

Full Length Research Paper

The Survey of Energy Demand in Islamic Countries by Using of Panel Data

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In this paper calorie demand of some Islamic countries is studied. Given the vast differences among Muslim countries by per capita income level of the first cluster using SPSS software analysts were divided into 5 groups. According to this matter, the countries such as Kuwait, Saudi Arabia and Iran a lonely each groups were posited of first, second and third place. The four countries such as Jordan, Malaysia, Turkey and Egypt were posited in fourth group of 10 countries, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, Kambya, Cameroon were in fifth place. The pattern model of fourth and fifth countries is estimated as a panel. In first, fourth and fifth price index of consumer was positive and significant. Also, the coefficient of national impure produce in first, second, third and fifth group were positive and significant. According to the absolute values of the coefficient of variable of incoming the fifth groups with other countries have significant difference. Also, the coefficient on the price difference between Kuwait and other countries are significant. Except in the case of Saudi Arabia (Group II) in other countries this time around with the theoretical values is obtained. The increased income has a positive effect on per capita calorie consumption and the negative relationship between price index and caloric intake is observed. As expected, income elasticity is less than one in all countries and it is about annually per capita. The tension between the absolute numbers of countries, the difference is highly significant.

Key words: Energy demand, Islamic countries, Panels, Consumer price index, Per capita income

1. INTRODUCTION

Due to population growth and increasing demand for food products, estimating demand functions and demand factors affecting food has special importance. The topic of consumer behavior, in addition economists, has been a favorite of policy makers. This group of mainly policy makers to adopt appropriate policies in areas such as quotas, subsidies, transfer payments and welfare changes and changes in the pursuit of food security due to some economic policies that affect consumers, have sought to understand consumer behavior (Bakgshodeh, M. 1996). Estimated demand for various goods that are used by people, in recognition of consumer preferences (consumer preference) to determine the policies and guidelines related to the consumption, predict future consumer needs, and finally the plan has particular importance. Indeed, the programs in various fields of life including economic issues and the importance of people's livelihood. Therefore, research in behavior and consumption patterns can help in effective community programs to be more careful. Despite the importance and breadth of the

Islamic countries of the world's population with an annual annually impure produce of over a trillion dollars, have only 4% of global impure produce. In general, the economic structure of these countries has a different structure of world economy and this difference tended to structure their production towards the production of agricultural raw materials is concerned. Islamic countries are mainly developing countries and countries in transition, and an agricultural sector in these countries plays an important role. Therefore, and due to the economic nature of these countries, they are expected to have moderate to low food security. Due to the importance of planning for countries, present survey about energy demand for Iran and the other Islamic countries will be examined.

There are many studies in the field of commodities demand. The studies of research and evaluation of the product groups and urban and rural distinction, and also the importance of the demand functions can be classified as income and per capita calorie. Some studies examine the demand functions have use, variables and income per capita energy. Among these, there are two

policies: one is hypothesis causality calorie per capita income. While the other assumptions in the opposite direction of causality. Using this approach, the rate of calorie-income is estimated.

For example, Reutlinger and Selowsky (1976), the rate of income and per capita calorie is estimated about 0.17. Ravallion (1990), for Indonesia estimated non-significant coefficients. Behrman and Dlalikar (1987), for India and Strauss (1984) for Sierra Leone were estimated about 0.82 the rate of income and per capita calorie. For example Strauss (1986), the relationship between productivity and per capita calorie estimates for Sierra Leone and the rate of calorie product with 0.34 acquires significant. Deolalikar (1988) showed for India that, there is no evidence that feeding in this area, to determine the wage. Dawson and Tiffin (1998), were analyzed long-term relationship of incoming calorie with using a mass estimation with using of annual data, that they showed the period of 1961 - 1992 in India. The rate of Income was of 0.34 and the price of food was also insignificant.

Tiffin and Dawson (2003), began to study about energy demand in Zimbabwe. The results showed that the relationship between per capita calorie and food prices is significant and increasing of per capita income is for increasing of calorie, which confirms the hypothesis of increased wages.

2. METHODS OF RESEARCH

In order to make optimal policy and move to the increase of consumer welfare, it is necessary that, first comprehensive information of the consumption situation and also have power of income and price. Such information usually is for demand analysis, price and income and with using of time series data is accessible (Deaton 1988).

Now, therefore, we also follow the Tiffin and Dawson (2003)'s model which began to analyze the per capita calorie demand function, we considered the demand of per capita energy of Islamic countries, the function of consumer price index and per capita income:

$$\begin{aligned} \text{CAL} &= f(\text{GDP}, \text{CPI}) \\ \text{Per capita annual data : (CAL)} & \quad (1) \\ \text{GDP per capita: (GDP)} & \\ \text{Consumer Price Index: (CPI)} & \end{aligned}$$

Demand function calorie per capita for 16 countries of choice was considered, including Iran, Egypt, Turkey, Sierra Leone, Saudi Arabia, Senegal, Pakistan, Niger, Nigeria, Morocco,

Malaysia, Kuwait, Jordan, Indonesia, Kambya, Cameroon is a function of price index and per capita income in, is studied. Per capita annual data (CAL), gross domestic product per capita (GDP) and consumer price index (CPI) during the period 1980-2005 (1980-2005) of the 16 countries selected has been gathered. Also for the fourth and fifth groups of the panel data approach was used. Brief description of the topic being discussed in the panel data econometrics. Also for the fourth and fifth groups of the panel data approach was used. Brief description of the topic being discussed in the panel data econometrics.

Panel data, behavior and personal experiences relates every cross-sectional time to other cross-sectional time of experiences and behaviors. In this type of data can be achieved more flexibility in defining individual differences over time for phenomena. Combining cross-sectional time series data and increases the degree of freedom model is faced with fewer restrictions (Baltagi, 2001). Besides the advantages mentioned above, several other advantages for panel data has been expressed as follows: First is the control of individual heterogeneity. The second data panel makes the more use of data, reducing the time between the linear and higher efficiency compared to estimates is using separately for cross-sectional time series data. Panel data to identify and evaluate the effect that are not easily identifiable in cross-sectional time series data and is more appropriate. Panel data are better able to study the dynamics of adjustment and for processing and testing complex behavioral models are preferred. Against these benefits, data collection, measurement errors and the consequent costs of collecting these data are the most important problems that, have presented for these data (Baltagi, 2001).

Since the panel data regression models to estimate depends on the assumptions of origin's width, slope coefficients and accepted disturbing part, this model stipulated in these patterns is of great importance. Baltagi(2001), with introducing of an error component models, one side and two side, has introduced the panel data regression model as follows:

$$y_{it} = \alpha + X'_{it}\beta + u_{it} \quad i = 1, \dots, N; \quad t = 1, \dots, T \quad (2)$$

Footnotes i indicates people, households, firms, and countries like it. In other words, it shows the dimension sectional study. While the t is time indicator. is a scalar. The vector β is $k \times 1$ and X'_{it} is the observation of it for k explanatory variables.

3. RESULTS AND DISCUSSION

First-stage stratified random sampling and cluster geographically, countries are divided into groups. Based on data on GDP per capita with analysts cluster and the SPSS software selected countries of Islam, including Iran, Egypt, Turkey, Sierra Leone, Saudi Arabia, Senegal, Pakistan, Niger, Nigeria, Morocco, Malaysia, Kuwait, Jordan, Indonesia, Kambya and Cameroon were divided into 5 groups. Kuwait, Saudi Arabia and Iran a lonely first, second and third, respectively allocated to themselves.

Three countries such as Jordan, Malaysia and Turkey in fourth group were estimated as a panel. The 10 countries of Egypt, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, and Kambya, Cameroon in fifth group were estimated

as a panel. Facts and information from websites of FAO and Economic Information Center of the Islamic countries were collected. In order to estimate the models and tests of software packages and Microfit4.1 Eview5 and SPSS was used.

After the data were collected for 16 countries of choice, should be applied before any data for this series, static test done, that this is possible by software Eviews5.

The static test tables for calories per capita, consumer price index and GDP per capita for Kuwait, Saudi Arabia and Iran in Group I, II and III are as follows:

Static test tables for the fourth group includes Iran, Malaysia, Turkey and Egypt for the fifth group, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, Kambya, Cameroon is a panel of this species.

Table 1: Static test for Kuwait (group I), Saudi Arabia (second group) and Iran (third group)

Cointegration	ADF statistic	ADF statistic critical	Variable name	Country
I(0)	-2.67*	-2.6	Per capita calorie	Kuwait
I(0)	-3.8304**	-2.6422	Per capita income	
I(0)	-3.4257***	-1.26	Consumer price index	
I(0)	-2.204*	-2.20	Per capita calorie	Saudi Arabia
I(0)	-3.0064***	-3.0048	Per capita income	
I(0)	3.0819***	2.6	Consumer price index	
I(0)	-2.53**	-2.39	Per capita calorie	Iran
I(0)	7.0314**	-3.8304	Per capita income	
I(0)	-1.26**	-1.38	Food prices	

Source: Research Findings

*, ** and *** are represent of significance at level of 10, 5 and 1 percent, respectively.

Table 2: Static test of fourth group

Method	CAL calculated statistics	Probability CAL	CPIcalculated statistics	Probability CPI	GDP calculated statistics	Probability GDP
Lewin and Chow ,lee	-8.2929	0	16.4648	1	-6.4098	0
Britong	-3.6482	0.0001	-0.7430	0.2287	-5.6629	0
Iam and Pesara Shin	-7.3719	0	-2.8474	0.0022	-5.4040	0
ADF	44.4569	0	22.1184	0.0012	33.2072	0
PPP	44.6658	0	0.9889	0.986	37.2824	0
hedri	0.5887	0.278	3.9937	0	1.3651	0.0861

Source: Research Findings

Kohansal et al.
The Survey of Energy Demand In Islamic Countries by Using of Panel Data

Table 3: Static test of fifth group

Method	CAL calculated statistics	Probability CAL	CPIcalculated statistics	Probability CPI	GDP calculated statistics	Probability GDP
Lewin and Chow ,lee	-3.0123	0.0013	-3.3250	0.0004	-1.1316	0.1289
Britong	1.5513	0.9396	-3.0781	0.001	-2.7696	0.0082
Iam and Pesara Shin	-2.1922	0.0142	-2.4831	0.0065	-1.7314	0.0417
ADF	26.8966	0.0199	28.0619	0.014	24.0085	0.0457
PPP	33.1076	0.0028	27.9377	0.0145	19.0908	0.1615
Hedri	7.0235	0	1.8936	0.0291	1.9660	0.0246

Source: Research Findings

According to Table1 results of unit root tests based on the countries of Kuwait, Saudi Arabia and Iran in the first and second groups of data are in level of stationary. A Table 2 group based on the Consumer Price Index for the fourth is in level of stationary. All unit root tests indicate that there are other methods of Hedri in the consumer price index variable are in level of stationary. Based on the results in Table 2, all unit root tests indicate that the variable index and GDP per capita calorie is not in level of stationary and the results of these two static tables is in subtract of first order. Based on the results in Table 2, all unit root tests indicate that the method of Hedri calories per capita in the difference between static first order. The fifth group of calories per capita and GDP per capita based on Tables 3, is in level of stationary. All unit root tests indicate that except Britong and Hedri are in level of stationary..

All unit root tests except Levin and Fisher and Hedri methods indicate that the variable is GDP per capita domestic are in level of stationary. Based on the results in Table 3, all unit root tests indicate that a variable other than Hedri the

consumer price index by subtracting the first order and is static.

3.1 Kuwait energy demand function (first group)

Kuwait energy demand was estimated with using of ordinary least squares. According to the results for caloric demand in Kuwait, from first group, seen that the coefficient of food price index is negative and the negative effect of calories per capita demand has seen this as a significant variable with a high coefficient is -50.4795. Coefficient of GDP per capita is also positive and significant; it has significant effects on the demand for calories. Coefficient larger than the coefficient of GDP is consumer price index, which indicates that prices are more calorie consumption and income variables in the AR (1) is positive and significant.

3.2. Energy demand in Saudi Arabia (second group)

Table 4: Kuwait calorie demand function

standard error	coefficients	Name of variable	
2098.553	0.0137***	Intercept	C
15.549	-50.4795***	Consumer price of index	CPI
0.0131	0.0508***	Per capita GDP	GDP
0.0501	0.9060***		AR(1)
$R^2 = 0.7836$	F=73.2188		

Source: Research Finding

*, ** and *** are represent of significance at level of 10, 5 and 1 percent, respectively.

Table 5: Function demand of caloric in Saudi Arabia

Standard error	Coefficients	Name of variable
3.3525	4.5996	CPI
0.0089	0.0247*	GDP
573.6512	1900.5***	C
R² = 0.6783	F=12.6515	DW=1.7

Source: Research Findings

*, ** and *** are represent of significance at level of 10, 5 and 1 percent, respectively.

3.3. Function demand of calorie in Iran (Third Group)

According to the results for caloric demand in Iran, can be seen that the coefficient is negative, the negative effect of price index is the demand per capita calorie but as can be seen, this variable is not significant. The coefficient produce of per capita GDP is positive and 0.0723, and also is significant. It has a significant effect on per capita calorie demand. A virtual variable based on changes in GDP per capita is the end of the war. The virtual variable with a high coefficient is positive and significant. Also F is significant.

3.4. Estimated calorie demand function for the fourth group (Jordan, Turkey and Malaysia)

Calories per capita demand function model to estimate the fourth group, the combined significance of individual fixed effects and the Chaw test did.

Comparison of the calculation of F (830.034), with critical values at significance level indicates 1, 5 and 10 percent with 1% probability, assuming zero can be rejected based on lack of significant effects and individual time. For further familiar of the model should be paid a significant test of individual fixed effects (cross) and time. Next, the individual effects models with time-specific effects are examined. In this test result of F has

$F_2 \sim F_{(N-1), (N-1)(T-1)-K}^{H_0}$ distribution. Chaw test result shows the test statistics (352/7371) and the critical parameters, the 1% significance level, assuming zero can be rejected and therefore, the presence with existence of fixed effects and considering the effects of certain individual, were examined. The statistic of F has

$F_3 \sim F_{(T-1), (N-1)(T-1)-K}^{H_0}$ distribution Chaw compared with F statistics test significance levels of the critical parameters indicates that the null hypothesis cannot be denied.

Table 6: Function demand of calorie in Iran

Standard error	Name of variable	Name of variable	
1022.871	3510.251***	Intercept	C
10.5834	-11.3221	Consumer price of index	CPI
0.0320	0.0723*	Per capita GDP	GDP
199.550	585.5763*	Variabledummy	D67

Source: Research Findings

*, ** and *** are represent of significance at level of 10, 5 and 1 percent, respectively.

Table 7: The stages of estimation of function demand calorie for fourth group

period TestEffects when considering the effects of certain individual	estTIndividual effects due to the period effects of certain	Significant test variables along the imaginary
RSS=326143.6	RSS=31676556	RSS=17398.2
URSS=173983.2	URSS=173983.2	URSS=272536.4
	(N=3,T=23,K=3)	(N=3,T=23,K=3)
F = 1.62 < F_{22,41}	F = 352.7371 > F_{2,41}	F = 830.034 > F_{24,41}

Source: Research Findings

Kohansal et al.
The Survey of Energy Demand In Islamic Countries by Using of Panel Data

Finally it was concluded that the relationship between calorie demand per capita, per capita income and consumer price index for three Islamic countries, Jordan, Turkey and Malaysia was clear that there is a time constant effects.

According to the results obtained from Table 8, can be seen that the coefficient of negative consumer price index is -7.0015 has the negative effect of demand per capita calorie. As seen, this variable is significant. The coefficient of GDP per capita is not positive and significant. As can be seen that the F model is large and significant. What this means is that the correct model is selected as significant.

3.5. Estimation of panel models, the fifth group (Egypt, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, Kambya, Cameroon)

Calories per capita demand function model to estimate the fourth group, the combined significance of individual fixed effects and the Chaw test did.

Comparison of the calculation of F (197/4931), with critical values at significance level indicates 1, 5 and 10 percent with 1% probability, assuming zero can be rejected based on lack of significant

effects and individual time. For further familiar of the model should be paid a significant test of individual fixed effects (cross) and time.

The existence of individual effects in the model due to the effects test is given. Chaw test result shows the test statistics (135/4247) and the critical parameters, the 1% significance level, assuming zero can be rejected and therefore we can conclude that there are individual fixed effects. Chaw compared with F statistics test significance levels of the critical parameters indicates that the null hypothesis cannot be denied. Finally it was concluded that the relationship between calorie demand per capita, per capita income and consumer price index for the ten Islamic countries, (Egypt, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, Kambya, Cameroon) was clear that there is a time constant effects.

According to the results obtained from Table 10, can be seen that the coefficient of negative consumer is significant and is about -3.3070. Coefficient of GDP per capita is 0.5640 and P is the GDP per capita has positively associated with per capita caloric.

As can be seen that the F model is large and significant. What this means is that the correct model is selected as significant.

Table 8: The function demand calorie for the fourth group of countries

Probability	Standard error	Coefficients	Name of variable	
26.0164	124.0512	3227.3660	Intercept	C
1.4337	0.0452	0.0649	per capita GDP	GDP
-6.6745	1.04898	-7.0015	Consumer price of index	CPI
F = 2.13		DW = 0.14		R² = 0.5377
				R² = 0.2855

Source: Research Findings

Table 9: The function demand calorie for the fourth group of countries

period TestEffects when considering the effects of certain individual	estTIndividual effects due to the period effects of certain	Significant test variables along the imaginary
RSS=3549445	RSS=3364578	RSS=1000000.09
URSS=3364578	URSS=24394443	URSS=3364578
(N=10,T=23,K=3)		(N=10,T=23,K=3)
F = 0.5094 > F_{22,277}	F = 135.4247 > F_{9,277}	F = 197.4931 > F_{33,277}

Source: Research Findings

Table 10: The function demand calorie for the fifth group of countries

Probability	Standard error	Coefficients	Name of variable	
19.2597	117.0405	2254.172	Intercept	C
6.510752	0.086663	0.5640	Consumer price of index	GDP
-2.0702	1.5977	-3.30755	per capita GDP	CPI
F=2.49	DW=0.0805		$R^2 = 0.2497$	$\bar{R}^2 = 0.1497$

Source: Research Findings

4. SUMMARY AND CONCLUSIONS

Energy demand in the present study is examined a number of Islamic countries. Given the vast differences among Muslim countries by the level of per capita income, first using cluster analysts were divided into 5 groups. The classification of countries, Kuwait, Saudi Arabia and Iran were alone in a group instead. 3 Jordan, Malaysia and Turkey in a group of 10 countries and Egypt, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, Kambya and Cameroon took place in another group. Panel model was estimated as the fourth and fifth countries.

The result of estimating calorie demand of different groups in Table (11) is shown. The demand for calories in Kuwait (first group), it was observed that the consumer price index and GDP per capita have a significant effect on per capita calorie demand. For Saudi Arabia (second group) price index was not significant. On the contrary, however, this variable is positive. GDP per capita was positive and significant coefficient, the calorie consumption among households in the selected period, only Saudi Arabia has been influenced by income. According to the results for caloric

demand in Iran (third group), observed that the coefficient of food price index is negative of course this variable is not significant in per capita energy demand. The coefficient GDP per capita is positive and significant. In the fourth group (Jordan, Turkey and Malaysia), it was observed that only the consumer price index and significant negative relationship with per capita caloric demand. The coefficient of per capita GDP is positive but lacks statistical significance. The fifth group (Egypt, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, Kambya and Cameroon), the two variables are consumer price index and the per capita income on energy. As seen on the absolute values of the coefficient of income in countries with significant are the fifth group with other countries. Also about the case of coefficient on variable difference of price between Kuwait and other countries are significant. Except the country Saudi Arabia (second group) about other countries, the mark of obtained coefficients is based on theoretical foundations. The increased income has a positive effect on per capita calorie intake and calorie expenditure price index and the negative relationship are observed.

Table 11: The function demand calorie for Islamic countries elected

Islamic selected countries	Consumer price index coefficient	Coefficient of GDP per capita	Islamic selected countries	
0.0508***	The first group	-50.4795***	0.0508***	The first group
0.0247*	The second group	4.5996	0.0247*	The second group
0.0723*	The third Group V	-11.3221	0.0723*	The third Group V
The fourth group		-7.0015***	0.0649	The fourth group

Source: Research Findings

*, ** and *** are represent of significance at level of 10, 5 and 1 percent, respectively.

Kohansal et al.
The Survey of Energy Demand In Islamic Countries by Using of Panel Data

Table 12: The power of energy demand for Islamic countries elected

Elasticity price	Elasticity income	Islamic selected countries
-1.38616***	0.24079***	The first group
-0.156	0.072116*	The second group
-8.22372	0.0021*	The third Group V
0.13696***	0.047741	The fourth group
-0.07938**	0.142686***	The fifth group

Source: Research Findings

*, ** and *** are represent of significance at level of 10, 5 and 1 percent, respectively.

In order to compare the effect of variables on the demand for consumer price index and income per capita calorie consumption among different groups and also compare them in any group, the powers income and price can be selected for the Islamic countries in the Table 12 is shown. As expected, given the essential nature of calorie-income elasticity is less than one in all countries and it is about necessity of per capita. That the power of income per capita demand for all groups except fourth group is significant. Based on the absolute figure is considerable tension between countries in this sharp difference between the first group to Kuwait can be seen that if a 100 percent increase in per capita income, calories per capita increased 24 percent in the first group. Whereas the figure for the second, third and fourth, 7.2, 0.2 and 4.7 percent, respectively. Following a 100 percent increase in revenue in five groups of consumers expected their caloric demand increase 2/14 percent. The first important point is the reaction of consumers to changes in income compared with other groups. Among the selected countries was the highest-income a consumer, this group is expected to respond by increasing their income is lower in comparison with other groups. However, this fact can be explained that these cravings may Kuwait among consumers and consumer-oriented nature of such households has created. Although Iranian consumers about the high percentage of the population are below the poverty line (Farajzadeh and Najafi, 2004) but they tend to consume more low income has increased. In this regard we can say that this is also probably due to high costs and consumption, savings tend to be high among consumers. The power of obtained price for selected Islamic countries also showed a wide difference of consumer price increases. So that a 100 percent increase in price, reduction in consumption in Kuwait (Group A) in excess of 138 percent. While the reduction in caloric intake among the groups in the fourth and fifth sections

are, 13.6 and 9.7, percent, respectively. The reaction of consumers against high prices, this could also be hypothesized that the intake of calories in the wake of price increases, there is possibility of reducing the consumption of calorie intake not be in adverse conditions. The pattern of consumers while maintaining enough calories can also react against rising prices. According to the results, recommendations are presented below:

1- Planning the Islamic countries for per capita calorie intake should be given enough knowledge of demand functions with respect to the subject of calories per capita and per capita income and consumer price index.

2- Also among the Islamic countries due to differences in per capita income, the amount of calories in response to consumers is different; though similar also in terms of per capita calorie consumption can be seen. Thus, for the first, second and third (Kuwait, Saudi Arabia and Iran) is better for the consumer's response, should adopt future planning of their countries. The fourth group (Jordan, Turkey and Malaysia) and the fifth group (Egypt, Sierra Leone, Senegal, Pakistan, Niger, Nigeria, Morocco, Indonesia, Kambya and Cameroon) also plan to adopt similar policies.

3- Also appear in future research demand per capita calorie, other factors and also indexes of cultural, social, political should be considered.

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