Systematic Approach to the Budgeting of Municipalities in Terms of Applying Adjustment Policies of Energy Prices

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Abstract: Implementation of targeted subsidies law has influenced the revenue and costs of these organizations directly or indirectly. In this regard, studying the impacts of mentioned plan on revenue resources and municipalities' costs of the country is of great importance with systematic approach in municipalities' budgeting. The impacts of adjustment policies of energy prices on municipalities' revenue and costs can be assessed systematically based on input-output models. What complicates the issue is the adjustment of municipalities' costs issues.

Rise in the price of energy carriers may directly lead to increase in revenue from value added tax act for municipalities through increasing revenues from duties related to fuel and electricity. In order to estimate the impact of the implementation of the first stage of law on the income item, consumption and price of energy carriers were used in the years before and after of the law. Having information about price and consumption after targeting, this makes it possible to calculate the increase of Rial value of use of different energy carriers in the year and calculate the rate of increase in duties of each fuel for all municipalities and rural municipalities in the country by using obtained figure and applying toll collection rates related to municipalities, specified in VAT act, as well. The impact of adjustment of energy prices on the inflation of different products can be stimulated by using price model based on input-output table. Increase in the costs of municipalities can be calculated according to obtained inflation in goods and services of the total economy. This type of simulation will be based on systematic approach and all direct and indirect effects are considered in it. Budgeting of municipalities based on mentioned approach will result in balanced budget.

Keywords: balanced budgeting, input-output model, municipalities' revenue and cost, price model, policy of adjustment in energy prices
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1- Introduction

Document budget (revenues) and expense (costs) of an organization or a national or local government is like municipalities' budgeting. Revenue and cost streams are influenced in terms of applying adjustment policies of energy prices. Value added tax (VAT) is one of financing methods of municipalities affected directly and positively by adjustment policies of energy prices, but municipalities' costs influenced directly and directly by adjustment policies of energy prices. The main question in this article is "what approach and model should be a base for expert tasks in municipalities' budgeting in order not to be faced with budget deficit."

The issue of energy prices adjustment has been considered by Iranian policy-makers and officials so that it has been emphasized in all development plan, particularly the third and fourth plans, after Revolution. Considering the important matter, the ninth government proposed targeted subsidies bill in 2008 and its law was adopted by Islamic Consultative Assembly with some changes in 2009 upon which energy carriers, water and bread were presented with new prices across the country from December 19, 2010. Therefore, implementation of the first stage of targeting subsidies law has been started from December 19, 2010. It seems that the adjustment of energy prices would be continued even after completion period of targeting law because of economic gap of energy prices and current prices in the future years. Even though targeting subsidies law has been proposed nationally and the effects of implementing the plan have been studied nationally that the most fundamental of which is to reform energy prices and cash subsidies, its impacts are of great importance locally- particularly the impacts on revenue resources and municipalities' costs in the country. To achieve ideal situation and remove gap between current and ideal situation, many plans, projects, and decisions have been adopted in the national economy arena such as socio-economic development plan and Iran's 20-year perspective document. Special attention have been paid to targeting subsidies issue in the law of the fourth development plan that the most important of them can be referred to the retention paragraph "a" of article 46 of the third Plan's law.

Item "A" of Article 46 of the Third Plan's Law

The government is obliged to take legal actions by doing expert studies and investigations up to the end of the second year of the Third Development Plan for targeting basic commodities including wheat, rice, vegetable oil, sugar, cheese, milk, medicines, dry milk, fertilizer, seed,and pesticide. It was decided during the Fourth Development Plan in 1384 to withdraw part of the difference between the real price (production cost without considering fuel price) and obligatory price of the products that determined by the Parliament, out of the limited single article from foreign currency reserve account, and pay to refining and distribution, gas and TAVANIR companies. The volume of these resources was gradually increased and it

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was reached to nearly 42,000 billion Rials in 2007. It was decided that the withdrawals to be included in the budget law in 2008 and 122000 billion Rials were considered for this purpose. The amounts form the second part of energy subsidies. The government paid 319264 billion Rials, 383557 billion Rials, and 504691 billion Rials as implicit subsidies in 2005, 2006, and 2007 respectively (Tasdiqi et.al, 2008).

Targeting energy subsidies in Poland has formed part of economic reforms plan after collapse of socialist system that their most successful plan was in the East Bloc nations. According to the mentioned package, paying subsidies to industries was cut in shock therapy method.

The Bulgarian government strongly supported the energy sector until the economic reforms. Supporting this sector was decreased with economic liberalization program began in Bulgaria in order to reduce public debt and increase investment and currently, households are the only users of the benefits of energy subsidies. The process of reforming energy subsidies in Bulgaria was very effective. Subsidies share of GDP was decreased since 1998 so that it was reduced to 0.4 percent from 2.5 percent by 2002 (Tootoonchi, 2008).

Indonesian government uses the allocation of direct subsidies to oil products to support low-income groups and poor households. Indonesia tries to amend and supplement laws and regulations for rational use of energy.

Chinese government has a long history of paying subsidies in the energy sector. Although energy carriers pricing system has changed partially and it is tries to consider the impacts of changes and transformations occurred in international markets, the price of most fuels is announced through the instructions and circulars in China. Therefore, the liberalization of the energy sector is considered with this assumption that the government will gradually eliminate paying subsidies.

Turkish parliament approved a plan in 2004 in which domestic oil production costs were amended (Qaderi, 2005).

2- Literature Review

Ministry of Commerce did a research in 2005 in order to simulate the effects of eliminating energy subsidies in Iran by using social Accounting Matrix in three different scenarios: 1. 50% increase in the prices of petroleum products, electricity and natural gas 2. Increase to the level of world prices 3. Rise in the price of all energy carriers to the world price level simultaneously (Permeh, 2005).

Majlis Research Center studied the effects of eliminating energy subsidies according to Input-Output (OI) table. The issue was emphasized that model can be specified in the economic arena in order to predict surely the impacts of implementation of this plan; a sudden and simultaneous reform of total price of energy carriers paying cash subsidies in a wide range (Tasdiqi et.al, 2008).

The impact of rising gasoline prices as input of different economic sectors on the cost of their output was studied in this research by using analytical relations of input-output table, technical coefficient matrix of Iran economy, and Leontief

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matrix coefficients. The rate of rise in consumer price index due to price increases was calculated by using the related information to the share of cost of each good related to different economic sectors in household's expenditure.

The rate of change prices of various products because of changing the price of oil products four times was calculated in the study of working group on transformation plan in the first stage by using table of direct coefficients of Iran's economy (91 products× 91 products) and IO price model. Thus, the mentioned price shocks influenced on water and air transport services with 43 and 42 percent respectively the most and then, on road passenger-transport services with 21%, and the least affect crude oil and natural gas, and public primary education services with 0.1% and 0.5 percent respectively.

3- Theoretical Principles

Municipalities play key role in production and supply many local and public goods and services such as highways, streets, parks, and urban cleaning. The primary tasks of municipalities can be considered mainly as producers and in charge of public products in cities. Thus, generally municipalities are responsible for producing and presenting public goods and services in economic system. In return, they receive tax and cost of services from citizens with the approval of the competent authorities in order to finance their duties. In fact, municipalities are counted as an independent body that they must try to earn. Undoubtedly, implementation of targeting subsidies law has affected revenues and costs of the institution directly and directly. If the issue is neglected, it can have heavy consequences for cities; since municipalities are considered as the most important institutions of public sector and they devote particular position to themselves in the economy of cities and society by creating very high turnover in the country. The position of municipalities and wide volume of their performance would result in their much effectiveness of implementing great plan such as targeting subsidies. It is obvious that acquiring much awareness of positive and negative consequences of implementing mentioned plan for municipalities will lead to better use of opportunities, confront threats and even change them into opportunity (Akbari et.al, 2011).

The impact of moderating energy prices on each municipality should be investigated in two dimensions of revenues and costs. Generally, income resources of each municipality in the country are:

1. Revenues from general (continuous) dues
2. Revenues from specific dues
3. Cost of services and revenues from municipalities' profit institutions
4. Revenues from municipal funds and properties
5. governmental and organizational aids
6. Donations, gifts and assets
7. Other sources of funding

Each of the above income resources has topics and sub-topics that are almost

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equal for all municipalities in the country with slight differences.

Among different municipalities' items of income, major revenue resources that can be influenced by adjustment policy of energy prices are revenue from VAT and construction revenues for municipalities. Fundamental items of income from construction are as follows:

Tax on construction permits

Tax on separation of land and buildings

Tax on balcony

10% infrastructure tax

Tax on parking removal

Fine of Article 100 commission

Dominance right revenue

The adjustment of energy carrier's price can affect construction costs. From this perspective, municipalities' revenue and their construction incomes in particular may be influenced by demand for construction permits. In fact, adjustment of energy prices affects construction revenues indirectly. Revenue codes received according to VAT law are as follows:

Tax on gas

Tax on subscribers' price of water

Tax on phone (landline phone and cell phone)

Tax on electricity

Tax on public places

Effects on sites and halls

Tax on manufacturing

Tax on soft drinks

80% of tolls and collected revenues

Tax on contracts

Aid from customs tax

Focused collected tolls

Rise in the price of energy carriers can directly lead to increase revenue from VAT for municipalities through enhancing revenues from taxes related to fuel. In fact, it should be said that the most common and obvious impact of adjustment policy of energy prices on revenue from municipalities' VAT is affected by construction dues (Akbari et.al, 2011).

Construction revenues devote high share of municipalities' income in the metropolises to themselves; therefore, they are of great importance among municipalities' revenue resources. This reveals when we can consider that more than 60 percent of metropolitan municipal revenues have been from construction ones.

Tax is the difference between the value of goods and presented services with the value of goods and purchased or obtained services in a specific period in the VAT law. In addition to determined tax rates for different goods and services that belong to the government, tax rate belongs to the municipalities. Municipalities are responsible for collecting part of it and another part is collected by Tax Affairs Organization. Some articles of VAT law that determines municipalities' collected taxes have been briefly mentioned in the following:

Article 38: according to the article, the rate of municipalities and rural municipalities' tax is as follows regarding goods and services subject to VAT law in addition to rate of collected tax in article 16:

a. All goods and services subject to article 16 rate of the law, 1.5 percent

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b. Types of tobacco products 3 percent

c. Different types of gasoline and aviation fuel: 10%

d. Kerosene and gas oil: 10% and fuel oil: 5%

According to Note (1) of this Article, pollutant-manufacturing units, that do not observe standards and regulations for environmental protection and oil refineries or petrochemical plants, are subject to the pay one percentage of the sale price as pollution tax in addition to tax and dues regarding the law. It is based on the Environmental Protection Agency's diagnosis (it is announced by March 5 of every year for implementation in the next year). Mentioned taxes within the cities are paid to the municipalities' account near the location of production units and they are paid to the account of Interior Ministry for production units outside of the cities in order to be distributed among rural municipalities of that city.

Article 41: equal to 1.2 percent of customs value of importing goods, that their input payment (tax) is collected from credits, are considered in the regulations of annual budget of the country every year. It will be at the disposal of the Interior Ministry in order to be considered as payment aid and definite costs to municipalities and rural municipalities in the country according to the regulations (according to provisions of Note (2) Article 39 of the Law on VAT).

Article 43: according to this article, tax and dues on certain services are determined as follows:

a. Passenger's suburban transport in the country with land vehicles (except railway), naval and air, 5 percent of ticket price (as taxes)

Collecting the taxes is assigned according to the Article 46 of the VAT Act to the neighborhood municipality and mentioned taxes are deposited to the municipality account.

b. Annual tax on types of passenger cars and two-cabin pickups including domestic or imported ones is equal to 0.01 percent of factory price (domestic) or 0.01 percent of total value of customs and their duties

Vehicles with a life of more than ten years (except NGVs), tax increases for spending each year (up to ten years) annually 10 percent and up to 100 percent of mentioned taxes.

c. Numbering types of passenger cars and two-cabin pickups including domestic or imported ones except urban or suburban public passenger cars; 3 percent of factory price or total customs value and their taxes (two percent tax and one percent dues)

Collected dues from this source should be deposited to focus account of funds, according to the article 46 on VAT act; in order to be distributed and spend according to the Note (2) Article 39 of the Act.

The titles of income resources from implementation of law on VAT are as follows:

- Gas dues
- Dues on subscribers' water price
- Dues on phone (landline phone and cell phone)
- Electricity dues

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- Public places dues
- Sites and Salons dues
- Factory product dues
- Soft drinks dues
- 80% of dues and collected revenues
- Dues on contracts

It is possible to calculate rise Rial value of different energy carrier's consumption in different years by having the information about price and the consumption of energy carriers before and after the implementation of adjustment policy of energy price. Then, the rate of increase in dues from each fuel for all municipalities and rural municipalities in the country is calculated by using obtained figure for Rial value increase of energy carrier's consumption and applying rates of different types of petroleum and aircraft fuel (10 percent), kerosene and gas oil (10 percent), fuel oil (5 percent), LPG, natural gas and electricity according to the rate of other goods and services (1.5 percent).

Municipalities' costs are divided into two categories of current and construction costs. Each of these costs includes topics and sub-topics (Akbari et.al, 2011).

Current costs are consisted of two general duties; administrative and urban services. Each of them includes four topics; personnel, administrative, capital and transitional costs.

Definitely, adjustment policy of energy prices has affected current costs of municipality. Fuel, water, and electricity costs are major issues influenced directly by implementing it.

Transportation is one of the most important issues linked with people's daily life. This sector would be changed by full implementation of targeting subsidies law. Transportation costs have not had basic position following urban households' decision-making. Implementation the changing law of transport costs would lead to serious changes in households' locational decision-making and urban jobs. Accordingly, the issue of public transportation in cities would confront with considerable increase in demand.

On the other hand, increase in fuel in public transport area costs may create serious problem in supply of the services. Therefore, it is necessary to predict the rate of rise and its impacts.

Construction costs include urban development planning, leading and disposal of interurban surface water, transport and improvement of urban traffic, creating protective facilities for cities, improving urban environment, creating sporting, cultural, touristic, and religious places, creating other urban facilities, construction costs.

According to the components of construction costs, it can be said that construction costs would be affected by increasing energy carriers' price indirectly with implementation of energy prices adjustment. In fact, rise in energy carriers' price will increase costs related to providing material and necessary equipment for development plans; therefore, construction costs will be increased as a result (Zenoz, 2011).

Thus, generally it can be said that liberalization the price of energy carriers influence municipalities' costs directly and indirectly. The major direct impact is

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occurred by current costs, and construction costs will affect indirectly.

4. Research Method

The adjustment policy of energy prices would be continued to reach economical prices during next years. Municipalities' budgeting will be affected by implementing these policies. Achieving to balanced budget is one of the budgeting goals. Revenues and costs should be predicted correctly in this regard. For this purpose, it is necessary to address mentioned process based on a systematic approach because of direct and indirect impacts of adjustment policies of energy prices. Input-output modeling would be able to help to planners of municipal budget in this way. The method is one of the linear economy methods that it has many functions in policy analysis. The functions are prediction of demand, production, and employment, investment for sectors separately for a country or a smaller economic area, study of the transformation of technology and its impact of efficiency, effect of changes in wages or profit on the price, study of economic relationships among countries and regions, and using natural resources and economic planning. Other items can be added to this list such as predicting imports and generally commercial balance, estimating energy consumption, distributional effects of state budget, determining the discount rate, the impact of financial tools such as standard rate of taxes (revenue, VAT), the effect of tax exemptions and social costs of the government (health and education), cyclical economic effect and environmental issues, and urban planning.

The first step in the use of general equilibrium theory in empirical analysis was the Leontief's work in designing input-output table. He designed an input-output table for the American economy in 1930 including different agriculture, industry, and transport sectors. He founded input-output analysis with the help of relations of national accounts. The analysis includes interactions and relationships of markets and different production sectors of a country or an area. The first formal function of input-output table was in prediction of employers' distribution in in the aftermath of World War II in the United States. Bureau of statistics and human power did the research in 1939 by using 96-part table. A group of 50 people in the same office started to prepare a 500-part table in the U.S. in 1949 that it was lasted until 1953.

Analytical input-output table is symmetric one; sector in sector or commodity in commodity. Sector in sector table indicates what each economic sector presented (supply) and what it received (demand). Commodity in commodity table also shows how much of other commodities have been used and where did they consume to produce each commodity. In input-output table, it is clear how much was the cost of intermediate material (inter-sectoral relationship matrix), demand for labor and capital, and cost of tax in producing each product. In addition, it is clear how much money has been cost for each product by demanders.

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According to the theoretical strength and the application of input-output model, the importance of Leontief's input-output model was revealed at the end of World War II. At that time, policymakers were looking to answer the question whether the demand for iron and steel would be decreased or not at the end of the war. Leontief's input-output model was one of the few models that predicted demand for iron and steel will not be reduced. Proving this prediction in reality led analyzing the impacts of policies based on input-output model for policy makers to be more attractive.

Thus, Leontief founded a general equilibrium equation system in which people's production and utility functions have Leontief' form and demand functions are determined in commodity market, and factors are determined based on Leontief' function. Form of production function and the manner of clearing supply and demand in commodity market is expressed in the equation system.

Interactions of productive sectors and different markets have been modeled in this simple structure, but the condition of clearing labor and capital markets have not been considered in it. In addition, sample consumer's demand and (final demand of other bodies) are considered as exogenous.

Input-output analysis is occurred in two forms of price and amount. Quantitative analysis of input-output takes place based on the "market clearing condition" and it shows clearing supply and demand. Price analysis of input-output has been developed for economic sectors based on "zero profit condition" and it shows the manner of determining product price based on input prices. Exogenous variables are political parameters in such analysis.

Quantitative analysis of input-output is a matrix analysis of interactions of economic sectors. In other words, "the amounts of the final demand of each product" are political variable and "production level of various sectors" is a target variable. In fact, quantitative analysis of input-output calculates the impact of final demand change of each commodity on the production of various economic sectors. The system's expression of matrix simply is:

$x = (I - A)^{-1} f$

f= Vector of final demand of sectors

A= Technical coefficient matrix

I= Identity matrix

X= Vector of sectors' production

5- Research Findings

Price Model of Energy

Price model is a tool that the impacts of increase or decrease in commodity prices of economic sectors on commodity price of other economic sectors can be calculated and analyzed thereby. The constant ratio of inputs into output is a basic premise in the input-output model. This requires balanced material and semi-finished goods for a level of production. It seems that each production unit should consume a specific vector of data for a unit of output (Kula, 1996).

Participating sectors in the production process emphasize on both sides of price and amount and they are linked with them, a truth that justifies input-output analysis. A price in an

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industry depends on the prices of other industries since it applies their data and other sectors use its data. The product of each industry depends on the levels of demand of sectors that sells product to them.

Final demand for task force, capital and mediating imports is calculating by adding medium and final demands. The models applying factors in the economy as a whole is strongly influenced by the structure of production of its inter-industry (Butter et.al, 2003).

Price model is used for calculating costs in input-output table. According to the input-output table, each production unit purchases its needs from other sectors. These needs include basic and medium input. The relationship between prices and costs based on pure matrix is as follows:

$$P = A'P + V$$

A= square matrix of (n*n) technical coefficients that each of its component a_{ij} shows an amount of $(i = 1,....,n)i$ used for producing a unit of a sector's product $(j = 1,....,n)j$.

P= price vector of each unit product in each sector

A' = Transposed matrix of technical coefficients

V= Vector of added value in each section for each unit

Principally, the above equation shows the equality of unit price of product with the total production cost and created value added in the process of producing each unit of product. In other words, according to the above equation, product price of each sector is equal to total cost of product factors in addition to obtained value added for each product unit. According to the equation, final prices can be considered as a function of technical coefficients and value added of each product unit. Correcting the price of different kinds of basic commodities will lead to increase in their prices. This transfers to the price of all sectors' commodities quickly. In this process, the price of those commodities are influenced that whether they directly use them or via increase in the product costs of commodities. Price model can analyze all impacts of price based on input-output table.

Price analysis of input-output is also a matrix analysis of interactions between price and cost of different commodities of economy. In this analysis "the price of one or several commodities or production factor" is a political parameter and "level price of different commodities" is a target variable. In fact, price analysis of input-output calculates the impact of exogenous price changes on other prices. The prices are calculated based on the following equation in the input-output analysis:

$$\tilde{P} = (I - A')^{-1} v_c$$

V= exogenous prices

P= vector of prices for productive

The model describes inter-sectoral interactions of an economy in different aspects such as value added and input-output coefficients compared to total production. Particular economic indexes have been extracted in the model by using input-output model in order to examine structural changes of economy originating from the effects of economic policies or policies of energy domain, short-term

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predictions, change in demand level of energy, pollutants, status of resources, etc.

However, the question is "how and how much the price of other commodities in economy does change as a result of increase in the price of energy carriers." It is obvious that change in prices occurs in two ways: firstly, increase in the price of energy carriers affects directly rise in production costs of enterprises (through increase the price of energy carrier used directly as energy carrier). Secondly, the change affects other production inputs because energy is used in their production. The total impact of this change in energy carriers can be calculated by using price model of input-output.

The method is partitioned matrixes in two general parts of energy sectors and non-energy sectors. After partitioning matrices and writing the cost equation, we rewrite the equation in the following form:

$$\begin{bmatrix} P_e \\ p_n \end{bmatrix} = \begin{bmatrix} Aee' & Aen' \\ Ane' & Ann \end{bmatrix} \times \begin{bmatrix} P_e \\ p_n \end{bmatrix} + \begin{bmatrix} V_e \\ V_n \end{bmatrix}$$

Variables in this equation are:

Pn= price vector of a product unit in non-energy sectors (endogenous)

Pe= price vector of a product unit in energy sectors (exogenous)

Vn= vector of value added a product unit of non-energy sectors (endogenous)

Ve= vector of value added a product unit of a sector

Aee= data vector of energy sector to production of energy sector

Aen= vector of non-energy sector data to production of energy sector

Ane= vector of energy sector data to production of non-energy sector

Ann= vector of non-energy sector data to production of non-energy sector

The following results are obtained by solving above system:

(1)Pe = Aee' Pe + Aen' Pn + Ve

(2)Pn = Ane' Pe + Ann' Pn + Vn

It is assumed energy prices are determined by the government so they are exogenous. Therefore, the equation is eliminated and equation 2 is remained. To calculate price changes of non-energy sector, we write following equation:

$$\Delta Pn = [I-Ann']^{-1} Aen' \Delta Pe$$

As we see in the equation, it can be said that change in the prices of non-energy sector is a function of:

1. Changes in energy prices
2. The rate of non-energy sector's use from energy sector data
3. The rate of non-energy sector's use from non-energy sector data

As mentioned to the issue of direct and indirect impacts of increase in the price of energy carriers before, it should be said that the above equation indicates total impacts. To calculate direct impacts, following equation should be written:

$$\Delta Pdn = Aen' \Delta Pe$$

Therefore, the impacts of adjustment policies of energy prices on municipalities' revenues and costs can be assessed systematically, according to the input-output models. Adjustment of municipalities' cost issues makes the problem complex. Each cost issue is based on an economic sector in input-output models (Miller &Blair, 2009).

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6- Conclusion and Suggestion

Adjustment policy of energy prices has been always considered by policy-makers and officials in the country so that the necessity of its implementation has been considered in all development plans after Islamic Revolution (particularly third and fourth plans).

Even though targeting subsidies law has been proposed nationally and the effects of implementing the plan have been studied nationally that the most fundamental of which is to reform energy prices and cash subsidies, its impacts are of great importance locally- particularly the impacts on revenue resources and municipalities' costs in the country. The impacts of mentioned plan on revenue resources and Iranian municipalities' costs with systematic approach are of great importance in municipalities' budgeting.

It is necessary to follow these steps for implementing this approach:

1. Regional input-output table located in the municipality to be provided, if possible.

2. Municipalities' cost issues to be adjusted with input-output table

3. From revenue aspect, since the major impact of targeting subsidies on municipalities' revenues is from revenues of tax law, VAT, and construction revenues, the impact of targeting on these two components should be assessed.

Increase in the price of energy carriers through rise in revenues from taxes on fuel and electricity can directly lead to increase revenue from VAT act for municipalities. In order to estimate the impact of implementing the first step of law on this revenue item, consumption and price of energy carriers should be used in before and after targeting law. Having the information of prices before and after targeting, it is possible to calculate the increase Rial value of consumption of different energy carriers in that year. Then, rate increase in dues arising from each fuel for all municipalities and rural municipalities is calculated by using calculated figure and applying the rates of collecting dues related to municipalities (specified in law on VAT).

4. Increase in the price of energy carriers can affect the costs of construction as well. Therefore, municipalities' revenues are affected indirectly by influencing the demand for construction permits.

5. The impact of modifying energy prices on the inflation of different products can be simulated by using price model based on input-output table. Increase in municipalities' costs can be calculated based on obtained inflation in goods and services throughout the economy.

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