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Wheat Price Policy in Pakistan: A Welfare Economics Approach*

ANDREW P. BARKLEY

1. INTRODUCTION

The production of wheat is vital to the economy of Pakistan; wheat accounts for over one-third of planted acreage, contributes roughly one-third of the agricultural sector's value added, and is the major staple in the nation's diet. The growth rate of wheat production in Pakistan over the past thirty years has been phenomenal: nearly five percent per year [Cornelisse and Kuijpers (1987)]. This outstanding performance in the growth of wheat output is remarkable considering that it has occurred in spite of government intervention that has reduced incentives to wheat production.

Economists have devoted much time and effort to the analysis of the divergence between domestic and international prices for agricultural commodities. Wheat prices that prevail in world markets represent the opportunity cost of agricultural resources, reflecting the scarcity value of the inputs used in the production of wheat. Economic efficiency occurs when domestic prices for both producer and consumers equals world prices. Government intervention often occurs for reasons other than economic efficiency; governments may distort domestic agricultural prices to increase revenues, promote industrialisation, maintain low food prices for industrial workers or low-income consumers, or insulate domestic producers from fluctuations in world commodity market prices.

Government intervention that maintains the domestic price of wheat at levels lower than the world price results in decreased output levels and higher rates of consumption than would occur in a free market, free trade regime. This form of price intervention results in a transfer of income from wheat producers to wheat consumers, efficiency losses that represent foregone opportunities for agricultural resources, and an increase in government expenditures.

The impact of price on wheat production in Pakistan has been studied by Qureshi (1974), Cornelisse and Kuijpers (1987), and Pinckney (1989). These three

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Andrew P. Barkley is Assistant Professor, Department of Agricultural Economics, Kansas State University, USA.

studies found a direct relationship between wheat production and producer prices, indicating that wheat price policies affect wheat production incentives. The recent study by Hamid *et al.* (1991) provides a comprehensive summary of the impacts of both price policy and exchange rate policy on agricultural output, consumption, exports, income distribution, and government revenues in Pakistan.

Analyses of the impact of low agricultural prices on economic welfare include Peterson (1979), who calculated welfare losses caused by "cheap food" policies of twenty-seven nations in 1969. Bale and Lutz (1981) calculated income transfers and welfare costs that resulted from government intervention in agricultural markets for nine countries in 1976. Thobani (1979) studied the impacts of changes in wheat prices on the incomes of farmers, middlemen, and consumers in Pakistan. This study updates and extends previous research by calculating income transfers and welfare costs of wheat price policies in Pakistan over an extended time period. The study also identifies the underlying determinants of price intervention in the wheat market of Pakistan.

The first objective of this research is to quantify the transfers of income and efficiency losses that occurred due to government intervention in the wheat economy of Pakistan from 1971 to 1986. During the early 1970s, world prices of wheat increased substantially, while domestic prices remained relatively stable. In the late 1970s and 1980s, domestic wheat prices were moved closer to world price levels, providing a comparison of the welfare impacts of wheat price policies under divergent policy regimes. Two quite different approaches to agricultural price policy were implemented during the period under investigation: wheat price policy under the Bhutto government (1971–1977) was consumer-oriented, while the Zia government (1977–1988) moved agricultural commodity prices towards free-market levels.

Given the lowered production incentives, increased budget costs, and efficiency costs of government intervention, an important question arises: what caused the Government of Pakistan to maintain low agricultural prices, and in particular, low wheat prices? This question can be approached through the development of an empirical model of political economy. The second objective of this study is to identify the determinants of the wheat procurement price.

2. WELFARE ECONOMIC ANALYSIS OF WHEAT PRICE POLICY

Following previous research conducted by Bale and Lutz (1981) and Sukhatme (1983), partial equilibrium Marshallian welfare analysis was employed to study the impact of domestic wheat price policy in Pakistan from 1971-72 to 1986-87. Government intervention in the form of domestic prices held lower than

world prices results in economic transfers and welfare costs that can be calculated. Border prices were used as the point of reference, and are compared to domestic producer prices at the same point in the marketing chain. The domestic price of wheat in Pakistan is determined by procurement policies that are administered through government purchases of wheat at the procurement price.

Prices faced by domestic producers were assumed to be the official procurement price (Table 1). The world price of wheat was assumed to be the import

Table 1

Data Employed in Pakistan Wheat Price Policy Study[a,b]

Year	Production (Previous Year) (1000 mt)	Net Imports (1000 mt)	Procurement Price (Rs/mt)	World Price (Rs/mt)
1971-72	6476	439	455.55	783.25
1972-73	6890	1418	602.75	1673.50
1973-74	7442	1079	683.25	2111.00
1974-75	7629	1173	991.25	1806.50
1975-76	7673	1273	991.25	1645.50
1976-77	8691	505	991.25	1344.25
1977-78	9144	822	991.25	1624.75
1978-79	8367	2112	1205.75	2001.25
1979-80	9950	668	1450.00	2176.50
1980-81	10857	20	1450.00	2231.25
1981-82	11476	101	1450.00	2492.75
1982-83	11304	(53)	1600.00	1924.75
1983-84	12414	(191)	1600.00	1959.25
1984-85	10882	544	1750.00	2967.25
1985-86	11703	1482	2000.00	2697.75
1986-87	13940	80	2000.00	2810.75

Sources: *Production: FAO Production Yearbook.*
Net Imports: Pinckney (1989), Table 3, page 23.
Procurement Price: GOP *Economy Survey, 1988-89.*
World Price: Hamid *et al.* (1987), Table 16, page 2-40.

[a]World Price is equal to import parity for all years when net imports were positive, and equal to export parity for 1982-83 and 1983-84, when net imports were negative. "In the calculation of import parity, import costs are assumed to be $ 40 per ton (in 1985 dollars) and to change over time with the U. S. wholesale price index. Export costs are assumed to be $ 25 per ton (in 1985 dollars) which includes a $ 13 per ton cost advantage to Middle Eastern countries, with costs changing over time in relation to a non-agricultural GDP-sector deflator." [Hamid *et al.* (1987)].

[b]Negative values appear in parentheses.

parity prices calculated by Hamid *et al.* (1987), with the exception of the two years 1982-83 and 1983-84, when the relevant world price was the export parity price reported and defined in Table 1. Production data were taken from the U.N. *FAO Production Yearbook,* and net imports were calculated by Pinckney (1989). These data, together with assumptions of linear supply and demand curves, an assumed supply elasticity of 0.43 [Pinckney, (1989a)] and assumed demand elasticity of –0.25 [Hamid *et al.* (1987)] form the inputs to the calculations of the impact of government wheat policy in Pakistan. For a detailed description of the calculation procedure, see Barkley (1992).

Calculations of the impact of wheat price policy in Pakistan on producers, consumers, and taxpayers are reported in Table 2 (current Rupees) and

Table 2

Pakistan Wheat Price Policy Results: Current Rupee [a]

Year	Loss in Producer Surplus (Million Rs)	Gain in Consumer Surplus (Million Rs)	Government Budget Cost (Million Rs)	Welfare Loss (Million Rs)	Welfare Loss as Percent of Ag. GDP (%)
1971-72	2489	2062	144	570	3.5
1972-73	10523	6920	1518	5120	28.6
1973-74	15954	8988	1541	8507	38.8
1974-75	7447	6438	956	1965	7.0
1975-76	5815	5370	833	1278	3.8
1976-77	3330	3102	178	407	1.1
1977-78	6681	5809	521	1393	3.2
1978-79	7710	7649	1680	1741	3.4
1979-80	8098	7231	485	1352	2.5
1980-81	9579	7925	16	1669	2.7
1981-82	14032	10987	105	3151	4.4
1982-83	3850	3561	(17)	272	0.3
1983-84	4700	4268	(69)	364	0.4
1984-85	15312	12605	656	3365	3.7
1985-86	8849	8799	1034	1085	1.0
1986-87	12401	10791	65	1676	1.4

[a] Figures in parentheses are negative values.

Table 3 (constant 1980 Rupees). Transfers of economic surplus from producers to consumers, government budget costs, and welfare losses for the years 1972-73 and 1973-74 were particularly large. In each of these two years, the welfare costs represented roughly one-third of the agricultural Gross Domestic Product (GDP).

Table 3

Pakistan Wheat Price Policy Results: Constant (1980) Rupees[a]

Year	Loss in Producer Surplus	Gain in Consumer Surplus (Million 1980 Rs)	Government Budget Cost	Welfare Loss	Welfare Loss as Percent of Ag. GDP (%)
1971-72	8611	7136	498	1973	3.5
1972-73	29069	19117	4194	14146	28.6
1973-74	36676	20662	3541	19555	38.8
1974-75	13920	12034	1789	3674	7.0
1975-76	8905	8224	1275	1957	3.8
1976-77	4658	4338	249	569	1.1
1977-78	8362	7270	652	1743	3.2
1978-79	8624	8555	1879	1948	3.4
1979-80	8717	7783	522	1456	2.5
1980-81	9579	7925	16	1669	2.7
1981-82	12607	9871	95	2831	4.4
1982-83	3080	2849	(14)	217	0.3
1983-84	3591	3260	(52)	278	0.4
1984-85	10814	8902	464	2376	3.7
1985-86	5939	5905	694	728	1.0
1986-87	7991	6953	42	1080	1.4

[a] Figures in parentheses are negative values.

The world price decreased from a high of 2111 Rs/mt in 1973-74 to 1344.25 Rs/mt in 1976-77, while the government-determined procurement price increased, but remained below, the import parity price. This decrease in the disparity between world and domestic prices during the mid 1970s reduced the transfers from wheat producers to consumers, as well as the budget and welfare costs, as reported in Tables 2 and 3.

Pakistan achieved self-sufficiency in wheat production in 1982-83, in spite of reduced production incentives caused by low domestic prices. Cornelisse and Kuijpers (1987) found this achievement bittersweet:

> It is not at all self-evident, however, that grain exports should be attractive. In fact, barring unforeseen catastrophes in world-wide grain production, the prospects for suppliers in international grain markets are not favourable... exporting wheat does not seem to be an attractive proposition... (pp. 385-86).

From the perspective of this analysis, the opportunity costs of resources employed in wheat production are measured by the exogenously determined world wheat price. Whenever the domestic price diverges from the world price, efficiency losses are incurred by the wheat producers of Pakistan. However, it is possible that insulation of wheat producers from the dramatic raise in wheat prices in the early 1970s may have been in the public interest.

The consumers of wheat would have suffered drastic reductions in consumer surplus if market prices of wheat in Pakistan were equal to the extreme prices prevailing in world markets; wheat producers would have increased quantities of resources employed in wheat production in the early 1970s, based on expectations of continued high wheat prices. Once the world prices dropped, the agricultural sector would have been subject to excess supplies, and economic dislocation could have ensued. The procurement price policy of Pakistan may have slowed the rate of growth of production, but this may have alleviated severe economic dislocation that might have occurred under a free-market, free-trade regime. Any control of wheat production will result in losses of economic efficiency and transfers between producers, consumers, and taxpayers. However, political decisions are determined by a multiplicity of considerations, of which efficiency in resource use is only one political objective.

Given these conclusions, a caveat that accompanies most studies of the welfare economics of price policies is necessary. Bale and Lutz (1981) concluded, "While it is politicians and not agricultural economists who make the decisions for governments, our profession plays a vital role in defining and quantifying the issues involved, and in passing these findings to appropriate officials" (p. 21).

3. THE POLITICAL ECONOMY OF WHEAT PRICE POLICY

The welfare economic analysis presented above demonstrates the substantial impact that wheat procurement price levels had on the producers, consumers,

and taxpayers of Pakistan. The analysis now turns to the determinants of wheat price policy: what political or economic forces cause the government to select a given procurement price? A model of the political economy of wheat procurement pricing was developed and empirically tested for the period 1971 to 1986.

Hamid *et al.* (1991) concluded that "The government's primary objective in intervening in the price of wheat was to provide urban consumers with *atta* (flour) at low prices. The secondary objective was to protect wheat farmers against seasonal price fluctuations". Governments may also take the international price of wheat into account when setting a procurement price. The Bhutto government was committed to maintaining low food prices in urban areas, but ".... the subsidy became very large (about Rs 2 billion a year in 1973-74 and 1974-75, or more than 10 percent of the government's expenditure). Consequently, the government was forced to increase the price of *atta*" [Hamid *et al.* (1991), p. 138]. To the degree that consumer prices (release prices) and producer prices (procurement prices) are correlated, world wheat prices influence procurement price decisions made by the government. While insulation of the domestic wheat market from world price fluctuations is one objective of price policy, such isolation is subject to increasing budget and welfare costs.

Self-sufficiency is often cited as a political objective of market intervention. Pakistan achieved self-sufficiency in 1982-83, and likely would have been a wheat exporter throughout the period under investigation if domestic prices reflected prevailing international prices. Given the desire for self-sufficiency, the level of imports is expected to have a negative impact on wheat procurement prices: in periods of high imports, the government may increase production incentives in order to approach self-sufficiency.

Results of the welfare analysis suggest that wheat price policy underwent a significant change when the transition in governments occurred in 1977. Procurement price levels reflect the underlying economic philosophy of the government, and when political power changes hands, this is anticipated to be reflected in the agricultural pricing policies pursued by the government. To summarize, the procurement price of wheat (*PROPRI*) is modelled as a function of economic conditions (*ECON*), world wheat prices (*WORPRI*), the level of net wheat imports (*IMPORT*), and the government in power (*GOVT*), as in Equation (1).

$$PROPRI = f(ECON, WORPRI, IMPORT, GOVT) \quad \ldots \quad \ldots \quad (1)$$

To estimate this model of political economy, economic conditions must be defined. If politicians base wheat price decisions on economic conditions in the nonagricultural sector, then a measure of the returns to nonfarm labour is ap-

propriate. A crude measure of nonfarm labour returns can be calculated by dividing the GDP in nonagriculture by the size of the nonfarm labour force. This results in a measure of the average product of labour in the nonagricultural sector (APL_n). The agricultural average product of labour (APL_a) is calculated similarly, and used as a measure of economic conditions in agriculture. Relative economic conditions are captured by the ratio of average products: agriculture to nonagriculture ($APLRAT = APL_a/APL_n$).

A decrease in nonfarm income, as measured by the average product of nonfarm labour, would result in an increase in the ratio of average products, which is expected to increase political pressure on the government to reduce the procurement price to appease urban wheat consumers. Urban consumers are directly affected by the release price of wheat, rather than the procurement price. However, the government may move procurement prices and release prices up and down together in order to avoid the massive government expenditures that were faced by the Bhutto government in the early 1970s. Equation (2) summarises this discussion and reports the expected empirical relationships from the model.

If the returns to labour in agriculture decline relative to the returns to

$$\underset{}{PROPRI} = \underset{(-)}{F(APLRAT,} \ \underset{(+)}{WORPRI,} \ \underset{(+)}{IMPORT,} \ \underset{(-)}{BHUTTO)} \quad \ldots \quad \ldots \quad (2)$$

nonfarm labour, higher procurement prices are expected to ensue: the government is expected to insulate agricultural producers from low returns. The procurement price is expected to be directly related to world prices, because of the large costs associated with the divergence between domestic and international prices.

Self-sufficiency goals lead to an expected positive relationship between imports and procurement prices. The Bhutto government placed a higher priority on maintaining consumer welfare than did the Zia government: a qualitative variable that equal one for the Bhutto years (1971 to 1977) and zero for all other years is included in the model to capture this difference in economic philosophy.

Data for procurement prices and net imports are identical to the data used in the welfare analysis and reported in Table 1. World prices are measured by the import parity prices calculated by Hamid *et al.* (1987). The world price and procurement prices were not deflated because the model was developed to explain how government officials set the procurement price, which is always set in nominal, rather than real, prices. To calculate the average product of labour ratio, data on sectoral GDP and labour force were taken from the *Economic Survey* of the Government of Pakistan. To avoid problems of simultaneity, all explanatory vari-

ables were lagged one year, with the exception of the Bhutto qualitative variable, which is predetermined.

Equation 3 is estimated for the period 1971-72 to 1986-87 using OLS, where u_t is the error term. The data utilised in the regression is summarised in Table 4 and the regression results are reported in Table 5. Because the Bhutto variable reflects a political rather than an economic variable, regression trials were run with *BHUTTO* excluded (Regression One) and included (Regression Two). Elasticity estimate were calculated at mean values for all statistically significant variables. The regressions were corrected for autocorrelation using the Yule-Walker method, with autocorrelation coefficients reported a RHO in Table 5.

$$PROPRI_t = \alpha + \beta_1 APLRAT_{t-1} + \beta_2 WORPRI_{t-1} + \beta_3 IMPORT_{t-1} + \beta_4 BHUTTO_t + \mu_t \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Table 4

Data Employed in Regressions to Explain Pakistan Wheat Procurement Price 1971–86[a]

Variable Name	Description	Mean	Standard Deviation
PROPRI(t)	Wheat Procurement Price (Rs/40 kg)	46.169	18.657
APLRAT(t–1)	Ratio of Average Products of Labour: Agriculture to Nonagriculture[a]	0.844	0.099
WORPRI(t–1)	Wheat World Price (Rs/40 kg) (Import Parity Price)	76.846	28.993
IMPORT(t–1)	Wheat Net Imports (1000 mt)	759.467	659.650
BHUTTO(t)	Qualitative Variable: 1 = Bhutto government (1971-1977) 0 = Else (1978–1986)	0.438	0.512

Sources: Procurement Price: G.O.P. *Economy Survey, 1988-89.*
Net Imports: Pinckney (1989), Table 3, page 23.
World Price: Hamid, Pinckney, Gnaegy, Valdes, Table 16, page 2–40.
G.D.P., Ag and Nonag: GOP *Economy Survey, 1988-89.*
Labour Force, Ag and Nonag: GOP *Economy Survey, 1988-89.*

[a]The average product of labour in agriculture is the agricultural GDP divided by the agricultural labour force. The nonagricultural average product of labour is the nonagricultural GDP divided by the nonagricultural labour force.

Table 5

Pakistan Wheat Procurement Price Regression Results: 1971-1986.[a,b,c]
Dependent Variable: Pakistan Wheat Procurement Price. PROPRI (t)

Independent	Regression One			Regression Two		
Variable:	Beta	*t*-Stat	Elas.	Beta	*t*-Stat	Elas
INTERCEPT	75.433	2.531*	–	81.635	5.388**	–
APLRAT(*t*–1)	–67.584	–2.375*	–1.24	–60.874	–4.160**	–1.11
WORPRI(*t*–1)	0.374	3.924**	0.62	0.280	5.773**	0.47
IMPORT(*t*–1)	0.001	0.547	–	0.001	0.473	–
BHUTTO(*t*)	–	–	–	–10.774	–5.684**	–0.10
RHO	–0.26	–0.853	–	0.320	0.316	–
R-SQUARE		0.888			0.986	
ADJ. *R*-SQUARE		0.926			0.978	
D.O.F.		10			9	

[a] One asterisk indicates statistical significance at the 5 percent level.
[b] Two asterisks indicates statistical significance at the 1 percent level.
[c] Absolute values of *t*-statistics are reported in parentheses.
Elasticity estimates are calculated at mean values.

The explanatory power of the model is high as reflected in the high R_2 values in Table 5. All variables were significant and of the expected sign, excluding *IMPORT*, which was not significant. The average product of labour ratio was an important determinant of the procurement price, as indicated by the relatively large elasticity estimates and the high degree of significance. This result can be interpreted in two ways. First, when nonfarm labour returns decline relative to agricultural returns, the government lowers procurement prices to provide cheap food to urban constituents. Alternatively, if economic conditions in the farm sector decline relative to nonfarm returns, the government raises procurement prices in order to support wheat producer incomes.

The government did not make procurement price decisions in isolation; world price increases were followed by procurement price increases in the following

year. This result may reflect the large efficiency and welfare losses associated with insulation of domestic markets from the international economy as calculated in the previous section. Self-sufficiency, as reflected by the level of net imports, did not influence procurement price levels set by the government.

As described above, the Bhutto government was characterised by lower procurement prices relative to the Zia government. The significant negative coefficient on the BHUTTO qualitative variable reflects the huge disparity between domestic and world prices that existed in the early 1970s. The elasticity of procurement price with respect to the Bhutto qualitative variable is relatively small, but highly significant.

CONCLUSIONS

Wheat price policies in Pakistan that held domestic market prices below international wheat price levels resulted in significant transfers from wheat producers to wheat consumers over the period 1971 to 1986. Price distortions also caused increased government expenditures and welfare costs. Annual efficiency losses averaged 6.6 percent of the agricultural GDP over the sixteen years covered by the study. Due to impressive growth in agricultural production, Pakistan achieved self-sufficiency in wheat in 1982. The welfare analysis results indicate that Pakistan could have been a net exporter of wheat in each of the sixteen years from 1971 to 1986, had domestic prices reflected the opportunity cost of resources employed in agricultural production, as represented by the world price of wheat.

What caused the government to maintain low wheat producer prices? Wheat prices determined by the government were shown to be statistically related to relative economic conditions in the nonfarm sector of Pakistan. Relatively depressed nonfarm incomes, measured by the average product of labour in the nonfarm sector, resulted in lower procurement prices in the following year. Domestic wheat prices were also directly influenced by world wheat prices. Budgetary pressure may have contributed to the movement of procurement prices towards free-trade levels over the course of the period under investigation. The desire for self-sufficiency in wheat, as captured by the level of net wheat imports, did not appear to influence political decisions concerning procurement prices.

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