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Energy carriers and welfare cost (case study of Iran)

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Abstract. In this article we study the effect of price increase of energy carriers on welfare costs of Iran′s consumers using the indexes of welfare cost measurement EV and CV and demand function AIDS. Data used include the price of energy carriers (petrol, kerosene, gas oil, fuel oil, liquid gas) and their amount and consumption share in the time period of 1378 -1353. The results of model show that increase of prices or realization of prices based on price scenario suggested by government result in consumers′ welfare reduction 16/5% in the society. To compensate peoples′ income to reach initial welfare, government must pay 510000 rails.

Keywords: Welfare, consumption, pricing, energy, energy carriers

1. Introduction

The study of energy section status in country shows that pricing energy carriers is adjusted in the framework of government social and economic policies. Also non –observance of technical problems and use of energy technology have resulted in strong wastage of energy resources in Iran. In another connection, government subsidizes huge amounts to the different sections fixing energy ruling prices. But we know that the largest part of subsidies belongs to the wealthy. Additionally, subsidization results in non- optimal and non- efficient allocation in energy costs and resources wastage. So one of the important problems related to energy in Iran is to provide optimum equilibrium between demand and supply, increase of consumption efficiency and its pattern modification. Some of the researchers believe that one of the important causes of high energy consumption is the low level of energy carrier's price compared to its real rate. According to these, the very low price of energy compared to the price of the other production factors and goods has resulted in the increase of energy consumption. So it is very important to check – up trend of energy consumption based on current leverages. Also the most analysts believe that firstly energy price is not in the lower level than its own equilibrium price; secondly, logical decision – making about the increase of energy carriers price given to increase of goods cost index and consumer′s services necessitate that this problem is studied with more sensitivity. However, given to serious decision of policy – makers about increase of energy carriers price, it needs study of the effect of increase of energy price on its consumption , price elasticity and the most important of all welfare cost rate provided in families level and the other economic factors .

As a result we should study the energy section from the demand dimension. However the non –price policies are very important and efficient and the estimation of energy demand should be considered in the different sections in energy resources management. To clarify this matter we explain the following cases. For example in budget 1389 government has predicted that would earn incomes through realization of energy carriers price and reduction of the subsides in this section. Based on some studies, it is said that if the price of energy carriers is increased 5 times of current price averagely, we can access global standard price level. Now the question is that how the increase of energy carrier's price resulted in providing social welfare cost. The main goal of this study is to answer this question .

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2. The importance and necessity of research

Energy is one of the most important social, politic, and economic issues. Our country, Iran, has the rich energy resources. The appropriate economic management of terminable energies is very important. In our country Energy section confronts many problems. The strong increase of consumption, reduction of expert share, non – substitution between fuels are the current problems in consumption and energy section. So, the optimum pricing the kinds of energy is one of the important problems in energy resources management.; because with the trend of current consumption ,we will need the large imports of energy carriers to provide country′s needs in the future that it is the result of the non – efficiency management policies , misconsumption , and …. Per capita consumption of energy in Iran in 1387 has been more than 14/783 barrels equivalent per capita energy. Finally given to discussion and current conditions in allocative pattern of consumption in sections of energy carriers and given to the serious decision of country′s executive policy –makers for realization of the price of energy carriers , it is needed to answer the above question practically . Answering this question can deliver an appropriate evaluation from the consequences resulted of execution this policy to the public sector policy –makers .

3. Goals of research

As it is clarified in the problem description and necessity of research section, the main goal of this research is to measure welfare cost resulted of the increase of energy carriers prices to provide an appropriate politic pattern to realize the price of energy carriers.

4. Subject variables

In this research we need these variables:

- Consumption rate of energy carriers (include gas, diesel fuel, petrol, kerosene, gas oil, fuel oil, liquid gas).
- Consumption share of energy carriers (gas, diesel fuel, kerosene …)
- Price of energy carriers (the index of gas, petrol, diesel fuel price,)

5. Hypotheses

- Increase of energy carrier's price results in providing social welfare cost .
- Increase of welfare cost resulted of price change of energy carriers in Iran has a more increasing growth than prices level related to energy carriers .

Questions of research

- What is the relationship between income and consumption costs in the section of energy carriers?
- Does the increase of energy carrier's price in Iran results to provide considerable welfare cost?
- How much money should be paid to people, if the price of energy carriers increases, to reach them their own initial welfare level?

6. Type of study, method and mode of performance

This is a theoretical and practical study. In this research to study welfare cost, firstly it is needed estimate the demand functions the kinds of energy carriers. After estimation of demand, compensation changes (CV) are calculated .Here, to evaluate welfare changes resulted of the changes of energy carriers in Iran we use demand system AIDS and index CV related to this system. The characteristic of demand system AIDS is that can use neoclassical assumptions of demand function and Slateski relations between equations, budget constraints and homogeneity. Then demand function AIDS is extracted of Diton and Molbair′s costs function that has the following form:

$$\log c(u,p) = (1-u)\log a(p) + u\log b(p)$$

Where a and b are a function of the prices and u is utility index which is zero for poor people and 1for the wealthy. Finally, Using Lemschephard and microeconomic relations we can obtain the following demand function:

Now after estimation of above system function, we can measure welfare changes.

We know that obtained consumers′ utility rate may increase or reduce with the change of economic conditions. To how and the magnitude of consumer′s utility effectiveness from the economic conditions change, we use compensation change CV.

7. Tools of data collection

Data of cost section were collected from samplings of Iran′s demographic center and energy balance sheet. Data related to index of prices were collected from information of Central Bank .Also data related to energy consumption have obtained from the balance sheet of energy ministry.

Statistical universe, sampling size, sampling method

In this research, we have studied time period 1353- 1387(1974-2008). We have used demand equations system, unrelated regressions method and indexes of welfare changes.

8. Conclusion

- given to trend of Stone index during 1353-1387 we can observe upward trend of prices in energy carriers section in Iran.
- There is many changes in the trend of index CV .This index have been influenced by price changes of energy carriers during different years. Also averagely 4/5 %of consumption cost in energy section is the lost welfare value resulted of price increase of energy carriers .But can we compare this value of welfare cost during the large time period to welfare cost 16/5% during a short time ?
- As the results of this research show the real time increase of energy carrier's results in significant reduction of society′s welfare level .Therefore to compensate people′s income to reach the initial welfare level, government must pay 510000rials to everyone.
- Based on obtained results we can observe that price increase of energy carriers results in social welfare cost. So our first hypothesis is not being rejected.
- According to the second hypothesis based on that welfare cost increase resulted of price increase of energy carriers has a more steep ascent than the price level of energy carriers , the results show the reverse of this hypothesis ,so our second hypothesis is rejected .
- It is better that the price of carriers isn’t suddenly increased and it is better that this is a step increase.

9. Suggestions for future researches

This research has been studied in partial equilibrium; and the effect of price increase on the other goods has not been studied. It is suggested that in the future researches, model will study in general equilibrium.

Income tenths an economic deciles and income classification have not been considered in this research. This important factor should be considered in the future researches.

Politic advices in the subsidy section of energy carriers

Undoubtedly, the allocative and distribution pattern of subsides (especially in the section of energy carriers) must be changed because of unfair use of an economic deciles. But how to change the distribution pattern is very important. So in the following, we have tried explain the important subjects in policy – making in this section.

The sections in which production goods have consumption and intermediary characteristic should be differentiated. .Firstly, the pricing pattern of sections in which energy carriers are as consumption goods should be changed.

It is better instead of clustering based on income ,clustering based on per capita consumption is considered With differentiation of consumption energy carriers in the home , trade , industrial and …. After clustering based on consumption, the price of energy carriers should be realized in high –consumption sections.

The results of study in the industrial sections show that about 60/7% sale of industry section belongs to the large industrial agencies in Iran. And more than 50%energy is used in these industries and most of these

are governmental or semi – governmental industries. Given to this reality in Iran′s economy, to prevent the negative effects of prices increase in the whole economy, it is rationale that realization of energy carrier's price in the industry section is prioritized. For this purpose, at the first years of plan implementation the price of carriers should be realized in the large industries section. And in the middle years and at the end of plan, it is generalized to the total industrial sections. This policy has main advantages. Firstly it prevents lock- out most of small agencies and provides an appropriate opportunity for reconstruction and foundation of production organization for medium and small agencies. Secondly, it prevents advice in price of produced goods in the industrial section. Thirdly, it doesn't allow deleting the private section from the country′s industrial activities (because in Iran most of private agencies have small or medium production scale).

The realization of the price of energy carriers should be prioritized. This attitude is associated to high inflation (based on this attitude that in the first phase of plan implementation, the price of all carriers must be changed but with a proportional gradient). It is better this is prioritized and the carriers like kerosene and petrol with a heavy gradient are increased and the carriers like fuel oil and gas are increased with a partial gradient .

Unfortunately in the calculation of subsides value, the cost of non –efficiency and weakness of administrative apparatus and the other production sections take account of subside. For example, if actual cost of power in Iran 832 rials is considered, more than 20%this price should take account of non-efficiency in production and distribution of power industry. So if directiveness of subsidies is considered from this view, income earn doesn’t mean. So the cost of non-efficiency must be deleted from the amounts of subsides.

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