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A Model of Iran's Farm-Retail Marketing Margin for Beef

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ABSTRACT

High and increasing beef marketing margin leads one to controversy about factors affecting it. This study using the monthly data for the 1998-2005 period to investigate the market power and to estimate how farm and marketing services supplies and retail demand determinants can affect beef marketing margin. The results show that farm, marketing services and retail level prices and thereby marketing margin move together in different ways that depend on whether the determinants that cause movement arise from a shift in retail demand, marketing services supply or farm supply. And also, positive impact of market power beef marketing margin is observed.

Keywords: Beef, Farm-retail marketing margin, Iran.

INTRODUCTION

Average beef marketing margins ranged from an annual average low of 11.49 thousand Rials kg^{-1} in 1998 to 44.17 thousand Rials kg^{-1} in 2005 (March to December). Beef marketing margins averaged from 5.00 thousand Rials kg^{-1} in 1998 to 26.2 thousand Rials kg^{-1} in 2005. Large differences were found between farm and retail prices of beef. Annual average differences in lamb (as substitute for beef) marketing margins ranged from 11.51 thousand Rials kg^{-1} in 1998 (March to December) to 27.56 thousand Rials kg^{-1} (Each dollar is approximately equal to 9,000 Rials during these years.)

in 2005 (LAPO, 2007).(For calculation of the beef marketing margin, we estimate retail price of beef from the actual farm price of the live animal. We use 0.522 as transforming multiplier, taken form Khaldari (2005)) High and increasing beef marketing margin often lead to controversy. Beef producers often blame low farm prices on high marketing margins. Consumers blame high retail prices on high marketing margin. Increasing price spreads can both inflate retail prices and deflate farm prices. Fluctuation of price spreads from one month to the next is another problem in Iran's beef sector. Monthly average marketing margins over the nine-year period were highest in March and April. (Iran has undergone several violent beef price fluctuations since 1999. Especially from 2003, farm and retail beef prices increased sharply.) One of the important factor that adjusted beef marketing margin is the determinant that acting as an explanatory variable in the related markets. The central question addressed in this study is how related market with beef can be used to accurately moderate beef marketing margins. By answering this question, policy maker can moderate beef marketing margin and thereby producer and consumer welfare will be granted.

In Iran, many studies have been conducted on the marketing margin of other food products. Some of the recent studies are Hosseini *et al*. (2008a, b), Hosseini and Nikoukar (2006), Hosseini and Ghahremanzade (2006), and Hosseini and

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Dourandish (2006). These studies examined the price asymmetry in Iran's food markets.

Gardner (1975) studied the effects of a food demand shift, farm supply shift, and the marketing input supply on the retail-farm price ratio. Gardner developed a system of equations to explain as to what happens to the retail-farm price ratio in each circumstance. Heien (1980) followed the work of Gardner and examined the changes in demand and supply from the farm to wholesale and from wholesale to retail levels and developed a theory of price determination consistent with Gardner's conclusions. Heien used the mark-up pricing model and developed a system of equations to reach his conclusions. Brorsen *et al.* (1985) looked at how price uncertainty affects the farm to mill margin and the mill to retail margin for wheat. The authors examined several theories that looked at the output of competitive firms under price uncertainty, and used the expected maximization hypothesis which looks at comparative static results concerning the influence of uncertainty on production decisions. They developed two specifications that would explain the farm-to-mill and the mill-to-retail price transmission of wheat. Kinnucan and Forker (1987) looked at four dairy products (fluid milk, butter, cheese, and ice cream) to determine if the farm-to-retail price transmission was asymmetric. The authors developed a model to explain the farm to retail price transmission process by using the markup pricing model assuming competitive conditions, fixed-proportions productions technology, and constant returns to scale in the food-marketing system. Wohlgenant (1987) are modeled the farm-retail price spread for Beef. He examined factors that affected the farm- retail margin.

We followed Gardner (1975), Holloway (1991),Wohlgenant (1989), Piggott *et al.* (2000) and Lloyld *et al* (2001) to model Iran's beef marketing margin behavior. This study is using the monthly data for the 1998-2005 periods to investigate the market power. Also, this research is used to consider how farm and marketing services supplies and retail demand determinants can affect beef marketing mar.

The objectives of this study were threefold: (1) to determine a suitable model for defining the farm-retail price spread for beef, (2) to investigate market power in beef marketing chain and (3) to discover the determinants that contribute significantly to the beef marketing margin.

MATERIALS AND METHODS

Functions

To assess the beef marketing margin behavior, first, beef production, beef demand, live animal supply, and marketing services supply functions are specified as follows:

Beef Production Function

The beef production is a function of live animal and marketing services. Substitution capability between live animal and marketing services inputs in beef production is limited, but due to the reasons such as existence of wastage, non-skilled labor, substitution is still possible (Hosseini *et al.*, 2008). Therefore, the production function of beef can be specified as follows:

$$X = f(a,b) \qquad (1$$

where X, a, and b are quantities of beef, live animals, and marketing services, respectively.(The quantity of live animals is their weight in the slaughterhouse. The quantity of marketing services is a summation of labor, water, and electricity inputs that are used in the slaughterhouse together with transportation cost in the marketing process.)

By estimating the above production function [Equation (1)], the elasticity of substitution between live animal and marketing services inputs (σ) is calculated. Then, the live animal marginal product (f_a) and the marketing services marginal product (f_b) were used to derive the live animal and marketing services derived demand.

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By using R^2, $\overline{R}^2$ and DW (Durbin-Watson) test, the translog production function was selected as the best model equation (27). This equation is specified as follows:

$$Log(X) = Log(A) + \alpha_1 Log(a) + \theta_1 Log(b) + 0.5\alpha_2 (Log(a))^2 + 0.5\theta_2 (Log(b))^2 + \gamma_1 Log(a) Log(b) \quad (2$$

Following Hosseini *et al* (2008) who demonstrated that constant return to scale in beef production was confirmed, by the way, we imposed the constant return to scale assumption (Such as Gardner, 1975). So, equation (2) is transformed to equation (3) as follows:

$$Log(X/a) = Log(A) + \theta_1 Log(b/a) + 0.5\theta_2 (Log(b/a))^2 \quad (3$$

where *X*, *a*, and *b* are the beef production at the retail level, quantity supplied of live animals at the farm level, and supplied quantity of marketing services at the processing level, respectively.

Beef Demand Function

The retail beef demand (and the associated derived demand) can be defined as follows:

$$X = D(P_x, N) \quad (4$$

Where X and P_x are quantities of beef demanded and the retail price, respectively and *N* is a set of beef demand determinants. From the estimated beef demand Equation (4), the own-price elasticity (η) and the determinant elasticities (e_N) can be derived. The retail beef demand is specified as follows:

$$Ln(X) = Ln(A) + \eta Ln(P_x) + \eta_{N_1} Ln(N_1) + \eta_{N_2} Ln(N_2) + \eta_{N_3} Ln(N_3) + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 + \alpha_4 ST \quad (5$$

where X, P_x, N_1, N_2 and N_3 are quantity demanded, price of beef, price of lamb and chicken and Per Capita disposable national income respectively. D_1, D_2, D_3 and *ST* are dummy variable for spring, summer, fall seasons and dummy variable for March and April months. From the estimated beef demand Equation (5), the own-price elasticity (η) and the determinant elasticities (e_N) can be derived.

Live Animal Supply Function

To describe the live animal market, we estimated a primary supply function for live animal supply, which was estimated as single equations. This function was expressed as follows:

$$P_a = h(a, W) \quad (6$$

In Equation (6), P_a and a are the price and supplied quantity of live animals at the farm level. *W* is a determinant of the live animal supply that can shift the supply curve up or down. Live animal supply at the farm level is specified as follows:

$$Ln(a) = Ln(A) + e_a Ln(P_a) + e_{W_1} Ln(W_1) + e_{W_2} Ln(W_2) + e_{W_3} Ln(W_3) + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 \quad (7$$

where a, P_a, W_1, W_2 and W_3 are quantities supplied, the price of the live animal, feed price, labor wages and capital price, respectively. D_1, D_2 and D_3 are dummy variables for spring, summer and fall seasons. From the estimated live animal supply, the own-price elasticity (e_a) and the determinant elasticity (e_w) were calculated to determine their effects on the marketing margin.

Marketing Services Supply Function

To describe the marketing services, we estimated the primary supply of marketing services as a single equation. This function is explained as follows:

$$P_b = g(b, T) \quad (8$$

In Equation (8), P_b and b are the price and supplied quantity of marketing services at the processing level. *T* is a determinant of the marketing services supply that can shift the supply curve up or down. The marketing services supply at the processing level is specified as follows:

$$Ln(b) = Ln(A) + e_b Ln(P_b) + e_{T_1} Ln(T_1) + e_{T_2} Ln(T_2) + e_{T_3} Ln(T_3) + \alpha_1 D_1 + \alpha_2 D_2 + \alpha_3 D_3 \quad (9$$

where b, P_b, T_1, T_2 and T_3 are quantities supplied, price of marketing services, water and electricity prices, capital price and beef price (slaughterhouse price). D_1, D_2 and D_3 are dummy variables for spring, summer and autumn. From the estimated marketing services supply function, the own-price elasticity (e_b) and

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determinant elasticity (e_T) were calculated to assess their effects on the marketing margin.

Marketing Margin

To determine the relationship between the marketing margin and the determinants of live animal supply, marketing services supply, and beef demand, following Gardner (1975) and using the Equations (1), (4), (6) and (8), the derived demands are specified as follows:

$P_a = (1+(1/\eta)/1+(1/e_a)).P_x.f_a$ or $P_a = \beta_1.P_x.f_a$ (10

$P_b = (1+(1/\eta)/1+(1/e_b)).P_x.f_b$ or $P_b = \beta_2.P_x.f_b$ (11

Equations (10) and (11) are then the derived demand of live animal and marketing services, respectively. The β_1 and β_2 parameters are indices of market power. If the live animal and beef markets do not have market power, the price elasticities of live animal supply (e_a) and beef demand (η) are infinite; thereby, β_1 will be equal to one. Similarly, if the marketing services and the beef market are not of any market power, the price elasticities of marketing services supply (e_b) and beef demand (η) are infinite; and β_2 will be equal to one. If there does not exist market power for firms in the beef, live animal, or marketing services markets, β_1 and β_2 will not equal one. Thereby, β_1 and β_2 will indicate market power.(Market power is the gap between market price and industry marginal cost (Hatirli *et al*., 2000))

Substitution of Equation (4) into Equation (1) will give Equation (12), eliminating variable X. Substitution of Equation (6) into Equation (10) will give Equation (13), eliminating variable P_a. Finally, Substitution of Equation (8) into Equation (11) will give equation (14), eliminating variable P_b. Equations (12), (13) and (14) are as follows:

$$D(P_x, N) = f(a,b) \quad (12$$

$$P_x f_a = h(a,w) \quad (13$$

$$P_x f_b = g(b,T) \quad (14$$

These three equations indicate a system of equations that shows the equilibrium in the beef (retail), live animal (farm), and marketing services (processing) markets. We assessed the effect of an exogenous shift in retail beef demand on the marketing margin. With differentiations from Equations (12), (13), and (14) with respect to N and writing as a matrix, the following matrix (15) was arrived at.

$$\begin{bmatrix} -(\frac{S_b}{\beta_2\sigma}+\frac{1}{e_a}) & \frac{S_b}{\beta_2\sigma} & 1 \\ \frac{S_a}{\beta_1\sigma} & -(\frac{S_a}{\beta_1\sigma}+\frac{1}{e_b}) & 1 \\ \frac{S_a}{\beta_1} & \frac{S_b}{\beta_2} & -\eta \end{bmatrix} \begin{bmatrix} E_{a,N} \\ E_{b,N} \\ E_{P_x,N} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ \eta_N \end{bmatrix} \quad (15$$

According to the definition of farm share and non-farm share [Equations (16) and (17)], and substituting Equation (10) in Equations (16) and (17), the right-hand side of Equations (16) and (17) was obtained.

$$S_a = P_a a / P_x x = \beta_1 P_x f_a a / P_x x = \beta_1 \chi_a \quad (16)$$

$$S_b = P_b b / P_x x = \beta_2 P_x f_b b / P_x x = \beta_2 \chi_b \quad (17)$$

where S_a and S_b are the farmer and non-farmer shares, respectively. χ_a and χ_b are the production elasticities of live animal supply and marketing services. Substituting Equations (16) and (17) in matrix (15) yielded the following new matrix:

$$\begin{bmatrix} -(\frac{\chi_b}{\sigma}+\frac{1}{e_a}) & \frac{\chi_b}{\sigma} & 1 \\ \frac{\chi_a}{\sigma} & -(\frac{\chi_a}{\sigma}+\frac{1}{e_b}) & 1 \\ \chi_a & \chi_a & -\eta \end{bmatrix} \begin{bmatrix} E_{a,N} \\ E_{b,N} \\ E_{P_x,N} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ \eta_N \end{bmatrix} \quad (18$$

To solve matrix (18), the total elasticity of live animal supply, marketing services, and total price elasticity of beef demand calculated with respect to *N*. To assess the price elasticity of live animal supply, marketing services supply, and beef demand with respect to *N*, Equations (16) and (17) were substituted into matrix (18), described as follows:

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$$\begin{bmatrix} \eta & -\frac{S_a e_a}{\beta_1} & -\frac{S_b e_b}{\beta_2} \\ 1 & -(\frac{S_a}{\beta_1 \sigma}+\frac{1}{e_b}) & -(\frac{S_a e_b}{\beta_1 \sigma}+1) \\ 1 & -(\frac{-S_b e_a}{\beta_2 \sigma}+1) & -\frac{S_b e_b}{\beta_2 \sigma} \end{bmatrix} \begin{bmatrix} E_{p_x,N} \\ E_{p_a,N} \\ E_{p_b,N} \end{bmatrix} = \begin{bmatrix} -\eta_N \\ 0 \\ 0 \end{bmatrix} \quad (19$$

where $E_{p_x,N}$, $E_{p_a,N}$, and $E_{p_b,N}$ are the total elasticity of beef demand, live animal supply, and marketing services supply, respectively. By substituting Equations (13) and (14) in matrix (15), the following matrix was obtained.

$$\begin{bmatrix} \eta & -\chi_a e_a & -\chi_b e_b \\ 1 & \frac{\chi_a e_a}{\sigma} & -(\frac{\chi_a e_b}{\sigma}+1) \\ 1 & -(\frac{\chi_b e_a}{\sigma}+1) & \frac{\chi_b e_b}{\sigma} \end{bmatrix} \begin{bmatrix} E_{p_x,N} \\ E_{p_a,N} \\ E_{p_b,N} \end{bmatrix} = \begin{bmatrix} -\eta_N \\ 0 \\ 0 \end{bmatrix} \quad (20$$

Matrix (18) and (20) provide total elasticities for three prices and quantities. From matrix (18) and (20), the impacts of changes in the exogenous variables *N*, *W*, and *T* (determinants of beef demand, live animal supply, and marketing services supply) can be tested. According to Gardner (1975), the price ratio($R = P_x / P_a$), farmer share($S_a = P_a a / P_x x$), and percentage margin($\%M = ((P_x - P_a)\times 100)/P_a = ((P_x/P_a)-1)\times 100$) elasticity are calculated as follows:

$$E_{R,N} = E_{p_x,N} - E_{p_a,N} \quad (21$$

$$E_{S_x,N} = E_{p_a,N} - E_{a,N} - E_{p_x,N} - E_{x,N} \quad (22$$

$$E_{\%M,N} = E_{R,N}(R/(R\text{-}1)) \quad (23$$

In the above equations, $E_{R,N}$, $E_{S_a,N}$ and $E_{\%M,N}$ are the price ratio, farmer's share, and percentage margin elasticity with respect to *N*. Solving matrix (18) and (20) with respect to *N*, *W*, and *T*, allows one to calculate the full set of price ratio, farmer's share, and percentage margin elasticities, which are shown in Table 1.

Data

Monthly data for the period of 1997-2005 were employed. All prices (retail, processing, and farm) include retail beef, retail lamb, retail chicken, slaughtered beef, farm beef and feed were obtained from the Iranian Agriculture Ministry. Because Iranian Agriculture Ministry data is reported daily, we used a monthly average of prices. The Iranian Agriculture Ministry also provided beef and lamb quantities, both farm and retail. Labor wages, water and electricity costs, household expenditures (income), and the marketing cost index of meat (marketing services) were provided by the Iranian Central Bank. This index is a weighted average of electricity, water, labor, machinery (in slaughter house) and transportation costs which is used in marketing process of beef production. Prices at the level of retail and farm were deflated by *CPI* and *PPI*, respectively.

RESULTS AND DISCUSSION

Equations (3), (5), (7), (9) –the empirical models- were estimated through Shazam software. Equation (3), (5), (7) and (9) are *Recursive* models which were estimated as single equations using OLS method. The estimated equations are presented as follows:

Table 1. Marketing margin elasticities respect to *N*, *T*, *W* [a].

Elasticity	Increasing 1 per cent in *T*	Increasing 1 per cent in *W*	Increasing 1 per cent in *N*
Price Ratio (*R*)	$\beta_1 e_T e_b S_b (e_a\text{-}\eta)/D$	$\beta_1 e_w e_a S_b (\eta - e_b)/D$	$\beta_1 \eta_N S_b (e_a - e_b)/D$
Farmer's Share (S_a)	$\beta_1 e_T e_b S_b (e_a\text{-}\eta)(\sigma\text{-}1)/D$	$\beta_1 e_w e_a S_b (\eta - e_b)(\sigma - 1)/D$	$\beta_1 \eta_N S_b (e_a - e_b)(\sigma - 1)/D$
Percentage Margin (%*M*)	$E_{R,T} R/(R-1)$	$E_{R,W} R/(R-1)$	$E_{R,N} R/(R-1)$

[a] $D = -\eta(\beta_1 S_b e_a + \beta_2 S_a e_b) + \beta_1 \beta_2 e_a e_b + \sigma(\beta_1 S_b e_a + \beta_2 S_a e_b)$.

Source: Piggott *et al*. (2000).

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Table 2. Estimation of beef production function.

σ	DW	R^2 / $\bar{R}^2$	Coefficients			Goods
			θ_2	θ_1	Constant	
0.59	1.84	0.99 0.98	0.0888*** (0.0012)[a]	-1.5629*** (0.0358)	11.732*** (0.0086)	Beef

***, ** and *; Significant at 1%, 5%, and 10%.
[a] Numbers in parentheses are Standard Errors.
Source: Own result.

Beef Production Function

First, we estimated the production function of beef (Equation 3). Table (2) reported the results of estimated equation (3). The substitution possibility between farm and non-farm inputs in beef production is 0.59. This result is consistent with Hosseini *et al* (2008) finding.

Beef Demand Function

The estimation of retail beef demand, Equation (5), is presented in Table 3. The empirical results were consistent with the theoretical specifications. There is a negative relationship between price and quantity demanded. Also, a positive relationship between per capita disposable income, chicken and lamb prices (as substitution goods) with beef retail demand were revealed. Seasonal impacts show that, with respect to winter, quantity demanded, during the spring and summer, decreased because of increasing maintaines cost in beef production process in spring and summer (increasing in its price), decreasing of demand in these season, is reasonable and because of decreasing of maintaines cost of beef in autumn (decreasing in its price), increasing of demand in these seasons, is reasonable. In March and April, which is Nourooz or New Year in Iran, the demand for beef is decreased because its price, with respect to other months of the year, is increased.

Live Animal Supply Function

The estimation of Equation (7) for beef is presented in Table 4. The empirical results were consistent with theoretical specifications. The results show a positive relation between price and quantities supplied for beef at the farm level. A negative relations labor wages, capital and feed prices were also observed. An important input into live animal production is feed, as it is the largest expenditure in beef production. For this study, we used the average weight of several feeds with the percentage of nutrition expenditure as the weighting factor. Note that capital price is the average weighted of interest rate of long and short run deposits in the Iranian governmental banks. Table 4 also shows the negative effect of the spring and autumn and positive effect of the summer on the live animal supply respect to the winter. Because of increasing feed price in autumn (increase in production cost), decrease in supply during this season is reasonable and because of increasing of maintaines costs of beef in spring (decrease in demand), decreasing of supply during this season, is valid.

Marketing Services Supply Function

The estimation of Equation (9) is presented in Table (5). The empirical results were consistent with theoretical specifications. The results revealed the positive relation between price and quantities marketing

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Table 3. Estimation of beef demand model for beef.

DW	R^2 / $\bar{R}^2$	Independent Variables									Goods
		Constant	Dummy variable of March and April	Dummy variable of autumn	Dummy variable of summer	Dummy variable of spring	Per capita income	Chicken price	Lamb price	Beef price	
1.78	0.56	2.13	-0.06**	0.003	-0.05*	-0.13***	0.10	0.27**	0.71***	-1.24***	Beef
	0.52	(1.91)[a]	(0.02)	(0.03)	(0.03)	(0.04)	(0.14)	(0.08)	(0.35)	(0.33)	

***, ** and *; Significant at 1%, 5%, and 10%.
[a] Numbers in parentheses are Standard Errors.
Source: Own result.

Table 4. Estimation of live animal supply model for beef.

DW	R^2 / $\bar{R}^2$	Independent variables								Goods
		Constant	Dummy variable of autumn	Dummy variable of summer	Dummy variable of spring	Capital price	Feed price	Labor wages	Live animal price	
1.98	0.77	-2.60***	-0.008	0.007	-0.08*	-0.04	-0.21**	-0.11*	0.23***	Beef
	0.75	(0.61)[a]	(0.02)	(0.02)	(0.02)	(0.03)	(0.09)	(0.06)	(0.06)	

***, ** and *; Significant at 1%, 5%, and 10%.
[a] Numbers in parentheses are Standard Errors.
Source: Own result.

Table 5. Estimation of marketing services supply model for beef .

DW	R^2 / $\bar{R}^2$	Independent Variables								Goods
		Constant	Dummy variable of autumn	Dummy variable of summer	Dummy variable of spring	Capital price	Price of water and electricity	Price of beef (Slaughterhouse)	Price of Marketing Services	
4.1*	0.99	0.009**	0.001	0.003	0.006***	-0.06	-0.002**	0.56***	0.11***	Beef
1.97	0.98	(0.004)[a]	(0.001)	(0.02)	(0.002)	(0.12)	(0.0007)	(0.14)	(0.04)	

***, ** and *; Significant at 1%, 5%, and 10%.
[a] Numbers in parentheses are Standard Errors.
Source: Own result.

Table 7. Beef marketing margin elasticities.

1% change in									Marketing margin elasticity
(T)			(W)			(N)			
T_3	T_2	T_1	W_3	W_2	W_1	N_3	N_2	N_1	
Price of beef (Slaughterhouse)	Price of capital	Price of water and electricity	Capital price	Labor wages	Feed price	Per Capita income	Lamb Price	Chicken Price	
0.099	-0.012	-0.0004	0.013	0.451	0.037	0.013	0.092	0.035	Price ratio ®
-0.041	0.005	0.0002	-0.006	-0.030	-0.015	-0.005	-0.038	-0.014	Farmer share (S_a)
0.483	0.059	-0.002	0.065	2.19	0.179	0.062	0.446	0.169	Percentage margin (M%)

Source: Own result.

services supply for beef. A negative relation between water and electricity prices on the price of marketing services was also observed. The price of beef at the slaughterhouse exerts a positive and insignificant impact on its marketing services' price. A negative impact of capital price on supplied marketing services for beef was also observed. Seasonal factors like the spring, summer and autumn for beef have a positive impact with respect to the winter on the price of marketing services at the processing level. Because of increasing of maintainces costs of beef in spring and summer, increasing of supply in these seasons, is reasonable and because of increasing of beef demand in autumn, increasing of marketing services supply in this season, is reasonable (Variance decomposition, Breush-Pagan, and Durbin-Watson test, were used to assess multi-collinearity, hetroskedasticity, and autocorrelation in Equations (3), (5), (7) and (9), respectively. We useD integration test for residual because some variables were not stationary. This indicates that variables in Equations (3), (5), (7), (9) are co-integrated.)

Using the Equations (10) and (11), the market power index for beef marketing chain was estimated. Results are presented in Table 6. The results show that the beef farm-retail marketing chain (from farm to retail and from slaughterhouse to retail) is subject to some degree of market power. These results revealed that marketing power from processing to retail is greater than that of farm to retail (0.17 versus 0.33).

To investigate the impacts of the determinants of beef demand, live animal supply, and marketing services supply on the beef marketing margin, the elasticity of price ratio, farmer share and percentage margin were calculated.

Using Equations (5),(7),(9), the marketing margin elasticity of beef demand (N), live animal supply (W), and marketing services supply (T) determinants are estimated and presented in Table 7.

Results show that farm, marketing services and retail level prices can move together in different ways that depend on whether the determinates that cause movement arise from a shift in retail demand, marketing services supply or farm supply. Determinates that increase -decrease- the demand for beef (chicken retail price, lamb retail price, per capita national disposable income) will increase -decrease- the retail-farm price ratio and percentage of marketing margin because marketing inputs are less elastic in supply than farm products.

Table 6. Beef market power indices.

Slaughterhouse to retail	Farm to retail	Goods
$0 \le \beta_2 \le 1$	$0 \le \beta_1 \le 1$	
0.17	0.33	Beef

Source: Own result.

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Determinants that increase -decrease- the live animal supply (feed price, labor wage in farm level, capital price), will increase -decrease- the retail-farm price ratio and percentage of marketing margin. Determinants that decrease –increase- the supply of marketing services (water and electricity price in slaughterhouse level, capital price in slaughter house level and price of beef in slaughterhouse) will increase -decrease- the retail-farm price ratio and percentage of marketing margin because marketing inputs are less elastic in supply than farm products, while the impacts of all these determinants on farmer share are inverse of the above explanations.

Based on the marketing margin elasticities, the most important determinants at farm, marketing services and retail levels are lamb price, labor wages and slaughterhouse prices of beef, respectively.

In sum, a conceptual and empirical framework for investigating beef marketing behavior is presented. The empirical results were consistent with theoretical specifications. These results revealed some degree of market power in the beef processing sector. The slaughterhouses (processing sector) are severely under the direct control of government, that is, about 92 per cent of Iranian slaughterhouses are governed by a single decision making process (IAM, 2005). The result of this study is approved by this information as well as by Hosseini *et al.* (2008). It seems government may release the restrictions on entry of the beef processing sector by facilitating the privatization program of slaughterhouses, which are under the government control. Also, beef marketing chain elasticities show that farm, marketing services and retail level prices and thereby marketing margin move together in different ways that are dependent on whether the determinants that cause movement arise from a shift in retail demand, marketing services supply or farm supply. Based on the marketing margin elasticities, the most important determinants at farm, marketing services and retail levels are lamb price, labor wages and slaughterhouse prices of beef, respectively. Government or policy maker can modify or control the beef marketing margin via changing these determinants. In sum, significant implication of marketing margin elasticities is that policy maker takes into account these determinants of retail demand, marketing services supply and farm supply into its policy revision.

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الگوی حاشیه بازاریابی مزرعه- خرده‌فروشی گوشت گاو در ایران

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چکیده

حاشیهٔ بازاریابی زیاد و فزایندهٔ گوشت گاو ما را بر ان داشت تا عوامل مؤثر بر آن را مورد بررسی قرار دهیم.این مطالعه با استفاده از داده‌های ماهانه سال‌های ۱۹۹۸ تا ۲۰۰۵ ، قدرت بازاری را بررسی و چگونگی اثر گذاری عوامل تعیین‌کنندهٔ عرضه سطوح مزرعه و خدمات بازاریابی و تقاضای خرده‌فروشی بر حاشیهٔ بازاریابی را برآورد کرده است. نتایج نشان می‌دهد که عرضه سطوح مزرعه و خدمات بازاریابی و تقاضای خرده‌فروشی و از آن رو حاشیهٔ بازاریابی با یکدیگر تغییر می‌کنند که بستگی به این دارد که کدام عامل تعیین‌کننده در عرضه سطوح مزرعه و خدمات بازاریابی و تقاضای خرده‌فروشی تغییر کرده است. همچنین، اثر مثبت قدرت بازاری بر حاشیهٔ بازاریابی مشاهده شد.

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