

The Effects of Converting Energy Indirect Subsidies to Direct Subsidies on Household Electricity Consumption in Iran

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ABSTRACT

Solving the structural problems of Iran's economy and for the most effective usage of irretrievable energies, creation of bonus economy, optimizing the production and consumption of energy and establishing economic and social equity, the law of targeting subsidies started to be performed in Iran. In this appeal, for surveying the effects of such targeting on electric usage of Iranian families, after stating the importance of the research, the hypothesis are posed and in the method of the research which is descriptive-analytical, after gathering data and its analysis with ARDL model (auto regressive distributed lag), the effects of increment in electricity on families' welfare were calculated. The equation of electricity demand in domestic section was counted. Besides, the lost welfare in such was computed. The results show that performing the electricity price's increment and the equal direct payment of subsidies to families has resulted in a delicate increase in welfare of poor and low class families, though this equation is reversed for middle and high income families i.e. decrease in their welfare. Likewise, the findings show that the amount of domestic electricity consumption after performing the subsidies targeting decreased and targeting has not resulted the satisfaction of families. And due to increase in life expenses, dissatisfaction of families are rather resulted in cities life.

KEYWORD: Targeting subsidies, energy bearer, consumed electricity, ARDL model.

INTRODUCTION

Paying the indirect subsidies has been one of the most prominent problems of Iran's economy and since then, there have always been endeavors to obviate these issues [1,3]. Of such, we can point to the annual increment in prices of energy bearers which comprises the most quote of subsidies paid by the government as well as economy adjusting policies are of very samples of efforts done towards targeting the subsidies in the past years. The ninth government, considered and performed the law of targeting subsidies in the mode of economic upheaval to maximize the optimized usage of irretrievable energies, to create bonus economy, to optimize and promote technology in production and consumption and in equipment of energy consumers as well as social equity [2]. According to the law, the government pledged on one hand to provide the grounds such as developing public transportation and activating and performing makeup policies of liberating the prices and price tagging energy bearers according to last price and the prices of whole sale of Persian Gulf, and on the other to spend the revenues gained through such to affairs such as direct and makeup help of government to susceptible families and economic enterprises as well as creating economic infrastructures and developing social welfare system[4,12].

The importance of research:

Since one of the most important goals of share payment is to help to the susceptible and low income class of society, promoting production sections and developing the exports, though, the recent decades of Iran's experience shows that paying the indirect subsidies specially subsidies of energies in a controlled way and keeping the prices of energy bearers low, not only has reduced the income gap but also the conditions were worsened towards the increase in social class gaps and inequity in economy and increasing the economic status of high income class of society. Likewise, in production section, paying the subsidies has caused the decrease in the technology of production, yielding low and replacing the permanent energy to the other production factors. Henceforth, this study aimed at surveying the effects of targeting subsidies of energy in electricity consumption of families in Iran.

REVIEW OF LITERATURE

Not many studies have been done about the paying the energy subsidies in different countries of the world. Caroline Ferond and Christin Walich in 1995 [9] in a case study, surveyed the disadvantage of increasing the energy

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price on the families in Poland and showed that overall, in high income families, more welfare has been lost. They resulted that supposing the requirement is zero, welfare of poor families in 5.9 percent decreases while this is 8.2 percent in high income families. According to the kind of energy, the amount of lost welfare of families has been more in electricity price increase.

In another study, Lin Vigan in 2010[10] has computed the subsidies of China's energy in 2007 based on the data gathered in 2007 through using public equity model and in continuation, in three scenarios the effects of correcting the subsidies in China has been detected and surveyed. Their results showed that China in 2007, a figure equivalent to 1.43 percent of their impure production has paid through subsidies. In the first scenario, the total deletion of subsidies caused the decrease in the families' welfare, gross domestic product (GDP) and employment, 2.03, 1.56, 1.41 respectively. Also, the intensity of energy and dissemination of brimstone d-oxide, and carbon d-oxide decreased 3.56, 6.83, 7.03 respectively. In second scenario, subsidies are repaid to the families again. Families' welfare, gross domestic product (GDP) and employment increased 0.16, 0.37, 0.53 respectively. Also, intensity of energy, and dissemination of brimstone d-oxide, and carbon d-oxide decreased 2.71, 4.83, 5.91 percent respectively. In the third scenario, following omission of subsidies, 50 percent of subsidies were redistributed which resulted in increase in welfare of families, GDP and employment to 1.52, 1.74, 2.07 respectively and the intensity of energy and dissemination of brimstone d-oxide, and carbon d-oxide decreased 1.95, 3.61, 4.73 respectively.

Research hypothesis:

1. Targeting energy subsidies increases the family's welfare.
2. Targeting energy subsidies causes decrease in domestic electricity consumption
3. Paying direct subsidies decreases the expenses tensions caused by domestic electricity targeting on low income families.
4. There is a significant relationship between performing subsidies targeting and satisfaction of families.

RESEARCH METHODOLOGY

According to the aim, this research is practical and according to the method, it is descriptive-analytical and from the data gathering view point, it is a descriptive-purview. In this research, first stating the introduction and review of literature, then hypothesis are posed. About 109 families in Iran are taken as statistical samples. After making sure of justifiability and perpetuity, questionnaires are distributed and data are analyzed through SPSS and EXCELL. The advantage of such method is that the effects of performing subsidies targeting of electricity can be measured easily.

For counting the effects of increase in electricity price on domestic welfare in varied income families, firstly, the equation of electricity distribution in domestic section for different groups are calculated with auto regressive distributed lag (ARDL) model then the modification of bonus welfare of consumers and net lost welfare undergo computation[6, 7, 8]. Five groups are divided and two-way logarithm is used for requirement equation. Per-capita consumption is considered as variables of per-capita income of (YR), the average price of real electricity sale (RP).

$$Lq_{it} = B_1 ly_{it} + B_2 lrp_{it} + B_3 d_1 + u_t$$

They are the indicators of surveyed groups.

For calculating this modification, Hasmen method is used. After computing co-efficient from this equation, anti-logarithm is taken to reach the following equation:

$$q_i = y_{T_i}^{B_1} r_p^{B_2} e^{B_3 d_1}$$

For taking the sum of profits gained from modifications of price, Hiski function shall be suitable to primary level then through replacing the sum of p^1 in this function, Hiski's sum can be calculated.

The sum of profit gained from price modification: $Hq_i(r_p, u^0) * drp$

$$\text{Function of Electricity's Hiski: } Hq_i(r_p, u^0) = \frac{\partial e(r_p, u^0)}{\partial r_p}$$

Then, the sum of this function shall be calculated in rp^1 point as it is shown by Hq_i^1 . Likewise, for statistical analysis of data in descriptive analysis, the average, data table and percentage and in substantialized analysis, the singular independent T test and variance test are used[5, 11].

Statistical inference and the results of sample estimation:

In this research, variables used include family dimension, majority of population in Iran, per-capita income in varied income groups, electricity price in domestic sections in recent years before targeting subsidies and two years after targeting the subsidies. Five functions of requirement has been estimated for surveying families' welfare in different groups of incoming in which:

q_i : the amount of consumed electricity per-capita in group i Is based on Kw/h.

r_p : it is the real average price of electricity which this price is gained through dividing the electricity price to the index of consumer's price based on 1387

y_i : the per-capita income in group "I" is based on the year 1387

D_i: Variable is virtual

In this survey, the requirement function has been based on logarithm form; hence, price and income co-efficient are indicators of traction. After making sure of existing long-term relationship between variables, requirement function in varied income groups have been calculated based on ARDL method as the results are shown in table 1.

Table number (1)

Income group	descriptive variable	computed co-efficient	statistic sum of T
Group 1	Ly ₁	0/48304	10.5873
	lrp	-0/61113	-2/4808
	D ₁	-0/15541	-0/4181
Group 2	Ly ₂	0/51816	10/5598
	lrp	-0/70285	-2/6412
	D ₁	-0/24883	-0/54489
Group 3	Ly ₃	0/53206	14/6483
	lrp	-0/91438	-5/2832
	D ₁	-0/39463	-1/1832
Group 4	Ly ₄	0/53241	23/8735
	lrp	-0/83931	-8/8631
	D ₁	-0/49138	-0/2834
Group 5	Ly ₅	0/57868	10/1366
	lrp	-0/72351	-2/7887
	D ₁	0/55601	1/8981

In table no. 2, the amount of makeup modification and lost net welfare in each income group is illustrated.

Table 2: lost net welfare in each income group based on rials

Income group	makeup modification (cv)	decreased expenses due to price increment	lost welfare
Group1	38550/2	34877/6	702/6
Group 2	38857/4	37162/03	1695/37
Group 3	38948/08	37234/05	1714/03
Group 4	39123/01	37385/09	1738/01
Group 5	55348	48232/07	7115/93
Total	207856/69	194857/84	12965/94

As it is observed, due to increase in electricity price, the most decreased expenses caused by increment in price of electricity is in group five and the most lost net welfare also belongs to group five and the least decreased expenses caused by increment in price of electricity is observed in group one and the least lost welfare also belongs to group one. Hence, the welfare of high income groups is seen to be lost more.

In general, having performed the increase in price of electricity and paid the direct and equal subsidies to all the individuals in society, causes the increase in welfare of low income people while decrease in welfare of high income families.

The findings of this research in relation to second hypothesis is that targeting energy subsidies decreases the domestic electricity usage. Table 3 is indicator of fact that the amount of statistic of test (9.37) is more than 1.96 hence it can be concluded that the test in level 5 is significant. Therefore, the second hypothesis is substantiated and energy targeting causes decrease in amount of domestic energy usage.

Table 3: test results related to second hypothesis

Results	critical regions	freedom degree	statistic sum (t)	average difference ($\bar{x} - 3$)	Average (\bar{x})	No (n)
H ₀ unaccepted	$t > t_{0.05,108} = 1/96$	108	9/37	0/528	3/528	109

The findings of the research related to third hypothesis, direct payment of subsidies, decreases the pressures of expenses caused by domestic electricity targeting subsidies for low income families. Table 4 indicates the amount of statistic of test (6.84) is more than 1.96 hence it can be concluded that test in level 5 percent is significant therefore, third hypothesis is substantiated that direct payment of subsidies decreases the pressures caused by targeting subsidies for low income families.

Table 4: the test results related to third hypothesis

Results	critical regions	freedom degree	statistic sum (t)	average difference ($\bar{x} - 3$)	Average (\bar{x})	No (n)
H ₀ unaccepted	$t > t_{0.05,108} = 1/96$	108	6/84	0/530	5/530	109

The research findings related to fourth hypothesis is the relationship between performing targeting subsidies and families' satisfaction. Table 5 indicates that statistic sum of test (-2.125) is less than 1.96 hence it can be concluded that the test in level 5 percent is not significant therefore, fourth hypothesis is not substantiated that targeting subsidies brings along the families' satisfaction.

Table 5: the test results related to fourth hypothesis

Results	critical regions	freedom degree	statistic sum (t)	average difference ($\bar{x} - 3$)	Average (\bar{x})	No (n)
H_0 accepted	$t < t_{0/05,108} = 1/96$	108	-2/125	-0/09	2/91	109

Summary and conclusion:

Surveying the results of targeting subsidies of energy on electricity of families in Iran, represents the fact that through performing the policies related to incrementing the price of electricity and paying direct and equal subsidies to all people in society, causes the increase in welfare of low income families though decrease in welfare of middle and high income families. Likewise, the findings of the research represents targeting the electricity subsidies for families of low income is decreased due to makeup direct payment by government. Also, the linkage between performing targeting subsidies and satisfaction of families indicates that targeting subsidies has not caused in satisfaction of families and due to incrementing the life expenses, dissatisfaction of families has been inevitable.

Suggestions:

1. Indicating the low and middle income families to set forth the more monetary help of government as susceptible group
2. Paying a sum as equal and constant to all families, including poor and rich requires principle revision. Through this revision and paying more to susceptible families and deletion of such paying to high income ones can be right steps towards performing governmental economic justice.
3. Supporting economic enterprises and producers through increasing their motivations for production of more qualified products based on standards in a way that finished price is less for consumers which may increase their satisfactions and welfare.
4. Performing thorough and precise economic upheaval and correcting the tax and monetary system
5. Second phase of targeting subsidies of energy especially subsidies of energy bearers to be performed with mild steep and gradually.
6. Conducting the similar appeals in rural regions of Iran.

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