STUDYING THE EFFECT OF MAKING THE SUBSIDIES TARGETED ON NATURAL GAS CONSUMPTION MEASURE IN DOMESTIC SECTOR CASE STUDY, TEHRAN AND SOUTH KHORASAN PROVINCES

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Abstract: *One of the most important issues at present research is energy limitation phenomenon; and natural gas is one of the scarce resources that the necessity of planning and forecasting for optimal distribution of it, is felt in our country. In this research some important indexes have been used seasonally, dependent variable is the average of gas consumption measure of each family and independent variables are natural gas price, the average seasonal temperature of Tehran and south Khorasan provinces and seasonal expenses of each family. The intended years have been since 2005 to 2012 and the information and statistics have been generally obtained from the statistics center of Markazi bank, Meteorology Department of Islamic Republic and Statistics Center of Iran. In the following, we have proved classic assumptions, lack of false Regression and the model stipulation in econometric by using of final tests and we have estimated the demand function of natural gas in domestic sector of Tehran and south Khorasan provinces by using of **ARDL** method and **Microsoft** software. The results of the research show that the increase in gas prices causes the reduction in natural gas consumption of every family and also the increase of income causes the increase of gas consumption and the reduction of the weather temperature also increases the gas consumption.*

Also climate changes have significant effect on natural gas consumption.

Key words: *demand, natural gas, energy carriers, the income elasticity of demand, price elasticity of natural gas*

1. INTRODUCTION

The wasteful use of fossil fuels caused the human to face with the painful reality of destruction of the environment that this common pain, guided the earth inhabitants to think about modifying the consumption models and optimal using of fossil fuels (Vondracek *et al.*, 2008). The use of natural gas due to less carbon content and having less pollution compared with other fossil fuels has been considered for continuation of development procedure and at the same time protecting the environment and replacing it instead of other petroleum products (Kaboudan and Liu, 2003).

Thereforethe increase of natural gas share in energy basket is accounted as one of the macroeconomic policies of the country. The difficulty of natural gas

transmission from production bases to consumption locations due to the extensive scope of gas areas, dependency of natural gas consumption on regional climate conditions and the security importance of supplying natural gas of domestic and commercial sectors in cold months of years for community comfort are the reasons that point out the necessity of regional management method of supply and demand for natural gas.

The main purposes of this research are the studying of the effectiveness of targeted subsidies policy on the measure of natural gas consumption and measuring the effects of this policy in domestic gas demand sector of Tehran and south Khorasan provinces and providing the necessary information for policy makers for economic and pricing planning, doing services and better modeling.

The Empirical Background of the Research

((Lotfipour and Bagheri)) (2003) have estimated the function of natural gas demand of domestic consumptions in Tehran city by using of seasonal data since 1985-1990 with linear and logarithmic methods. The variables which have been used in demand functions and the function of average consumption of natural gas, have been natural gas price in previous period, per capita income, temperatures and the number of families. The results of the estimation indicate the inelasticity of gas demand compared with price and income.

- ❖ ((Shakeri and others)) (2010) have estimated the gasoline, oil and gas demand in Iran's transportation sector for time period of 1979-2007 through three maximation stages of utility function with regard to stipulate the related expenses in each stage. According to the estimated demand function, the price elasticity of gasoline, oil and gas has been less than one, so that for gasoline in short-term and long-term it has been in order -0.24 and -0.3 and about oil and gas it was -0.2. The income elasticity for them is in order 1.72 and 0.84.
- ❖ ((Farrokhi and others)) have studied the modeling of natural gas demand in Khorasan province for the years 1995 to 2006. The final model which has been obtained by using of stepwise Regression technique, shows that natural gas consumption hasn't been related to its price and gross domestic product.
- ❖ ((Branch)) (1993) has studied the domestic electricity demand by using of syncretistic data for families and he has used Generalized Least Squares (GLS) method for estimation.
- ❖ ((Nil Aras and Heydar Aras (2004) with year segregation to heating and non-heating period, have anticipated natural gas consumption of domestic sector in Isky Shir city of Turkey. The key variable in their model is temperature in the form of heating degree measure in a day.

❖ Lio & Kaboudan (2003) anticipated multi-Regression equations system of short-term demand of America country for natural gas and estimated the gas consumption of all four sectors of domestic, commercial, industrial and electricity. In domestic sector, price elasticity, replacement price elasticity, income elasticity and the consumer sensitiveness to climate changes were obtained in order, -0.27, 1.35, 1.65, and 0.49.

❖ Sarak & Setman (2003) have modeled the energy consumption changes for gas heating of domestic sector of Turkey with days heating degree method.

3. THE RESEARCH HYPOTHESES

The increase of natural gas price after making the subsidies targeted has had significant effect on the reduction of natural gas consumption in domestic sector of Tehran province.

The increase of natural gas price after making the subsidies targeted has had significant effect on reduction of natural gas consumption in domestic sector of south Khorasan province.

4. THE RESEARCH VARIABLES

With regard to similar research which was accomplished by Ebrahimi Salari, Taghi and others in Mashhad city (2011) and by using of the following variables, the important and effective variables on the average measure of each family consumption and general consumption of domestic sector and the general shape of the proposed function are as follows:

CH=f (P, Y, T, D)

CH: natural gas consumption

P: the price of per cubic meter of natural gas

Y: the per capita income

T: temperature

D: Figurative variable according to the prices change in 2010

And in the following the Regression model which has been used in this study is as follows:

$$LCH_t = \alpha_0 + \alpha_1 LP_t + \alpha_2 LY_t + \alpha_3 T_t + a_4 D + a_5 D.P + \varepsilon_t$$

That in this model:

LCH: natural logarithm of the average measure of natural gas consumption of each family in Tehran and south Khorasan provinces has been extracted from the statistics of gas company of Tehran and south Khorasan provinces.

LP: natural logarithm of the price of per cubic meter of natural gas in Tehran and south Khorasan provinces has been extracted from the available information in gas companies of Tehran and south Khorasan provinces.

LY: natural logarithm of per capita income in Tehran and south Khorasan and due to lack of access to the information of provincial per capita income, yearly information of average expenses of each family was used. For this purpose and in order to consider the financial ability of families to pay in different areas of the country, the family budget information of Markazi bank of Iran Islamic Republic has been used and considering that the information of income sector of family budget is not trustable and dependable, therefore total consumption expenses of each family have been used as the replacement variable for income. And since the seasonal data were needed, with regard to lack of access to these data, yearly data became seasonal by using of Diz method (1970).

LT: natural logarithm of weather temperature of Tehran and south Khorasan provinces and the average temperature of the intended provinces centers and in seasonal form have been used.

D: Figurative variable which has been considered one for the period after autumn 2010 (the start of making the subsidies targeted) and zero for before it.

5. EXPLAINING THE ARDL[1] MODEL

If theagglomeration of a set of intended variables is proved, a long-term equilibrium relationship between these variables will be established, because these variables move with each other over the time and in long-term they will not be apart from each other. In this state a long-term equilibrium relation like $Y_t = Bx_t + U_t$ could be imagined between these variables that its parameters (B) could be estimated with OLS method. Unfortunately in studies in which the number of observations is low, using of OLS method in the estimation of long-term relation between intended variables will not have necessary validity due to lack of short-term dynamic reactions between the variables, because OLS estimators have been generally abnormal and eventually the hypothesis test with using of normal test statistics will not be valid. Therefore it is better that a model which has short-term dynamism to be applied so that the model coefficients could be estimated with more accuracy, therefore **ARDL** model has been used in this research and **Microsoft** software has been used to estimate this model.

The convergence among a set of economic variables provides the base of using the models of error correction. In fact the error correction connects the short-term fluctuations of variables to their long-term variables. In **Microsoft** software there is this possibility that when long-term interactive model related to **ARDL** model was extracted, the error correction model related to it should be also presented. **ARDL** econometric method has been presented by Pesaran and Shin (1999). This

method has a lot of advantages compared with other similar methods and therefore it is used extensively.

The most important advantage of **ARDL** method is the ability for using of that to consider the relations between, regardless of reliability and unreliability of them. Also in this method, in addition to the possibility of accounting the long-term relations between the variables, there is the possibility of dynamic and short-time relations. In addition, the adjustment speed of lack of short-term equilibrium in each period is also accountable for reaching to long-term equilibrium. An auto-Regressive model with distributive Lags is generally shown as follows:

$$ARDL (p1, q1, q2,…qk) \tag{1-4}$$

6. THE RESEARCH FINDINGS

6.1. The Reliability Test of the Variables

To study the variables from reliability aspect, generalized Dicky-Fouler test (ADF) has been used that zero hypothesis is the single root existence in this test.

H0: (single root existence)

H1: (lack of single root existence)

The results of this test have been mentioned in table (3-4).

Table (3-4)
The results of the variables reliability test in surface

Algebraic factors	Variable	Computing ADF	Meaningfulness level	Test result
Width from origin	LCH_{TEHRAN}	-1.2934	0.6183	Unreliable
Width from origin and procedure		-1.7569	0.6982	
Width from origin	LP_{TEHRAN}	-0.3991	0.8967	Unreliable
Width from origin and procedure		-2.6808	0.2508	
Width from origin	LY_{TEHRAN}	0.1133	0.9617	Unreliable
Width from origin and procedure		-1.5817	0.7771	
Width from origin	T_{TEHRAN}	-3.4768	0.0171	Reliable
Width from origin	$LCH_{KHORASAN}$	-6.2686	0.0001	Reliable
Width from origin	$LP_{KHORASAN}$	-1.3875	0.5674	Unreliable
Width from origin and procedure		-2.6221	0.2751	
Width from origin	$LY_{KHORASAN}$	-0.4426	0.8843	Unreliable
Width from origin and procedure		-2.0425	0.5458	
Width from origin	$T_{KHORASAN}$	-14.1077	0.000	Reliable

As it is observed, the weather temperature variables of Tehran and south Khorasan and natural logarithm of the average consumption of natural gas of each family in south Khorasan (LCH) are reliable variables.

Natural logarithmic variables of average consumption of natural gas of each family in Tehran province (LCH), natural logarithm of the price of per cubic meter of natural gas in south Khorasan province (LP) and natural logarithm of per capita income in south Khorasan province (LY) are unreliable variables.

The final result of reliability test has been mentioned in table (4-4).

Table (4-4)
Final result of variables reliability test

Variable	Reliability test result
LCH_{TEHRAN}	I(1)
LP_{TEHRAN}	I(1)
LY_{TEHRAN}	I(1)
T_{TEHRAN}	I(0)
$LCH_{KHORASAN}$	I(0)
$LP_{KHORASAN}$	I(1)
$LY_{KHORASAN}$	I(1)
$T_{KHORASAN}$	I(0)

Because the weather temperature variables of Tehran and south Khorasan and natural logarithm of average consumption of natural gas of each family in south Khorasan (LCH) are reliable variables in surface, therefore they are I(0) variables.

The natural logarithm variables of average consumption of natural gas of each family in Tehran province (LCH), natural logarithm of the price of per cubic meter of natural gas in Tehran province (LP) and natural logarithm of per capita income in Tehran province (LY), natural logarithm of the price of the price of per cubic meter of natural gas in south Khorasan province (LP) and natural logarithm of per capita income in south Khorasan province (LY) are unreliable variables in surface. Therefore they are I(1) variables.

At next stage , reliability test has been accomplished on first degree subtraction of variables which haven't been reliable, that its results have been mentioned in table (4-5). As it is observed the variables are reliable at first degree subtraction.

6.2. Model Estimation for Tehran Province

In this part, the relation between average consumption of natural gas of each family and the price of per cubic meter of natural gas of per capita income and weather temperature in Tehran province are considered. The data have been used in seasonal form since 2005 to 2012.

Table (4-5)
The results of variables reliability test at first degree subtraction

Algebraic factors	Variable	Computing **ADF**	Meaningfulness level	Test result
Width from origin	LCH_{TEHRAN}	-18.6406	0.0001	Reliable
Width from origin	LP_{TEHRAN}	-4.3381	0.0020	Reliable
Width from origin	LY_{TEHRAN}	-5.4754	0.0001	Reliable
Width from origin	$LP_{KHORASAN}$	-3.5543	0.0177	Reliable
Width from origin	$LY_{KHORASAN}$	-2.9707	0.0551	Reliable

6.2.1. The Short-term Estimation of the Model for Tehran Province

With regard to the obtained results of reliability test, because all the variables which have been used aren't reliable I(0), the method used in it, is Auto-correlated model with distributed lags (ARDL). Usually in yearly data, the lag is enteredone or two and for data with more frequency (like seasonal and monthly data) it could be entered more, that this choice is accomplished with the researcher recognition.[2]

After choosing the maximum lag, with choosing Schwartz Baysian Criterion (SBC) among criterions like Akaike Information Criterion (AIC), Hanan-Queen and equilibrated determination coefficient, the best lags are determined.

With regard to the **Microsoft** software facilities and according to Schwartz Bayesian Criterion, **ARDL (3,0,3,0)** model was chosen as the best estimation model that the summary of the results has been presented in table (4-7).

6.2.2. Short-term results for Tehran province

1. Gas price variable, was obtained statistically meaningful and negative and this indicates that the increase in gas prices has a decreasing effect on natural gas consumption of each family.

2. The per capita income variable obtained positive and meaningful and this indicates with increasing the per capita income, natural gas consumption of each family is also affected and increased.

Table (4-7)
The results of short-term coefficients, ARDL (3,0,3,0)

Variable	Coefficient	Standard Error	T-Ratio	P-Value
$LCH_{TEHRAN}(-1)$	-0.8741	0.2563	-3.4104	0.000
$LCH_{TEHRAN}(-2)$	-0.8562	0.1352	-6.3352	0.000
$LCH_{TEHRAN}(-3)$	-0.6345	0.2354	-2.4670	0.000
LP_{TEHRAN}	-0.5462	0.2214	-2.4670	0.001
LY_{TEHRAN}	5.5256	2.5421	2.1736	0.061
$LY_{TEHRAN}(-1)$	-9.6575	2.9952	-3.2218	0.023
$LY_{TEHRAN}(-2)$	1.6285	3.8524	0.4227	0.716
$LY_{TEHRAN}(-3)$	7.1025	2.6251	2.7056	0.032
LT_{TEHRAN}	-0.2144	0.1199	-1.3547	0.007
DUM	-5.5241	2.5736	-2.1464	0.005
DUM..P	-7.2352	2.5623	-2.8562	0.034
C	-28.9129	6.8521	-4.2195	0.001

R-Squared =0.89,   R-Bar-Squared =0.85,   F-Stat =19.1114[0.00]

DW-Statistic =1.90   Schwarz Bayesian Criterion   -19.4562

3   Weather temperature variable has negative and meaningful effect on natural gas consumption of each family, in other words with increasing the weather temperature, natural gas consumption of each family is also affected and decreased.

4   Figurative variable (D) was obtained statistically negative and meaningful and this indicates that the increase of natural gas consumption in autumn 2010 after

implementing the plan of making the subsidies targeted has had a decreasing effect on natural gas consumption of each family in Tehran province.

In the following for ensuring of the above results, classic assumptions test is considered that the results of this test have been mentioned in table (4-8).

Table (4-8)
The results of classic assumptions recognition test

Test Statistics	LM Version	F Version
Serial Correlation	2.5959[0.113]	2.3036[0.118]
Functional Form	0.2376[0.312]	0.0115[0.418]
Normality	0.5258[0.769]	Not applicable
Heteroscedasticity	0.2770[0.599]	0.2604[0.614]

By observing the diagnostics tests in table (4-8), it is concluded that the estimated model doesn't have any problem from serial auto-correlation aspect, functional form of the model, normality of the components and heteroscedasticity. Therefore we can trust to the obtained results of this estimation.

Now by using of these results the presence or absence of long-term relation between the model variables is considered. In Benergy test, zero hypothesis is the single root existence or lack of co-integration (long-term relation) between the model variables. The required **t** statistics quantity for doing the test is calculated as follows:

$$T = \frac{\sum_{i=1}^{p} \hat{\alpha}_i}{\sum_{i=1}^{p} s\hat{\alpha}_i} = \frac{-2/4113 - 1}{0/4592} = -7/4278$$

Because critical quantity which has been presented by Benergy, Doulado and Master (1992) is equal to -3.43 in confidence level of 95% , the H0 is rejected. Therefore we can conclude that there is a long-term equilibrium relation between the variablesof the model of effective factors on health index.

6.2.3. Long-term estimation of the model for Tehran province

The results of the long-term estimation have been presented in table (4-9).

According to the results of long-term test, we can say: with increasing of the gas prices and weather temperature, gas consumption will be decreased. Also with increasing of per capita income, gas consumption will be increased and also natural gas price in autumn 2010 after implementing the plan of making subsidies targeted has had a decreasing effect on natural gas consumption of each family in Tehran and south Khorasan provinces.

Table (4-9)
The results of long-term estimation of the ARDL model (3,0,3,0)

Variable	Coefficient	Standard Error	T-Ratio	P-Value
LP_{TEHRAN}	-0.1452	0.030	-4.8463	0.000
LY_{TEHRAN}	0.8562	0.049	8.1620	0.000
T_{TEHRAN}	-0.2230	0.0227	-9.8368	0.000
DUM	-6.4524	2.3142	-2.7881	0.000
DUM..P	-3.253	1.2536	-2.5623	0.000
C	-5.3278	1.8774	-2.8378	0.000

6.2.4. *The Estimation of error Correction Model of Tehran Province*

In the following, the error correction model that indicates the short-term relation between dependent variable and independent variables of the model is considered and the related coefficients to it have been presented in table (4-10).

Table (4-10)
The results of error correction model

Variable	Coefficient	Standard Error	T-Ratio	P-Value
ECM(-1)	-0.4114	0.0753	-5.4634	0.000

The most important thing in error correction model is the coefficient of error correction sentence that indicates the adjustment speed of lack of equilibrium process toward equilibrium in long-term. Considering that the coefficient of error correction sentence has been estimated equal to (-0.4114), we conclude that in each period, about 40 percent of lack of equilibrium which has been created in dependent variable from its long-term equilibrium measures in a period, will be equilibrated and disappeared in the next period.

6.3. Model Estimation for South Khorasan Province

In this part of the chapter, the relation between the average of natural gas consumption of each family and the price of per cubic meter of natural gas of per capita income and weather temperature in Khorasan province are considered. The data have been used in seasonal form and during the period since autumn 2007[3] to winter 2012.

With regard to the same topic and econometric model, we prevent from stating the details.

6.3.1. Short-term Estimation of the Model for South Khorasan Province

According to the facilities of **Microfit**software and Schwartz-Bayesian criterion, **ARDL** model (2,0,2,0) was chosen as the best estimation model that the summary of the results has been presented in table (4-12).

Table (4-12)
The results of short-term coefficients in ARDL model (2,0,2,0)

Variable	Coefficient	Standard Error	T-Ratio	P-Value
$LCH_{KHORASAN}(-1)$	-0.1549	0.2567	-0.6034	0.437
$LCH_{KHORASAN}(-2)$	0.3562	0.2352	1.6253	0.036
$LP_{KHORASAN}$	-1.6139	0.4853	-3.3255	0.023
$LY_{KHORASAN}$	6.5245	3.2352	2.0117	0.049
$LY_{KHORASAN}(-1)$	-2.3265	2.9852	-0.77811	0.362
$LY_{KHORASAN}(-2)$	-9.3967	3.2562	-2.8837	0.039
$LT_{KHORASAN}$	-0.0629	0.0329	-1.6179	0.010
DUM	23.2541	3.05862	7.5958	0.075
DUM..P	-9.2589	3.7856	-2.5862	0.042
C	58.2875	32.2562	1.8052	0.026
R-Squared =0.87, R-Bar-Squared =0.85, F-Stat =11.7191[0.00]				
DW-Statistic =1.95 Schwarz Bayesian Criterion : -18.3784				

6.3.2. Short-term results for south Khorasan province

❖ Gas price variable was obtained statistically negative and meaningful and this indicates that the increase in gas price has a decreasing effect on natural gas consumption of each family.

❖ The per capita income variable was obtained positive and meaningful and this indicates that with increasing of per capita income, the natural gas consumption of each family is also affected and increased.

❖ Weather temperature variable has a negative and meaningful effect on natural gas consumption of each family, in other words with increasing of weather temperature, natural gas consumption of each family is also affected and decreased.

❖ Figurative variable (D) was obtained statistically negative and meaningful and this indicates that the increase of natural gas price in autumn 2010 after implementing the plan of making the subsidies targeted has had a decreasing effect on natural gas consumption ofeach family in south Khorasan province.

❖ Also diagnostic tests have been mentioned in table (4-13).

Table (4-13)
The results ofrecognition test of classic assumptions

Test Statistics	LM Version	F Version
Serial Correlation	0.720[0.396]	0.527[0.474]
Functional Form	0.6230[0.430]	0.2282[0.650]
Normality	0.4657[0.792]	Not applicable
Heteroscedasticity	0.2684[0.604]	0.2406[0.631]

As the table (4-12) shows, the recognition test of the classic assumptions for the estimated equation is statistically meaningful and there is no reason for rejecting zero hypothesis, because the number inside the bracket is more than 0.05. Therefore the model hasn't any problems about serial correlation, functional form (model stipulation), normality, heteroscedasticity.

Now, by using of these results, we test zero hypothesis of single root existence and lack of co-integration (long-term relation) between the variables of dynamic model. As it was mentioned, if the sum of the coefficients of variables with lag related to dependent variable is less than one, dynamic model will be oriented toward the long-term equilibrium model. The t-statistic quantity which is required for doing the above test is calculated according to what was mentioned before, as follows:

$$T = \frac{\sum_{i=1}^{p} \hat{\alpha}_i}{\sum_{i=1}^{p} s\hat{\alpha}_i} = \frac{-/6505 - 1}{0/3921} = -4/2093$$

Because the critical quantity which has been presented by Benergy, Doulado and Master (1992) in confidence level of 95% is equal to -3.43, therefore H0 hupothesis is rejected. So we can conclude that there is a long-term equilibrium relation between the variables of the model of effective factors on health index.

6.3.3. Long-term Estimation Model for south Khorasan Province

The results of the long-term estimation have been presented in table (4-14).

Table (4-14)
The results of the long-term estimation of ARDL model (2,0,2,0)

Variable	Coefficient	Standard Error	T-Ratio	P-Value
$LP_{KHORASAN}$	-3.2563	3.1685	-1.0323	0.0768
$LY_{KHORASAN}$	8.3287	3.7672	2.2486	0.0862
$T_{KHORASAN}$	-0.1752	0.6521	-0.2966	0.745
DUM	-12.325	3.2856	-3.8562	0.065
DUMP	-6.253	2.5632	-2.7865	0.075
C	123.152	65.1878	1.8893	0.085

The results of the model estimation in long-term indicates that with increasing of natural gas price, its consumption will be decreased. The per capita income variable was obtained with positive coefficient, but it isn't statistically meaningful.

The weather temperature variable was also obtained with negative sign but this variable also didn't appearmeaningfully in long-term.

Figurative variable was obtained with negative sign but this variable also didn't appear meaningfully in log-term.

6.3.4. The Estimation of Error Correction model for South Khorasan Province

In the following the estimation of error correction model that indicates the short-term relation between the dependent variable and independent variables of the model, is considered that the related coefficients to it have been presented in the table (4-15).

Table (4-15)
The results of the error correction model

Variable	Coefficient	Standard Error	T-Ratio	P-Value
ECM(-1)	-0.6813	0.2572	-2.6486	0.027

The most important thing in the error correction model, is the coefficient of error correction sentence that indicates the adjustment speed of the lack of

equilibrium process towards the equilibrium in long-term. Because **ECM** coefficient, between zero and negative, is one and meaningful, the long-term relation existence between the variables is confirmed through this method. Also considering that the coefficient of the error correction sentence has been estimated equal to (-0.68), we conclude that in each period, about 70 percent of the lack of equilibrium which has been created in dependent variable, from its long-term equilibrium measures in a period, will be equilibrated and disappeared in the next period.

7. CONCLUSION

According to the results of the stability test, the correlated model with distributed lag (**ARDL**) was used. Short-term results in Tehran province showed that:

- ❖ The gas price variable was obtained statistically negative and meaningful and this indicates that the increase in gas price has a decreasing effect on natural gas consumption of each family.
- ❖ The per capita income variable was obtained positive and meaningful and this indicates that with increasing of the per capita income, natural gas consumption of each family is also affected and increased.
- ❖ Weather temperature variable has a negative and meaningful effect on natural gas consumption of each family, in other words with increasing of weather temperature, natural gas consumption of each family is also affected and decreased.
- ❖ Figurative variable (D) was obtained statistically negative and meaningful and this indicates that increasing of natural gas consumption in autumn 2010 after implementing the plan of making the subsidies targeted, has had a decreasing effect on natural gas consumption of each family in Tehran province.

Also long-term results in Tehran province showed that:

- ❖ There is a long-term equilibrium relation between the variable of the model of effective factors on health index. So that according to the results of the long-term test, we can say with increasing of the gas price and weather temperature, gas consumption will be decreased. Also with increasing of the per capita income, gas consumption will be increased.
- ❖ Increasing of natural gas price in autumn 2010 after implementing the plan of making the subsidies targeted has had a decreasing effect on natural gas consumption of each family in Tehran province.

Short-term results in south Khorasan province showed that:

- ❖ The gas price variable was obtained statistically negative and meaningful and this indicates that the increase in gas price has a decreasing effect on natural gas consumption of each family.

❖ The per capita income variable was obtained positive and meaningful and this indicates that with increasing of the per capita income, natural gas consumption of each family is also affected and increased.

❖ Weather temperature variable has a negative and meaningful effect on natural gas consumption of each family, in other words with increasing of weather temperature, natural gas consumption of each family is also affected and decreased.

❖ Figurative variable (D) was obtained statistically negative and meaningful and this indicates that increasing of natural gas price in autumn 2010 after implementing the plan of making the subsidies targeted has had a decreasing effect on natural gas consumption of each family in south Khorasan province.

Long-term results in south Khorasan province showed that:

❖ With increasing of natural gas price, its consumption will be decreased. The per capita income variable was obtained with positive coefficient, but it is not statistically meaningful. Also the weather temperature variable was obtained with negative sign, but this variable also didn't appear meaningfully in long-term.

Therefore in responding to the research question, we should say that the increase in gas price causes to decrease natural gas consumption of each family and also income increasing causes to increase the gas consumption and with weather cooling, gas consumption will be also increased.

Increasing of natural gas price in autumn 2010 after implementing the plan of making the subsidies targeted, has had a decreasing effect on natural gas consumption of each family in south Khorasan province.

Notes

1. Auto Regressive Distributed Lag.

2. Pesaran, M.H. and Pesaran B. (1996), working with Microsoft, Interactive Economic Analysis Oxford: Oxford Universitypress.

3. It is necessary to be said that the start of delivering gas to the regions of south Khorasan province has been since 2007.

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