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Meat Price Bubble in Iran: An Empirical Evidence from State-Space Model

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Abstract

Price bubbles and price fluctuations of agricultural products are important issues that can significantly affect the welfare of consumers and producers. Therefore, in this study, the price bubbles in three main protein products, i.e. lamb, beef, and chicken meats, were investigated by the state-space model based on the Kalman filter using monthly time series data on the price of selected protein products from June 2001 to November 2020. We considered barley, concentrate feed prices, broiler chicken, and corn prices as the main important inputs used for producing lamb, beef, and chicken meat production, respectively. Also, real exchange rate and real oil price were used in the model. The results showed the differences in structures making positive and negative price bubbles, period and number of occurrences and the collapse of the bubble during the sample period. Also, in contrast to chicken prices, we concluded the price bubble of lamb and beef, is not significant compared to the real prices. For chicken meat, the main cause of price bubbles was due to the disruption of the marketing process of agricultural products, the lack of transparency of information, and contradictory government interventions in the market. To deal with the problem, the implementation of aggregated market information through merging technologies in Information and Communication Technology could be considered an efficient tool as suggested. In addition, government intervention should be prioritized on reforming the market structure instead of controlling prices.

Keywords: Beef, Chicken meat, Kalman filter, Lamb
Classification JEL: D84, G14, Q4

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Introduction

Most commodity price fluctuations rooted in market principles contain supply and demand forces, which are not a concern and are essential for market equilibrium. If commodity price fluctuations that occur in the market are due to speculative activities and, in other words, have a significant deviation from the predicted fluctuations, the hypothesis of price bubble occurrence is raised (Garber, 1989). A price bubble is created when price fluctuations are not justified by common market principles, and its source is a factor beyond market principles (Arshanapalli and Nelson, 2016). Usually, the price bubble includes explosive price patterns followed by rapid price declines (Li *et al*., 2017).

Meanwhile, one of the problems faced by most consumers and producers is agricultural market instability, commodity price fluctuations, and price bubbles (Umar *et al*., 2021; Mohammadi *et al*., 2016). In economic literature, rising prices over a long period and a sudden drop in prices are called price bubbles (Li *et al*., 2017). In addition, the deviation of commodity prices from the long-run equilibrium price could be a price bubble. Yildirim (2020) described price bubbles as unexplained price movements in commodity prices and reason is that they are expected to sell at higher prices in the future (Garber 2001).

The occurrence of price bubbles in agricultural products has also exacerbated this issue. These fluctuations at the micro-level lead to numerous problems, such as increasing production risk and income risk, and reducing consumer welfare and food security disruption in production planning. At the macro level, it also poses several problems, especially in developing countries such as Iran. These problems include negative effects on the balance of payments, foreign exchange reserves, agricultural sector growth, and the implementation of social security programs (Gutierrez, 2011).

To deal with the price bubbles of agricultural commodities, it's essential to identify the factors affecting changes in prices of agricultural products. The major factor causing rising food price volatility is exogenous shock due to demand side, supply side, and macroeconomics policies (Tadasse *et al*., 2014) where investigated in this study.

Lamb, beef, and poultry meat are the most important commodities in the Iranian household bundle. However, the trend of changes in red meat (lamb and beef) and chicken meat consumption in Iran are different. A study of the per capita time series of meat consumption in Iran showed that the consumption of red meat decreased from 8.7 kg in 2011 to about 6 kg in 2017. Currently, the per capita consumption of red meat is about 6 kg. On the other hand, the consumption of chicken meat as substitute meat for red meat increased from 17.6 kg in 2011 to about 21 kg in 2017. However, due to the Covid-19 pandemic, the per capita consumption of poultry meat has dropped dramatically over the past two years (CBI, 2021). Figure 1 shows the trends of nominal lamb, beef and chicken meat prices from June 2001 to November 2020.

As can be seen in Figure 1, the trends of lamb and chicken meat prices are upward with many fluctuations while this situation can be devastating to consumers especially in developing countries (Etienne, 2014). Given the importance of meat in providing protein to households and creating food security and trying to control its price by the government, investigating the role of non-fundamental factors in the movement of meat prices can help policymakers to adopt appropriate policies.

Hence, the main objective of this study was to detect price bubbles of the three protein sources, chicken meat, lamb, and beef. In addition, the links between chicken meat, lamb, and beef price and fundamental factors include supply, demand, and macroeconomic variables. Although, in recent years, several studies have detected price bubbles in stock and capital markets. However, few studies have been conducted to detect price bubbles in agricultural commodity markets.

For instance, Gillbert (2010) focused on future price bubbles in corn, wheat, and soybean from 2006 to 2008. The empirical results detected price bubbles only in soybean. Gutierrez (2011) detected explosive processes and collapsing bubbles in the prices of wheat and paddy crops using the bootstrap method over the sample period from 1985 to 2010. In addition, Liao-Etienne *et al.* (2012) detected price bubbles in corn and wheat markets by employing the sup-ADF test. Liu *et al.* (2013) detected speculative bubbles in daily futures prices for six agricultural commodities using a regime-switching approach. Adämmer and Bohl (2015) studied the price bubbles of corn, soybean, and wheat in the market US market by using the momentum threshold autoregressive (MTAR) approach. Areal *et al.* (2016) examined the explosive price bubble in the market of 28 selected agricultural products by employing the generalized supremum augmented Dickey-Fuller (GSADF) test between 1980 and 2012. Mohammadi *et al*. (2016), examined the existence of multiple bubbles by applying the GSADF test in the chicken and beef meat market of Iran during 2002 -2013. The results showed that food commodities exhibited short-lived bubble behavior during the studied period. Li *et al.* (2017) detect commodity price bubbles in China's agricultural commodity market by applying the GSADF test. They also examined the relationship between commodity price bubbles and macroeconomic factors using a zero-inflated Poisson model. The empirical results show that speculative bubbles occur in most Chinese agricultural commodity futures markets. In addition, economic growth, money supply, and inflation have positive effects on the agricultural future price bubble, while interest rates have a negative effect. In addition, economic growth and money supply have the greatest impact on future agricultural price bubbles.

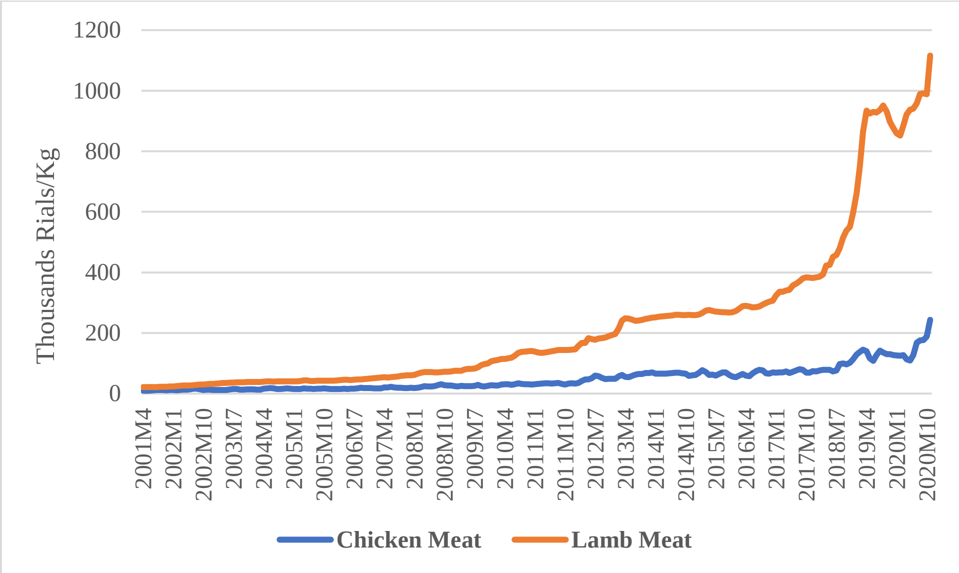

Figure 1- The nominal price of lamb and chicken meat

Maddah *et al*. (2018), studied the existence of commodity price bubbles in the Iranian imported market of some strategic imported commodities from 1976 to 2012. Also, the Right-Tailed Unit Root test is used. The empirical results detected the price bubble in barely. On the other hand, the price bubble did not detect the price of edible oil, wheat, and tea.

Wang *et al.* (2018) examined the existence of multiple explosive bubbles in the international food market between1990 and 2017. The GSADF test was used to detect multiple bubbles. The empirical results illustrate four explosive bubbles in the international food market. Also, Afrasiyabei and Tarazkar (2020) studied the existence of multiple explosive bubbles in domestic production and imported corn and barely by applying the GSADF test in Iran. The results of the research detected at least two or three bubbles from January 2014 to December 2018.

The literature review illustrated that most studies used the GSADF test, MTAR approach, and the Right-Tailed Unit Root test for detecting multiple price bubbles in the agricultural commodity market. Unlike most previous studies, in the present study, the state-space model based on the Kalman filter was used. To the author's knowledge, this study the first research in detecting price bubbles in the agricultural commodity market by using the state-space model. A dynamic system in the state-space form has two main advantages. First, we allow the model with both observed and latent variables to be estimated. Second, the Kalman filter is a powerful recursive algorithm that can be applied to analyze state-space models (Harvey, 1989; Hamilton, 1994; Koopman *et al*., 1999).The present study is a new attempt to answer these main research questions by a state-space method: Do price bubbles have a significant effect on the price formation and variation of lamb, beef, and chicken meat? What is the intensity of the bubbles and how does it affect the price of the studied products? Is the formation of the price bubble in the three studied products similar in intensity and duration?

Materials and Methods

According to the bubble model, the prices of meat can be represented as follows (Zhang *et al.*, 2019):

$$P_t = P_t^f + b_t \quad (1)$$

where, P_t^f is the fundamental monthly time series price of the lamb, beef and chicken. b_t represents the bubble. According to equation (1), in the case of b_t inexistence, the basic part P_t^f affects the Pt entirely. However, by considering the price bubble component, the lamb, beef and chicken meat prices are higher or lower than their essential values.

The linear state-space of the dynamic of the z_t is represented by the following equations (Harvey, 1989; Hamilton, 1994; Koopman *et al.*, 1999):

$$z_t = c_t + Y_t\beta_t + \epsilon_t \quad (2)$$

$$\beta_{t+1} = d_t + T_t\beta_t + \vartheta_t \quad (3)$$

where, β_t is a vector of the unobserved state variables. c_t, Y_t, d_t, and T_t are matrices and estimated parameters, where ϵ_t and ϑ_t are vectors of mean zero with serially independent, contemporaneous variance structure (σ_t), and Gaussian disturbances, respectively.

$$\sigma_t = var\begin{bmatrix}\epsilon_t \\ \vartheta_t\end{bmatrix} = \begin{bmatrix}H_t & R_t \\ R_t' & M_t\end{bmatrix} \quad (4)$$

where H_t and M_t are symmetric variance matrices, and R_t is a matrix of covariances. In addition, the unobserved state vector is assumed to be a first-order vector autoregression.

Note that the mean and variance matrix of the conditional distribution of state vector β_t can be defined by providing information available at times.

$$\beta_{t|s} \equiv E_s(\alpha_t) \quad (5)$$

$$P_{t|s} \equiv E_s\left[(\beta_t - \beta_{t|s})(\beta_t - \beta_{t|s})'\right] \quad (6)$$

By setting $s = t - 1$, we can obtain the one-step-ahead mean $\beta_{t|t-1}$ and the one-step-ahead variance $P_{t|t-1}$ of the states β_t. Therefore, the linear Mean Square Error (MSE) one-step-ahead estimate of $z_t$can also be formed by the one-step-ahead state conditional mean as follows:

$$\tilde{z}_t = z_{t|t-1} \equiv E_{t-1}(z_t) = E\left[z_t \middle| \beta_{t|t-1}\right] = c_t + Y_t\beta_{t|t-1} \quad (7)$$

The one-step-ahead prediction error ($\tilde{\epsilon}_t$) is given by,

$$\tilde{\epsilon}_t = \epsilon_{t|t-1} \equiv y_t - \tilde{y}_{t|t-1} \quad (8)$$

In fact, the Kalman filter is a recursive algorithm which can be used to compute one-step ahead estimates of the state and the associated mean square error matrix, $(\beta_{t|t-1}, P_{t|t-1})$, the filtered state mean and variance, (β_t, P_t), and the one-step ahead prediction, prediction error, $(z_{t|t-1}, \epsilon_{t|t-1})$. After applying Kalman filter and replacing the unobserved variables with their estimates, the sample loglikelihood can be evaluated under the assumption that ϵ_t and ϑ_t are Gaussian as a below:

$$Log\ L(\theta) = -\frac{nT}{2}\log 2\pi - \frac{1}{2}\sum_t log\left|\tilde{F}_t(\theta)\right| - \frac{1}{2}\sum_t \tilde{\epsilon}_t'(\theta)\tilde{F}_t(\theta)^{-1}\tilde{\epsilon}_t(\theta) \quad (9)$$

By numeric derivatives, the likelihood can be maximized with respect to unknown parameters θ.

In this study, the price bubbles of lamb, beef and chicken meats were state or unobservable variables. In addition, the fundamental components of their prices were divided into supply, demand, and macroeconomic variables according to Tadasse *et al.* (2013). The main stimulate for meat supply-side is the feed cost. Therefore, in this study, real broiler chicken price (RBH), real corn price (RCO), real barley price (RBR), and real concentrated feed (RCF) were used in chicken meat (RCH), lamb (RMU) and beef (RBF) real price equations. Also, the dummy variable (D1), so that in April and Ramadan is one and otherwise zero, were used as a stimulus to demand for meat. Finally, the real exchange rate (EXG) and real oil prices (OLP) are applied as macroeconomic variables.

As a result, the price equations for chicken, lamb, and beef are rewritten as follows:

$$RCH_t = c_0 + c_1\mathrm{RBH}_t + c_2RCO_t + c_3\mathrm{D1} + c_4\mathrm{EXG}_t + c_5\mathrm{OLP}_t + b_t + \varepsilon_t \quad (10)$$

$$RMU_t = c_0 + c_1\mathrm{RBR}_t + c_2\mathrm{D1} + c_3\mathrm{EXG}_t + c_4\mathrm{OLP}_t + b_t + \varepsilon_t \quad (11)$$

$$RBF_t = c_0 + c_1\mathrm{RCF}_t + c_2\mathrm{D1} + c_3\mathrm{EXG}_t + c_4\mathrm{OLP}_t + b_t + \varepsilon_t \quad (12)$$

Before estimating the above equations, it is necessary to test the stationary of the variables to avoid spurious regression and ensure the accuracy and validity of the results. Since the data used in this study are monthly, we apply the HEGY[1] seasonal unit root test with the null hypothesis that there is a unit root at the specified frequency including 0, π, ${}^{\pi}/_{2}$, ${}^{2\pi}/_{3}$, ${}^{\pi}/_{3}$, ${}^{5\pi}/_{6}$, ${}^{\pi}/_{6}$. The first of these frequency, which is termed a zero frequency unit root, is non-seasonal and occurring at zero cycles per year. The other unit roots which accruing at 2, 4, 3, 6, 2.4, and 12 cycles per year respectively are all seasonal (Gil-Alana, 2007; Tylor, 1998).

Data sources and descriptive statistics

We used the monthly data from June 2001 to November 2020 which collected from the State Livestock Affairs Logistics Company, Iranian ministry of Agriculture, Central Bank of Iran and Statistical Center of Iran. We used Eviews software (Version 12) to estimate the regression equations (10, 11 & 12).In continue, Table 1 provide the variables name of the data used along with their descriptive statistics.

Table 1 shows that the high standard deviation for real lamb and beef prices, and this shows the volatility of these variables. The minimum and maximum of real chicken price are 505.8 and 1395.9 respectively. Also, real broiler chicken price has the highest mean and variation among input prices while the means of real corn, barley and concentrated feed prices are close to each other.

Results

As described in the previous section, in this study, using the Kalman filter method and state space equations, the price bubbles of chicken, lamb and beef. At first, the results of seasonal unit root test are presented in Table 2.The results show that all variables are stationary in level.

Tables 3, 4, and 5 show the empirical results of the state-space equation model for the price bubble of lamb, beef and chicken, including lamb, respectively.

In equation related to the price of lamb (Table 3), there is a positive significant relationship between barley price, as the most important input to production of lamb, and lamb price. However, the demand shock at the beginning of the Iranian New Year in the April and the Ramadan did not have a significant effect on the price of lamb.

Another result is the positive and significant effect of the real exchange rate on the fundamental lamb price at the 10% level. Rising exchange rates, in addition to making exports more attractive, increase the price of inputs, especially barley. Another macroeconomic variable that has a negative and significant effect on the fundamental price of lamb is the real oil price. Since oil sales account for a large share of Iran's gross domestic product, rising crude oil revenues will increase subsidy support and lower fundamental meat prices.

Table 4 shows the state-space estimation results for the beef meat price equation. Looking at the numbers in the one column of this table, it can be seen that all the studied variables have affected fundamental chicken meat prices, except crude oil and demand dummy variables.

As expected, the price of concentrate feed has a positive and significant effect on the price of beef. However, the negative effect of real exchange rate on real beef price is so small. A review of the studied data shows that during the study period, despite the sharp increase in the real exchange rate, the real price of beef decreased. Therefore, this result shows that the inflationary effects of the rising exchange rate have outpaced the nominal price of beef, and the overall real price has decreased.

The estimation result for the chicken meat price equation is presented in table 5. Similar to the previous two estimates, the real price of corn and broiler chicken has a positive and significant effect on the real price of chicken meat. Also, the occasions of the new year and the month of Ramadan have increased the price of chicken meat. This result shows that, unlike lamb and beef, the demand for chicken is influenced by national and religious occasions and should be seen in the price analysis of this product. However, macroeconomics variables, real exchange rate and oil price, with the positive and negative signs are insignificant.

1- Hylleberg, Engle, Granger, and Yoo

Table 1- Descriptive statistics of the variables (Rials)

Variable name	Mean	Maximum	Minimum	Std. Dev.
Real chicken price (RCH)	860.8475	1395.929	505.8316	157.9406
Real lamb price (RMU)	3219.416	5337.833	2402.477	632.2423
Real beef price (RBF)	3011.825	4856.906	2224.397	520.3006
Real corn price (RCO)	111.3469	163.4674	79.06221	18.39018
Real barley price (RBR)	102.4512	163.0980	70.38961	16.72135
Real concentrated feed price (RCF)	97.02995	144.8841	72.23	16.06
Real broiler chicken price (RBH)	170.7127	345.9459	31.08015	58.18573

Table 2- Robustness checks for HEGY seasonal unit root test results

	Frequency							
variable name	0	2π/12	4π/12	6π/12	8π/12	10π/12	π	All frequency
Real chicken price (RCH)	-3.09*	12.70**	15.04**	5.86*	12.87**	9.19**	-2.60***	12.70**
Real lamb price (RMU)	-3.07*	11.89**	7.61**	10.3**	9.52**	5.86*	-2.96***	10.36**
Real beef price (RBF)	-3.33**	33.95**	24.94**	35.15***	35.60***	39.79***	-6.19***	39.63***
Real corn price (RCO)	-2.08**	20.21**	19.15**	17.41**	16.57**	25.25**	-3.90***	18.73**
Real barley price (RBR)	-2.06**	17.27**	19.26**	15.96**	16.37**	23.82***	-3.84**	17.90**
Real concentrated feed price (RCF)	-4.13***	41.23**	15.91**	45.45***	14.25**	43.90***	-3.76***	45.58***
Real broiler chicken price (RBH)	-2.43***	23.30**	19.88**	17.78**	17.03**	26.45***	-3.89**	20.39**
Real exchange rate (EXG)	-6.89***	9.32**	3.9*	4.89*	11.48**	50.00***	-7.86***	61.41***
Real oil price (OLP)	-7.26***	3.91*	16.07**	3.86*	10.41**	13.98**	-9.10***	37.06***

Notes: Single, double, and triple asterisks (*, **, ***) indicate (statistical) significance at the 10%, 5%, and 1% level, respectively.

Table 3- State Space Estimation Results for Lamb Price Equation

Variable name	Coefficient	z-Statistics	Std. Error
Constant	438.46	1.22	357.00
Real Barley Price	2.612**	2.10	1.24
Demand Dummy	10.06	0.76	13.16
Real Exchange Rate	0.0012*	2.05	0.0005
Real Oil Price	-3.23E-05**	-2.36	1.37E-05
State variable	Final State	z-Statistics	Prob.
Sv1	116.08	1.78	0.07
Log-likelihood: -1307.00		Akaike info criterion:11.79	

Table 4- State–space estimation results for beef meat price equation

Variable name	Coefficient	z-Statistics	Std. Error
Constant	3029.81***	6.53	463.91
Real concentrate feed Price	5.06***	4.24	1.19
Demand Dummy	-3.19	-0.5	6.35
Real Exchange Rate	-0.002***	-5.60	0.004
Real Oil Price	4.23E-06	0.69	6.13E-06
State variable	Final State	z-Statistics	Prob.
Sv1	1171.86	1.99	0.000
Log likelihood: -1267.44		Akaike info criterion: 11.44	

Table 5- State–space estimation results for chicken meat price equation

Variable name	Coefficient	z-Statistics	Std. Error
Constant	279.32***	3.11	89.64
Real Corn Price	1.02**	2.20	0.464
Real Broiler chicken	1.00***	10.41	0.095
Demand Dummy	32.20***	5.11	6.30
Real Exchange Rate	0.0002	0.39	0.0005
Real Oil Price	-6.06E-06	-0.58	1.04E-05
State variable	Final State	z-Statistics	Prob.
Sv1	132.02	2.66	0.007
Log-likelihood: -1187.24		Akaike info criterion: 10.72	

So far, the results of the factors affecting the fundamental changes in the price of lamb, beef, and chicken have been presented. However, the question remains whether there is a price bubble for these three products. Figures 2, 3 and 4 are provided to answer this question.

In Figure 2, the estimated bubble price share from the real lamb price is presented. As shown, on average, during the study period, the price bubble accounted for 3.7% of the real lamb price, and the formation of bubbles and their burst in this product is gradual.

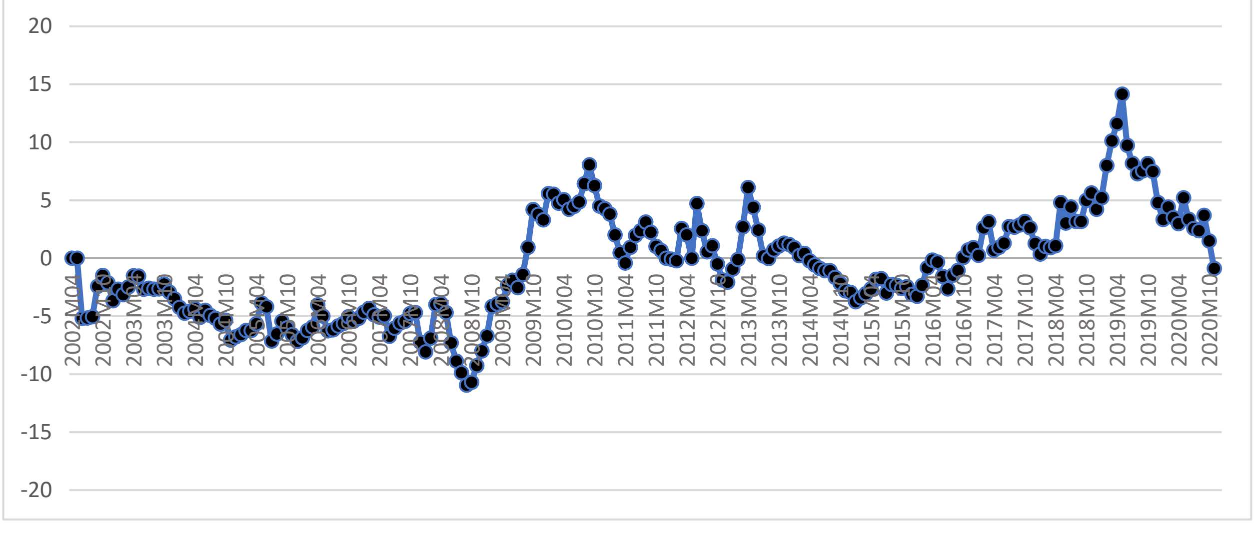

Figure 2- Estimated price bubble share from real lamb price between 1380 to 1399 (percentage)

As mentioned in the previous section, one of the positive features of using the Kalman filter method is the detection of negative bubbles or when the price is lower than the fundamental price. The results showed that real lamb prices before the middle of 1388 were less than the fundamental level. However, the largest bubbles were positive in value and formed in 1398 M02. During this period, the market was faced with the shock of the increasing exchange rate, beyond the expected amount.

In addition, the frequency distribution of the estimated price bubble share from real lamb price show less than 2.5% of the bubbles were formed above 10%, and more than 70% of the bubbles were less than 5%. Therefore, it can be concluded that the price of lamb is influenced by fundamental factors such as feed prices and macroeconomic variables such as exchange rates and the share of price bubbles in it is very small.

Real beef price babbles were different in size and pattern compared with lamb. As can be seen in Figure 3, the average share of babbles from real beef price was less than 1.2%. In addition, Figure 3 shows that the bubbles formed are not long-lived and have collapsed after two or three periods, and the real beef price is close to the fundamental level.

Most of the peaks from 2008 onwards are related to the beginning of the year (March and April) and the middle of the year (September and October) while the biggest bubble similar to real lamb price bubbles was formed in May 2017.

In Figure 4, the estimated price bubble share for chicken meat is presented. As can be seen, the size and range of bubble changes are larger than red meat. In real chicken meat price, averagely, the share of bubbles was about 7%, more than twice as much lamb. Also, many of the created couriers belong to the months of August and September and the highest bubbles, with an approximate amount of 20%, were occurred in September 2002.

Figure 4 also shows that, unlike the real lamb price, the formation of bubbles and their burst in this product is fast. The average bubble burst period for chicken meat during the study period was 7 months while the formation period until reaching the peak was less than 3 months. However, similar to the lamb and beef, real chicken meat prices experienced big positive bubbles at the beginning of 1391 and 1398, coinciding with the implementation of the targeted subsidy scheme and the sharp increase in the exchange rate. In addition, in the study period, more than 18% of the months had experienced price bubbles above 10%, which is worth considering. Therefore, in general, it can be concluded that the price bubble in chicken meat, in terms of quantity, has a significant share of the price. The reason can be due to the high sensitivity of consumers to price changes and extensive government interventions in controlling it, which sometimes has contradictory effects on the market of this product.

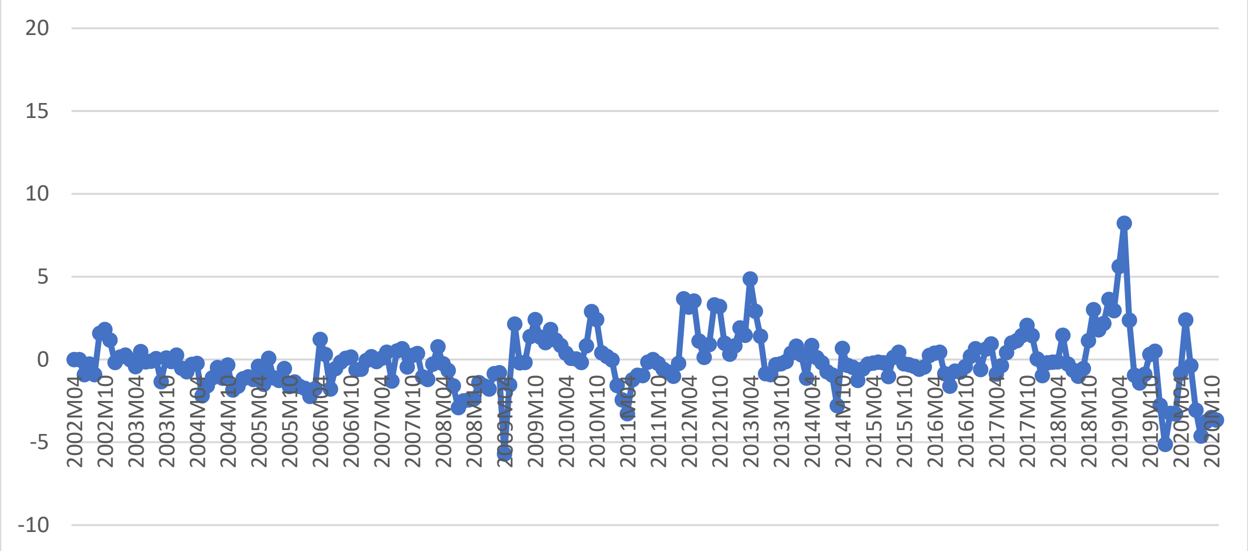

Figure 3- Estimated Price Bubble share from real beef price between 1380 to 1399 (percentage)

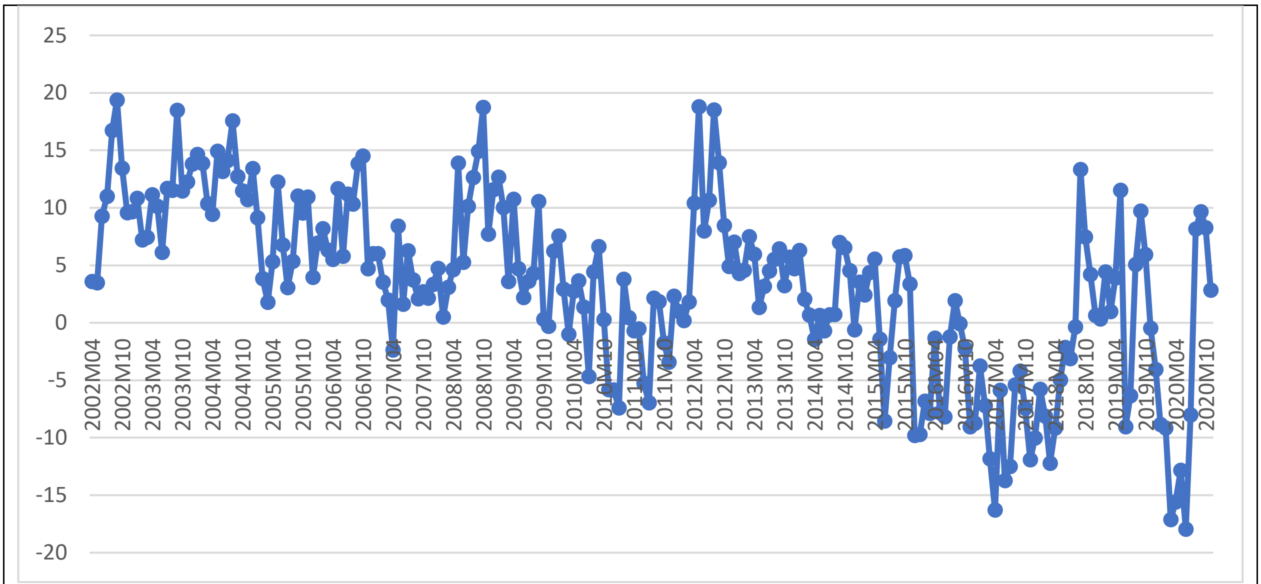

Figure 4- Estimated price bubble share from real chicken meat price between 1381 to 1399 (percentage)

Conclusion and policy implication

One of the problems that can be seen at the microeconomics and macroeconomics levels is the triggering of bubbles and fluctuations in the price of agricultural products. Therefore, in the present study, the price bubbles in three protein products, chicken, lamb, and beef meat, were investigated.

The results of the state-space model based on the Kalman filter showed that there is a significant positive relationship between the real price of feed and the real price of lamb and beef. This is due to the large share of barley and concentrated feed used as an input in the production process of red meat. Therefore, one strategy to reduce the price of red meat is to control and monitor the price of livestock feed and prevent an excessive increase in the price of livestock inputs. The results of the study also showed a significant positive relationship between the real exchange rate and the real price of lamb. This relationship showed that with the increase in the real exchange rate and as a result of the increase in the price of imported livestock inputs, the price of lamb also increases. Accordingly, one of the other proposed policies to control the price of lamb is to control the exchange rate and subsequently reduce the price of livestock imported inputs.

The empirical results also show that the dummy variables of April and Ramadan months do not have a significant effect on the price of red meat. This result indicates that Iranian consumers do not have more demand for these two months compared to other months. This result confirmed the high proportion cost of red meat in the household bundle, and consumers are not able to spend more on red meat in April and Ramadan compared to other months.

The results of the Kalman filter on chicken meat showed that the price of chicken meat has a significant positive correlation with the price of corn and chicken broiler. Considering the contribution of these two inputs in chicken meat production, monitoring and controlling the price of these two inputs can be suggested as a solution to control chicken meat. The dummy variable also has a positive and significant relationship with the real price of chicken meat. Accordingly, in April and Ramadan, chicken meat prices will also increase with an increase in it demand. Therefore, increasing the supply of chicken meat to the market in these two months can play a key role in controlling the price of chicken meat.

Studying the price bubble of meat showed that the structure of the triggering price bubbles of these three products in terms of positive and negative bubbles, period and number of occurrences, and the collapse of the bubbles are completely different during the sample period. Also, the nature and formation of bubbles for these three products are completely different. Bubbles occurrence and collapse in the real price of lamb are gradual. However, in the case of chicken meat, price bubbles occur, and collapse are faster. The results showed that, on average, the price bubble in chicken meat reached its maximum after approximately seven months, and returned to its original value after approximately three months. In addition, the average share of bubbles in the real price of lamb and beef is less than 3.7% and 1.1% respectively, which indicates that the price bubbles in red meat are not significant compared to the real price. However, in the case of chicken meat, the average share of bubbles at the price is more than7%. The results also showed that more than 80% of the price bubbles in red meat were less than 5% of the real price. However, less than 40 percent of the price bubbles in chicken meat were less than 5 percent of the real price. On the other hand, approximately 60% of the bubbles in chicken meat were more than 5% of the real price. Based on the above results, it can be suggested that the government should pay more attention to fluctuations in the price of chicken meat compared to red meat. For chicken meat, a unified market information release platform should be established. Government intervention should also be done to reform the market structure, not just price control, to avoid the negative effect of stockpiling policy.

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بررسی حباب قیمتی گوشت در ایران: کاربرد مدل فضا–حالت

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چکیده

حباب‌های قیمتی و نوسانات قیمت محصولات کشاورزی از چالش‌های مهمی است که می‌تواند رفاه مصرف‌کنندگان و تولیدکنندگان را به طور قابل توجهی تحت تاثیر قرار دهد. بنابراین، در این مطالعه، حباب‌های قیمت در سه محصول پروتئینی اصلی، یعنی گوشت گوسفند، گوشت گاو و مرغ، با استفاده از مدل فضا–حالت بر اساس فیلتر کالمن با استفاده از داده‌های ماهانه از سال ۱۳۸۰ تا ۱۳۹۹ مورد بررسی قرار گرفت. در این راستا، به ترتیب قیمت جو، قیمت کنسانتره، جوجه یکروزه و ذرت را به عنوان نهاده‌های مهم مورد استفاده برای تولید گوشت گوسفند، گاو و مرغ در نظر گرفته شد. همچنین از نرخ واقعی ارز و قیمت واقعی نفت در مدل استفاده شده است. نتایج نشان دهنده تفاوت ساختارهای در حباب‌های قیمتی مثبت و منفی، دوره و تعداد وقوع و فروپاشی حباب در موراد مورد مطالعه بود. همچنین بر خلاف قیمت مرغ، به این نتیجه رسیدیم که حباب قیمت گوشت گوسفند و گوساله نسبت به سطح قیمت قابل توجه نیست. در بازار گوشت مرغ علت اصلی حباب‌های قیمتی را می‌توان به دلیل اختلال در روند بازاریابی این محصولات، عدم شفافیت اطلاعات و دخالت‌های متناقض دولت در بازار دانست. برای مقابله با این مشکل، پیاده‌سازی اطلاعات بازار بصورت تجمیع شده از طریق فناوری اطلاعات و ارتباطات می‌تواند ابزاری کارآمد در جهت حل چالش مذکور در نظر گرفته شود. علاوه بر این، مداخله دولت باید به جای کنترل قیمت‌ها، اصلاح ساختار بازار باشد.

واژه‌های کلیدی: گوشت گوسفند، گوشت مرغ، گوشت گاو، کالمن فیلتر

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