International Journal of Technical Research and Applications e-ISSN: 2320-8163,
www.ijtra.com Volume 3, Issue 5 (September-October, 2015), PP. 158-166

THE EFFECT OF INFLATION, DOLLAR EXCHANGE RATE AND INTEREST RATE IN TURKEY ON CHICKEN AND EGG PRODUCTION: VECTOR AUTOREGRESSIVE (VAR) ANALYSIS

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***Abstract*— : In this study, impact of inflation (WPI), exchange rate and interest rate on the amount of chicken and egg in Turkey was examined using the Vector Autoregressive (VAR) model. The model consisting of variables of dollar exchange rate, inflation rate, interest rate, number of chicken and egg has been estimated for the period of 1981-2014. It has been determined that there has been a relationship between dollar rate, interest rate, interest rate in Turkey. Granger causality test was performed to determine the tendency of this relationship. It has been identified that there has been one-way causality relationship between number of eggs, dollar rate and interest rate(%). Impact response functions and variance decomposition analysis were used to interpret VAR model. As a result of the variance analysis , it was determined that the expression influence of dollar rate on the changes of variance at number of chickens is more than that of inflation rate and interest rate on the changes of variance at number of eggs.**

Index Terms— VAR Model, Impulse-Response Analysis, Variance Decomposition, number of chicken, number of egg.

I. INTRODUCTION

Today, the rapidly growing population and diminishing natural resources together are increasing the importance of adequate and balanced nutrition day by day for the protection of community health and development. Production of staple food which are necessary in a healthy diet of individuals in society are being either plant based or of animal origin necessitates the creation and development of agricultural polices that would allow effectively functioning of agricultural markets and opening the way for individuals to reach staple food at desired level and with minimum cost [1].

In Turkey, animal husbandry constitutes the sub-sector of agricultural industry with the highest total output of its agrarian economy. In Central Anatolia, Southeastern Anatolia Region, rural areas of the West and in East Anatolia Region in particular, livestock is the basic subsistence activity in primary agricultural level [2].

According to statistics of FAO (United Nations Food and Agricultural Organization) issued in 2013, China realized the maximum production of chicken in the world as 5 462 000 000 pcs in 2013, it was followed by United States and Brazilian with the quantities respectively 917 000 000 pcs and 1 272 000 000 pcs. Also China realized the maximum production of chicken in the world as 496 634 000 000 pcs in 2012, it was followed by United States and Brazilian with the quantities respectively 92 275 000 000 pcs and 65 450 000 000 pcs. Turkey took place at 12th rank in the ranking of world countries in terms of production of chicken in 2013 and took place at 10th rank in the ranking of world countries in terms of production of chicken egg in 2012 [3]. According to statistics of Turkey statistics institution (TSI) on poultry production data, amount of egg production in October reached to the record level with 1 483 203 pcs on a monthly basis through increase by 2.2 percent comparing to previous year and the same month [4-6]. According to data of the year 2011, Turkey took place at 3th level in terms of egg export in the world after Netherlands and United States [3].These information announce that the production of egg and chicken in Turkey is extremely important.

In Turkey during 1989, speculating foreign capital inflows being encouraged and high interest rates that needed for attracting foreign capital have crushing effects on the production structures. During the period of 1990-1999, distanced from real investments rent-seeking type ventures adversely affected the country's economy, as higher interest rates did the same to the agriculture sector [7]. Although Turkey appears in good condition by amount of its animal production, have lagged behind among European Union (EU) countries in animal production efficiency. In this, incentive system that applied in the agricultural policy framework plays an important role. In 2001 while EU supporting the agriculture by 105.6 billion US dollar, Turkey has given the support of 6.3 billion for the same period. While the share agriculture received from EU budget is growing over the years, Turkey

seems to be trending toward reduction of agricultural support [8].

It must be known how number of chicken and egg which holds an important place in Turkey's economic as main food affected by inflation, dollar, exchange rate and interest rate. Because preparing plans and policies aimed to increase production of chicken and egg based on inflation, dollar exchange rates and interest rates, which are the main indicator of country's economy, is extremely important. Although there are studies carried out in other areas related to the statistical methods used in this study, there is limited number of studies on animal husbandry variables.

The aim of this study is to investigate the effect of inflation, the dollar, exchange rates and interest rates on number of chicken and egg determining the relation between them.

II. MATERIALS AND METHOD

In the study, all statistical data on number of chicken and egg as materials, are obtained from Statistical Institute of Turkey (TSI) and the United Nations Food and Agriculture Organization (FAO). Additional have been used the data of average annual percent change of Wholesale Price Index (WPI) published by the Ministry of Development, dollar exchange rate value published by the Republic of Turkey Central Bank (CBT) and the rediscount rate (%) values (1981-2010) [9,10]. The information belonging to the period after 2010 obtained from "Statistical Indicators 1923-2013" published by TSI [11]. Dollar exchange rate and interest rate information for 2014 is taken from the CBT's web address, and WPI (%) is taken from the web site of http://www.alomaliye.com/2015/tufe-aralik-2014.htm [12]. The number of chicken and number of egg were collected as annually. The study covers the period between the years 1981-2014. Variables of the data used in the study are shown as follows:

TS: Number of chicken, YS: Number of egg, DOLLAR: Dollar exchange rate, WPI: Wholesale Price Index Inflation Rate (%), INTEREST: Central Bank rediscount rate (%).

In order to obtain a significant relation between the variables used in the statistical analysis, series must be stationary. Stationarity, in general, is constant mean**,** constant variance and covariance between two values of the series, not depending on time studied, but depending only on the difference between the two time value [13].

A. Unit Root Test

There are three situations in ADF test for every time series; random process includes intercept (c) and trend (t), random process includes intercept but no trend and random process includes no intercept and trend [14]. According to Schwert (1989), the ADF test with long lags is superior to the others [15]. The three differencing AR models of ADF are expressed as the following forms:

$$\Delta X_t = \gamma X_{t-1} + \sum_{i=1}^{k} \beta_i \Delta X_{t-i} + e_t \quad (1)$$

$$\Delta X_t = \alpha_0 + \gamma X_{t-1} + \sum_{i=1}^{k} \beta_i \Delta X_{t-i} + e_t \quad (2)$$

$$\Delta X_t = \alpha_0 + \alpha_1 t + \gamma X_{t-1} + \sum_{i=1}^{k} \beta_i \Delta X_{t-i} + e_t \quad (3)$$

Model (1) is a pure random walk with the lag terms. Model (2) possesses a drift. Model (3) includes a drift and a time trend. The null hypothesis for ADF test is: $H_0 : \gamma = 0$, with the alternative $H_1 : -2 < \gamma < 0$ [16].

ADF test, in above equation, tests if γ coefficient statistically equal to zero. The results reached with ADF test can be compared to McKinnon critical values at significance level of 1%, 5% and 10%. In the equation ΔX_t shows the first difference of time series which is being analyzed to determine whether or not it is stationary, t general trend variable and X_{t-1} lagging difference terms.

B. Vector Autoregressive (VAR) Model

Vector Autoregressive (VAR) Model was developed by Sims (1980) [17]. In this method dependence structure between the variables is not required. In this case In this case, the variables in the model without the distinction between endogenous-exogenous all variables are considered endogenous. This feature provides flexibility in the analysis phase. In this method, each variable is projected by its own lagged values and the lagged values of other variables [18].

VAR models are being used primarily to examine the relations between macro economic variables and variables used in the analysis of the dynamic effects of random shocks on variables system. Moreover, according to many economists unrestricted VAR, gives better results than classical structural modeling for forecasting [19]. First degree vector autoregression (VAR (1)) model is

$$X_t = \alpha + \Phi X_{t-1} + e_t$$

Here α:stationary, Φ: over X_{t-1} with kxk dimension transition matrix of expression free from X_t [20]. e_t zero mean, with multivariate normal distribution, with zero covariance and stationary variances that are with white noices. Similarly VAR(p) model is

$$X_t = \Phi_1 X_{t-1} + \Phi_2 X_{t-2} + \ldots + \Phi_p X_{t-p} + e_t$$

[21]. VAR models, often preferred for time series for that its dynamic relations can be given without limitation on the structural model [22]. Additionally in VAR models inclusion of the lagged values of the dependent variables allows making strong predictions for the future [23]. Such a modeling methods are used for analyzing the dynamic structure of the time series [24]. Each variable used in the model is a function of past values of itself and other variables. When this function is used

obtained with series of research by vector autoregressive model is expressed as follows.

$$\begin{bmatrix} TS \\ YS \\ DOLLAR \\ INTEREST \\ WPI \end{bmatrix} = \begin{bmatrix} \alpha_1 \\ \alpha_2 \\ \alpha_3 \\ \alpha_4 \\ \alpha_5 \end{bmatrix} + \begin{bmatrix} \Phi_{11}(L) & \Phi_{12}(L) & \Phi_{13}(L) & \Phi_{14}(L) & \Phi_{15}(L) \\ \Phi_{21}(L) & \Phi_{22}(L) & \Phi_{23}(L) & \Phi_{24}(L) & \Phi_{25}(L) \\ \Phi_{31}(L) & \Phi_{32}(L) & \Phi_{33}(L) & \Phi_{34}(L) & \Phi_{35}(L) \\ \Phi_{41}(L) & \Phi_{42}(L) & \Phi_{43}(L) & \Phi_{44}(L) & \Phi_{45}(L) \\ \Phi_{51}(L) & \Phi_{52}(L) & \Phi_{53}(L) & \Phi_{54}(L) & \Phi_{55}(L) \end{bmatrix} \begin{bmatrix} TS_{t-1} \\ YS_{t-1} \\ DOLLAR_{t-1} \\ INTEREST_{t-1} \\ WPI_{t-1} \end{bmatrix} + \begin{bmatrix} e_{1t} \\ e_{2t} \\ e_{3t} \\ e_{4t} \\ e_{5t} \end{bmatrix}$$

In addition to variables put in the Materials section, α: stationary term, e_{1t}, e_{2t},…, e_{7t} mean zero and with stationary covariance random stochastic processes. In the term $\Phi_{ij}(L)$ in the matrix of coefficients, subscript ij represents equation number and independent variable, and L lagging processor.

C. Causality test

Causal relations between the variables are to be examined with Granger (1969) causality test [25]. Granger (1969), Sims (1972), based on these relations, they suggested causality [26]. In VAR model to conduct causality tests between variables all variables required to be stationary [27]. Granger causality test is to be conducted with the equations number (4) and (5) [28].

$$X_t = \beta_0 + \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{i=1}^{n} \beta_i X_{t-i} + e_{1t} \quad (4)$$

$$Y_t = \alpha_0 + \sum_{i=1}^{n} \beta_i X_{t-i} + \sum_{i=1}^{n} \alpha_i Y_{t-i} + e_{2t} \quad (5)$$

If the two time series are mutual cause there would be a mutually causal relation [29]. Models numbered (4) and (5) established only on the lagged values, if the hypothesis $\beta_i = 0$ is true variable X_t is not a granger reason for Y_t [30].

D. Impulse and Response Functions

Impulse Response Functions reflects the effect to the current and future value of endogenous variables of standard error shock in any of random error terms. Which one is the most influential variable on a macro-economic indicators is to be determined by variance decomposition, usability of this variable as an effective policy tool is to be determined by impulse response functions [31].

E. Variance Decomposition

Variance decomposition is decomposition ratio of prediction error variance components of each variable that can be installed on each variable in the system [32]. Indicates the percentage of the change that occurs in the used variables that originates from itself and the percentage from other variables.

If the large part of the changes occurring in the variable stems from the shock in itself, this is an exogenous acting of the variable. The variance decomposition provides information on the degree of causal relations between the variables [27]. The variance decomposition provides information that determines the relative importance of each and every random shocks influence the variables in VAR [33].

III. FINDINGS

Primarily stationarity analysis of variable series of red meat production, dollar exchange rate, interest rate and WPI has been conducted. Therefore, ADF unit root tests was calculated. As a result of unit root test conducted, series found to be not significant at their level value. To make the series stationary, taking the first difference, the stationarity test was conducted again. According to Table 1 as result of unit root test. When taking the first difference of the series TS, YS, DOLAR, WPI and INTEREST was noted that they weren't with unit root, accordingly they were stationary.

Table (1). Augmented Dickey-Fuller (ADF) Unit Root Tests

Variables	Level	1. Row Difference
TS	-0.973	-4.925 **
YS	-0.585	-5.641 **
DOLLAR	0.619	-5.385 **
WPI	-1.379	-9.719 **
INTEREST	-0.399	-5.093 **

Mac Kinnon critical values for the model is 1%, 5% and 10% for significance level respectively –3.662, –2.960 and –2.619. ** 1% significance level indicates stationarity of the variable. TS: Number of chicken, YS: Number of egg, DOLLAR: Dollar exchange rate, WPI: Wholesale Price Index Inflation Rate (%), INTEREST: Central Bank rediscount rate (%).

The result of stationarity was supported by reverse roots of AR characteristic polynomial of predicted VAR model shown

in Figure 1.

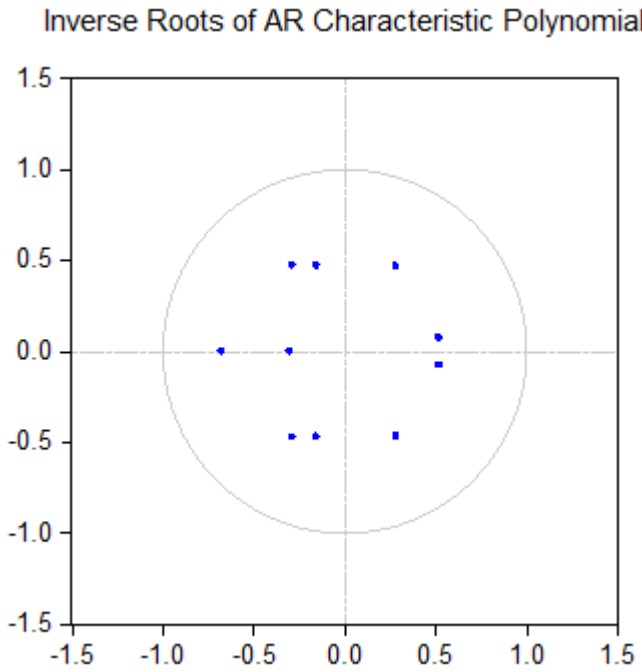

Figure 1. Stability of the integrity of the Model

Table (2). Determining criteria the length of the lag

Lag	LR	FPE	AIC	SC	HQ
0	NA*	1.19e+36*	97.25868	97.49442*	97.33251
1	29.34294	1.92e+36	97.70703	99.12148	98.15002
2	17.13068	4.94e+36	98.47947	101.0726	99.29161
3	31.40370	4.04e+36	97.78794	101.5598	98.96923
4	31.11192	1.59e+36	95.62308*	100.5736	97.17354*

Here, LR: Serially arranged LR test statistics, FPE: Final Prediction Error, AIC: Akaike information criteria, SC: Schwarz information criteria, HQ: Hannan-Quinn information criteria.

In Table 2 for the variables of TS, YS, DOLLAR, WPI and INTEREST was determined that appropriate length of delay was 3 according to AIC criteria. After determining appropriate length of delay, VAR analysis and Granger causality test were conducted.

As a result of VAR analysis enclosed at Annex, it was determined that as being delayed for 4 periods, the relationship between number of chicken and number of egg is important in terms of statistics ($P < 0.05$). Relating to the duration before 4 periods, the number of chicken had an affect at the rate of -20.14% on the number of egg. Negative coefficient means that relating to the data before 4 periods, an increase of % 1 percent at number of chicken would cause a decrease of 20.14 at number of egg. It was determined that as being delayed for 2 periods, the relationship between number of egg and dollar rate is important in terms of statistics ($P < 0.05$ and $P<0.01$). Relating to the duration before 2 periods, an increase of % 1 percent at number of egg would cause a decrease of 0.53 on itself and a increase of 0.12% at dollar rate. It was determined that as being delayed for 4 periods, the relationship between number of egg and dollar rate is important statistically ($P<0.01$). Relating to the duration before 4 periods, the number of egg had an affect of increase at the rate of 0.12 % on dollar rate.

Relating to the duration before one period, an increase of 1% at dollar rate would cause an increase of 3.21 % at number of egg. Relating to the duration before 4 periods, an increase of 1 % at values of WPI (Total Goods Price Index) would cause an increase of 31333.64 pcs at number of egg.

Nazlıoğlu (2010), in the study of "Impacts of Macro Economic Policies on Agricultural Production; A Comparison for Advanced and Emerging Economies"; effects of agricultural prices, money supply, government spending, inflation rate, interest rate and exchange rate on agricultural production were analyzed with cointegration methods. The obtained results indicate that agricultural production is affected in a positive direction from the rise in agricultural prices and in exchange rate [34]. Okumuş (2012), in the study named "Agricultural Policies and Time Series Analysis; An Application to Cotton Price in Turkey" cotton production, relations between the cotton price in the stock market and diesel fuel were analyzed with VAR method. Previous 1 year's production amount and cotton prices found to be the important factors on production. Also with causality analysis, observed that there is a strong tie between diesel fuel and production. With this aspect, the results obtained by our study differ from these results [35].

As being delayed for 4 periods, the results of F test performed to determine whether any casualty relationship existed between variables is seen at table 3.In the direction of these findings, it was determined that, one-way causality relationship caused by number of egg and dollar rate from number of egg to dollar rate and from interest rate to number of egg existed ($P<0.01$).

Subaşı (2013) announced that one-way causality relationship existed from R&D expenditures to agricultural growth. It was seen that this conclusion includes similar findings with the findings in our study obtained when the relationships between inflation, dollar rate, interest rate and number of chicken and number of egg was compared [36].

Table (3). Granger Causality Test Results

Null hypothesis	n	F-Statistic	P
YS does not Granger Cause TS	29	1.89530	0.1507
TS does not Granger Cause YS		0.29945	0.8748
DOLLAR does not Granger Cause TS	29	0.98459	0.4383
TS does not Granger Cause DOLLAR		1.29435	0.3058
INTEREST does not Granger Cause TS	29	0.72605	0.5845
TS does not Granger Cause INTEREST		0.23351	0.9162
WPI does not Granger Cause TS	29	0.91170	0.4762
TS does not Granger Cause WPI		0.69459	0.6045
DOLLAR does not Granger Cause YS	29	2.17820	0.1085
YS does not Granger Cause DOLLAR		3.90693	0.0167
INTEREST does not Granger Cause YS	29	3.01933	0.0423
YS does not Granger Cause INTEREST		2.83393	0.0518
WPI does not Granger Cause YS	29	1.02788	0.4171
YS does not Granger Cause WPI		1.03807	0.4123
INTEREST does not Granger Cause DOLLAR	29	0.97340	0.4440
DOLLAR does not Granger Cause INTEREST		2.54931	0.0711
WPI does not Granger Cause DOLLAR	29	0.77366	0.5551
DOLLAR does not Granger Cause WPI		1.17286	0.3526
WPI does not Granger Cause INTEREST	29	0.92768	0.4677
INTEREST does not Granger Cause WPI		0.40446	0.8032

Here * 0.05, ** 0.01 significance level of materiality, 29 is the number of observations.

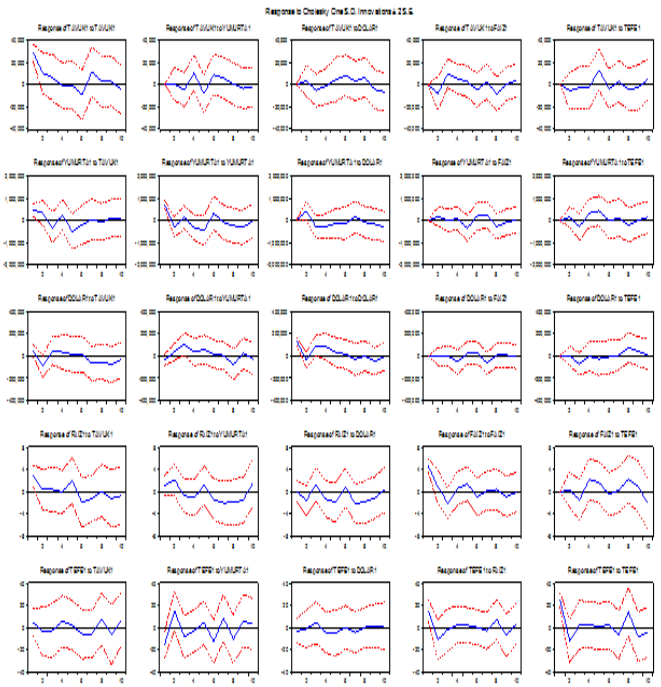

Figure 2. Impulse response analysis results

It was seen in figure 2 that how an effect dollar rate, interest rate (%) and WPI(%) had on number of chicken and number of egg. Here the effect and impact graphs given in figure 2 were presented for 10 periods for the purpose of exhibiting the dynamic effects resulted in the impact of other series(TS and YS) against this change when rate of short-term financial transactions was increased by 1%. The dashed line in the graph indicates confidence interval and the straight line indicates point estimation. The production of beef against an increase of 1% at number of chicken had such up and down tendency that positive tendency for the first periods, and a negative tendency for 6th and 7th periods and positive tendency for the following periods. The number of egg against an increase of 1% at number of chicken had such up and down tendency that negative tendency for the first two periods, and positive tendency between 3th and 4th periods and between 6th and 8th periods and negative tendency for the following periods. An increase of 1% at number of chicken had positive effect on dollar rate for the first periods and again positive effect between 4th and 8th periods and negative effect for the following periods.

Interest rate against an increase of 1% at number of chicken had negative tendency for the first two periods and positive tendency between 3th and 6th periods and up and down tendency for the following periods. The WPI against an increase of 1% at number of chicken had a negative tendency for the first four periods and up and down tendency for the following periods**.**

The number of chicken against an increase of 1% at number of egg had up and down tendency for the first 6 periods, hadn't any significant tendency for the following periods. An increase of 1% at number of egg resulted in up and down tendency on number of egg and WPI. The tendency of dollar rate against increase of 1% at number of egg didn't change significantly between 3th and 6th periods and also after 8th period and The tendency of interest rate against that didn't change significantly for the first 4 periods as well. The WPI against an increase of 1% at number of egg hadn't any significant tendency for the first periods, had a negative effect on 3th period and hadn't any significant tendency between 4th and 8th periods.

Interest rate against an increase of 1% at number of chicken had negative tendency for the first two periods, and positive tendency between 3th and 6th periods and up and down tendency for the following periods. The WPI against an increase of 1% at number of chicken had a negative tendency for the first four periods, and up and down tendency for the following periods**.**

The number of chicken against an increase of 1% at number of egg had up and down tendency for the first 6 periods, hadn't any significant tendency for the following periods. An increase of 1% at number of egg resulted in up and down tendency on number of egg and WPI. The tendency of dollar rate against increase of 1% at number of egg didn't change significantly between 3th and 6th periods and also after 8th period and The tendency of interest rate against that didn't change significantly for the first 4 periods as well. The WPI against an increase of 1% at number of egg hadn't any significant tendency for the first periods, had a negative effect on 3th period and hadn't any significant tendency between 4th and 8th periods.

The number of chicken against an increase of 1% at dollar rate had positive tendency for the first period, negative tendency for the second period, positive tendency between 3th and 6th periods and negative tendency for the following periods. The number of egg against an increase of 1% at dollar rate had positive tendency for the first seven period, dollar rate against an increase of 1% at number of egg had positive tendency for the first period; negative tendency for the second period; positive tendency between 3th and 8th periods; interest rate against an increase of 1% at number of egg hadn't any significant tendency for the first 3 periods, had up and down tendency until 8th period and hadn't any effect for along time and had positive tendency afterwards.

The number of chicken against an increase of 1% at interest rate had positive tendency for the first six periods and negative tendency afterwards. The number of egg against an increase of 1% at interest rate had positive tendency for the first periods and negative tendency after 6th period. The dollar rate against an increase of 1% at interest rate had negative tendency for the first period and up and down tendency until 7th period and had negative tendency after 7th period. The interest rate against an increase of 1% at interest rate had positive tendency for the first periods and up and down tendency afterwards. The WPI against an increase of 1% at interest rate had positive tendency for the first periods and negative tendency until 4th period ,and positive tendency after 4th period.

The number of chicken, interest rate and WPI against an increase of 1% at WPI had positive tendency for the first period, but number of egg and dollar rate had negative tendency against an increase of 1% at WPI for the first period. Dollar rate, interest rate and WPI against an increase of 1% at WPI had insignificant tendency.

Table (4). Variance Decomposition Analysis of results

Variance Decomposition: TS

Period	S.E.	TS	YS	DOLAR	FAİZ	TEFE
1	28745.58	100.0000	0.000000	0.000000	0.000000	0.000000
2	32236.83	89.60978	0.008903	0.966681	6.439308	2.975324
3	35031.71	78.97480	1.895651	2.916886	13.09901	3.113655
4	37110.33	70.49465	9.799540	2.784027	13.66397	3.257812
5	40679.25	58.69138	12.61316	3.421992	11.80155	13.47191
6	43874.50	54.98668	14.95305	6.374823	11.43010	12.25535
7	45955.52	56.27682	15.18678	6.286705	10.72862	11.52108
8	47509.32	52.96841	14.22540	7.628075	13.45116	11.72695
9	47994.07	52.20321	14.44795	8.395237	13.19650	11.75710
10	49104.95	50.71547	14.06088	9.927540	13.14105	12.15507

Variance Decomposition: YS

Period	S.E.	TS	YS	DOLAR	FAİZ	TEFE
1	832806.9	30.14273	69.85727	0.000000	0.000000	0.000000
2	1061372.	28.34519	51.19409	16.16906	2.506984	1.784677
3	1196565.	29.81428	41.60634	19.16925	1.978154	7.431980
4	1333276.	27.24689	39.48832	19.41528	1.833942	12.01557
5	1602450.	28.83780	35.28387	14.26756	6.216472	15.39430
6	1665094.	28.12693	36.49474	13.93135	7.155855	14.29113
7	1696850.	27.12911	35.43507	14.24830	8.907954	14.27957
8	1753535.	25.58086	35.08025	13.66164	10.80468	14.87257
9	1795990.	24.72918	36.66230	13.92136	10.50927	14.17789
10	1828794.	24.22799	35.35891	16.05721	10.13643	14.21947

Variance Decomposition: DOLLAR

Period	S.E.	TS	YS	DOLAR	FAİZ	TEFE
1	149446.4	10.00477	5.095409	84.89982	0.000000	0.000000
2	183035.0	31.64565	7.876543	60.36209	0.114364	0.001356
3	247595.4	20.61783	23.13932	47.55563	0.064339	8.622878
4	271603.2	18.91443	21.01501	49.21890	3.680920	7.170733
5	282394.7	17.77612	23.83043	46.90389	4.066543	7.423015
6	285789.4	17.89113	23.53964	46.15318	5.092045	7.324008
7	302126.1	20.84526	21.09371	42.21654	9.242286	6.602203
8	324443.5	20.52633	23.80538	36.60852	8.061408	10.99835
9	340152.2	23.69384	22.12189	35.31834	7.385551	11.48037
10	342782.4	24.24691	22.25731	34.78160	7.307841	11.40633

Variance Decomposition: INTEREST

Period	S.E.	TS	YS	DOLAR	FAİZ	TEFE
1	5.617979	25.69232	4.201048	0.112823	69.99381	0.000000
2	6.305963	20.79654	14.95495	6.339138	57.54899	0.360383
3	6.959519	17.42863	13.36892	8.847575	55.56513	4.789753
4	7.525532	14.90608	13.36743	10.51118	48.20475	13.01056
5	8.403406	17.67263	12.56706	13.71006	41.68318	14.36707
6	8.835940	20.93036	13.82451	13.22595	38.76073	13.25845
7	9.376627	20.15654	16.84765	16.65832	34.44843	11.88907
8	10.02828	17.65134	18.32493	17.90256	30.29765	15.82353
9	10.34352	17.83241	19.38315	17.89851	29.23887	15.64706
10	10.73199	17.05134	20.39622	16.74581	27.16243	18.64420

Variance Decomposition: WPI

Period	S.E.	TS	YS	DOLAR	FAİZ	TEFE
1	33.50490	1.985582	20.56053	0.987317	21.11898	55.34759
2	40.35082	2.268485	28.03874	0.773634	21.96550	46.95364
3	41.63739	2.545618	30.22458	1.981301	20.81560	44.43290
4	42.54433	4.347461	29.41446	3.070553	20.25185	42.91567
5	43.16716	4.424854	29.67034	4.288633	19.89697	41.71920
6	45.42044	5.565358	34.61629	3.875332	17.97222	37.97080
7	47.41810	6.691252	35.02773	4.493188	16.88989	36.89794
8	51.65904	7.729965	33.59821	3.787244	16.25917	38.62541
9	53.56019	8.630345	32.55237	3.610479	16.82300	38.38381
10	54.39062	10.02958	31.87027	3.553572	16.71946	37.82712

According to variance decomposition results given in table 4,number of chicken can describe the values related to one period later at %100 percent, two periods later at 89.61% , three periods later at 78.97% and ten periods later

at 50.72%. Relating to values at ten period later, the number of chicken could describe the number of egg at 14.06% percent, dollar rate at 9.93% and WPI at 12.16 %. When the variance change at number of egg examined, the description ratios relating to ten period later were determined as follows; number of egg at 35.36% ,number of chicken at 24.23%, dollar rate at 16.06%,WPI at 10.14% and interest rate at 10.14%.% and WPI at 12.16 %.When the variance change at number of egg examined, The description ratios relating to variance change at dollar rate are as follows : dollar rate at 34.78%,number of chicken at 24.25%, number of egg at 22.26% and WPI at 11.41 % and interest rate at 7.31%. The description ratios relating to variance change at interest rate are as follows: interest rate at 27.16%, number of egg at 20.40 %, WPI at 18.64 % and 17.05 %at number of chicken and dollar rate at 16.75%. The description ratios relating to variance change at WPI are as follows: WPI at 37.18%, number of egg at 31.87 %, interest rate at 16.72 % and number of chicken at 10.03 and dollar rate at 3.55 %.

IV. CONCLUSION

In this study, the factors having an effect on number of chicken and number of egg in Turkey was determined through VAR analysis. Number of chicken, number of egg, dollar rate and inflation rate in terms of total good price index (WPI) and interest rate were used as variable for this analysis. The result of VAR analysis was interpreted by being obtained through three methods, such as, causality test, variance analysis, and action-reaction analysis. In the light of these results, it has been determined that dollar rate, WPI and interest rate have effect on chicken and egg production in Turkey.

As a result of variance analysis, it was seen that the most important effect of number of chicken, number of egg, dollar rate, interest rate and WPI on variables are their delayed values. Dollar rate affected chicken number at 24.25%, egg number at 22.26% interest rate at 7.31%, WPI at 11.41%. Interest rate affected number of chicken at 17.06%, number of egg at 20.40%, dollar rate at 16.75% and WPI at 18.64%. WPI affected number of chicken at 10.03%, number of egg at 31.87%,dollar rate at 3.55%, and interest rate at %16.72.In the lights of these results, it was seen that dollar rate mostly affected number of chicken, WPI and interest rate mostly affected number of egg.

One way relationship existed from number of egg to dollar rate and from interest rate(%) to number of egg at Granger causality analysis. Impact – response analysis and variance analysis supported these results.

According to the results obtained, it was seen in general that dollar rate, WPI and interest rate affected production of chicken and egg.

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Appendix. VAR Analysis Results

	TS	YS	DOLLAR	INTEREST	WPI
TS(-1)	0.491026	6.573753	-3.343938	-2.59E-05	-0.000128
	(0.34048)	(9.86424)	(1.77013)	(6.7E-05)	(0.00040)
	[1.44216]	[0.66642]	[-1.88909]	[-0.38887]	[-0.32336]
TS(-2)	0.087107	4.576271	-1.105630	2.08E-05	-0.000153
	(0.26746)	(7.74872)	(1.39050)	(5.2E-05)	(0.00031)
	[0.32568]	[0.59058]	[-0.79513]	[0.39886]	[-0.48965]
TS(-3)	-0.470798	14.60297	1.539763	-1.91E-05	0.000321
	(0.27666)	(8.01525)	(1.43833)	(5.4E-05)	(0.00032)
	[-1.70173]	[1.82190]	[1.07052]	[-0.35235]	[0.99652]
TS(-4)	0.141210	-20.13736	-2.286621	-1.72E-05	-0.000148
	(0.30257)	(8.76595)	(1.57304)	(5.9E-05)	(0.00035)
	[0.46670]	[-2.29722]*	[-1.45363]	[-0.29125]	[-0.41877]
YS(-1)	-0.001841	-0.184658	0.044651	2.64E-06	1.14E-05
	(0.00768)	(0.22260)	(0.03995)	(1.5E-06)	(9.0E-06)
	[-0.23955]	[-0.82955]	[1.11779]	[1.75960]	[1.27577]
YS(-2)	-0.010418	-0.525396	0.120839	-1.14E-06	3.52E-06
	(0.00852)	(0.24681)	(0.04429)	(1.7E-06)	(9.9E-06)
	[-1.22293]	[-2.12875]*	[2.72838]*	[-0.68226]	[0.35431]
YS(-3)	0.005727	-0.541722	0.113890	3.71E-06	1.95E-06
	(0.01066)	(0.30882)	(0.05542)	(2.1E-06)	(1.2E-05)
	[0.53723]	[-1.75414]	[2.05511]	[1.78321]	[0.15718]
YS(-4)	0.004471	-0.463958	0.142481	3.16E-06	8.33E-06
	(0.01027)	(0.29742)	(0.05337)	(2.0E-06)	(1.2E-05)
	[0.43548]	[-1.55993]	[2.66958]**	[1.57415]	[0.69626]
DOLLAR(-1)	0.019008	3.213422	-0.256820	-1.13E-05	-1.95E-05
	(0.04873)	(1.41174)	(0.25334)	(9.5E-06)	(5.7E-05)
	[0.39007]	[2.27621]*	[-1.01375]	[-1.18367]	[-0.34318]
DOLLAR(-2)	-0.057048	-0.949356	0.442119	-4.87E-07	-2.01E-05
	(0.04181)	(1.21134)	(0.21737)	(8.2E-06)	(4.9E-05)
	[-1.36442]	[-0.78372]	[2.03391]	[-0.05965]	[-0.41190]

DOLLAR(-3)	0.054433	-2.194957	0.495633	1.67E-06	-4.05E-06
	(0.04635)	(1.34289)	(0.24098)	(9.1E-06)	(5.4E-05)
	[1.17433]	[-1.63450]	[2.05673]	[0.18400]	[-0.07490]
DOLLAR(-4)	0.011726	-2.544527	0.029777	-6.43E-06	-1.27E-05
	(0.05293)	(1.53347)	(0.27518)	(1.0E-05)	(6.2E-05)
	[0.22154]	[-1.65932]	[0.10821]	[-0.62174]	[-0.20667]
INTEREST(-1)	-1009.655	17119.94	-1228.379	0.139739	-0.763560
	(1703.71)	(49359.4)	(8857.50)	(0.33297)	(1.98579)
	[-0.59262]	[0.34684]	[-0.13868]	[0.41967]	[-0.38451]
INTEREST(-2)	2937.241	56222.67	5475.799	-0.326275	-1.308839
	(1525.26)	(44189.2)	(7929.72)	(0.29809)	(1.77779)
	[1.92573]	[1.27232]	[0.69054]	[-1.09454]	[-0.73622]
INTEREST(-3)	-510.8699	-61498.46	-8679.594	-0.025881	-0.524123
	(1362.69)	(39479.3)	(7084.51)	(0.26632)	(1.58830)
	[-0.37490]	[-1.55774]	[-1.22515]	[-0.09718]	[-0.32999]
INTEREST(-4)	-957.0938	-36215.38	2035.290	-0.044825	0.948437
	(1182.71)	(34265.1)	(6148.84)	(0.23115)	(1.37853)
	[-0.80924]	[-1.05692]	[0.33100]	[-0.19392]	[0.68801]
WPI(-1)	-223.0806	5688.397	-27.03705	0.015187	-0.480036
	(330.230)	(9567.31)	(1716.84)	(0.06454)	(0.38491)
	[-0.67553]	[0.59457]	[-0.01575]	[0.23532]	[-1.24715]
WPI(-2)	-79.56121	-6711.374	-3917.929	-0.075127	-0.216141
	(378.030)	(10952.2)	(1965.35)	(0.07388)	(0.44062)
	[-0.21046]	[-0.61279]	[-1.99350]	[-1.01686]	[-0.49054]
WPI(-3)	-60.35334	21413.36	-3617.280	0.072391	0.028688
	(398.287)	(11539.0)	(2070.67)	(0.07784)	(0.46423)
	[-0.15153]	[1.85573]	[-1.74692]	[0.92999]	[0.06180]
WPI(-4)	470.0123	31333.64	-443.5595	-0.000308	-0.023540
	(406.287)	(11770.8)	(2112.26)	(0.07940)	(0.47355)
	[1.15685]	[2.66198]**	[-0.20999]	[-0.00388]	[-0.04971]
C	6463.948	1029737.	-56685.01	-2.806960	-8.124188
	(12070.0)	(349688.)	(62751.1)	(2.35894)	(14.0684)
	[0.53554]	[2.94473]	[-0.90333]	[-1.18993]	[-0.57748]
R-squared	0.721349	0.855669	0.838342	0.774079	0.660609
F-statistic	1.035486	2.371414	2.074352	1.370527	0.778583