Journal of Applied Science and Agriculture, 8(7) December 2013, Pages: 1065-1071

AENSI Journals

Journal of Applied Science and Agriculture

Journal home page: www.aensiweb.com/jasa/index.html

The Subsidies Reform Impact on the Cement Industry of Fars Province

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ARTICLE INFO

Article history:
Received 11 October 2013
Received in revised form 20 November 2013
Accepted 23 December 2013
Available online 25 February 2014

Keywords:
Subsidies Reform Cement Industry Panel Data Vector Auto Regression (VAR) model Fars Province

ABSTRACT

Objective: Subsidies reform plan undoubtedly is one of the most important economic projects in Iran. Iranian industry after the implementation of subsidies reform has been faced with some pressure from the demand and cost of production, and this plan caused some of the industries whose ability of competition was because of unrealistic share of energy costs in the industry to be eliminated. Thus, it is necessary to pay particular attention to infrastructures and industries with high energy consumption and to accompany these industries with an appropriate devise for being successful in passing this stage and it causes stable employment in country. Meanwhile the cement industry can be noted. This industry is inherently and in nature an industry with high energy consumption. **Methodology**: This study examines the status of the cement industry in Fars province before and after implementation of the subsidies reform plan using the econometric techniques of panel data and Vector Auto Regression (VAR) model. The data used are monthly and in two time frames, prior to subsidies reform (March 2009 to December 2010) and after subsidies reform (January 2011 to March 2012). **Results:** Results of model estimation showed that subsidies reform has had a decreasing effect on production, employment, total factor productivity and raw materials cost (due to production decline). On the other hand, The implementation of subsidies reform plan has had an increasing impact on sale price of cement, updating cost of machinery and energy cost.

To Cite This Article: Hassan Daneshvar, Yousof Rabbani, Jalil Khodaparast Shirazi., The Subsidies Reform Impact on the Cement Industry of Fars Province. ***J. Appl. Sci. & Agric.,*** *8(7): 1065-1071, 2013*

INTRODUCTION

The subsidy is one of the important government instrument paid to support consumers and producers. Economists make use of various concepts to define the subsidy. In general, the subsidy is defined as government aid that in one hand, at first, allows consumers to buy goods and services at lower prices than the market price, and in the other hand, increases producers' turnover in comparison with the status without (or lowers manufacturing cost) (Clements and Schwartz, 1999).

Historically, the subsidies debate returns to mercantilist time and industrial revolution. With the emergence of utilitarianism and increase of gold reserves and precious commodities, countries begin global trading to obtain other countries gold reserves (Alizadeh, 2010). Thus, a certain protectionism as a policy tool was adopted by governments, but with the emergence of the classical school, the founder of the school, Adam Smith, was at the top of opposition against government intervention in economic activities (Azvaji, 2009). This led to weaker effects of these policies and this condition was followed with slight variations in the neoclassic period. But with the outbreak of war and the emergence of inflation along with great depression, new ideas were strengthened such as Keynesian economics which considers government as one of the most important factors in the regulation and moderation of economic activities (Zamanzadeh,2012). Applying this policy and recovery in the west economy, control of fiscal and monetary policy making sector and management of the public sector in the economy was gradually entrusted to government; however, the subsidy payment in its contemporary meaning began during this period, coincided with the Second World War. But this interference was exacerbated with the start of the war and more limitations in resources. When the World Wars and the Cold War ended, the impotence of economic power to take political advantage and putting step on economic self-sufficiency had changed supportive policies in a number of countries and it was a basis for economically developed countries and developing countries to move toward market economy (Pedroni, 1999). Though many third world countries due to the great political and economic problems and external pressures could not still revise their supportive

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policies. Adopting subsidy payment policy in certain conditions of countries, but not continuously, and its positive effects on the economy perhaps is the reason why subsidy payment, especially in agriculture, is still observed in a number of developed and developing countries (Uri and Boyd, 1997).

This study examines the status of the cement industry in Fars province before and after implementation of the subsidy reform plan. To achieve this aim the econometric techniques of panel data and Vector Auto Regression (VAR) model is used during the April 2009 to March 2012 timeframe. In the meantime, the results as well as the proposed solutions to improve some of its effects can be a useful tool for planning for the next phases of subsidy reform law. This paper is organized in six sections. The first part was devoted to the introduction. The next section dealt with the theoretical basics and relationships between variables. The next parts respectively are an overview of previous studies, model introduction, model results, Summary and Conclusion.

The phenomenon of production inputs price liberalization specifically energy is not a new and unique subject and in terms of behavioral analysis is very similar to energy price shock in the economy of industrial countries (Taghsimi and Rastghalam, 2012). We should of course, consider this difference that in subsidy reform debate in Iran there is a redistribution effect from higher deciles to lower deciles which will have two different effects on the demand function and consequently it adds new and interesting dimensions to this issue. The existence of these two at the same time can be a double pressure on some industries because some cost and demand shocks to these sections will occur simultaneously. In contrast, some industries may benefit from increased demand for their goods (Borhan Azad, 2009).

To know more about the effects of energy carrier prices reform on macroeconomic variables in the policy making environment, it is necessary to do a logical analysis quantitatively and qualitatively. All studies show that increase in the price of energy carrier has a positive effect on the general level of prices (Fetini and Robert, 1999). This effect can be studied directly and indirectly, but we must also remember, the effect of increase in energy carriers price on the general level of prices depends on changes domain or price revision of this energy carriers. At the same time, price reform of energy carriers among key macro-economic variables shows that inflation rate as the main core influenced by the implementation of this policy and other variables are thereby influenced by inflation rate. Revising the price of energy carriers, according to type of energy carriers in final or intermediate consumption, could be involved in changing the general price level (Zamanzadeh, 2012). In other words, the price reform of energy carriers which are located in final consumption of households, changes directly the consumer's price index. While some of these energy carriers shall be used as a medium good for economic firms whose price change will affect the producers price index and finally the change in this index can be effective in increasing the prices of goods produced by firms. Rising energy carriers will be followed by rising of consumer price index and producer price index; however, according to the formation of inflation expectations, its effect on inflation can be intensified. As the policy of energy carriers price reform is implemented in one stage, economic activists and the people do not expect rise in prices in next year's like the year of plan implementation, thus increase in the prices due to increase of inflation expectations in next year's will not happen (Pedroni, 1999). Note that one stage price reform needs more measures than the policy of gradual reform of energy carrier prices because institutions, facilities, tools, rules and regulations and public confidence are necessary as the background of preparing the platform of plan implementation, But expectations of inflation would be longer with gradual adopting of policy, because the price of energy carriers is expected to increase each year. But the government can gradually modify or revise the policy to be less harmful to people and economic activists (Azvaji, 2009).

Modifying the price of energy carriers has a negative effect on the level of economic growth in the short term. This effect can be examined from two aspects of the supply and the total demand. The total supply is affected by three factor including energy inputs price changes in firm production process price, labor's wage, and the price of capital. Increased cost of production and increased production costs of firms and ultimately reduced profit margin of the firms occurred once or increasingly will cause supply of the whole economy decreased and this reduction leads to a change in the level of production and increase in the general level of price and it is natural that these changes will be followed by their own effects. In the long run due to changes in the production structure and technology enterprises and savings due to reduced energy consumption, it is expected that total supply of economy increases(Borhan Azad, 2009).. Although it should be noted that some of the firms may be out of the production process in the long term with the energy price reform and change of labor's wages level. In the total demand, increased price of energy carriers will cause directly a decrease of real energy consumption at the total economy level and consequently a decrease in total demand, and on the other hand, an increase in the general price level of goods and services by reducing the purchasing power of households will cause a decrease in real disposable income and consequently a reduction in the consumption of other goods and services. Thus it is expected the consumption of goods and services reduces. To sum up, energy prices reform reduces aggregate demand in the short-term and economic changes mentioned will in the long-term vary (ibid, 2009).

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Generally the labor market like other economic markets is relatively affected by energy carrier price reform policy. This effect of can be analyzed from two dimensions of supply and demand. Of the labor supply, it must be said that, according to the country's labor market structure and the existence of unemployment, the structure, intensity, and the response of the country's labor supply is different compared with competitive market. Energy carriers price reform and consequently increase of the public price level causes a decrease in the purchasing power of labor, the labor to offset this reduction will have to apply for new job opportunities that at the macro level, these changes will increase labor participation rate(Borhan Azad, 2009).. Naturally, in these conditions, working hours or having more than one job will be expanded. As inland energy price also in the usual situation is moving toward world or regional prices, change in the general price level will cause an increase in wages in the wage determination process (even with a lag of several months) by labor union or workers. Anyway, this increase in wages due to not meeting expectations (probably) is lower than prices increase, and As labor supply is sensitive to nominal labor wage, workers due to money illusion, though (probably) real wages declined, based on nominal wage increase will increase labor supply. It is altogether possible some inactive people to join the group of active population and labor supply increases. It is also possible that the labor supply of the elderly and retired increase due to lowering of purchasing power and income. Thus, the types and redistribution of resources resulted by implementation of this plan will be effective in labor market management, especially in regard to the labor supply. In a study on how energy carrier price increase will influence on labor demand, It can be said that when energy carriers price increases, the cost of production increases and production level reduces and as a result, it in the short term can decrease the employment that consequent of labor demand and supply in the short term will increase unemployment rate because production cost of enterprises increases with the labor wage increase and demand for labor by these firms decreases(Uri and Boyd, 1997). This situation is more evident in worker-driven enterprises. However, due to wages and lack of labor market flexibility, it is possible that implementing energy carrier price reform plan compared with other markets to be more affected by interruptions, but there is a possibility of replacing factors of production in the long term due to the possibility of a change in the structure of production and technology since the adoption of the energy carrier price reform policy is an effective step in releasing price of production factors and the use of other production factors (capital and labor) in the process of production (Baltagi,2005). According to the ability of substituting labor instead of energy in the long term, due to the structure of production and technology, as well as the complementary degree of capital and energy in the long term, the labor will be hired more in production; in other words, the labor market compared with energy and capital in the long run benefits more from energy price reform. Experimental results attest the claim in a way that the long-term increase of energy prices has enhanced employment in industrialized countries (ibid, 2009).

Methodology:

Model introduction:

Vector Auto Regression model (VAR) is used to evaluate the impact of subsidies reform on the cement industry of Fars province by econometric of panel data. This model is estimated using panel data and estimation methods including fixed effect method and random effect method. It must be mentioning that first of all stability and co-integration of model's variables is examined Pesaran and Shin (1998) method and Pedroni (1999) method. The basic model used in this study is as follows:

In which Y is a Vector of variables and includes:

$$Y_{it} = \phi_{0i} + \sum_{j=1}^{s} \varphi_{ni} Y_{it-j} + \varepsilon_{it} \quad (1)$$

LY: The natural logarithm of production (t); LE: The natural logarithm of employment (person); LI: The natural logarithm of investment (million rials); LP: The natural logarithm of sale price (million rials); LCFM: The natural logarithm of raw materials cost (million rials); LCM: The natural logarithm of updating cost (million rials); LCEN: The natural logarithm of energy cost (million rials); LS: The natural logarithm of energy subsidies (million rials) and LTFP: The natural logarithm of total factor productivity.

Statistical population in this research includes cement factories in Fars province: Abadeh cement factory, Estahban cement factory, Darab cement factory, Fars cement factory, Fars-e No cement factory, LAR cement factory and Neyriz cement factory and the required data are collected through a questionnaire monthly, from the April of 2009 to the March of 2012.

Model estimation:

Since the aim of this study was to obtain subsidies reform impact on the cement industry of Fars province, for this purpose the time period of data is divided into two parts: From April 2009 to December 2010 for a time

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period before the subsidies reform and from January 2011 to March 2012 for the time period of after the subsidies reform. Accordingly, the used model is estimated in two sections and by the Eviews software.

Model estimation (Before the subsidies reform):

It is necessary for ensuring non-false regression to test variables stability. For this purpose Pesaran and Shin (1999) test is used in which optimal lags is determined by Schwarz criterion. This test is conducted in two modes: 1. provided that any cross-sectional data has a fixed value 2. Provided that any cross-sectional data in addition to the fixed value has a surface variable.

The result of stability test shows that variables of the natural logarithm of production, the natural logarithm of employment, the natural logarithm of raw materials cost, the natural logarithm of updating cost, the natural logarithm of energy cost, the natural logarithm of energy subsidies, the natural logarithm of total factor productivity are firm level variables and without time series, in other words these variables all are I(0). Variables of the natural logarithm of investment and the natural logarithm of sale price were not firm level and without time series so stability test is repeated for these variables examined with time series and levels. According to results of this test, examined variables in this mode are not stable, therefore in the next stage we should take difference from variables once and stability test should be carry out on first difference of variables at surface. As variables of the natural logarithm of investment and the natural logarithm of sale price turned to firm level variables, It can be said these variables are I(1).

The variables under study are a series of variables of I(0) and I(1). Therefore, examining co integration of variables is so important that it is observed examined variables are co integrative. Knowing this, we examine whether our data are Panel or Pool. In Panel data method, Limer's F test (Chow Test) is used to determine model estimation method. This test is estimated by F statistic. Null hypothesis in this test means existence of monetary data and counter hypothesis means that data are panel.

In this test, F estimation is done as follows:

$$F = \frac{(RRSS - URSS)/\ N - 1}{URSS/(NT\_N\_K)} \overset{H_0}{\sim} F_{N-1,N(T-1)-K} \tag{2}$$

So we will have:

$$F = \frac{(11.0921 - 4.0351) \times [(7 * 21) - 7 - 2]}{4.0305 * (7 - 1)} = 40.2968$$

and F value of table is 2.10. As the estimated F is more than Table's F, counter hypothesis is confirmed and it can be concluded that data are panel.

Results:

Hausman test can be also used to differentiate between fixed effects and random effects in panel data. According to obtained results, fixed effects method is the preferred method for estimating model because it rejects null hypothesis. Thus, according to obtained data fixed effects method is used for estimating model. After finding suitable method for estimating parameters in the previous part, we present results obtained from model estimation. At first for this purpose, suitable log should be determined for Vector Auto Regression model; We use statistic of Schwarz Bayesian (BIC), statistic of Akaike (AIC) and statistic of Hannan–Quinn (HQ). Statistic of Schwarz Bayesian and Hannan–Quinn select lag 1 as the optimal lag while Statistic of Akaike selects lag 8 as the optimal lag. Thus, as two criteria of Schwarz Bayesian and Hannan–Quinn introduced lag 1, it can be concluded lag 1 is the best lag for the model. Results of model estimation are presented in Table 1 below:

Table 1: Results of Model Estimation

Dependent variable	LY	LE	LP	LCFM	LCM	LCEN	LTFP
Coefficient	0.0202	0.0050	-0.006	0.0928	-0.0649	-0.1409	0.0236

Resource: Research findings

Based on results it can be said:

Subsidy has a significant and positive impact on production, i.e. if Subsidy increases one percent, production will increase 0.02 percent. Subsidy has a significant and positive impact on employment as the estimated value is 0.005, so employment increases 0.005 percent with a one percent increase of subsidy.

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Subsidy has a negative impact on the sale price, in other words industrial enterprises, receiving one percent of their products sale price as subsidy, lower their selling price of products 0.0006 percent. Subsidy has a significant and positive effect on the cost of raw materials in the sense that subsidy increases production and production increase also enhances the cost of supplying raw materials. Subsidy has a negative and significant impact on updating cost. As the subsidies get cement factories to think less about optimizing production line machinery and this reduces the updating costs. Subsidy has a negative and significant impact on energy cost. Subsidy would lead to price reduction in energy consumption for cement factories and consequently energy cost reduction. Subsidy has a significant and positive effect on total factor productivity. Given that productivity is a function of production, labor and capital, and as subsidies increase above variables, as a result productivity is also increased by subsidies.

Model estimation (After the subsidies reform):

Like previous part, Im, pesaran shin test is used to test stability of variables. Results of stability test for variables indicated that variables of the natural logarithm of production, the natural logarithm of updating cost, the natural logarithm of energy cost, the natural logarithm of energy subsidies, and the natural logarithm of total factor productivity all are I(0) variables. Variables of the natural logarithm of employment, the natural logarithm of raw materials cost, the natural logarithm of investment and the natural logarithm of sale price turned to stable variables with taking difference once, so they are I(1). It should be noted that results of co-integration test confirm co-integrative characteristics among variables.

Estimated F of limber is 28.8440 and F value of table is 2.10. As the estimated F is more than Table's F, counter hypothesis is confirmed and it can be concluded that data are panel. According to Hausman test results, it can be also concluded that the preferred method for estimating model is fixed effects. After finding suitable method for estimating parameters, we present results obtained from model estimation. The obtained results from optimal lag determination test in Vector Auto Regression (VAR) model shows that Statistic of Schwarz Bayesian and statistic of Hannan–Quinn select lag 1 as the optimal lag while Statistic of Akaike selects lag 2 as the optimal lag. Thus, as two criteria of Schwarz Bayesian and Hannan–Quinn introduced lag 1, it can be concluded lag 1 is the best lag for the model. Results of model estimation are presented in table 2 below:

Table 2: Results of Model Estimation

Dependent variable	LY	LE	LP	LCFM	LCM	LCEN	LTFP
Coefficient	0.0148	-0.0007	0.0148	0.0550	0.7678	0.0526	0.0033

Resource: Research findings

According to results of model estimation, it can be said that subsidies reform has a positive (but decreasing) impact on production and total factor productivity. Subsidies reform has a significant and negative effect on employment. Subsidies reform has a significant and positive effect on the sale price, the cost of raw materials, updating cost, and energy cost.

Comparing coefficients of model variables, before and after subsidies reform:

To examine more closely effects of subsidies reform on cement industry in Fars province, obtained results of estimations is illustrated in table 3 below:

Table 3: Comparing coefficients of model variables, before and after subsidies reform

Dependent variable	LY	LE	LP	LCFM	LCM	LCEN	LTFP
Coefficient before subsidies reform	0.0202	0.0050	-0.006	0.0928	-0.0649	-0.1409	0.0236
Coefficient after subsidies reform	0.0148	-0.0007	0.0148	0.0550	0.7678	0.0526	0.0033

Resource: Research findings

Implementing subsidies reform, production in cement industry has decreased because coefficient of subsidies effect on production before subsidies reform is 0.0202 and after subsidies reform is 0.0148. It can be said that production reduction is caused by energy cost increase after subsidies reform and not being implemented support programs of government which had been approved to support enterprises with high energy consumption. This support program includes three parts: energy pricing, short term programs (compensating plans for declining effects of energy cost increase and productivity growth plan), medium and long term plans (including plans to increase productivity in order to reduce net price, increase profitability and competitiveness of firms) and its full implementation at the beginning of subsidies reform enforcement causes less shock to the cement factories and factories meet new requirements as time passes. Subsidies reform have had a negative effect on employment, in other words employment in this industry is decreased. Since cement factories due to the cost of training and specialization of duties are trying to maintain personnel, decline in employment is not

sensible. Although if the manufacturing process in cement factories did not decline and had a increasing trend, the employment rate would increase in this industry. The subsidies reform has had an increasing effect on the sale price of products in this industry. With the enforcement of subsidies reform law, prices of many consumed goods including cement increased. The subsidies reform have had a deceasing effect on the cost of raw materials in this industry, because coefficient of subsidies effect on sale price prior to subsidies reform is 0.0928 and after subsidies reform is 0.0550. As the cost of raw materials is directly related to the amount produced in the cement factory, after subsidies reform and reduction of production, cost of raw materials has also declined. The subsidies reform have had an increasing effect on updating cost. Before subsidies reform, due to lower cost of energy, cement factories were not willing to optimization and to overhaul machinery. Necessary repairs of production line were carried out with minimum cost, but at the beginning of subsidies reform and sudden rising of energy costs forced factories to pursue optimization issue more seriously and this increased the upgrade cost. The subsidies reform has had an increasing effect on energy cost. Prior to subsidies reform, consumed energy price of cement factories including electricity, gas, fuel oil and gasoil was so much different from calculated prices for the industry sector and this issue get cement factories to receive substantial subsidies on energy because of their high energy consumption. After subsidies reform, rising of consumed energy price causes an increase of energy costs.

The subsidies reform have had a negative impact on total factor productivity because coefficient of subsidies effect on total factor productivity prior to subsidies reform is 0.0236 and after subsidies reform is 0.0033. This showed decreasing effect of subsidies reform law implementation on productivity. As productivity in this research is considered a function of production, labor and capital and as noted subsidies reform have had a negative impact on production and employment, and capital of cement factories before and after subsidies reform has had increasing trend and this has reduced the productivity of cement factories.

Conclusion:

Subsidies reform as one of the seven aspects of the economic development plan has a high economic position in Iran. In this regard, the fact of paying subsidies leaded to serious damage to the structure of the economy through waste of resources, extravagance, injustice in welfare of society vulnerable income groups, the subsidies reform have become a necessity rather than a choice.

This study examines effects of subsidies reform on the cement industry in Fars province (Abadeh cement factory, Estahban cement factory, Darab cement factory, Fars cement factory, Fars-e No cement factory, LAR cement factory and Neyriz cement factory). The required data are collected through a questionnaire monthly, from the April of 2009 to the March of 2012.

The obtained results of model estimation of econometrics method of panel data and Vector Auto Regression model showed that coefficient variables of employment is estimated 0.0050 prior to subsidies reform and -0.0007 after subsidies reform. Thus, subsidies reform has a negative effect on employment. Subsidies reform has decreasing effect on production because coefficient of subsidies effect on production prior to subsidies reform is 0.0202 and after subsidies reform is 0.0148. As coefficient of subsidies effect on energy cost prior to subsidies reform is estimated -0.1409 and 0.0526 after subsidies reform, so subsidies reform has had positive effect on energy cost. Subsidies reform has had positive effect with negative trend on the cost of raw materials as coefficient of subsidies effect prior to subsidies reform is 0.0928 and after subsidies reform is 0.0550. As coefficient of subsidies effect on sale price prior to subsidies reform is estimated -0.0006 and 0.0148 after subsidies reform, so subsidies reform has had positive effect on sale price. As coefficient of subsidies effect on productivity prior to subsidies reform is estimated 0.0236 and 0.0033 after subsidies reform, so subsidies reform has had positive effect with negative trend on productivity. As coefficient of subsidies effect on updating cost prior to subsidies reform is estimated -0.0649 and 0.7678 after subsidies reform, so subsidies reform has had positive effect on updating cost.

In the end, according to the results of this study, the following recommendations can be given:

1. The cost and conditions of the subsidies reform should be considered in preparing the feasibility plan of new and development al units in the cement industry, because the factories has already been in trouble in terms of economic indexes, investors have been affected by loss; 2. Creating the conditions for reconstruction and optimization of old units by providing with appropriate facilities to reduce energy consumption in these units and also provides sufficient funding and appropriate profit margin for the reconstruction and modernization of these units; 3. Positive attitudes of government agencies and industry in new conditions after subsidies liberalization in terms of not imposing cost pressures on industry and stopping unnecessary pressures on industries for employment and removing fines resulting from non-compliance with the expenditure limit which basically is no longer relevant after energy carriers price liberalization; 4. Creating stable economic conditions for industry to enable manufacturers to adopt appropriate methods and measures to achieve growth and prosperity

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