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Research Article

VERTICAL PRICE TRANSMISSION IN CUCUMBER MARKET OF IRAN

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ABSTRACT
One of the factors that affect welfare levels of producers, and the consumers of a product is the sensitivity of a level of the market to the changes in another level of the market or the method of price transmission. Given that Iran is the world's third largest producer and ten exporter of cucumber also point to allocated. In this study, the mechanism of price transmission in the markets of cucumber in Iran is studied. For that reason, monthly reports of producers' and retailer's price index for cucumber from March 1996 to November 2010 are used. For estimate of model used by Eviews5 software .The results of causality test shows that a short-term unilateral causality relation, from retailers' price to the producers' price exists. The results of estimation of error correction model shows that the long-term and short-term speed of price transmission in cucumber market is symmetric during the period of study. There asymmetry suggests that the transmission price will be completely and marketing intermediaries and agents from shocks caused by rising and falling market prices on the margin do not earn interest . Comparing the results of the estimation of the elasticity of price transmission between producer and retail levels, suggesting that reduced the retail price transmission elasticity is transferred faster to farmers.

Keywords: *Vertical Price Transmission, Causality Test, Error Correction Model, Cucumber, Marketing Margin*

INTRODUCTION
Research on asymmetric price transmission is one of the issues that concern agricultural economics. Prices are the most important determinants of income level of farmers, traders and exporters of agricultural commodities and the economic welfare of consumers. Knowledge of the relationship between prices received by producers and paid by consumers gathers some information about market efficiency and welfare. Knowledge of the relationship between the price levels of vertical bound market has the effect on trade policy. Asymmetric price transmission in terms of policy is important not only from the standpoint of economic theory but as it exists in the gaps where there is evidence of market failure (peltzman,2000).taking the concept of the marketing margin is the difference between producer and consumer prices, where there is symmetry in the transfer market indicate an increase or decrease in prices of the manufacturer , the asymmetry of transfer is if increases the market margin, makes that is due to the loss of benefits for producers and consumers. For this reason, it is important to analyze the prices of agricultural commodities, both economically and in terms of appropriate policies by planners and policy makers in agriculture. In general, there are two main reasons for asymmetry in price transmission in agricultural economics literature.

1.Non-competitive markets structure: on the other hand, producers are located at the beginning of marketing chain and consumers at the end of it in Agricultural market often believe that less than perfect competition in the market, allows middleman and brokers at various levels to make use of market power in order to amplify their profit. (Cramon Taubadel, 2000 and D Graft, 2008)

2. Adjusting and Menu Costs: Another major explanation for asymmetric price transmission is provided by adjustment costs.(weldgebriel,2004). Adjustment costs arise if a firm increases or decreases its output

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or price of its product. If these costs are asymmetric with respect to an increase or a decrease in output quantities or prices, the adjustment will be asymmetric. In the case of price changes, adjustment costs are also called menu costs. Besides these two main reasons are another reason such as Political interference, asymmetry information and Inventory management. Also one of the main reason for stronger transmission of price *is* Perishable products. (It is possible that middleman and brokers like quick sell a perishable product) (Fray and Manera, 2005). Ward (1982) confirms that retailers may be hesitant to raise prices of perishable goods for fear that they could end up holding spoiled stocks. So that the most important reason for more intense transmission of price decreases has been found to be product perishability. Economic executor organizing and inventory management are 2 other potential explanations for asymmetry. This explanation was challenged by (Heien, 1980).he believed that changing prices for the products can be stored is difficult more than Perishable products. Because changing prices of these products is needed too much time and will hurt the seller's reputation.

One of the important aspects of asymmetric price transmission theory is kinds of Asymmetry.

1. Vertical and Spatial Price Transmission:Price movements between different market levels (farm, retail and wholesale) are indicative of vertical price transmission, while its movement in the same level between different areas suggests spatial price transmission. As an example of vertical asymmetry, farmers and consumers often complain that increase in farm prices are more fully and rapidly transmitted to the wholesale and retail levels than similar decreases in farm prices.(Moghadasi and Fazeli 2007)

2. Magnitude and Speed in Asymmetric Price Transmission: Asymmetry with respect to the magnitude of price transmission leads to a permanent transfer, the size of which depends solely on the price changes and transaction volumes involved. Asymmetry with respect to speed and magnitude leads to a combination of temporary and permanent transfers. When Asymmetry with respect to the magnitude of price transmission occurs that magnitude of changing price at market level is different in response to rising and falling prices at another level. For example, if every one percent increase in versus of the farm price, retail price is increased one percent and so for every one percent decrease in farm prices is decreased retail price of less than one percent, price transmission is Asymmetry and asymmetry is happened in reaction magnitude. If price increases and decreases in the market in different durations is transferred to other levels of market so, asymmetry was occurred in reaction speed.(Hosseyni and Nikookar ,2007) 3.long-term and short-term: Short-term asymmetry occurs when the immediate effect of increasing or decreasing the rate of producer price is equal to the retail price But the long-term effect is the same. Long-term asymmetry occurs when the increase in the producer price deflation in the short term than in the long run (after full adjustment period) will have a different effect. (Moghadasi and Fazeli, 2007). Given that the country has the third highest in the world in terms of export product cucumbers also point to allocated. (Food Agriculture Organization of the United Nations FAO, 2008) The highest level of production in crop year was 88 in Jiroft and Kahnooj. Therefore, we study the transition from manufacturing to retail levels of the market price of the product that's actually How will reflect market forces involved in activities. The research hypotheses are as follows: 1 - Changes in operating retail price cucumber product producer price changes. 2 - Long-term market price transmission is symmetric cucumbers product.3 - Short-term market price transmission is symmetric cucumbers product. In this paper, we focus on the second part of the research, the third part of the model to estimate and analyze the analysis of Section IV is devoted to the conclusions and recommendations.

1. METHODOLOGY

Data of this research including monthly producer price index and retail from Sep/Oct month 1998 to Nov/Dec month 2010 that 175 cases have observed. monthly producer price index and retail based on *base year* (2004=100) has been resulted by the Central Bank of the Islamic Republic of Iran and for model determining have used Excel and Eviews5 software.economic analysis model and asymmetric price transmission are completed 4 steps. First check the static variables used in the study of static Augmented Dickey Fuller test to check the stability of the price series used. The second step is to test the

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convergence variable the second step is to test the convergence variable. This method is used to extract the long-run relationship between the variables since the convergence model Johansson, all model variables should be retained therefore, and the first step Dickey Fuller test was used to evaluate the reliability of the series. Johansson technique based on a vector autoregressive model (VAR) is done in this model is necessary. In this test using the maximum eigenvalue statistic and the effect of convergence and convergence relations are specified. The maximum eigenvalue test, the null hypothesis of no relation to the existence of convergence. There is a convergence relation to one or less than one relationship exists between the relationship of convergence and convergence is tested. In order to test the effect of the convergence hypothesis, the lack of correlation between the presence of 2 or more than 2 related to the integration and test. If the test statistic, the critical values of these variables at the 5% level is higher, the opposite hypothesis is accepted .The co-integration among the variables are permitted to use the vector error correction. The second step to determine the causal relationship between producer and retail price series cucumber, the vector error correction model (VECM) is used. (Johansen, 1990).
In general, vector error correction model is expressed as follows:

$$\Delta Z_t = \mu + \sum^{p-1} \Gamma_i \Delta z_{t-i} + \Pi z_{t-1} + \varepsilon_t \qquad (1)$$

So that Zt is a vector of n × 1 and I1), Γi and Π n × n matrices and represent (respectively) the adjustment of short-term and long-term changes in Zt are vectors. And Ɛt an n × 1 vector of regression equation of the error and μ is a vector of n × 1 and indicate to constant Coefficients. Vector error correction model between the two price series CPIt (Retail Price cucumber) and PPIt (producer prices cucumber) is shown as follows.

$$\begin{cases} \Delta PPI_t = \alpha_1 + \sum_{i=1}^{n} \beta_{1i} \Delta PPI_{t-i} + \sum_{i=1}^{n} \gamma_{1i} \Delta CPI_{t-1} + \lambda_1 \varepsilon_{t1-i} + e_{t1} & (2) \\ \Delta CPI_t = \alpha_2 + \sum_{i=1}^{n} \beta_{2i} \Delta CPI_{t-i} + \sum_{i=1}^{n} \gamma_{2i} \Delta PPI_{t-1} + \lambda_2 \varepsilon_{t2-i} + e_{t2} & (3) \end{cases}$$

In these equations:

$$\varepsilon_{t1\text{-}1} = PPI_t - \beta_0 - \beta_1 CPI_{t-1}, \quad \varepsilon_{t2\text{-}1} = CPI_t - \alpha_0 - \alpha_1 PPI_{t-} \qquad (4)$$

In the above equations Ɛt1-1 and Ɛt2-1 represents the error correction mechanisms are interrupted. Equation (2) to test the causal effect on the consumer price series CPIt of the PPI series producer prices and Equation (3) shows the photo mode. In equations (2) and (3) the hypothesis H0: $\lambda_1 = 0$ and H0: $\lambda_2 = 0$ the long-term causality between the test series C Pt and PTt. These assumptions imply a causal connection between the prices of long-term exclusion. To evaluate the short-run causality Wald test, there is no causal hypothesis, the hypothesis $\delta_{2i} = 0$ and $\delta_{1i} = 0$ were tested. Rejection of a causal relationship between these two represents a short-term obligation from PPIt (producers) to CPIt (consumer) or vice versa (jalali and naeeni,2009). Finally, after determining the direction of causality between the two series producer price and retail in the fourth step, the asymmetry in the market cucumbers using asymmetric error correction model can be tested. Error correction model is estimated the long-term equilibrium relationship between the price series in equation (5). Long-term equilibrium is obtained relationship among error correction equation (6).

$$PPI = \alpha_0 + \alpha_1 CPI + \mu_t \qquad (5)$$

$$ECT_{t-1} = PPI_{t-1} + \lambda_0 + \lambda_1 CPI_{t-1} \qquad (6)$$

λ_0 and λ_1, but they are the ones that ECT consists of two components as follows.
$ECT_{t-1} = ECT_{t-1}^{+} + ECT_{t-1}^{-}$

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Asymmetric error correction model van Kramon - Taubadel be expressed as follows. (2003).

$$\Delta PPI_t = \Phi_1 + \sum_{i=1}^{K} \beta_{1i}^{+} D^{+} \Delta CPI_{t-i+1} + \sum_{i=1}^{l} \beta_{2i}^{-} D^{-} \Delta CPI_{t-i+1} + \Phi_1^{-} ECT_{t-1}^{-} + \Phi_1^{+} ECT_{t-1}^{+} + \varepsilon_t \quad (7)$$

$$\begin{cases} D=1 & \text{if} \quad \Delta CPI_{t-1} > 1 \\ D=0 & \text{if} \quad \Delta CPI_{t-1} \leq 0 \end{cases}$$

Using the coefficients in Equation 7 is able to test transmission rate on long-term and short-term price. Assuming H0: $\Sigma\beta_i^{+} = \Sigma\beta_i^{-}$ is true that there is symmetry in the speed of price transmission in the short term. If the assumption $\varphi_2^{-} = \varphi_2^{+}$: H0 is accepted, the transmission price in the long term is symmetric. To calculate the elasticity of price transmission coefficients of the estimated error correction model in equation (7) and the average retail price and production cucumber used. So as to calculate the elasticity of price transmission in the short and long term relationships is used. Respectively, indicate that the formulas prt and pft is the average retail price and production cucumber.(goshray,(2008)and tey,(2009)

Elasticity of price transmission for increasing retail prices:

$$Er^{+} = \beta 1i^{+} \times p_{rt} / p_{ft}$$

Elasticity of price transmission for decreasing retail price

$$Er^{-} = \beta 3i^{-} \times p_{rt} / p_{ft} \quad (8)$$

2. RESULTS AND DISCUSSION

For static analysis, produce and retail price series was used Augmented Dickey Fuller(ADF) test. According to the chart, the price series pp (producer price) and cp (Retail Price) for this product in level not significant but first difference is significant. (ADF) method confirmed that the time series of the variables under study are I (1) (table 1) and consequently they might give a linear combination of variables that is I(0).

Table 1: Result of unit root test

variable	*Computational* Statistic value	Test critical value		
		1%	5%	10%
cp	-1.13	-4.01	-3.43	-3.14
pp	-1.97	-4.01	-3.43	-3.14

Reference: research results

Table 2: First differential variables Dicky fuller test

variable	*Computational* Statistic value	Test Critical values		
		1%	5%	10%
Δcp	-8.34	-3.46	-2.87	-2.57
Δpp	-6.24	-3.46	-2.87	-2.57

Reference: research results

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To employ Johansen technique, it is necessary to calculate numbers of lags of endogenous variables in the model. According to results taken by table 3, AIC and LR suggest optimum lag of 2 and 3 to respect and SBC suggests lag of 1. So in this research we chose optimum lag of 1 according to Schwartz–Bayesian criterion.

Table 3: Result of optical lag length for Johansen Technique

lag length	(Ln l)	AIC(q)	SBC(q)	LR
0	-1678.347	19.4259	19.4624	Na
1	-1379.43	16.0120	16.0928*	588.226
2	-1366.570	15.8376*	16.0963	24.224
3	-1355.554	15.9141	16.1214	20.371*

Reference: research results

The cointegration analysis of jouhansen-juselius, using the maximum likelihood of jouhansen-juselius that involves the use of the trace and the maximum eigenvalue statistic, indicates two cointegration vectors between the producer and the consumer prices (table 4). It should be noted that the maximum number of cointegration vectors must be r = n – 1 (where n is the number of model variables) vector. So concerning the number of model variables) vector. So concerning the number of model variables that include two variables, there is one cointegration vector that has fallowing from table 5.

Table 4: Johansen test for co-integration vectors

variables	Special value	statistics	Critical value 5%	Hypothesis of non-co-integration vectors	Number Of convergence equations
Test based on Trace statistic:					
pp ,cp	0.20	38.99	15.49	None*	r=0
	0.0006	0.106	3.84	Atmost 1	r≥ 1
Test based on Max-Eigen statistic:					
pp ,cp	0.202	34.89	14.26	None*	r=0
	0.0006	0.106	3.84	Atmost 1	r≥ 1

* indicate rejection of the null hypothesis at the 5% level.

Thus, Johansen technique confirms the existence of a long-run equilibrium relationship between consumer and producer prices in the cucumber market and so it can be studied the VECM causality and symmetry price transmission tests.

Table 5: Long-Term Relationship

Variable / Vector	pp	cp
unrestricted	-0.107	0.117
Normalized restricted	1	-1.90

Reference: research results

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After confirming of the collective variables vector error correction model (VECM) to equations 2 and 3, respectively, and there was a causal relationship between variables. The results of the estimation are shown in Table 6. According to the presented results, the long-term and significant level of 1% of the retail price of a two-way causal relationship between the producer prices at the market is confirmed and vice versa. The results show a significant level of 5% in the short term, the first hypothesis is based on a unidirectional causal relationship of the retail price to the producer price in cucumber market in the period under study not be rejected.

Table 6: Result of VECM causality test

	(ΔPP):Dependent variable			(ΔPP):Dependent variable	
Coefficient	Coefficient	t-value		Coefficient	t-value
$_{t1-1}\varepsilon$	-0.24***	-2.87		-	-
$_{t2-1}\varepsilon$	-	-		0.22***	2.84
ΔPP_{t-1}	0.27	1.29		0.03	0.45
ΔCP_{t-1}	0.25**	1.46	Coefficient	0.34***	3.41
	16.82		kurtosis	234.654***	
	17		Normality	90.115***	
	107.627***		White test	256.12***	

Refrence: research results

One of the factors that ECT $^{+}$ and ECT^{-} is statistically significant at the five percent level which is statistically significant at the five percent of the adjusted prices to producers In order to balance the cucumber market reflects. The estimated coefficients indicate that this is so adjusted to market prices for cucumber producers. Almost every month, 69% of a unit positive change in the deviation from the equilibrium relationship then almost every month, 69% of a unit positive change in the deviation from the equilibrium relationship. On the other hand, only 62% of cucumber producer prices of a negative change in the deviation from equilibrium, the market adjusts. The LM test statistic, Q Yang and check the box for autocorrelation and Arch test for heteroskedasticity sentences were used in the model. The results indicate the absence of autocorrelation and heteroskedasticity variance in the model.

Table 7: Results of the retail price transmission to producers of cucumbers

Dependent Variable: Cucumber producer price changes relative to prior periods			
variable	Coefficient	statistic t	elasticity
(ECT^{+})	-0.56*	-5.56	-
(ECT^{-})	-0.27**	-2.23	-
Increasing series Retail Price cucumber	0.62**	5.40	0.58
Decreasing series Retail Price cucumber	0.69**	5.2	0.64
Increasing series Retail Price cucumber with a lag	0.64**	5.05	0.60
Decreasing series Retail Price cucumber with a lag	0.73**	5.83	0.68
constant	-0.05	-0.02	-
Durbin-Watson=1.99	R-Square:0.48		N:175
	Arch:0.69		LM:0.69

The calculated results show that the short run elasticity of price transmission transfer rate of increase and decrease Retail prices are not the same, Reduction of retail prices is transmitted quickly to the producer, With a ten percent increase in retail prices 58% increase in producer prices Ten percent decline in producer prices and retail prices are reduced by 64%. To determine the symmetry or asymmetry Fresh Market Wald test was used, as shown in Table 8. Test results show that the transmission price of the second and third hypothesis suggests that there is symmetry in the speed of price transmission Long-term

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and short-term market cucumber is being studied in the course, not be rejected. In other words, the marketing margin of positive and negative shocks such as rising and falling retail prices are the same. Asymmetry suggests that the transmission price will be completely Intermediaries and marketing do not earn profit from rising and falling prices Welfare of consumers and producers of positive and negative shocks on the market will not increase margins.

Table 8: To test symmetry in price transmission rate in the long-term and short-term

Test Result	P-value	F-Statistic	Wald Method Symmetry Test
Not be rejected	0.12	2.37	Test of speed of symmetry price transmission in short-run
Not be rejected	0.27	1.19	Test of speed of symmetry price transmission in long- run

3. Conclusion

The formation and transmission of market prices have been particular interest to agricultural economists at the Markets of agricultural products. The analysis of how price is transmitted along a supply chain from producer price to consumer price and possible existence of asymmetric transmission is of high importance in economics literature (Auguire and Santana, 2002).Most empirical estimates indicate that the price transmission is the price assuming a symmetrical transmission However, there are several studies that show asymmetric price transmission is very common. In explaining this, peltzman, 2000 provides evidence that the asymmetric transfer is more than two-thirds of producers and consumers in the United States.Bunte and Zachariasse, 2003 were studied relations between price and price transmission patterns for potato, tomato, orange and dairy products in Greece. According to his findings symmetric transmission was studied between producer and retail prices for all products. Research about price transmission in different markets of Iran are some and do not have a long history. In other words, it is only in recent years has been focused on a few of Iranian scholars and researchers. How to transfer the price of the meat market of Iran has been examined (Hosseini and Ghahremanzadeh, 2006). The results of asymmetric price transmission are between producer and retail levels. Hosseini, 2006 in another paper has investigated how price transmission pistachio farm producer and retailer level .Results of this study In another research Ahmadi and Shadmehri 2010 have investigated vertical asymmetry price transmission in milk market of Iran. Results show that there are two way causality relation between consumer and milk producer in long-term. Test results of asymmetric price transmission from the producer to the consumer in the long term is rejected, but in the short term isn't rejected.

In the present study price relationships and how price is transmitted between producer and consumer levels have been surveyed for cucumber in Iran. With the assistance of Johansen-Jesiules technique, it was confirmed that there is a long run equilibrium relationship between consumer and producer prices in cucumber market. The cucumbers causality test results (VECM) indicate that the two-way causal relationship in the long run than the retail price of the manufacturer and vice versa, although the short term, there is a unidirectional causal relationship from the retail price to producer price. Test results of asymmetric price transmission speeds also showed long-term and short-term that Hypothesis of asymmetric price transmission in the long term, short term market cucumbers in the study period cannot be rejected. There symmetry suggests that the transfer price will be completely and intermediaries and brokers and marketing agents of shocks from rising and falling prices on the market margins do not earn interest. Comparing the results of the estimation of the elasticity of price transmission between producer and retail levels show the price transmission elasticity is less than one but greater than the elasticity of price transmission elasticities reduce the transmission of price increases in the short term. In other words,, retail Price reductions are transferred faster to the manufacturer. The comparison results can be interpreted considering that the cucumbers have more interstitial water so, there are more perishable and cannot be store long time and Wholesalers gain fewer opportunities when increase profit margins and

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gain market. Symmetry in the product market shows that government policies have been successful in reducing volatility in the cuchamber market price of Iran. As regards Iran ranks third after China and Turkey in has allocated cuchamber production. In terms of exports also ranked tenth among the exporters of these products. (World Food and Agriculture Organization FAO, 2008) And the efficiency of the market system about this product Development and establishment of cooperative to eliminate Intermediaries and increasing the share of the final selling price of the product for farmers Seems, to process and export the product such as Pickles Investment required in provinces that have the highest rate of production recommended Partnership with institutions such as Agriculture.

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