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BEHAVIOUR ANALYSIS OF BASIC INPUTS PRICES IN IRAN'S LIVESTOCK SUBSECTOR

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ABSTRACT

Decision-making for future products based on the current input prices, variability and fluctuations in the price of products in the livestock subdivision, as well as the high cost of support decisions made by the government in this field, causes sensitivity and distortions in the policies for the inputs supply chain and production in this subsection. So, analysing the concept of these fluctuations and measurement of the basic inputs price behaviour is needed for the Iran's livestock subsection. Present study analyse the monthly retail price behaviour pattern of livestock subsector basic inputs, include local and foreign corn, local and foreign soybean meal, local and foreign fish meal and local and foreign barley, during 2004-2012 using national market data sets. Two types of seasonal unit root tests include FH and Taylor was used to investigate price behaviour pattern for mentioned inputs. The results indicated that among the analysed inputs; only the price behavioural patterns of the local and foreign barley have a complete resemblance with each other. In addition, the price behaviours of the local and foreign corn markets are similar. On the other hand, the price behavioural patterns of the local and foreign soybean meal and fish meal markets are different from one another. Based on this, the adoption of measures and presenting of separate policy packages are required to regulate the market of the two groups of local and foreign inputs, soybean and fish meal; as well as supporting the domestic production of these two commodities. Additionally, similar policies regarding the two local and foreign input groups of corn and barley could reduce the cost of supporting policies in the livestock subsection.

Keywords: behavioural patterns, basic inputs, market regulation, supporting national production, livestock.

INTRODUCTION

Analysis of the behavioural pattern and predicting the prices, as one of the important economic criterions, could help businesses to evaluate the effectiveness of their management decisions (Tahamipour, 2011, Ghahremanzadeh and Bagherziaei, 2014). Information regarding the price nature and behavioural patterns of the basic inputs required by the sector's manufacturing firms, could adjust many of the hazards present in the production system. This could offer great assistance to the policy makers with the goal of improving the supporting policy package. This matter, especially in the field of livestock production activities in which prices have a high solidarity with the price of basic inputs, is of utmost importance (Tahamipour, 2011; Ghahramanzadeh and Salami, 2008).

In the agriculture section, there is a constant mistrust in the price of products and inputs, and because the producers lack the capability of controlling the weather, climate, the marketing organization as well as the inputting area, they normally face the risk of production and price variations (Dillon and Hardaker, 1993). These conditions have caused the agriculture section to face more risk and mistrust, in comparison to other economic sectors (Goodwin and Smith, 1995). A gap between the decision to produce and offer, the random nature of presenting livestock and the elasticity of demand for these products, has caused various price fluctuations. On the other hand, imposing liberalization and market regulation policies, constant changes in the rules of importing and exporting, currency fluctuations and the sanctions push, have also caused severe imbalances between supply and demand. This has inevitably resulted in unpredictable fluctuations in the price of livestock (Salami *et al.*, 2010). Under these conditions, analysis of the nature and modelling the behaviour of basic inputs used in the livestock subsection provides the policymakers and programmers with the opportunity to not only estimate future demand, but also improve the adopted policies. The most important outcome of this approach is the reduction in the risk of decision-making for the supporting programmes in this subsection, as well as stabilizing the chain of business value.

The necessity of supporting the national production, and the Supreme Leader's emphasis on this constructive policy, has imposed supporting approaches based on the correct understanding from the present mechanisms in the production systems of the country's livestock subsection. These policies prioritize the securing of the basic inputs and regulating the market. This matter not only causes a boom in domestic business and production, but creates the appropriate foundation to calm down the market of basic items needed by the public.

Based on the importance and necessity of measuring the behavioural patterns and the active nature of the input and output price variations in the country's livestock subsection, several local studies have analysed these cases. Muhammadi *et al*. (2013), in a study tried to choose the appropriate pattern to predict the nominal and real prices of cow meat, sheep meat, and sheep's milk and fleece. In this regard, after a static analysis for the means of determining the randomness of the studied time periods, the Wald-Wolfowitz nonparametric test was used. The patterns used in this study included the Autoregressive Integrated Moving Average (ARIMA) model and the Artificial Neural Network (ANN) model. Results indicated that the ARIMA pattern proved more successful in predicting the nominal price, and the ANN pattern was better in predicting the real price.

Tahamipour (2011) analysed the presenting of an appropriate pattern to predict the seasonal price of day-old broilers in Iran. In this regard, the Error Correction Model (ECM) pattern and the Autoregressive Integrated Moving Average (ARIMA) model were used to predict the price of the day-old broilers. Results indicated that the price of the day-old broiler faces many fluctuations, and these fluctuations are mainly followed by the fluctuations in the chicken meat prices. Results from the causality and cointegration tests indicate a long-term relationship between the price of the day-old broiler and the chicken meat.The direction of causality is from the chicken price towards the day-old broiler price. The prediction error from the ARIMA pattern is less than the ECM pattern, but comparing the errors and results indicates that both patterns are appropriate for predicting the future price of the day-old broiler. Fahimifard *et al.* (2010), presented the new Adaptive Neuro-Fuzzy Inference System (ANFIS) pattern in a study, and compared its efficiency with the ARIMA pattern in predicting the three time horizons of one, two, and four weeks later in the prices of retail chicken meat and eggs. Results of the pattern's performance evaluation criteria indicated that the predicted data in the test structures designed by the ANFIS model, in comparison to the data predicted in the section outside the comparing pattern, had more compatibility with the actual data; therefore, the non-linear ANFIS method had higher efficiency.

Fahimifard *et al*. (2009) used the Neural Network Autoregressive Model with the Exogenous Inputs (NNARX) pattern to predict the three future time horizons of the chicken meat and eggs.The results were then compared to the ARIMA pattern as the most common linear method of prediction. Results from measuring the pattern's efficiency indicated that the NNARX method was more successful in predicting the prices. Ghahramanzadeh and Salami (2008), considered predicting the monthly price of the chicken meat, using the seasonal time series techniques, in the form of Periodic Autoregressive (PAR) patterns, regression-based seasonal unit root tests and Box-Jenkins (SARIMA). The study's findings indicated that the chicken prices did not experience regular cyclical changes, and the PAR approach could not be used to predict the prices. Furthermore, the SARIMA results indicated that the chicken's monthly price complies with the seasonal non-stationary random process, and, based on this, it is appropriate to use the regression based model to codify the prediction pattern. Keshavarz-Haddad (2006) predicted the chicken meat, red meat, and fish meat prices by using the monthly retail indicator from 1990-2005. In this study, the seasonal unit root test was used, and based on the static nature of the time periods studied at a data level, the ARIMA method was used for modelling. Abbasian and Karbasi (2003) predicted the amount of production and the wholesale price of eggs. In this study, the prices used were from spring 1994 to winter 2002, and the annual production data of this product covered the time period of 1990-2003. The results achieved indicated that the modified exponential model had the least error in comparison to other methods of prediction.

The price of basic inputs affects considerably the production cost, and the price of the Iran's livestock subsection products. So, identifying the behavioural nature of mentioned price could improve the decision-making and supporting policies in Iran's livestock subsector. This study analyse the nature and behavioural pattern of eight basic inputs price include local and foreign corn, local and foreign soybean meal, local and foreign fish meal and local and foreign barley. Determining price behaviour pattern would able policy makers to distinguish and provide proper policy in each input market and regulate markets with minimum costs.

MATERIALS AND METHODS

Data Sets: In order to investigate the price behavioural pattern of the inputs, monthly unit roots tests should be analysed. In the stationary test of a time period, we analyse the unit root's presence or absence; the unit root test is conducted after determining a stochastic or deterministic trend in a time period (Karthikeyan and Nedunchenzhain, 2014). If the unit roots stand outside the unit circle, they are considered stationary. For the means of conducting the stationary test for a time period with seasonal and non-seasonal behaviour, the test used must include seasonal and non-seasonal aspects. In this matter, we could use statistical tests, such as HEGY, CH, BM, FH and TAYLOR (Hylleberg *et al.,* 1990; Canova and Hansen, 1995; Beaulieu and Myron, 1993; Frances and Hobijen, 1997; Taylor, 1997). So, monthly data sets of Iran's national market during 2004-2012 were used for local and foreign corn, local and foreign soybean meal, local and foreign fish meal and local and foreign barley.

Monthly Unit Root Tests: In the HEGY approach for the unit root test on the monthly price of basic inputs (IP_t), an autoregression pattern must be formed, such that it introduces seasonal and long-term unit roots using the regression coefficients. The autoregression pattern mentioned has the general form of $A(L)y_t = \varepsilon_t$, in which ε_t stands for the white noise, A (L) the continuous function of degree 12. The function above is stationary if all the A (L) polynomial roots are placed outside the unit circle. For the unit root test of the pattern above, the $A(L) = 1 - L^{12}$ polynomial expansion is used. The time series analysis of monthly prices of basic inputs is conducted to determine the unit roots by using this equation (Frances, 1991):

$$\Delta_{12} = (1-L)(1+L)(1+L^2)(1+L+L^2)(1-L+L^2)(1+\sqrt{3}L+L^2)(1-\sqrt{3}L+L^2) \qquad (1)$$

Based on this, the seasonal and non-seasonal monthly roots are placed respectively from left to right:

$$\pm 1,\ \pm i,\ -\frac{1}{2}(\sqrt{3}\pm i),\ \frac{1}{2}(\sqrt{3}\pm i),\ -\frac{1}{2}(1\pm i\sqrt{3}),\ \frac{1}{2}(1\pm i\sqrt{3}) \qquad (2)$$

The roots above are respectively related to the ∞, 6, 3, 9, 8, 4, 2, 10, 7, 5, 1, and 11 of each year, and their abundance are respectively at 0, π, $\pm\pi/2$, $\pm 2\pi/3$, $\pm\pi/3$, $\pm 5\pi/6$, $\pm\pi/6$ (Beaulieu and Myron, 1993). For the means of conducting a unit root test ofmonthly prices on the basic data inputs studied, the hypothesis test must be done based on the presence of each unit root, regardless of the presence of other unit roots. For this matter, by using the Taylor approximation, linear transformations are created from the monthly time periods, which enables us to conduct the existence test for each unit root, without mentioning the other ones (Frances, 1991). By using the Frances and Hobijen approach (1997), the general form of this test for the basic input's monthly price (IP_t), will be as follows:

$$\begin{aligned}\Delta_{12} IP_t &= \alpha + T + \sum_{s=1}^{11} \delta_s D_{s,t} + \pi_1 y_{1,t-1} + \pi_2 y_{2,t-1} + \pi_3 y_{3,t-1} \\ &\pi_5 y_{4,t-1} + \pi_6 y_{4,t-2} + \pi_7 y_{5,t-1} + \pi_8 y_{5,t-2} + \pi_9 y_{6,t-1} + \pi_1 \\ &\pi_{11} y_{7,t-1} + \pi_{12} y_{7,t-2} + \sum_{i=1}^{p} \varphi_i \Delta_{12} IP_{t-i} + \varepsilon_t\end{aligned} \qquad (3)$$

In the equation above, the definite parts include constant (α), monthly dummy variables, and trend (T). The y_i linear transformations, as mentioned below, are also entered in the equation for the existence test of seasonal and non-seasonal roots:

$$\begin{aligned} y_{1,t} &= (1+L)(1+L^2)(1+L^4+L^8)IP_t \\ y_{2,t} &= -(1-L)(1+L^2)(1+L^4+L^8)IP_t \\ y_{3,t} &= -(1-L^2)(1+L^4+L^8)IP_t \\ y_{4,t} &= -(1-L^4)(1-\sqrt{3}L+L^2)(1+L^2+L^4)IP_t \\ y_{5,t} &= -(1-L^4)(1+\sqrt{3}L+L^2)(1+L^2+L^4)IP_t \\ y_{6,t} &= -(1-L^4)(1-L^2+L^4)(1-L+L^2)IP_t \\ y_{7,t} &= -(1-L^4)(1-L^2+L^4)(1+L+L^2)IP_t \end{aligned} \qquad (4)$$

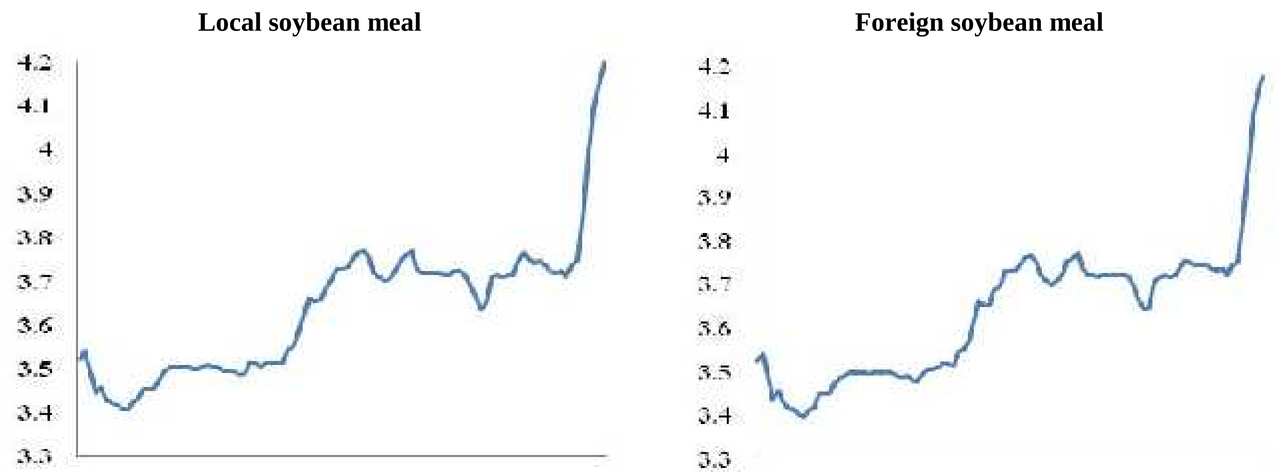
The π_1 regression coefficient is used for the existence test of non-seasonal roots, and the π_2 to π_{12} regressions coefficients are utilized to determine the presence of seasonal roots.

For the means of conducting the existence test for seasonal and non-seasonal unit roots, first we estimate equation (3), using the Ordinary Least Square (OLS) method. Afterwards, the significance of the π_i parameters are determined via the (t) and (F) test statistics. To conduct the unit root existence check at 0 and π plentitudes, the $H_{k_0}: \pi_k = 0 \quad k = 1,2$ deficiency hypothesis is separately tested versus the opposing hypothesis of $H_{k_1}: \pi_k < 0 \quad k = 1,2$, using a unilateral (t) statistic. For the compound seasonal unit roots test, the deficiency hypotheses of $H_{k_0}: \pi_k = \pi_{k+1} = 0 \quad k = 3,5,7,9,11$ are tested versus the presence of at least one non-zero seasonal unit root $H_{k_1}: \pi_k = \pi_{k+1} \neq 0 \quad k = 3,5,7,9,11$, by using the (F) test statistic. The, $\pi_5 = \pi_6 = 0,\ \pi_3 = \pi_4 = 0$, $\pi_9 = \pi_{10} = 0,\ \pi_7 = \pi_8 = 0$, and $\pi_{11} = \pi_{12} = 0$ deficiency hypotheses, respectively implicate the presence of unit roots in the frequencies of $\pm\pi/2$ (4 months), $\pm 2\pi/3$ (3 months), $\pm\pi/3$ (6 months), $\pm 5\pi/6$ (2.5 months), $\pm\pi/6$ (12 months or annual). Not rejecting any of the t_k and $F_{k,k+1}$ in the basic inputs' monthly price (IP_t), means the presence of a unit root in that specific frequency, and, therefore, to extract this root from the period we must use its corresponding subtracting filter. Furthermore, in case a unit root appears in more than one frequency, we must use the product of related subtracting filters. To simultaneously determine the presence of a unit root in all seasonal and non-seasonal plenitudes, we respectively use the $F_{1,2\ldots 12}$ and $F_{2\ldots 12}$ Taylor statistics. In these two tests, the null hypothesis based on the presence of unit roots in all frequencies is tested against the deficiency hypothesis of at least one unit root present (Arnade and Pitch, 1998).

The data needed for the study, including the monthly prices of various basic inputs from 2004-2012, were collected from the Ministry of Agriculture's Support Corporate for Livestock Affairs database.

RESULTS AND DISCUSSION

Analysis of the variation coefficient (CV) of the basic inputs studied indicates that during the monthly period studied, the foreign soybean meal (0.453) and the local soybean meal (0.443) had the most variations and scattering. Additionally, the time periods related to the local fish meal (0.249) and the foreign fish meal (0.204) had the least price variations. For the means of analysing the fluctuations and observing the trend of each time period studied, their logarithmic graph has been presented below:

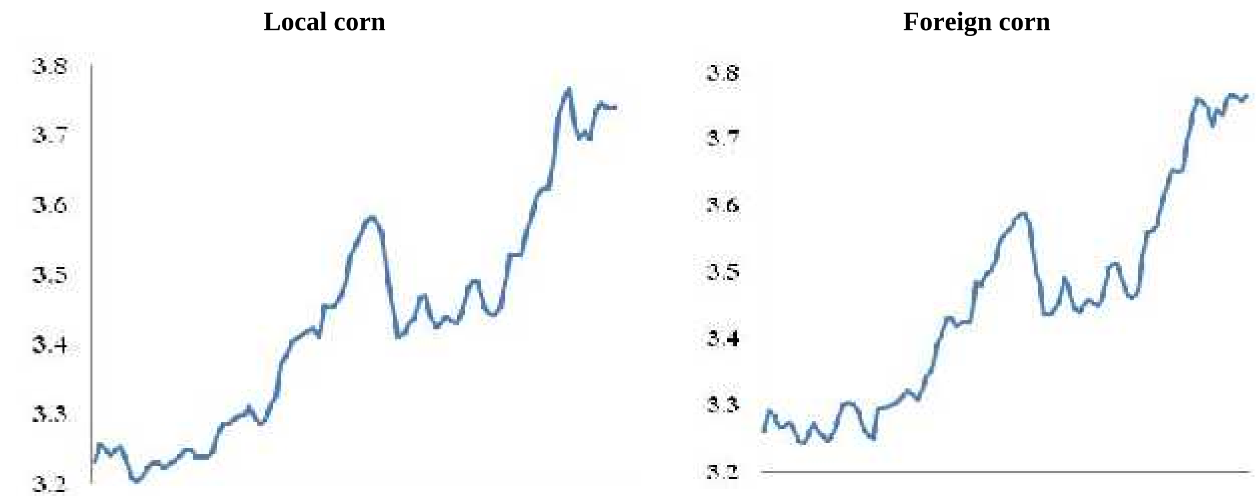


Graph 1 - Logarithmic amounts of the local and foreign soybean meal.

The chart's dispersion index for the local and foreign soybean meal prices was at 0.16. Regarding the two inputs of local and foreign barley, the logarithmic price graph is presented below:

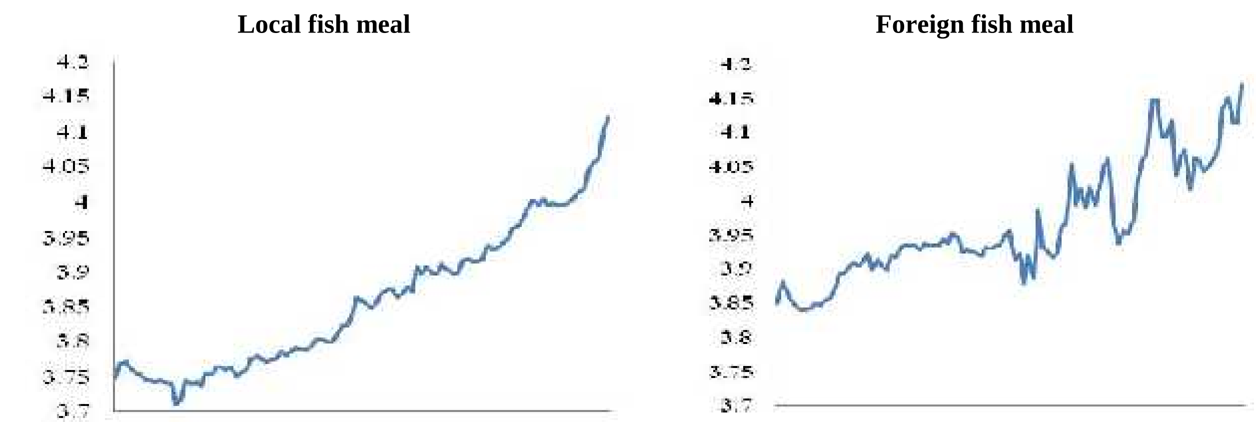
Graph 2 - Logarithmic amounts of the local and foreign barley.

The chart's dispersion index for the local and foreign barley prices was at 0.17. Alike the soybean meal and barley inputs, the logarithmic graph for corn prices is mentioned below:



Graph 3 - Logarithmic amounts of the local and foreign corn.

The chart's dispersion index for the local and foreign corn prices was at 0.16.Eventually, both logarithmic graphs are also mentioned for the fish meal input:



Graph 4 - Logarithmic amounts of the local and foreign fish meal.

The chart's dispersion index for the local and foreign fish meal prices were respectively at 0.1 and 0.08, which had the least amount among the studied time periods. The strongly ascending trend, sudden fluctuations, and sudden increase over the last months, are similar traits among all logarithmic graphspresented for the studied inputs' monthly price time periods.

Following up, in order to determine the adherence of the time periods mentioned from the trend's functional form, the mean relative difference of the observed amounts were calculated via the trend functional forms (the MAPE index).

Table 1. Evaluating different functional forms of investigated time series based on MAPE index (%)

Time series	Linear	Exponential	Quadratic	S-curve
Local corn	14	12	12	13
Local soybean meal	14	13	14	11
Local fish meal	6	4	2.5	3
Local barely	17	14	15	19
Foreign corn	15	12	11	13
Foreign soybean meal	15	13	14	11
Foreign fish meal	7	7	7	7
Foreign barely	17	14	15	18

The quadratic functional form has achieved the best trend predictions for the monthly price time periods of the local and foreign corn input, such that the prediction error was at 12%. For the local and foreign soybean meal inputs, the (S-curve) functional form, with an 11% prediction error, was the best reflector for the trend in these two monthly time periods. Modelling the trend for the price of local and foreign fish meal had the least prediction error in its functional forms, in comparison to other time periods studied. For the two mentioned inputs, the quadratic functional form had the least error. On the other hand, modelling the trend for the local and foreign barley prices, in comparison to other inputs, had the most errors in all its functional forms. For the monthly price time periods of the local and foreign barley, the exponential functional form had the least error among the four functional forms.

After modelling the trend in eight studied time periods, analysis and comparison of the seasonal index amounts came into order. Calculating the correlation amounts among the local and foreign pairs indicated that the maximum resemblance between two seasonal fluctuations, which was at 92%, was between the price of local and foreign soybean meals. Therefore, the seasonal fluctuations are very similar between these two monthly time periods. The correlation between the local and foreign corn was also at 90%, which means there is a resemblance between the seasonal variations of these two time periods. An 88% correlation was seen between the seasonal variations of the local and foreign barley prices, also indicates a resemblance between the seasonal behavioural patterns of these two time periods. Analysis of the correlation between the seasonal prices index of the local and foreign fish meal time periods, indicated that these two series have very different seasonal behaviour, such that the amount of this coefficient was only 8%.

Following up, regarding the adherence of all eight studied time periods from the Periodic Autoregressive model (PAR), we evaluate the presence of seasonal and non-seasonal unit roots, using the FH and TAYLOR tests. The related results were separately evaluated based on the two functional models with intercept (I), and with intercept and trend (I+T). Furthermore, to address the lack of autocorrelation and heteroscedasticity, three diagnostic control tests (Portmanteau, Ljung and box, ARCH-LM) were presented for each output. The results can be seen in 16 series of outputs based on the FH and TAYLOR unit roots tests, which were achieved for all eight inputs studied.

Table 2. Seasonal indices of investigates time series

Months	Local corn	Local soybean meal	Local fish meal	Local barely	Foreign corn	Foreign soybean meal	Foreign fish meal	Foreign barely
January	0.958	0.992	1.007	1.031	0.99	0.986	1.008	1.012
February	0.962	0.998	1.006	1.016	0.987	0.995	1.007	0.999
March	1.006	1.001	1.006	0.991	1.011	0.998	0.981	0.995
April	1.021	1.031	1.007	0.978	1.012	1.037	0.992	0.991
May	1.028	1.014	1.001	1	1.016	1.02	0.998	0.996
June	1.027	1.012	1.003	0.963	1.014	1.011	1.024	0.974
July	1.022	1.009	0.998	0.948	1.009	0.997	0.994	0.967
August	1.013	0.977	0.995	0.982	1.01	0.985	1.003	0.986
September	1.028	0.99	0.999	1.02	1.007	0.984	0.995	1.028
October	1.01	0.991	0.992	1.016	1.009	1	0.994	1.026
November	0.962	0.982	0.994	1.024	0.968	0.984	0.997	1.017
December	0.956	0.998	0.985	1.026	0.962	0.998	1	1.002

Table 3. Results of FH and Taylor tests for local inputs

Time series	Local corn		Local soybean meal		Local fish meal		Local barely	
Model	I	I + T	I	I + T	I	I + T	I	I + T
®$_1 = 0$	-0.04***	-1.46***	-2.55**	-2.38**	-0.27***	-1.2**	-0.59***	-1.42***
®$_2 = 0$	-1.73**	-2.49*	-2.14**	-2.51**	-2.74	-2.79	-1.08***	-1.08***
®$_3 =$ ®$_4 = 0$	4.07**	3.42**	4.99	8.89	6.09	5.69	2.04***	1.84***
®$_5 =$ ®$_6 = 0$	6.24	5.01	1.01***	1.03***	2.29**	2.2**	1.28***	1.39***
®$_7 =$ ®$_8 = 0$	2.97**	5.34	6.22	5.95	12.42	10.44	1.34***	1.24***
®$_9 =$ ®$_{10} = 0$	4.57*	6.7	1.8***	2.34**	2.62**	2.33**	0.37***	0.6***
®$_{11} =$ ®$_{12} = 0$	3.48**	3.63**	0.36***	0.29***	5.76	5.3	2.5**	1.45***
$F_{1...12}$	5.85	7.96	4.95	6.31	51.03	23.99	2.16**	2.4***
$F_{2...12}$	6.32	6.48	5.34	5.65	30.17	20.3	2.06**	1.98***
Portmanteau test	1.89	3.6	2.11	4.27	1.59	1.12	4.56	4.69
	(0.99)	(0.99)	(0.99)	(0.98)	(0.99)	(0.99)	(0.97)	(0.97)
Ljung& Box test	2.09	4.05	2.42	4.86	1.82	1.27	5.33	5.64
	(0.99)	(0.98)	(0.99)	(0.96)	(0.99)	(0.99)	(0.95)	(0.93)
ARCH-LM test	11.82	13.79	14.96	7.93	8.7	11.35	5.04	2.93
	(0.46)	(0.31)	(0.24)	(0.79)	(0.73)	(0.5)	(0.96)	(0.99)

***p<0.01, ** p<0.05 and * p<0.1
Numbers in () show p-value.

Table 4. Results of FH and Taylor tests for foreign inputs

Time series	Foreign corn		Foreign soybean meal		Foreign fish meal		Foreign barely	
Model	I	I + T	I	I + T	I	I + T	I	I + T
®$_1 = 0$	-0.27***	-0.82***	-2.86**	-2.29***	-0.03***	-0.71***	-0.02***	-2.13***
®$_2 = 0$	-0.8***	-0.71***	-2.26**	-1.77**	-0.72***	-1.47***	-0.61***	-0.29***
®$_3 =$ ®$_4 = 0$	4.37*	4.88	3.37**	2.77**	1.88***	0.88***	0.001***	0.76***
®$_5 =$ ®$_6 = 0$	4.64	6.36	3.48**	1.7***	0.05***	2.29***	0.69***	1.7***
®$_7 =$ ®$_8 = 0$	5.93	6.86	6.98	3.45**	0.36***	1.84***	0.07***	0.93***
®$_9 =$ ®$_{10} = 0$	3.26**	5.85	0.2***	0.54***	1.29***	4.5**	0.63***	0.92***
®$_{11} =$ ®$_{12} = 0$	2.08***	2.61**	0.29***	0.91***	0.13***	1.5***	0.68***	2.63***
$F_{1...12}$	5.21	8.32	4.16	2.32**	0.91***	2.19**	0.55***	2.42**
$F_{2...12}$	5.68	7.16	4.48	2.68*	0.77***	2.35**	0.49***	1.76***

Portmanteau test	2.45	3.49	3.77	4.47	8.84	2.16	13.2	3.59
	(0.99)	(0.99)	(0.99)	(0.97)	(0.72)	(0.99)	(0.35)	(0.99)
Ljung& Box test	2.74	3.97	4.36	5.24	10.14	2.54	15.55	4.24
	(0.21)	(0.98)	(0.98)	(0.95)	(0.6)	(0.99)	(0.21)	(0.98)
ARCH-LM test	11.98	15.14	5.78	5.95	17.65	5.25	10.42	12.84
	(0.45)	(0.23)	(0.93)	(0.92)	(0.13)	(0.95)	(0.58)	(0.38)

$^{***}p<0.01$, ** $p<0.05$ and * $p<0.1$
Numbers in () show p-value.

The presence or absence of seasonal and non-seasonal roots for the price times periods studied, for each frequency, can be summarized in the table below.

Table 5. Summary of FH results

Model	Frequency	0	π	±® / 2	∓2® / 3	±® / 3	∓ 5® / 6	±® / 6
I	Local Corn	✓	✓	✓		✓	✓	✓
	Foreign Corn	✓	✓	✓		✓	✓	✓
I	Local soybean meal	✓	✓		✓		✓	✓
	Foreign soybean meal	✓	✓	✓	✓		✓	✓
I	Local fish meal	✓			✓		✓	
	Foreign fish meal	✓	✓	✓	✓	✓	✓	✓
I	Local barley	✓	✓	✓	✓	✓	✓	✓
	Foreign barley	✓	✓	✓	✓	✓	✓	✓
I+T	Local Corn	✓	✓	✓				✓
	Foreign Corn	✓	✓					✓
I+T	Local soybean meal	✓	✓		✓		✓	✓
	Foreign soybean meal	✓	✓	✓	✓	✓	✓	✓
I+T	Local fish meal	✓			✓		✓	
	Foreign fish meal	✓	✓	✓	✓	✓	✓	✓
I+T	Local barley	✓	✓	✓	✓	✓	✓	✓
	Foreign barley	✓	✓	✓	✓	✓	✓	✓

✓ show the existence of unit root in that frequency.

According to the results of the current study, in the following we have mentioned our most important policy suggestions.

Conclusion and Recommendations: Results from the patterns analysing the presence or absence of the seasonal and non-seasonal unit roots among the local and foreign input pairs indicated that only the price of the two local and foreign barley inputs follow the same behavioural pattern. Although, the behavioural nature difference between the local and foreign corn and soybean meal were relatively small, it was very significant between the local and foreign fish meal. In these conditions, trade policies, securing inputs, and regulating the market must be distinguished based on their behavioural pattern. Explaining supporting policies and regulating the seasonal market by the government, and the codification of seasonal input-securing programmes, is an important step in supporting domestic production. Furthermore, the fact that there is a behavioural nature difference between the price of local and foreign inputs needed in the country's livestock subsection must be acknowledged and addressed.

- Reduced price risk for the country's livestock subsection producers, is one of the policy priorities required to support the domestic production. With the lack of an appropriate insurance coverage, the use of behavioural and seasonal prediction patterns by the experts in the Ministry of Agriculture and the Ministry of Industry, Mining and Trade, for the means of preventing market imbalance and turbulence in the price of basic inputs required by this subsection, is crucial.
- The effectiveness of the decisions and economic profitability, are a function of insight and understanding from the input and output markets. Most production firms in the livestock subsection face a delay between the decision to produce and supply the product, which makes us notice the need to form a quantitative analysis of the market on the levels of corporations, unions and guilds. Using experts and the output from behaviour patterns, analysing patterns and market prices of inputs and outputs, can be effective in improving decision-making, performance, participation in trade policy-making and guild actions.

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