

An Economic Estimation of Wheat Marketing Margins: A Context of Pakistan

Sonila Hassan¹, Muhammad Qasim², Irfan Mahmood^{1*}, Arshed Bashir¹ and Najid Ahmad^{3*}

¹Pakistan Agricultural Research Council-Social Sciences Research Institute (PARC), AARI, Faisalabad, Pakistan

²Social sciences research institute NARC, Islamabad, Pakistan

^{3*}School of Economics, Dongbei University of Finance and Economics, Dalian, China

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ABSTRACT

The estimation of wheat marketing margins at three different levels (farm-wholesale, wholesale-retail and farm-retail level), producer share in consumer rupee and empirical examination of determinants of marketing margins is the basic thrust of this paper. Time series data about wheat prices at different levels were utilized for the period of 1980-2010. The analysis indicates the marketing margins of wheat at farm-wholesale level remained always greater than the wholesale-retail level market margins. Farm-wholesale marketing margins were highest in 1980-81 (58.52 percent) but afterwards continued to decrease and again soared in 2007-08 as estimated 31.9 percent. The wholesale-retail margins remained less than 10 percent for most of the years except for period 1996-2000 (ranges 10-24 percent). Wheat producers share in consumer rupee was 80-90 percent for most of the time period. The results of regression analysis indicated that farm prices had inverse relation with marketing margins where as retail prices had direct association with overall marketing margins. On the basis of findings it can be concluded that stabilized wheat prices are the prerequisite to control marketing margins.

KEY WORDS: Marketing margins, Wheat, Producer share in consumer rupee, growth, Production

INTRODUCTION

Wheat is the staple food crop of Pakistan and its price has been remarkably increased during the last one decade. Wheat price hike is of major concern as it accounts for almost 37 percent of food energy and protein intake thus has strong implications for nutritional food insecurity in the country (Prihodko and Zrilyi, 2013). According to the estimates provided by Friedman et al. (2011), the wheat prices rose by 106 percent during 2005-2008. Wheat price in Pakistan was affected not only by the global food crisis but also by domestic hoarding and smuggling of wheat. To overcome this situation procurement price of wheat were increased in 2009 to stabilize the domestic wheat prices. Moreover, in Pakistan the rising prices are usually associated with decline in wheat production due to scarcity of water and other natural calamities, higher imports of wheat, increase in international food prices due to rapid economic growth in emerging economies (China, Taiwan, India) and political instability (Ahsan et al. 2011).

Prices of agricultural food commodities face increment at each stage of marketing and vary accordingly. The prices of food commodities received by producers, wholesalers and retailers is of major consideration as the lower marketing margins and higher share of producer in consumer rupee are the pre requisite for the better price fixation policy (Ahmad *et al.*, 2008). In theory, changes in marketing margins can help measure changes in the efficiency of the agricultural commodities marketing system. Both consumers and producers can gain if the food marketing system becomes more efficient and marketing margins drop. Lower marketing margins can reflect both higher farm prices and lower consumer prices (Hahn, 2004). According to economic and marketing literature, marketing margin is the difference between the prices paid by consumers and prices received by farmers. The nature of price transmission between farm and retail levels depends, in general, on the size of the producers' share in the retail price and the degree of market competition at each stage of the marketing chain (Schnepf, 2013).

Marketing of agricultural produce has strong implications on the welfare of economy as a whole as it affects both ends of supply chain (producers and consumers). Wheat has great importance because of its strong impact on food security of masses. Due to this government's intervention in wheat procurement, trade and marketing are of great concern. Wheat marketing involves both public and private stakeholders. Government procures wheat from

***Corresponding Author (1):** Irfan Mahmood, Pakistan Agricultural Research Council-Social Sciences Research Institute (PARC), AARI, Faisalabad, Pakistan. Email: irfanparc@gmail.com

***Corresponding Author (2):** Najid Ahmad, School of Economics, Dongbei University of Finance and Economics, Dalian, China. Email: najid_2iqbal@yahoo.com

producers directly. The provincial food departments and Pakistan Agricultural Storage and Services Corporation (PASSCO) procure wheat at the announced support price during harvest months. Private sector also trade wheat at the prevailing market prices. Large farmers usually sell their produce directly to government departments whereas small farmers sell to middleman such as village shopkeepers and local dealers/beoparies who further supply wheat to government departments and/or private traders. In some cases middleman brought wheat produce to primary wholesale markets and sell through arthis/commission agents to millers and wholesalers (Kurosaki, 1996; Khan and Burki, 2005).

The marketing structure in Pakistan is such that agricultural commodities are transacted between producer, wholesalers, retailers and consumers. These three price levels allow the calculation of marketing margins at three price levels: farm-wholesale, wholesale-retail, and farm-retail. Marketing margin is the difference between the cost of an item at one stage of the marketing channel and at other stage (Hazen *et al.*, 1961). Increasing marketing margins can both inflate retail prices and deflate farm prices (London Economics, 2003). The importance of the marketing margins to access the efficiency of wheat marketing reforms and regulations calls to bring about the latest calculations. The present paper aimed to calculate the marketing margins for wheat crop at three levels of marketing farm-wholesale, wholesale-retail and farm-retail. It further evaluate wheat producer share in consumer rupee and impact of farm, wholesale and retail prices on overall marketing margins.

METHODOLOGY

Time series data for Farm price, wholesale price and retail price of wheat were collected from the national and international published data sources like Pakistan Economic Survey, Pakistan Agricultural Statistics and FAO Stat for the period 1981-2010. Due to the unavailability of farm price data from FAO Stat for years after the year 2010 the analysis and results were confined till year 2010. Average wholesale prices of wheat were computed by using data from Agricultural Statistics of Pakistan whereas average retail prices were taken from Economic Survey of Pakistan. Marketing margins at different stages of marketing and producer share in consumer rupee have been estimated from the data set. The simple arithmetic mean technique was used to compare the prices at different levels of market operation. The marketing margins at three different levels of marketing farm-wholesale, wholesale-retail and farm-retail were calculated by using the following equations:

$$\text{Farm-Whole sale marketing margins} = \frac{WP - FP}{WP} * 100 \dots\dots\dots (\text{eq. 1})$$

$$\text{Whole sale-retail marketing margins} = \frac{RP - WP}{RP} * 100 \dots\dots\dots (\text{eq. 2})$$

$$\text{Farm-Retail marketing margins} = \frac{RP - FP}{RP} * 100 \dots\dots\dots (\text{eq. 3})$$

In these equations, FP is the average farm Price, WP is the mean wholesale price and RP is the average retail price. In the next step the producer share in consumer rupee is calculated by:

$$\text{Producers' share in consumer price} = \frac{FP}{RP} * 100 \dots\dots\dots (\text{eq. 4})$$

To empirically investigate the effect of prices on the overall marketing margins Double log linear regression model is used to empirically investigate the effect of farm, wholesale and retail prices on the overall marketing margins. The specified estimated model for marketing margins is as follows;

$$\ln MM_w = \beta_0 + \beta_1 \ln FP_w + \beta_2 \ln WP_w + \beta_3 \ln RP_w + \mu_i \dots\dots\dots (\text{eq5})$$

where MM_w is overall wheat marketing margin, FP_w is wheat farm gate price, WP_w is wheat wholesale price and RP_w is wheat retail price.

RESULTS AND DISCUSSION

Wheat Price Trends during 1981-2010

Prices of wheat are of special importance as it is the staple food crop and having major share of 14 percent in household food consumption basket (HIES 2012). Table 1 figure out the average prices of wheat at farm gate, wholesale and retail level along with their respective percentage differences and producer share in consumer rupee. The analysis indicates that farm price of wheat was Rs. 0.63/kg in 1980-81 and reached up to Rs. 17.89/kg in 2009-10. Likewise whole sale and retail prices were Rs. 1.51/kg and Rs. 1.57/kg respectively in 1980-81 and Rs. 25.40/kg

both at wholesale and retail prices in 2009-10. The farm-wholesale marketing margin were highest in year 1980-81 estimated 58.52 percent but after wards this market margin decreased (Table 1). Some years also showed negative farm-wholesale marketing margins like in 1995-96, 1997-98, 1998-99, 1999-2000, 2001-02 and 2002-03. During the years of price shock in 2007-08 the farm-wholesale margins again increased sharply and continued to increase from 5.63 percent in 2003-04 to the highest 52.57 percent in 2008-09.

The wholesale to retail margins remain low less than 10 percent for most of the years except for period 1996-2000 when this margin ranges between 10-24 percent. Farm-retail market margins for wheat remained positive for all years with the highest difference of 60.19 percent in 1980-81 to the lowest 2.80 percent 2001-02. The analysis indicates the marketing margins of wheat at farm-wholesale level remained always greater than the wholesale-retail level market margins (Table 1).

Table 1. Wheat Marketing Margins at Different Level of Marketing

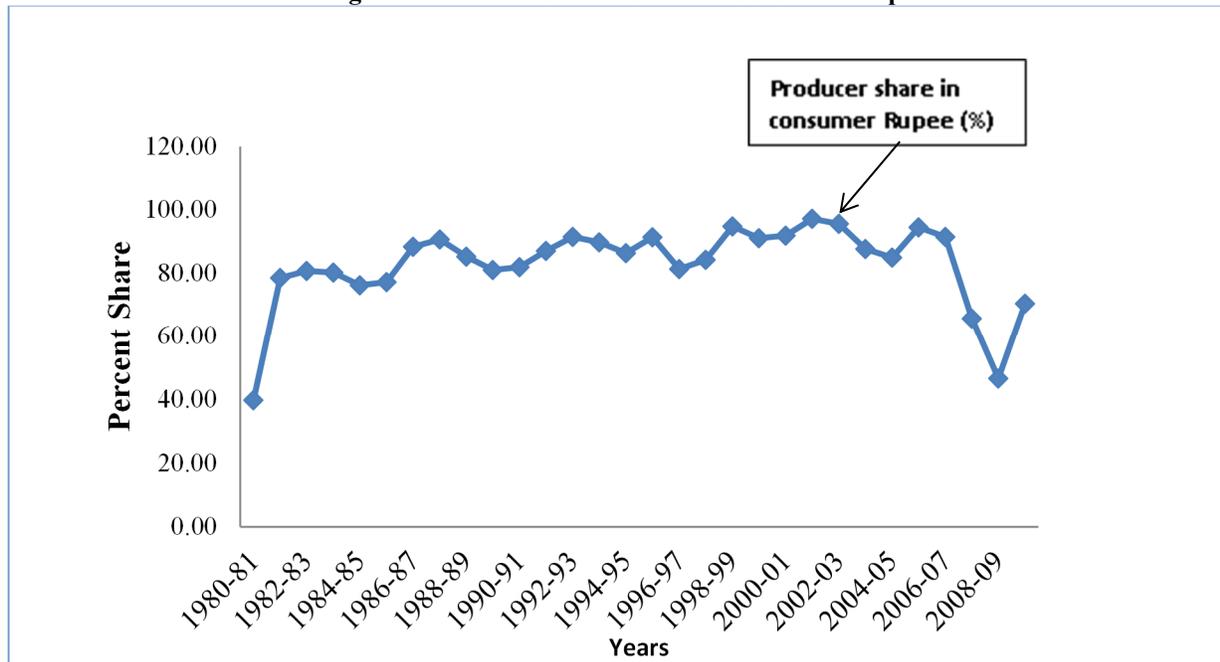
Years	Producer Price (Rs/Kg)	Wholesale Price (Rs/Kg)	Retail Price (Rs/Kg)	Marketing Margins Farm-wholesale level (%)	Marketing Margins Wholesale-retail level (%)	Marketing Margins Farm-retail level (%)	Producer Share in Consumer Rupee
1980-81	0.63	1.51	1.57	58.52	4.02	60.19	39.81
1981-82	1.35	1.67	1.72	18.94	3.10	21.45	78.55
1982-83	1.45	1.78	1.79	18.72	0.60	19.21	80.79
1983-84	1.53	1.90	1.90	19.74	0.00	19.74	80.26
1984-85	1.60	2.10	2.10	23.75	0.08	23.81	76.19
1985-86	1.68	2.16	2.17	22.60	0.21	22.77	77.23
1986-87	1.88	2.10	2.12	10.90	0.78	11.60	88.40
1987-88	2.00	2.14	2.21	6.59	2.92	9.32	90.68
1988-89	2.03	2.35	2.38	13.60	1.37	14.78	85.22
1989-90	2.09	2.58	2.58	18.86	0.13	18.96	81.04
1990-91	2.52	2.90	3.07	13.35	5.46	18.08	81.92
1991-92	3.15	3.35	3.62	5.79	7.56	12.91	87.09
1992-93	3.52	3.68	3.85	4.31	4.33	8.45	91.55
1993-94	3.84	4.09	4.28	5.94	4.55	10.22	89.78
1994-95	4.36	4.63	5.04	5.96	8.11	13.59	86.41
1995-96	4.70	4.66	5.14	-0.76	9.31	8.62	91.38
1996-97	5.36	5.79	6.59	7.39	12.14	18.63	81.37
1997-98	6.71	6.12	7.96	-9.64	23.16	15.75	84.25
1998-99	7.32	5.91	7.72	-23.92	23.49	5.19	94.81
1999-00	7.46	6.18	8.19	-20.82	24.59	8.88	91.12
2000-01	7.97	8.23	8.67	3.18	5.06	8.09	91.91
2001-02	8.06	8.03	8.29	-0.38	3.17	2.80	97.20
2002-03	8.35	8.02	8.73	-4.15	8.18	4.38	95.62
2003-04	8.99	9.52	10.25	5.63	7.09	12.32	87.68
2004-05	9.92	11.01	11.68	9.87	5.74	15.04	84.96
2005-06	10.91	10.98	11.55	0.60	4.96	5.53	94.47
2006-07	10.94	11.66	11.96	6.21	2.49	8.55	91.45
2007-08	10.80	16.44	16.44	31.91	3.56	34.34	65.66
2008-09	11.12	23.87	23.87	52.57	1.82	53.44	46.56
2009-10	17.89	25.40	25.40	29.18	0.54	29.56	70.44

Source: FAO Stat, Economic Survey and Agricultural Statistics of Pakistan

Keeping in view the importance of wheat government of Pakistan has introduced various intervention policies for procurement, trade and marketing of wheat. The analysis given above shows the higher farm-wholesale marketing margins in early eighties till 1987. A study conducted by Khan and Burki 2005, clearly postulates the fact that through the entry of private traders in wheat marketing after abolition of ration shops in 1987 leads to eliminate the marketing margins of wheat. The authors further explained that the upsurge of marketing margins in 2003 and 2004 is associated with the policy change by the government introduce in December 2001, which witness to increase the role of private entrepreneurs and traders in wheat procurement and storage through reduced government role in procurement and maintenance of strategic reserves. The 50 percent cut on government wheat procurement has many adverse effects on wheat production and prices as few private traders were available in market to procure wheat from growers total demand for harvested wheat in 2002 was far less than the supply and prices of wheat dropped. This change in policy affected the next year crop as farmers were reluctant to produce excess wheat. As a result the farm-wholesale market margins increased in 2003 and 2004 due to crop shortfall. To combat this situation and encourage farmers for wheat production Government of Pakistan gradually moved towards the positive support price policy. According to Prikhodko and Zrilyi (2013), government of Pakistan adopted positive wheat price support in year 2002 and it has been accelerated in the year 2008 through food crisis and as a result domestic prices of wheat remained well above the international prices from July 2008 till August 2010. The surging prices of wheat induce increasing market margins which led to market distortions.

The estimates in Table 1 and graphical presentation in Figure 1 postulates the variation in percentage share of producer in consumer rupee during 1981-2010. Wheat producers receive more than 80-90 percent retail price share during most of the mentioned years. During 80's producer share fluctuate between 39.80 percent in 1980-81 to highest 90.68 percent in 1987-88 where as during 90's producer share in consumer rupee was above 80 percent and remained almost stagnant. At the start of 21st century percentage share of producer reached its maximum point 97.20 percent and after wards remain above 85 percent and have decreasing trend after 2006-07. The analysis indicates that wheat producers were getting maximum share of their produce and this is because of the government procurement policy and support prices.

Figure 1. Wheat Producer Share in Consumer Rupee



Source: Author's Estimation

Kurosaki 1996 was of the view that the proper implementation of government procurement policy helps to better established the village markets for wheat. As the small farmers were also able to sell their produce at the price equals to support price minus transportation cost through the increased competition among village beoparies and traders. In the nut shell, the rural marketing network of private middleman also contributed to the spatial integration

of wheat prices which help to increase producer share in consumer rupees and in some years farm gate prices remained higher than wholesale prices with negative farm-wholesale market margins. The decreasing share of producer in consumer rupee in years 2007-08 and 2008-09 is mainly because of the global food crises of 2008 as it accelerate the retail prices of wheat from July 2008 to August 2010 in domestic market whereas farm prices remained stagnant. In order to safeguard wheat growers from adverse price hike impacts, the government of Pakistan moved towards positive price support and maintained the procurement price of wheat at higher level to encourage farmers for wheat production. This resulted in increasing the producers' share in consumer rupee again in 2009-10 (Prikhodko and Zrilyi 2013).

Wheat Production Growths and Marketing Margins (1980-2010)

Variation in production of wheat also contributes to the price change and varying marketing margins at different levels of marketing. The production growth of wheat has fluctuation trend over the time period (1980-2010). Table 2 illustrates the relationship comparison of production growth with marketing margins at farm-wholesale and wholesale-retail. The estimates postulate that during the years of increased production growth marketing margins decline due to decreased prices at all levels of marketing chain and vice versa.

According to Ahsan *et al.* 2011, production growth is expected to have the negative relationship with prices of food commodities like wheat. The farm-wholesale marketing margin remains higher than wholesale-retail margins for most of the years which indicated that wheat marketing witnessed higher returns to the marketing players at the farm-wholesale level. According to Kurosaki 1996, lower marketing margins of wholesale-retail level is result of the government procurement policy as it controls the wheat prices released by the private marketing chain. This policy also helps to uplift the farm gate prices of wheat at first place; secondly it helps to control the wheat shortage and its retail price in lean months through the utilization of its buffer stock. The shortfall of wheat production in the years 2001-04 has increased the market prices of the wheat. Government of Pakistan suffered from buffer stock shortage as a result of 50 percent cut on wheat procurement under 2001 revised policy. To overcome this situation government raised procurement prices sharply for two consecutive years 2003-04 and 2004-05 which raised the overall prices of wheat (Dorosh and Salam 2008). The unstable production of wheat during 2000-2010 was considered as the main cause of its price hike as shortages of wheat in some consecutive years induced the support price of wheat to safeguard domestic farmers which in turn increased the retail price (Abdullah and Kalim, 2008).

Table 11. Wheat Production Estimates and Price Spread (1980-2010)

Years	Wheat Production (000 tonnes)	Production growth (%)	Marketing Margins Farm-Wholesale level (%)	Marketing Margins Wholesale-retail level (%)
1980-81	11474.6	5.69	58.52	4.02
1981-82	11304.2	-1.49	18.94	3.10
1982-83	12414.4	9.82	18.72	0.60
1983-84	10881.9	-12.34	19.74	0.00
1984-85	11703.0	7.55	23.75	0.08
1985-86	13923.0	18.97	22.60	0.21
1986-87	12015.9	-13.70	10.90	0.78
1987-88	12675.1	5.49	6.59	2.92
1988-89	14419.2	13.76	13.60	1.37
1989-90	14315.5	-0.72	18.86	0.13
1990-91	14565.0	1.74	13.35	5.46
1991-92	15684.2	7.68	5.79	7.56
1992-93	16156.5	3.01	4.31	4.33
1993-94	15123.0	-6.40	5.94	4.55
1994-95	17002.4	12.43	5.96	8.11
1995-96	16907.4	-0.56	-0.76	9.31
1996-97	16650.5	-1.52	7.39	12.14
1997-98	18694.0	12.27	-9.64	23.16

1998-99	17857.6	-4.47	-23.92	23.49
1999-00	21078.6	18.04	-20.82	24.59
2000-01	19023.7	-9.75	3.18	5.06
2001-02	18226.5	-4.19	-0.38	3.17
2002-03	19183.3	5.25	-4.15	8.18
2003-04	19499.8	1.65	5.63	7.09
2004-05	21612.3	10.83	9.87	5.74
2005-06	21276.8	-1.55	0.60	4.96
2006-07	23294.7	9.48	6.21	2.49
2007-08	20958.8	-10.03	31.91	3.56
2008-09	24032.9	14.67	52.57	1.82
2009-10	23310.8	-3.00	29.18	0.54

Source: Agricultural Statistics of Pakistan

Determinants of Wheat Marketing Margins

To empirically investigate the effect of prices on the overall marketing margins Double log linear regression model is used to investigate the effect of farm, wholesale and retail prices on the overall marketing margins. The value of R-square presents that model is good fit as 71 percent variation in dependent variable is expressed by independent variables. The model is overall significant at 1 percent level with the estimated F-stat 24.889. The estimated coefficients of farm gate and retail prices are highly significant at 1 percent and 5 percent respectively, having the expected signs. The coefficient for farm gate price was negative which indicate that 1 percent increase in farm prices will reduce the overall marketing margins (farm-retail) by 2.93 percent whereas the coefficient of retail price has direct relationship with marketing margin and have positive sign. The retail price coefficient value however stated 2.23 percent increase in marketing margin (farm-retail) with 1 percent increase in retail price of wheat. The coefficient for wholesale price was insignificant with positive sign. The study conducted by Abbasian *et al.* 2012 also postulated the negative relationship between farm price and marketing margins however positive impact of retail prices on overall marketing margins. Hahn 2004 also highlighted the same relationship as stated that price spreads/marketing margins deflate with increment in farm prices and reduction in retail prices.

Table 2. Determinants of Wheat Marketing Margins

Independent Variable= Marketing Margin		
Variables	Coefficients	t-statistics
Constant	2.226	12.773***
Farm gate price	-2.929	-8.024***
Wholesale price	0.598	0.621
Retail price	2.228	2.034**
R-Square=0.742	Adjusted R ² =0.712	F-statistic= 24.889***

Source: Author's Estimation

Conclusion and Recommendations

Prices of wheat vary across marketing chain but the marketing margins of wheat have been controlled by government intervention policies over the time. Through government intervention policy regulations in wheat markets; wheat producers are able to attain maximum return of their produce. The analysis indicates that marketing margins of wheat at farm-wholesale level always surpass the wholesale-retail level margins. It is also obvious from the above analysis that in the years of increased production growth of wheat the marketing margins decline due to decreased prices at all levels of marketing chain and vice versa. Marketing margins have positive association with retail prices whereas negatively related with farm gate prices. As increase in farm gate prices deflate marketing margins and increasing retail prices inflate marketing margins. The analysis of marketing margin at different levels clearly indicate that marketing margins falls in the years when private traders allow to enter the wheat market at competitive basis.

The discussion above however clearly postulate that marketing margins remained high in years of tight government interventionist policy era (1980-87) and also in the years of more liberalized policy when most of the wheat procurement was handed over to private traders (2001). This scenario calls for the moderate wheat procurement policy by the government in which government control on wheat market remain prominent. Stabilized wheat prices are the pre requisite to control marketing margins and government interventionist policies plays a vital role to minimize the marketing margins of wheat in order to benefit farmers as well as consumers to ensure food security. Public private partnership can be the most appropriate policy intervention to stabilize wheat prices and to control the widening marketing margins as introduction of competition will lead to efficient market functioning. Government should ensure the timely announcement of wheat support prices in order to reduce farmer's risk perception of crop profitability and to make them aware of their due share as a result of selling wheat at government procurement centers.

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