

## **Examining the Factors Affecting Iranian Government Support of Agricultural Products Market**

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### **ABSTRACT**

As one of the oldest sectors of economy, agriculture has had an important role in the supply of food for people and raw materials. In this study, the factors affecting the Iranian government support of agricultural products market has been investigated for the period of 1989-2011. In this regard, using the theory of efficient redistribution and panel data of 12 selected agricultural products including wheat, barley, rice, cotton, pistachio, apples, dates, beets, eggs, milk, red and poultry meat, the rationale for government intervention in the agricultural sector has been modeled in the Panel Tobit model framework and is then estimated. The results of this study indicated that the elasticity of supply and demand, the share of total exports of agricultural goods, the real income of farmers, number of farmers, the share of total agricultural output, and concentration of production are the factors that are directly related to the amount of agriculture support, such that, with the increase in each of these variables, the amount of government support has increased. However, the results showed no significant relation between the import variables (the products which have similar domestic production) and also the number of agricultural cooperatives and organizations with the level of government support.

**Keywords:** Agricultural support policies, Efficient redistribution, Panel Tobit model.

### **INTRODUCTION**

The agricultural sector has always had special significance and position among the agricultural policymakers because of having an important role in the food supply and preparation of raw materials for many industries (Vaezi and Yazdani, 2007). Accordingly, from the past till now, governments in both developed and developing countries have always intervened in the markets for agricultural products, using the price and non-price supports. Nevertheless, the survey on the results of these interventions in different countries

shows that levels of government's support for agriculture has changed over time and has changed to the benefit or detriment of a specific product or even the entire agricultural sector, depending on the objectives of the government intervention in the market of agricultural production (Gardner, 1987). Inelasticity in supply and demand, low income elasticity, risky nature of agriculture, rapid technological changes, etc. can be considered as the main reasons for these changes over time. In addition to the mentioned factors, weight of interest groups (voter) during different periods of time is of great importance in agricultural

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policies and has been very important and outstanding in decision-making for agricultural policies. The government or the electorate intervenes in agricultural markets for political reasons and to satisfy pressure groups or other social groups who affect the process of deciding and implementing farming policies (Hosseini, 2006). Based on the aforementioned reasons, several studies have been done to identify and evaluate factors influencing government intervention in the agricultural products market. Studies show that in spite of extensive studies conducted in other countries, the number of local studies conducted in this field has not been much. Accordingly, through local studies, some studies evaluate government support policies in agriculture, such as the study by Gilanpour and Yazdani (2003) on assessing the effectiveness of policies in support of Iran's rice crop, Sagheb's (2005) on surveying the agricultural support policies using the Policy Analysis Matrix, and Hosseini *et al.* (2010) in evaluating government policies in support of Iran's wheat market. The only local study on the factors affecting Iranian agricultural sector's support programs is by Mohammadi *et al.* (2014), in which the economic factors affecting the government support of agriculture is examined. In contrast to the limited studies in Iran, a wide range of studies have been done in other countries on identifying and examining the factors influencing government intervention in agriculture. In this regard, Gardner (1987) reviewed the implementation of support programs in the United States agriculture. Similarly, Swinnen *et al.* (2001) studied the economic and political causes of government support of Belgium's agriculture and Thies and Porche (2007) investigated the economic and political causes of support to producers in OECD countries. Also, Inhwon (2008) reviewed the determinants of agricultural protection in industrial countries. Accordingly, considering the importance of identifying and assessing the factors affecting the government support of the market for

agricultural products in experimental, as well as the small size of the studies in this area, this study attempted to perform a comprehensive study, identify and reviewing economic and political factors affecting the government support of the market for agricultural products, during 1989–2011 period.

## MATERIALS AND METHODS

Agricultural policies seek the income redistribution from consumers and taxpayers to agricultural producers. But, the transition has direct and indirect costs. Since government intervention in the market is inevitable due to the nature of the agricultural sector, governments are seeking to intervene in the market and policy implementation at the lowest cost. Peltzman (1976) states that the purpose of government intervention behavior to regulate the market is maximization of the "Political Power Function". Becker (1983) assessed economic redistribution in the context and believed that logic of government intervention in agricultural products market is related to the failures in supply and demand as well as political pressure of interest groups from policy implementation. Just *et al.* (1982) evaluated the effect of the changes in consumer and producer's welfare using the concepts of Consumer Surplus (CS) and Producer Surplus (PS). Suppose that Production Quota policy has been implemented in the market of product *i*. Implementation of this policy decreases the production from  $Q_0$  (competitive level) to  $\hat{Q}$  and affecting surplus of consumers and producers, defined by the equations (1) and (2).

$$CS = \int_0^{\hat{Q}} D(Q)dQ - D(\hat{Q})\hat{Q} \quad (1)$$

$$PS = D(\hat{Q})\hat{Q} - \int_0^{\hat{Q}} S(Q)dQ \quad (2)$$

In the equations (1) and (2),  $D(Q)$  and  $S(Q)$  are the demand and supply inverse functions, respectively. Transfer of welfare from a policy implementation quota can be discussed in the context of supply and

demand curves or using the surplus transmission curve and evaluated welfare changes resulting from the implementation of the policy. Also, a social Welfare function (W) which is a function of consumer and producer surplus is defined as Equation (3):

$$W = CS + \theta PS \quad (3)$$

In the equations (3),  $\theta$  shows producers' political weight, that is a function of the economic and political characteristics of policy implementation interest groups. Assuming production control policy implementation, in order to achieve the optimal value of  $\hat{Q}$  that leads to efficient transmission, it is necessary to substitute equations (1) and (2) in the Equation (3) and then maximize the social welfare function. In this case, the first order condition for profit maximization is the Equation (4):

$$\frac{D(Q^*) - S(Q^*)}{D(Q^*)} = -\frac{1}{\eta} \left(1 - \frac{1}{\theta}\right) \quad (4)$$

The second-order condition for profit maximization is also the case that CS and PS should be concave with respect to  $\hat{Q}$ . Accordingly, assuming constant elasticity of demand and supply functions, the optimal  $Q^*$  value that is the result of a production control policy and the cause of the maximum transmission of welfare, with minimal deadweight loss to producers from consumers, can be defined as the equations (5):

$$\frac{Q^*}{Q_0} = \left[ \frac{1}{\eta} \left(1 - \frac{1}{\theta}\right) + 1 \right]^{1/[(1/\varepsilon) - (1/\eta)]} \quad (5)$$

In equations (5),  $\eta$  and  $\varepsilon$  are respectively the demand and supply elasticity and  $Q_0$  shows production value in competitive condition and in the case of no policy implementation. In situations where  $\theta = 1$ , or in other words, political weight by producers and consumers are equal, the competitive equilibrium conditions hold. However, when  $\theta \rightarrow \infty$ , the equilibrium conditions tend to be biased towards monopoly product. Assuming the policies implemented by the government to be the guaranteed price through the compensation payment to producers instead of production control policy, the guaranteed price, which transfer maximum welfare with minimal deadweight

loss from consumers to producers, will be defined in the form of the Equation (6):

$$\frac{P^*}{P_0} = \left[ \frac{1}{\varepsilon} (\theta - 1) + 1 \right]^{\eta\varepsilon/(\varepsilon - \eta)} \quad (6)$$

According to the equations (5) and (6), effective components on redistribution and also redistributive aspects of the two mentioned policies can be reviewed and compared. The equations (5) and (6) make clear the government intervention logic of the agricultural products market; in other words, government intervention is done with the efficient redistribution hypothesis based on three main components of supply elasticity ( $\varepsilon$ ), demand elasticity ( $\eta$ ), as well as producer's political weight ( $\theta$ ). Based on the first two components, more inelasticity of the supply and demand curves will cause more government intervention in support of product  $i$ . The manufacturers' political weight is a function of political and economic factors, or in other words is a function of factors that create common economic benefits to a specific group and reduces the cost of investment in the lobby for commonwealth groups (Gardner, 1987).

According to the theory of efficient redistribution, as well using the two studies by Gardner (1987) and Thies and Porche (2007), which are important studies in the field of theory of efficient redistribution, and given the circumstances of Iran, the political and economic factors affecting the logic of government intervention in support of Iran's agricultural products market can be defined in the Equation (7):

$$PB^i = f \left( \varepsilon^i, \eta^i, EX^i, IM^i, INC^i, PRN^i, PTP^i, COP^i \right), \quad AUN^i \quad (7)$$

$i = 1, \dots, 12$

The components of the Equation (7) are discussed in the following definitions:

$PB^i$ : This variable is defined as a measure to gauge the level of the government's support of products  $i$ . Accordingly, in the present study, the Producer Support Estimate has been used to measure the extent of government's support for any of the products.



$\varepsilon^i, \eta^i$ : The two variables represent, respectively, the supply and demand elasticity's for each product. Low elasticity's of supply and demand are the main reasons for government intervention in the agricultural products market. The relationship between these two variables and the level of government support is expected to be an inverse relation.

$EX^i$ : This variable is defined as the ratio of the contribution of each commodity to total agricultural exporting products. Since the higher value of the variable indicates importance and special position of that commodity in exports and foreign exchange earnings of the country, the relationship between the variable and the level of government support is expected to be direct.

$IM^i$ : This variable is the imported goods and another component directly related with the level of government intervention to support the products. If the goods are imported, the government intends to further support the similar domestic product and increases the extent of their involvement in support of selected product in the form of tariff and non-tariff barriers.

$INC_t^i$ : This variable represents the real income of farmers. In the Third World countries, increasing the income of farmers, especially small farmers, is another factor that the governments fulfill it through the support of agricultural products. Accordingly, the relationship between the variable and the level of government support for the selected product is expected to be direct.

$PRN^i$ : The variable indicates the number of producers. The relationship between the variable and the level of support varies in different studies, including a study by Gardner (1987) which shows that there is a direct relationship between the numbers of operators and level of government support.

$PTP^i$ : The variable indicates the share of each product to the total agricultural products. Those products that have a high share of the total agricultural products, have a special place in supporting government

policies by the economic and political reasons, even if they even if they have not been affordable.

$COP^i$ : The variable indicates the concentration of production in the country and the Herfindahl index is used to measure it. By expanding the cultivation area of any crop in the country and reducing the degree of scattering of production in the areas, it is expected that the regional and political power increase to pressure the government to support the products.

$AUN^i$ : This variable is defined as the number of agricultural cooperatives and organizations for each of the products. It is expected that interest groups of the implementation of agricultural policies force the government to implement policies that benefit them.

Variables specified in Equation (7) are related to 12 selected commodity groups of agricultural sector, including wheat, barley, rice, cotton, pistachios, apples, dates, beets, eggs, milk, chicken, and beef. To select the desired products, the study of RahimiBadr et al. (2007) has been used. Accordingly, the mentioned products have been selected by considering the restrictions on availability of the required information and upon three criteria of food security, livelihood security, and development needs.

Assessment criteria for the level of support of producer ( $PB^i$ ) used as the dependent variable in this study has shown that level of the government's support of the selected products varied over the years and frequent fluctuations is observed. Therefore, in this study, by defining a censorship threshold for the dependent variable, the panel Tobit model was used to estimate the Equation (7). Equation (8) demonstrates the general form of a censored regression model for panel data with individual special effects.

$$y_i^* = x_{it}'\beta + \varepsilon_{it} = x_{it}'\beta + \mu_i + v_{it}$$

$$y_{it} = \begin{cases} \alpha & \text{if } y_{it}^* \leq \alpha \\ y_{it}^* & \text{if } \alpha < y_{it}^* < b \\ b & \text{if } y_{it}^* \geq b \end{cases} \quad (8)$$

In equations (8), i indicates the selected products and t is the time period. The  $T_i$  is

the number of observable time periods for  $i^{\text{th}}$  product. Also,  $\mu_i$ , represents an invisible time-invariant individual specific effect, while  $v_{it}$  shows the remaining disturbance, commonly known as the disturbing part in the regression. In the above equation,  $\alpha$  and  $b$  are the lower and upper limit of dependent variables, respectively. Accordingly, in this study, due to negative support index of manufacturers over the years, by threshold censorship definition,  $PB^i$  is censored at zero from the left, but it is uncensored from right. In the censored regression model, unlike the linear panel models, individual effects cannot be removed from the model by data conversion or deformation. Theoretically, Tobit panel model with fixed effects is influenced by the incidental parameter problem. Lancaster (2000) showed that the estimated coefficients in such a situation are inconsistent unless the number of time periods for each product  $i$  is long. However, Greene (2004), using Monte Carlo method, showed that the slope coefficients of Tobit panel model parameters with fixed effects (not their variance) can be compatible even if the number of time periods is small. In the panel models to achieve valid results, conducting homogeneity and Hausman test are very necessary and important. Upon homogeneity test, if the heterogeneity parameter is ignored among individuals and sections or along the series, it could lead to inconsistent estimates of the parameters. In these cases, it is clear that the panel data regressions, which ignore the heterogeneous latitudes, should not be used (Fotros *et al.*, 2012). To conduct the homogeneity test in econometric literature, typically,  $F$  test is used and the best model is selected. The test can be stated as follows:

$$F(n-1, nt-n-k) = \frac{(R_{LSDV}^2 - R_{POOLED}^2)/n-1}{1 - R_{LSDV}^2/nt-n-k} \quad (9)$$

Where,  $R_{LSDV}^2$  and  $R_{POOLED}^2$  are, respectively, the dummy variables and consolidated regression pattern definition coefficients. Also, in the equation,  $n$  shows

the number of cross sections,  $T$  is the number of observations in each section, and  $K$  is the number of repressors. The best model can be selected based on the null hypothesis. After the homogeneity test for estimating equations with respect to the characteristics of the model, it should be determined which one of the fixed effects or random effects methods are appropriate. For that purpose, the Hausman test is typically used in studies. Hausman test statistic is calculated according to the following equation:

$$h = (beta_f - beta_r)(var_f - var_r)^{-1}(beta_f - beta_r) \quad (10)$$

Where,  $beta_f$  and  $beta_r$  are, respectively, the fixed effects and random effects equation coefficient vector.  $var_f$  and  $var_r$  are also variance-covariance matrix of the fixed effects and random effect equations. The null hypothesis of the Hausman test suggests that random effects should be taken into account in estimating the equations (Hausman, 1978).

By explaining how to estimate the model with Tobit panel, to estimate the model, and perform all the tests, the R software package Plm and censReg were used. Time period of this study was from 1989–2011. All the data of this study related to the mentioned variables in the Equation (7) were studied for 12 products including wheat, barley, rice, cotton, pistachios, apples, dates, beets, eggs, milk, chicken, and beef. Producer Supporting Estimate (PSE) and elasticity's of supply and demand have been calculated by the methods of Melyukhina (2002) and estimating the supply and demand function for each product, respectively. The data for these variables (including information about price and non-price government supports and producer and consumer price) has been gathered using statistical data of the Central Bank and Statistical Center of Iran. Also, information about other variables, such as ratio of the contribution of each commodity to total agricultural exporting products, imported goods, real income of farmers, number of producers, share of each product



in the total agricultural products, and concentration of production sites in the country has been gathered from the Statistical Center of Iran and Food and Agriculture Organization (FAO). [It is necessary to mention that for measuring concentration of production (Herfindahl index), information about the cultivation of each of the products was collected and then divided by the total cultivated area. Also, real income of farmers was calculated by dividing the crops value of each product (compared to the base year) by the number of producers of each product.] Finally, information about the number of agricultural cooperatives and organizations for each of the products has been gathered from the Rural Cooperative Organization of Iran.

## RESULTS AND DISCUSSION

In panel models, before estimating the models, we need to examine the reliability of the variables in the model. Accordingly, in the first step, the present study investigated the reliability of the studying pattern variables by Levin, Lin and Chu (LLC) test. In the test, Null hypothesis is the presence of a unit root in the investigating variables. Therefore, the absence of a unit root and stationary variables rejects the null hypothesis. As Table 1 shows, the results of this test indicate that all equation model variables (7) are not stationary in level and become stationary by once differentiation. In other words, all the variables are in the first order. Thus, using variables based on their surface, it is necessary to examine co-integration between the variables in the model. In this study, Pedroni Co-integration test has been used. In the test, the presence of convergence among economic variables and possibility of long-term relationship between the variables used in the model are examined. Pedroni Co-integration test results are presented in Table 2. As is clear from the results, we cannot reject the presence of co-integration among the variables.

**Table 1.** Results of the unit root tests.

Variables	LLC statistics	Co-integration level
PB	1.38	I(1)
$\Delta$ PB	7.19	
$\varepsilon$	0.91	I(1)
$\Delta\varepsilon$	-4.12	
$\eta$	1.37	I(1)
$\Delta\eta$	-5.21	
EX	1.79	I(1)
$\Delta$ EX	-4.57	
$INC_t$	1.05	I(1)
$\Delta$ INC <sub>t</sub>	-14.7	
PRN	-0.86	I(1)
$\Delta$ PRN	-3.34	
PTP	2.71	I(1)
$\Delta$ PTP	-4.1	
COP	0.99	I(1)
$\Delta$ COP	-4.24	
AUN	1.39	I(1)
$\Delta$ AUN	3.99	

**Table 2.** Results of Pedroni Co-integration test.

Test statistics	Statistics
Panel v-statistic	1.84**
Panel rho-statistic	1.62*
Panel PP-statistic	-2.70*
Panel ADF-statistic	-2.71*
Group rho-statistic	1.89**
Group PP-statistic	-3.27*
Group ADF-statistic	-3.42*

\*, \*\*, and\*\*\*: Show significant difference at probability of 1, 5, and 10%, respectively.

With the endorsement of long-term relationship between the variables of the model by the Pedroni Co-integration test, data on variables levels can be used to estimate the model of factors influencing the government support of agricultural products market. However, the use of panel data model, performing both homogeneous and Hausman test is very important, in addition to the unit root test and Co-integration test.

In the estimating model using panel data, the main issue is considering the effects of group. Accordingly, to address this issue, the performed tests and the results are reported in Table 3. Based on the results of the homogeneity test, the hypothesis of latitudes are not accepted and rejected. Therefore, in estimating the model, it is necessary to consider the effects of group and estimate the model as panel. Also, according to the Hausman test, it is necessary to estimate the model coefficients using a random effects model.

Doing the tests for panel data, government intervention logic model (Equation 7) of agricultural products markets was estimated for 1989-2011, in the model of Tobit panel and by the random effects method. The

**Table 3.** Results of Homogeneity and Hausman tests.

Homogeneity test	
$F_{Test}$	<i>P</i> value
10.9	0.01
Hausman test	
$\chi^2_1$	<i>P</i> value
1.36	0.99

results are shown in Table 4. Reviewing the results of estimating the considered model indicates that the model has not heteroskedasticity. Also consistent with the theory, most of the considered variables have the expected signs and are significant at high levels.

The first considered variables were the supply and demand elasticity. Based on economic theory, their low levels were considered as the main reasons for government intervention in the market of agricultural products. Reviewing the correlation of these two variables with the government support indicates that relations between these two variables inversely related to the level of government support. In other words, by declining the supply and demand elasticity and weak reaction of supply and demand changes to price changes, during the recent years, the government has always entered into the market and has increased the amount of its support from agricultural products. The results show the importance of agriculture in exports and exchange technology, reflecting that the government's decision in support of agricultural products has been an influencing variable. The correlation between this

**Table 4.** Effective variables at the level of government support for agricultural production.

Variables	Terminology	Coefficients	<i>t</i> -Test
<i>C</i>	Intercept	-0.311	-5.36*
$\varepsilon$	Supply elasticity	-0.357	-4.11*
$\eta$	Demand elasticity	-0.264	-2.19*
<i>EX</i>	The commodity's share of total exports of agricultural sector	0.053	1.65***
<i>IM</i>	In the case of imported goods= 1, Otherwise= 0	0.039	1.05
<i>INC<sub>t</sub></i>	Agricultural income in the current crop year	0.356	2.8*
<i>PRN</i>	Number of producers	0.127	1.96**
<i>PTP</i>	The commodity's share of total products of agricultural sector	0.275	2.91*
<i>COP</i>	Concentration index	0.281	2.23*
<i>AUN</i>	Agricultural cooperatives and organizations	0.03	0.98
Lagrange Multiplier test (LM test)		$\chi^2_{(0.11)}=2.49$	

\*; \*\*, and \*\*\*: Show significant difference at probability of 1, 5, and 10%, respectively.



variable and the level of government support indicates the relation is positive and statistically significant, thus, the increase in the share of the products in the total exports of agricultural goods increases the levels of governmental support of agricultural products. Results of Table 4 show that the relationship between levels of support and importing products with similar domestic production is a positive and direct correlation. The positive sign of the coefficient of the variable indicates government support for the products that are imported from other countries to partly meet local consumption, because of inadequate domestic production. However, based on the results of this relationship, it is not statistically significant. The results show that there was a direct relationship between the real income of farmers from the current crop and the level of government support of agricultural products. Thus, the increment in real income of farmers increases the level of government support of agricultural crops. The direct relevance to Iran's agricultural sector could be investigated as economic conditions in recent years, during which Iran has experienced rapid growth and high inflation rates. Meanwhile, prices at the farm gate of agricultural products and for the farmers have always been lower than inflation in the country and, accordingly, real income of farmers has declined. So, it seems reasonable that during this period, to fix this problem and increase the purchasing power of farmers, government seeks more support to increase the real income of farmers directly or indirectly. Reviewing correlation between the number of farmers and the level of government support of agricultural sector indicates a direct correlation between the two variables. Therefore, as the number of beneficiaries increased, the number of government intervention to protect the crops has also grown. According to the developing theories in the process of transition, agricultural labors leave the farms and enter other sectors of the economy, especially the industrial sector, thereby reducing the share

of agriculture in employment and surplus value. However, the process in Iran is not formed due to weakness in the industrial sector to absorb surplus agricultural labor. In this context, to reduce the social pressures, government policies have been decreased and increased the farm lands and farmers in the agricultural sector. Reviewing the correlation between the share of each product in the total agricultural output also shows that the relationship between the variables and the level of government support is a direct and positive relationship. Hence, a rising share of goods in the total agricultural output increases the level of government support of agricultural crops. Products that have a high share in the total agricultural output are commonly known as a strategic commodity. Accordingly, for political and economic reasons, these products have a special place in the government support policies. And even if they are expensive and not affordable to produce in the country, the level of support of these products won't decrease and they enjoy more price and non-price support than the other products. The results suggest that the relationship between the production concentration variable and level of the government support of the agricultural sector is a positive and direct correlation. Therefore, expanding the cultivated area and concentrating of the cultivated area in the whole country raise government support policy of these products. Nevertheless, as results show, agricultural cooperatives and organizations, which are considered as the most important component of modern agriculture, have no significant effects on the government's decision to support the agricultural sector.

## CONCLUSIONS

The results of this study indicate that a low elasticity of supply and demand, the share of agricultural sector's total exports, the real income of farmers, number of producers, the share of total agricultural output, and

production concentration are the variables directly associated with the level of government support of agriculture. Therefore, to strengthen each of these variables, the government support of agricultural production has increased during the study course. Based on these results, for example, expansion of the land size under export crops and cultivating crops with high economic value has great benefits for farmers. On the other hand, the small size of most of the variables' coefficients (including variables related to foreign trade) in comparison with other studies could indicate inadequate policies adopted by the government at the current level. In other words, the size and extent of the current level of support is insufficient. On this basis, in order to solve the major problems of the agricultural sector in the country according to World Trade Organization rules, adoption and implementation of mixed policies in the agricultural sector is a way to increase efficiency and minimize cost for policy makers while maximizing welfare for farmers. The results of the present study indicate that unions, agricultural cooperatives, and associations, which are the most important component of modern agriculture in many countries, could not play an effective role in the government's decision-making in supporting agriculture in Iran. Accordingly, contrary to the results of Gardner (1987) and Thies and Porche (2007) that the role of political factors and especially NGO associations and organizations is evaluated as an important agricultural policies, In Iran, these institutions could not play an important role in agricultural policy. It is recommended to the government to take steps in supporting the creation and development of agricultural organizations and associations by transferring most of its activities to the sectors and also by recognition of these organizations as powerful advisory arm in adopting agricultural policies, and monitoring role in agricultural sector activities.

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## بررسی عوامل موثر بر حمایت دولت از بازار محصولات کشاورزی ایران

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### چکیده

بخش کشاورزی به عنوان یکی از بخش‌های قدیمی و اصلی اقتصاد در زمینه تولید و اشتغال محسوب شده و به لحاظ نقش مهمی که در تأمین مواد غذایی مردم و تهیه مواد اولیه بسیاری از صنایع ایفا می‌نماید همواره از اهمیت و جایگاه ویژه‌ای در سیاست‌های حمایتی، سیاست‌گذاران بخش کشاورزی برخوردار بوده است. بر این اساس در مطالعه حاضر سعی شده است تا عوامل موثر بر حمایت دولت از بازار محصولات کشاورزی ایران شناسایی، و برای دوره زمانی ۸۹-۱۳۶۸ الگوسازی شود. در این راستا با استفاده از تئوری بازتوزیع کارا و با به کارگیری اطلاعات پانل مربوط به ۱۲ گروه کالای منتخب بخش کشاورزی شامل گندم، جو، برنج، پنبه، پسته، سیب، خرما، چغندر، تخم مرغ، شیر، گوشت مرغ و گوشت قرمز منطق مداخله دولت در بخش کشاورزی ایران در قالب مدل پانل تویت الگوسازی و سپس بر این اساس برآورد شده است. نتایج حاصل از مطالعه حاضر نشان می‌دهد کشش عرضه و تقاضا، سهم

کالا از کل صادرات بخش کشاورزی، درآمد واقعی کشاورزان، تعداد بهره‌برداران، سهم از کل تولیدات بخش کشاورزی و همچنین تمرکز تولید متغیرهایی هستند که با میزان حمایت دولت از بخش کشاورزی ارتباطی مستقیم دارند، به طوری که با تقویت هر یک از این متغیرها میزان حمایت دولت از محصولات کشاورزی طی دوره مورد بررسی افزایش یافته است. با این وجود نتایج نشان دهنده آن است که میان متغیر واردات (محصولاتی که دارای تولید مشابه داخلی هستند) و همچنین تعداد تعاونی‌ها و تشکل‌های کشاورزی با میزان حمایت دولت ارتباط معنی‌داری وجود ندارد.