

STUDYING COST COMPETITIVENESS OF IRAN'S STEEL INDUSTRY AFFECTED BY ELIMINATION OF ENERGY SUBSIDIES (CASE STUDY: KHUZESTAN STEEL COMPANY)

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Abstract

The implementation of the biggest economic project in Iran, i.e. targeting subsidies, can highly affect industries' competitiveness considering the role of subsidies on their cost price. Steel industry has been considered as a basic industry throughout the world which is regarded as a basis for industrialization of countries. Also, it is one of the industries that may be highly affected by enforcement of targeting subsidies law. This industry requires high energy, capital and technology. Accordingly, increased price of the energy inputs affect the cost price of production and sales. Since the cost price of the product is one of the factors determinants and industry's competitiveness in the market, this study analyzed the law enforcement approach on domestic and foreign competitiveness of Khuzestan Steel Company between 2011 and 2012 through used unit cost competitiveness. And to evaluate government policies on the competitiveness of the company has been supportive of coefficients. The results showed that after targeting subsidies of energy, this Khuzestan Steel Company competitiveness has decreased compared to the time when energy subsidies were existed. and Government policy is to support the company's products.

Keywords: Subsidies, Energy carriers, Competitive, Protection Coefficient

JEL: .C02,F14,F15,D21

1- Introduction

Iran's economy is in transition from a centralized planning to a decentralized planning. Energy subsidies are one of the major issues in this transitional process. Large amount of annual national income is assigned to subsidies of various types of energy carriers. Therefore, the removal of energy subsidies is of great importance. Targeting subsidies results in increased productivity and economic competitiveness. On the other hand, one of the main ways to enhance competitiveness and to gain new markets in the business and production environment is to reduce total production costs. The increase in cost leads to the loss of competitiveness of manufacturing industries. The increase in the total cost of goods and services following the removal of energy subsidies is due to the presence of energy as a vital input (due to low cost) in the production function of Iran's economy. Any change in the price of energy will influence the price index for goods and services through its cost share in short term. It also affects goods and services price index through influencing other inputs in long term.

One of the most important factors affecting the cost of steel is fuel and energy required for steel production. Steel industry and its related products is one of mother industries in Iran. It may have a great impact on jobs and economic growth. Iran has a comparative advantage in terms of steel production, development of disadvantaged areas and providing sustainable employment through this key industry.

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Therefore, the development of steel industry is more important than other industries. On the one hand, studying the economic and social consequences of each policy in reducing or eliminating energy subsidies is of paramount importance and on the other hand, costs are the major determining factor in the competitiveness of a firm or an industry. Therefore, the present article studies the effects of targeted subsidies of energy carriers on competitiveness of Iran's steel industry with a focus on Khuzestan Steel Company using indicators of cost competitiveness and protection coefficients during 2011-2012. This competitiveness can be related to before and after the targeted subsidies project and domestic and foreign markets.

Therefore, a methodology is presented first for calculating cost competitiveness at the firm level. One of the unique features of this method is calculation of misalignments through which we are able to analyze the state's protection policies and observe their influence on each item of competitiveness indicators.

The rest of the article is presented as the following order:

- Section (2) explains the literature and experimental studies.
- Section (3) introduces the theoretical basics and research methodology.
- Section (4) analyzes the data.
- Section (5) discusses the results

2 - Literature Review

Reduction of major sources of energy in the world and increase of energy prices led to higher energy contribution in the price of products. Consequently, authorities of different industries are taking various measures to reduce energy costs. Experts always give priority to energy in development plans as a comparative advantage in Iran's industry. On the one hand, Iran has a very good position in the world in terms of all kinds of energy reserves and resources. On the other hand, these resources are more easily supplied to various industries with prices much lower than other countries. Energy consumption in Iran is in contrast with principles of productivity and energy efficiency promotion in the world.

As a result, comparative advantage in energy is used to cover other costs being used by industries instead of moving towards the creation of added value and converting into a competitive advantage. This is more pronounced in energy-intensive industries such as metal industries, particularly steel industry. A significant part of the steel cost is related to energy prices. Therefore, Iran has been always known as one of the best places in the world for steel production due to facile availability of cheap energy.

Reviewing the evolution of advantage theories, we will face competitive advantage theory proposed by "Michael Porter". Perhaps he is the most famous theorist in the field of competitiveness and competitive advantage. According to Porter (1990), it is better to use comparative advantage instead of competitive advantage to evaluate the competitiveness of countries, because competitive advantage considers other aspects of competition such a variety of products, different technologies, returns to scale, etc. The most common definition of competitive advantage in the competition strategy literature is value creation or whatever causes revenue increase over costs. In other words, a firm or industry can compete when its unit cost is less than or equal to its competitors.

Porter has also investigated the sources of competitiveness and divided them into following six groups:

1 – The status of production factors including supplying factors (human resources, physical resources, capital resources, infrastructure and technical knowledge), the efficient use of production factors, focusing on advance factors such as information technology (IT), skilled labor, research and development, and so on, focusing on factors that contribute to high levels of expertise, focusing on factors that contribute to continuous improvement, innovation and invention.

2 - The structure of demand market including the composition of domestic demand and customers, the size and pattern of the growth of domestic demand and saturation rate of the market, customers access to global markets and so on.

3- The status of related industries and suppliers including competitive advantage of related industries and suppliers and presence of good suppliers and related industries.

4- Firm strategy and competition including strategy and structure of domestic firms, goals and motivation of firms, domestic competition (competitive environment), arrangement of new firms and son on.

5- The role of government including subsidies, capital market policies, education policies, price controls, investment in infrastructure sectors, the government's role in the market (either as a buyer or issuing laws and regulations), the impact of regulations on suppliers and related industries, media and

advertising, tax policies and anti-cartel laws as well as government policies influencing all sources of competitive advantage.

6- Unexpected events that have an immediate impact on the business environment such as new inventions, new technology, severe fluctuations in production factors such as oil prices, significant fluctuations in financial markets, interest rates, the rapid surge in demand, war, natural disasters, etc. Porter also explained the relationship between these factors and comparative advantage. However, he did not provide a method for calculating them.

Targeting assumes that a part of community has a higher priority to receive transitional aids. Since resources are limited, priority should be observed to distribute aids. The aim of targeting is to identify those who are eligible for transitional aids. Targeting subsidies came to operation since December 2010. One of the goals of this Act is to make sensitivity toward energy consumption by industry and to increase productivity in this sector. This will be realized through definition and implementation of modernization, optimization and complementary projects.

The major advantages of subsidies targeting include reducing smuggling of subsidized goods through price difference, reducing expenditures of the state, strengthening the private sector due to the sheer production of these items by private sector, increased investment in non-subsidized goods, increasing the quality of goods out of the supporting basket, formation of technology based on real prices and justly distribution of subsidies.

Although numerous studies were conducted on the Iran's steel industry, no serious study was conducted on the competitive advantage in this industry.

Siegel (1993) conducted a theoretical study on international competitiveness. He proposed a framework for measuring competitiveness and its constituents through economic and mathematical relationships. Siegel and Cockburn presented two papers in 1995. One of the papers investigates various aspects of competitiveness while the other paper proposes indicators for competitiveness and fully explains their resources. They used their method for evaluating the competitiveness of industries in Mali and Côte d'Ivoire as its main financial competitor.

Torn (2005) examined the competitiveness of cereal production in some EU countries (Ireland, Italy, England, Germany, France and Denmark) during 1996-2000. In this study, profitability was considered as a measure of competitive performance while production costs, value of output and productivity were considered as the sources of competitive performance. The results showed that productivity level in the UK, Ireland and France is higher than Denmark, Germany and Italy. Opportunity cost of resources owned by respective countries had a significant impact on the competitiveness of cereal production in EU countries. In Italy, cash expenses as a percentage of total output was lower than other countries. However, Italy had highest opportunity costs of resources owned by countries among studied countries.

In a study entitled "Estimates of energy subsidies in China and the impact of reforming energy subsidies", Boqiang and Resosudarmo (2010) examined the effect of eliminating or reducing energy subsidies on macroeconomic variables of China using a general equilibrium model. The results showed that welfare, GDP and employment will reduce by 56.03, 1.2 and 1.42%, respectively. However, if 35% of savings gained by removal of subsidies is distributed between sectors with higher priority in terms of energy consumption such as agriculture, services and lighting of plants, welfare, GDP and employment will be increased by 37.16, 0.0 and 0.53%, respectively.

Kalbasi and Garivani (2003), in their research called 'Studying Cost Competitiveness of Mobarakeh Steel Complex of Isfahan in Iran' concluded that lack of competitiveness occurred in Mobarakeh Steel Complex of Isfahan in Iran following Iran's accession to the WTO. Regarding the significant impact of the targeted subsidies project on different industries, few studies have already been conducted on the competitiveness of steel industry. Izadi (2012), in his research on studying the competitiveness of Isfahan Steel Industry in Iran following Iran's accession to the WTO using the unit cost method and cost of internal sources concluded that Isfahan Steel Company was able to compete in the international markets at that time. However, after Iran's accession to the WTO, this company was not able to do that. Following implementation of the targeted subsidies, competitiveness of different industries was exposed to numerous changes. For instance, the studies conducted on the impact of eliminating subsidies in the agricultural sector indicate that reduction of agricultural subsidies will have negative impacts on all sectors (Piraei and Akbari Moghaddam, 2005). Moreover, studying the effect of elimination of energy subsidies on competitiveness of products of Yazd Rubber Industries indicates the existence of cost

competitiveness of radial tire and tube factories before enforcing targeted subsidies law. Following enforcement of the law, tube products maintained their competitiveness, but radial tire products lost their competitiveness. Bias products lacked comparative advantage and competitiveness before and after enforcement of the law. However, bias products are strongly protected. Radial products are received little protection, and tube products are not received any protection (Nasrollahi and Hosseini, 2012).

3- Theoretical Basics and Research Methodology

3-1- Conception of Competitiveness:

Competitiveness is the difference among countries in terms of the ability to change inputs into goods and services with respect to maximization of firm's profit.[†] Competitiveness encompasses tangible assets and intangible assets (such as technology and executive skills), which are combined to improve efficiency of required inputs for producing goods. * Siggel and Culibaly (1999) believe that the competitiveness of a firm is the ability of the firm to sell its products profitably. In other words, for a firm to have competitiveness, it should sell its products at a lower price with a higher quality. They believe that providing the economy of a country with favorable conditions, such as a high level of general education, productivity, natural resources, and trade-oriented economic policies may have significant effects on the level of competitive power of firms and industries.

3-2- Indicators to Measure Competitiveness

3-2-1- Concept of Cost Competitiveness

In cost competitiveness, *indicator of competitiveness based on sales prices* is used instead of *measurement of indicator of competitiveness based on costs*. Due to the ease of access to the required information and data, this method is simpler and more feasible than other methods. However, accuracy of this method is low. Despite coverage of sales prices through the rents caused by monopolies and protection, this method has some shortcomings. One of the shortcomings of this method is that it reveals the competitiveness of a firm only in a descriptive manner. Consequently, when we evaluate state's policies in a specific sector or in an industry, and when we evaluate resources of competitiveness or lack of competitiveness, this is not an appropriate method.

3-2-2- Concept of Competitiveness as Exploitation

Total Factor Productivity (TFP) is another indicator to measure competitiveness. One industry is able to compete when its TFP is greater than or equal to the one of its rivals. The shortcomings of this indicator are as follows:

- 1- It does not consider factors of costs (cheap and expensive), which are major sources of productivity.
- 2- TFP depends on production function whose shape is often hypothetical.

3-2-3- Concept of Competitiveness as Relative Unit Labor Cost

Relative Unit Labor Cost (RULC) is under the influence of variables such as productivity, wages, and exchange rates. In case, RULC is the sole factor used in production, it is as follows:

C_i = Relative unit labor cost in section i

$$\frac{\alpha_i W_i}{\alpha_i W_i e} \quad \alpha_i = \frac{L_i}{Q_i} \quad (1)$$

α = Reverse of productivity in section i

Q_i = Value-added in section i

L_i = Required Labor in section i

W_i = Wage in section i

e = Exchange rate

[†] B. Kogut (1985)

$a_i^* w_i^*$ = foreign Unit labor cost

The above relation can be written as follows:

$$C_i = \frac{a_i}{a_i^*} \cdot \frac{w_i}{w_i^*} \quad (2)$$

Based on the above index, when $C_i \leq 1$, the relevant country has competitiveness in section i.

Therefore, a country has competitiveness as compared with other countries when:

- 1- Labor productivity in that country is higher than other countries.
- 2- It is low as compared with the wages
- 3- Exchange rate is high (Edward and Globe, 2004)

3-2-4- Concept of Cost Competitiveness

Cost competitiveness means the potential to sell profitable products. In other words, for a firm to have competitiveness, it should be able to sell its products at a lower price with a higher quality as compared with its rivals. If the unit costs of an industry or a firm are lower than or equal to the ones of its rivals, it will be able to compete.

Competitiveness means the ability to sell profitable products. In other words, a firm should be able to offer its products with lower price and higher quality than its competitors to be competitive. Siegel and Cockburn used unit cost (UC) index to calculate cost competitiveness. Thus, a firm or industry is able to compete, if its unit cost is less than or equal to competitiveness of foreign and domestic competitors. The unit cost (UC) is the total cost (TC) divided by the value of output (VO). The general form of this criterion can be expressed as follows:

$$UC = \frac{TC}{VO} = \frac{TC}{P \cdot Q} \leq UC^* \quad (3)$$

In above equation, P is product price, Q output rate and UC^* is unit cost of competitor. A firm or industry is able to compete when the unit cost of its products be less than or equal to its (foreign and domestic) competitors. In the long term and perfect competition condition, international manufacturers will produce at a point where $TC = P \cdot Q$. Therefore, UC^* is equal to 1 and competitiveness criterion will be as follows:

$$UC \leq 1 \quad (4)$$

In microeconomics, unit cost is defined as the total cost divided by quantity (Q). Thus, the physical unit cost of goods is obtained. But it can be used as the unit cost when the products of two competitors are perfectly homogeneous. In the real world, it is rarely found given the product mix, different quality and different after sales services. This is why it is divided by the value of product (VO), i.e. PQ instead of dividing the total cost (TC) by quantity (Q). In other words, consumer compares and estimates quality, after-sales service, product mix, etc. Consumer will estimate the product quality according to the amount of purchase at various prices. When two firms have equal total costs, but one of them produces a higher quality product and sell it at higher price, the value of output (VO) will increases, while unit cost decreases. This means that this firm has a higher competitiveness compared to its competitor.

Therefore, the criterion used to measure competitiveness is the unit cost expressed as follows:

$$UC = \frac{TC}{VO} = \frac{TC}{P \cdot Q} \leq 1 \quad (5)$$

In which, the value of output (VO) can be evaluated at domestic price (P_d), world price (P_w) or shadow price (P_s). Given the above three types of prices, the competitiveness is divided into domestic and international competitiveness and comparative advantage.

3-3- Protection Coefficient Analysis

State's policies through creating cost misalignments in product and input market affect competitiveness of firms. This study is conducted through protection coefficient indices, which examines the effect of state's policies at levels of inputs, products, and industries. The nominal protection coefficient (NPC) of product, the nominal protection coefficient of input (NPC_I), and the effective protection coefficient (EPC) are used to analyze protection coefficients.

NPC is the ratio of market income (A) to shadow income (E). The formula of NPC is as follows:

$$NPC = \frac{A}{E} \quad (6)$$

If NPC is greater than the unit, domestic market price will be higher than its shadow price and an indirect subsidy will be allocated to product. In case NPC is smaller than the unit, shadow price will be higher than the domestic price of product and an indirect tax is imposed on product by the state. If NPC equals the unit, no protection is offered for product.

The ratio of cost of inputs on market price (B) to cost of these inputs in terms of shadow price (F) is used for calculating NPC_I as follows:

$$NPC_I = \frac{B}{F} \quad (7)$$

If NPC_I is greater than the unit, cost of inputs to market price will be greater than shadow price. That is, a producer pays indirect tax for using these inputs. If NPC_I is smaller than the unit, cost of inputs to market price will be smaller than shadow price. Therefore, a producer receives subsidy for using these inputs. Finally, if NPC_I is equal to the unit, no protection will be offered for the input.

EPC shows the value-added obtained from production to market prices (A-B) to the value-added of product in terms of shadow price (E-F). By calculating this coefficient, we may study the effects of a state's intervention on input market and product market at the same time. Therefore

$$EPC = \frac{A-B}{E-F} \quad (8)$$

In fact, the numerator and denominator are the same difference between the numerator and denominator of the protection coefficients of product and the inputs of the earlier sections. In case EPC is greater than the unit, state's policies protect production process. In case it is smaller than the unit, state acted to the detriment of manufacturer through intervening and imposing its policies. Finally, if EPC is equal to the unit, it indicates that state does not impose any policy on production and/or they negate each other if there is any.

4- Data Analysis:

As competitiveness in the domestic and international markets is calculated individually, indices of unit cost ratio in terms of different costs (domestic and international) are of crucial importance. In this section, we examine domestic competitiveness (UC_d), international competitiveness (UC_w) of Khuzestan Steel Company and evaluate the effect of elimination of energy subsidies on competitiveness of this industry. To calculate an indicator of cost competitiveness of a company, the cost accounting information during 2011-2012 (the two years during which elimination of energy subsidies was implemented) of Khuzestan Steel Company were extracted. The required information is as follows:

4-1- Costs of Company

Table (1) summarizes different costs during 2010-2012 separately.

Table 1- Costs of Khuzestan Steel Company

Description	2010	2011	2012
Cost of Consuming Materials	8,044,471	10,773,327	16,387,517
Costs of personnel	1,665,298	2,442,640	3,164,970
Operating costs	2,389,351	3,531,681	4,002,934
Cost of Depreciation	612,867	632,009	708,444
Distribution and sales cost – Administrative and Organizational	1,263,235	1,078,335	1,142,024
Finance Costs	227,918	176,778	180,965
Total	14,203,140	18,634,770	25,586,854

Cost accounting reports of Khuzestan Steel Company during 2011-2012

4-2- Production and Sale Statistics

Here, we explain the statistics concerning production and sales of the company products in a brief and coherent manner.

Table 2- Production statistics of Khuzestan Steel Company during 2011-2012

Description	20 March 2013	19 March 2012	Percentage Changes
Production Statistics			
Slab	1,173,145	1,324,406	(11.42)
Blooms and Billets	2,321,973	2,023,534	14.75
Total of Productions	3,495,082	3,347,940	4.40

Table 3- Sale statistics of Khuzestan Steel Company during 2011-2012

Description	20 March 2013	19 March 2013	Percentage Changes
Sales Statistics			
Slab	1,168,762	1,342,094	(12.92)
Blooms and Billets	2,316,970	2,011,186	15.20
Total of Sales	3,485,732	3,353,280	3.95

Cost accounting reports of Khuzestan Steel Company in 2012

4-3- Calculation of Domestic Cost Competitiveness before Elimination of Energy Subsidies

By calculating the indicator of domestic competitiveness, we may discover the competitiveness of the pertinent firm under internal protection, such as subsidies, tariff and non-tariff protections, and exchange rate misalignments. In this research, indicator of domestic competitiveness (Relation 5) is used as the domestic cost competitiveness of Khuzestan Steel Company before eliminating energy subsidies.

Based on the results of calculations, cost competitiveness for Khuzestan Steel Company in 2012 is equal to 0.60. This figure indicates domestic competitiveness of the company in the domestic markets, as its internal costs is equal to 0.60 of its incomes. In other words, while considering energy subsidies, it spends 0.60 of the costs to gain a profit unit in the domestic markets. Cost competitiveness in 2011 is equal to 0.78. Therefore, it spends 78% of the cost to gain a profit unit in the domestic market.

$$UC_{d1391} = \frac{\text{Total Cost of Production in Internal Prices}}{\text{Product Value in Internal Prices}} = \frac{26,025,254}{43,105,461.526} = 0.60 \quad (9)$$

$$UC_{d1390} = \frac{\text{Total Cost of Production in Internal Prices}}{\text{Product Value in Internal Prices}} = \frac{\text{هزینه کل تولید در قیمت داخلی}}{\text{ارزش محصول در قیمت داخلی}} = 0.78 \quad (10)$$

4-4- Calculation of Domestic Cost Competitiveness after Elimination of Energy Subsidies

To calculate cost competitiveness in this section, the adjusted cost is the same total cost whose cost misalignment (energy subsidy) was aligned. In other words, the energy cost is added to the total cost.

$$UC_{d1391} = \frac{\text{Total Adj}}{\text{Product Value in Domestic Prices}} = \frac{35,097,015}{43,105,461.526} = 0.81 \quad (11)$$

$$UC_{d1390} = \frac{\text{Total Adjusted Cost of Production in Domestic Prices}}{\text{Product Value in Domestic Prices}} = \frac{4,667}{4,204,796.693} = 1.12 \quad (12)$$

Indicator of the domestic cost competitiveness after elimination of energy subsidy is equal to 0.81, which shows the domestic competitiveness of this company in the domestic markets in 2012.

As it is noticed, at the time energy subsidy was eliminated in 2012 and 2011, company costs increased about 34% and 43%, respectively, as compared with the years energy subsidy was effective. When there was no energy subsidy, the domestic costs of the company was 81% of its profits.

Company's competitiveness in 2011, the first year that the targeted subsidies project was effective, is equal to 1.12, which indicates lack of competitiveness in the domestic markets. In other words, it spends more than one cost unit for one sale unit in the domestic markets.

4-5- Calculation of Export Cost Effectiveness before Elimination of Energy Subsidy

In this research, this indicator is used for evaluating cost effectiveness of Khuzestan Steel Company in the international markets. The only difference of this indicator with the domestic competitiveness is that borderline price or FOB price is substituted by the domestic price of products in export competitiveness. Based on the following calculations, values of this indicator in 2012 and 2011 were 1.06 and 0.80, respectively.

The figures show that Khuzestan Steel Company has almost no international competitiveness in the foreign markets in 2012; in other words, it spends 1.06 units for each income unit. Conversely, it has international competitiveness in the international markets in 2011 and economic profit in these markets, as the global prices of products exceed the ones of their domestic prices.

$$UC_{w1391} = \frac{\text{Total Cost of Production in Domestic Prices}}{\text{Cost of Product in Global Prices}} = \frac{1,025,254}{4,388,997.712} = 1.06 \quad (13)$$

$$UC_{w1390} = \frac{\text{Total Cost of Production in Domestic Prices}}{\text{Cost of Product in Global Prices}} = \frac{\text{هزینه کل تولید در قیمت داخلی}}{\text{ارزش محصول در قیمت جهانی}} = 0.8 \quad (14)$$

4-6- Calculation of Export Cost Effectiveness after Elimination of Energy Subsidy

Similar to the earlier section, cost information of the company and international sales price are used for calculating international competitiveness. The Indicator of international competitiveness for 2011 and 2012 is as follows:

$$UC_{w1391} = \frac{\text{Total Adjusted Cost of Production in Domestic Prices}}{\text{Product Value in International Prices}} = \frac{197,015}{24,388,997.712} = 1.43 \quad (15)$$

$$UC_{w1390} = \frac{\text{Total Adjusted Cost of Production in Domestic Prices}}{\text{Product Value in International Prices}} = \frac{1,064,667}{3,370,650.965} = 1.14 \quad (16)$$

The results of calculations show that Khuzestan Steel Company in 2011 and 2012 has export competitiveness of 1.14 and 1.43, respectively. It indicates that the company does not have competitiveness in the international market after targeted subsidies. In other words, it spends 1.14 and 1.43 units for each income unit in 2011 and 2012, respectively.

4-7- Analysis of Protection Coefficients in Khuzestan Steel Company

After determining the competitiveness status of Khuzestan Steel Company, it is necessary to reveal protection status of the company, which describes a part of the price misalignments. Therefore, the estimation of NPC, NPCI, and EPC of the company are used.

$$NPC_{2012} = \frac{A}{E} = \frac{\text{Market Income}}{\text{Shadow Income}} = \frac{42,992,467}{24,388,998} = 1.76 \quad (17)$$

$$NPC_{2011} = \frac{A}{E} = \frac{\text{Market Income}}{\text{Shadow Income}} = \frac{24,240,374}{23,570,651} = 1.03 \quad (18)$$

$$NPCI_{2012} = \frac{B}{F} = \frac{\text{Cost of Inputs in Terms of Market Price}}{\text{Cost of Inputs in Terms of Shadow Price}} = \frac{15,458,463}{15,995,502} = 0.97 \quad (19)$$

$$NPCI_{2011} = \frac{B}{F} = \frac{\text{Cost of Inputs in Terms of Market Price}}{\text{Cost of Inputs in Terms of Shadow Price}} = \frac{7,999,999}{14,340,439} = 0.69 \quad (20)$$

$$EPC_{2012} = \frac{A-B}{E-F} = \frac{\text{Value-added Obtained from Production at Market Price}}{\text{Value-added of Product in Terms of Shadow Price}} = \frac{42,992,467 - 15,458,463}{24,388,998 - 23,570,651} = 3.28 \quad (21)$$

$$EPC_{2011} = \frac{A-B}{E-F} = \frac{\text{Value-added Obtained from Production at Market Price}}{\text{Value-added of Product in Terms of Shadow Price}} = \frac{24,240,374 - 7,999,999}{23,570,651 - 23,570,651} = 1.56 \quad (22)$$

The calculations show that NPC index is greater than the unit. It means that the domestic price of product exceeds its shadow one. Therefore, an indirect subsidy is allocated to producer.

NPCI is smaller than one. Cost of inputs to domestic price is smaller than their costs to the shadow price. Therefore, producer receives subsidy for using these inputs.

EPC>1 means that the state's policies are in protection of production process of Khuzestan Steel Company products.

5- Conclusion and Recommendations:

The results of the calculations show that Khuzestan Steel Company during the two years discussed here has the domestic competitiveness equal to 0.6 and 0.78 before targeted subsidies. The figures indicate the company competitiveness in the domestic markets. The company's competitiveness after eliminating energy subsidies in 2012 and 2011 are 0.81 and 1.12, respectively. The figures show the domestic competitiveness in the domestic markets in 2012 and lack of domestic competitiveness in 2011. In other words, costs of the company in 2012 are 81% of its incomes. It should be noted that cost competitiveness during targeted subsidies is decreasing as compared with the energy subsidy period. When the price of energy carriers was not determined according to market mechanism, similar to the conditions before elimination of subsidies in the country, in which consumers, due to subsidies, do not accept equilibrium price in a competitive market, prices give wrong signals to an investor. Therefore, investment is made in the fields, which are not to the benefit of a society and the investor gains benefit. The major effect of adjustment of prices of energy carriers is elimination of price differentiation. In case price adjustment is

implemented correctly, it will streamline market mechanism and direct investments in a society. Consequently, production sources of the country will be exploited better and waste of resources are prevented. Energy subsidies cause major misalignment in input prices, especially when raw materials comprise major part of the cost price of products. Elimination of energy subsidies increases cost price of raw steel and steel products.

Two major technologies are used in the world for producing steel. One is the *blast furnace technology* used by a company like Isfahan Steel Company and the other is the *direct reduction technology* used by companies like Khuzestan Steel Company and Mobarakeh Steel Complex. In producing steel through the blast furnace method, energy consumption is low, but the use of auxiliary materials such as coke, which is rare in the country, increases cost price of the product. Conversely, in the direct reduction method, cost of raw materials is lower, but cost of energy is higher. Therefore, when cost of energy remains unchanged, the production method employed by Khuzestan Steel Company enjoys a higher and more secure profit margin.

Export competitiveness of Khuzestan Steel Company during 2011-2012 before energy subsidies elimination is 0.8 and 1.06, respectively, which indicates export competitiveness in the international markets in 2011. However, in 2012, it experienced a lack of international competitiveness in the relevant markets.

After targeted subsidies, the company's international competitiveness in 2011 and 2012 were 1.43 and 1.14, respectively. It shows lack of competitiveness of Khuzestan Steel Company in the foreign markets. The companies producing raw steel in the country, such as Khuzestan Steel Company, do not have competitiveness to compete international rivals. Besides, their domestic price exceeds the international one. Therefore, it is economic for them to satisfy domestic demands rather than to export their products. The export process of raw steel and steel products of the company were declining during recent years, as export sale of Khuzestan Steel Company has been zero since 2011.

Protection coefficients show the protection offered for the products and inputs used in production. The NPCs calculated for 2011 and 2012 are 1.76 and 1.03, respectively. These coefficients help us to find out the effect of the state's policies on price of products. As these values are greater than one, it can be concluded that market price of products exceeds its shadow price. Therefore, subsidies were offered for the products of the company.

Indicators of NPCI in 2012 and 2011 are 0.97 and 0.69, respectively, which are lower than one. As a result, cost of inputs in terms of domestic prices is lower than their cost to shadow price. It can be argued that the production inputs were offered subsidies and Khuzestan Steel Company receives a direct subsidy for using the inputs.

The effects of state intervention on inputs markets and product market can be studied through calculating EPC. EPC indicator in 2012 and 2011 are 3.28 and 1.56 respectively. This indicates that state policies support production process of the company.

Opening capital required for constructing steel industry is higher than one of the rest of higher industries; in case energy subsidy is eliminated, the advantage of the relevant industry and justification of investment in it will be lost. In the industrialized countries, the price of energy carriers and electricity of the production sectors are less than other sectors, especially household sector whereas, this is quite the opposite in Iran. Therefore, with respect to the advantages of steel production, huge reserves of oil, gas, and coal - particularly iron ore - and technological advances achieved in the leading steel industries, it is necessary for the policymakers and managers of industries of the country to review adjustment of energy consumption pattern and to select an appropriate technology. They should also take measures to prepare grounds and infrastructures for better implementation of the targeted subsidies project with fewer consequences and adverse effects as soon as possible. To do so, experiences of the top steel-producing countries may reduce costs for executing projects. A collaborative attempt should be made for future investments to construct the most modern technologies of steel production in the country. We have to take steps as per the international standards, taking into account the domestic capacities. Consuming scrap steel to produce steel using modern methods and improving its share in a long-term schedule should be placed on agenda.

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