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SUPPLY RESPONSE OF MAIN LEGUMES IN TURKEY BY VECTOR ERROR CORRECTION APPROACH

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ABSTRACT

Measuring the impact of price and non-price factors on annual agricultural products is an agricultural policy subject that continues to receive attention. In this study it was aimed to question the response of quantity supplied for main legumes as lentils, dried beans and chickpeas that are produced specifically in South-eastern regions of Turkey. Vector error correction methodology was incorporated to estimate the short-run dynamics of the quantity supplied as well as the static supply relationships between 1991 and 2013.Iimpacts of economical or ecological shocks were considered within the analysis for 1991 and 2013. Persistent declination of both the amount supplied and the producer price was recognised, even if the dependency of dried beans on its price was found relatively lower than the other staples. However, the declination in the amount and prices had shown that, well-built strategies to convince producers in order not to leave their lands and to support development of processing units are required specifically for South-eastern parts of Turkey.

KEYWORDS:
Legumes, Price, Supply Response, VEC

INTRODUCTION

One of the most important issues in agricultural economics is supply response of crops as the responsiveness of farmers to incentives determines agriculture's contribution to the overall economy. The situation is more important in Turkey, where the sector is the largest employer.

Agricultural supply response represents change in agricultural output due to a change in agricultural output price and other relevant factors. The concept of supply response is dynamic and different from supply function, which resides on a static concept. The supply function describes a price quantity relationship, where all other factors are held constant. On the other hand, the response relation is a more dynamic concept. It shows the change in quantity supplied with relevance to the changes in prices as well as changes in supply shifters such as prices of other products and costs of inputs like land and labour. Therefore, it approximates the amount supplied to the long run [1]. The production growth through incentives, while effective in the recent years, may be relatively difficult in the future. This may be induced by an economic or demand crisis or financial difficulties which result in reduced subsidies. Some agricultural policy experts are interested in observing the response of supply and demand to farm inputs accordingly [2].

The recent studies in the agricultural economics mostly focus on cointegration and error correction studies of time series data. The supply response of maize farmers to prices in Nigeria was analysed using cointegration and Auto Regressive Distributed Lag (ARDL) model between 1961 and 2008. The empirical findings showed that maize supply responds significantly and positively in the long run to its own price and negatively (positively) to the price of cassava (yam). Other results revealed that maize supply failed to respond price changes significantly in the short run. While short-run causality runs only from price of cassava to maize supply, long-run causality runs from joint price effect to maize supply [3].

Cointegration and error correction modelling approaches was used to estimate aggregate supply response for maize using data for Trans Nzoia District of Kenya for 1980 and 2003. Results indicated that high maize and low fertiliser costs positively influenced the aggregate maize supply. The elasticity of supply to fertiliser costs was -1.05 for the short-run and -1.26 for the long-run. The elasticity of supply to maize price was 0.53 for the short-run and 0.76 for the long-run. These findings indicated that the market liberalisation targeting for changing producer price incentives is reasonable and advisable [4]. Departing from this research, another Kenyan maize study confirmed inelastic response of maize production to its price, fertiliser costs, agro-investments and marketing board purchases between 1972 and 2008 [5].

Response of rubber farmers to price and non-price factors were analysed from 1970 to 2008 in Nigeria. Response of rubber supply to its own price was low with an estimated elasticity of 0.373 for the short-run and 0.204 for the long-run. Price sustainability and opportunity to increase supplies leaded to low responsiveness and promotion of sustainable marketing outlets and high quality exportable crop

production were suggested [6].

Legumes (pulse crops), which are the major vegetative protein sources for human nutrition, are important for the World and for Turkey. Chickpeas (45 %), lentils (38 %) and dried beans (17 %) are the most significant pulse crops of Turkey. Legumes are mainly produced in the South-eastern Anatolia, which is one of the least economically developed regions of Turkey. These crops are of considerable significance to the regional economy, which has relatively inefficient conditions and constraints compared to western regions regarding water supplies and reach to information. Although government policy actions intend to lessen the economic disparities among regions and prevent migration from rural to urban, the impact on legumes production has been a dramatic decline in the last fifteen years [7]. Departing from this inference, this study aimed to understand the effect of supply shifter factors on three major pulses of Turkey in the long and short run.

DATA CHARACTERISTICS AND MODELLING FRAMEWORK

Data. As it was aimed to understand the impacts of price and non-price factors on the amount of produced for chickpeas, dried beans and lentils, it is first necessary to understand the data characteristics. Yet, it is important to note that the secondary data analysed was withdrawn from the databases of Turkish Statistical Institute for the target products between 1991 and 2013. Accordingly, we first intended to look at the descriptive characteristics of the data for the above mentioned crops.

Quantity of Production. The production amount has varied specifically for lentil and chickpeas since the beginning of the analysis period as demonstrated in Figure 1. However, the amount of dried beans produced has remained relatively stable. The total production has remained around 200 thousand tons despite an almost 28 % decline in 2008 for chickpeas. Amount of lentils produced has declined steadily from

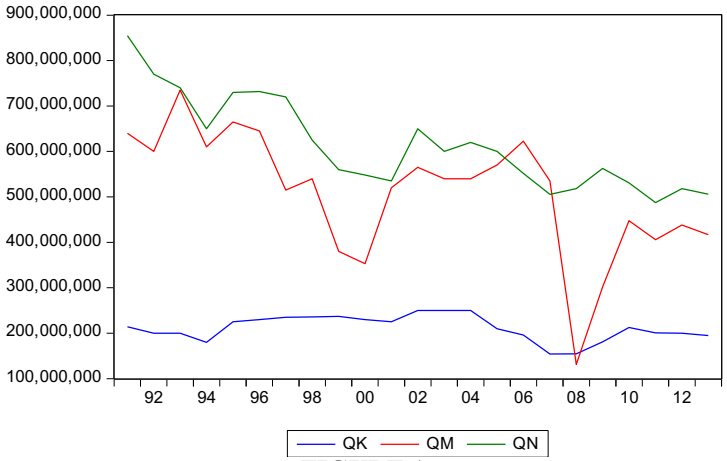


FIGURE 1
The amount of production for lentil (Q_m), chickpeas (Q_n) and dried beans (Q_k)

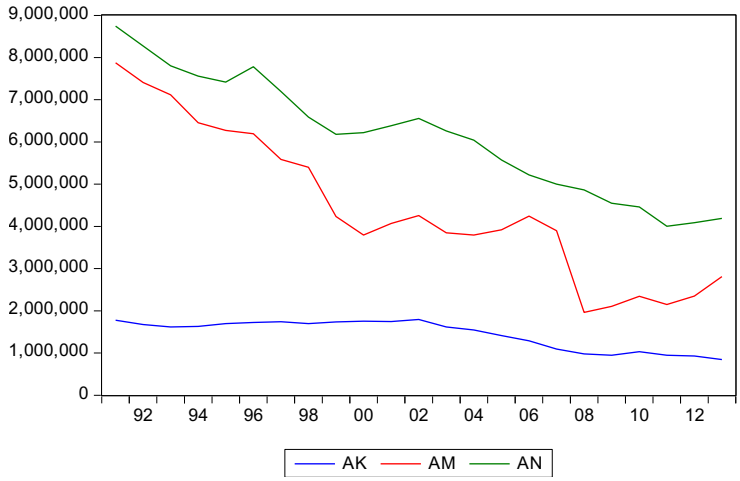


FIGURE 2
The production area for lentil (A_m), chickpeas (A_n) and dried beans (A_k)

around 855 thousand tons in 1991 to 506 thousand tons in 2013 with sharp reductions in 1994 and 2000 followed by induced production. The total declination accounted for 41 %. The change in lentil production was significant. From 640 thousand tons in 1991, the amount declined to 420 thousand tons in 2013 with 34 %. However, there are more sharp downsizing movements in 2000 (44 %) and 2008 (80 %) in comparison with the starting point, which are worth to diagnose. The variations of production amount are quite visible in Figure 1.

Area of Production. The field devoted for production of these three main staples had also declined with a higher variation for lentils. The lentil production fields had declined by 64 % to almost 3 million acres in 2013 while the declination was 52 % for chickpeas to 4 million and dried beans to below 1 million acres. The steady declination is also visible from Figure 2.

Producer Price. Outlet producer price per kg of these three crops had also evolved for as well as shown in Figure 3. While the real price had declined by 21 % for dried beans and by 40 % for lentils, the price for chickpeas had increased by almost 50 %. Besides, there had been seasonal shocks in 1995 and 2008 for all of the products in either direction followed by inverse movements. The reasoning behind the uprising in 1995 was the 1994 economic crisis induced by Mexican Peso crisis and the above expectations rise in price levels that became visible through more than 100 % rise in CPI levels [8]. Yet, the reason of the boom in 2008 however is the climatic conditions and attached declination experienced in the summer of 2007 [7].

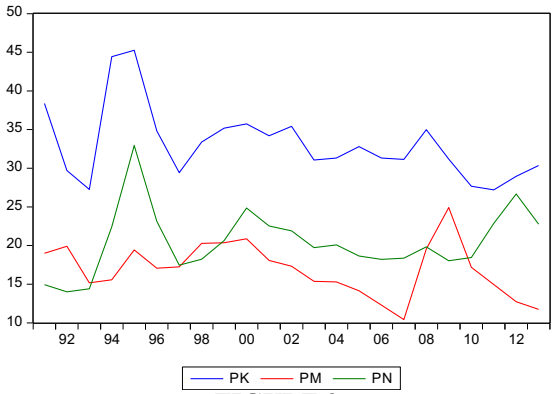


FIGURE 3
Real prices for lentil (P_m), chickpeas (P_n) and dried beans (P_k)

Methodology. Modelling Framework. Before proceeding, it is essential to note that the explanation of amount of agricultural products produced needs consideration with regards to the inter-period relationships. There are various methods applied for determination of the effects on quantity supplied. However, one of the most preferred methodologies is the Nerlovian approach that uses expected prices and non-price factors in explaining the production amount expectations [9].

Accordingly, the main function used to form the expectations framework is as following:

$$Q_t^* = a + bP_t^* + cZ_t \quad (1)$$

$Q_t^* = expected\ production\ amount\ for\ time\ t$
$P_t^* = expected\ price\ level\ for\ time\ t$
$Z_t = non - price\ vector\ for\ time\ t$

In order to integrate expectations, we need the previous year's data for annual agricultural crops. When detailed, it can be understood that the farmers decide what to produce, and how to exchange it with complementary and/or competitive products looking at the previous year's prices and factors as land and existing production capacity. Therefore, the expectation-oriented system is formed by integrating the differenced variables in the system. Besides, all data needs to be normalised by using logarithmic transformation.

$$Q_t - Q_{t-1} = \delta(Q_t^* - Q_{t-1}) \quad (2)$$

$$P_t^* = \theta P_{t-1} + (1-\theta) P_{t-1}^* \quad (3)$$

$$lnQ_t = C_0 + C_1 lnP_{t-1} + C_2 lnQ_{t-1} + C_3 lnZ_t \quad (4)$$

In this representation while C_1 refers to short-run price elasticity, $C_1/1\text{-}C_2$ refers to long-run price elasticity of the amount produced [1, 10].

Estimation of equations formed of non-stationary level variables generally tends to mislead the economic and statistical interpretations [11, 12]. Accordingly, the error correction system depending on co-integration of the auto-correlated variables of same order in a time series analysis was set forward in 1980s [12, 13, 14]. The objective behind was to reach a sound economic interpretation of the changes in the level of production. The co-integration methodology refers to estimation of the short run relationship between integrated variables. In this situation, the co-integration and joint estimation of the variables needs to be tested towards the static equations that refer to the long-run explanation of quantity supplied [15].

Static Equations. The static equations used to explain quantity supplied of these specific legumes are as following.

Lentil

$$lnQ_{mt} = \propto_1 + \alpha_2 lnQ_{mt-1} + \alpha_3 lnP_{mt-1} + \alpha_4 lnA_{mt-1} + \alpha_5 lnP_{kt-1} + \alpha_6 lnP_{nt-1} + \varepsilon_t \quad (5)$$

$Q_{mt} = lentil\ production\ amount\ in\ year\ t - kg$
$Q_{mt-1} = lentil\ production\ amount\ in\ year\ t_1 - kg$
$P_{mt-1} = real\ lentil\ price\ in\ year\ t_1 - per\ kg$
$A_{mt-1} = harvested\ field\ for\ lentils\ in\ year\ t_1 - decares$
$P_{kt-1} =$

$real\ dried\ beans\ price\ in\ year\ t_1 - per\ kg$

$P_{nt-1} = real\ chickpeas\ price\ in\ year\ t_1 - per\ kg$

Chickpeas

$$lnQ_{nt} = a_1 + a_2 lnQ_{nt-1} + \alpha_3 lnP_{nt-1} + \alpha_4 lnA_{nt-1} + \varepsilon_t \quad (6)$$

$Q_{nt} = chickpeas\ production\ amount\ in\ year\ t - kg$

$Q_{nt-1} = chickpeas\ production\ amount\ in\ year\ t_1 - kg$

$P_{nt-1} = real\ chickpeas\ price\ in\ year\ t_1 - per\ kg$

$A_{nt-1} = harvested\ field\ for\ chickpeas\ in\ year\ t_1 - decares$

Dried Beans

$$lnQ_{kt} = b_1 + b_2 lnQ_{kt-1} + b_3 lnP_{kt-1} + b_4 lnP_{mt-1} + \varepsilon_t \quad (7)$$

$Q_{kt} = dried\ beans\ production\ amount\ in\ year\ t - kg$

$Q_{kt-1} = dried\ beans\ production\ amount\ in\ year\ t_1 - kg$

$P_{kt-1} = real\ dried\ beans\ price\ in\ year\ t_1 - per\ kg$

$P_{mt-1} = real\ lentil\ price\ in\ year\ t_1 - per\ kg$

FINDINGS

The distribution of the data. Before proceeding, the data obtained on level needs to be tested for normality of distribution in order to meet the assumptions of estimation.

TABLE 1
Normality Test Results

	Jarque-Bera (p)		Jarque-Bera (p)		Jarque-Bera (p)
Q_k	1,05 (0,59)	A_k	3,18 (0,20)	P_k	6,29 (0,04)
Q_m	3,63 (0,57)	A_m	1,33 (0,51)	P_m	0,10 (0,94)
Q_n	2,25 (0,32)	A_n	1,13 (0,57)	P_n	6,17 (0,05)

Due to the normality test results indicated in Table 1, it can be noted that specifically the price indicators are not normally distributed and need be normalised for further analysis and logarithmic transformation is used accordingly.

Stationary Testing. Firstly, it is essential to check the correlograms of the logged data. Looking at the Q-statistics that were indicated in Table 2, it is understood that data on level were not stationary. Depending on the theory, it can be concluded that differencing the data can grant stationarity.

Subsequently, it is also essential to check existence of unit root of the data via ADF testing [13]. The results leaded the decision on whether the inter-period relationships could be overcome within the analysis.

Due to the findings demonstrated in Table 3, other than real price factors, all of the remaining variables have first order autocorrelation. The price variables on the other hand can be noted as not autocorrelated as they are also stationary on level. For implication of the concerned methodology, it is also essential to check the stationarity level of the lagged variables before explaining the equation system in details and considering the error correction process.

Apparently, the unit root process for the lagged variables revealed the same outcomes that they are mostly stationary in their first lags as can be seen in Table 4.

TABLE 2
Q-statistic Results

	Q-stat (p)		Q-stat (p)		Q-stat (p)
lnQ_k	13,50 (0,00)	lnA_k	19,64 (0,00)	lnP_k	3,03 (0,08)
$D(lnQ_k)$	0,31 (0,58)*	$D(lnA_k)$	2,38 (0,12)*	$D(lnP_k)$	< 0,01 (0,93)*
lnQ_m	4,26 (0,04)	lnA_m	18,69 (0,00)	lnP_m	5,64 (0,18)
$D(lnQ_m)$	1,34 (0,25)*	$D(lnA_m)$	< 0,01 (0,99)*	$D(lnP_m)$	0,04 (0,84)*
lnQ_n	13,52 (0,00)	lnA_n	19,57 (0,00)	lnP_n	6,69 (0,01)
$D(lnQ_n)$	0,27 (0,60)*	$D(lnA_n)$	0,47 (0,49)*	$D(lnP_n)$	0,90 (0,34)*

*, stationary at 1 % level of significance

TABLE 3
Unit Root Test Results (with constant)

	ADF (p)		ADF (p)		ADF (p)
lnQ_k	-2,08 (0,22)	lnA_k	0,90 (0,99)	lnP_k	-3,20 (0,03)**
$D(lnQ_k)$	-3,93 (< 0,01)*	$D(lnA_k)$	-3,04 (0,04)*	$D(lnP_k)$	-4,96 (< 0,01)*
lnQ_m	-2,93 (0,06)	lnA_m	-1,39 (0,56)	lnP_m	-3,11 (0,04)**
$D(lnQ_m)$	-5,52 (< 0,01)*	$D(lnA_m)$	-4,38 (< 0,01)*	$D(lnP_m)$	-4,59 (< 0,01)*
lnQ_n	-2,12 (0,24)	lnA_n	-0,65 (0,84)	lnP_n	-5,39 (< 0,01)*
$D(lnQ_n)$	-4,95 (< 0,01)*	$D(lnA_n)$	-2,59 (0,02)**	$D(lnP_n)$	-4,33 (< 0,01)*

*, stationary at 1 % level of significance; **, stationary at 5 % level of significance

TABLE 4
Unit Root Test Results for Lagged Variables (with constant)

	ADF (p)		ADF (p)		ADF (p)
lnQ_{k-1}	-2,06 (0,26)	lnA_{k-1}	0,54 (0,98)	lnP_{k-1}	-3,10 (0,04)**
$D(lnQ_{k-1})$	-3,94 (< 0,01)*	$D(lnA_{k-1})$	-3,00 (0,05)**	$D(lnP_{k-1})$	-4,72 (< 0,01)*
lnQ_{m-1}	-2,88 (0,07)	lnA_{m-1}	-1,04 (0,72)	lnP_{m-1}	-3,34 (0,03)**
$D(lnQ_{m-1})$	-5,36 (< 0,01)*	$D(lnA_{m-1})$	-4,45 (< 0,01)*	$D(lnP_{m-1})$	-4,53 (< 0,01)*
lnQ_{n-1}	-2,14 (0,23)	lnA_{n-1}	-0,15 (0,93)	lnP_{n-1}	-4,97(< 0,01)*
$D(lnQ_{n-1})$	-4,71 (< 0,01)*	$D(lnA_{n-1})$	-4,10 (< 0,01)*	$D(lnP_{n-1})$	-4,06 (< 0,01)*

*, stationary at 1 % level of significance; **, stationary at 5 % level of significance

TABLE 5
Co-integration test results

LENTILS		CHICKPEAS		DRIED BEANS	
Dep. Var.	**D(et)**	**Dep. Var.**	**D(et)**	**Dep. Var.**	**D(et)**
e(-1)	-1,04	e(-1)	-1,03	e(-1)	-1,20
t(p(t))	0,00*	t(p(t))	0,00*	t(p(t))	0,00*

*, stationary at 1 % level of significance

TABLE 6
Results for lentil production between 1991 and 2013

LONG-TERM				SHORT TERM			
Variable	**Est.**	**t-stat**	**(p)**	**Variable**	**Est.**	**t-stat**	**(p)**
Q_{m-1}	0,58	1,52	0,15	**$D(Q_{m-1})$**	0,75	7,17	0,00
P_{m-1}	0,97	2,30	0,04	**$D(P_{m-1})$**	0,03	0,08	0,93
A_{m-1}	0,03	0,07	0,95	**$D(A_{m-1})$**	-1,50	-2,35	0,03
P_{k-1}	-0,15	-0,17	0,87	**$D(P_{k-1})$**	0,26	0,78	0,45
P_{n-1}	0,19	0,35	0,73	**$D(P_{n-1})$**	-0,07	-0,28	0,78
α_1	5,12	0,99	0,33	**ECM2(-1)**	-0,23	-0,91	0,38
				α_1	-0,07	-1,45	0,17
R^2	0,42	**F-stat**	2,28 (0,09)	**R^2**	0,90	**F-stat**	21,33 (0,00)
D-W	2,07	**M.D.V.**	19,98	**D-W**	1,99	**M.D.V.**	-0,01

Co-integration. The data being recognised as non-stationary with detected unit roots, the co-movement of the data needed to be verified. Therefore, the residuals of the static equations formed for three crops (equations 7, 8, 9) were tested for their unit roots in order to make inferences about the short run co-integration. The reasoning behind was to understand whether a linear combination of the non-stationary series are stationary and could produce significant inferences through linear estimation [16]. The results are provided in the Table 5.

Accordingly, it was understood that quantity supplied of lentils, chickpeas and dried beans can be estimated by co-integrating the non-stationary series with I(1). The non-stationary series can be used to estimate the short-run relationships with co-integration methodology. Accordingly, the short-run static estimators were reformed to incorporate the co-integration correction.

$$D(lnQ_{mt}) = \propto_1 + \alpha_2 D(lnQ_{mt-1}) + \alpha_3 D(lnP_{mt-1}) + \alpha_4 D(lnA_{mt-1}) + \alpha_5 D(lnP_{kt-1}) + \alpha_6 D(lnP_{nt-1}) + \varepsilon_t \quad (8)$$

$$D(lnQ_{nt}) = a_1 + a_2 D(lnQ_{nt-1}) + \alpha_3 D(lnP_{nt-1}) + \alpha_4 D(lnA_{nt-1}) + \varepsilon_t \quad (9)$$

$$D(lnQ_{kt}) = b_1 + b_2 D(lnQ_{kt-1}) + b_3 D(lnP_{kt-1}) + b_4 D(lnP_{mt-1}) + \varepsilon_t \quad (10)$$

RESULTS AND DISCUSSION

Lentils. For the concerned crops, the factors that affect amount of production were determined and their effects were estimated for the long and short term after co-integration. The results are demonstrated in Table 6.

For lentil supplies, more than 50 % of the previous year's production was reflected in the contemporary level of production. This means that experiences and preferences of the farmer are considerably important in the decision making process. Besides, the production amount is highly responsive to the price. The long term price elasticity (0,97) indicates that a unit rise in log of real price leaded to a unit rise in the log of production amount. Considering the declination in the amount and real price between 1991 and 2013, it can be said that the supply mechanism followed its own path. However, the short term response is even more significant. The elasticity of 2,31 (0,97/(1-0,58)) can be read that lentil producers prefer to shift to competitive or complementary products easily due to a price reduction in the short term. This also can explain the steady reduction in prices and lentil supplies and the low responsiveness to the harvested area with 0,03 elasticity.

In addition, the real price of the chickpeas

(0,19) affect the production of lentils positively in the long run, while dried beans (-0,15) affect it in the adverse direction. Yet the impacts are said to be not too significant. It is indecisive apparently to conclude that whether consumers choose between dried beans and lentils or consume chickpeas and lentils together. To understand whether they are alternatives to each other, it is important to check the remaining relationships.

Considering the spill-over of short term cyclical movements in the production to long term, the co-integrated relationship provided some inferences. The estimate of the error correction coefficient revealed that the shocks of the previous period were purified by 23 % in the current period. This meant that inter-period effects were important but the out-of equilibrium conditions were also in control of the sector. And the short-term production amount is most significantly determined by the previous terms production amount, almost by 75 %. Besides, the production shock of 2008 was attributed to the climatic shock appeared in 2007 [7, 17]. The impacts of the drought had been visible in production figures in 2008 as seen in Figure 1.

Chickpeas. The production of chickpeas could have been explained by its previous supplies, price and area harvested. The findings are demonstrated in Table 7. Looking at the long term results, the long term price elasticity was 0,35. Meaning the 35 % of the rise in the real price is reflected as rise in the amount of production. One-third of the production was followed by the previous year. Yet, the short term price elasticity was 55 % (0,35/(1-0,37)). And the effect of rise in fields harvested was 13 %. Therefore, it can be concluded that, chickpeas are more dependent on the production area and producer loyalty is more important than lentils. Besides, looking at the short-run, it was notable that 91 % of the temporary shocks were offset in the following period.

Apparently, there was a steady decline in chickpeas production for the analysis period. Therefore, even if the price and land of production is said to impact chickpeas production, there appeared a continuous decline in both the harvested area and the price. This was mainly attributed to the more water dependent characteristic of chickpeas production and the drought summer periods that have been experienced.

Dried Beans. Dried bean production was also explained by its previous price, previous supplies and previous price of lentil. The findings are indicated in Table 8. Besides, both its own price and price of the lentil have positive impacts on the amount of production. Yet, the price elasticity of dried beans and lentils were 22 % and 24 % in a consecutive order. Besides, the price of the dried beans was more effective in the long-run with around 60 % (0,22/(1-0,63)) of elasticity. Considering the short term shocks and how the equilibrium was reached back, the dynamics are rather significant. Any sharp change in the current period is offset with a high speed of adjustment.

TABLE 7
Results for chickpeas production between 1991 and 2013

LONG-TERM				SHORT TERM			
Variable	**Est.**	**t-stat**	**(p)**	**Variable**	**Est.**	**t-stat**	**(p)**
Q_{n-1}	0,37	1,82	0,08	$D(Q_{n-1})$	0,22	0,73	0,48
A_{n-1}	0,13	1,75	0,09	$D(A_{n-1})$	0,16	2,08	0,05
P_{n-1}	0,35	2,61	0,02	$D(P_{n-1})$	0,64	1,46	0,16
α_1	6,90	2,74	0,01	**ECM2(-1)**	-0,91	-2,46	0,02
				α_1	0,01	0,20	0,84
R^2	0,83	**F-stat**	28,67 (0,00)	R^2	0,50	**F-stat**	4,04 (0,02)
D-W	2,04	**M.D.V.**	20,21	**D-W**	2,16	**M.D.V.**	-0,01

TABLE 8
Results for dried beans production between 1991 and 2013

LONG-TERM				SHORT TERM			
Variable	**Est.**	**t-stat**	**(p)**	**Variable**	**Est.**	**t-stat**	**(p)**
Q_{k-1}	0,63	4,83	<0,01	$D(Q_{k-1})$	0,73	2,66	0,02
P_{k-1}	0,22	1,65	0,12	$D(P_{k-1})$	0,33	2,54	0,02
P_{m-1}	0,24	2,50	0,02	$D(P_{m-1})$	0,21	2,31	0,03
α_1	5,67	2,29	0,03	**ECM2(-1)**	-1,14	-3056	<0,01
				α_1	0,01	0,39	0,70
R^2	0,72	**F-stat**	15,39 (0,00)	R^2	0,57	**F-stat**	5,23 (<0,01)
D-W	1,92	**M.D.V.**	19,16	**D-W**	2,01	**M.D.V.**	-0,001

While there appeared a seasonal decline in 2007-2008, the cyclical movement around the average production has continued and the reduction is again attached to the summer conditions of 2007. 63 % of the existing production affecting the future production meant that the dried bean production had producer loyalty on a considerable extent.

POLICY IMPLICATIONS

The impacts of price and non-price factors on the production amount of main legumes were analysed within the study between 1991 and 2013 in order to undermine how important is the price. Therefore, it can be shortly noted that price and price related incentive and deterrents are important factors for estimating the production amount of these staples. To exemplify, all lentils, chickpeas and dried beans production schedules are open for the price motivations, lentils being the most affected with 97 % elasticity in the long run. The corresponding rates were 35 % for chickpeas and 22 % for dried beans. Besides, all these staples follow the previous period's production experiences. This finding both refers to the professionalization of the producer and persistent demand from the consumers. Yet, even if the rates do change, consideration of price related factors as supply motivators is still valid for these staples as it is a strict case for wheat production [10].

However, when the continuous decline in production of these staples is considered together with the findings, it is visible that real prices have been declining. Even after the seasonal shocks of 1995 and 2008, of which the reasoning were explained above as economic and climatic disruptions, the prices declined back to their normal downsizing way. Accordingly, declining prices leaded declinations in supplies of these staples and this finding is in conformity with the reached elasticity levels. In this manner, there needs policy solutions to reverse the impact of the declining prices. These solutions cannot be named as price subsidies or quantity-attached support systems. What is needed is more related with keeping the land in production and developing food processing industry in close proximity to the production fields, therefore in the South-eastern Anatolia in Turkey. When the producers are given incentives through reduced packaging or transportation expenses, or they are supported to establish their own processing facilities, it would be easier to keep the supply adequate for rising population and increasing export requirements from the Southern neighbours.

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