

The Impact of agricultural governance variables in the Sixth Development Plan of Iran in the agricultural sector

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Abstract

Good governance in the agricultural sector provides better facilities by entering government, civil society and private sector closer to farmers. Agricultural governance emphasizes establishing effective mechanisms, processes and institutions where farmers articulate their interests, exercise their legal rights, meet their obligations and mediate their differences. In this research, We examine the effect of agricultural governance variables on the Iranian livestock and meat market using the EDM model. The results show that the factors of agricultural governance, employment, cooperative companies (production input) and investment have the highest effect on Iran's meat market. Also, cooperative companies have a significant impact on price, quantity, and producer welfare in the meat market. A policy recommendation of this research is that good governance should mediate differing interests in order to reach broad consensus on the best interest of groups on agricultural policies and procedures.

Keywords: Agricultural governance, Group participation, Equilibrium displacement model.

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I. Introduction:

Governance is the way in which laws, norms, and actions are structured, sustained, regulated, and accountable in a society. Work by the World Bank and other multilateral development banks on good governance addresses economic institutions and public sector management, including transparency and accountability, regulatory reform, and public sector skills and leadership. Other organizations, like the United Nations, European Commission and OECD, are more likely to highlight democratic governance and human rights, aspects of political governance avoided by the Bank. Some of the many issues that are treated under the governance programs of various donors include election monitoring, political party support, combating corruption, building independent judiciaries, security sector reform, improved service delivery, transparency of government accounts, decentralization, civil and political rights, government responsiveness and “forward vision”, and the stability of the regulatory environment for private sector activities (Janssen and van der Voort 2016).

The question of how to strengthen governance, especially from a political perspective, is the most pressing. However, this question can not be answered precisely without a better understanding of the meaning of good governance; that is what exactly are you wanting to improve?. The term “good governance” has become a catchy shorthand way to describe a variety of political and economic institutions and outcomes. If we can implement governance in all areas of a country, it will be a great help to improve good governance in a country (Champan et al, 2017).

Governance includes political, economic, and administrative dimensions. Especially related to agriculture. For agriculture, political governance is the decision-making process for agricultural policy, while economic governance emphasizes decision-making processes that affect economic activities and their relationship to the agricultural economy. Administrative governance addresses with the implementation of policies. In most developing countries, the government seeks to improve agriculture and ensure livelihoods through consultation with agricultural organizations, NGOs, civil society, development economists, and the private sector (Stead 2015). Good governance for agriculture encourages better services by “bringing

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government closer to farmers” and coordinating between legal, economic and social systems and governing institutions.

For sustainable agricultural development, the existence of a predictable and transparent framework of laws and institutions is a necessary condition for the implementation of agricultural projects. Good governance therefore emphasizes the establishment of effective mechanisms, processes, and institutions through which farmers can express their interests, exercise their legal rights, fulfill their obligations, and mediate their disputes. Good governance can be generally assessed with the following terms.

- Voice and accountability: to eliminate the abuse of public office for private gains and diversion of resources.
- The rule of law: access to justice and enforcement of rights to land, water, food etc.
- Regulatory quality: quality of agricultural development policies and regulations.
- Government effectiveness: efficiency and equity in the provision of agricultural services and infrastructure.
- Promoting effective participation of farmers (particularly small scale, marginal, women and tenant farmers; share croppers; and oral lessees) and their organizations in agricultural policy processes, refining management information system in the department of agriculture at local levels, initiating community-driven agricultural development projects and supporting self-help groups of small producer organizations. Efforts must create awareness among farmers and seek their full participation, train them and build their capacity.

The agricultural sector and livestock farming play a major role in human life, but its share has declined in Iran's economic development. Despite Iran's high agricultural potential, growth in agriculture's share of GDP is lower than in other sectors. Iran is an oil-dependent economy. Improving agricultural and livestock sectors have much potential to reduce the economy's dependence on oil. Good governance in this sector is a key in agricultural growth.

Ronaghi et al., (2020) show that Iran faces challenges in all of the World Bank's governance indicators (transparency and accountability, political stability, violence, government effectiveness, regulatory quality, rule of law, and corruption control). They used an indicator of governance from the World Bank, which ranged from -2.5 (the weakest) to 2.5 (the strongest) to investigate the role of governance measures on the agricultural sector in Iran. They found that all governance indicators were quite low for Iran, indicating much room for improvement (Figure 1). Better governance reduces internal and external barriers to development and improves internal resource management by creating a more transparent regulatory structure. These changes can lead to faster growth of Iran's agricultural sector.

Meat plays an important role in providing protein and calories to the Iranian population. Fluctuations in meat supply and demand affect people's food consumption patterns. Meat prices have fluctuated particularly in recent years. The government has a duty to support the increase in the production of animal protein (livestock and poultry), and they can achieve this by improving agricultural (livestock) governance. Therefore, in this study, we examine the role of governance in improving agricultural and livestock performance (Hosseini, 2008).

These questions arise:

1. What are the important variables which impact agricultural governance?
2. What effects do agricultural governance variables have on economic aspects of the meat market?
3. How does the livestock market, in particular the price and quantity of meat, change by implementing agricultural governance?
4. How does supplier welfare change by improving agricultural governance?

II. Literature review

Good governance requires cooperation and partnership. This can be done by setting an example, strengthening accountability, encouraging public debate, and fostering a free press. It also means, strengthening public relations and non-governmental organizations such as agricultural associations, cooperatives, and women's groups (Elmenofi et al, 2014). Given that the sector of agriculture plays an important role in the human life, several studies have been performed on agricultural governance.

Bitzer et al. (2016) suggests that demand-driven services in the agricultural sector have led to improvements in agricultural governance and resulted in a more responsive agricultural sector with regard to the environment and other conditions. More farmer participation improves agricultural governance and empowerment, which is a goal of the development community (World Bank and IFPRI, 2015). They argue that the local government sector is very important in improving agricultural governance and promoting public participation. Díaz (2013) shows that increasing agricultural governance and the government's commitment are priorities for rural development in Guatemala. Achieving this improvement should be supported by allocating funds to implement public policies and increasing social participation in the social council.

The “quality of government performance”, which consists of two dimensions of governance: “government effectiveness” and “regulatory quality,” plays an important role in agricultural governance (Sheng, 2015). Fan et al., (2004) focused on public goods and services, such as roads, irrigation systems,

communications infrastructure, schools, and agricultural research and extension programs, and their ability to increase agricultural productivity. They argue that effective and efficient delivery of these public goods and services is critical to agricultural development. The government also must deliver sound macroeconomic policies, such as prudent fiscal policies, positive real interest rates near the opportunity cost of capital, and exchange rates near their equilibrium, which are vital to the creation of an economic and policy environment conducive which promotes broad-based agricultural development (Tomich et al., 1995).

Improving agricultural governance is difficult and there are many obstacles. Poulton (2010) wrote about many governance failures, such as financial instability, elite capture, corruption and misappropriation of funds and employees for political purposes. They find these problems at all levels, but the central government's lack of commitment the most problematic (e.g., Benson and Jafry, 2013; Chisinga and Cabral, 2010). Political stability is clearly an important asset for agricultural governance. Donkor et al., (1998) found that people are unable to stay on the farms to produce food or engage in farming activities when there are armed conflicts ongoing. Farmers become food aid recipients rather than food providers. Such instability drives away investment in agriculture as all types of risk skyrocket.

There is no study that investigates the effects of agricultural governance on livestock and meat markets. The strategies of governance can lead to better outcomes as "demand-side" and "supply-side" strategies. The "demand-side" strategy aims at strengthening the ability of farmers and their organizations to demand better public services and hold public officials accountable, including elected representatives, legislators and administrators. This strategy refers to the "voice and accountability" dimension of good governance. The "supply-side" strategy aims at strengthening the capacity of the administrators and other service providers to supply services effectively and efficiently, and to be more responsive to farmer priorities and needs. This strategy refers to the "government effectiveness" dimension of good governance (Patel, 2017). Since the improvement of governance has a significant impact in improving the agricultural sector, we investigate the impact of agricultural governance variables on supply and demand in the meat market for this paper.

Methodological Approach and Model Development

The agricultural sector plays a major role in human life, but the share of this sector has decreased as Iran's economy has developed. More attention should be paid to agricultural development because of economic sanctions and other international challenges faced by the country. In this study, we determine the factors of agricultural governance and their effects on Iran's meat markets.

We use the findings from Ronaghi et al (2019) as an input to our analysis. They defined four variables for agricultural governance. The results of their fuzzy analysis show that the factors of agricultural employment, group participation, and cooperative companies have the highest weight in the political, social and environmental areas, and the factors of increased production inputs, and financial and capital markets have the highest weight in the economic area. We use their data for four variables of agricultural governance: Employment, Investment, Cooperative, Production inputs. Since, we need the expenditure of each factor of governance in this study and also, due to, there is not expenditure data for cooperatives and also because of the impact of cooperatives on improving efficiency and distribution of inputs, we consider (cooperative) and (production inputs) variables as one variable in this study (Kermani et al., 2004).

After selecting the variables of agricultural governance, we examine the impact of variables of agricultural governance on the Iranian livestock and meat market. An Equilibrium Displacement Model (EDM) is used to assess the effects of agricultural governance variables on meat producers and consumers. The EDM model determines the effects of agricultural governance variables on price and quantity of livestock products by shifting the supply and demand functions before and after the implementation of agricultural governance variables with different scenarios. This is the first study to measure the impact of agricultural governance on vertical and horizontal meat markets by using an EDM.

Equilibrium Displacement Model (EDM)

In order to assess the impact of agricultural governance on the livestock and meat markets, we consider the horizontal markets among cattle, chicken, and sheep, as well as vertical markets within each species, including the farm and retail markets. The specification of an EDM includes the percentage change in the price and quantity of each species (cattle, chicken and sheep) in retail markets and farm markets (Wohlgnant, 2012):

$$EQ_B^R = \eta_{BB}(EP_B^R - \delta_B) + \eta_{BC}(EP_C^R - \delta_C) + \eta_{BM}(EP_M^R - \delta_M) \quad (1)$$

$$EQ_C^R = \eta_{CB}(EP_B^R - \delta_B) + \eta_{CV}(EP_V^R - \delta_C) + \eta_{CM}(EP_M^R - \delta_M) \quad (2)$$

$$EQ_M^R = \eta_{MB}(EP_B^R - \delta_B) + \eta_{MC}(EP_C^R - \delta_C) + \eta_{MM}(EP_M^R - \delta_M) \quad (3)$$

$$EP_B^R = S_B EP_B^F \quad (4)$$

$$EP_M^R = S_M EP_M^F \quad (5)$$

$$EP_C^R = S_C EP_C^F \quad (6)$$

$$EQ_B^F = -(1 - S_B)\sigma_B EP_B^F + EQ_B^R \quad (7)$$

$$EQ_M^F = -(1 - S_V)\sigma_M EP_M^F + EQ_M^R \quad (8)$$

$$EQ_C^F = -(1 - S_C)\sigma_C EP_C^F + EQ_C^R \quad (9)$$

$$EP_B^F = \left(\frac{1}{\epsilon_B}\right)EQ_B^F - K_B \quad (10)$$

$$EP_M^F = \left(\frac{1}{\epsilon_V}\right)EQ_M^F - K_M \quad (11)$$

$$EP_C^F = \left(\frac{1}{\epsilon_C}\right)EQ_C^F - K_C \quad (12)$$

In all equations, EP is the percentage change in price, $dln(p)=dp/p$, and EQ is the percentage change in quantity, $dln(Q) = dQ / Q$. The B, C, and M subscripts are for beef, chicken and mutton (the meat products from the species) at the farm (F) and retail (R) levels, respectively. In the retail market live animal units have been transformed into meat equivalents (Muth, 1964). EQ_B^R , EQ_C^R , EQ_M^R are the percentage change in the demand for beef, chicken and mutton, and EP_B^R , EP_C^R , EP_M^R are the percentage change in price for beef, chicken and mutton.

The relationship between the three retail markets for beef, chicken, and mutton is expressed horizontally. Own price elasticity and cross price elasticity are η_{ii} and η_{ij} , respectively. Equations 1-3 are the percentage change in the retail demand for beef, chicken and mutton. δ_B , δ_V and δ_C are the transaction costs at the retail level. Equations 4-7 are the percentage change in the retail price for beef, chicken, and mutton. The S is the producers' share of the retail price. Thus, S_B is the beef producer's share of retail price, S_C is the chicken producer's share, and S_M is the sheep producer's share. Average prices and quantities are used to calculate these coefficients.

Demand at the farm level is expressed in equations 7-9. σ_B , σ_C and σ_M are the substitution elasticity between beef, chicken and mutton, respectively. Equations 10-12 are the inverse total supply of cattle, chicken, and sheep ready for slaughter as percentage changes. ϵ_B , ϵ_C , and ϵ_M are the supply elasticities of cattle, chicken, and sheep, respectively. The impact of agricultural governance variables is considered as exogenous shifters/variables, k_B , k_C , and k_M on the total supply of cattle, chicken, and sheep.

-Determine the (K) variable on Iran's Livestock and Poultry Market:

In order to gauge the influence of agricultural governance variables on meat markets, we consider the effects of agricultural governance variables (Employment, Investment, Cooperative (Production inputs)) on inverse supply for each kind of meat (beef, chicken, and mutton).

According to Fathi et al (2014), the exogenous variable K (the percentage change in expenditures for each kind of governance variable divided by the percentage change in price for each kind of meat), is calculated as follows:

$$k_n = \frac{EG_n^F}{EP_n^F} \quad n = B, V \text{ and } C \quad (13)$$

In this case, n includes beef (B), chicken (C) and mutton (M), EG_n^F is the percentage change in expenditures on each kind of governance variable in one year, and EP_n^F is the percentage change in farm price for cattle, sheep and chicken in one year. For example, for the investment variable in the agricultural (livestock) sector (an important governance variable), the value of K is the percentage change of investment from 2018 to 2019 divided by the percentage change in beef price from 2018 to 2019.

Following the implementation of the equilibrium displacement model, various results are obtained from the effects of agricultural governance variables on the meat market. We use the EDM to determine governance impacts on price and quantity at the farm and retail levels. We also compute welfare changes for farm suppliers and retailers from improved governance in different scenarios.

-Welfare changes:

According to the equations (10) to (12), the effects of agricultural governance variables enter through K_n in the inverse total supply function at the farm level. Therefore, agricultural governance variables affect the welfare of suppliers at the farm level. In this research, the welfare changes of farm supplier and retailers are calculated according to Willig, 1976:

$$dln(Q_n^R) \cong \frac{dQ_n^R}{Q_n^R} = EQ_n^R, \quad dln(P_n^R) \cong dP_n^R/P_n^R = EP_n^R$$

$$\Delta PS_n^R = P_n^{RO} Q_n^{RO} (EP_n^R - \delta_n)(1 + 0.5EQ_n^R) \quad n = B, V \text{ and } C \quad (14)$$

Where ΔpS_n^R is the suppliers' welfare in the retail market, p_n^{RO} is the initial price and Q_n^{RO} is the initial quantity. The suppliers welfare of farm market (ΔpS_n^F) is calculated using equation (15).

$$dln(Q_n^R) \cong \frac{dQ_n^R}{Q_n^R} = EQ_n^R, \quad dln(P_n^R) \cong dP_n^R/P_n^R = EP_n^R$$

$$\Delta PS_n^F = P_n^{F0} Q_n^{F0} (EP_n^F - K_n)(1 + 0.5EQ_n^F) \quad n = B, V \text{ and } C \quad (15)$$

Where p_n^{F0} and Q_n^{F0} are the initial price and quantity of live meat animals (beef, mutton and chicken). The total surplus for suppliers of each meat is equal to the total surplus of producers in farm and the retail market ($\Delta pS_n = \Delta pS_n^R + \Delta pS_n^F$) and the total meat market is equal to ($\Delta pS = \Sigma \Delta pS_n$).

III. Data And Empirical Results

Our analysis draws on the work of Ronaghi et al, 2019 for the factors that influence agricultural governance in Iran. Their results find that the factors of agricultural employment, cooperative companies, input production, and investment are selected as agricultural governance variables in Iran. According to equation (13), we need expenditures for each factor of agricultural governance. In this study, due to the impact of cooperatives in the efficient distribution of inputs and increased production efficiency, the cooperative variable and the improving the efficiency of inputs are combined into one variable. In this research, we evaluate the impact of selected agricultural governance variables on the Iran's meat market.

We first use the percentage change in price and quantity for each kind of meat during the 2012 to 2018 period as the baseline. Then we use equations (1) through (12) to estimate the percentage change of price and quantity for each kind of meat that would occur if there was an increase in agricultural governance in each of the factors analyzed in the amount that they changed in 2018. We insert the change in agricultural governance from each variable into the K variable in the model. Because there are three agricultural governance variables and three meat prices, we solve for nine different cases in the analysis of governance changes on meat markets. We compare the percentage change in price and quantity with different changes in agricultural governance. Finally, we use equations (14) and (15) to estimate producer surplus changes for each meat from increased agricultural governance and compare their impacts.

Data on farm price of cattle, sheep and chicken and retail price of beef, mutton and chicken are from the livestock and poultry company, the production of cattle, sheep and chicken on the farm and retail levels are from the Iranian Agricultural Organization, and other costs of livestock and poultry are in the Iranian Statistics Center as time series. Data on expenditures for each factor of agricultural governance are from the Iranian Agricultural and livestock Organization.

The actual percentage change in the price and quantity of retail and farm markets for each year from 2012 to 2018 are shown in table (1). The price for each kind of meat increased markedly in 2017 and 2018, and the quantity of each kind of meat fell in 2018. One reason for the price increase in recent years is the higher level of licensed and illegal livestock exports. The depreciation of the Iranian rial has greatly encouraged these legal and smuggled exports, and therefore an increase in meat prices. Due to the boom in the export market, livestock owners have sold their animals at a younger age and lower weight. The large increase in livestock exports will reduce future reproduction potential and cause a shortage of meat. The average annual percentage change in the farm-level price of mutton from 2012-2018 is 1.39, which is higher than beef and chicken, and the average percentage change in the quantity of mutton at the farm level is -0.70, which is less than other meats.

The results of percentage change in price (EP) and quantity (EQ) for the retail meat market and farm level after the application of agricultural governance variables are shown in Table (2) for 2018. Following the increase in agricultural dominance in the meat market, the percentage change in price (EP) for beef, chicken and mutton are negative at the retail and farm level, and the percentage change of quantity (EQ) are positive at the retail and farm level. These results show the positive effect of implementing agricultural governance. Improved agricultural governance increases quantity at the farm and retail level, so farm and retail prices fall. Table 2 shows that chicken prices at the farm level react more to increases in the investment variable and increases in expenditures by cooperatives (and production inputs) have a larger effect on prices at the retail level for beef. Quantity changes are large for increases in cooperative expenditures (and production inputs) on mutton at the farm level.

Cooperatives are considered an important vehicle to improve livelihoods, better implement livestock plans and increase public participation by farmers. Rural production cooperatives help ranchers to improve their production and marketing. The cooperatives increase the bargaining power for beneficiaries and reduce the related costs for production, transport, marketing and product processing. They also play an important role in economic development and are effective in improving the people's socioeconomic conditions (Zeranezhad et al., 2006).

Investment in the livestock sector is risky because farmers have no control over livestock prices and therefore their income from the market; they only control their own production decisions. Market demand, including buyers outside Iran, is a big factor in determining the profitability of livestock production. Agricultural governance in this model only affects the supply side of the market, so it is expected that if there is no concomitant increase in market demand that all prices will fall. Of course, investing in new technologies has the same effect of decreasing the final price of products in the long run (Qaravi, 2000).

The best predictions for future changes in agricultural governance variables come from the sixth development plan for the agriculture sector (table 3). In this plan, it is expected that the average annual growth of investment will be 20.3%, the average annual growth of employment will be 3.9%, and the average annual growth of production inputs will be 3.2%. When these projected growth rates are included in the EDM the estimated changes in meat prices and quantities are shown in Table 4.

Annual investment growth at 20.3% has a greater impact on quantities at the farm level for chicken, beef and mutton. Growth in cooperative expenditures (and production inputs) of 3.2% per year has a greater impact on retail prices for chicken and the retail quantity of beef; while the 3.9% annual growth of employment has small effects for all variables (the largest impact is for the retail chicken price).

Changes in the governance variables (through the K variable) impact the supplier's function, which changes their welfare. The changes in producer surplus in the meat market after applying the variables of agricultural governance are shown in table (5) for 2018. These are the welfare impacts of the price and quantity changes presented in Table 2. The implementation of agricultural governance in the meat market leads to lower prices and higher quantities, which reduce the suppliers' welfare at the retail and farm levels. In addition, according to equation (15), the impact of reducing the price is much greater than the effect of increasing production. For this reason, producer surplus is reduced.

The cooperative (production input) variable has the largest effect among governance variables on the total surplus of meat producers, which falls by \$4.85 million. The highest impact of the cooperative (production input) variable among the meats is for mutton at the farm level and the lowest impact is for chicken at the retail level. As stated earlier, cooperatives reduce the cost of marketing through the provision of their services, which reduce the price of products and encourages them to produce more.

The employment variable has a larger effect on total surplus of meat producers than the investment variable. The largest impact on producer surplus at the retail and farm level is for mutton, and the lowest effect is for chicken at the retail level. Increasing the labor force in the agriculture sector reduces wages. By decreasing wages, worker's responsibilities will be reduced and product quality will deteriorate, therefore product prices and supplier surplus will also fall (Moghadas, 2012). By increasing employment, young rural laborers are more likely to find a position and make money in the village. They will not be forced to migrate. More laborers stay in the village and they help to improve the agriculture and livestock.

The results of producer surplus with different scenarios of agricultural governance variables (Employment, Investment, Cooperatives (Production inputs) by increasing 3.9%, 20.3%, 3.2%,) are shown in table (6). These are welfare estimates from the price and quantity changes shown in Table 4. The 3.9% growth of employment has the largest impact on producer surplus of meat suppliers (\$997 thousand), and its effect is focused on mutton and chicken at the farm-level. The predicted growth of cooperative (production inputs) has the smallest effect on producer surplus of meat suppliers; its impacts are largest on mutton farmers. Producer surplus decline from the 20.3% investment growth is greatest for chicken and mutton at the farm level. By increasing investment in the livestock and poultry sector, facilities and machinery will be improved for this industry, which will reduce the initial costs and the final price of the product.

It is obvious that consumers are the main beneficiaries of the increase in agricultural governance. They experience an increase in quantity and a reduction in price. Thus, consumers should be very interested in improving agricultural governance.

IV. Conclusions

Due to the important role of governance in improving the agricultural sector and the significance of the meat market, we studied the effects of governance factors on the Iran's meat market (prices and quantities of beef, chicken and mutton at the retail and farm level). Since governance variables affect the producers, the producers' behavior for each kind of meat was modelled and the effects of agricultural governance were estimated. Because agricultural governance affects the supply side of the market, we found that output increased and prices fell with improved agricultural governance. We also investigated the effects of these changes on producer surplus for each meat.

According to research findings, the investment variable has the greatest impact on price. By increasing investment in the livestock sector, not only can modern technology and equipment be used in livestock farms, but also specialists and skilled labor in the production process can be used. Using university graduates in the fields of farm management, nutrition, livestock and poultry production, animal health and other technical fields can bring huge benefits to producers. Agricultural production is a risky business, so the government should support this sector. In Iran, national and provincial funds should be developed to support the poultry and livestock production sector, and to provide funds for cooperatives. When cooperatives enter the supply chain, there are improvements in input supply, assembly, processing, and product distribution.

The current situation in Iran is difficult for the poultry and livestock industry because of the need for foreign currency and the abuse of market power in the distribution system. Timely supply of inputs can be a

problem because those inputs are hoarded or supplied to other parties without notice. These activities lead to increased prices for inputs. Farmer cooperatives can overcome these problems because their objectives are to serve farmers and their goals align with farmer goals.

In the market of inputs, low profitability and market volatility have been a major cause of closure for many firms in this sector. Supporting the development of productive cooperatives at the regional level, also seems to be beneficial. These cooperatives purchase member's products at a reasonable price and provide the inputs which they need.

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Appendix:

Table 1. Percentage changes in the quantity and price of farm and retail level of meat market before applying the variables of agricultural governance for the period 2012-2018 in Iran.

| Years | Markets | Chicken | Beef | Mutton | |
|-------|----------|--------------|--------|--------|--------|
| 2012 | Price | Farm level | 0.050 | 0.817 | 0.312 |
| | | Retail Level | 0.033 | 0.037 | 0.052 |
| | Quantity | Farm level | 0.008 | 0.085 | 0.001 |
| | | Retail Level | 0.049 | 0.090 | -0.293 |
| 2013 | Price | Farm level | 0.020 | 0.291 | -0.876 |
| | | Retail Level | 0.016 | 0.004 | 0.201 |
| | Quantity | Farm level | 0.110 | 0.050 | -0.032 |
| | | Retail Level | 0.067 | 0.111 | -0.051 |
| 2014 | Price | Farm level | 0.032 | 0.007 | 9.607 |
| | | Retail Level | 0.031 | 0.08 | 0.083 |
| | Quantity | Farm level | 0.031 | 0.030 | 0.010 |
| | | Retail Level | -0.016 | 0.038 | 0.05 |
| 2015 | Price | Farm level | 0.049 | 0.016 | 0.053 |
| | | Retail Level | 0.030 | 0.037 | 0.038 |
| | Quantity | Farm level | 0.010 | 9.275 | 0.091 |
| | | Retail Level | 0.034 | 0.076 | 0.007 |
| 2016 | Price | Farm level | 0.022 | 0.028 | 0.109 |
| | | Retail Level | 0.029 | 0.071 | 0.111 |
| | Quantity | Farm level | 0.19 | -0.109 | -0.448 |
| | | Retail Level | 0.044 | 0.229 | 0.429 |
| 2017 | Price | Farm level | 0.197 | 0.200 | 0.276 |
| | | Retail Level | 0.159 | 0.333 | 0.367 |
| | Quantity | Farm level | 0.074 | 0.191 | -0.018 |
| | | Retail Level | -0.015 | -0.227 | 0.071 |
| 2018 | Price | Farm level | 0.210 | 0.140 | 0.313 |

| | | | | |
|----------|--------------|--------|--------|--------|
| | Retail Level | 0.875 | 0.237 | 0.268 |
| Quantity | Farm level | -0.044 | -0.115 | -0.154 |
| | Retail Level | -0.036 | -0.038 | -0.451 |

Table 2. Percentage change in the quantity and price of meat market in farm and retail level after applying the variables of agricultural governance in 2018.

| Agricultural governance variables | | Mutton | Chicken | Beef | Mutton |
|-----------------------------------|----------|--------------|---------|--------|--------|
| Employment | Price | Farm level | -0.075 | -0.023 | -0.013 |
| | | Retail Level | -0.005 | -0.087 | -0.081 |
| | Quantity | Farm level | 2.301 | 0.214 | 2.551 |
| | | Retail Level | 2.289 | 0.020 | 0.984 |
| Investment | Price | Farm level | -0.364 | -0.014 | -0.008 |
| | | Retail Level | -0.003 | -0.053 | -0.049 |
| | Quantity | Farm level | 1.408 | 0.130 | 1.539 |
| | | Retail Level | 1.400 | 0.013 | 0.581 |
| Cooperative (Production inputs) | Price | Farm level | -0.001 | -0.033 | -0.019 |
| | | Retail Level | -0.007 | -0.125 | -0.117 |
| | Quantity | Farm level | 3.330 | 0.309 | 3.649 |
| | | Retail Level | 3.313 | 0.029 | 1.383 |

Table 3. Predicting the growth of agricultural governance variables in the Sixth Development Plan of Iran

| Indicators | Average annual Employment Growth (%) | Average annual Investment Growth (%) | Average annual Cooperative (Production input Growth)(%) |
|--------------------|--------------------------------------|--------------------------------------|---|
| Agriculture sector | 3.9 | 20.3 | 3.2 |

Source: Sixth development program of Iran's government 2018.

Table 4. Percentage change in the quantity and price of meat market in farm and retail level as a result of different scenarios of growth percentage of agricultural governance variables in 2018.

| Scenarios | | Markets | Chicken | Beef | Mutton |
|---|----------|--------------|---------|--------|--------|
| Average annual Employment Growth (3.9 %) | Price | Farm level | -0.827 | -0.521 | -0.308 |
| | | Retail Level | -0.468 | -0.002 | -0.002 |
| | Quantity | Farm level | 0.054 | 0.005 | 0.044 |
| | | Retail Level | 0.054 | 0.256 | 0.007 |
| Average annual Investment Growth (20.3 %) | Price | Farm level | -1.127 | -0.003 | -0.002 |
| | | Retail Level | -0.638 | -0.010 | -0.010 |
| | Quantity | Farm level | 0.271 | 0.025 | 0.308 |
| | | Retail Level | 0.269 | 0.003 | 0.124 |
| Average Annual Cooperative (Production | Price | Farm level | -0.327 | -0.811 | -0.466 |

| input) Growth (3.2%) | | | | | |
|----------------------|----------|--------------|--------|--------|--------|
| | | Retail Level | -1.853 | -0.003 | -0.003 |
| | Quantity | Farm level | 0.081 | 0.008 | 0.088 |
| | | Retail Level | 0.081 | 1.595 | 0.032 |

Table 5. Producer surplus in the meat market after increasing agricultural governance in 2018, (Dollars).

| Agricultural governance variables | | Markets | Chicken | Beef | Mutton |
|-----------------------------------|------------------------------|--------------|------------|----------|------------|
| Employment | Producer surplus | Farm level | -1,156,327 | -233,294 | -1,427,429 |
| | | Retail Level | -426 | -3464 | -4966 |
| | Total Producer surplus | | -1,156,754 | -236,758 | -1,432,396 |
| | Total surplus meat producers | -2,825,908 | | | |
| Investment | Producer surplus | Farm level | -523,002 | -136,767 | -733,673 |
| | | Retail Level | -203 | -2103 | -2598 |
| | Total Producer surplus | | -523,205 | -138,870 | -736,272 |
| | Total surplus meat producers | -1,398,347 | | | |
| Cooperative(Production input) | Producer surplus | Farm level | -1,907,758 | -351,605 | -2,575,812 |
| | | Retail Level | -740 | -5000 | -8131 |
| | Total Producer surplus | | -8040 | -1497 | -1116 |
| | Total surplus meat producers | -4,848,309 | | | |

Table 6. Producer surplus in the meat market as a result of different scenarios of growth percentage of agricultural governance variables in 2018 year, (Dollars).

| Scenarios | | Markets | Chicken | Beef | Mutton |
|---|------------------------------|--------------|----------|----------|----------|
| Average annual Investment Growth %20.3 | Producer surplus | Farm level | -804,925 | -25,055 | -88,939 |
| | | Retail Level | -28,340 | -394 | -435 |
| | Total Producer surplus | | -833,265 | -25,450 | -89,375 |
| | Total surplus meat producers | -948,090 | | | |
| Average Annual Cooperative(Production inputs) Growth 3.2% | Producer surplus | Farm level | -211,695 | -139,651 | -493,422 |
| | | Retail Level | -76,630 | -212 | -125 |
| | Total Producer surplus | | -288,325 | -139,863 | -493,547 |
| | Total surplus meat producers | -921,734 | | | |
| Average annual Employment Growth %3.9 | Producer surplus | Farm level | -501,475 | -136,199 | -340,312 |

| | | | | |
|------------------------------|--------------|----------|----------|----------|
| | Retail Level | -18806 | -88 | -82 |
| Total Producer surplus | | -520,282 | -136,288 | -340,395 |
| Total surplus meat producers | | -996,965 | | |

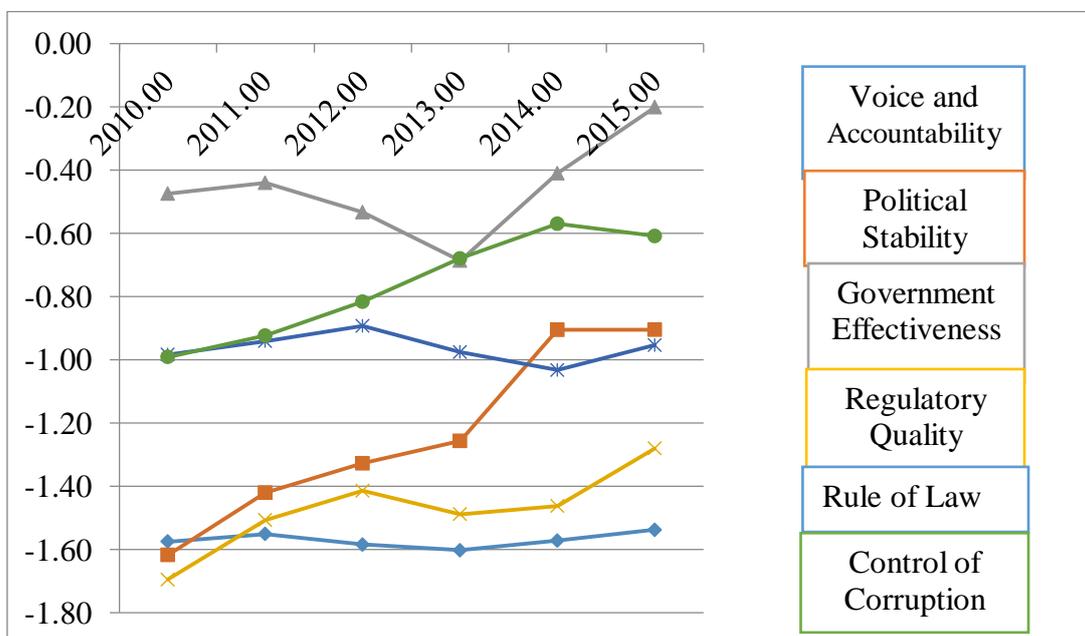


Figure 1. Governance Indicators in Iran in 2010- 2015.

Table 7. Coefficients in the equilibrium displacement model

| coefficients | Define the coefficients | |
|--------------|--|------|
| σ_M | Substitution elasticity between mutton and marketing inputs | 2.31 |
| σ_C | Substitution elasticity between chicken and marketing inputs | 2.90 |
| σ_B | Substitution elasticity between beef and marketing inputs | 3.69 |
| ϵ_M | price elasticity of supply for mutton (Absolute value) | 4.5 |
| ϵ_C | price elasticity of supply for chicken(Absolute value) | 2.71 |
| ϵ_B | price elasticity of supply for beef(Absolute value) | 0.17 |