Root *t* Test, No Time Trend

Significance Level	Critical Values
1%	-3.63
5%	-2.94
10%	-2.61

The expressions

$$H_0 : \beta = 0$$

$H_0 : \beta < 0$

Ho indicates the null hypothesis and alternative hypothesis denotes by H_1 and its general expression for ADF test is given below:-

$$H_1 : \beta \neq 0$$

3.2.2 Phillips-Perron test

Phillips-Perron test is used as unit root test and it provides the insight whether the data is stationary at level, first difference or at second difference. It covers the higher order correlation so that its results are more reliable rather than the ADF test. The error term create problem in ADF test because it is fixed and uncorrelated. First time PP test was introduced by Perron and Phillips in 1988 and it mathematically form is as follow,

$$\Delta Y_{p-1} = \beta_o + \delta y_{p-1} + \varepsilon t \qquad (4)$$

PP test used the t statistics and it is compared with the critical value. There are enough evidence to reject the null hypotheses if critical value is less than the calculated and it indicates the stationarity of data (Gujarati, 2003). Table 2 shows the critical values of PP test

Table 2 Critical Values for Unit Root *t* Test, No Time Trend

Significance Level	Critical Values
1%	-3.63
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$$H_1 : \beta \neq 0$$

3.3.3 The ARDL Approach

ARDL (Autoregressive Distributed Lag) technique is developed by Pasaran and Shin in 1999. It was later improved by Pasaran et al (2001). According to him, ARDL is more suitable than other techniques such as Johanson integral and VECM (Vector Error Correction Model). It can also be applied to small sample sizes and the procedure is flexible. Because of this possibility, we adopt the ARDL model. It shows short-term and variable-to-variability consistency trends. Variables are made up of variance distributions that represent one series over different periods. This technique is used when the variable is displayed statistically mixed at level I (0) and the first difference I (1). The equation of ARDL model is given below:

$$Y_t = \alpha_0 + \alpha_{1t} + \sum_{i=1}^{p} \theta_i Y_{t-1} + \beta' X_t + \sum_{i=0}^{q-1} \beta_i \Delta X_{t-1} + u_t \quad (5)$$

$$\Delta X_t = P_1 \Delta X_{t-1} + P_2 \Delta X_{t-2} + \ldots\ldots\ldots\ldots + P_i \Delta X_{t-i} + \varepsilon t \quad (6)$$

εt and μt are error term and θi is coefficient of the lagged dependent variables.

3.3.4 Model Specification

The econometric model is applied on the basis of unit root test. The econometric model of our study is given below,

$$Yt = \beta o + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \varepsilon$$

$$EHC = \beta o + \beta 1PI + \beta 2EP + \beta 3I + \beta 4URBAN + \varepsilon$$

Where:

EHC = Household Electricity Consumption

PI = Personal Income

EP = Energy Prices

I = Investment.

URBAN = Urbanization

ε = Error Term

We have shown our model in the following equations:

$$EHC = \beta o + \beta_1 P1 + \beta_2 EP + \beta_3 I + \beta_4 URBAN + \beta_5 FP \quad (7)$$

The long run and short run ARDL model is given below:-

$$EHC_t = \beta_0 + \sum_{t=1}^{a} \lambda_1 EHC_{t-1} + \sum_{t=1}^{a} \lambda_2 PI_{t-1} + \sum_{t=1}^{a} \lambda_3 EP_{t-1} + \sum_{t=1}^{a} \lambda_4 I_{t-1} + \sum_{t=1}^{a} \lambda_5 URBAN_{t-1} + \mu_t \quad (8)$$

$$EHC_t = \beta_0 + \sum_{t=1}^{a} \lambda_1 \Delta EHC_t + \sum_{t=1}^{a} \lambda_2 \Delta PI_{t-1} + \sum_{t=1}^{a} \lambda_3 \Delta EP_{t-1} + \sum_{t=1}^{a} \lambda_4 I_{t-1} + \sum_{t=1}^{a} \lambda_5 \Delta URBAN_{t-1} + \mu_t \quad (9)$$

4.Empirical Analysis

4.1 Descriptive Statistics

Descriptive Analysis is completely explained in the table 3.

Table: 3 Results of Descriptive Analysis

	PI	I	EHC	FP	URB
Mean	70.67796	0.789774	4.471680	6.564472	4.406146
Median	71.30300	0.403102	4.537050	5.385173	2.777670
Maximum	71.79700	4.168545	7.189716	45.46371	35.03011
Minimum	68.91800	-0.951217	1.711578	6.251123	0.279995
Std. Dev.	1.120337	1.423207	1.541002	10.61181	6.767553
Skewness	0.701449	0.924098	0.212313	1.783952	3.387830
Kurtosis	1.732340	2.878961	2.002007	7.134009	15.30006
Jarque Bera	104.2733	100.0556	34.30867	869.7491	5751.694
Probability	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	49474.57	552.8416	3130.176	4595.131	3084.302
SumSq. Dev.	877.3541	1415.837	1659.906	78714.77	32014.05
Observations	47	47	47	47	47

Source; Author's calculation based on E.views 9.5.

The table 3 has 47 observations of all variables. EHC, PI, I, EP, and URB. The dependent variable is EHC which measure the household energy consumption, whereas the EP measures energy prices, and others variables are I, PI, URB. The mean value of EHC is 4.47 with standard value of 1.54 the mean value of PI is 70.67 with standard deviation is 1.12. I mean value is 0.78 with standard

deviation is 1.42. The mean value of EP is 57.74 with standard deviation 7.76 and mean value of URB is 4.40 with standard value is 6.76.

According to the Bulmer (1979), our variables can positively or negatively skewness. After checking the skewness of the variables, we can check the kurtosis which tells the central peak of the variables. By the kurtosis we check central peak of the variables and in the above table kurtosis shows wider peak and thicker tail i.e. Leptokurtic. Therefore, it is confirmed that most of the values are concentrated around the mean.

4.2 Correlation Matrix

The correlation among the variables are shown in table 3. Correlation represents the strength of the relationship among variables. It shows no multicollinearity in the model. The variables show weak as well as strong relationship. The Correlation Matrix is shown in table 4.

Table: 4 Correlation Matrix Results

	PI	I	EHC	URB	EP
PI	1.000000				
I	-0.830768	1.000000			
EHC	-0.108126	0.357950	1.000000		
URB	0.349788	-0.289570	-0.229493	1.000000	
EP	-0.401316	0.512239	0.530230	0.111415	1.000000

Source; Author's calculation based on E.views 9.5.

The correlation matrix results indicate that personal income has negative impact on all variables except the urbanization. Urbanization and personal

income is positively correlated whereas investment has negatively corelated with urbanization. Energy prices and household consumptions show the positive relationship.

4.3 Unit Root Analysis

Before applying different econometric estimation technique like OLS, ARDL and cointegration techniques, we first check the stationarity among variables through unit root test. The results of Philip-perron and ADF Fisher (1999) show that variables are stationarity at first difference except EHC, I and URB are at level. These results are shown in Table 5.

Table 5:Unit Root Test (Based on ADF-Fisher (1999))

Variables	Level		1st Difference		Conclusion
	Intercept	Intercept with Trend	Intercept	Intercept with Trend	
PI	2.168 (1.000)	26.596 (0.997)	252.341 (0.000)	185.596 (0.000)	I(1)
I	57.054 (0.229)	104.166 (0.000)	520.743 (0.000)	415.707 (0.000)	I(0)
EHC	222.667 (0.000)	145.891 (0.000)	476.360 (0.000)	373.401 (0.000)	I(0)
FP	2.939 (1.000)	3.697 (1.000)	62.202 (0.115)	597.493 (0.000)	I(1)
URB	218.299 (0.000)	220.261 (0.000)	372.036 (0.000)	283.889 (0.000)	I(0)
EP	34.074 (0.958)	16.185 (1.000)	421.028 (0.000)	236.662 (0.000)	I(1)

Source; Author's calculation based on E.views 9.5.

4.4 Estimation of ARDL Model

The main objective of our study is to determine the energy prices and their impact on household consumption in Pakistan. We estimated results thorugh ARDL model because variables are stationarity at different levels in unit root test. According to Romar (1990), if dependent variable is stationary at first difference then we can apply ARDL econometric technique. The long run and short run association between variables are measured through Bound test.

4.5 Bounds test

The long run association between variables is measured through Bound Test. The results of Bound test is shown in Table 6.

Table 6: Results of Bounds Test

Test Statistics	**Value**	**k**
F-statistics	58.722	4
Critical Value Bounds		
Significance	I(0)	I(1)
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Source; Author's calculation based on E.views 9.5.

Table 6 shows the bounds test results. It shows that the critical value of the bound test is less then f statistics. So we reject the null hypothesis that there is long run relationship between the dependent and independent variable and

accepts alternate hopothesis which states energy prices affect the household consumption in the long run. Now confirm long run relationship through ARDL Model and the results of this model is shown in Table 7.

Table: 7 Long run ARDL Results (1, 1, 1, 1, 1, 1)

Dependent Variable: EHC				
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
I	0.721114	0.062649	11.51038	0.0000
PI	0.186807	0.153598	7.726704	0.0000
URB	0.110326	0.017951	6.145815	0.0000
EP	-0.065760	0.013350	-4.925877	0.0000
C	0.6987870	0.035460	2.5876760	0.0002

Source; Author's calculation based on E.views 9.5.

The results in the table show that there is strong and negative relationship between Household energy consumption and Energy prices. It shows that Energy prices decrease the household consumption of Pakistan as stated by (Saul Estrin, 2017) in his study. It indicates that if one unit increases in energy prices the energy consumption will likely to be decreased by 6.5 percent in the long run. However, there is a positive relationship between PI and EHC. If one unit increases in personal income than the household electricity consumption will likely to be increasd by 18%. Similarly, if one unit increases in urbanization it will likely to cause increase in electricity consumption by 11 percent in the long run. Investmet has a significant positive relationship with energy consumption as is indicated by its high coefficient value. For example,

if one unit increases in investment it will likely to increase energy consumption by 72 percent.The outcome of the ARDL model shows that investment and household consumption has positively related. If one unit increases in investment, the consumption will increase by 72.11 percent in the long run. It means that investment is a vital variable for increasing energy consumption. Now we look at short run results given in Table 8:

Table: 8 Short Run Results

Dependent Variable: PI				
Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
COINTEQ01	-0.126867	0.001170	-108.4116	0.0000
D(I)	-0.103851	0.002048	-50.69638	0.0000
D(EHC)	-0.125216	0.000944	-132.5947	0.0000
D(URB)	-0.017873	3.74E-05	-477.7470	0.0000
D(EP)	0.036285	5.56E-05	653.1083	0.0000
C	8.818856	5.877131	1.500538	0.0000

Source; Author's calculation based on E.views 9.5.

Table 8 shows short run estimation between the variables. The short tun outcome of the study shows that there is strong and negative relationship between Household energy consumption and personal income. It shows that disposable income of people will decrease if the household consumption is increased in Pakistan. The reason is that the prices of energy is very high in Pakistan because Pakistan generates electricity through costly imported oil. These results are consistent with the study of (Saul Estrin, 2017). The value

of COINTEQ (01) describes the speed of adjustment. It shows that how quickly or slowly variables move towards its equilibrium level. The coefficient of COINTEQ (01) in the above table is -0.126 shows that convergence situation. It indicates that adjustment will take place in Pakistan towards equilibrium in the long run with the speed of 12.6 percent points.

4.6 Heteroskedasticity Test

The Heteroskedasticity test is calculated by the Bruesch Pagan LM test that is given below the table. The null hypothesis is constant variance that is not rejecting because p value is greater than 5%. So variance is constant and there is no heteroskedasticity in the model.

Table 9: Heteroskedasticity Test

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of roa

         chi2(1)      =     0.19
         Prob > chi2  =   0.6600
```

5. Conclusions

Most of the studies show that population aging increases household energy demand. This is also true for Pakistan because older people spend a large proportion of their time in homes and thus consume more energy by using fans, lights, air conditioners, and other domestic equipment for longer hours.The outcome of the study shows that there is a strong negative relationship between Household energy consumption and Energy prices. It

means that if energy prices are increased the household electricity consumptionwill decrease. However, if per capita income of the people is increase then household electricity consumption will also increase because in such a situation their capacity to pay high cost of electricity consumption will increase. Similarly, the increase in urbanization will also increase electricity consumption because people migrated to urban areas demand electricity for different domestic and commercial purposes. The same is with investment. If the volume of investment in the country increases particularly in industrial sector it will likely to increase demand for electricity.

6. Policy Recommendations

On the basis of our results we would like to make the following policy implications are suggested to control energy prices and bring efficiency in the consumption of energy.

► Government should build new power plants based on renewable energy resources. It will not only reduce the cost of energy but also reduce the level of emission in the country.

► The dependence on non-renewable energy resources must be reduced in order to reduce oil imports on which Pakistan is spending from US$10 to 12 billion per annum.

► The use of coal and furnace oil in generation of electricity must be abandoned and be replaced with Nuclear energy, Wind and tidel energy.

► The use of solar energy must be encouraged to reduce the consumption of costly electricity being produced by follies fuels.

► Business firms must be encouraged to use latest technology that reduce

the demand of electricity and create efficiency in producton of goods and services.

► Latest clean technology must be obtained from advanced countries to reduce growing emission and pollution particularly in big cities.

► A media campaign must be launched to create awareness among the people not to use inefficient source of energy.

► The prices of electricity and petroleum products may be reduced in order to accelerate economic activity in Pakistan.

7. Contribution of this study

This study contributes in a sense that it has added new piece of knowledge in energy sector by analyzing the relationship between high energy prices and households' energy consumption in Pakistan. Now the policy makers and researchers can easily understand why prices of energy are increasing and why consumption of energy is decreasing. They can also understand that there is a negative relationship between energy prices and energy consumption. So the results of this study given an insight to the policy makers that they will have to reduce energy prices by using cheap energy resources if they want to increase the consumption of energy. Similarly, this study also highlights this fact that high energy prices also impact personal income of households negatively.

8. Suggestions for future research

The new researchers can add more variables into their study and also enhance study period to attain better results. Our study period is from 1972 to 2018 and they can add nest period developments in energy sector in their studies. We

have selected personal income, energy prices, investment and urbanization as independent variables to measure the impact of these variables on household energy consumption. The new researchers can add foreign direct investment (FDI) and clean technology in their model to measure these variables on household electricity consumption.

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