



## Time Series Analysis of Wheat flour Price Shocks in Pakistan: A Case Analysis

**Asad Raza Abdi**

Assistant Professor; Department of Economics, Shah Abdul Latif University, Khairpur Mirs, Pakistan

**Ali Hassan Halepoto**

Assistant Professor; Department of Commerce, Shah Abdul Latif University, Khairpur Mirs, Pakistan

**Aisha Bashir Shah**

Assistant Professor; IBA, University of Sindh, Pakistan

**Faiz M. Shaikh**

Assistant Professor; SZABAC, Dokri, Larkana, Pakistan

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### Abstract

The current research investigates the wheat flour Price Shocks in Pakistan: A case analysis. Data was collected by using secondary sources by using Time series Analysis, and data were analyzed by using SPSS-20 version. It was revealed that the price of wheat flour increases from last four decades, and trend of price shocks shows that due to certain market variation and supply and demand shocks also play a positive relationship in price shocks in the wheat prices. It was further revealed that Government should take certain measures to Stable prices of wheat in Pakistan.

**Keywords:** Time series, price, shocks, wheat

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### Introduction

The agriculture sector continues to be an essential component of Pakistan's economy. It currently contributes 21 percent to GDP Agriculture generates productive employment opportunities for 45 percent of the country's labour force and 60 percent of the rural population depends upon this sector for its livelihood. It has a vital role in ensuring food security, generating overall economic growth, reducing poverty and the transforming towards industrialization. The present government is determined to improve the quality of life of the people and to banish hunger and malnutrition from the country by making agriculture an efficient, productive and profitable sector of the economy.

In order to improve governance in the public sector the government took bold steps and brought in the 18<sup>th</sup> Amendment to the Constitution of 1973. Accordingly, Ministries performing tasks which were provincial subjects were devolved from the Federal level, including the Ministry of Food and Agriculture. However, realizing the food security concerns across the country the government took timely steps to establish the Ministry of National Food Security and Research to tackle the Food Security issues.

The newly created Ministry, under the aegis of the present government, has planned to take two major steps in order to solve the food security issues on a permanent basis. The first step is the establishment of the National Food Security Council Federal, Province local level Governments. Secondly, through a Letter of Intent the Ministry, in collaboration with World Food Program, is launching the Zero Hunger Program worth US \$ 1.6 billion to address the

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Corresponding author's details:

Name: Faiz M. Shaikh

Email address: [faizanmy2000@hotmail.com](mailto:faizanmy2000@hotmail.com)

food security objective. Under this Program the Ministry shall donate up to 500,000 metric tons of wheat per year and the World Food Program intends to negotiate with local producers to exchange part of the donated wheat for High Energy Biscuits (HEB) and similar products manufactured in Pakistan factories for distributions through WFP operations to primary school children, siblings of malnourished children and the vulnerable populations especially children at risk of malnutrition. The fund will also be converted to fortified wheat flour for distributions aimed at combating food insecurity in Pakistan. The WFP will also cooperate in the capacity building of the Ministry's officials in areas addressing food security and monitoring progress.

In Pakistan, wheat being the staple diet is the most important crop and cultivated on the largest acreages in almost every part of the country. It contributes 14.4 percent to the value added in agriculture and 3.0 percent to GDP.

Over the past three decades, increased agricultural productivity occurred largely due to the deployment of high-yielding cultivars and increased fertilizer use. With the introduction of semi-dwarf wheat cultivars, wheat productivity has been increased in all the major cropping systems representing the diverse and varying agro-ecological conditions.

### Wheat in Pakistan

Pakistan has been divided into ten production zones because of great agro ecological areas where wheat is grown. The zoning is mainly based on cropping pattern, disease prevalence and climatological factors. However, production zones need to be revisited. In Pakistan, wheat is grown in different cropping systems, such as; cotton - wheat, rice - wheat, sugarcane - wheat, maize - wheat, fallow - wheat. Of these, Cotton-Wheat and Rice-Wheat systems together account about 60% of the total wheat area whereas rain-fed wheat covers more than 1.50 m ha area. Rotations with Maize-Sugarcane, Pulses and fallow are also important.

Improved semi-dwarf wheat cultivars available in Pakistan have genetic yield potential of 6-8 t/ha whereas our national average yields are about 2.7 t/ha. A large number of experiment stations and on-farm demonstrations have repeatedly shown high yield potential of the varieties.

There are progressive farmers of irrigated area who are harvesting 6 to 7 tones yield per hectare. However, farmers yield ranges 0.5 to 1.3 tons per hectare depending on the amount of rainfall in rained areas and in irrigated areas it ranges from 2.5 to 3 tons per hectare depending upon the amount of water available and other factors.

**Table 1: Area, production and yield of wheat**

Year	Area		Production		Yield	
	(000 hectares)	% Change	(000 tons)	% Change	(Kgs/Hec.)	%
2007-08	8550	-0.3	20959	-10.0	2451	-9.8
2008-09	9046	5.8	24033	14.7	2657	8.4
2009-10	9132	1.0	23311	-3.0	2553	-3.9
2010-11	8901	-2.5	25214	8.2	2833	11.0
2011-	8666	-2.6	23517	-6.7	2714	-4.2

Source: Pakistan Bureau of Statistics

P: Provisional (July-March)

**Table 2: Wheat flour price shocks**

Years	Acreage under Wheat(000)	Production under Wheat(000)	Price of Wheat Rs/Mons.	Average Price of Wheat Flour
1961	6639	3814	15.62	16.46
1962	4923	4027	14.49	16.88
63	5022	4170	13.78	16.85
64	5019	4162	15.25	15.27
65	5317	4591	16.65	33.34
66	5155	3916	15.18	14.84
67	5344	4335	2290	19.32
68	5983	6418	2026	23.22
69	6160	6618	17.37	24.50
70	6229	7294	17.53	32.42
71	5977	6476	18.27	22.51
72	5797	6890	20.77	24.19
73	5971	7442	21.36	33.33
74	6113	7629	27.54	39.34
75	5812	7673	40.71	49.5
76	6111	8691	39.65	46.36
77	6390	9144	42.37	48.59
78	6360	8367	46.31	79.64
79	6687	9950	51.45	68.12
80	6924	10587	51.88	74.62
81	6984	11475	58.00	100.00
82	7223	11304	68.05	139.75
83	7398	12414	71.08	121.23
84	7343	10882	74.66	93.06
85	7259	11703	81.80	100.10
86	7403	13923	86.76	106.08
87	7706	12016	85.89	82.38
88	7308	12675	86.10	105.36
89	7730	14419	94.43	174.52
90	7845	14316	104.52	134.83
91	7911	14565	119.03	107.51
92	7878	15684	139.99	133.26
93	8300	16157	147.53	178.74
94	8034	15213	160.00	257.37
95	8152	16699	188.71	344.62
96	8194	16374	190	400
97	8219	16853	200	423
98	8280	17417	225	450
99	8231	17734	250	700
2000	8349	19210	270	760
2001	8291	19320	280	800
2002	8234	19443	300	440
2003	8243	1955	310	500

2004	8543	1988	390	550
2005	8767	1966	415	500
2006	8786	1888	514	650
2007	8876	1988	523	1100
2008	9000	1991	540	1200
2009	9200	2000	567	1250
2010	9230	2100	900	1300
2011	9240	2150	1000	1400
2012	9290	2200	1100	1500

Years	Production		
	under	Acreage	Price
1961	3814	6639	15.62
1962	4027	4923	14.49
63	4170	5022	13.78
64	4162	5019	15.25
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75	7673	5812	40.71
76	8691	6111	39.65
77	9144	6390	42.37
78	8367	6360	46.31
79	9950	6687	51.45
80	10587	6924	51.88
81	11475	6984	58
82	11304	7223	68.05
83	12414	7398	71.08
84	10882	7343	74.66
85	11703	7259	81.8
86	13923	7403	86.76
87	12016	7706	85.89
88	12675	7308	86.1
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91	14565	7911	119.03
92	15684	7878	139.99
93	16157	8300	147.53
94	15213	8034	160
95	16699	8152	188.71
96	16374	8194	190
97	16853	8219	200
98	17417	8280	225
99	17734	8231	250
2000	19210	8349	270
2001	19320	8291	280
2002	19443	8234	300
2003	1955	8243	310
2004	1988	8543	390
2005	1966	876	415
2006	2011	8787	514
2007-08	2088	8765	613
2009	2090	8900	620
2010	2100	9000	640
2011-12	2200	9100	670

**Summary output**

Regression Statistics	
Multiple R	0.767893
R Square	0.58966
Adjusted R Square	0.559636
Standard Error	3477.025
Observations	45

**Results**

According to the table No.2 in which production and acreage of wheat were discussed. There was huge difference year to year from 1961-2012. The Wheat flour price trend was found to be

increasing trend. There was price shocked in the years 1955, 188, 2000.2007 where nearly 70-80% prices were changed.

**ANOVA**

	df	SS	MS	F	Significance F
Regression	3	7.12E+08	2.37E+08	19.63908	4.76E-08
Residual	41	4.96E+08	12089705		
Total	44	1.21E+09			

	Coefficients	S. Error	t Stat	P-value	Lower 95%	Upper 95%	Upper 95.0%
Intercept	-5768.27	2665.794	-2.16381	0.036358	-11151.9	-384.585	-384.585

X Variable 1	1.954231	0.439955	4.441889	6.61E-05	1.065724	2.842739	2.842739
X Variable 2	-0.71805	1.198775	-0.59899	0.552478	-3.13902	1.702927	1.702927
X Variable 3	127.9544	47.78352	2.677793	0.010612	31.45359	224.4551	224.4551

Consider gain the demand for Wheat varieties. One way to analyze these beverages would be to postulate that they form a block independent group and then use demand equation. One disadvantage of this approach is that equation group the nose demand equation.

One disadvantage of this approach is that equation involves real income and. through their influence on the Frisch price index log P, the price of other (i.e. non-Wheat) goods. Conditional demand

equations deal only with Wheat and thus avoid he problem. Accordingly a system with a large number of commodities can be transformed into a number of smaller.

Independent sub systems, one for each group of goods. In this section, we set out detail of this approach Recall from the retail price. Due to unstable prices of Wheat consumers are paying more every month. The recent price shocks have a negative impact on the consumers.

### Residual output

Observation	Predicted Y	Residuals	Standard Residuals
1	7322.614	-3508.61	-1.04535
2	4097.919	-70.9192	-0.02113
3	4419.852	-249.852	-0.07444
4	4540.888	-378.888	-0.11289
5	5250.198	-659.198	-0.1964
6	5062.623	-1146.62	-0.34162
7	3926.496	408.5037	0.121709
8	5492.769	925.2307	0.275662
9	7408.916	-790.916	-0.23564
10	7671.597	-377.597	-0.1125
11	7306.554	-830.554	-0.24745
12	7080.952	-190.952	-0.05689
13	7548.519	-106.519	-0.03174
14	7949.536	-320.536	-0.0955
15	7479.81	193.1898	0.057559
16	8192.841	498.1591	0.148421
17	8864.073	279.9273	0.083401
18	8930.571	-563.571	-0.16791
19	9693.868	256.1318	0.076312
20	10284.67	302.3333	0.090077
21	10525.48	949.5196	0.282898
22	11113.28	190.7203	0.056823
23	11581.05	832.9511	0.248168
24	11598.95	-716.95	-0.21361
25	11557.62	145.3781	0.043314
26	11963.42	1959.576	0.583833
27	12684.14	-668.135	-0.19906
28	12034.15	640.8453	0.190932
29	12980.81	1438.187	0.428491
30	13326.26	989.7408	0.294882
31	13572.77	992.226	0.295622
32	13621.19	2062.812	0.614591

33	14568.41	1588.586	0.473301
34	14167.59	1045.411	0.311468
35	14505.53	2193.472	0.65352
36	14714.63	1659.367	0.494389
37	14884.26	1968.737	0.586562
38	15113.47	2303.526	0.686309
39	15127.72	2606.28	0.776511
40	15471.91	3738.087	1.11372
41	15479.34	3840.659	1.14428
42	15481.54	3961.457	1.18027
43	15619.91	-13664.9	-4.0713
44	16276.69	-14288.7	-4.25715
45	1403.596	562.4036	0.167562

The trend of Wheat flour prices were changes from the above trend. It has direct relationship with the demand of the market and supply shortage from time to time increased the prices of wheat in Pakistan. In Pakistan have genetic yield potential of 6-8 t/ha whereas our national average yields are about 2.7 t/ha. A large number of experiment stations and on-farm demonstrations have repeatedly shown high yield potential of the varieties. There are progressive farmers of irrigated area who are harvesting 6 to 7 tonnes yield per hectare. However, farmers yield ranges 0.5 to 1.3 tons per hectare depending on the amount of rainfall in rain fed areas and in irrigated areas it ranges from 2.5 to 3 tons per hectare depending upon the amount of water available and other factors.

## Conclusion

The current research explores the wheat prices shocks and wheat flour prices in Pakistan. The results of the analysis indicate that wheat growers are response to changes in the wheat of wheat in the case of production and acreage under wheat response. The lagged wheat of cotton has no significant impact on the production of wheat and acreage under wheat. This may attributed to the reason that cotton is grown on marginal lands and usually in the western areas of Pakistan. The cultivation of cotton is also risky due to the attack of pests. Government of Pakistan should fixed the

price of the Wheat and also take some measures to control the prices of Wheat.

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